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Master Craftsman®

Educational & Development Program

LOW-SLOPE ROOFING

SIXTH EDITION

Master Craftsman® Low-Slope Roofing Contractor CREDENTIALED certainteed

A technical manual for professional roofing contractors

SAINT-GOBAIN

Welcome

Thank you for consulting and using this sixth edition of the CertainTeed Master Craftsman Low-Slope Roofing Applicator's Manual. This Manual is available in both paper and electronic format.

Available Credentials

By taking the online test associated with this Manual, individuals can earn a Master Craftsman credential in Modified Bitumen Roofing. Businesses may also earn credentials such as Low-Slope Roofing Master, Low-Slope Roofing Master PRO and Low-Slope Roofing Master PREMIER, in part, by maintaining staff with Master Craftsman-credentialed employees. For information on business credentials and the many benefits they offer, see more information in this Manual, call CertainTeed at 800-404-9880 or visit www.certainteed.com

Commercial Roofing Technical Services

CertainTeed has a team of seasoned low-slope professionals available for technical support Monday through Friday, 8:30 AM to 5:00 PM, Eastern Standard Time, complemented by localized support available during business hours in Central and Pacific Standard zones.
Phone: 800-396-8134 ext. 2
rpg@saint-gobain.com

CertainTeed's Website

Please visit www.certainteed.com for additional information. Always be sure to check this resource for the most current application instructions.

An Invitation to Readers

After you've had a chance to study the material in this Manual, we would appreciate hearing from you! Tell us what you think of the program and send us your ideas, suggestions, and tips so that we can keep improving this publication for roofing applicators. Send your input in an email to: cbi@saint-gobain.com. If we publish your "tip", we will give you $200 and credit for having supplied the tip.

About CertainTeed

CertainTeed is a leading manufacturer of commercial and residential roofing products and a division of Saint-Gobain, the world's largest manufacturer of building materials Saint-Gobain ranks among the world's top 100 industrial corporations, operating through a global network of businesses in 67 countries. A quality roof depends on two essential elements: excellent materials and superior workmanship. CertainTeed has been one of North America's leading roofing material manufacturers for more than 120 years.

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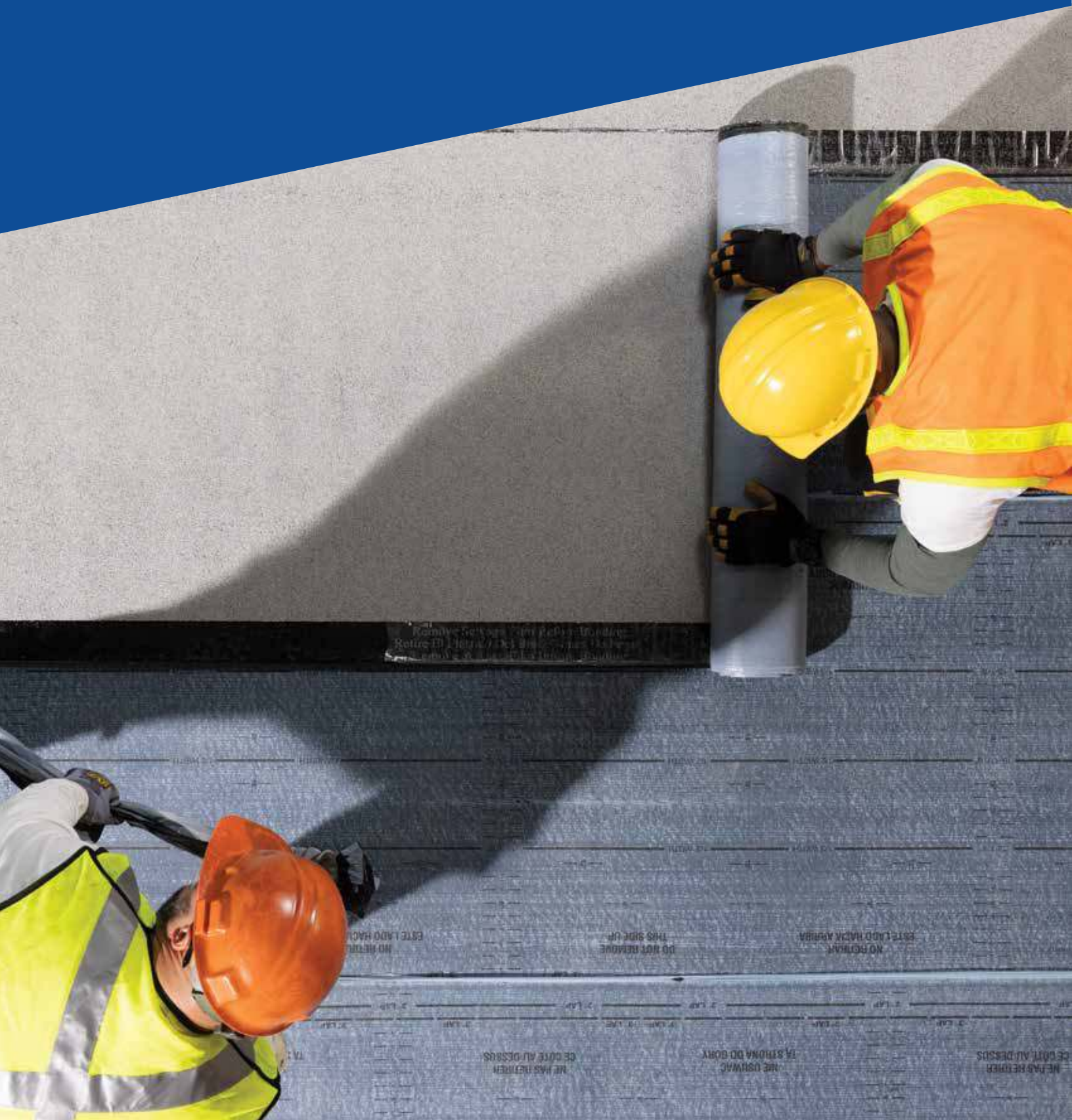
PART 1

Manual Overview



Introduction

Purpose of the Manual

The CertainTeed Master Craftsman Low-Slope Roofing Applicator's Manual, Sixth Edition ("the Manual") is a technical handbook for professional low-slope roofing contractors. It is published by CertainTeed LLC (CertainTeed) to provide application and product knowledge. By studying and learning the information in this Manual, you can become a more effective and low-slope roofing professional.

The Manual contains chapters that are based on fundamental principles of low-slope roofing systems along with specific CertainTeed product details and application instructions. Parts I & II aim to deliver important information on materials and systems to form a context for Part III which focuses on application of these materials. The Manual also includes a chapter on successful project completion with clear information on initiating the appropriate roofing warranties. Three appendices are also included for reference — one with a glossary of standard low-slope roofing definitions, a second with CertainTeed approved roofing detail drawings, and a third with CertainTeed limited warranty forms and samples.

Required vs. Recommended

It is important to recognize that the information contained in this Manual falls into several categories:

- **Required Procedures** must be followed. Otherwise, CertainTeed's warranty coverage may not be in force for the completed job. Required procedures are either specifically labeled as "required" in the text, or the procedure contains the word "must."
- **Recommended Procedures on Workmanship** can be valuable to an installer but do not affect CertainTeed warranties. They are considered recommended best practices specific to the roofing profession.

Available Commercial Roofing Company Credentials

CertainTeed reflects our sincere gratitude and value of our loyal contractor community through a commitment to excellent contractor support. In addition to the Master Craftsman credentials available to individuals by passing the test questions featured in this Manual, CertainTeed offers the following company credentials and benefits:

Credential Tier	Master	PRO	Premier
Requirements Distinguish your company with credentials that reflect professionalism, reliable workmanship, and strong system know-how for the unique demands of commercial roofing. Your credentials help convey quality, trust, and confidence to those who rely on your expertise.	Show your customers that your company is committed to quality installation practices and professionalism in commercial roofing.	Show customers your team is composed of trusted professionals with advanced training and proven system expertise.	The highest credential level a company can earn. Premier status signals your team delivers exceptional performance and stands among the most trusted in the industry.
Warranty Benefits Gain access to enhanced system warranty options that offer added protection and peace of mind for commercial projects. Higher-level warranties reflect your commitment to quality installation and dependable long-term performance.	✔	✔+	✔++
Marketing Benefits Access Rewards, Promotions and Perks designed to help your business stand out in the commercial space. These tools strengthen visibility, build credibility, and support growth with the audiences that matter most to your work.	✔	✔+	✔++
Education Benefits Build skills and confidence through training that deepens system knowledge and supports high-quality installation on commercial projects. Education is accessible in multiple formats to help your team continue to grow.	✔	✔+	✔++
Business Resources and Tools At CertainTeed, we believe your success is our success. Tap into business tools and support that help you deliver successful commercial projects, operate efficiently, and build strong customer relationships. Resources are designed to reinforce your credibility and support your continued success.	✔	✔+	✔++

Using this Manual to Achieve Modified Bitumen Master Craftsman Credential

CertainTeed offers this qualification for individual installers, separate from the business credentials: Low-Slope Roofing Master, Low-Slope Roofing Master PRO and Low-Slope Roofing Master PREMIER. Individual installers may seek out Master Craftsman credentials to demonstrate the acquisition of the technical knowledge required for proper application of hot-mopped, torch-welded, cold-applied, and self-adhered low-slope Flintlastic modified bitumen roofing systems, and to support their company's efforts to maintain business credential staffing requirements. A Master Craftsman credential can be obtained by accurately completing the complementary Master Craftsman Exam online.

Achieving a Master Craftsman designation represents:

- Your knowledge of CertainTeed built-up-roofing (non-modified) and modified bitumen systems.
- Your competency for proper, water-tight installation of CertainTeed low-slope products and systems.

There are multiple benefits to holding a Master Craftsman designation:

- Your professional capability, with the knowledge you gain, can make you a more valued and dependable worker. This can mean added job security.
- Added confidence and competence can result in more job satisfaction and responsibility, as well as more challenging work.
- Your status as a Master Craftsman is illustrative to a client or customer that you are committed to self-education and quality craftsmanship.
- Your company can be confident that the work you do will be performed in accordance with CertainTeed limited warranty requirements.
- If your company seeks to earn or maintain a Low-Slope Roofing credential, your status can be valuable in helping them achieve credentialed staffing requirements.

Study Hints

To become a Master Craftsman, CertainTeed recommends that you study this Manual in the following manner:

1. Read over the entire handbook once, without attempting to answer questions. This will give you "the big picture."
2. Next, read just one chapter. Underline or highlight the details that are new to you or that seem to be of special importance.
3. After you have studied the chapter, try to answer the questions at the end. If the answers are not obvious, re-read the chapter to find the correct answers and underline, highlight, or circle them.
4. Repeat hints two and three for all chapters.
5. When you are confident you know the answers, complete the Master Craftsman of Low-Slope Roofing test online. Once you have succesful passed the online exam, CertainTeed will contact you with your credential certificate.
6. At minimum, once ever two years, you all credentialed Master Craftsman will receive a notification with any substantive changes within this Manual. To maintain your Master Craftsman status, you must review and acknowledge these changes are understood.

READY TO GET YOUR CREDENTIALS? TAKE THE TEST HERE!
https://www.certainteed.com/modified-bitumen-roofing-master-craftsman-liquid-applied-roofing

Disclaimers

CertainTeed has obtained the material contained in this Manual from sources believed to be reliable. However, CertainTeed cannot guarantee that any referenced code, regulations, standards, or practices are current. Users should consult direct sources for the most up-to-date versions of this type of information. Further, it should not be assumed that all applicable information associated with low-slope roofing products or procedures are contained in this Manual; additional information, measures, or techniques may be required under certain circumstances or conditions.

CertainTeed recommends the use of this Manual by roofing professionals to become a more effective and more professional craftsperson with regard to CertainTeed product and application knowledge. This Manual is not intended to be relied upon as a sole source of information with respect to safety issues and or fundamental roofing products or applications. Users must take all necessary measures to establish sound safety practices and are urged to consult reference materials such as CertainTeed Safety Data Sheets (SDSs), federal Occupational Safety and Health Administration (OSHA) requirements, and applicable state or local ordinances. The user expressly assumes all risk of loss, harm, or injury resulting from the use or misuse of the information contained in this Manual. Additionally, the information presented in the Manual should be complemented with training and guidance by experienced, technically competent roofing professionals.

CertainTeed assumes no liability or responsibility in connection with the use or misuse of this Manual or information included therein, or in connection with any modifications to or adaptations of this Manual by a user, purchaser, or other party, and expressly disclaims any such liability or responsibility.

Chapter 1:
Workmanship Principles

The Installer's Responsibility for Workmanship

As a professional roofer, your employer, your clients, and CertainTeed® all depend on you to have the know-how to properly stage, install, clean up, and maintain a low-slope roof. CertainTeed recommends the use of this Manual by roofing professionals to become a more effective and more professional craftsperson with regard to CertainTeed product and application knowledge. This Manual is not intended to be relied upon as a sole source of information with respect to safety issues and or fundamental roofing products or application. The user expressly assumes all risk of loss, harm, or injury resulting from the use or misuse of the information contained in this Manual. Additionally, the information presented in the Manual should be complemented with training and guidance by experienced, technically competent roofing professionals.

As a professional installer of CertainTeed Roofing products, and particularly for a qualified Master Craftsman, there are some fundamental expectations regarding the way that the roofing work is carried out. These expectations center around minimum requirements for responsible, professional work and fall into four categories:

1. **Safety First** — Intentionally seeking to create a safe workspace and continuously protect worker safety
2. **Material Handling and Storage** — Properly handling and storing materials onsite from the moment of delivery through project completion
3. **Warranty Eligible Craftsmanship** — Paying attention to detail and executing the work in a first-class, professional, and skilled manner
4. **Seasonal Roofing** — Making appropriate adjustments to the installation process to accommodate seasonal weather conditions

Each of these areas of minimum expectation is discussed in more detail below.

1. Safety First

Your objective: To fully appreciate the importance of learning and practicing roofing safely.

You owe it to yourself and those who depend upon you to learn as much as possible about roofing safety equipment and its use, government safety regulations for roofers (especially those issued by OSHA), and trade association safety recommendations. And, while you are learning all about roofing safety, make sure you are putting it into practice immediately.

The Benefits of Working Safely

There are many benefits to knowing and implementing safe roofing practices:

- Insurance costs are high, especially workers' compensation. Many contractors have found that it is too expensive not to implement a safety program.
- It is difficult to find and qualify productive workers. The cost of losing an experienced worker (or another valuable asset) is very high.

- The Occupational Safety and Health Administration (OSHA) enforces a federally mandated safety program for all roofing contractors. An inspection that reveals that no safety program is in effect, ignorance of the regulations, or blatant disregard for the regulations, can cost a contractor an enormous amount of money (from hundreds to many thousands of dollars).
- None of us wants to see harm come to another.

Resistance to the use of safety equipment boils down to a lack of vision. Many installers simply DO NOT believe that any harm will ever come to them. And many fear that safety equipment interferes with work productivity. While you may never experience a serious roofing accident, you are always at risk for one. The cost that safe operations may add to a job outweighs this risk. Try to picture your loved ones ten years from now. Picture the circumstances they might be living under if you become a victim of an accident, an accident which probably could have been prevented if you practiced roofing safely. Seek out a roofer who has fallen, preferably someone who was using safety equipment at the time. Ask him or her what they thought about safety before and after the fall.

The concern about productivity loss should be addressed by talking to workers who have adopted and enforced safety programs. Most will say that initial productivity loss was overcome in a relatively short time by workers as they learned to use the devices. They were able to focus a greater portion of their attention on the work at hand rather than having to continuously split their attention between getting work done and avoiding a fall. Some workers will even tell you that productivity improved.

There are many safety devices, training materials, and experts available to assist, instruct, consult, evaluate, and even help you implement a safety program. Remember, it will always be in everyone's best interest if you decide to work under the safest conditions possible.

Basic Roof Safety Tips

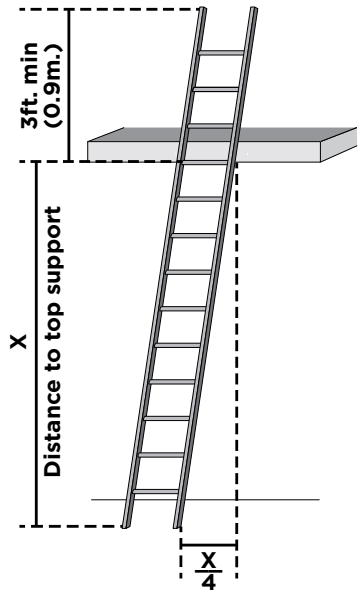
Under no circumstances should low-slope roofing applications be attempted by "do-it-yourselfers" or any persons other than professional, trained roofers. It is the roofing contractor's sole responsibility to be certain all crew members are appropriately trained in safe application practices and proper use of tools such as propane torches, hot asphalt materials, equipment, and cold adhesives, plus general roofing tools such as knives, hammers, drills, etc. In addition, following are some fundamental safety tips that apply to every roofing project:

- **TIE-OFF:** Wear a safety harness that is securely tied off to a fall-resistant device.
- **AVOID SLIPPERY ROOFS:** When the roof is slippery from rain, snow, frost, or dew, the best precaution is to wait until the roof surface is dry.
- **KEEP IT CLEAN:** Make sure someone keeps the roof clean by frequently sweeping up particulate matter.
- **SECURE OPENINGS AND PERIMETERS:** Secure all fall risks, such as roof openings (skylights) and open roof perimeters, with visual indicators or guardrails.
- **CONSTANTLY INSPECT THE ROOF AND IMMEDIATELY REMOVE ANY POSSIBLE TRIPPING HAZARDS:** Tools, electric cords, and other loose items can all pose hazards and should be removed from the roof.
- **LEARN THE FEDERAL, STATE, AND LOCAL WORKER-SAFETY REQUIREMENTS:** Learn what the government agencies require of you and the contractor for which you work. These requirements exist to protect you. If you are going to be a roofing professional, an important part of your job is to learn and follow these regulations.
- **USE YOUR COMMON SENSE:** Safety programs and regulations cannot foresee each of the roof conditions and layouts on which you must work. Adapt to protect yourself.

Ladder Safety Tips

Ladders are the most common tool of a professional roofer, and very often, they are one of the primary means of accessing a roof. They do pose some unique safety concerns, though, and you should never take it for granted that they are safe. Instead, always consider the following whenever ladders are used:

- **LADDER RATING:** Ladders are rated by how much weight they can safely bear, and you should consider the highest available rating of 1A or 300 pounds.
- **MATERIAL:** When it comes to safety, the best material for a ladder is fiberglass. Although wood is cheaper and aluminum is easier to handle, wood deteriorates when used outdoors, and aluminum is dangerous when used around electric circuits. Some businesses and industrial plants will not allow you to use aluminum ladders, while some insist on the use of fiberglass ladders only.
- **POWER LINES:** Even ladders made of wood or fiberglass should not be used in the vicinity of power lines or other electrical hazards.
- **POSITIONING:** Ladders should extend above the roof edge by 3 to 3-1⁄2 feet and sit on a firm level base. Leveling can be attained by digging or by the use of adjustable leg levelers. Firmness can be attained by the use of a 2-foot square piece of 3⁄4" plywood under each leg.



Ladder Positioning

- **LADDER ANGLE:** To be at a proper angle, the distance of the foot of the ladder from the wall supporting it should be one- quarter of the height of the wall (1 foot for every 4 feet of vertical rise).
- **TIE-OFF:** A ladder in place for use over an extended period should be tied off at the bottom rung to a stake driven into the ground and near the top to an eye bolt screwed into the fascia.
- **OVER-REACHING:** Don't over-reach to either side while on a ladder. A good rule is to make sure to keep your belt buckle between the rails.
- **NOT A PLANK:** DO NOT use the ladder, or even a section of a ladder, as a plank or to provide stiffness to a wooden plank. Besides the danger of failure, the stresses set up during this usage loosen the ladder's connecting points.
- **STEP LADDERS:** Step ladders are intended for use fully opened, not closed, and leaning against a wall. The highest step on which you can stand is 2 feet below the top.
- **INSPECTION:** A ladder should be inspected every time it is set up for use. Check the ladder from bottom to top for any visible defects or wear, and make sure it is correctly and securely anchored and properly positioned.

Wet Weather Safety Precautions

Three common wet weather conditions must concern a roofing installer: dew, frost, and rain. All pose safety and liability problems.

In the case of dew and frost, early mornings present increased risks for workers walking on a roof. Roofing materials can be slippery without appearing so to the untrained eye. Never take safety shortcuts in this situation.

Rain presents direct risks to workers since the surface of roofing materials can become too slippery to walk on safely when they are wet. DO NOT attempt to continue a roofing application if rain, ice, frost, moisture, or snow is present on the roofing materials. It is not considered safe.

Torch Safety Tips

The use of propane torches requires thorough knowledge and skill in all aspects of safety with respect to their use and handling. CertainTeed recommends that professional applicators receive the CERTA torch safety training as offered by the MRCA or NRCA and safety training available through local roofing associations, ARMA, NFPA, local fire departments, and OSHA, among others. **All supervisors and crew members on the jobsite shall have fire safety training.**

Job Watch

When using the torch application method, it is important to remember that, if heat enters a crevice, it may cause concealed smoldering. A supervisor trained in fire safety should remain on the jobsite a minimum of four hours after cessation of torching to check for any signs of smoke, smoldering, or fire.

The safety check should utilize infra-red thermometers and include a thorough interior check of the attic, crawl spaces, and return air ducts in addition to the roof area where torches have been utilized. Prior to leaving the jobsite, the contractor must be certain that all chance of fire, including smoldering fire, has been eliminated.

Additional application details and recommendations can be found in the CertainTeed *Commercial Roof Systems Specifications* manual.

Personal Protection

- Proper clothing, including work boots, long pants, long-sleeved shirts, and gloves, must be worn. It is the contractor's responsibility to require employees to wear proper attire.
- Workers, other than the torch operator, should be no closer than three feet to the torch flame.
- It is the contractor's responsibility to observe all fire prevention policies and practices during the installation of the roof system.
- It is the contractor's responsibility to train, instruct, and warn employees on the use and handling of propane torching equipment.
- LP gas (LPG) is heavier than air. DO NOT work in an enclosed area where gas can accumulate.

Fire Department Regulations

- Written notice should be given to the local fire department, and any necessary permits must be acquired.
- The required number of fire extinguishers shall be on the roof at all times.
- No flammable liquids shall be stored on the roof (excluding LPG in approved containers). Any LPG not in use shall be stored on the ground.

General Torch Safety

Prior to commencing any roof membrane torch-welding, carry out the following:

Equipment Check

- Check that all torching equipment is in good working order.
- Check that cylinder valves are clean.
- Use an adjustable pilot with a complete shut-off valve.
- DO NOT use any equipment without an operating pressure gauge.
- DO NOT operate any pressure gauge beyond the top of its scale, near excessive heat (above 150°F), or where there is excessive vibration.
- Secure propane tanks on the roof.
- Increase the size of the propane tank, if necessary, to prevent frost from occurring. Never heat the tank with a torch or any other device, and never put the torch flame anywhere near the tank.
- DO NOT tighten brass fittings too tightly with a wrench.
- Never fill a propane cylinder that needs repair. Use only the hose intended for use with LP gas.
- DO NOT use a hose longer than 50′.
- Use an adjustable, UL-approved regulator with the torch.
- Use a soap solution to check for gas leaks before lighting the torch. Then check for proper operation of the torch. **Never check for leaks using a lighter or matches.**
- Check hoses frequently for wear and tear or signs of burned/charred areas.
- Be aware of the difference between liquid and vapor gas bottles and dispensing equipment.
- Protect all equipment from damage – store in a toolbox.

Material Check

- Use non-combustible cant strips such as perlite or fiberglass and cover them with an appropriate CertainTeed base sheet.
- Use the appropriate CertainTeed base sheet over all nailable deck types, insulations, and any flammable surface. The base sheet must fit tightly around all deck openings and turn up parapet walls so that torch flame cannot flash down into and start a fire underneath the deck.
- Use non-combustible insulation and cover it with the appropriate CertainTeed base sheet.
- Prior to torching, install metal flashings to penetrations, or protect flashings with a tight-fitting collar.

Building/HVAC Check

- Check that all air conditioning units, exhaust fans, and air intake fans in the work area are shut off at the roof control.
- Examine the roof substrate for any voids, holes, or gaps and fill it with non-combustible or perlite cant strip.

While torch-welding:

Active Operation

- Keep an ABC or halon fire extinguisher on the roof, readily accessible to each worker using a torch at all times. Ensure the extinguisher is readily accessible but not so close to the torch or propane equipment that it cannot be safely accessed in the event of a fire.
- Use a flint or electronic igniter to light the torch. Matches or disposable lighters are unsafe and not acceptable.
- Propane tanks must be secured in an upright position and placed a minimum of 10′ from the torch flame at all times.
- Never turn a propane tank on its side to increase pressure. Liquid could escape.
- Protect cylinder valves, and where possible, use cylinders that have valve protection welded to the cylinder. **Never lift a cylinder by the valve. Valves are made of soft brass and are easily broken.**
- Keep vent in the pressure regulator unobstructed at all times.
- Make sure the flow of gas through the regulator is in the proper direction. Directional flow is indicated on the regulator.
- If a leak occurs, stop work immediately and repair all relevant parts. DO NOT use any torch equipment that is leaking gas at any fitting.
- Stop torching immediately if any propane odor is detected.
- DO NOT allow torch flame to come into contact with hoses. Keep hoses free of kinks and DO NOT allow heavy equipment to roll over them.
- Treat the torch as if it is always burning. In sunlight, it can be difficult to see the flame, and when working near mechanical equipment, you cannot always hear the torch.
- Use a small detail torch when applying flashing details.
- Use extreme caution when working with torches in areas where you cannot see. Heat the membrane away from the area and then apply it to the flashing. DO NOT torch directly into any crevice or unsafe area where flame could be sucked in.
- Shield air conditioning units and other protrusions with perlite or similar panels when using the torch around them. Heat roofing membrane away from air conditioning units, fans, soil pipes, and all other protrusions, and set in place while still hot. Use extreme caution to prevent the flame from being pulled into the building's interior.
- Use caution when torching near pipes in the event there is suction present.
- DO NOT torch directly to wood fiber cant strips or wood fiber insulations.
- DO NOT torch directly to any cant strip, insulation, wood, or any other flammable surface.
- Never torch near gas lines or electrical wires.
- Never torch around flammable vents.
- DO NOT point the torch under rooftop equipment.
- DO NOT direct the torch down open roof penetrations, or near openings around roof penetrations.
- Never point the torch at low flashings where an overhang exists and flame could get up under the counterflashing (such as around skylights or prefabricated curbs with fiberboard sidewall insulation).

Inactive Operation

- When shutting off the torch, close the propane cylinder valve first and let the remaining gas burn out of the hose before closing the torch valve.
- Use a torch stand to direct the torch flame upward when the torch is briefly set down. Shut off the torch completely when not in use.
- Never lay a torch to rest on a gas cylinder, on a trowel, or over the edge of the roof. Never leave a torch unattended.

In Case of a Fire

- DO NOT attempt to put out a cylinder fire if it cannot be done without tipping the tank. Call the fire department.
- When using a dry chemical fire extinguisher, direct the chemical stream at the base of the fire from a safe distance of about 10′ to 15′. Sweep the fire away from you, starting at its nearest point and moving the chemical stream toward the furthest point.
- DO NOT use a soda acid fire extinguisher, as it will spread the flame.

Hot Asphalt

Asphalt Precautions: Materials, Tools & Equipment

IMPORTANT: Follow all fire and safety precautions from the Asphalt Roofing Manufacturers Association (ARMA), the National Roofing Contractors Association (NRCA), OSHA, and CertainTeed, including the following:

- Store asphalt carefully to prevent leakage, moisture contamination, and wear and tear of the carton.
- Asphalt is combustible. Keep away from heat, flame, or any other ignition source.
- Empty cartons are toxic and should be disposed of following local, state, and federal regulations.
- The kettle should be placed on plywood or a tarp for easier clean-up.
- The kettle operator must be fully trained and use the required safety equipment and clothing for their protection.
- Asphalt should be broken down into smaller pieces before added to the kettle for melting. (Find the appropriate temperature for asphalt in use on the carton, bill of lading, or order.)
- Keep kettle temperature at 500°F (260°C) Fahrenheit (the maximum heating temperature of ASTM D312). See Equiviscous temperature (EVT) section below.
- Use appropriately sized kettles to keep asphalt from overheating. Overheating could cause a fire or flash point.
- Stir asphalt while heating. Never leave a hot kettle unattended.
- Keep kettle lids closed whenever possible.
- Monitor asphalt temperature periodically (at both the kettle and where mopped) during application.
- Never let asphalt stand in mop carts or luggers for long periods. Also, DO NOT keep asphalt at high temperatures for long periods of time. Asphalt should never be kept above 500°F for more than four hours.
- When necessary, insulate hot asphalt transport lines to maintain an acceptable temperature for the climate and season.
- Excessive, prolonged heating of asphalt may damage it. In addition to fire risk, problems caused by overheating include:
  - Asphalt becomes brittle and hard and may not seal.
  - Other aspects/composition of the asphalt may be altered.
  - Asphalt becomes harder to apply because it is too viscous and may slide across the surface, resulting in uneven bonding and the potential for blisters, bumps, and ridges once dry.

- When mopping, try to keep bucket as close to installation as possible to keep temperature steady and provide less chance of melted asphalt spill and damage to surroundings.
- Avoid drippage on the exterior and interior of a building.
- If foaming is seen when applying asphalt to any substrate, STOP immediately and correct temperature.

Ashalt Precautions: Building Safety

- Keep worksite clean from asphalt spills and other debris.
- Never apply hot asphalt on exposed pipes on the roof.
- See this chapter for approved base sheets hot-mopping application. Only use approved base sheets.

Ashalt Precautions: Job Watch

- When using the hot-mopped application method, it is important to monitor the EVT often to make sure that the melted asphalt doesn't reach a flash point and ignite.
- Before leaving the jobsite, the contractor must be certain that all chance of fire has been eliminated.
- Additionally, hot asphalt application comes with risk of contamination and or burning if workers come into contact with it. Maintain watch of workers and jobsite for quick action if this occurs. (Follow OSHA or your worksite safety guidelines.)

Cold Adhesive Safety Tips

- Do not use modified bitumen adhesives in areas without proper ventilation

OSHA® Occupational Safety and Health Administration

OSHA Regulations

OSHA operates as part of the U.S. Department of Labor. They point out, "Falls are the leading cause of death in the construction industry, accounting for over 3,500 fatalities between 2003 and 2013. Falls from roofs accounted for early 1,200, or 34%, of the fall deaths during that period. Roofers encounter many hazards on the job, including hazards associated with working at heights and from ladders, power tools, electricity, noise, hazardous substances, and extreme temperatures. Unless these hazards are controlled by the employer, roofers risk serious injury, illness and death."

Recognizing these hazards and the need for worker protection, OSHA mandates that "to protect workers on roofing jobs, employers must identify the hazards present and take steps to address them." As a means of information and education, OSHA provides numerous publications and resources related to safe practices to help prevent falls, other physical injuries, hazardous substance exposures, and injuries and illnesses related to environmental conditions.

More information can be found at https://www.osha.gov/sites/default/files/publications/OSHA3755.pdf

Safety Data Sheets (SDS)

Roll roofing products are all considered to be non-hazardous "articles" when used according to their label directions and for their intended purpose, and are exempt under the provisions of OSHA's Hazard Communication Standard (29CFR1910.1200). Safety Data Sheets (SDS's) for all CertainTeed roofing products may be found on the website: www.certainteed.com. You may also contact CertainTeed Commercial Technical Services at 800-396-8134 ext. 2 for questions related to SDS's.

2. Material Handling & Storage

Your objective: To acknowledge the responsibility and proper ways to protect materials until they are fully and properly installed.

CertainTeed works very hard to assure that all of the materials we manufacture are of the best quality and packaged in the most appropriate manner to arrive at the jobsite without damage. Once delivered, it is the responsibility of the roofing contractor or installer to continue to protect the materials from undue exposure or conditions that could compromise the integrity of the final roofing installation.

Handling and Storage Recommendations

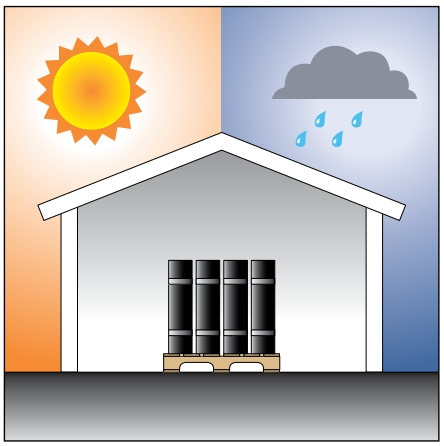
First, CertainTeed and other product manufacturers' safety guidelines for storage, handling, and usage should be consulted and followed. Second, all materials should be carefully inspected at the time of delivery and examined during unloading. Product labels should be intact. Material that has been exposed to weather in transit or storage should be examined carefully for deterioration and damage. Any damaged or unsuitable material should be rejected. Note that some materials are flammable and may contain hazardous materials.

During storage and handling, all roof system materials should be protected from the weather. Moisture-sensitive materials should be covered with water-resistant coverings that are "breathable," such as water-resistant tarpaulins.

Roll Goods

Prior to application, CertainTeed roll goods should be covered or stored in a dry, ventilated location. Keep rolls protected from heat, sun, cold, and moisture. The storage substrate should be swept to rid the surface of loose gravel, sharp objects, and other debris that could damage the membrane material. Stored material should be raised up off the roof surface a minimum of 4" and out of any standing water, and palletized rolls should never be double-stacked. They must be stored on end, selvage edge up, to prevent crushing or flattening of the rolls. Wet or damaged roll roofing materials shall not be used.

When applying roll goods in cold weather conditions, rolls should be stored in a conditioned, warming space (60°F or higher) prior to use. See Seasonal Roofing for further details.



Roof Insulation and Cover Boards

While multiple materials and products can be used as roof insulation and cover board, this Manual addresses polyisocyanurate (CertainTeed FlintBoard® ISO) products. In addition to FlintBoard ISO HD, multiple cover board materials are approved for use with FlintBoard insulation. They are included in this Manual as well.

CertainTeed FlintBoard ISO products are shipped to the jobsite protected by a plastic shrink wrap and then a plastic bag. This double layer of protection allows shipment of our ISO products for up to 750 hundred miles without requiring tarps. To minimize jobsite storage, we recommend that delivery of CertainTeed ISO products be carefully coordinated with the roof construction schedule.

Prior to application, FlintBoard products should be covered or stored in a dry, ventilated location. Keep insulation protected from heat, sun, cold, and moisture. The storage substrate should be swept to rid the surface of loose gravel, sharp

objects, and other debris that could damage the ISO. Stored material should be raised up off the roof surface a minimum of 4" and out of any standing water. We DO NOT recommend storing pallets of FlintBoard on grass or dirt areas.

The amount of time that products will be stored needs to be considered as follows:

- **Less than two weeks** — The CertainTeed packaging is adequate for outside storage with no tarps required, providing the product arrives in its original and intact packaging.
- **Two weeks to 90 days** — For any storage beyond two weeks, the sides of the packaging need to be slit on four sides to allow the product to breathe and then completely covered with a breathable tarpaulin.
- **Excess of 90 days** — additional precautions or alternative storage locations may be needed.

NOTE: *We understand that many specifications are written requiring immediate tarping of the insulation at the jobsite. It is not our position to contradict any specification detailing jobsite storage of FlintBoard products, but rather to provide a recommendation when no direction is provided.*

Exercise care during handling to prevent breaking, edge damage, or crushing of FlintBoard products. Techniques such as pushing pallets off the truck, rolling pallets across the roof surface, and dislodging support feet, must be avoided.

FlintBoard insulation that has become wet, damaged, cupped, or bowed must be replaced with solid, dry products. Apply only as much FlintBoard as can be covered by the finished roofing material that same day.

Cover Boards

The following cover board materials are approved for use within CertainTeed low-slope roof systems:

- FlintBoard ISO HD
- Fiber-reinforced gypsum
- Perlite
- Wood fiberboard
- Asphalt core board

Follow the cover board manufacturer's published instructions for material handling and storage.

Liquid-Applied Coatings

Liquids require particular attention for storage and handling to address temperature concerns and avoid the potential for leakage.

- Lids should be secured on cans or buckets.
- Any water-based materials should be protected from freezing, never stored at temperatures above 100°F, and, in colder weather, stored at temperatures between 65°F-80°F at least 24 hours prior to application.
- Deliver materials to project site in original, factory-sealed, unopened containers bearing CertainTeed's name, label intact, and legible with the following information.
  - Name of material
  - Lot number and date of manufacture
- Store materials in protected and well-ventilated areas, away from direct sunlight.
- Handle materials carefully to avoid damage.
- Once loaded on roof, it is recommended to store pails upside down to allow any solids that may have settled during transport to migrate, reducing mix time before coating.

CertainTeed Roofing Products Pallet Stacking Guide			
Product	**Single Stack**	**Double Stack**	**Triple Stack[1]**
FlintBoard			X
Millennium One-Step Adhesive/ Millennium PG-1: 5G Pails	X		
Millennium PG-1: 15G, 55G	X		
Flintlastic Membranes		X	
Flintglas Membranes		X	
FlintPrime QD			X
FlintBond Caulk		X	
FlintBond Trowel			X
SmartFlash ONE[2]		X	
SMARTCOAT 5G Pails		X	
SMARTCOAT 55G Drums, 275G Totes			

[1] Cannot triple stack in straight column; third pallet must be offset and bridge two double-stacked pallet columns.

[2] Requires Slip Sheet

3. Warranty Eligibility & Protocol

Your objective: To understand CertainTeed warranty options and how your work performance affects roofing warranties, your employer, CertainTeed, and you.

Warranty Options

A Warranty is an expressed promise of quality between a manufacturer or installer and an end user stands behind our products with best-in-class warranty coverage for either materials defects-only or, for credentialed contractors, defects in materials and/or workmanship. We recognize the value of loyal, competent installers, and we are dedicated to supporting and investing in the development of those partnerships.

CertainTeed offers warranty durations between ten and twenty-five years, depending on contractor company credential level.

Sample Limited Warranty forms and samples can be found in the Appendix. Note that forms may be updated from time to time; the most current forms can be found on https://www.certainteed.com/commercial-roofing/commercial-roofing-warranties/

Roll Goods Product & System Warranties			
	Limited Warranty on Materials	**Integrity Roof System Limited Warranty**	**Integrity Roof System NDL Limited Warranty**
Contractor Requirements	—	—	Silver or True Blue Credential
Coverage	Warranty covers manufacturing defects in CertainTeed products only, regardless of roof system specification or application method	Warranty covers leaks caused by manufacturing defects in CertainTeed products only for products included in a published CertainTeed roof system specification	Warranty covers leaks caused by manufacturing defects in CertainTeed products and or approved partner brands and/or workmanship
Obtain	https://warranties.certainteed.com/	https://warranties.certainteed.com/	Application submitted through www.ndl.certainteed.com

Asphaltic Membrane Complementary and Accessory Stand-Alone Warranties			
	Enhanced Wind Warranty Endorsement	**FlintBoard Limited Warranty**	**SmartFlash ONE Limited Warranty**
Contractor Requirements	Low-Slope Roofing Master, Low-Slope Roofing Master PRO and Low-Slope Roofing Master PREMIER	—	—
Coverage	Warranty covers roof system detachment in accordance to primary CertainTeed Warranty	Warranty covers thermal insulation R-value in FlintBoard products	Warranty covers leaks caused by manufacturer defects in CertainTeed products only
Obtain	Application submitted through Technical Services	https://warranties.certainteed.com/	

Warranty Fees

Warranty fees only apply to NDL Limited Warranties. They must be paid in order for the requested Limited Warranty to be issued. The fees listed below are current as of the date of printing of this Manual, but are subject to change at any time. Verify all fees with CertainTeed before submitting the warranty application and fees.

Built-Up Roofing (Non-Modified) Specifications		Modified Bitumen Roofing Specifications	
Warranty Duration	**Warranty Fee***	**Warranty Duration**	**Warranty Fee***
10 Years	$6.00 per square ($600 minimum)	10 and 12 Years	$4.00 per square ($400 minimum)
15 Years	$10.00 per square ($1000 minimum)	15 Years	$7.50 per square ($750 minimum)
20 Years	$15.00 per square ($1500 minimum)	20 Years	$12.50 per square ($1250 minimum)
		25 years**	$15.00 per square ($1500 minimum)
—	—	30 Years†	$18.00 per square ($1500 minimum)

*Subject to change at any time.

**Subject to additional requirements. Contact Tech Services at 1-800-396-8134 x2. NDL Warranties are fully transferable and subject to a $500* warranty transfer fee and inspection.

†Available only to Low Slope Master PREMIER contractors for approved specification-driven projects and eligible system configurations. Subject to CertainTeed Warranty Services approval and additional requirements. No warranty fee allowance or rebate benefits apply. Check with your local territory manager for more information.

Wind Warranty Fee Schedule

Wind endorsement fee schedule for NDL Warranties, minimum 100 sq.

If Professional Engineering Stamp is required, an additional $1,000 fee applies. Contact CertainTeed Commercial Technical Services at 800-396-8134, ext. 2 for more information.

55-80 mph	$1.00 per square
81-90 mph	$2.00 per square
91-100 mph	$4.00 per square
101-110 mph	$8.00 per square
111-120 mph	$10.00 per square
121-135 mph	$15.00 per square

Warranty Applications

CertainTeed requires an Integrity Roof System NDL Limited Warranty application be submitted at least 5 business days prior to the start of any roofing project.

Once a warranty application is received and reviewed, upon approval the contractor will be notified and any associated warranty fee may be submitted. Additionally, the contractor and inspector may schedule the pre-job inspection.

Roof Inspections

Inspections of NDL warranted low-slope roofing work may be carried out by a representative of CertainTeed or by a third-party inspector designated or approved by CertainTeed. These are meant to be in addition to routine inspections of work by the supervisors or quality control specialists who work directly for the roofing contractor or the building owner. Inspections are critical for assuring the integrity of the installed roofing membrane and for warranty qualification. Since CertainTeed inspections are conducted intermittently during the project installation — for our records only, and not distributed outside of the company — CertainTeed recommends that the installing contractor, building owner, or Authority Having Jurisdiction (AHJ) obtain the services of their own inspectors to ensure proper quality control/assurance. The roofing contractor is solely responsible for the quality of the application of the roof system.

Pre-job Inspection: Prior to job start, a pre-job inspection may be conducted to review CertainTeed requirements such as, but not limited to, NDL application information, system installation, material inventory, flashing details, non-standard field conditions, roof deck conditions, etc. Any project concerns should be discussed during the pre-job inspection.

In-progress Inspections: When a roof membrane is being installed, multiple steps take place, with each step typically covering over and concealing the work of the prior one. Therefore, it is important that inspections not be left to the end, but rather, that they are carried out at each step in the process. The number and schedule of in-progress inspections is dependent upon job size, complexity and installation plan.

Final Inspection: Please refer to Chapter 15, Project Closeout, for details associated with the final inspection and warranty issuance.

Common Workmanship Defects That Impact Warranty Coverage

Some of the most common applicator mistakes, which can place at risk the protection offered by a CertainTeed warranty, are as follows:

- **Under-torching**
  A torch-applied roof membrane can fail to prevent water incursion if the membrane is not exposed to enough heat uniformly across the membrane. See Chapter 10 of this Manual.
- **Over-extending hot asphalt leads**
  When applying a hot asphalt roof system, hot asphalt leads should be mopped no further than six feet beyond the roll; in colder temperatures, leads should be managed more conservatively.
- **Leaving blue film surfacing on self-adhered base and interply sheets exposed for extended periods of time**
  From time to time during a roof installation, a contractor will install an SA base or interply sheet and leave it exposed to the elements for 24 hours or longer. CertainTeed requires that these sheets be covered with their respective Flintlastic® SA cap sheet in the same day. Prolonged exposure to UV rays and or rain will lead to degradation of the top surfacing blue film and cause adhesion problems.
- **Improper detailing**
  Contractors may fail to follow published applicator instructions for construction details such as end laps, penetrations, and flashing. See Chapters 14 and 15 plus the standard details provided in Appendix 2.
  - Failure to properly cut and affix membranes at end lap corners to avoid water incursion.
  - Failure to include flashing collars in two-ply edge details and pipe penetrations.
  - For self-adhered roof systems: failure to address granule-surfaced end laps and details with either FlintBond® SBS-Modified Adhesive or use of a hot-air welder.
  - For torch-applied roof systems: failure to address granule-surfaced end laps and details by heating/sinking granules on the overlapped roll.
- **Failure to stagger end laps**
  Application of base, ply, or cap sheets such that end laps are horizontally aligned. See Chapters 9-13.
- **Improper mechanical fastening**
  Failure to install at least the CertainTeed minimum fastening pattern for roof insulation or anchor sheets. See Chapters 9-13.
- **Intermixing non-compatible materials**
  - CertainTeed does not recommend, nor will we warrant, low-slope roof systems with base, ply, or cap sheets manufactured by other roofing manufacturers; these product combinations have never been performance tested and, therefore, cannot be supported.
  - FlintBond SBS-Modified Adhesive cannot be utilized on APP-modified bitumen roofing products, except where where repairs are being made or, Flintbond is being used with metal roofing accessories that require its use per our published details.

- **Failure to follow local building code requirements**
- **Using unapproved application methods**
  Roofing material installation instructions can change. Unfortunately, many installers DO NOT look for such changes. Also, some installers assume that application instructions are the same from manufacturer to manufacturer. This assumption can create significant problems because the instructions may not be the same. Applicators are responsible to know and use the correct procedures for each product that they apply.
- **Ignoring "DO NOT MIX" labels**
  Color or performance variations that result from mixing membranes from pallets marked with "DO NOT MIX" labels or imprints, and pallets without the labels are entirely the contractor's and supplier's responsibility. Accordingly, complaints arising from the mixed installation of such products will also be the contractor's and supplier's responsibility.
- **Failure to cut out "splices"**
  Splices occur in the roll goods manufacturing process when switching over to a new fiberglass or polyester reinforcement mat roll. CertainTeed does not cut out the reinforcement splices in Flintlastic or FlintGlas® cap sheets to form a two-piece roll. When a splice occurs, all splice rolls are labeled with instructions on how to remove the splices before applying the roofing membrane. All rolls that contain a splice are manufactured with extra material to ensure they are receiving the published quantities of that particular sheet.

4. Seasonal Roofing Adjustments

Your objective: To learn safe and effective application techniques for low-slope roofing application during all weather conditions and seasons of the year.

Wet Weather Work

When membrane roofing materials are applied, entrapment of moisture should be prevented. Keep in mind that dew, frost, rain, and snow are all forms of moisture that can turn dry materials into wet, compromised materials. Wet roll roofing materials shall not be used. Moisture in or on materials may cause membrane blistering.

If precipitation occurs before completely installing the roof membrane, the membrane surface in the immediate work area and the substrate should be dried or allowed to dry before work resumes. If installed products are damaged after exposure to water, tear out damaged sections and properly replace them with new material. Rain presents risks to the building itself. Many professional roofers will only tear off roofing materials that can be replaced with new ones during the same day. Under no circumstances should wood roof decks be exposed to rain without putting appropriate temporary waterproofing in place.

Rain is often accompanied by wind, so it is very important that temporary roofing used in the process of re-roofing be adequately wind uplift-resistant. Membrane roof systems should only be installed over clean, dry surfaces. CertainTeed requires that our roof systems not be installed if precipitation of any kind is occurring or is imminent. DO NOT attempt application if ice, frost, moisture, rain, or snow is present.

Cold Weather Work

During cold weather, when ambient temperatures are below 49°F, the following guidelines should be observed when installing CertainTeed roof systems:

- **DO NOT** attempt application if ice, snow, moisture, or dew are present; roof conditions shall be dry.
- Store materials in a heated location, minimum of 60°F, and draw materials as needed. If the materials have been exposed to cold temperatures, allow a sufficient period of time in a heated environment for them to warm to 60°F. Roll materials contract in cold temperatures and expand in hot temperatures. Rolls that are installed cold (below 50°F) will expand while attached to the roof and can cause the membrane to buckle, "tent", or "mole run." When possible, rolls should be cut to manageable lengths and allowed to relax in a heated (60°F) location before being transported to the roof and installed.
- If the material isn't bonding, **STOP** the application immediately!

Self-Adhered Application Precautions

- During application there are several scenarios where the membrane being installed will overlap a granulated surface, such as a cap sheet end lap and flashings. When ambient temperatures are 50°F and warming, FlintBond SBS-Modified Adhesive may be utilized. This adhesive is not recommended for use when ambient temperatures are below 50°F. FlintBond may be used in conjunction with cold process material warmers, or in place of FlintBond, a hot air welder – in combination with a hand-held silicone roller – can be utilized to heat and seal these laps.
- When applying self-adhered membranes in ambient temperatures below 50°F, follow cold weather instructions as noted in Chapter 9. For applications in lower temperature lower, our Arctic Edge™ auxiliary tape can be utilized engineered to significantly boost Flintlastic SA adhesion in temperatures as low as 35°F.

Liquid-Applied Coating Precautions

- Do not apply liquid-applied coatings if the dew point and temp are less than 5 degrees from each other.

Guidelines for use of a hot air welder and hand-held silicone roller with Flintlastic SA:

Detail	Welder Setting	Welder Temperature
Side Lap (Self-Adhered Cap Only)	2-3	300°F - 500°F
End Lap/Granule Surface Lap	8-10	900°F - 1,100°F

Hot Asphalt Application Precautions

- Always use insulated mop carts and luggers.
- Never heat asphalt above maximum temperature to compensate for rapid cooling when moving bucket across the roof for spreading.

Cold-Applied Application Precautions

- DO NOT apply adhesive when the outside temperate is below 45°F (7.2°C). For best results outside temperature should be should be 65° F (18.3°C) without the threat of rain for 48 hours.

Liquid-Applied Coating

- Acrylic and/or water-based products must be kept from freezing; ideally these products should not be subjected to ambient temperatures below 40°F, either during application or during cure.

Summer Weather Work

In the case of extreme heat, the human body can quickly become dehydrated. Working in a state of dehydration can be akin to working under the influence. Brain function may slow, and decisions and judgment can be handicapped. Severe dehydration can cause fainting and falls. This can be especially dangerous while on a roof. Make sure to regularly drink plenty of water while working under high heat conditions.

Sunlight reflects off of low-slope roof surfaces, especially white or highly reflective membranes. Intense sunlight can temporarily impair clear vision, which increases the risk of trips, falls, and other rooftop accidents. The UV radiation associated with direct sunlight can also cause skin burns. Always wear protective eyewear and clothing to prevent bodily harm associated with exposure to the sun.

Use caution when walking on freshly installed material to avoid “tracking” warm asphalt. This applies to all membranes. Additionally, when torch applying smooth APP membranes in very warm weather, you may want to utilize a roll puller and work from the front side of the roll (as is the standard torch method for SBS membranes) to avoid tracking.

Chapter 1 – Self-Test for Workmanship Principles

Questions

Test online https://certainteed.com/low-slope-test

1. It is okay to apply a roof even if rain, ice, frost, moisture or snow is present.
   - ☐ a. True
   - ☐ b. False

2. Ladders should extend above the roof edge by _____ and sit on a firm base.
   - ☐ a. 1 – 1-1/2′
   - ☐ b. 2 – 2-1/2′
   - ☐ c. 3 – 3-1/2′
   - ☐ d. 4 – 4-1/2′

3. What is the maximum safe length of a propane torch hose?
   - ☐ a. 10′
   - ☐ b. 30′
   - ☐ c. 50′
   - ☐ d. 60′

4. How often should you inspect a ladder?
   - ☐ a. Once a week
   - ☐ b. Once a month
   - ☐ c. Once a year
   - ☐ d. Every time it is used

5. When storing roll goods or roof insulation on a jobsite, what is the minimum ground clearance that must be maintained?
   - ☐ a. None, storing directly on ground or grass is allowed
   - ☐ b. 3″
   - ☐ c. 4″
   - ☐ d. 5″

6. Which of these options is a common application fault?
   - ☐ a. Under torching
   - ☐ b. Improper detailing
   - ☐ c. Failure to follow local building code requirements
   - ☐ d. All of the above

7. If using a propane torch, the following people should be trained in fire safety
   - ☐ a. Jobsite supervisor
   - ☐ b. 1-2 crew members
   - ☐ c. Project manager
   - ☐ d. All supervisors and crew members

8. What is the minimum distance required to maintain between a propane tank and torch flame?
   - ☐ a. 5′
   - ☐ b. 10′
   - ☐ c. 12′
   - ☐ d. 15′

9. How long should a supervisor remain on the roof after torching to check for signs of smoke or fire?
   - ☐ a. 4 hours
   - ☐ b. 6 hours
   - ☐ c. 2 hours
   - ☐ d. 8 hours

PART 2

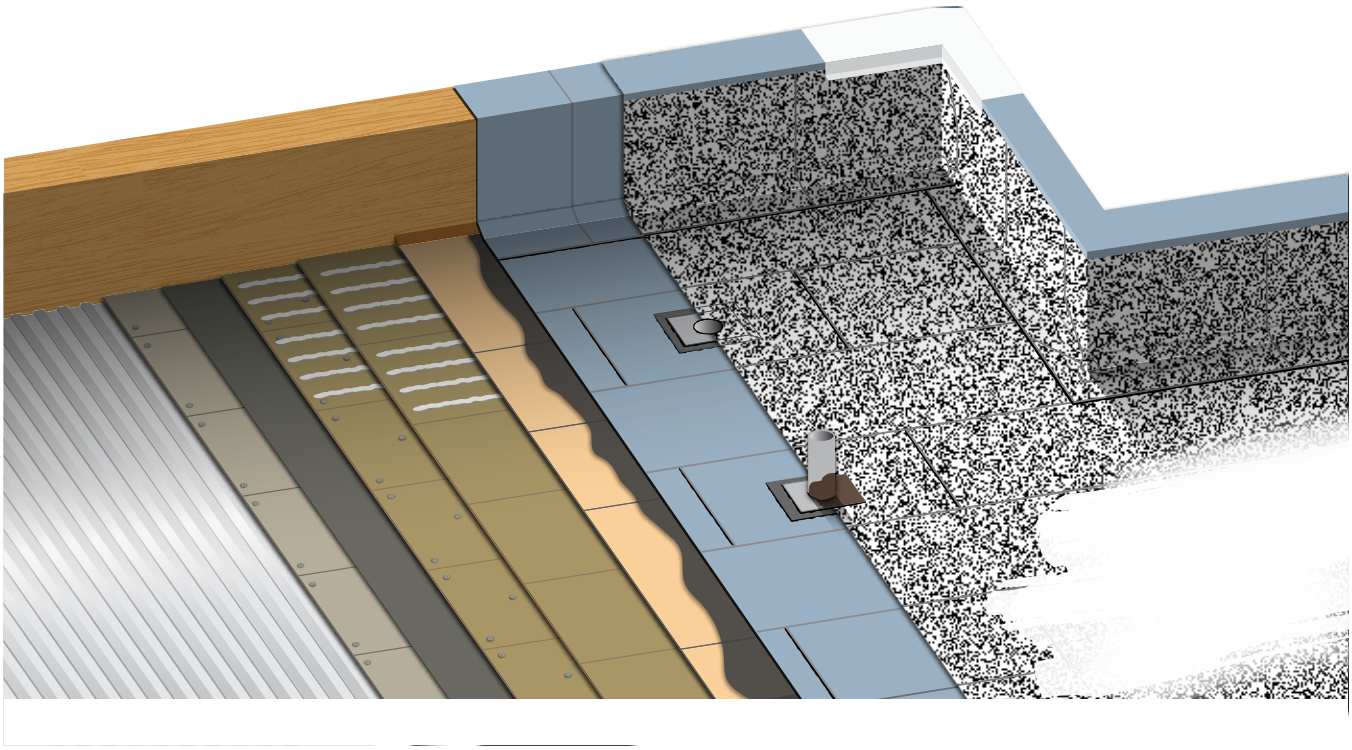
Low-Slope Roof System Principles

Chapter 2:
Overview of Low-Slope Roof Systems

Your objective: To gain an understanding of the various components that comprise a low-slope roofing assembly.

Anatomy of a Roof System

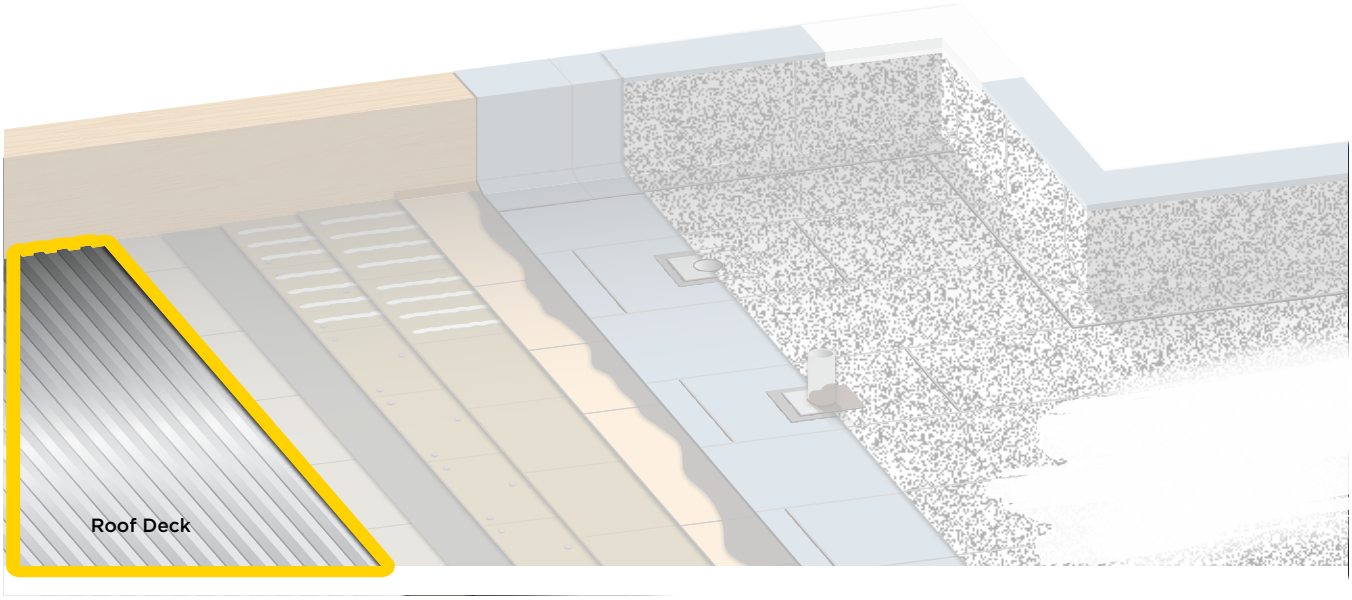
A low-slope roofing assembly is comprised of multiple parts, or what we call here, components. All of these components need to be selected, installed, and coordinated with each other to produce a successful roof system. Our purpose in this chapter is to provide an overview of the multiple components in general terms as each component is discussed in detail in subsequent chapters.



A. Roof Decks (reference: Chapter 3)

The roof system needs to rest on a building structure that is made up of products or materials provided by others.

Roof Decks:
The most common roof deck materials are concrete, metal (steel), or wood, and they form the structural supporting platform for the roof of the building. Less common roof deck materials include, but are not limited to, poured gypsum, lightweight-insulating concrete (LWIC), and cementitious wood fiber (Tectum). The watertight, warranted, low-slope roofing system is installed on this surface.



B. Substrates: Vapor Retarders, Insulation, and Cover Boards (reference: Chapter 4)

Between the roof deck and waterproof roofing system may be some distinct components that are commonly referred to as substrates. These can include the following:

Anchor Sheets

An anchor sheet may not be found in every bituminous roof system. When utilized, they are mechanically attached sheets which serve as a suitable surface for adhered insulation.

Vapor Retarders

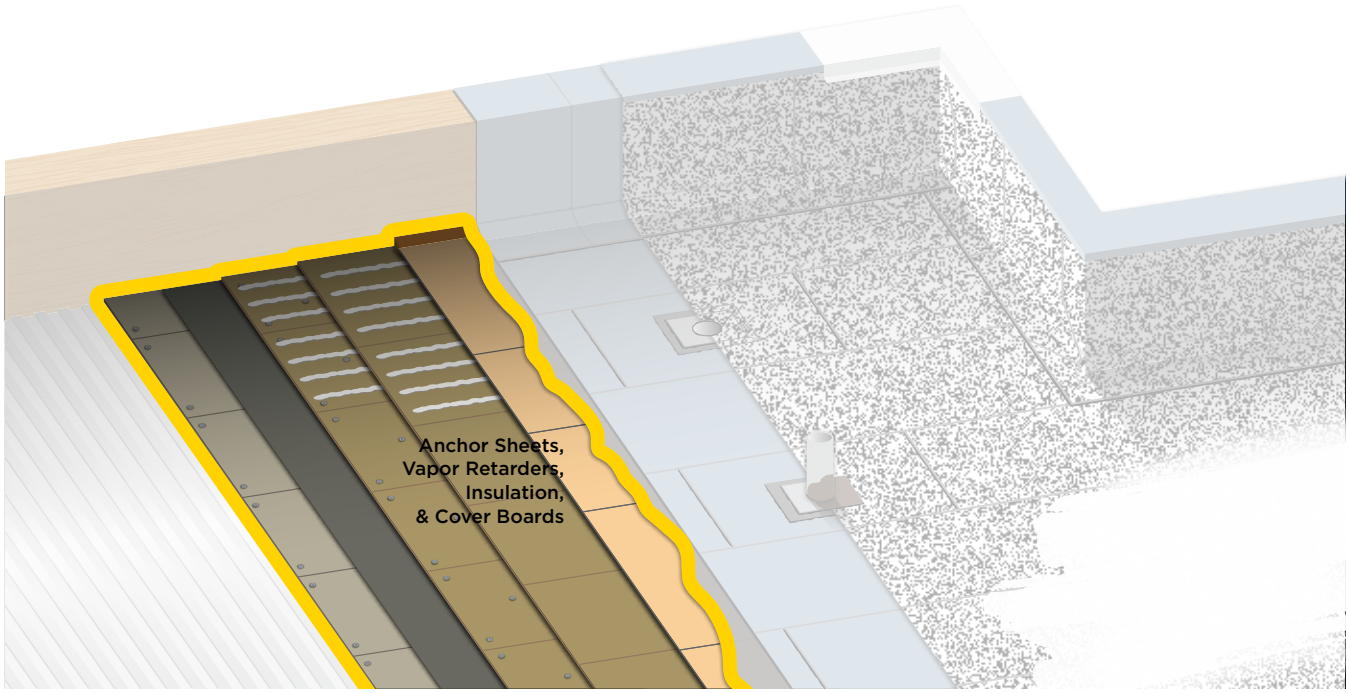
A vapor retarder may not be found in every bituminous roof system. When utilized, they serve to inhibit the transfer of vapor from within a building into the roof system.

Insulation

Insulation may not be found in every bituminous roof system. When utilized, insulation can serve multiple functions including: providing a substrate for the application of the roof membrane, reducing the heating and cooling loads of a building, reducing condensation on the underside of the roof deck, enhanced fire resistance and positive drainage for the roof assembly.

Cover Boards

Cover boards may not be found in every bituminous roof system. When utilized, cover boards can serve multiple functions including: providing a smooth, stable bonding surface for a roof membrane, enhanced protection for the underlying insulation layers, and enhanced fire and impact resistance.



C. Roofing Membranes (reference: Chapter 5)

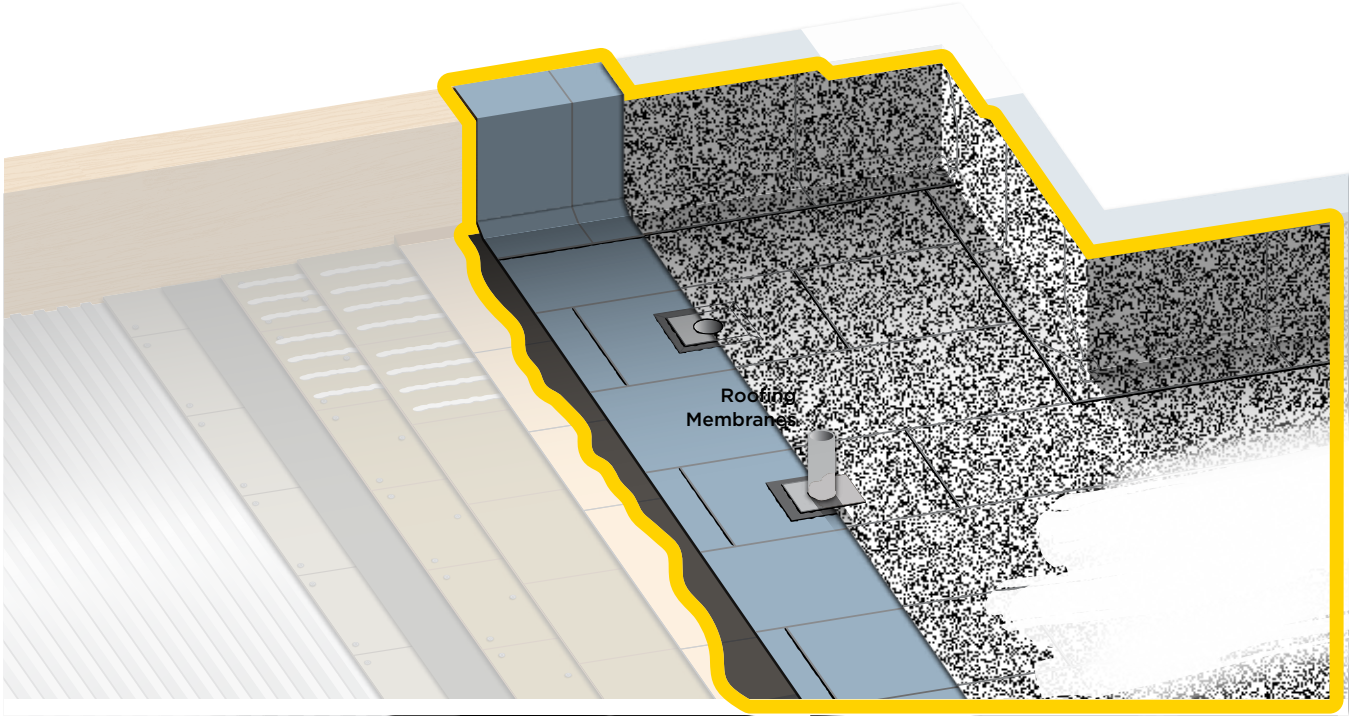
The waterproofing part of the roofing system is made up of overlapping layers of materials that collectively form the roofing membrane.

Low-Slope Membrane Categories

A roof membrane is defined as the coordinated system of products and components that serve to prevent water from penetrating into the building. There are five common categories that are used to identify roofing membranes, listed as follows:

- Material Type
- Reinforcement type
- ASTM/CGSB standard classification
- Applied function of the roll product
- Application method

These categories are summarized on the next page and described in detail in *Chapter 5, Roofing Membrane Products & Systems*.



Material Type

CertainTeed manufactures non-modified, built-up roofing products (BUR), and modified asphalt membranes, wherein the asphalt is blended with polymers to produce desired performance characteristics.

Reinforcement Type

Reinforcement mats serve as the structural skeleton at the core of asphaltic membrane products, supporting strength, resilience and dimensional stability. CertainTeed manufactures membranes with either fiberglass or polyester reinforcement.

ASTM/CGSB Classification

The American Society for Testing and Materials (ASTM) publishes standards for material physical properties as well as test methods associated with each standard. In Canada, the Canadian General Standards Board (CGSB) provides the same service with its own set of testing standards.

Applied Function

Individual asphaltic roofing membranes can serve in one or more of the following functions within a roof system, depending on the product and its composition:

- Anchor Sheet
- Base Sheet
- Base Ply
- Interply
- Cap Sheet

Application Method

Asphaltic roofing membranes are designed and engineered to be installed by using one or more of the following application methods:

- Mechanical Fastening
- Hot Asphalt/Mop
- Cold-Adhesive/Squeegee or Brush
- Torch-Welded
- Self-Adhered

D. Other Components (reference: Chapter 6)

Other components are required, or used, in low-slope roofing systems. You can recommend the right solution for your customer based on their performance needs.

Fasteners and Adhesives:

The metal fasteners used to secure base sheets, cover boards, or insulation need to be specifically selected to suit the application. Similarly, adhesive is commonly used to adhere upper layers of insulation or cover boards. Adhesive may also be used to adhere roofing membranes.

Substrate Primer (Optional):

Roofing primer may be required, or recommended, to support enhanced adhesion of the membrane system to the roof deck or substrate. Please reference FlintPrime products on page 10.

Coatings and Surfacing:

Coatings, or surfacing, include flood coat and gravel or liquid coatings that serve as a sacrificial weathering layer, thus protecting the membrane from degradation associated with UV, heat, and weathering. As such, a roof coating may be used to extend the life of a new or existing roof, or may be applied to enhance a roof system's fire resistance and or solar reflectivity.

Flashing Adhesive:

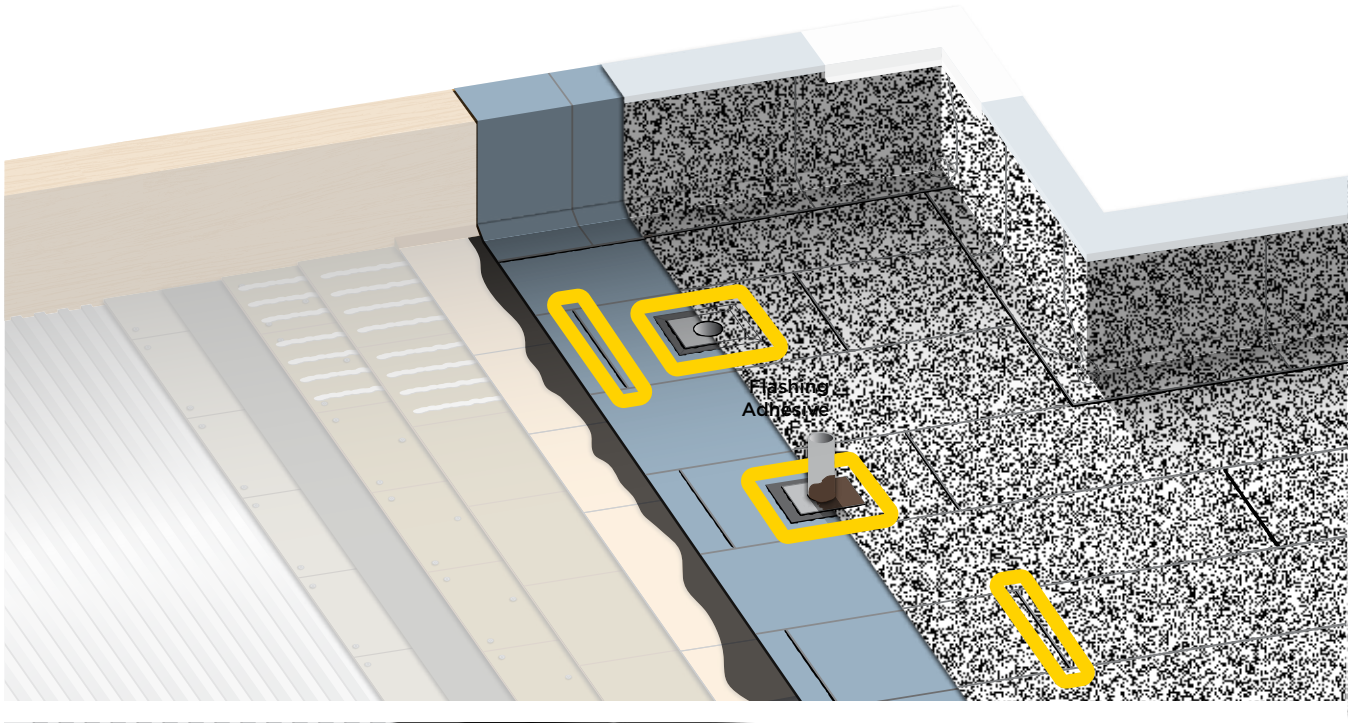
Rolled sheets/membranes are used to ensure edges, joints, and penetrations within a low-slope roof system are rendered watertight. Flashing adhesive can also be used to repair minor damage to the membrane or places where the membrane connects with other materials.

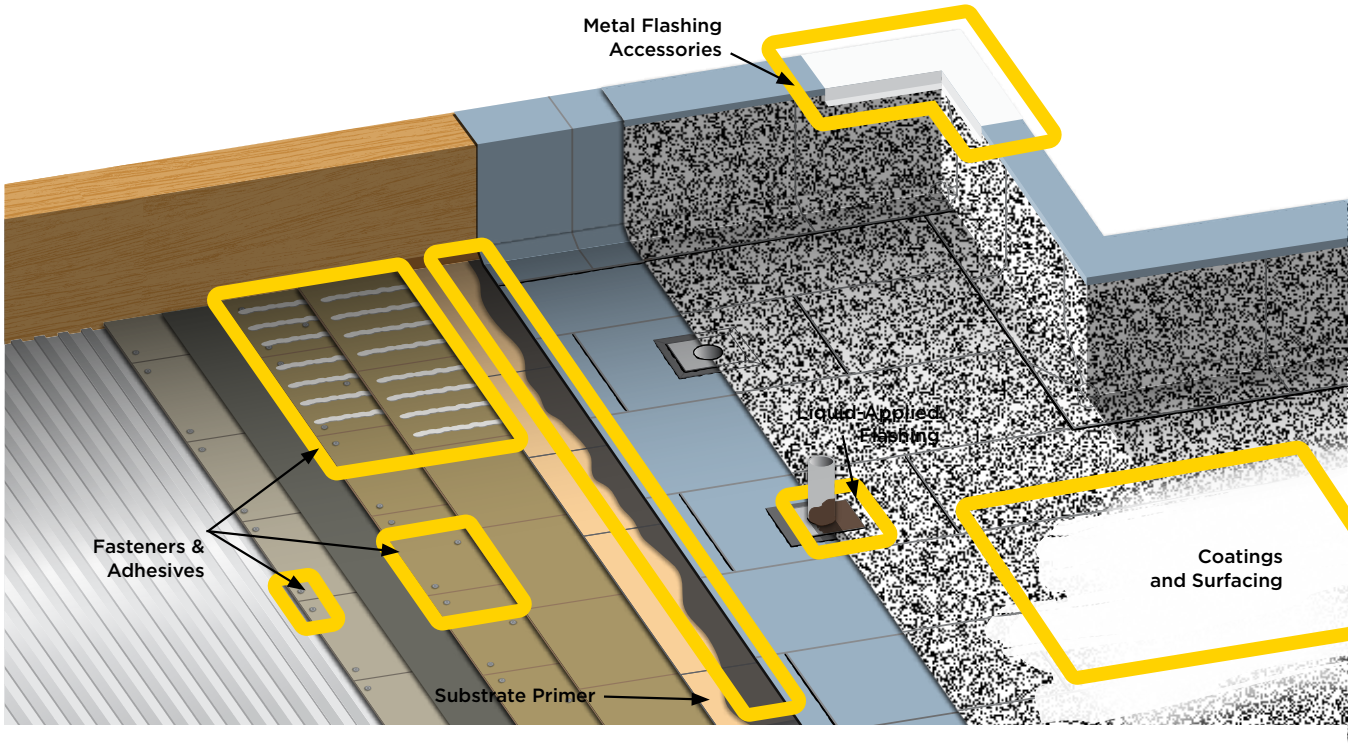
Liquid-Applied Flashing:

As opposed to a factory-manufactured membrane affixed in combination with mastic, liquid-applied flashings are a field-applied combination of resin and reinforcement fabric, commonly polyester, to add strength. They can also be used for repairs if there is damage to the membrane.

Metal Flashing Accessories:

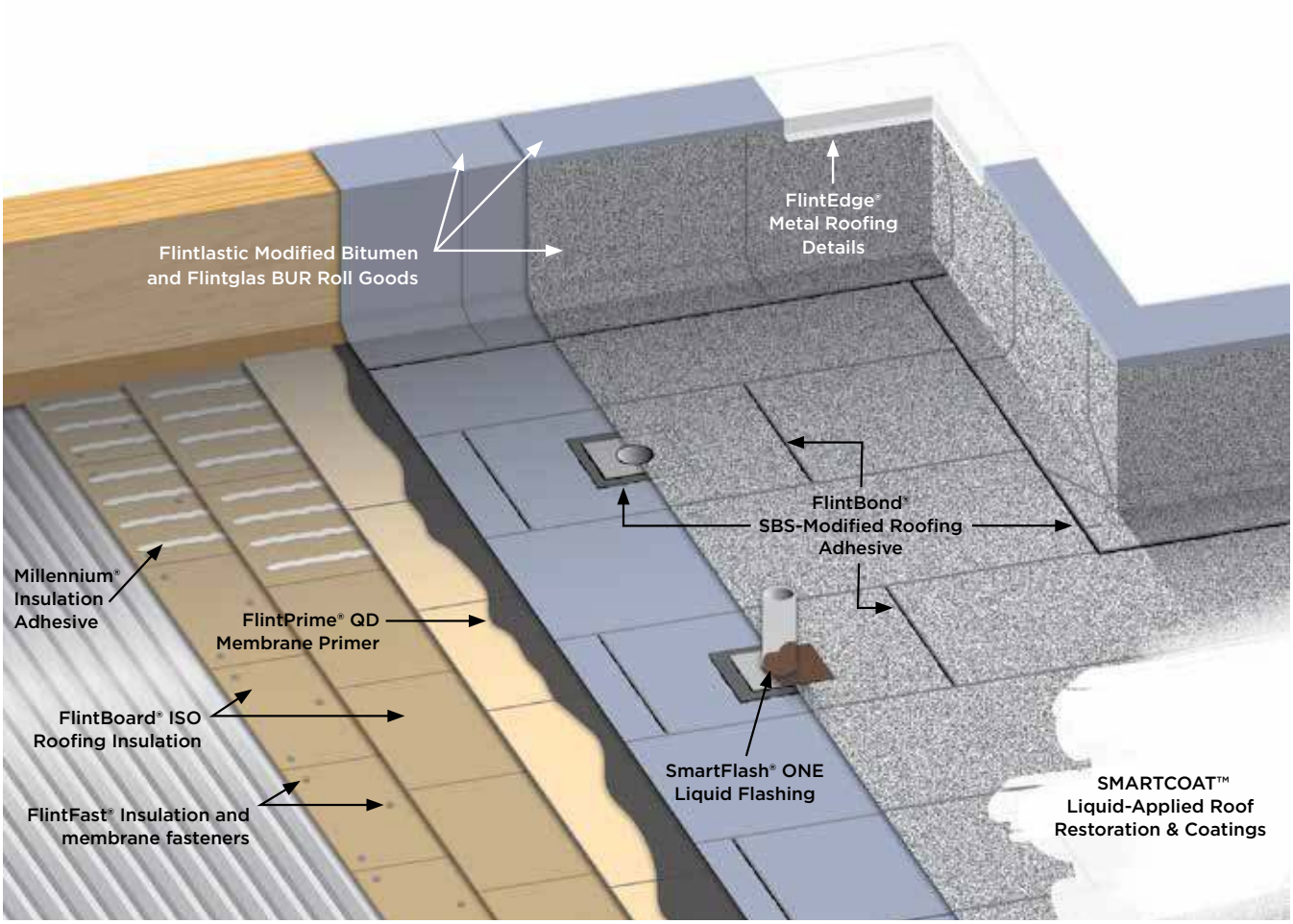
Roofing membranes typically terminate and are tied into the building along the perimeter or interior edges using metal components. Depending upon the design of the roof system, metal components such as, but not limited to, edge metal, coping, fascia, drains, pipes, expansion joint, and scuppers may be included.


Flashing
Adhesive


Metal Flashing
Accessories
Liquid-Applied
Flashing
Fasteners &
Adhesives
Coatings
and Surfacing
Substrate Primer

E. CertainTeed's Total Low-Slope Roof System

CertainTeed offers a comprehensive selection of high-quality roofing products needed to complete the entire roof system with confidence. Through the responsible development of innovative and sustainable building products, CertainTeed has helped to shape the building products industry for more than 120 years. We start with the highest-quality raw materials and add state-of-the-art technology to monitor our manufacturing processes and test our finished products. The result is superior performance from beginning to end, backed by one of the strongest warranties in the industry.



Chapter 2 – Self-Test for Low-Slope Roof Systems

Questions

Test online https://certainteed.com/low-slope-test

1. What can be installed over steel or wood decks to enhance fire resistance?
   - ☐ a. Anchor sheet
   - ☐ b. Gypsum thermal board
   - ☐ c. Primer
   - ☐ d. Cold Adhesive

2. The purpose of rigid insulation is to inhibit the transfer of heat from inside the building out, and from outside of the building in.
   - ☐ a. True
   - ☐ b. False

3. CertainTeed offers many components of a roofing system. One component CertainTeed does not offer is:
   - ☐ a. Cap sheets
   - ☐ b. Fasteners
   - ☐ c. Insulation boards
   - ☐ d. Roof decks

4. Liquid-applied flashings are reinforced with a field-applied fabric. Which reinforcement material is most often used for this purpose?
   - ☐ a. Fiberglass
   - ☐ b. Polyester

5. What is the name of the CertainTeed brand of membrane primer?
   - ☐ a. FlintBond
   - ☐ b. FlintPrime QD
   - ☐ c. SmartFlash ONE
   - ☐ d. SMARTCOAT

6. Which CertainTeed product is specifically designed for liquid-applied roof restoration and coatings?
   - ☐ a. FlintBond
   - ☐ b. FlintPrime QD
   - ☐ c. SMARTCOAT
   - ☐ d. SmartFlash ONE

7. What is the primary function of a vapor retarder in a low-slope roofing system?
   - ☐ a. Provide a smooth bonding surface
   - ☐ b. Inhibit the transfer of vapor from inside the building into the roof system
   - ☐ c. Enhance fire resistance
   - ☐ d. Serve as a waterproofing layer

Chapter 3:
Roof Decks

Your objective: To learn (1) the functions of a roof deck and (2) the coordination of roofing installations for different roof deck types.

1. Roof Deck Basics

Roof Deck Function

A roof deck serves as the structural component of the roof assembly and the substrate to which a roof system is applied. It must:

- Be structurally capable of safely supporting both dead loads (stationary) and live loads (environmental, workers).
- Be engineered and constructed to meet building code or insurance-required conditions, resist code-required uplift pressures, and shall not deflect greater than L/180 or the maximum deflection requirements established under the applicable code.
- Accommodate building movement (expansion and contraction).
- Offer a dimensionally stable structural base for the roof systems.

Further:

- All roof deck surfaces shall offer a smooth and dry surface, clean of sharp projections and depressions.
- All openings in the deck shall be fully supported on all sides.
- All projections through the deck shall be completed prior to starting the application of the roof system. Installation of conduits or piping above the deck and under the roof membrane is not acceptable and shall not be warranted by CertainTeed.
- Any damaged or defective elements of a roof deck should be replaced prior to installation of the roof membrane.
- As applicable, wood blocking shall be attached to the deck during construction to provide for the securing of the roofing membrane and flashings at perimeter edges (see *Wood Blocking* in Chapter 8 for further details).

Roof Deck Disclaimer: *CertainTeed technical personnel may be consulted to determine if a roof deck is suitable for installation of a warranted membrane assembly; however, the consultation shall not be a substitute for a complete roof design or inspection. Selection of the proper roof assembly, suitability of an existing substrate, appropriateness of adding insulation, and design of vapor retarders, expansion, and control joints – along with the detailing of roof transitions – are all design responsibilities that remain solely with the licensed design professional of record.*

Roof Slope and Drainage

The minimum required roof slope for low-slope roofing projects, as published by The International Building Code, 2018 Edition, is 1/4″:12″. Roof systems must be sloped to provide positive drainage for a finished roof system. Positive drainage is obtained when no ponding water exists on the roof 48 hours after a rain during conditions conducive to drying. CertainTeed may accept limited and minor areas of ponding under the terms of a warranty; however, sacrificial surfacing may be required to maintain a warranty should the condition worsen over time. If the structural design of the roof deck does not provide

sufficient drainage, positive drainage can be achieved through tapered materials such as insulation or crickets. In addition to slope, positive drainage includes the correct number, size, and placement of water control provisions such as drains, scuppers, and gutters, which must be accommodated in the roof deck design. All roofs should have an overflow system adjacent to drains or scuppers to collect and direct water off the roof should one or more water collection devices fail.

Expansion Joints and Roof Dividers

Expansion joints are engineered breaks in the building extending from the exterior to the interior. These joints allow the building to move while being subjected to thermal, seismic, and wind load-induced forces. Typically, expansion or seismic joints are designed into structures at changes in direction in "L," "U," or "T" shaped buildings, changes in deck types, changes in decking direction, transitions with building additions, and the breakup of large structures. The sizes and locations of expansion joints are always determined by a structural engineer.

Roof dividers provide a similar function as expansion joints but extend only into the roof membrane and not into the building's interior. Thus, they allow for movement of the roofing system, but not the building itself. These types of joints are typically installed on very large roofs where few or no expansion joints have been designed into the structure. Typically, if the roof membrane has not been broken over a horizontal distance of 300 feet, then a roof divider should be installed. Roof dividers are also sometimes used to define adjacent work areas, such as the separation of a new roof system from an existing roof system on the same building, where there is no change in the roof deck or deck structure. Raised joints should be a minimum of 8" above the roof membrane surface.

Expansion joints in the roof deck need to be addressed by covering them with a watertight system that still allows the building to move. Expansion joint cover systems are commonly separate, prefabricated assemblies comprised of materials such as, but not limited to, metal and EPDM. All components of the roof membrane system must connect to and provide a watertight condition with the joints.

Water drainage should not be restricted or impeded by these features. Several Expansion Joint construction details are available for reference in *Appendix 2 — Construction Details*. In all cases, the manufacturer of the expansion joint assembly system should be consulted for full coordination.

Wood Nailers and Blocking

When insulation is part of the roof assembly, wood nailers or woodblocking, matching the height of the insulation, provide an attachment surface for the roofing membrane and flashings at perimeter edges, penetrations, and other deck openings. Additionally, all cant strips shall be fully supported by woodblocking. They are the first defense against wind damage to a roof. Woodblocking shall be the height of the combined height of the insulation and coverboard and shall be a minimum 3-1/2" in width. Woodblocking shall be pressure treated, #2 or better lumber with minimal deformation. Lumber shall be dry (<20% by weight) and protected from the elements when stored prior to application. Storage shall be under breathable tarps. Due to the corrosive nature of pressure treatments, fasteners shall be stainless steel or protected from corrosion in compliance with the wood treater's recommendations for long- term, unexposed applications. Where tapered insulation is installed, woodblocking shall taper with the insulation to create a planar condition. Woodblocking should be attached to the structure wherever possible and secured to resist wind uplft. See *CertainTeed Technical Bulletin on Woodblocking Attachment*, found in the *Commercial Roof Systems Specificatons* manual, for further information and recommendations..

Roof Decks and Warranties

If you apply a low-slope roof system over a roof deck that is not suitable and roofing damage results, the warranty will not be honored. CertainTeed does not take responsibility for:

- Settlement, deflection, movement, moisture content, inadequate attachment, or other deficiencies of the roof deck, pre-existing roof system, or any other part of the building structure
- Lack of positive drainage
- Installation over a wet surface or substrate

2. Common Roof Deck Types

Roof decks can be classified primarily by two key functional attributes. Decks are either noncombustible or combustible. Additionally, they are considered either nailable or non-nailable; mechanical fasteners are required to secure roof system components to nailable decks whereas components are directly adhered to a non-nailable deck. In some cases, decks can receive either attachment means.

Roof Deck Type	Noncombustible	Combustible	Nailable	Non-nailable
1. Steel	YES	NO	YES	NO
2. Structural Concrete	YES	NO	YES but uncommon	YES
3. Lightweight Insulating Concrete (LWIC)	YES	NO	YES	YES
4. Plywood/ Oriented Strand Board (OSB)	NO	YES	YES	YES
5. Wood Plank	NO	YES	YES	NO
6. Poured Gypsum	YES	NO	YES	YES
7. Cementitious Wood Fiber	YES	NO	YES	YES[2]

Further, required inclusion and attachment mechanism of insulation and base sheets differ by roof deck type:

	INSULATION			BASE SHEET/PLY				
Roof Deck Type	Required	Mechanically Attached	Adhered	Mechanically Attached	Self-Adhered	Torch	Hot Asphalt	Cold Adhesive
1. Steel	YES	YES	NO	NO	NO	NO	NO	NO
2. Structural Concrete	OPTIONAL	YES	YES[1]	YES	YES[1]	YES[1]	YES[1]	YES[1]
3. Lightweight Insulating Concrete (LWIC)	OPTIONAL	YES	YES[2]	YES	NO	NO	NO	YES[2]
4. Plywood/Oriented Strand Board (OSB)	OPTIONAL	YES	YES[1, 2]	YES	YES[2]	NO	NO	NO
5. Wood Plank	OPTIONAL	YES	NO	YES	NO	NO	NO	NO
6. Poured Gypsum	OPTIONAL	YES[2]	YES[2]	YES	NO	NO	NO	NO
7. Cementitious Wood Fiber	OPTIONAL	YES[2]	YES[2]	YES	NO	NO	NO	NO

[1]Roof deck must be primed prior to insulation or base ply application.

[2]Only under specified circumstances does CertainTeed allow insulation or base plies to be adhered to certain deck types.

To provide a better understanding of these common roof deck types, we discuss each further in the following paragraphs.

It is the responsibility of the roof installer to visually inspect the roof deck — no matter what type it is — review the construction makeup and identify any potential issues that need to be addressed. Some of those issues will then be the responsibility of the general contractor or other tradespersons to resolve. Some may be appropriate to resolve with roofing products. In the case of any uncertainty, contact the CertainTeed Commercial Roofing Technical Services Department.

1. Steel

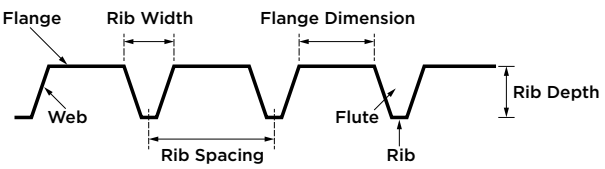
Steel roof decks are constructed of sheets or panels with ribs formed in each panel for strength and stability. Steel panels can be procured in a range of gauges, rib depths, flute spacing, and yield strengths.

Panel Types

Some of the most commonly used steel roof deck panels are:

- **Type A or Narrow Rib** is commonly 1-1/2″ deep x 36″ wide metal panels with only 1″ between ribs. The narrow spacing between ribs makes the Type A deck a weaker panel than other types. It is mainly used in repairs when trying to match existing metal decking on older buildings.
- **Type F or Intermediate Rib** is also typically 1-1/2″ deep x 36″ wide metal panels but with 1-7/8″ between ribs. This makes it stronger than Type A but not as strong as Type B. Type F is also mainly used in building repairs when trying to match existing metal decking on older buildings.
- **Type B or Wide Rib** is currently the most common type of metal roof deck used in new construction or significant re-construction projects. It is produced as 1-1/2″ deep x 36″ wide metal panels with 2-1/2″ between the top of the ribs. It is available in a range of metal thicknesses (gauge) ranging from as light as 22-gauge or as heavy as 16-gauge, allowing its strength to be carefully engineered. It is generally used for spans that are 10 feet or less between supporting structural members.

Steel Roof Deck



- **Deep Rib** has several designations, such as Type N, HSN3, or 3DR. Deep rib decks are typically 3″ deep by 24″ or 32″ wide. Rib spacing can range from 2-5/8″ to 4-1/8″ in 22-gauge to 16-gauge thicknesses. These characteristics make deep rib panels the strongest available, and they are generally used for structural spans more than ten feet on new or renovated buildings.

Roofing Coordination: CertainTeed agrees with the position of the NRCA that steel roof decks be 22-gauge or heavier and have a minimum G-90 galvanized coating complying with ASTM A653, “Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.”

Steel decks should be designed and attached in compliance with the Steel Deck Institute (SDI). All roof assemblies installed over steel decks shall be mechanically attached. Insulation, or at minimum, a thermal barrier board, must be installed prior to installation of the roof membrane assembly. ***NOTE***: Cap sheets are never mechanically attached except as noted in back-nailing details on steep-slope roofs. All mechanical fasteners and stress plates shall meet the corrosion resistance criteria published by FM Global Test Standards 4450, Section 5.4 and 4470, Section 4.7.

2. Structural Concrete

Both normal-weight and lightweight structural concrete roof decks are produced by mixing large and small aggregates, Portland cement, water, and optional additives. Lighter-weight aggregates are used to produce lightweight concrete. These aggregates are highly porous, and lightweight drying times are longer than normal-weight concrete. CertainTeed agrees with the position of various industry organizations, such as the NRCA, MRCA, and ARMA, that selection of the deck material and its suitability for use is the responsibility of the designer of record, who must make appropriate design accommodations to address high moisture content encountered in lightweight structural concrete decks. Therefore, CertainTeed recommends avoiding lightweight structural concrete whenever possible and does not warranty Flintlastic® or Flintglas® roof membranes when installed over it. See NRCA Industry Issue *Update: Moisture in Lightweight Structural Concrete Roof Decks.*

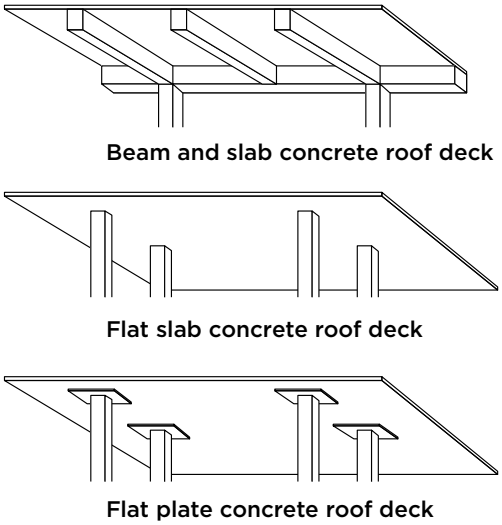
Concrete Sub-Types

Structural concrete roof decks may be any of several sub-types:

- precast, prestressed slabs or tees that are transported to the jobsite for erection to make up the roof deck
- cast-in-place or poured at the jobsite with structural columns and beams to support the roof deck configured in a variety of industry-approved designs
- cast-in-place with post-tensioned steel reinforcing, which results in a highly compressed roof deck that can accommodate a greater load than if the concrete had been reinforced in a traditional manner

Roofing Coordination: All concrete deck surfaces should be adequately dry and primed with FlintPrime® QD (ASTM D41) primer, allowed to fully dry before the application of a CertainTeed base ply or vapor retarder.

Concrete Roof Decks



Beam and slab concrete roof deck

Flat slab concrete roof deck

Flat plate concrete roof deck

3. Lightweight Insulating Concrete (LWIC)

Lightweight-aggregate and lightweight-cellular insulating concrete are used as fill material, usually to add slope over a structural substrate. As such, LWIC does not, in itself, have structural load-supporting capacity and should not be confused with structural concrete. LWIC is mixed, pumped, and screeded or leveled at a jobsite. Lightweight insulating concrete is available in a variety of mixes that yield different densities, physical properties (including fastener pull out), and required dry times.

Roofing Coordination: CertainTeed agrees with the position of the NRCA that lightweight insulating concrete roof decks are a minimum of 2″ thick, not including the thickness of the underlying substrate. To be eligible for CertainTeed Limited Warranty coverage, test data must be submitted to CertainTeed confirming:

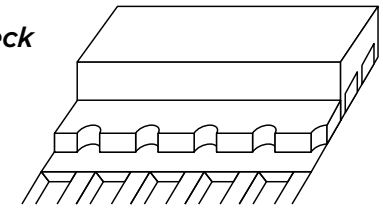
- the type of pan for casting the deck
- the thickness criteria for the LWIC
- the design pressures for the decking assembly with the proposed CertainTeed roof assembly
- the type and density of base ply fasteners

Additionally, decks of a density less than 22 pounds per cubic foot (pcf) or a minimum compressive strength of 125 pounds per square inch (psi) are not eligible for any warranty and will not be supported by CertainTeed.

Extreme care must be taken to ensure an LWIC deck is properly vented. The deck designer and erector shall consult the LWIC manufacturer for specific venting requirements. Venting can be achieved by use of a venting base sheet or pressure relief vents. A minimum 4″ diameter "one-way" pressure relief vent, fitted with minimum 4″ flange and a weather-resistant hood shall be installed 20′ from the perimeter edges and 40′ o.c. thereafter, located directly over 4″ diameter openings cut through the roof system and into the LWIC not less than 2″ depth. Special care shall be taken with LWIC installed over non-vented decking systems. *See Construction Details – Appendix 2 for LWIC venting application reference.*

CAUTION: *Do not subject an LWIC deck to temperatures below 40°F during application or curing. Additional moisture may accumulate in the roof deck during the construction of the deck. The roofing contractor may consider measuring moisture levels after installation of the roof to confirm the levels are remaining static.*

LWIC Deck



4. Plywood/OSB

Plywood and Oriented Strand Board (OSB) panels are manufactured by laying thin layers or strands of wood at right angles to each other and gluing them together under heat and pressure. They are commonly fastened to an underlying structure with nails, screws, or other mechanical fasteners installed by carpenters or other trades.

Roofing Coordination: CertainTeed agrees with the position of the NRCA that panels be approved and rated for use as roof sheathing by either the Department of Commerce (PS 1 or PS 2) or The Engineered Wood Association (APA PRP-108). Further, CertainTeed agrees with the position of the NRCA that sheathing be a minimum four-ply, 5/8″ nominal thickness (actual thickness 19/32″) plywood for 16-inch rafter spacings. While OSB is frequently used as a roof deck substrate, NRCA has concerns with the material's dimensional changes and, ultimately, the increased potential for ridging or fastener backout under normal environmental circumstances.

Plywood

5. Wood Plank

Wood plank decks are composed of solid-sawn dimensional lumber typically supported by wood joists, beams, or purlins. Thicknesses range from nominal 2″ - 5″, and widths vary from 4″ - 12″, with the width dimension in the horizontal plane of the deck.

Roofing Coordination: Nominal 6” width planks/boards are recommended to avoid excessive movement and splitting. Wood decking shall be fully seasoned and have a moisture content below 20% by weight.

Wood planks shall be integrated to the adjoining plan with a tongue and groove, or ship-lapped configurations, and shall be secured to the underlying structure with sufficient screws and/or nails to resist code-required uplift pressures. Where decking has been installed over steel joists, fastener heads shall be countersunk below the deck surface. The decking shall have no protruding fasteners or other elements that could damage the roofing membrane.

Wood Plank

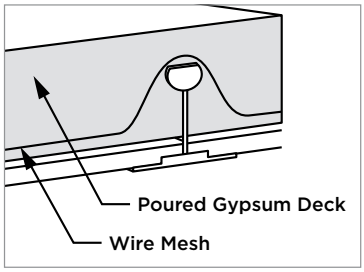
6. Poured Gypsum

Gypsum roof decks are essentially plaster of Paris slurry blended with wood shreds serving as extenders. They are cast over form boards and, usually, a combination of iron and steel structural support. They offer relatively high product density and compressive strength, though they can be challenging to work with in the field.

Roofing Coordination: Poured gypsum decks shall be constructed in compliance with local code and The Gypsum Association. Gypsum roof decks shall be a minimum 2″ thick.

CAUTION: *Gypsum decks are typically cast with minimum or no slope. Slope to create drainage must be accomplished by alternative means.*

Prior to the installation of any roof membrane, the bonding surface must be smooth and flat. This can be achieved with asphalt-based filler or other materials. Confirmation of an adequate bond to the substrate and to materials to be applied over the filler is required to be provided to CertainTeed for warranty coverage.



Poured Gypsum

7. Cementitious Wood Fiber Panels

Cementitious wood fiber roof deck panels are comprised of treated wood fibers that are bonded together with cement or other binders, then compressed and molded into panels. They serve as a structural support between beams, girders, or rafters, and the underside is frequently used as the finished interior ceiling.

Roofing Coordination: CertainTeed warranties on roof membranes over cementitious wood fiber panels require that the deck erector furnishes written certification that the deck meets job specifications and deck manufacturer’s requirements. Cementitious wood fiber decks must be protected from the elements once installed to avoid cupping, bowing, and deformation of the panels. Where heights of deck joints vary, the deck erector shall level these with screed coat material as recommended by the deck manufacturer.

Chapter 3 – Self-Test for Roof Decks

Questions

Test online https://certainteed.com/low-slope-test

1. An existing roof has LWIC (20 pcf, 110 psi compressive strength) over a structural deck. The owner wants a warranted modified-bitumen reroof; the existing roofing assembly has been removed. Which actions are required to make the deck/assembly warranty-eligible? (Select all that apply)
   - ☐ a. Assuming LWIC meets eligibility thresholds, add pressure-relief vents per manufacturer spacing and depth
   - ☐ b. Replace LWIC or re-engineer slab; current density/strength does not meet eligibility thresholds
   - ☐ c. Prime the LWIC and fully adhere a vapor retarder directly to LWIC
   - ☐ d. Without replacement or re-engineering, provide test data (pan type, thickness, design pressures, fastener density) to CertainTeed and proceed with installing the new roof

2. For structural concrete, which statement aligns with CertainTeed coordination?
   - ☐ a. Direct-bond the membrane after priming the deck
   - ☐ b. Do not direct-bond the membrane; first install a reinforced topping slab or a fully bonded insulation layer (no voids)
   - ☐ c. Use mechanical attachment through the tendon zone

3. For steel decks, to make the deck/assembly warranty-eligible? (Select all that apply)
   - ☐ a. Minimum 22-gauge; G-90 zinc coating per ASTM A653
   - ☐ b. Insulation or at least a thermal barrier is required before the roof membrane
   - ☐ c. Roof assembly may be fully adhered without mechanical attachment

4. Which definition of positive drainage matches the manual?
   - ☐ a. 1/8″:12 slope; no water after 24 hr
   - ☐ b. 1/4″:12 slope; no ponding 48 hr after rain under drying conditions
   - ☐ c. 1/4”:12 slope; no ponding after 24 hr

5. Your deck framing is 16″ o.c. What plywood spec is the minimum acceptable?
   - ☐ a. 11/32″ (3/8 nominal)
   - ☐ b. 15/32″ (1/2 nominal), four-ply, APA exterior rated
   - ☐ c. 19/32” (5/8 nominal), four-ply, APA exterior rated

6. A 950-ft long roof has no structural expansion joints. What divider strategy aligns with the manual?
   - ☐ a. No divider needed
   - ☐ b. Install roof dividers so that no continuous membrane run exceeds 200 ft; raised joints ≥6″
   - ☐ c. Install roof dividers so that no continuous membrane run exceeds 300 ft; raised joints ≥8″

7. You may self-adhere a base ply directly to:
   - ☐ a. Primed structural concrete
   - ☐ b. Unprimed structural concrete
   - ☐ c. Wood (with primer recommended)
   - ☐ d. Steel deck

8. For steel decks, which combination meets the matrix in the manual?
   - ☐ a. Skip insulation; torch the cap directly to deck
   - ☐ b. Mechanically attach insulation, then proceed with the specified membrane system
   - ☐ c. Adhere insulation, then proceed with the specified membrane system

Chapter 4:
Substrate Principles: Thermal Barriers, Vapor Retarders, Insulation, and Cover Boards

Substrates

Low–slope roofing membranes are not always placed directly on the roof deck. Rather, they may require a substrate material, such as a thermal barrier, vapor retarder, insulation, or a cover board. The use of these products is determined by the designer of record.

Several important attributes should be considered when selecting any substrate material:

- Compatibility with other components used throughout the roof system
- Board strength to resist damage from any impacts during construction, onsite, and after installation during the roof's lifespan (applicable to insulation and/or cover board only)
- Fire resistance and compliance with building codes and insurance requirements
- Vapor and water resistance throughout the lifetime of the system
- Stable LTTR-value for when the roof ages and experiences ever-changing temperatures (applicable to insulation only)

4A – Thermal Barriers

Your objective: To learn the function that thermal barriers provide in a roof assembly and some of the acceptable products that can be used.

Building codes or insurance guidelines will sometimes require a thermal barrier between the roofing system and the rest of the building, placed beneath insulation and/or a vapor retarder in the roof system. The designer of record is responsible for the specification of a thermal barrier.

CertainTeed does not manufacture any products that are specifically used for thermal barriers. However, CertainTeed warranties will accept any of the following when used properly:

COMMON THERMAL BARRIER PRODUCTS

Product	Description	ASTM Standard
Fiber-Reinforced Gypsum	Rigid boards comprised of cured gypsum, cement, and cellulose fibers	ASTM C1278 Type X
Cement Board	Rigid panels comprised of cement and organic and or inorganic filler sandwiched between two fiberglass facers	ASTM C1325 Type A
Perlite	Volcanic minerals bound with organic fibers	ASTM C728 Types I, II, and III
Stone Wool	Natural and synthetic materials heated, spun, and bound into rigid boards	ASTM C726

4B – Vapor Retarders

Your objective: To learn (1) why vapor retarders are used and (2) basic application coordination between CertainTeed vapor retarders and different roof deck types.

Vapor Retarder Purpose

Unwanted moisture can build up within a roof system if vapor enters from inside the building and condensation forms. Vapor retarders are designed to restrict the passage of vapor into the roof system from below.

It is important that not only a proper material is used as a vapor retarder, but that the seams of the vapor retarder are sealed to prevent convection or air leakage. Additionally, consideration should be given to tying the roof vapor retarder into any specified wall air/vapor barriers to form a continuous building envelope.

As a guide, vapor retarders are generally used where average outside temperatures can be 40˚F or below, and the winter season expected interior relative humidity is greater than 45%. An engineer of record should verify dew-point control; this rule-of-thumb is not a substitute for psychrometric analysis..

Vapor Retarder Installation

Please refer to the table below for CertainTeed asphaltic membranes which can be utilized as vapor retarders. ***NOTE***: Use of these membranes as a vapor retarder would be separate from any additional use in the same roof assembly as a base, interply or cap sheet.

CERTAINTEED PRODUCTS USED AS VAPOR RETARDERS, FULLY BONDED (SEE SECTION 2. SUBSTRATE GUIDELINES)

Product	Application Method
Glasbase Base Sheet	Hot Asphalt
All Weather/Empire Base Sheet	Hot Asphalt or Cold Adhesive
Black Diamond® Base Sheet	Self-Adhered
Flintlastic® Ultra Glass SA	Self-Adhered
Flintglas® Ply 4 (1 or 2 layers)	Hot Asphalt
Flintlastic Poly SMS	Hot Asphalt or Cold Adhesive
Flintlastic Ultra Poly SMS	Torch, Hot or Cold
Flintlastic Base 20	Hot Asphalt or Cold Adhesive
Flintlastic Base 20 T	Torch-Welded
Flintlastic SA Cap	Self-Adhered
Flintlastic SA PlyBase	Self-Adhered
Flintlastic GTA	Torch-Welded
Flintlastic GTS-FR	Torch-Welded

4C – Insulation

Your objective: To learn (1) the function insulation serves in a roof assembly, (2) the differences between the various types of insulation, and (3) the benefits of FlintBoard® polyisocyanurate insulation.

Insulation Purpose

Roof insulation can serve the following functions:

- Provide a substrate for the application of the roof membrane.
- Reduce the heating and cooling loads of a building by reducing thermal transfer between the building and the outside.
- Reduce or eliminate condensation on the underside of the roof deck.
- Provide enhanced fire resistance to the overall roof assembly (i.e., stone, or mineral wool).
- Tapered insulation can provide positive drainage for the roof assembly.

While roof insulation offers many benefits, it is important to consider that by limiting the transfer of heat from the roof membrane into the building the membrane may experience an increase in temperature and greater expansion and contraction. Highly reflective roof surfaces, such as those provided by CertainTeed CoolStar® and SMARTCOAT™ products, address this concern by reducing the temperature within the roof system.

Thermal Principles and Nomenclature

The laws of thermodynamics tell us that heat is the energy source that always seeks equilibrium with its surroundings. That means heat that is concentrated in one area will always seek to flow to an adjacent area that has less heat (i.e., is cooler). Insulation slows this natural heat flow. In roof assemblies, that means insulation reduces the ability for heat to flow into a building during the summer months and out from the interior during the winter months.

How well insulation performs in a building is determined by its tested thermal resistance effectiveness, which is expressed as an "R-value." In this case, the higher the R-value, the higher the level of thermal resistance. For specific products, the tested R-values are typically stated for each inch of thickness of the insulation. For example, if one inch of a tested insulation product has an R-value of 5, then it is reasonable to expect that two inches will equal an R-value of 10.

Taking insulation out of a testing lab and placing it in the field over time has been recognized as a legitimate concern in terms of actual thermal performance. In response, the insulation industry has developed a standard for identifying the Long-Term Thermal Resistance (LTTR) of insulation. This is a scientifically supported method for calculating the 15-year time-weighted average R-value for roof insulation and is also specified by material thickness.

Roof insulation may be manufactured as boards unto themselves, or in composite form where two different types of insulation and or cover board are factory-laminated together. Such composite boards utilize polyisocyanurate as the primary insulation since it has one of the highest R/LTTR values per inch. The laminated top layer is commonly other insulating substrates, such as OSB, gypsum, or perlite.

Roof insulation is available in both flat and tapered boards/panels. Flat panels are commonly used when the roof deck is already adequately sloped for water drainage, or as the base layer of tapered systems. Tapered panels are used to achieve positive drainage if the slope of the roof deck is inadequate. The degree of taper (slope) and the arrangement of the tapered panels are configured to move water to internal drains, scuppers, or gutter systems. The tapered layout is typically designed by the manufacturer of the insulation or tapered departments set up by others, such as distributors.

Insulation Types

COMMON ROOFING INSULATION PRODUCTS, NORTH AMERICA

Product	Description	ASTM Standard	R-Value per Inch
Polyisocyanurate (ISO)	Rigid boards comprised of closed-cell polyisocyanurate foam sandwiched between two facers, such as foil or paper	C1289 Type I & II, Classes I, II, or III and Grades I, II, or III	(LTTR) 5.6
Cellular Glass	Rigid blocks or boards composed of heat-fused, closed-glass cells	C552	3.44
Expanded Polystyrene (EPS)	Rigid boards composed of polystyrene and heat-expanded, closed-cell foam	C578 Types I – XIV (Type VIII)	3.1 – 4.3 (dependent upon density and compressive strength or Type)
Extruded Polystyrene (XPS)	Rigid boards composed of closed-cell polystyrene, extruded	C578 Types I – XIV (Type IV)	3.8 – 5.0 (dependent upon density and compressive strength or Type)
Stone Wool	Natural and synthetic materials heated, spun, and bound into rigid boards	C726 Types I & II, Classes I & II	3.8 (Type I), 4.0 (Type II)

FLINTBOARD ROOFING INSULATION & COVER BOARD

Product	Description	Size
FlintBoard ISO/ISO-T	Workhorse product features heavy, black (non-asphaltic), organic fiber-reinforced felt facers	4′x4′ (standard or tapered), 4′x8′
FlintBoard ISO Cold/ISO Cold-T	Features heavy-duty inorganic glass-reinforced facers for improved dimensional stability, ideal for cold-applied adhesive applications	4′x4′ (standard or tapered), 4′x8′
FlintBoard ISO NB	Features foam core laminated to 7/16″ or 5/8″ OSB, or 5/8″ or 3/4″ plywood, For use under shingles or low slope membranes.	4′x4′, 4′x8′
FlintBoard ISO CV	Features foam core with 1″, 1.5″, 2″ ventilation channels bonded to 7/16″ or 5/8″ OSB, or 5/8″ or 3/4″ plywood, For use under shingles or low slope membranes.	4′x8′
FlintBoard ISO Pre-Cut Crickets	Provides a standardized pre-fabricated cricket solution to promote positive drainage. Unfolds to 12′x4′, 1/4″:12 and 1/2″:12 slopes	Unfolds to 12′x4′
FlintBoard ISO HD Cover Board	1/2″ lightweight (11 lbs per 4′x8′ panel), quicker to install than heavier gypsum bases boards, high density polyiso insulation designed for use as a cover board with heavy-duty inorganic glass-reinforced facers.	4′x4′, 4′x8′
Hinged Target Sump	8′ x 8′ Hinged Target Sumps are pre-assembled with FlintBoard ISO-T/ISO Cold-T 25 PSI. Sumps have perimeter edge thicknesses of 1.5″, 2″, 2.5″ or 3″ and can assist in saving 50% in material and waste costs over field fabricated sumps.	Unfolds to 8’x8’
Hinged Target Sump	4′ x 4′ Target Sumps are manufactured with FlintBoard ISO Cold-T 25 PSI only. This sump comes pre-assembled with 1/2″ slope in thicknesses of 0.5″ to 2.0″ and can assist in saving 74% in material and waste costs over field fabricated sumps	Unfolds to 4’x4’

T = Tapered

4D – Cover Boards

Your objective: To learn (1) the function cover boards serves in a roof assembly and (2) the differences between the various types of cover boards.

Cover Board Purpose

Cover boards serve the following functions in a roof assembly:

- Smooth, stable bonding surface for a roof membrane
- Enhanced protection for the underlying insulation layers
- Enhanced fire resistance
- Enhanced impact resistance

NRCA published Bulletin #9 in September 1988, recommending the use of cover boards to minimize blistering, enhance adhesion, and provide a stronger surface for the application of built-up membranes.

Cover Board Types

When compared to standard rigid insulation boards, cover boards typically have lower R-values and higher densities or compression strength. Foam insulations produce higher R-values, surfacing materials such as wood fiberboard, perlite, mineral wool, water-resistant gypsum, and high-density polyisocyanurate provide more suitable surfaces for the application of roofing membranes. A highly dimensional and stable surface creates less stress on the membrane, reduces impact damage, and typically enhances the bond of the roofing to the substrate layer.

COMMON COVER BOARD BOARD PRODUCTS, NORTH AMERICA

Product	Description	ASTM Standard	R-Value per Inch
High-Density Polyisocyanurate (including FlintBoard ISO HD)	Rigid boards comprised of high-density, closed-cell polyisocyanurate foam sandwiched between two facers, valued for lightweight and speed of install when compared to gypsum-based products	C1289 Type I & II, Classes I, II, or III and Grades I, II, or III	(LTTR) 2.5
Stone Wool	Rigid boards comprised of high-density stone wool	C726	Product specific – approx. 2.0
Fiber-Reinforced Gypsum	Rigid boards comprised of cured gypsum, cement, and cellulose fibers	C1278 Type X	0.5
Asphalt Core Board	Semi-rigid panels comprised of asphalt and minerals sandwiched between two fiberglass facers	n/a	Not published
Cement Board	Rigid panels comprised of cement and organic and or inorganic filler, sandwiched between two fiberglass facers	C1325 Type A	Product specific
High Density Wood Fiber Boards	Bound wood or cane fibers	ASTM C 208, Type II, Grade 1 and Grade 2	2.6
Perlite	Volcanic minerals bound with organic fibers	C728 Types I, II, and III	2.78

Warranty Coordination

For information regarding warranty inclusion of non-CertainTeed branded thermal barriers, vapor retarders, insulation or cover boards, contact CertainTeed Commercial Roofing Technical Services Department at 800-396-8134, ext. 2.

Chapter 4 – Self-Test for Substrate Principles

Questions

Test online https://certainteed.com/low-slope-test

1. When is a vapor retarder prudent? Typical guidance says: (Select all that apply)
   - ☐ a. Average outdoor temps ≤ 40°F and winter interior RH > 45%
   - ☐ b. Average outdoor temps ≥ 60°F and interior RH < 20%
   - ☐ c. Average outdoor temps ≥ 55°F and interior RH < 40%

2. Pick the product + method that can serve as a fully bonded vapor retarder. (Select all that apply)
   - ☐ a. Glasbase/hot asphalt
   - ☐ b. Black Diamond / self-adhered
   - ☐ c. Flintlastic GTA / torch
   - ☐ d. Flintlastic SA Cap / self-adhered

3. You need R-20 from polyiso over a primed concrete deck. Which assemblies satisfy the thermal target? (Select all that apply)
   - ☐ a. One layer 3.5″ ISO
   - ☐ b. Two layers 2″ + 1.75″ ISO, joints staggered
   - ☐ c. Two layers 3” + 2” Stone Wool, joints staggered

4. Which cover boards elevate impact resistance over polyiso? (Select all that apply)
   - ☐ a. Fiber-reinforced gypsum
   - ☐ b. Stone wool board
   - ☐ c. HD polyiso cover board

5. When setting membranes in FlintBond over ISO, you must use which facer?
   - ☐ a. Standard felt facer ISO
   - ☐ b. ISO Cold (inorganic glass facer)
   - ☐ c. Either facer is approved so long as the ISO is installed in two layers with joints staggered

6. Which is the most accurate statement?
   - ☐ a. HD polyiso cover boards contribute ~2.5 R/in, specified more for lightweight and speed of install over thermal properties
   - ☐ b. HD polyiso cover boards contribute 5.6 R/in like standard ISO

7. Which insulation product offers an LTTR R-Value per inch 4<
   - ☐ a. Polyisocyanurate (ISO)
   - ☐ b. Cellular glass
   - ☐ c. Expanded Polystyrene (EPS)
   - ☐ d. Stone Wool, Type I

8. Beyond the roof plane, what else should designers consider to control convection/ air leakage?
   - ☐ a. Isolated roof vapor retarder is sufficient
   - ☐ b. Tie the roof vapor retarder into wall air/vapor barriers for continuity
   - ☐ c. Install a cover board over the vapor retarder

Chapter 5:
Roofing Membranes: Products & Systems

Your objective: 1) To understand the low-slope membrane key product categories and corresponding performance differentiators, 2) To gain a conceptual understanding of how these products are integrated into low-slope roof systems, 3) To understand the key system performance metrics that drive product selection, and 4) To learn the fundamentals of the CertainTeed low-slope membrane offer and resources available to assist in CertainTeed® low-slope product and system selection.

Low-Slope Membrane Categories

A roof membrane is defined as the coordinated system of products and components that serve to prevent water from penetrating into a building. Since the membrane serves such a critical role, this chapter is focused on a detailed look at the different types of low-slope roofing membrane products and systems that are manufactured by CertainTeed.

Low-slope membrane products have different material make-ups and performance capabilities. As such, there are five common categories that are used to identify roofing membranes, listed as follows:

- Material type (i.e., BUR, APP-modified, etc.)
- Reinforcement type (i.e., fiberglass, polyester)
- ASTM standard classification (CGSB standard in Canada)
- Applied function of the roll product (i.e., base sheet, cap sheet, etc.)
- Application method (i.e., hot asphalt, torch, etc.)

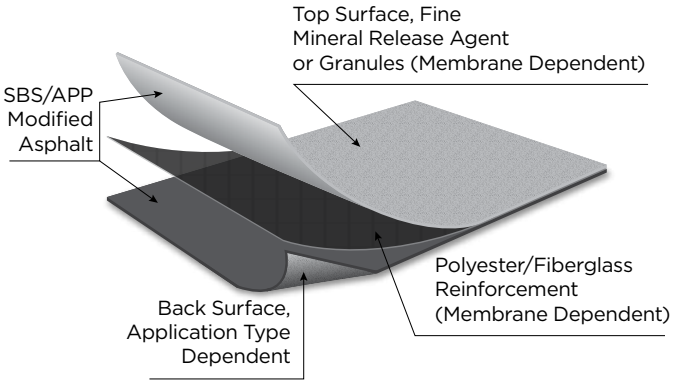
Each of these categories is explained in the following sections of this Chapter. It will become clear that every roofing membrane product and system is defined by a particular aspect of these five categories.

A frequent misconception is that warranty duration is also a low-slope category. While warranty duration may be a specific project requirement, it cannot be a product requirement as a warranty duration is associated with roof *systems*, a combination of products. CertainTeed warranties are discussed in more detail in Section 6 of this chapter.

1. Roof Membrane Material Types

The primary component of a low-slope system is the individual membrane sheet products (roll goods) that provide the weatherproofing layers. Such roof systems consist of multiple membrane layers, depending on the desired performance, warranty, and cost being sought for a specific project. Different product combinations are available to suit different project needs.

CertainTeed offers three membrane material types, summarized as follows:



Built-Up Roofing (BUR)

A BUR membrane derives its name directly from its application method. Hot asphalt is used to secure and flow through layers of permeable (non-water tight) sheets. As such, the waterproofing is "built up" as layers cure in place. BUR systems have been installed for more than a century and are valued for their dependability and durability. In BUR roof systems, the hot asphalt — once it is cured – serves as the weatherproofing element, and the felts serve to give the system dimensional stability and tensile strength.

BUR Roofing Interply Sheets

BUR Application/Installation: All CertainTeed BUR systems are installed utilizing hot asphalt. CertainTeed does not allow the use of cold-process adhesives in BUR roof membranes.

Styrene-Butadiene-Styrene (SBS)-Modified Membranes

SBS-modified membranes are comprised of asphalt that has been blended with polymers designed to give the material rubberized properties. SBS-modified membranes are valued for flexibility in handling, especially in low temperatures. Unlike a permeable BUR sheet, an SBS-modified membrane is a waterproof product unto itself. As such, multi-ply SBS-modified roof systems, installed correctly, reduce the risk of water penetration into a building. Additionally, the use of multiple layers of SBS provides better puncture resistance and system longevity.

SBS Roofing

SBS Application/Installation: The application methods for CertainTeed SBS membranes are product-specific and include hot asphalt, cold adhesive, torch-welded and self-adhered.

Atactic Polypropylene (APP)-Modified Membranes

APP-modified membranes are comprised of asphalt that has been blended with polymers designed to give the material plasticized properties. APP-modified membranes are valued for strength and enhanced UV stability. Just as with SBS-modified membranes, APP-modified membranes are also waterproof and provide extra durability and resilience when combined in multilayer applications.

APP Roofing Membrane

APP Application/Installation: All CertainTeed APP membranes are torch-welded.

Note that, in addition to the modification of asphalt with APP or SBS polymers, other additives can be blended in to further enhance desired performance characteristics. "FR" products, for example, are manufactured with proprietary additives to increase fire resistance.

2. Membrane Reinforcements

Reinforcement mats serve as the structural skeleton at the core of asphaltic membrane products, supporting strength, resilience and dimensional stability. The reinforcement mats are infused and coated with non-modified or modified asphalt, as appropriate to the membrane type. CertainTeed offers low-slope roofing membrane products with either fiberglass or polyester mats of varying weights.

A. Fiberglass stands up well to heat and tension. Its inherently high melting point affords superior fire resistance when combined with a fire-retardant asphalt formulation. Fiberglass-reinforced products applied in hot asphalt retain excellent dimensional stability. Additionally, fiberglass has superior tensile strength. When combined with SBS-modified asphalt, the sheets will resist roof movement until stress absorbed in the mat forces a break.

B. Polyester provides the benefits of puncture resistance, tear strength, and high elongation. Polyester products handle rooftop foot traffic better. They also absorb the strain of building movement and return back to their original dimensions, which makes them ideal for flashings and other areas where building movement is a concern.

NOTE: *CertainTeed BUR roll goods are manufactured only with fiberglass reinforcement mats. CertainTeed manufactures SBS and APP membranes with both fiberglass and polyester reinforcements*

3. ASTM / CGSB Classification

A roof membrane product is sometimes referred to based upon the performance standard that it is designed or specified to meet. In the United States, the American Society for Testing and Materials (ASTM) publishes standards for material physical properties as well as test methods associated with each standard. In Canada, the Canadian General Standards Board (CGSB) provides the same service with its own set of testing standards. Designers of record use these tests to define the roofing products, installations, and performance parameters of the system.

CertainTeed offers products that meet the following commonly cited ASTM standards for low-slope roofing roll goods.

ASTM STANDARDS FOR ROOF MEMBRANE ROLL GOODS

Standard	Subcategories	ASTM Standard	CertainTeed Product(s)
D2178	**Asphalt** Glass Felt	Type IV	Flintglas® Ply 4
D4601	**Asphalt**-Coated Glass Fiber Base Sheet	Type I	Black Diamond® Base Sheet
D4601	**Asphalt**-Coated Glass Fiber Base Sheet	Type II	Glasbase™, Flintlastic® SA NailBase, Flintlastic SA PlyBase, All Weather/ Empire® Base Sheet, Flintlastic Poly SMS, Flintlastic Base 20
D3909	**Asphalt** Roll Roofing (Glass Felt) Surfaced with **Mineral Granules**	n/a	Flintglas MS Cap, Flintglas MS Cap CoolStar®
D6509	**APP**-Modified Bituminous Base Sheet Materials Using **Glass Fiber Reinforcements**	n/a	Flintlastic APP Base T
D6222	**APP**-Modified Bituminous Sheet Materials Using **Polyester Reinforcements**	Type I, Grade G	Flintlastic GTA, Flintlastic GTA CoolStar, Flintlastic GTA-FR, Flintlastic GTA-FR CoolStar
D6222	**APP**-Modified Bituminous Sheet Materials Using **Polyester Reinforcements**	Type I, Grade S	Flintlastic STA, Flintlastic STA Plus
D6163	**SBS**-Modified Bituminous Sheet Materials Using **Glass Fiber Reinforcements**	Type I, Grade G	Flintlastic SA Cap FR, Flintlastic SA Cap FR CoolStar
D6163	**SBS**-Modified Bituminous Sheet Materials Using **Glass Fiber Reinforcements**	Type I, Grade S	Flintlastic SA MidPly, Flintlastic Ultra Glass SA
D6164	**SBS**-Modified Bituminous Sheet Materials Using **Polyester Reinforcements**	Type I, Grade G	Flintlastic SA Cap, Flintlastic SA Cap CoolStar, Flintlastic GMS, Flintlastic FR-P
D6164	**SBS**-Modified Bituminous Sheet Materials Using **Polyester Reinforcements**	Type I, Grade S	Flintlastic Ultra Poly SMS
D6164	**SBS**-Modified Bituminous Sheet Materials Using **Polyester Reinforcements**	Type II, Grade G	Flintlastic GTS-FR, Flintlastic GTS-FR CoolStar, Flintlastic Premium FR-P, Flintlastic Premium FR-P CoolStar

While many test methods are referenced in ASTM standards, the most commonly referenced is ASTM D5147 Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Material. The matrix below highlights some of the most important performance metrics.

Metric of Performance	What It Measures:	Why It Matters:	What You'll See:
Peak Load or Tensile Strength	**This is the measurement of force required to pull the membrane on opposite sides until "peak load."** Peak load is the highest force measured before the product begins to fail (at which point the force to continue to separate the product decreases).	Tensile strength indicates, in part, how the membrane performs under expansion and contraction stress, as the temperature fluctuates and is also an indicator of tolerance to more severe point stresses, such as foot traffic.	A peak load or tensile of "65/40" indicates that the product required 65 lbs. of force (in machine direction, 40-inch cross) to break a one-inch sample. **The higher the number, the better the material can resist breakage.**
Elongation/ Ultimate Elongation	**This is the measurement of percentage changes in length, at "peak load", and directly before complete breakage.** Ultimate Elongation is similar but measured once the force is reduced to 5% of peak load.	Like tensile strength, elongation is another indicator as to how the membrane performs under expansion and contraction stress, and fluctuates. It is also an indicator of tolerance to more severe point stresses, such as foot traffic.	An elongation of "6/5" indicates that the material stretched to 6% of its original length (in the machine direction, 5% in cross) after the "peak load" was reached and before breaking.
Tear Strength	The measurement of how a material resists the growth of cuts when under tension.	Tear strength indicates how well a membrane will sustain expansion and contraction over a pressure point (i.e., a 90° angle), especially once a tear forms.	A tear strength of "115/105" indicates that 115 lbs. of force was required to tear the product (in the machine direction, 105 in the cross direction) where it was already notched.
Compound Stability	This is the measurement of transition to a semi-liquid state under controlled, elevated temperature.	Compound stability indi-cates how well a membrane performs in extreme heat (i.e., will a very hot roof imprint with foot traffic).	"No failures" will indicate that none of the samples tested dripped during the test.
Low-Temperature Flexibility	This is the measurement of breakage when bent over a mandrill at very low temperatures.	Low-temperature flexibility indicates how well a membrane performs in extreme cold (i.e., will it crack being unrolled or with point load stress, such as foot traffic).	A Low Temp Flex of "0" would indicate that the sample did not crack during the test at this temperature.

Building Fire/Wind Requirements

It is important to note that when projects require a specific fire or wind uplift resistance rating, the system is granted these performance approvals, not the singular component. CertainTeed has preapproved systems within various code and compliance bodies such as UL, FM, Miami Dade, to name a few, all of which use ASTM or similar standards as their basis. It is important to be familiar with your local building codes and or facility insurance requirements before selecting any materials or coordinated roof membrane systems. Contact CertainTeed Commercial Roofing Technical Services at 800-396-8134, ext. 2 for system selection assistance.

4. Applied Function

Different membrane roll goods are each manufactured with a specific purpose related to the function they provide after they are applied. Roll goods can be categorized into one or more of the following functions:

- Anchor Sheet
- Base Sheet
- Base Ply
- Ply Sheets (BUR)
- Interply Sheet(s) (modified bitumen)
- Cap Sheets

Each of these is described in more detail in the following paragraphs, including the need to coordinate with each other to create a fully warrantable roofing system.

Anchor Sheets

An anchor sheet may not be found in every bituminous roof system. When utilized, they are mechanically attached sheets which serve as a suitable surface for adhered insulation. A roll good product that may serve as an anchor sheet may also serve as a base sheet or base ply depending on where it is installed in the roof system and how it is installed.

Base Sheets

Base sheets are the first layer of the roof membrane system when the first layer is mechanically attached. Depending on roof system design, a base sheet may be installed directly to the roof deck or an approved substrate. These sheets vary in thickness depending on their purpose in the system. When a base sheet is mechanically fastened, the roof system is able to expand and contract (move) independent of the roof deck.

Base Plies

Base plies are the first layer of the roof membrane system when the first layer is fully adhered. These sheets vary in thickness depending on their purpose in the system.

Sometimes a roofing primer, such as FlintPrime®QD Asphalt Primer, may be required or recommended to support better adhesion of the membrane to the roof deck or substrate.

Depending on the product, CertainTeed base plies can be self-adhered, torch-applied, set-in adhesives, or asphalt.

CertainTeed Base Ply Product Spotlight

Black Diamond® Base Sheet is a self-adhering, SBS-modified base ply manufactured with fiberglass reinforcement. It is created to serve as a base ply for torch-welded or hot asphalt applied interply or cap sheets, reducing the labor burden of the overall roof system. NOTE: Black Diamond's self-adhesive relies on heat from a torch or hot asphalt to form a permanent bond; it cannot be installed with a self-adhered or cold adhesive interply or cap sheet. Black Diamond's top surface is comprised of opaque slag valued for extremely high UV stability allowing Black Diamond to serve as a temporary roof as needed for up to six months.

Flintlastic® Ultra Glass SA is a premium self-adhering, SBS-modified base ply manufactured with fiberglass reinforcement. Flintlastic Ultra Glass SA is designed to serve as a base ply for torch-welded, hot asphalt, or cold adhesive applied interply and/or cap sheets, reducing the labor burden of the overall roof system. NOTE: Flintlastic Ultra Glass SA does not require additional heat to activate the adhesive. This product is not intended to be used as a temporary roof.

Ply Sheets

CertainTeed BUR roof systems are created by building redundant layers of asphalt reinforced with fiberglass ply sheets. Systems are typically four plies, which consists of three plies of fiberglass felt and a mineral surfaced cap sheet as the top ply. Other options include using Glasbase™ Base Sheet for the bottom ply instead of a ply sheet, and/or the final surfacing having a coating or flood coat and gravel, in place of the mineral surfaced cap sheet.

Interplies

In modified bitumen systems, interplies, when utilized, are placed in between the base sheet and the cap sheet. As a third (or more) layer, water protection exponentially increases, helping to diminish the risk of leaks. Interplies are not a required element of every modified bitumen roof system. Nonetheless, interplies are often specified in low-slope roofing systems to obtain an extended warranty or to comply with a specific fire or wind uplift rating. All CertainTeed products that can serve as base plies can also serve as interplies. For example, Flintlastic Base 20 can be the base ply in a roof system; a second layer of the same product could be installed as an interply. Base and interply products do not have to be identical.

Cap Sheets

All asphalt-based roofing systems have the exposed top surface as the weathering layer, which is subjected to cold, heat, wind, precipitation, UV, and foot traffic.

Most of CertainTeed's cap sheets are surfaced with ceramic granules, which provide UV protection and aesthetic appeal. The opaque granules are factory-applied to the sheet and serve as the primary "sunblock" for the membrane. CertainTeed low-slope granule blends are designed and manufactured with a solid and multi-granule mix to complement our most popular shingle colors, allowing for a uniform transition from steep to low-slope roofs where required. CertainTeed does not stock all cap sheets in every color. Some colors are made-to-order or are not available, depending upon the product.

Most CertainTeed cap sheets are available with CoolStar® highly reflective surfacing. Different CertainTeed cap sheets can be installed with hot asphalt, cold adhesive, torch-applied, or factory applied self-adhesive, and each affords different performance features.

Coatings

Coatings are used to protect cap sheets when they are not otherwise protected by either a granulated surface (i.e., smooth-surfaced cap sheets are used) or a protective covering of roofing gravel. CertainTeed offers three smooth-surfaced products that may be utilized as cap sheets:

- **Flintlastic STA** is an APP-modified, torch-welded membrane.
- **Flintlastic STA Plus** is a premium APP-modified, torch-welded membrane.
- **Flintlastic Ultra Poly SMS** is a premium SBS-modified membrane that can be set in hot asphalt, cold-adhesive or torch-applied and is the only membrane allowed in the CertaFast specification. See Chapter 9 for details.

These smooth-surfaced cap sheets will degrade over time when exposed to UV light from the sun. Therefore, CertainTeed requires that these sheets be coated with SMARTCOAT™ for durability (see Chapters 6 and 14 for information on these coatings). Such coatings over smooth surfaced cap sheets are required for product and system warranties. In some cases, an elastomeric or aluminum coating also may be specified as part of a smooth BUR warranted system.

5. Membrane Application Methods

It is very common to refer to a roofing membrane system based upon the way it is installed or applied. Both BUR and Modified Bitumen membranes may be installed by using one or more of the following application methods:

- Mechanical Fastening
- Hot Asphalt/Mop
- Cold Adhesive/Squeegee or Brush
- Torch-Welded
- Self-Adhered

While cap sheets are never mechanically attached on low-slope roof systems, with the exception of backnailing scenarios as required on certain slopes, fundamentally all rolled goods can be mechanically fastened. In most cases, however, the back surface of a membrane product defines how the product can be installed.

Products with a fine sand back surface, functioning mainly as a release agent to prevent the roll from sticking to itself during manufacturing wind up, can be applied with hot asphalt or cold adhesive. Products engineered to be torch-welded are backed by a polyethylene film which burns off during application, in part, providing a visual indicator to the contractor that sufficient heat has been applied. And, self-adhered membrane products are manufactured with a factory-applied release film, removed during application.

The following table summarizes the benefits and limitations of each application method:

MEMBRANE APPLICATION METHODS

Application	Benefit	Limitation
Mechanical Fasteners	Fast installation, allows the roof system to expand and contract independent of the roof deck	Requires correct type and properly placed fasteners, may cause thermal bridging, depending upon the application
Hot Asphalt	Proven, durable, cost-effective material	Fumes/odor, burn-risk, cost, and availability of trained labor and equipment
Cold Adhesive	No kettle, minimal tools, very good adhesion when applied correctly	May take up to 45 days to cure, high fumes, relatively high price for material
Torch-Welded	Faster than hot asphalt or cold adhesive, very good adhesion when applied correctly	Risk of burn/fire, risk of improper application, cost and availability of trained labor, cost of propane
Self-Adhered	Faster to train and install, very good adhesion when applied correctly, low fumes, no kettle, no burn/fire risk	Self-adhered membranes can be challenging to apply in extreme weather environments. **NOTE:** If cold temperature installation procedures are followed, SA may be installed in 20° - 49°F temperature.

These methods are each described in more detail below.

Mechanical Fasteners

Anchor or base sheets may be mechanically attached to roof decks or other substrates. Typically, this is done to wood, steel, and LWIC — although any deck has the potential to be attached to mechanically. Refer to Chapter *6, Other Roofing Components, Fasteners and Adhesives* for comprehensive information on approved fasteners.

Hot Asphalt

Roof systems are considered a "hot" or "mop" system when the cap sheet is set in hot asphalt using a mop. Hot systems are commonly installed with mechanically fastened, self-adhered, or hot-applied base sheets/plies. Application method of the base sheet/ply is typically determined by roof deck or substrate, architectural specification, warranty duration requirement, or wind uplift requirement. Refer to Chapter 11, Hot-Applied Modified Bitumen Roofing Systems for a comprehensive list of CertainTeed hot-applied products as well as approved complementary base sheets/plies.

Cold Adhesive

Roof systems are considered a "cold-process" or a "cold-applied" system when the cap sheet is set in cold adhesive, such as FlintBond® SBS-Modified Adhesive, or Millennium Hurricane Force® 1 Part Membrane Membrane or Flashing Adhesives. Cold systems are commonly installed with mechanically fastened, self-adhered, or cold-applied base sheets/plies. Application method of the base sheet/ply is typically determined by roof deck or substrate (some cannot handle the solvent within a cold adhesive), architectural specification, warranty duration requirement, or wind uplift requirement. Refer to Chapter 12, Cold-Applied Modified Bitumen Roofing Systems for a comprehensive list of CertainTeed cold-applied products as well as approved complementary base sheets/plies.

NOTE: Do not apply an APP-modified asphalt membranes with FlintBond SBS Modified Adhesive.

Torch Welding

Roof systems are considered a "torch" system when the cap sheet is torch-applied. Torch-welding is one of the earliest methods of modified bitumen applications. It is valued for speed, relatively low labor cost when compared to hot asphalt or cold adhesive, and year-round application capability. However, it is considered unsafe by some construction/building industry stakeholders, is associated with relatively high insurance premiums for roofing contractors and, in some cases, is prohibited by building insurers. Torch systems may be installed to the appropriate base or interply sheets that have been mechanically attached, self-adhered, or torch-applied. It is not safe to torch membranes directly to substrates underlying approved CertainTeed base sheets/plies. Application of a torch-applied base sheet is typically determined by roof deck or substrate (some cannot withstand the heat of a torch flame), architectural specification, warranty duration requirement, or wind uplift requirement. Refer to Chapter 10, Torch-Applied Modified Bitumen Roofing Systems for a comprehensive list of CertainTeed torch-applied products as well as approved complementary base sheets/plies.

Self-Adhered

Self-adhered membranes deliver time-tested benefits of modified bitumen roof systems without the health or safety hazards of hot asphalt, cold adhesive, or torch application. These membranes require minimal equipment for installation and less training to produce a qualified labor force. Additionally, because they are odorless, they do not disrupt building occupants present during a roofing application which makes self-adhered systems an ideal solution for healthcare, education, hospitality, and residences/condos where occupant comfort is tremendously important. Self-adhered membranes are manufactured with a pressure sensitive adhesive on the bottom surface, faced in the factory with a release film, removed in the field during application.

The value of self-adhered systems associated with labor savings and safety can be applied to any roof project. In addition, self-adhered roof systems are ideal when access to the roof is limited, such as high-rise buildings.

CertainTeed products and systems utilize specific naming conventions. While not all product names necessarily adhere to these rules, the following overview will provide a fundamental understanding of "CertainTeed language" that can be applied to most products and systems covered in this Manual. For a detailed listing of general low-slope roofing terms commonly used across the roofing industry, see APPENDIX 1 of this Manual.

The following CertainTeed products are included in this manual:

Product Name Brands: The majority of CertainTeed low-slope roofing product brands use "Flint" as a prefix to the product brands. Its origin is based upon our acquisition of GS Roofing in the 1990s.

- Flintglas® is the CertainTeed brand for non-modified or built-up roofing (BUR) roll goods.
  - Glasbase™ Base Sheet is an exception.
- Flintlastic® is the CertainTeed brand for SBS-modified and APP-modified roll goods.
  - All Weather/Empire® Base Sheet is an exception.
  - Black Diamond® Base Sheet is an exception, named for the opaque slag material utilized on the product's top surface.
  - CoolStar® granulated cap sheets offer the latest technology in reflective roofing materials to meet energy conservation and environmental codes.

Roll Goods: Many roll goods are named with three-letter acronyms that represent the SURFACE, the APPLICATION, and the MATERIAL, such as the following:

- GTA: Granule-Torch-APP
- STA: Smooth-Torch-APP
- GMS: Granule-Mop-SBS
- GTS: Granule-Torch-SBS
- SMS: Smooth-Mop-SBS

Specialty Acronyms: Some product names include a two-letter acronym to identify some basic properties, including the following:

- SA is an acronym for Self-Adhering.
- FR is an acronym added to the of products that have enhanced Fire Resistant properties; for example Flintlastic FR-P is a fire resistant , polyester reinforced cap sheet.
- MS is an acronym Mineral Surface which designates the cap sheet used in BUR systems

Overall, under its Flintlastic® label, CertainTeed offers a complete line of hot asphalt, cold process, torch welded, and self-adhered systems, providing a wide array of APP and SBS–modified bitumen roofing choices and Flintglas® built-up roofing options. Accessory products such as FlintBoard® insulation, Millennium insulation adhesive, FlintBond® adhesives, FlintEDGE® metal, FlintPrime® QD asphalt primer, CoolStar® granulated cap sheets offer the latest technology in reflective roofing materials to meet energy conservation and environmental codes.

CertainTeed Low-Slope Membrane Products

CERTAINTEED ROLL GOODS BY MEMBRANE MATERIAL, REINFORCEMENT, APPLIED FUNCTION, AND APPLICATION TYPE

Base/Ply	Application Type	Reinforcement	CertainTeed Products
SBS	Self-Adhered	Fiberglass	Flintlastic SA NailBase (mechanically attached) Flintlastic SA PlyBase Flintlastic SA MidPly Black Diamond Base Sheet Flintlastic Ultra Glass SA
	Torch	Polyester	Flintlastic Ultra Poly SMS
	Hot Asphalt/ Cold Adhesive	Fiberglass	All Weather/Empire Base Sheet Flintlastic Base 20
		Polyester	Flintlastic Poly SMS Flintlastic Ultra Poly SMS
APP	Torch	Fiberglass	Flintlastic APP Base T
		Polyester	Flintlastic STA Flintlastic STA Plus
BUR	Hot Asphalt	Fiberglass	Glasbase Base Sheet Flintglas Ply 4

Cap	Application Type	Reinforcement	CertainTeed Products
SBS	Self-Adhered	Fiberglass	Flintlastic SA Cap FR (CoolStar)
		Polyester	Flintlastic SA Cap (CoolStar)
	Torch	Polyester	Flintlastic Ultra Poly SMS Flintlastic GTS-FR (CoolStar)
	Hot Asphalt/Cold Adhesive	Polyester	Flintlastic GMS Flintlastic Ultra Poly SMS (requires coating as cap) Flintlastic FR-P Flintlastic Premium FR-P (CoolStar)
APP	Torch	Polyester	Flintlastic GTA (CoolStar) Flintlastic GTA-FR (CoolStar) Flintlastic STA (requires coating as cap) Flintlastic STA Plus (requires coating as cap)
BUR	Hot Asphalt	Fiberglass	Flintglas MS Cap Sheet (CoolStar)

SELF-ADHERED MODIFIED ASPHALT MEMBRANES

Product	Description	Rolls/Pallet
Flintlastic® SA NailBase	Base sheet when utilizing Flintlastic SA Cap (FR) on nailable substrate.	25
Flintlastic SA PlyBase	Base ply when utilizing Flintlastic SA Cap (FR) on approved substrates where direct adhesion is allowed and an unpenetrated membrane is desired.	25
Flintlastic SA MidPly	CertainTeed's unique, most robust self-adhering base for fully self-adhered systems. When utilizing Flintlastic SA Cap (FR) on approved substrates where direct adhesion is allowed and an unpenetrated membrane is desired; included in two-ply systems with 25-year warranty coverage.	25
Flintlastic SA Cap	Tried and true modified bitumen performance with significantly reduced labor over torch, hot asphalt or cold adhesive applications. No fumes, no kettle, no flame, no disruption.	25
Flintlastic SA Cap FR	See "Flintlastic SA Cap" plus fiberglass reinforcement mat allows for improved dimensional stability. Option to be incorporated in Class A fire rated system and achieve Class IV Impact Resistance.	25
Flintlastic SA Cap CoolStar®	See "Flintlastic SA Cap" plus highly reflective. Reduces thermal heat gain, improving building comfort and reducing energy cost.	25
Flintlastic SA Cap FR CoolStar	See "Flintlastic SA Cap FR" plus highly reflective. Reduces thermal heat gain, improving building comfort and reducing energy cost.	25
Black Diamond Base Sheet	When utilizing torch or hot-applied cap sheet on approved substrates where direct adhesion is allowed and an unpenetrated membrane is desired.May be exposed for up to 6 months.	30
Flintlastic Ultra Glass SA	CertainTeed's most unique sheet is robust and versatile. This self-adhered base sheet is designed for use with hot asphalt, cold proscess or torch applied cap sheets on approved substrates where direct adhesion is allowed and an unpenetrated membrane is desired. 100% more asphalt per square than Black Diamond Base Sheet and a 70% heavier fiberglass mat.	25

TORCH-APPLIED MODIFIED ASPHALT MEMBRANES

Product	Description	Rolls/Pallet
Flintlastic APP Base T	Economical option for strong, homogenous (APP to APP) system when utilizing an APP-modified cap sheet.	25
Flintlastic STA	When used as a base sheet STA offers Strong, robust, homogeneous (APP to APP) system. It may also be used as an interply or cap sheet. When used as a cap sheet it requires coating.	25
Flintlastic STA Plus	See "Flintlastic STA" but manufactured as a premium thicker sheet.	20
Flintlastic Base 20 T	Offers the strength of fiberglass reinforcement and the pliability of SBS-modified asphalt.	25
Flintlastic Ultra Poly SMS	CertainTeed's most robust base ply; combines high performance, extra-tough, stress-resistant polyester mat with pliable SBS-modified asphalt; pairs well with any torch cap, cold or hot-applied sheet and offers extended warranties.	25
Flintlastic GTA	Workhorse granule-surfaced, torch-grade, APP-modified cap sheet; combines strength and UV stability of APP-modified asphalt with the stress-resistance of its polyester reinforcement mat.	25
Flintlastic GTA-FR	See "Flintlastic GTA"; fire retardant additives enables incorporation in Class A fire rated system.	25
Flintlastic GTA CoolStar	See "Flintlastic GTA" plus highly reflective. Reduces thermal heat gain, improving building comfort and reducing energy cost.	25
Flintlastic GTA-FR CoolStar	See "Flintlastic GTA-FR" plus highly reflective. Reduces thermal heat gain, improving building comfort and reducing energy cost.	25
Flintlastic GTS-FR	Granule surfaced, torch-grade SBS-modified cap sheet; CertainTeed's most robust (Type II) torch-grade cap sheet with a high-performance, extra-tough, stress-resistant (excellent elongation) polyester mat. Fire retardant additives enables incorporation in Class A fire-rated system.	25
Flintlastic GTS-FR CoolStar	See "Flintlastic GTS-FR" plus highly reflective. Reduces thermal heat gain, improving building comfort and reducing energy cost.	25

COLD ADHESIVE/HOT ASPHALT-APPLIED MODIFIED ASPHALT MEMBRANES

Product	Description	Rolls/Pallet
All Weather®/Empire Base Sheet	Economical, lightly SBS-modified non-permeable base sheet to allow for more uniform application than non-modified sheets.	25
Flintlastic Base 20	Offers the strength of fiberglass reinforcement with the pliability of SBS-modified asphalt.	25
Flintlastic Poly SMS	Most economical polyester-reinforced base sheet; both SBS-modified asphalt and polyester reinforcement mats are valued for pliability and stress resilience.	25
Flintlastic Ultra Poly SMS	CertainTeed's most robust base ply; combines high performance, extra-tough, stress-resistant polyester mat with pliable SBS-modified asphalt; pairs well with any cap torch, cold or hot-applied sheet and offers extended warranties.	25
Flintlastic GMS	Workhorse granule surfaced, mop-grade, SBS-modified cap sheet; combination of stress-resistant polyester reinforcement mat and pliable SBS-modified asphalt delivers high resistance to strain caused by building movement	25
Flintlastic FR-P	See "Flintlastic GMS" with additional SBS-modified asphalt and fire retardant additives enables incorporation in Class A fire-rated system.	25
Flintlastic Premium FR-P	See "Flintlastic FR-P" with high performance, extra-tough, stress resistant polyester mat to allow for "Type II" ASTM performance classification.	25
Flintlastic Premium FR-P CoolStar	See "Flintlastic Premium FR-P" plus highly reflective. Reduces thermal heat gain, improving building comfort and reducing energy cost.	25

BUILT-UP ROOFING (BUR) SHEETS

Product	Description	Rolls/Pallet
Glasbase Base Sheet	Economical, non-modified, permeable base sheet.	25
Flintglas Ply 4	Economical, non-modified, permeable ply sheet.	30
Flintglas MS Cap Sheet	Economic cap solution for built-up roofing systems, reduces labor when compared to flood coat and gravel. Can also be inverted and used as a venting base sheet with granule side down.	25
Flintglas MS Cap Sheet CoolStar	See "Flintlastic MS Cap Sheet" plus highly reflective. Reduces thermal heat gain, improving building comfort and reducing energy cost.	25

Membrane Material Selections

In addition to the aforementioned information, the following should be considered when selecting products for the low-slope roof assembly.

Anchor, Base Sheet/Ply Selection

Roof Deck or Substrate Implications

CertainTeed base sheets are mechanically attached; base plies can be installed with hot asphalt, cold adhesive, torch-applied or factory applied self-adhesive. As discussed in earlier chapters, base sheets/plies shall be selected to align with approved application methods for respective roof decks or substrates.

Cap Sheet Selection/Application

In some cases, if the cap sheet has been selected, the base sheet/ply selection is significantly influenced. For example, Flintlastic SA Cap (FR/CoolStar) may only be paired with Flintlastic SA NailBase, SA PlyBase or SA MidPly. Further, since Black Diamond Base Sheet must be paired with a cap sheet that is affixed with hot asphalt or torch-welded, the selection of a cap sheet that does not install with one of these methods would eliminate the potential for Black Diamond to be specified.

Lastly, in some cases, specifiers or contractors prefer material-homogeneous systems. In other words, if an SBS-modified cap sheet is specified, only an SBS-modified base sheet/ply may be considered. In contrast, some architects or contractors prefer to incorporate the benefits of both material types including both SBS and APP-modified membrane products in the system.

Ply Sheet Selection (BUR)

As noted previously, ply sheets are integral to BUR and hybrid BUR/modified roof systems. Some CertainTeed base sheets, such as Glasbase Base Sheet, may be used as the first ply of these systems. Otherwise, multiple plies of Flintglas Ply 4 shall be utilized.

Interply Selection

All CertainTeed base plies can be utilized as interplies, which some contractors prefer, as this limits the number of materials on a project. In other cases, specific interply roll good products are selected as part of a coordinated system.

Cap Sheet Selection

Cap Sheet Application

Application methodology is frequently the primary driver for preliminary product selection when it comes to cap sheets. Different CertainTeed cap sheets can be installed with hot asphalt, cold adhesive, torch-applied, or factory-applied self-adhesive. Specifiers or contractors commonly prefer one application method over another due to familiarity and/or environmental/building constraints.

Reflectivity Requirements

Where energy conservation is a goal or code mandated, CoolStar cap sheets or cap sheets coated with SMARTCOAT bright white acrylic or silicone coatings shall be specified.

Membrane Systems

Individual sheets or membranes, described above, are specified or selected to form multi-ply bituminous roof systems.

CertainTeed System Spec Guides

CertainTeed publishes the Commercial Roof Systems Specifications manual to guide in the specification of low-slope roof systems. These Specification Guides are classified in CertainTeed specific alphanumeric combinations to identify the general make-up of a particular roofing system, as summarized in the table below.

Specification Examples

Cap Material	Surfacing	Base Attachment	Total Plies	Cap Application
BUR	**(M)**	**N**	**5**	**A**
SA		**C**	**2**	**S**

Each CertainTeed roof system Specification Guide, such as SA-C-3-S, includes multiple base, interply (if applicable), and cap sheet options. Limited Warranty durations are dependent upon both the Specification Guide and specific product configuration.

Specification Example Terms

Cap Material

- **SA** Self-Adhered
- **APP** Atactic Polypropylene
- **SBS** Styrene Butadiene Styrene
- **BUR** Built Up Roofing

Surfacing

- **(G)** Gravel
- **(M)** Mineral Surfaced Cap Sheet
- **(S)** Smooth

Base Attachment

- **C** Fully-adhered/Non-insulated Substrate
- **I** Fully-adhered/Insulated Substrate
- **IN** Mechanically Attached Through Insulated Substrate
- **N** Mechanically Attached Through Non-Insulated Substrate

Total Plies

- 2, 3, 4 or 5

Cap Attachment

- **S** Self-Adhered
- **T** Torch Weld
- **A** Hot Asphalt
- **C** Cold Process/Adhesive
- **CF** CertaFast (specialty application, see specification)

Additional Resources for Low-Slope Roof System Design and Specifications

General CertainTeed Resources

- CertainTeed Low-Slope Product Selection Guide
- CertainTeed Commercial Roof System Specifications manual
- CertainTeed Websites
  - www.certainteed.com
- Your local CertainTeed Commercial Territory Manager
- CertainTeed Commercial Technical Services Department
  - 800-396-8134 ext. 2 or
  - Email: rpg@saint-gobain.com
- CertaSpec, a web-based submittal tool, aids contractors and specifiers in system selection and proposal generation. All documents are as current as the CertainTeed website content, which is continuously updated and enhanced. CertaSpec provides you with:
  - Proposal letter
  - Short specs
  - Technical data sheets
  - Installation information
  - Warranty specimens
  - Construction details

Codes, Standards, and Approval Resources

- Building Codes
  - International Code Council https://www.iccsafe.org/
- Fire Performance
  - Underwriters Laboratories (UL) https://www.ul.com/
  - Factory Mutual (FM) https://www.fmapprovals.com/
- Wind Uplift Performance
  - Florida Building Code https://floridabuilding.org/c/default.aspx
  - Miami Dade Notice of Acceptances (NOA) https://www.miamidade.gov/building/notices.asp
  - Texas Department of Insurance (TDI) https://www.tdi.texas.gov/wind/index.html
  - Factory Mutual (FM) https://www.fmapprovals.com/
- Solar Reflectivity
  - Cool Roof Rating Council (CRRC) https://coolroofs.org/directory

Chapter 5 – Self-Test for Roofing Membranes

Questions

Test online https://certainteed.com/low-slope-test

1. Which pairings are permitted?
(Select all that apply)
   - ☐ a. Flintlastic SA Cap over SA NailBase/ SA PlyBase/SA MidPly
   - ☐ b. Black Diamond base with a cold-applied cap
   - ☐ c. Black Diamond base with a torch or hot-applied cap

2. You need minimal odor on an occupied healthcare building with limited roof access. Which method best fits?
   - ☐ a. Torch
   - ☐ b. Hot asphalt
   - ☐ c. Self-adhered

3. Which is more tolerant of point stress and movement at flashings?
   - ☐ a. Polyester reinforcement (high elongation)
   - ☐ b. Fiberglass reinforcement

4. Which smooth membranes require coating when used as the exposed cap sheet?
(Select all that apply)
   - ☐ a. STA/STA Plus
   - ☐ b. Ultra Poly SMS
   - ☐ c. Flintglas Ply 4

5. "Do-Not-Mix" quick check
(Select all that apply
   - ☐ a. Don't use FlintBond (SBS) on APP membranes
   - ☐ b. Don't install Black Diamond Base Sheet with Flintlastic SA Cap
   - ☐ c. Don't intermix non-tested manufacturers' plies in one system

6. Which statement is correct?
   - ☐ a. Cap sheets can be mechanically attached in the field so long as laps are heat welded.
   - ☐ b. Cap sheets are not mechanically attached (except back-nailing where slope requires)
   - ☐ c. Smooth surface membranes can be mechanically attached as cap sheets with no additional lap treatment if they are coated.

7. For code-driven reflectivity without a coating step, pick a cap option.
   - ☐ a. GTA-FR CoolStar (APP granulated, highly reflective)
   - ☐ b. STA (smooth APP, uncoated)
   - ☐ c. SA Cap White (SBS granulated, published reflectivity)

8. Beyond the roof plane, what else should designers consider to control convection/ air leakage?
   - ☐ a. Isolated roof vapor retarder is sufficient
   - ☐ b. Tie the roof vapor retarder into wall air/vapor barriers for continuity
   - ☐ c. Install a cover board over the vapor retarder

Chapter 6:
Accessories

Your objective: To learn about additional miscellaneous required or optional products that contribute to the success of a low-slope roofing system.

Completing a Roof System

Beyond the roof structure, substrates, and membranes, other components needed or may be required to assure that a roof system either performs to its highest potential or ties in properly with other parts of the building. These components, sometimes referred to as "accessories", include:

- Fasteners and Adhesives
- Membrane Primer
- Coatings and Surfacing
- Flashing Adhesive
- Metal Flashing Accessories

Each of these components is reviewed in more detail in the following sections.

TIP: Top load CertainTeed accessories on full truckloads for no additional freight.

1. Fasteners and Adhesives

Fasteners are used in roofing applications for the attachment of roofing insulation (FlintBoard®) and/or base and anchor sheets. The details of each type of fastening approach follow.

1A – Fasteners for Insulation and Cover Boards

Mechanical attachment of insulation and/or cover boards is one method of attachment over steel, wood, lightweight insulating concrete, gypsum, cementitious wood fiber, and, in some cases, structural concrete.

Many mechanical fastening systems includes two pieces that are designed to work together so that they resist wind uplift and prevent lateral movement of insulation, cover boards, or base sheets:

Screws: The primary fastening component is the screw (or occasionally a nail), which penetrates through the material being secured—such as insulation, cover board, or base sheet—into the roof deck. The type of fastener used depends on the roof deck material. Screws are classified by diameter, expressed as numbers (e.g., #12, #14, #15), with higher numbers indicating larger diameters and greater pullout resistance. For example, a typical pullout value in a 22-gauge steel deck is approximately 680 pounds. Fastener length is determined by the combined thickness of the materials being fastened plus the depth required to properly engage the deck. Naturally, fasteners penetrating 2 inches of insulation must be longer than those securing a single ply of base sheet. Proper selection of screw size and length is essential for roof system performance and durability.

Stress Plates: These are essential in mechanically attached roof systems to prevent concentrated uplift forces from damaging insulation, cover boards, and/or membranes. Screw heads are relatively small, because of this, high wind loads could create punctures around the fastener. To counter, a larger metal stress plate with a central hole is used to spread the force across a broader area. CertainTeed stress plate sized range from 2″ to 3″. Plates may differ and can be designed for insulation and/or base sheets. Those designed for base sheets may have extended legs that are suited to different roof deck materials. Differences also exist according to the wind uplift ratings based on FM designations.

It is important to recognize that fasteners and stress plates alone do not determine of strength and resistance. The density of the fastening pattern (the spacing of the fasteners) is critical to determine the uplift resistance of the entire roof assembly.

Per ASCE 7, all roofs are divided into zones depending on the version currently in adoption by applicable building code bodies:

- Zone 1' (interior field)
- Zone 1 (exterior field)
- Zone 2 (perimeter)
- Zone 3 (corner).

Fastener density will increase in perimeter and corner areas. Uplift resistance of the roof assembly is calculated based upon local code requirements. The foundation design document adopted by most codes is ASCE 7, which is revised and updated every several years. The design criteria for FM Global insured or specified projects can be located in the FM Global Loss Prevention Data Sheet (LPDS) 1-28.

CertainTeed publishes fastening patterns for different insulation and cover board dimensions to meet uplift resistance requirements. Note that densities may be different, depending upon the roof cover. Fasteners shall be installed in strict compliance with fastener and insulation manufacturers' installation recommendations. LPDS 1-28 is a helpful guide to mechanical attachment.

CertainTeed has tested hundreds of assemblies over a wide variety of deck types to document uplift resistance. Ratings of the tested systems can be found in CertainTeed's various Evaluation Reports or in FM Approvals' RoofNav tool at www.roofnav.com. Building officials may require confirmation of performance of a roof membrane assembly prior to issuance of a permit. For assistance in determining appropriate fasteners and stress plates, or to calculate uplift pressures for job-specific conditions, please contact CertainTeed's Commercial Building & Infrastructure Technical Services, or the designer of record. See Chapter 8, Application of Thermal Barriers, Vapor Retarders, Insulation, and Cover Boards for more information.

Mechanical fastening can create thermal bridging, where fastener heads and stress plates conduct heat through the roof assembly, reducing overall thermal efficiency. To prevent this, install insulation in two staggered layers, bonding the second layer in asphalt or adhesive over the mechanically fastened base layer. Similarly, cover boards should be bonded to the top layer of insulation. This method minimizes thermal bridging and enhances energy performance.

Common Insulation Fasteners & Plates

	Product	Description
	#12 Drill Point (DP)	Designed for insulation attachment to 16-22 gauge steel decks. Allow for a minimum 3/4" penetration on steel. FM and Miami-Dade approved.
	#12 Pre-Assembled (PA)	#12 Drill Point Fasteners pre-assembled with 3" recessed galvalume plates.
	#14 Heavy Duty (HD)	Ideal "all-purpose fastener" for use in corrugated steel, structural concrete, and wood decks for insulation or lap attachment. Allow a minimum 3/4" penetration on steel and a minimum 1" embedment in wood plank. Pre-drilling is required for concrete using a 3/16" drill bit; pre-drilled hole must be at least 1/2" deeper than the length of the fastener to allow for debris. FM and Miami-Dade approved.
	#15 Extra Heavy Duty (EHD)	Engineered for lap attachment in higher wind uplift assemblies; good for increased pull strength with lighter gauge steel decks. Allow a minimum 3/4" penetration on steel. FM and Miami-Dade approved.
	SIPLD Fasteners	Engineered for attaching structural insulated panels (SIPs) and nail base panels to corrugated steel and wood decks. Large, low-profile pancake head with a 6-lobe drive, no need for washer.
	Galvalume Plates	Spread the compression load of the fastener to avoid insulation pull through/pull over.
	FlintFast® Nylon/FG Auger	Engineered to improve application efficiency and increase the strength of the mechanical attachment, FlintFast® fasteners provide top quality performance in commercial roofingsystems. FlintFast fasteners are tested to meet FM requirements for the attachment of roofing insulation (FlintBoard®) and base sheets (Flintlastic) in high performance roof systems.

FlintFast Termination Bars – Fasteners

FlintFast termination bars are made from specially extruded aluminum without sharp edges. Termination bars come with holes either 6", 8" or 12" on center.

FlintFast Term Bar Rib Flat
Feature: Rib Flat
Thickness: .10"
Material: Extruded aluminum

FlintFast Term Bar All Purpose
Feature: All Purpose
Thickness: .050"
Material: Extruded aluminum

FlintFast Term Bar Lip
Feature: All Purpose
Thickness: 0.082"
Material: Extruded aluminum

FlintFast Term Bar .075
Feature: Single Lip or Rib Single Lip
Thickness: .075"
Material: Extruded aluminum

FlintFast Term Bar .090
Feature: Lip & Ball
Thickness: .090"
Material: Extruded aluminum

1B – Fasteners for Base Sheets

Base sheets are mechanically attached with either fasteners and stress plates, annular ring-shank nails and tin caps, or metal head cap nails with integrated heads – or specialty fasteners for use with LWIC, gypsum, or tectum decks and structural concrete.

Common Base Sheet Fasteners

	Product	Description
	Ring Shanked Metal Cap Nail.	Base sheet nails with integrated metal head; square or rounded corners; ***NOTE:*** *CertainTeed does not allow plastic heads for use in low-slope roofing systems*
	Standard (Round Head) Roofing Nails and Cap	Base sheet nails with field-assembled metal head; square or rounded corners; ***NOTE:*** *CertainTeed does not allow plastic heads for use in low-slope roofing systems*
	#12 Drill Point (DP)	Designed for insulation attachment to 16-22 gauge steel decks. Allow for a minimum 3/4″ penetration on steel. FM and Miami-Dade approved.
	#12 Pre-Assembled (PA)	#12 Drill Point Fasteners pre-assembled with 3″ recessed galvalume plates.
	#14 Heavy Duty (HD)	Ideal “all-purpose fastener” for use in corrugated steel, structural concrete, and wood decks for insulation or lap attachment. Allow a minimum 3/4″ penetration on steel and a minimum 1″ embedment in wood plank. Pre-drilling required for concrete using a 3/16″ drill bit; pre-drilled hole must be at least 1/2″ deeper than the length of the fastener to allow for debris. FM and Miami-Dade approved.
	#15 Extra Heavy Duty (EHD)	Engineered for lap attachment in higher wind uplift assemblies; good for increased pull strength with lighter gauge steel decks. Allow a minimum 3/4″ penetration on steel. FM and Miami-Dade approved.

CertainTeed publishes minimum attachment criteria assuming the use of a 1″ cap nail with annular ring shank installed into 15/32″ thick plywood. The minimum attachment pattern of 9″ on center (o.c.) in a 2″ side lap with two staggered rows at 18″ o.c. in the field will provide a minimum uplift resistance of 30 pounds per square foot (psf) after a 2:1 margin of safety is applied. A minimum attachment pattern of 12″ o.c. in 4″ side laps with two staggered rows at 18″ o.c. in the field with screws and plates for steel decking. The attachment pattern shall be increased a minimum of 50% in the perimeters and 100% in the corners to meet higher pressures in these areas.

1C – Low-Rise Foam Adhesive for Insulation & Cover Boards

Insulation adhesives, such as Millennium One-Step Low Rise Foam Adhesive, are recommended to eliminate the potential for thermal bridging through fasteners. If the metal fasteners penetrate all the way through multiple layers of insulation, they conduct heat from one side of the insulation to the other. This can cause heat loss or gain and the potential for condensation. By staggering the joints of layers of insulation and securing the top layer(s) with adhesive, thermal bridging is reduced or eliminated. Additionally, adhesive application is valued for reduced labor as compared to mechanical attachment, fastening and ribbon pattern dependent.

Insulation adhesive is designed for use with 4′x4′ FlintBoard insulation panels. See Chapter 8 of this Manual for additional product details.

Benefits of using Millennium One-Step Insulation Adhesive include the following:

- Precise 1:1 application ratio every time
- Consistent adhesive in varying temperature or humidity
- No temperature restrictions — one year-round formula
- Will not suffer from foam collapse
- High viscosity = wider footprint and stronger bond
- Labor saving — boards go down immediately
- Low VOC and solvent-free
- No chance of overspray — no respirator needed

FlintBond Brush, and SBS-modified asphaltic adhesive, may also be utilized to adhere membranes to FlintBoard ISO Cold. Refer to Chapters 8 and 11 for application details.

Millennium Adhesives

Millennium PG-1

2. Membrane Primer

On a low-slope roof, primers are often used to promote adhesion between membranes and certain substrates when the membrane is adhered directly to the substrate.

CertainTeed's FlintPrime QD is a quick-drying, solvent-based, highly penetrating primer designed to promote adhesion for:

- Self-adhered
- Torch-applied
- Cold-applied
- Hot-applied

It is available in:

- 15 oz. aerosol spray cans
- 1-gallon pails
- 5-gallon pails.

FlintPrime QD ensures strong bonding and efficient installation across a variety of asphaltic roofing applications.

FlintPrime® QD

FlintPrime	
Packaging	15 oz, aerosol (12/carton, 960 units/pallet) 5G pail (48 units/pallet) 1G pails (150 units/pallet)
Coverage	100-200 sq. ft./gal. or 1/2-1 gal. 100 sq. ft
Cure	3 hours to touch[1]

[1]Ambient temperature and humidity will effect dry time.

3. Membrane, Flashing & Repair Adhesive

Membrane Adhesives

Brush, spray, and roller-grade adhesives may be used with approved CertainTeed SBS-modified bitumen membranes. Cold adhesives shall not be used with Flintlastic APP or SBS-modified bitumen membranes designed for torch-welding or self-adhered (except as required for flashing details) applications. In addition, cold adhesives shall not be used with Flintglas Ply 4.

FlintBond Brush and Spray Grade, Millennium Hurricane Force 1-Part Membrane and Flashing Adhesive are designed to bond base, interply, and cap sheets to one another. FlintBond Brush may also be utilized to adhere membranes to FlintBoard ISO Cold. Refer to Chapters 8 and 11 for application details.

Flashing & Repair Adhesive

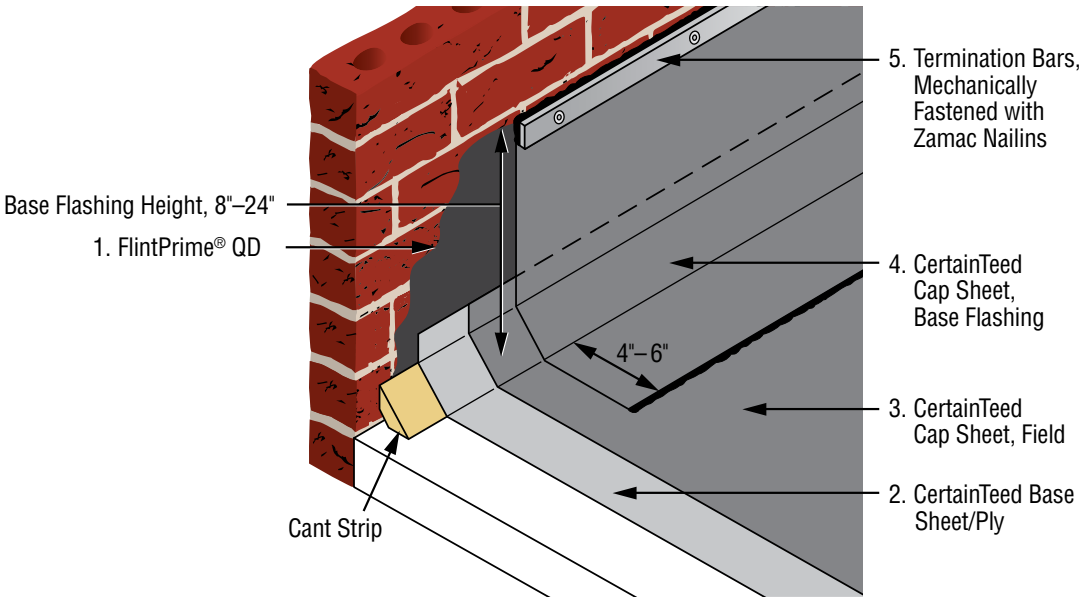
The NRCA defines flashings as:

"Components used to weatherproof or seal roof system edges at perimeters, penetrations, walls, expansion joints, valleys, drains and other places where the roof covering is interrupted or terminated."

Since every roof system has at least one or more of the conditions described in this definition, every roof is required to have flashing. This is the only way to be sure that the roofing membrane is connected in a waterproof manner to all of these elements.

Two possible ways to flash BUR or modified bitumen roofing systems besides the method employed in installing the field membrane are as follows.

Asphaltic cements, adhesives, mastics, and sealants used in combination with asphaltic membranes can be used to waterproof edges, joints, and penetrations within a low-slope roof system. Typically, flashings are made up of the same two sheets used in the field of the roof membrane, in combination with one of the adhesive solutions mentioned above. All vertical flashings are mechanically terminated with term bars or fasteners, and are finished with caulk or other mastic. The top of the flashing is covered by counter flashing, coping, or some other means for protecting the membrane from water penetration between the substrate and the flashing membrane. Other flashing details



Flashing Example: Base Flashing, Masonry/Brick with Termination Bar

require cutting and fitting membrane plies to make watertight seals. Consult CertainTeed for drawings and requirements for these details.

The same combination of mastics and membranes can often be used for repairs if there is any minor damage to the membrane or places where the membrane connects with other materials. In all cases, the means of attachment will be the same or compatible with the means of attachment for the rest of the roofing system (self-adhered, torch-applied, hot/cold-applied).

As a complement to CertainTeed Flintlastic modified bitumen membranes, CertainTeed offers FlintBond® SBS-Modified Adhesives.

Liquid-Applied Flashing: As opposed to a factory-manufactured membrane affixed in combination with mastic, liquid-applied flashings are a field-applied combination of resin and reinforcement fabric, commonly polyester. They can also be used for repairs if there is damage to the membrane.

CertainTeed's liquid-applied flashing solution, SmartFlash® ONE is a one part liquid-applied flashing and repair resin for commercial and residential use over asphaltic membranes or shingles. It is a self-terminating, durable, polyurethane bituminous resin with multiple benefits as a liquid-applied product.

When used directly for flashing, it provides:

- Low maintenance leak protection, up to 20 years
- Self-Termination: No additional components required, no lead
- Versatility: Conformation to almost any shape
- Efficiency: One-part resin, no primer, no roof-top measuring or mixing, no limitation to working time, no waste – unused resin can be stored and used on a future project

SmartFlash ONE can also be used for repairs, offering:

- Cost-effective, quick, permanent repairs, warranted for 10 years
- Versatility: Repair cracks in asphalt membrane/shingle or damaged/corroded flashings
- Visual Appeal: Broadcast granules into wet resin to match existing roof surfacing, if desired
- Efficiency: Resin and reinforcement are easily stored on repair trucks for use when needed

Liquid Flashing

CERTAINTEED COLD ADHESIVES FOR MEMBRANE, FLASHING & REPAIR

Product	Packaging	Coverage	Cure
FlintBond Brush SBS-modified cold-process adhesive engineered to bond SBS-modified asphalt membranes in the field.	5G	1 – 1.5G per 100 ft^2	48 hours for subsequent layer application, up to 45 days for full cure
FlintBond Trowel	3G 5G	Approximately 12-13 sq. ft. per gallon applied 1/8″ thick; additional material may be required when 3-coursing to saturate and encapsulate fiberglass fabric	Up to 45 days for full cure
FlintBond® Caulk All weather SBS-modified mastic engineered to bond SBS-modified asphalt membranes in detail areas such as endlaps and base flashing; also extremely effective repair solution for wet or dry low-slope asphaltic roof systems.	10.1 oz. 12/carton	Approximately 24 lineal feet applied in a 1/4″ x 1/4″ bead.	Up to 45 days for full cure
Millennium Hurricane Force 1-Part Membrane Adhesive	5G	1.5 – 2G per 100 ft^2	5-15 minutes dry to touch Initial cure 24 -36 hours Full cure 21-28 days
Millennium Hurricane Force 1-Part Flashing Adhesive	5G	Approximately 12-15 sq. ft. per gallon applied 1/8″ thick	5-15 minutes dry to touch Initial cure 24 -36 hours Full cure 21-28 days
Arctic Edge™ Cold Lap Tape Use-as-needed, auxiliary tape engineered to significantly engineered to enable Flintlastic SA membrane application in cold weather.	4″x260′ roll, 8/carton	N/A	N/A
SmartFlash ONE	Flash Pack (1G) 1G 5G	17 sq. ft. (2 m2)[1] 17 sq. ft. (2 m2)[1] 83 sq. ft. (8 m2)[1]	Dry Time (Wait to Top Coat): 2 hours at 68°F (20°C) Dry Time (Rainproof): 2-12 hours Cure: 3 days

[1]Assumes three layers, 30 wet mils per layer

NOTE: Dry/cure times are approximate and will vary by ambient temperature and humidity

4. Coatings and Surfacing

The coating serves as a sacrificial layer, protecting the membrane from degradation associated with UV and weather. A roof coating may be used to extend the life of a new or existing roof. A coating may also be applied to enhance a roof system's fire resistance and or solar reflectivity, thereby creating a "cool roof."

Flood coat and gravel surfacing is addressed in Chapter 13; aluminum, acrylic and silicone coatings are addressed in Chapter 14. Roof coatings are manufactured in several material types that fall into two basic categories, which are described as follows.

Emulsions

Asphalt emulsions contain a mineral colloid suspended in a water carrier and are used as a preparatory surfacing, often over preexisting gravel-topped roof systems once gravel has been removed, prior to restoration, or highly weathered asphaltic cap sheets as a revitalization or restoration effort.

Asphalt emulsions are not designed to be the final surfacing and should be top coated by one of the reflective coatings described below.

Reflective Coatings

Reflective coatings are intended to reflect heat to lower membrane surface temperatures and can be applied to provide a pleasing aesthetic appearance. Common reflective coating chemistries include acrylic, silicone, and aluminum products. Each chemistry and formulation offers benefits and limitations that make it appropriate for different roofing applications based upon climate, roof condition, roof features, and desired performance. In some cases, specific cleaners shall be used to adequately clean the roof to remove adhesion-inhibiting contaminants. Additionally, depending upon the roof membrane to be coated and the coating being applied, surface preparatory/primer products may be necessary.

If a roof in service is being restored, mastics and sealants may be used to ensure the roof is sound and watertight prior to coating.

"Coolness" in a roof surface or coating is measured by two properties: solar reflectance and thermal emittance. Both properties are measured on a scale from 0 to 1, with higher values indicating more coolness. Reflective coatings can be tested and listed by the Cool Roof Rating Council (CRRC), an organization that publishes the "cool" metrics and values for qualifying products. The U.S. Green Building Council offers "cool roof" points as part of its Leadership in Energy and Environmental Design (LEED) program. In addition to the financial and environmental benefits of a cool roof, roofs with highly reflective surfaces experience less expansion and contraction, reducing long-term stress on the roof system and potentially extending performance life.

CertainTeed Roof Coatings

CertainTeed's SMARTCOAT product portfolio can be used for coating or surfacing a new or existing roof. Application guidance for new roofs is included in Chapter 14. For SMARTCOAT roof restoration application support, please refer to the Master Craftsman, Liquid-Applied Roofing Applicator Manual.

LIQUID-APPLIED COATINGS & ACCESSORIES FOR NEW MODIFIED BITUMEN ROOF SYSTEMS*

Product	Description	PACKAGING
100 Roof Wash	Industrial strength roof detergent	1G 4/carton
200 Asphalt Bleed Blocker	Prevents asphaltic exudate from staining coating	5G
400 High Performance Acrylic Coating	100% acrylic polymers, meets D6083 Type I	5G, 55G, 275G
401 High Solids Acrylic Coating	100% acrylic polymers, workhorse	5G, 55G, 275G
420 Fibered Aluminum Coating	Premium paint-grade leafing aluminum	5G, 55G
421 Non-Fibered Aluminum Coating	Premium paint-grade leafing aluminum	5G, 55G
450 High Solids Silicone Coating	100% silicone, direct-bond optimized	5G, 55G

*Refer to CertainTeed's Master Craftsman Liquid-Applied Roofing Applicator's Manual for the comprehensive roof restoration portfolio.

5. FlintEDGE® Metal Components

Many of the edges or other details of a roofing system need an extra layer of protection at the termination of the roofing membrane. These edges may also be visible on the building, requiring a solution that allows the building to look professionally finished. The material of choice is formed sheet metal — usually finished or coated aluminum or steel. When supplied by the roof system manufacturer, these metal components may be covered in the roof system warranty.

Metal flashing accessories are commonly used in four ways on low-slope roofing systems:

- Coping on walls and fascia along roof edges
- Water control where rainwater is channeled off the roof, such as drains and scuppers
- Expansion joint covers that appropriately cover the moving parts of an expansion joint
- To isolate irregular penetrations by using pitch pockets or cape and collars, for example

5A – Coping and Fascia

Coping is the covering piece on top of a parapet wall exposed to the weather, while fascia is the vertical or steeply sloped roof or trim located at the perimeter of a building. These two pieces typically work together along the top and sides of the building perimeter to create the watertight edge of the roofing where it meets the wall. A variety of CertainTeed products with different profiles or configurations are available to suit different roofing conditions.

FlintEDGE Coping

The coping utilizes a metal chair that functions as both a gutter chair (with its raised ribs) and as an internal splice plate in the same color and finish as the coping cap. An internal metal chair drainage system eliminates caulked joints. Coping+ includes a 16-gauge galvanized steel cleat. The products are FM-approved, Class 1-180.

FlintEDGE Coping

Tapered, Flat, andExisting Slope

Features a snap-on cover and 20 ga. galvanized steel anchor clips and is available in variety of options for different wall conditions and colors choices.

FlintEDGE Coping OE

Tapered, Flat, andExisting Slope

Quick-to-ship convenience and economical pricing to simplify projects and maximize profits. Manufactured in 12′ lengths with fasteners provided for quicker installation an lower costs.

FlintEDGE Coping OE

FlintEDGE Coping CL
Single and Dual Cantilever

For attachment to a parapet wall with a non-structural exterior building façade. The products unique support brackets bring extra stability to the roof edge system when attachment is required up to 6″ away from the outside facade.

FlintEDGE Coping CL Cantilever

FlintEDGE Coping GL
Tapered, Flat, and Existing Slope Versions

For parapet conditions with high-performance requirements. It features a snap-on cover and 16-gauge, galvanized steel anchor clips with factory-applied stainless-steel spring.

FlintEDGE Coping CL

FlintEDGE Fascia OE MB
Built-up or Modified Version

Quick-to-ship convenience and economical pricing to simplify projects and maximize profits.

FlintEDGE Fascia OE MB

FlintEDGE Fascia XE MB
Built-up or Modified Version

Designed for BUR or Modified roofs to protect against high wind events where larger face heights are needed.

FlintEDGE Fascia XE MB

FlintEDGE Fascia XT MB
Built-up or Modified Version

Features an extruded aluminum anchor bar design that securely terminates the membrane. Available in multiple heights to accommodate multiple nailers and coverage requirements.

FlintEDGE Fascia XT MB

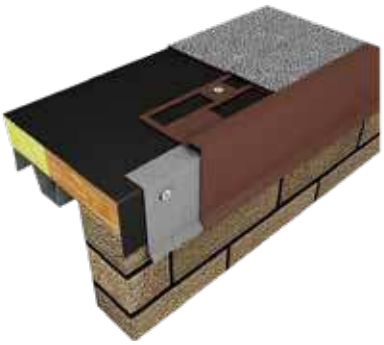
FlintEDGE
Fascia ET MB
Built-up or
Modified Version

Designed for fast and easy installation, eliminating the stripping in that is typical of other roof edge designs.

FlintEDGE
Fascia ET MB

FlintEDGE
Fascia FD
Built-up or
Modified Version

Designed to concealed splice plate design prevents migration under the cover and provides proper spacing for thermal movement of the material.



FlintEDGE Fascia FD

FlintEDGE
Fascia GG MB
Snap-on, Built-up or
Modified Version

Features dual attachment points on both the face and roof deck allow for added flexibility when accommodating roof irregularities with no exposed fasteners and no unsightly cover plates.

FlintEDGE
Fascia GG MB

FlintEDGE
Expansion Joints
Roof to Roof and
Roof to Wall Versions

Ideal for allowing thermal movement and condensation control between two roof systems or a roof system and a terminating. Also, the continuous cleat protects from wind driven rain.

FlintEDGE Gutter
Box, Chamfer, and Offset Versions. Additional products: Downspouts, Scuppers, and Conductor Heads.

Unique design, superior roof drainage, and attractive appearance, the design incorporates a 1″ wide extruded internal gutter hanger for strength and support.

FlintEDGE Reglets
Multiple Versions

Provides a watertight termination at the leading edge of the roofing material.

More than 50% of low-slope roof systems blow offs are associated with roof perimeter failure. Protect your building and it's occupants by specifying a high quality, ANSI/SPRI compliant edge metal.

- *ANSI/SPRI/FM 4435/ES-1 Tested*
- *Factory Mutual Approved*
- *Miami-Dade approved*
- *Available in a variety of colors, sizes, and materials*
- *Easy installation resulting in decreased labor costs*

Reach out to your local CertainTeed Territory Manager to request a sample and demonstration of FlintEDGE metal roof accessories.

5B – Water Control

Water control accessories channel water off of the roof for positive, proper drainage. Accessories are available in a variety of materials, thicknesses, and colors, and all can be customized. Products include:

FlintEDGE Scupper is for use in parapet walls or other locations where the water is being channeled off of the roof and down to the ground.

Scupper

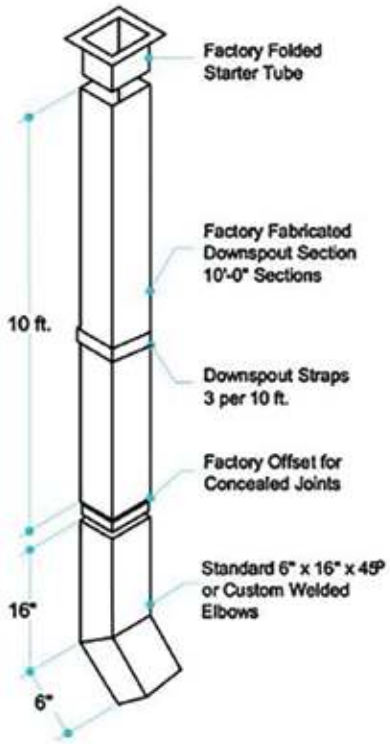
FlintEDGE Conductor Head is intended to be installed as the "catch basin" part of a coordinated water control design incorporating gutters, downspouts, leaders, or scuppers.

Conductor Head

FlintEDGE Gutter is custom-sized to meet individual project requirements and designed with internal straps for smooth, clean lines and ease of installation. External hangers are optional.

FlintEDGE Gutter

FlintEDGE Downspouts have a factory offset for concealed joints. Factory fabricated starter tubes are available to help channel water into the downspout. Standard or custom elbows help to complete the professional appearance.



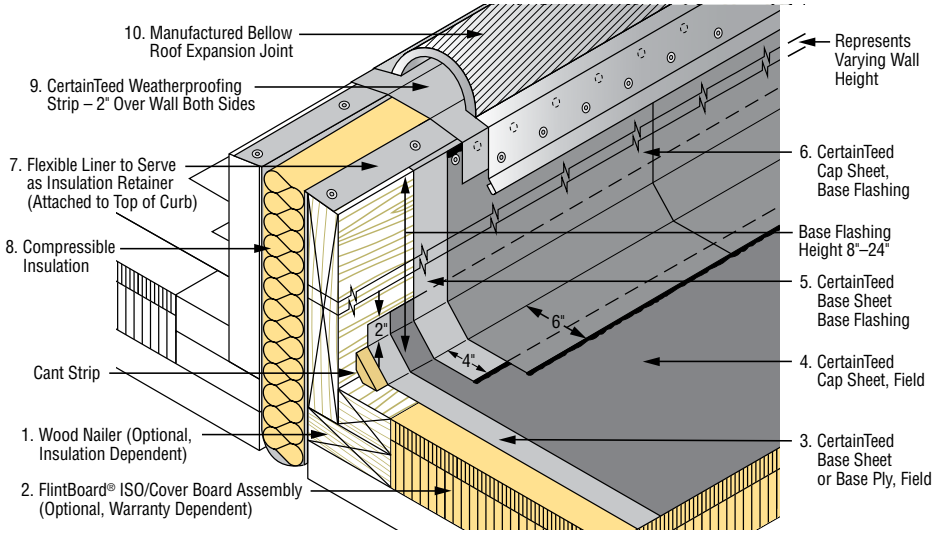
FlintEDGE Downspouts

5C – Expansion Joint Covers

Expansion joints in a building are just that – a joint or gap in the construction. That opening needs to be covered and protected in a manner that is watertight and still allows the building to expand and contract. Typically, some specialized products that include compressible or expandable fillers, bellows, or other products are specified and installed. In addition, sheet metal covers offer maximum protection and versatility. Carefully designed snap-on covers are available that provide ease of installation and improved aesthetic appearance.

FlintEDGE Roof to Roof Expansion Joints are for horizontal expansion joints across a large expanse of roof area.

FlintEDGE Roof to Wall Expansion Joints are designed for conditions in which an expansion joint occurs where the roof meets a wall. Note that the joint will likely continue in both the roof and wall, and the joint system and cover will need to be installed to address the change in direction along with the other needs of the joint system.



FlintEDGE Expansion Joints

All Edge Metal products are available in 31 different colors and finishes. For complete color options, see the Edge Metal brochure or www.certainteed.com.

Our most popular colors are:

Ascot White | Bone White | Dove Gray | Medium Bronze | Sandstone | Shale Gray | Statuary Bronze

Colors shown are representative of the prefinished KYNAR® colors but not exact matches.
Actual metal color chips are available upon request and should be used for final color approval.

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Chapter 6 – Self-Test for Other Roofing Components

Questions

Test online https://certainteed.com/low-slope-test

1. To avoid thermal bridging from fasteners, it is recommended that a second layer of insulation (or cover board) be:
   - ☐ a. Mechanically-fastened
   - ☐ b. Bonded in asphalt or adhesive
   - ☐ c. Loose laid
   - ☐ d. Avoided

2. Primers are used to enhance and promote adhesion.
   - ☐ a. True
   - ☐ b. False

3. When is a roof coating required?
   - ☐ a. To extend the life of a new roof
   - ☐ b. To increase fire resistance
   - ☐ c. Over a smooth surfaced roof membrane
   - ☐ d. To enhance solar reflectivity

4. What is the benefit to utilizing a liquid-applied flashing solution?
   - ☐ a. Conformation to almost any shape
   - ☐ b. Self-terminating
   - ☐ c. Low maintenance leak protection, up to 20 years
   - ☐ d. All of the above

5. Which of the following factors most influences wind uplift resistance in a mechanically fastened roof system?
   - ☐ a. Fastener diameter
   - ☐ b. Stress plate size
   - ☐ c. Fastener pattern density
   - ☐ d. Deck type

6. A roof assembly is divided into zones for fastener density based on ASCE 7. Which zone typically requires the highest fastener density?
   - ☐ a. Interior field
   - ☐ b. Perimeter
   - ☐ c. Corner
   - ☐ d. Exterior field

7. Which CertainTeed product is recommended instead of pitch pockets for irregular penetrations?
   - ☐ a. FlintBond Brush
   - ☐ b. SmartFlash ONE
   - ☐ c. FlintPrime QD
   - ☐ d. Millennium Hurricane Force

PART 3

Low-Slope Roof Systems Application

Chapter 7:
Re-cover Installations Over Existing Roofs

Your objective: To learn the best practices and CertainTeed® recommended products to use when installing a new Flintlastic® modified bitumen or BUR roofing system on an existing building with existing roofing.

Existing Roofs

In many cases, a new low-slope roofing system is needed not for a newly constructed building, but for one that has stood for many years and now requires replacement or recovery. Recovering is a common—and often profitable—opportunity for roofing contractors, with some even specializing in this work. Whether you're approaching an existing roof for the first time or have completed dozens of projects, each one presents specific concerns you need to address.

Chapter 7 focuses on recovering an existing roof with a CertainTeed membrane roofing system. The preparation and evaluation recommendations contained here also apply to Liquid Applied Roofing (LAR) Systems. Refer to Chapter 14 of this Manual for application information related to LAR Systems.

For comprehensive instructions on other specific roofing membrane recover installations, please refer to the following chapters for application information on:

- Modified Bitumen *Self-Adhered* Field Application – Chapter 9
- Modified Bitumen *Torch-Applied* Field Application – Chapter 10
- Modified Bitumen *Hot-Applied* Field Application – Chapter 11
- Modified Bitumen *Cold-Applied* Field Application – Chapter 12
- Built-Up Roofing (BUR) *Hot Asphalt* Field Application – Chapter 13

Unique Conditions of Recover Roofing

The first thing to remember about working on an existing roof is that nothing can ever be assumed. Most commercial buildings are custom designed, and, even if roofing details are repeated over multiple projects, variations or changes are likely to occur for multiple reasons. Therefore, the first step in any roofing application on an existing building is to determine exactly what is or is not there already. In that way, subsequent decisions can be made about the best, or most appropriate, roofing system to install.

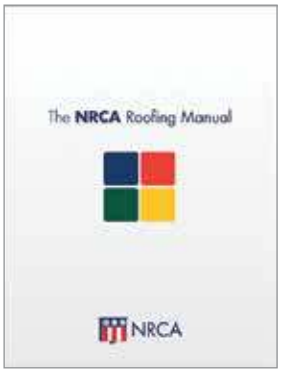
Architectural drawings and specifications detailing the design of the existing roof may or may not be available. If they are available, they should be consulted. However, it is possible that adjustments were made in the field during the original installation. A visual inspection of the roof must be performed to look for any visible differences between the actual roofing and the specified one.

In some cases, a core cut of the existing roofing system, from the cap sheet down to the roof deck, may be needed to determine the actual number of plies, the thickness of the insulation, and whether or not a vapor retarder or thermal barrier is present. The drilled core will then need to be replaced and repaired to keep the existing roof watertight until the new system is installed. Coring of the existing roof has the added benefit of ensuring there is only one existing roof system in place as, depending upon the age of the building, a recover may

have already taken place. If that is the case, a tear-off of all roof systems will need to be done, as most, if not all, applicable building codes limit recovers to only one additional roof system.

NRCA General Guidelines

The NRCA Roofing Manual has recognized the importance of addressing existing buildings by providing a significant chapter on "Reroofing." NRCA states, "When roof maintenance and roof repair can no longer prevent recurrent leakage or extend a roof system's useful service life, consideration needs to be given to reroofing — that is, roof recovering or roof removal and replacement.[1]" They point out that other situations also exist where reroofing may be considered, such as damage, leakage, the addition of elements on a roof (i.e., photovoltaic or vegetative systems), or simply the building owner desires to increase thermal performance, roof reflectance, or aesthetics.



NRCA Manual

As a supplement to the information in this CertainTeed Manual, the Reroofing chapter of the latest version of the NRCA Roofing Manual should be referred to for more detailed information on general reroofing best practices.

NRCA best practices for roof recovering include:

- **Evaluation of Existing Roof Systems:** Ways to help determine if roof recovering or roof replacement is most appropriate.
- **Building Code Requirements for Reroofing:** Since most building codes provide specific requirements for reroofing existing buildings, these requirements need to be consulted.
- **Roof Decks for Reroofing:** Recognize that unique design considerations exist when reroofing over different types of existing roof decks.
- **Preparation of Existing Roof Surfaces:** This is paramount to be sure that the existing roof can properly receive new membrane roof systems.
- **Recover Guidelines for Membrane Roof Systems:** General recommendations for applying membrane roof systems over common types of roof systems.

1. [The NRCA Roofing Manual: *Membrane Roof Systems – 2019 Chapter 9 – Reroofing*
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1. Evaluation: Recover Considerations

If a roof installation is a recover, the existing roof assembly must be a suitable substrate for the application.

The following steps can be taken to evaluate an existing roof for a recover application.

Structure: From a structural standpoint, added dead load from the roofing recover might compromise the integrity of the existing roof structure. Further, loading requirements may have changed since the original roof application, increasing the live load requirements due to updates in historical snow loading data, for example. Therefore, an evaluation of the combined live and dead loads should be carried out by a structural engineer prior to the application of an asphaltic, multi-ply roof system over an existing roof.

Moisture: The existing roof should be evaluated for moisture content. Moisture analysis can be carried out using a variety of conventional test methods, including nuclear, capacitance, or infrared. Prior to any recover, all wet roofing materials must be removed, and the area built back up to the same height with materials compatible with those that remain. If wet materials requiring removal are extensive, the contractor shall compare the mapped repair area to code thresholds. As an example, under the 2023 Florida Building Code, if more than 25% of the total roof area or any roof section is repaired, replaced, or recovered within any 12-month period, the entire affected roof section must be brought into compliance as a reroof. The contractor shall confirm the applicable edition and any local amendments with the AHJ before proceeding. CertainTeed will not approve a recover installation over existing wet roofs and requires assurances that existing roof systems are dry.

Adhesion: The existing roof should also be evaluated for adhesion to the underlying substrate. Adhesion can be evaluated with either a vacuum test or bonded pull test, as detailed in the FM Global Loss Prevention Data Sheet 1-52, or the vacuum test detailed in the ASTM E9071.

Suitability as a Substrate: Should the existing roof be used as a bonding substrate, the surface must be able to be prepared for the application of the new roof or insulating layer. Loose and large gravel shall be removed, blisters and splits shall be repaired, and existing flashings shall be removed to create a clean bonding surface for new components. If, for any reason, the existing roof is not capable of being suitably prepared to receive the application of a new roof, mechanically attaching a cover board, thermal barrier or insulation board will be required.

Fastener Withdrawal Resistance: Where the new roof is mechanically attached to the underlying substrate, withdrawal resistance testing should be carried out to confirm the attachment values for each fastening point. Testing should be carried out in compliance with ANSI/SPRI FX-1-2016 or TAS 105. Copies of the test protocols are available from CertainTeed Commercial Roofing Technical Services. Fastener values should meet or exceed 325 lbf, or the fastener density should be increased. The test data shall be evaluated by the roof designer of record to assess the fastening pattern. CertainTeed Commercial Roofing Technical Services can provide test data for a wide variety of systems to assist in the evaluation.

All of the above considered, it is important to also recognize that the following conditions require specific measures be taken prior to recovering with CertainTeed roofing products:

- **Single-ply Membranes:** When recovering with an asphaltic, multi-ply roof system, and the existing roofing is a single-ply membrane (EPDM, TPO, etc.), it needs to be sliced to address potential trapped moisture and compatibility problems. In all cases, mechanically attaching a cover board, thermal barrier, or insulation board will be required.
- **Coal Tar:** If the existing roof contains coal tar a suitable cover board needs to be mechanically attached or adhered first to isolate any coal tar from the new roofing recover system.

- **Parapet walls, perimeter edges, equipment and load bearing supports, platforms, curbs, etc.:** shall be structurally sound and suitable for the application of new flashings and terminations.
- **Existing roof assemblies:** shall be evaluated to determine if additional expansion or control joints are needed. Visual observations of wall cracks, membrane splits, and materials out of plane are indicators of such conditions.

Ultimately, it is the responsibility of the designer of record and or building owner to determine whether an existing roof is structurally sound, firmly attached, dry, and suitable for recover. Please contact CertainTeed Commercial Roofing Technical Services at 800-396-8134, ext. 2, for additional information to support specific recover projects.

2. Preparation and Field Conditions Required for Warranty

CertainTeed has specific requirements that shall be used in conjunction with good roofing practices to qualify a new recover assembly for the Integrity Roof System® Limited Warranty or Integrity Roof System NDL Limited Warranty.

NOTE: *Substrates with two or more existing roofing systems are not eligible for a CertainTeed warranty. Buildings that have two roof membranes on them may be considered for coatings instead. Two or more existing roof membranes should be torn off to meet code. Extended warranties, greater than 15 years, require new construction and or complete tear-off.*

CertainTeed recover warranty requirements include the following:

- Decks shall be dry and structurally sound.
- Existing plywood decking shall have adequate bearing or support of edge joints. In recover applications, remediation of the joints can only be achieved from the underside of the deck.
- All recover roofs shall be made to have positive drainage based on a minimum slope of 1/4":12" and meet other standard CertainTeed warranty requirements for roof drainage.
- Existing roof insulation shall be dry and firmly attached. Where existing insulation is found to have insufficient attachment, attachment of the existing system shall be enhanced.
- Existing roof system shall be compatible with the new roof system.
- All surface defects shall be corrected associated with the existing membrane.
- Existing roof surfacing with 1/2" or larger aggregate surfacing shall be torn off or spudded to provide a smooth surface. Notwithstanding gravel sizing, all loose gravel shall be swept from the existing roof surface.
- Existing areas of water ponding on the roof shall be corrected prior to the installation of a recover roof. Fillers designed to fill low spots should be used to correct these conditions. For a list of available products, contact CertainTeed Technical Services.
- Remove existing metal gravel stops and other termination flashings, and replace with new metal to meet current code requirements. Flashing metals shall be corrosion resistant and not be less than 24 gauge.
- Existing counter flashing, copings, dunnage protectors, protective caps, and other flashing metals designed to protect the roof shall be replaced where unsuitable for reuse. New metals shall be corrosion resistant and not be thinner than 24 gauge.

- Remove all clamping rings from drains, and clean to bare metal. Damaged drain components shall be discarded and replaced with new components. When in good condition, clamping rings may be saved for reuse. All bolts shall be replaced with new bolts, preferably formed from non-ferrous materials. Stripped bolt holes shall be drilled and tapped. All drains shall be fully secured to the deck with under deck clamps or other factory-supplied clamping systems.
- All abandoned and non-functioning equipment shall be removed. Any resulting deck opening shall be blocked and closed with appropriate decking.
- Flashing heights shall be a minimum of 8″ from the surface of the roof and a maximum of 24″. Where flashing terminations may be subjected to snow cover, the flashing shall be sealed.
- Existing base and wall flashings shall be removed to create a sound surface for the installation of new flashings.
- All roof penetrations require all new flashings, in compliance with current CertainTeed detailing.
- Equipment vibration shall be corrected.
- Masonry surfaces above flashings shall be tuck-pointed and sealed. All horizontal masonry surfaces above the roof membrane shall be adequately protected from weather.
- All pipes and condensation line supports shall be properly supported with factory-supplied pipe supports or pressure-treated wood blocking. All supports shall have a protection layer of not less than one layer of Flintlastic modified bitumen membrane. The support shall be designed to allow for pipe movement and not be secured through the roof membrane.
- Condensation lines shall be formed from ultraviolet, light-resistant materials and shall terminate at drains or scuppers. Condensate shall not run on the roof surface.
- The practice of installing only a part of a total roof assembly, known as phasing, can be harmful to the finished roof assembly. CertainTeed will not warrant phased applications without prior approval.

3. Recover Application: Installation Over an Existing Membrane

The recover process shall occur as follows:

Substrate Preparation: Assure that the existing substrate is completely clean and suitable to receive the new roofing system. Refer to the details and conditions required for warranty cited earlier in this chapter.

Rigid Insulation or Cover Board Application (if applicable): Rigid insulation or cover boards may be applied directly to an existing built-up or modified bitumen roof membrane provided that:

- the surface has been properly prepared
- there is adequate attachment of the existing roof assembly to resist design and or code required loads
- the deck has been adequately leveled to provide full adhesion of the maximum 4′ x 4′ insulation boards
- A surfacing of Type III/IV asphalt, approximately 15 pounds per square, can fill minor variations in the deck surface and provide a more suitable surface for the application of rigid insulation and or cover boards.

- See Chapter 8 of this manual for additional information about installing rigid insulation, cover boards, and thermal barriers.

Base Sheet Application:

- **Hot Mop Applied:** After preparing and priming the existing membrane surface, spot mop with Type III or Type IV asphalt, forming 12″ circles spaced 24″ on center (o.c.), and install an approved CertainTeed base sheet with side laps of 2″ and end laps of 6″. Asphalt quantity shall be 15 lbs. per square, or greater, depending upon the roughness of the existing membrane surface. When using Flintglas MS Cap as a venting base sheet, granules will be facing down.
- **Mechanically Fastened:** Alternatively, mechanically attach an approved CertainTeed base sheet with minimum #12 fasteners with 3″ galvalume plates to meet project-specific design uplift criteria. At a minimum, the mechanical attachment shall be placed 9″ o.c. in 3″ side laps and two staggered rows in the center of the sheet spaced 18″ o.c. Contact CertainTeed Commercial Technical Services at 800-396-8134, ext. 2, with project data for consideration of approved base sheets.

Interply and Cap Sheet Application: Follow the application procedures for the specific type of roofing membrane being installed, as described in Chapters 9 - 14 of this manual.

- For Modified Bitumen *Self-Adhered* Field Applications – see Chapter 9
- For Modified Bitumen *Torch-Applied* Field Application – see Chapter 10
- For Modified Bitumen *Hot-Applied* Field Application – see Chapter 11
- For Modified Bitumen *Cold-Applied* Field Application – see Chapter 12
- For Built-Up Roofing (BUR) *Hot Asphalt* Field Application – see Chapter 13
- For *Liquid-Applied* Roofing Field Application – see Chapter 14

4. Recover Project Completion

Following the completion of a recover project, follow the procedures for closing out the project successfully and applying for a warranty, as described in Chapter 15 of this manual.

Chapter 7 – Self-Test for Roofing Recover Systems

Questions

Test online https://certainteed.com/low-slope-test

1. When recovering a single-ply membrane with a CertainTeed asphaltic roofing system, it is important to slice the single-ply membrane before mechanically attaching a cover board or insulation over the existing roof.
   - ☐ a. True
   - ☐ b. False

2. How many roof systems are allowed by code before tear off is required?
   - ☐ a. 1
   - ☐ b. 2
   - ☐ c. 3
   - ☐ d. There is no limit

3. To be considered for warranty, recover roofs require positive drainage. What is the minimum slope required to achieve this positive drainage?
   - ☐ a. 1/16″:12″
   - ☐ b. 1/8″:12″
   - ☐ c. 1/4″:12″
   - ☐ d. 1/2”:12′

4. Existing metal flashings should be removed and inspected. Replacement metal should be installed if existing metal is not corrosion resistant and/or less than 24 gauge.
   - ☐ a. True
   - ☐ b. False

5. Which of the following conditions would disqualify a roof from CertainTeed's recover warranty?
   - ☐ a. Existing roof slope of 1/4″:12″
   - ☐ b. Two existing roof membranes
   - ☐ c. Dry insulation
   - ☐ d. Corrosion-resistant metal flashings

6. A recover roof requires positive drainage. What is the minimum slope required by CertainTeed?
   - ☐ a. 1/16″:12″
   - ☐ b. 1/8″:12″
   - ☐ c. 1/4″:12″
   - ☐ d. 1/2”:12′

7. Which test method is used to confirm fastener withdrawal resistance?
   - ☐ a. ASTM E9071
   - ☐ b. ANSI/SPRI FX-1
   - ☐ c. TAS 105
   - ☐ d. Both b and c

Chapter 8:
Application of Thermal Barriers, Vapor Retarders, Insulation, and Cover Boards

Your objective: To learn CertainTeed's procedures for the correct application and installation of substrates, including vapor retarders, thermal barriers, insulation, and cover boards used in Flintlastic® Modified Bitumen and BUR (Built-Up Roofing) Roof Systems.

Installing Thermal Barriers, Vapor Retarders, Insulation, and Cover Boards

As introduced in Chapter 4, each of the components covered in this chapter serve different purposes:

- **Thermal barriers** provide a layer of fire resistance between the roofing system and the building.
- **Vapor retarders** inhibit the flow of moisture from inside the building up into the roofing system.
- **Insulation** inhibits the transfer of heat into or out of the building, thus improving the energy performance and long-term thermal resistance (LTTR) of the building.
- **Cover boards** protect any substrate below and provide a smooth surface to which to apply a roofing membrane.

Where can I use Thermal Barriers, Vapor Retarders, Insulation, and Cover Boards?

It is the role of the architect or engineer of record to determine the need, type, thickness, and location of any vapor retarders, thermal barriers, insulation, and cover boards. When these elements are part of the specification or roof assembly, their correct installation is required to help protect the roofing system from damage, thermal stress, and failure. They may also be required to comply with CertainTeed's published installation recommendations and warranties. For additional details, please *refer to Chapter 4 of this manual*.

What tools do I need for Thermal Barriers, Vapor Retarders, Insulation, and Cover Boards?

Vapor retarders, thermal barriers, insulation, and cover boards can be cut, if needed, using common roofing tools or equipment. They can also be mechanically attached or adhered to the roof deck with a variety of materials, such as fasteners and plates, hot asphalt, or cold adhesives. You will use familiar tools when you install any of these components, which may include the following:

For cutting materials:

- Saw (hand or powered), or similar tool
- Roofer's knife with straight or hooked blade
- Insulation knife

For Mechanical Attachment of Substrates:

- Mechanical fastening equipment, such as an electric drill, driver, etc.

For Hot Asphalt Application of Substrates:

- A safety plan, *refer to Chapter 2 of this Manual*
- An asphalt kettle with working temperature gauge
- Propane
- Mop carts
- Optional mechanical asphalt applicator
- Cleveland open cup tester
- Rotational viscometer
- Mop buckets
- Asphalt mops (mop size should not be less than 32 oz.)
- Weighted roller
- Fire extinguishers
- Roofer's hooked blade knife (the hooked blade is ideal for cutting the membrane)
- Roofer's trowel with beveled edges and rounded tip (for smoothing of details without cutting or marking the membrane) and a handle that allows a safe distance between the roofer's gloved fingers and the warm membrane
- Protective eyewear
- Appropriate protective attire, including clothing, shoes, and heavy-duty gloves

For Cold Adhesive Application of Vapor Retarders:

- Caulk gun (manual or battery powered) for applying beads of adhesive
- Cart or spreaders, or similar adhesive applicators
- Squeegee

For Cartridge-Based Insulation Adhesive:

- Pneumatic Single-Bead applicator
- Battery powered Single-Bead applicator
- Manual Single-Bead Applicator
- Multi-Bead Applicator
- Multi-Bead Plus Applicator

For Pump Grade Insulation Adhesive:

- Millennium Cyclone 1 Low Pressure Pump Cart (5G box sets)
- Millennium Cyclone 5/15 (VS) Low Pressure Pump Cart (5G box/ 15G drum sets)
- Graco E-10 Reactor
- Graco Predator
- Adhesives Systems Technology GMP-075
- Adhesives Systems Technology PCH GMP-500
- Others, as approved by CertainTeed's Commercial Technical Services Department

Approved Materials to Use with a CertainTeed Low-Slope Roof System

Thermal Barriers

- Fiber-reinforced gypsum conforming to ASTM C1278 Type X
- Cement board conforming to ASTM C1325 Type A
- Stone wool conforming to ASTM C726

Vapor Retarders

CERTAINTEED PRODUCTS USED AS VAPOR RETARDERS, FULLY BONDED (SEE SECTION 2. SUBSTRATE GUIDELINES)

Product	Application Method
Glasbase Base Sheet	Hot Asphalt
All Weather/Empire Base Sheet	Hot Asphalt or FlintBond Cold Adhesive
Black Diamond® Base Sheet	Self-Adhered
Flintlastic Ultra Glass SA	Self-Adhered
Flintglas® Ply 4 (1 or 2 layers)	Hot Asphalt
Flintlastic® Poly SMS	Hot Asphalt or any CertainTeed-approved Cold Adhesive
Flintlastic® Ultra Poly SMS	Hot Asphalt or any CertainTeed-approved Cold Adhesive
Flintlastic® Base 20	Hot Asphalt or FlintBond Cold Adhesive
Flintlastic® SA Cap	Self-Adhered
Flintlastic® SA PlyBase	Self-Adhered
Flintlastic® GTA	Torch-Welded
Flintlastic® GTS-FR	Torch-Welded

Anchor Sheets

Technically, all non-self adhering CertainTeed base sheets can be mechanically attached and utilized as anchor sheets. However, it is uncommon to utilize base sheets engineered for torch application in this capacity. Additionally, it is uncommon to utilize robust rolls thicker than 2.0mm (79 mils) in this capacity. The most common CertainTeed base sheets to be used as anchor sheets are Glasbase Base Sheet and All Weather/Empire Base Sheet. Flintglas Ply 4 shall not be utilized as anchor sheet.

Insulation

- Extruded polystyrene* conforming to ASTM C578-85 Type IV (CGSB SB-51.20M Type 2 - Type 4)
- Expanded polystyrene* conforming to ASTM C578, Min. 1.1 Density (CGSB 51.26M)
- Polyisocyanurate conforming to ASTM C1289 Type II
- Cellular glass conforming to ASTM C552

Cover Boards

- High-density polyisocyanurate conforming to ASTM C1289 Type II, Class IV, Grades I, II, or III
- Fiber-reinforced gypsum conforming to ASTM C1278 Type X
- Asphalt core board
- Cement board conforming to ASTM C1325 Type A
- High-density wood fiber boards conforming to ASTM C 208 Type II, Grade 1 and Grade 2
- Perlite conforming to ASTM C728 Types I, II, and III
- Stone wool conforming to ASTM C726

CertainTeed FlintBoard Insulation & Cover Board Products

FlintBoard is CertainTeed's family of polyisocyanurate rigid board insulation and cover board products. The benefits of FlintBoard include:

- Made from polyisocyanurate to provide the highest R-value and LTTR per inch of any roofing insulation type
- Compatible with most low-slope roof components; note that a base sheet may not be torch-applied to any FlintBoard ISO due to fire safety concerns
- Lightweight and easy to handle/install
- Fire-resistant — approved for use in various UL and FM fire-rated assemblies
- Durable

FlintBoard Insulation

- Versatile installation methods, including mechanical fasteners, adhesives, or hot asphalt
- Available with a variety of facers, flat and tapered, depending on the desired performance
- Available in high density to serve as a cover board
- Available in either 20 or 25-psi compressive strength.

CERTAINTEED INSULATION & COVER BOARD PRODUCTS

Product	Description	Designation
FlintBoard® ISO and ISO-T	Polyisocyanurate core laminated to a heavy duty, black, organic fiber reinforced felt facer (ISO-T is tapered)	ASTM C1289 Type II
FlintBoard® ISO and ISO-T Cold	Polyisocyanurate core laminated to an inorganic coated glass facer that is mold resistant (ISO-T is tapered)	ASTM C1289 Type II
FlintBoard® ISO NB	A composite roof insulation consisting of a polyisocyanurate core laminated to 7/16" OSB; also available bonded to 5/8" plywood	ASTM C1289 Type V
FlintBoard® CV	Polyisocyanurate insulation secured to 7/16" OSB in a cross-ventilating design for use only over sloped, unventilated roof decks; also available with 19/32" CDX plywood	ASTM C1289 Type V
FlintBoard® Pre-Cut Crickets	Pre-packaged in triangular sections (not the entire cricket), each with a right angle to align with CertainTeed's stand 4′ x 4′ tapered FlintBoard panels	ASTM C1289 Type II
FlintBoard® Hinged Target Sump	Prefabricated drain sump — saves 50%-74% in material and waste costs over field fabricated sumps when installing drains; manufactured with FlintBoard ISO Cold 25 psi	ASTM C1289 Type II
FlintBoard® ISO HD Cover Board	Lightweight, high-density polyisocyanurate core laminated to an inorganic coated glass facer; compressive strength: ≤109 psi	ASTM C1289 Type II

Mechanical Fasteners

FlintFast fasteners are discussed in detail in Chapter 6 of this Manual. Note that different types and sizes are recommended, depending upon deck type and whether fastening is for anchor sheets, or ithermal barriers, insulation and cover boards.

Insulation Adhesives

CertainTeed offers several adhesive products used for installing insulation and cover boards.

Millennium One-Step™ Insulation Adhesive is a quick set, elastomeric, all-purpose, solvent free, insulation and cover board adhesive. It is a two-component, low VOC, all-temperature, polyurethane adhesive packaged together in a single bead dispensing cartridge.

Millennium PG-1 Insulation Adhesive is a low viscosity, all-purpose, solvent free insulation and cover board adhesive that sets up in minutes. It is a two-part, low VOC, polyurethane adhesive packaged in separate containers (Part A and Part B). It is designed for use in low pressure carts and applicator equipment that allow for equal mixing of both parts. The adhesive should never be allowed to freeze. Material stored and utilized at cold temperatures will be prone to crystallization of Part A.

Millennium PG-1 EF Eco_2 is a two part, low VOC, solvent free polyurethane insulation and cover board adhesive which contains no GWP propellants. Product comes in two separate canisters and is applied using the nozzles and hoses supplied with the set. The adhesive should never be allowed to freeze.

CERTAINTEED INSULATION ADHESIVE PRODUCTS

	Millennium One-Step™ Foamable Adhesive	Millennium One-Step™ Green Foamable Adhesive	Millennium Pump Grade Adhesive	Millennium PG-1 EF ECO_2
Material	Polyurethane Foam	Polyurethane Foam (45% renewable content)	Low Viscosity Polyurethane Foam	Polyurethane Foam (No high GWP propellants)
Temperature	No Minimum		25°F and rising	25°F and rising
Rise Time	None – Immediate Installation		2-3 minutes (before skinning)	2-3 minutes (before skinning)
Packaging	1.5 Liter Catridges or 4/Case		5G, 15G, or 50G, A+B sets	49 lb. and 43 lb.canisters
Coverage	600 sq ft (56m^2) per case		5 Gallon (18.9L) Kit: 2,500 - 3,000 sq. ft. (232 - 279m^2) 15 Gallon (56.7L) Kit: 7,500 - 9000 sq. ft. (697 - 836m^2) 50 Gallon (189L) Kit: 25,000 - 30,000 sq. ft. (2,323 - 2,787m^2)	Set: up to 3500 sq. ft. (325 m^2)
Application Accessories	Battery Powered Single Bead, Multi-Bead Applicator, Pneumatic Applicator		Cyclone	Nozzles and hoses included in kit

Vapor Retarder Adhesive

CertainTeed also offers cold-applied adhesive for the application of vapor retarders:

Primers: Primer may be required to enhance adhesion. See Chapter 6 of this Manual for details on primers.

FlintBond Brush:
FlintBond Brush, an SBS-modified cold adhesive, can be used to install approved CertainTeed SBS-modified bitumen membranes when utilized as vapor retarders. Coverage rate is approximately 1 to 2 gallons per 100 ft^2 (9 m^2), applied by stiff bristled brush or notched squeegee.

Millennium Hurricane Force 1-Part Membrane Adhesive:
Millennium Hurricane Force® 1-Part Membrane Adhesive is a highly elastomeric, one-part asphalt modified urethane adhesive that is solvent free and does not require mixing. It is designed for use as an adhesive for bonding approved vapor retarders. It can also be used to bond membranes in the field or to approved substrates, such as concrete, LWIC, and other decks, even if not fully cured. Hurricane Force is not engineered to bond insulation or cover boards.

For vapor retarders, coverage rate is approximately 2 gallons per 100 ft^2 (9 m^2) when applied in ribbon fashion 1/4" - 3/4" (0.6cm - 1.3cm) wide and 6" o.c. Long runs of adhesive are broken up at 36" - 48" intervals to allow for cross venting of the system. Coverage rates may vary when used over irregular surfaces. Review uplift requirements for correct spacing of ribbon-applied material.

1. Precautions During Substrate Installations

SAFETY FIRST!

Please review Chapter 1, Section 1 of this Manual for important safety guidelines prior to installation.

Material Handling and Storage Precautions

Please refer to Chapter 1, Section 2 of this Manual for important general material handling and storage information.

Cold Weather Application Precautions

Please refer to Chapter 1, Section 4 of this Manual for important weather precautions.

2. Installation

Planning and Preparation

Before installation of thermal barriers, vapor retarders, insulation, and cover boards:

- **Inspect your roof deck**. Inspect the roof deck to make sure it is firm, well attached, even, clean, and dry before proceeding. Make any needed repairs or clean now to prevent difficulties during installation, damage, or system failure later. Roof decks and substrates must be free of dust, dirt, oil, debris, and moisture. DO NOT attempt application if ice, snow, moisture, or dew are present. When ambient temperatures are below 50°F, cold weather application instructions must be followed.
- **For Tapered insulation**, take advantage of CertainTeed's technical services team for design services, if needed for drainage purposes. By code, slope must be a minimum of 1/4": 12" slope.
- **Warranty Requirements/Reminders:** Using non-CertainTeed materials may affect warranty coverage. If you are using a non-CertainTeed product, make sure to contact the CertainTeed Commercial Roofing Technical Services Department at 800-396-8134, ext. 2, to ensure the product is compatible with CertainTeed roofing systems. CertainTeed does not warrant performance of another manufacturer's product unless such approval is granted in writing in advance of installation.
- **Inclement Weather:** Never begin work if inclement weather is forecasted before a job can be finished.

Installation Overview

Thermal Barriers

When utilized, thermal barriers are mechanically attached to steel, lightweight insulating concrete or wood decks. See Sections 3A and 4 of this Chapter for details.

Vapor Retarders

Vapor retarders can be installed in four ways:

- **Self-Adhered:** See Chapter 9, Section 1-2 and 3B of this Manual
- **Torch-Welded:** See Chapter 10, Section 1-2 and 3B
- **Hot Asphalt:** See Chapter 11, Sections 1-3 of this Manual (hot asphalt application instructions in this Chapter are geared towards insulation and cover boards)
- **Cold Adhesive:** See section 2A of this Chapter

VAPOR RETARDERS, SUBSTRATE GUIDELINES

In most cases, vapor retarders may be installed directly above the roof deck. However, the type of deck will influence the way it is installed.

Deck Type	Thermal Barrier	Anchor Sheet	Application			
			Self-Adhered	Torch-Welded	Hot Asphalt	Cold Adhesive
Steel	Required	No	See Vapor Retarder Application Guidelines by Thermal Barrier Type			
Plywood/OSB, LWIC, Gypsum, Cementitious Wood Fiber, Wood Planks	Required unless Anchor Sheet Installed	Required unless Thermal Barrier Installed	See Vapor Retarder Application Guidelines by Thermal Barrier Type			
Concrete	Optional	No	Yes, priming required		Yes, priming recommended	Yes

VAPOR RETARDER APPLICATION GUIDELINES BY THERMAL BARRIER TYPE

Thermal Barrier Type	Self-Adhered	Torch-Welded	Hot Asphalt	Cold Adhesive
Gypsum	Yes, priming may be required			Yes
Cement Board	Yes, priming required			Yes
Perlite	No	No	Yes	No

Anchor Sheets

Anchor sheets are always mechanically attached or "anchored" into the roof deck. At a minimum, anchor sheets should be mechanically attached 9" on center (o.c.) in the side laps and 18" o.c. in two equally spaced, staggered center rows. Model building code may dictate a more stringent fastening pattern. See Chapter 11, Section 3A for further instruction.

Insulation and Cover Board

Insulation, and cover boards can be installed in three ways:

- **Mechanical Attachment:** See Sections 2A and 4A of this Chapter
- **Hot Asphalt:** See Section 2B of this Chapter and Chapter 11, Sections 1 and 2
- **Low-Rise Foam Adhesive:** See Section 2C and 4B of this Chapter

NOTE: When installing insulation or cover board with hot asphalt or low-rise foam, board size shall not exceed 4′ x 4′. Larger panels tend to cup at the edges whereas smaller panels help to ensure positive contact with the adhesive method.

When considering insulation materials, take into account that two or more layers are strongly recommended to reduce stress to the roof membrane on a low-slope roof. It is also recommended that to reduce thermal bridging through the metal fasteners and plates, at least the second layer be adhered as opposed to mechanically attached. Also, review board size (which may be dependent upon application method), thickness (which is typically determined by desired LTTR value), facer type, and density. If mechanically attaching, insulation specifications and wind uplift requirements will determine the number of fasteners and plates you will need.

While several insulation types are discussed early in Chapter 4, for the purposes of this document, the following installation instructions are for thermal barriers and FlintBoard polyisocyanurate insulation, including FlintBoard HD high density polyisocyanurate cover board and gypsum-based cover boards, only.

INSULATION & COVER BOARDS, SUBSTRATE GUIDELINES

Deck	First Layer	Subsequent Layer (As Applicable
Steel, Plywood/OSB, Cementitious Wood Fiber, Wood Planks	Mechanically attach or pre-secure (applicable when second layer is mechanically attached)	Adhere in hot asphalt, low-rise foam or mechanically attached[1]; joints should be staggered no less than 6″
LWIC	Mechanically attach[1], pre-secure[1] (applicable when second layer is mechanically attached) or adhere in low-rise foam	
Poured Gypsum		
Concrete	Adhere in hot asphalt, low-rise foam, or mechanically attach	

[1]For poured gypsum or LWIC decks, if you are not using FM 1-90 fasteners, the fasteners must be secured into the metal pan supporting the deck.

Beyond the general conditions listed above, special circumstances can certainly exist. If you have any doubt about the best way to install any of these layers over any roof deck type, contact CertainTeed Commercial Roofing Technical Services.

2A – Cold Adhesive

FlintBond Brush

For the purposes of this Chapter, FlintBond Brush is applicable to the installation of SBS-modified membranes used as vapor retarders.

For detailed installation instructions when utilizing FlintBond to adhere vapor retarders, please refer to Chapter 12, Section 3B as well as the Appendix, Construction Details: CT-30 or CT-30A, Vapor Retarder/Alternate.

Side laps shall be aligned for a minimum 2″ overlap, and end laps shall have a minimum 6″ lap. End laps should be staggered a minimum of 36″ apart so that no course ends match up with each other.

1. DO NOT apply to wet or damp surfaces. DO NOT apply when surface temperatures are below 40°F (4°C). For best results, store material at temperatures between 60°F - 80°F (15°C - 27°C) just prior to use.

2. Apply FlintBond Brush with a brush or squeegee at a minimum application rate of 1 gallon per square is required; on porous or irregular surfaces, a rate of 1-1/2 to 2 gallons per square may be required. Insufficient or excessive quantities may cause roof membrane failure or poor performance of the roof assembly.

3. Immediately place the vapor retarder into the freshly applied FlintBond Adhesive. Broom or roll the vapor retarder surface to ensure full contact.

4. If using adhesive to seal laps, a continuous bleed-out of adhesive should be present along all side laps and end laps. Alternatively, heat weld side laps and end laps.

Millennium Hurricane Force 1-Part Membrane Adhesive

For the purposes of this Chapter, Millennium Hurricane Force 1-Part Membrane Adhesive is only applicable to the installation of vapor retarders.

1. DO NOT apply to wet or damp surfaces. This includes primers. Allow solvent based primers to completely dry before using the adhesive. DO NOT apply when surface temperatures are below 40°F (4°C). For best results, store material at temperatures between 60°F - 80°F (15°C - 27°C) just prior to use.

2. Ensure that the substrate is suitable for bonding and is clean, dry, and free of defects. For dusty surfaces, prime the substrate using Millennium Universal Primer at a rate of 150 - 250 sq. ft. (14 m^2 - 23m^2) per gallon. Allow primer to dry.

3. To fully bond vapor retarders, coverage rate is approximately 2 gallons per 100 ft^2 (9 m^2) when applied in ribbon fashion 1/4" - 3/4" (0.6cm - 1.3cm) wide and 6" o.c. Long runs of adhesive are broken up at 36" - 48" intervals to allow for cross venting of the system. Review uplift requirements for correct spacing of ribbon-applied material.

For bonding vapor retarders to concrete (including structural lightweight) and LWIC, and to allow for venting, apply adhesive in ribbons. Pour contents of a 5-gallon can into a cart and apply in ribbon fashion 1/4" - 1/2" (0.6cm - 1.3cm) wide and 6" o.c. Bead spacing requirements may vary and will be determined by project specifications and codes. Before applying adhesive, place 2" - 4" wide strips of membrane or other material every 36" - 48" along length of area receiving adhesive. After applying adhesive, remove the strips prior to installing the vapor retarder membrane. Repeat for subsequent runs of the vapor retarder. Coverage rates may vary over irregular surfaces.

4. Unroll the sheet and allow it to relax prior to setting into the adhesive.

5. Immediately place the vapor retarder into the freshly applied Millennium Hurricane Force 1-Part Membrane Adhesive. DO NOT allow the adhesive to skin over. Broom or roll the vapor retarder surface to ensure full contact.

6. If using adhesive to seal laps, a continuous bleed-out of 1/4"-1/2" adhesive should be present along all side laps and end laps. Alternatively, heat weld side laps and end laps.

For more information, refer to the Appendix for Vapor Retarder Construction Details or contact CertainTeed's Commercial Technical Services Department.

2B – Hot Asphalt

Hot asphalt may be used to secure vapor retarders, insulation, or cover boards in place. However, hot asphalt application over steel, wood, LWIC, and gypsum is not permitted by CertainTeed. A minimum 5/8″ gypsum thermal barrier must be secured by mechanical attachment first.

For detailed installation instructions when utilizing hot asphalt to adhere vapor retarders, please refer to Chapter 11, Section 3B as well as the Appendix, Construction Details: CT-30 or CT-30A, Vapor Retarder/Alternate.

Side laps shall be aligned for a minimum 2″ overlap, and end laps shall have a minimum 6″ lap. End laps should be staggered a minimum of 36″ apart so that no course ends match up with each other.

For installation of aforementioned approved insulation and cover board, board size shall not exceed 4′ x 4′, staggering all joints a minimum 6″:

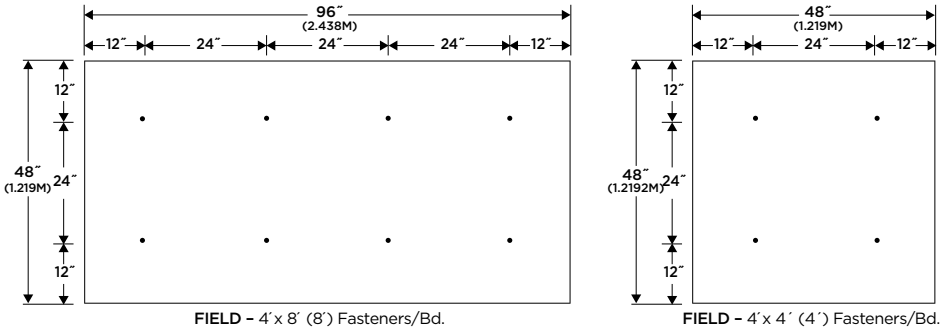
- All work surfaces should be clean, dry, and free of dirt, dust, debris, oils, loose, and or embedded gravel, un-adhered coatings, deteriorated membrane, and other contaminants that may result in a surface that is not sound or is uneven. DO NOT apply to wet or damp surfaces.
- On concrete decks, prior to the application of hot asphalt, prime the deck with FlintPrime® QD asphalt primer.
- Mopping asphalt shall conform to ASTM D312 Type III for applications on slopes up to 1″:12″ and Type IV for slopes up to 3″:12″, and shall be heated to ±25 degrees of the published EVT, as measured at the mop cart or mechanical spreader. Temperature measurement equipment shall be installed on all kettles and heating equipment. The contractor shall monitor the temperature measurement equipment and maintain recommended temperatures, as noted below. Where simultaneous mop and mechanical applications exist, the EVT for mechanical spreader application shall be used for both application methods. Asphalt should not be heated above the flash point. Asphalt should never be heated above 525°F and should not be held at 500°F or above for more than four hours. Use of 25 lbs. (± 5%) of asphalt per square foot is required to ensure proper attachment.
- Immediately set boards into hot asphalt with end joints tightly butted and staggered a minimum of 6″.
- Once insulation is in place, carefully walk it in to ensure contact between insulation and asphalt. If a second layer of insulation is to be installed with hot asphalt, CertainTeed recommends taping the joints of the first layer of insulation boards to prevent drippage. If mopping the first layer, taping is not needed.
- **IMPORTANT:** A fire watch of not less than four hours is recommended, as temperatures sufficient to ignite materials are used.

2C – Mechanical Attachment

Mechanical attachment is commonly used for installing thermal barriers and/or the base layer of insulation to the deck/substrate. Subsequent layers may then be secured in the same, or a different, manner.

- When mechanical attachment is called for, on an approved, clean deck, apply substrate, such as 4′ x 8′ or 4′ x4′ panels, with long joints continuous. Joints should be tightly butted unless gapping is required by the manufacturer. End joints should be staggered at least 6″. Use CertainTeed-approved mechanical fasteners (see Chapter 6 of this Manual) and plates in accordance with project-required fastening patterns. CertainTeed minimum fastening patterns for insulation are as follows.

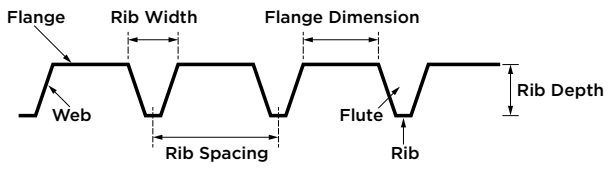
Field Fastening



Additional fastening patterns may be found in Section 5 of this chapter.

- Fastener density shall be increased at perimeters and corners, as required by code and project requirements. At a minimum, fastener density shall be increased by 50% at the perimeters and 100% at the corners, providing there is no parapet with a height less than 36″. If the parapet is less than 36″, fastener density shall not exceed 1 fastener per 1ft^2.
- On steel decks, fasteners shall penetrate the flange of the deck but should be sized to engage the rib a minimum of 3/4″, in the event the flange is missed. Be careful not to overdrive or underdrive the fasteners, as overdriving may cause cupping and damage the boards and under-driving may cause spots of loose insulation or damage to the membrane.

Steel Roof Deck



2D – Low-Rise Foam Adhesive

Foam adhesive may be used to attach insulation or cover boards.

1. All work surfaces should be clean, dry, and free of dirt, dust, debris, oils, loose, and or embedded gravel, un-adhered coatings, deteriorated membrane, and other contaminants that may result in a surface that is not sound or is uneven. DO NOT apply to wet or damp surfaces.
2. Apply 4′ x 4′ boards, staggering all joints a minimum of 6″.
3. For recover applications over gravel surfaced BUR, apply Millennium Universal Primer prior to the application of Insulation Adhesive. For applications over fresh and/or non-oxidized asphalt, coal tar, or plastic film membranes, a surface treatment may be required prior to the application of Insulation Adhesive.

Millennium One-Step™ Insulation Adhesive

Millennium One-Step™ Insulation Adhesive/ Millennium One-Step™ Green Insulation Adhesive may be applied at any ambient temperature. However, adhesive shall be stored at temperatures between 65°F - 85°F (18°C - 29°C) 24 hours prior to use. DO NOT store in direct sunlight or temperatures higher than 90°F (32°C).

1. With a utility knife, remove the molded tips at the groove from the One Step™ mixing head.
2. Attach a One-Step mixing nozzle to the threaded mixing head.
3. Place the cartridge into a hand-held or multi-bead applicator. (Adhesive application equipment may be found at the beginning of this chapter.)
4. Apply Millennium One-Step™ Insulation Adhesive directly to the substrate, using a ribbon pattern. Space 1/4″ - 1/2″ (0.6cm - 1.3cm) wide beads, 3″ - 12″ (7cm - 30cm) o.c., to achieve proper coverage rates for insulation attachment. Bead spacing requirements will be determined by wind uplift project requirements. As adhesive is applied, **immediately place insulation board** into wet adhesive. DO NOT allow the adhesive to skin over. Walk in insulation to ensure contact between the insulation board and substrate. Should insulation boards cup or form uneven surfaces, weight boards as needed while adhesive sets up, approximately 15 - 30 minutes.
5. Unused material can be applied at a later date by simply plugging the cartridges (with provided half-moon plugs) and using a new One-Step mixing nozzle.

Millennium PG-1 Pump Grade Insulation Adhesive

Millennium Pump Grade Insulation Adhesive can be applied when both ambient and substrate surface temperatures are at 25°F (-4°C) and rising, provided the adhesives are properly stored. Millennium Pump Grade Insulation Adhesive should be stored at approximately 70°F + (21°C+) for a minimum of 48 hours prior to use, and remain in a warm storage area until ready for use on the rooftop.

1. For the 5-gallon set, open the box utilizing the convenient tear strip and remove the plastic bladder from the box utilizing the easy-lift handle. Remove cap on plastic bladder and replace by attaching the quick-connect fitting supplied in each box. (Connect the black fitting to the Part 1 bladder and the gray fitting to the Part 2 bladder.) Place the plastic bladder on the pump cart. **Make sure that the bladder labeled "Part 1" is placed in area labeled for "Part 1" or "Part A" and that the bladder labeled "Part 2" is placed in the area labeled for "Part 2" or "Part B".**
2. Millennium Pump Grade Insulation Adhesive provided in 15- or 50-gallon drum sets can be used with approved pump systems. The adhesives should be placed on a drum roller or agitated prior to use. For instructions on loading drum sets, contact your Field Service Representative.
3. Connect the black Part 1 or Part A fitting to the black feed hose fitting. Connect the gray Part 2 or Part B fitting to the gray feed hose fitting. Operate the pump according to Cart manufacturer's instructions. Adhesive application equipment may be found at the beginning of this chapter.
4. Utilize the empty cardboard bladder container to capture adhesive pre-dispense, or recycle empty cardboard containers.
5. Apply Millennium Pump Grade Insulation Adhesive directly to the substrate using a ribbon pattern. Space the beads 12″ (30cm) o.c. to achieve proper coverage rates for standard insulation attachment. **Bead spacing requirements may vary and will be determined by project specifications and codes. Contact CertainTeed's Commercial Technical Services Department for specific requirements.**
6. Once Millennium Pump Grade Pump Grade Adhesive is applied, allow the foam to begin rising, typically 2″ - 3″, and place the insulation board into the adhesive before the adhesive has skinned over. "Walk in" insulation to ensure contact between the insulation board and substrate. Should insulation boards cup or form uneven surfaces, weight boards as needed while adhesive sets up, approximately 15 - 30 minutes.
7. Plastic bladders are designed for easy visibility to ensure the adhesive maintains a 1:1 ratio. If material is not consumed at a 1:1 ratio, stop application and check for blockage in hose or dispensing manifold.
8. Unused material can be applied at a later date. Properly clean and grease the dispensing wand and pump unit, according to the manufacturer's recommendations.

Millennium PG-1 EF ECO_2 Adhesive

Note: Millennium PG-1 EF ECO_2 should be applied when both ambient and substrate surface temperatures are at 40°F (4°C) and rising. Adhesive canisters should be properly stored and conditioned at 70°F + (21°C+) for 24 hours prior to use and remain in a warm storage area until ready for use on the rooftop. Storing the adhesive below the recommended application temperature range prior to use can have a negative effect on product performance which may include reducing the expected coverage rates of the adhesive, delayed or extended reaction and set up times and in some cases can alter the dispense mix of the two components. In the event the adhesive is exposed to cooler temperatures for an extended period of time, it must be brought back up to the recommended application temperature prior to use. The adhesive should never be allowed to freeze.

Proper PPE must be used during setup and dispensing of adhesive. Consult SDS and product label for complete safety guidelines

1. Shake each adhesive canister for 10-15 seconds before use. Connect hoses to the tanks prior to opening the A and B tank valves. To prevent contamination by cured foam and to maintain clean ports and prior to attaching the nozzle to the dispensing unit, apply petroleum jelly to the face of the adhesive applicator (supplied in Part A box). When dispensing adhesive for the first time from each unit slowly squeeze the trigger only a quarter to halfway open until the desired output and spray pattern is achieved.

2. Utilize the empty waste container to capture adhesive pre-dispense.

3. **Adhesive Ribbon Application for Board Stock Attachment:** Eliminate uneven surfaces to ensure positive contact between the insulation boards, adhesive, and substrates. Apply Millennium PG-1 EF ECO_2 directly to the substrate using a ribbon pattern. Space the beads 12" (30cm) on center to achieve proper coverage rates for standard insulation attachment. **Note: Bead spacing requirements may vary and will be determined by the OEM Roof System Manufacturer.**

Allow adhesive to begin to rise then place board stock into the adhesive before the adhesive has skinned over.

4. After ribbon application, unused material in adhesive canisters can be applied at a later date.
   To prepare the canisters for short term storage (< 30 days):

   a. Close the adhesive canister valves and purge excess pressure from the applicator and hoses. Completely emptying the hoses is not necessary.

   b. Engage the handle safety lock to prevent accidental discharge by rotating the wheel clockwise until firmly against the handle assembly. Leave the applicator, hoses and static mixer attached.

   To reuse the applicator after short term storage:

   a. Remove the used static mixer from the applicator

   b. Check the face of the applicator to make sure the outlet ports are clear of obstructions. If necessary, remove any cured adhesive or chemical from the face of the applicator. re-apply petroleum jelly to the face and outlet port area to prevent further buildup of adhesive.

   c. Shake each adhesive canister for 10-15 seconds before use. Adhesive canisters should be properly stored and conditioned at 70°F + (21°C+) for 24 hours prior to use and remain in a warm storage area until ready for use on the rooftop.

d. Fully open the adhesive canister tank valves and disengage the handle safety lock by rotating the wheel counter clockwise. Dispense adhesive into waste container to verify that both components are being dispensed in equal streams. The applicator is a disposable unit not designed for prolonged storage or continuous re-use. If any clogging is visible in the test spray, the applicator should not be used. A replacement applicator should be obtained (Part number XYZ 123)

e. If no visible clogging is observed, attach a new static mixer to adhesive applicator and proceed with application.

f. Use of contents within 30 days of initial use is recommended.

DISPOSAL

Proper PPE must be used during setup, dispensing and disposal evacuation of adhesive canister. Consult SDS and product label for complete safety guidelines.

Dispense all remaining adhesive into an appropriate waste container using the applicator with a new static mixer attached. Spray the adhesive until one or both of the components / canisters no longer sprays mixed adhesive.

Remove the static mixer and continue to depressurize by dispensing the unmixed chemicals into a waste container, (a box or pail lined with a plastic bag). Dispense the residual chemicals until all pressure is depleted. Add liquid absorbent material to the waste container prior to disposal.

Close the adhesive canister tank valves and relieve any remaining pressure in the applicator and hoses. Using a 9/16" wrench, remove the hoses from the adhesive canisters and discard.

With the hoses removed, point the outlet of the adhesive canister away and slowly open the valves to ensure no pressure remains. Leave valves open.

3. Roof Membrane Attachment Coordination and Precautions

Once the required thermal barrier, vapor retarder, insulation, and/or cover board is properly installed and inspected, the roofing membrane can be installed. The following needs to be kept in mind, related to installing roofing over CertainTeed FlintBoard products:

- CertainTeed membranes or roof plies may be hot mopped directly to FlintBoard products.
- CertainTeed membranes may be self-adhered directly to FlintBoard products.
- CertainTeed membranes may be installed in cold adhesives directly over FlintBoard products. For this application method, FlintBoard ISO Cold or ISO-T Cold is required when using FlintBond or other solvent-based adhesives.
- DO NOT torch-weld low-slope roof membranes directly to any FlintBoard product.

For more comprehensive instructions on roofing membrane installation, please refer to the following chapters for application information on:

- Modified Bitumen *Self-Adhered* Field Application – Chapter 9
- Modified Bitumen *Torch-Applied* Field Application – Chapter 10
- Modified Bitumen *Hot-Applied* Field Application – Chapter 11
- Modified Bitumen *Cold-Applied* Field Application – Chapter 12
- Built-Up Roofing (BUR) *Hot Asphalt* Field Application – Chapter 13

4A – Fastener Placement for Thermal Barrier, Insulation & Cover Board

Standard fastening pattern and placement options are summarized in this section following the CertainTeed General Recommendations/Roofing Specifications.

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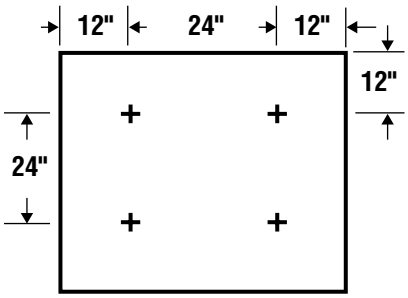
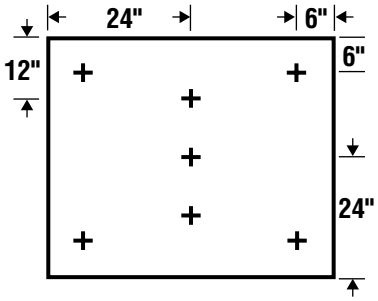


4 Fasteners/Board



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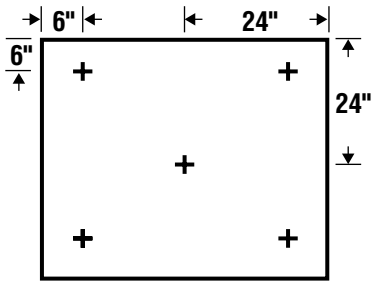

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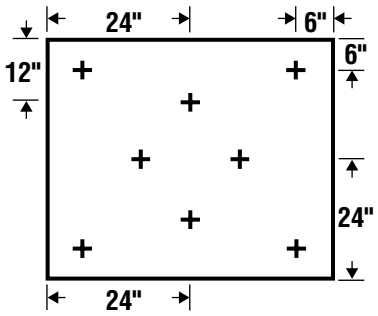

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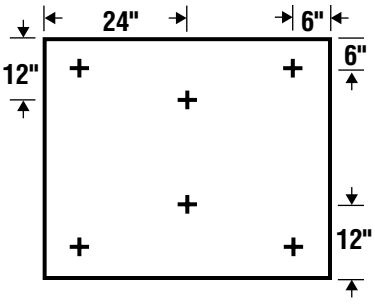

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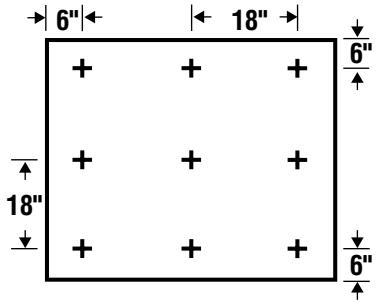
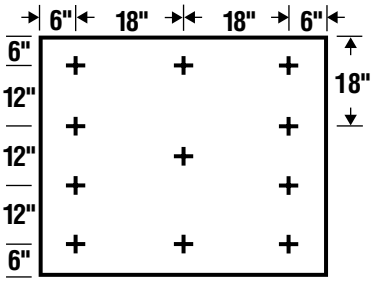


9 Fasteners/Board

4 X 4 FT. (1.2 X 1.2 M) BOARDS



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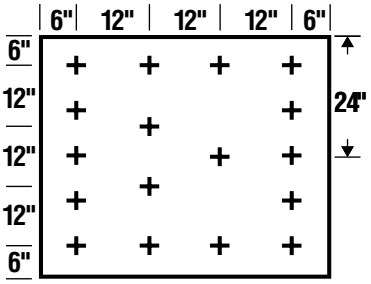

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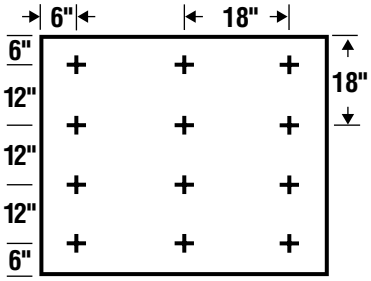

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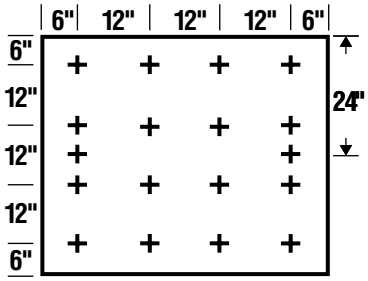

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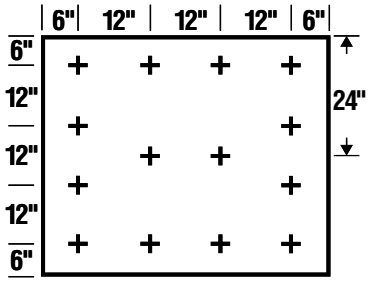

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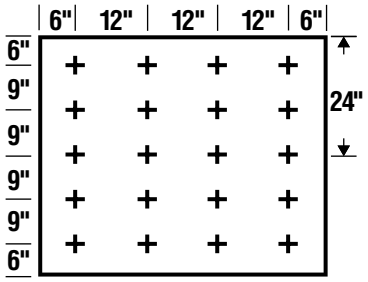

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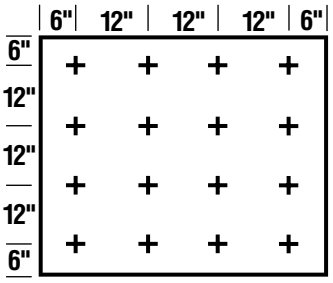

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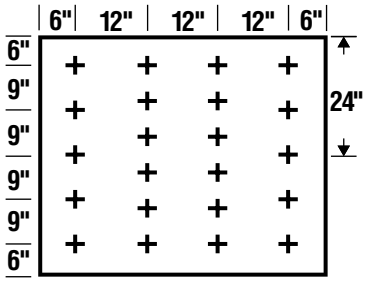
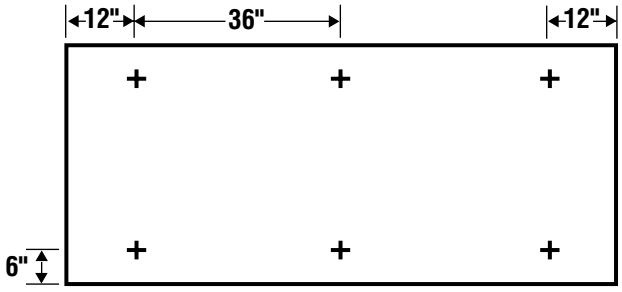


22 Fasteners/Board

4 X 8 FT. (1.2 X 2.4 M) BOARDS



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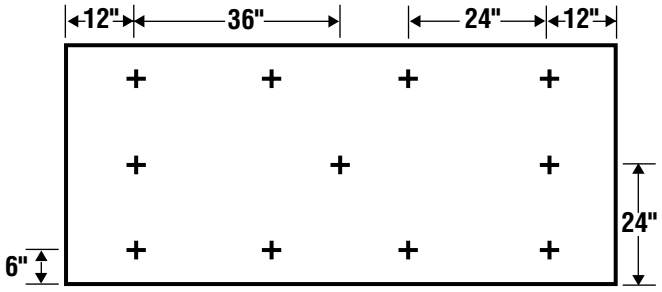

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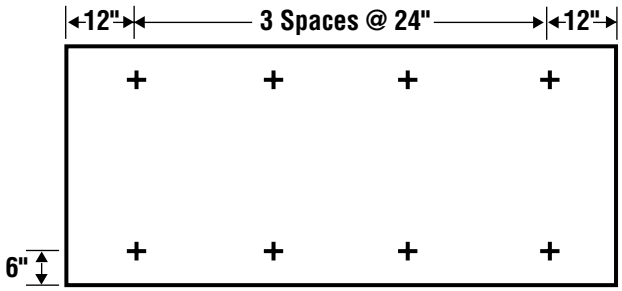

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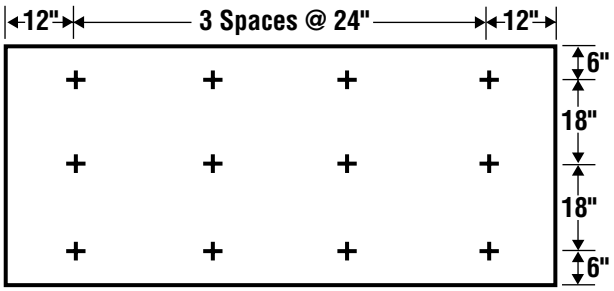

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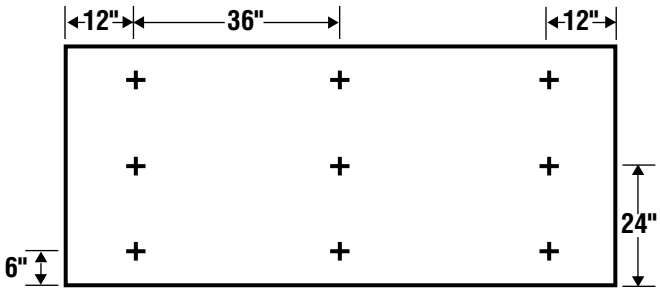

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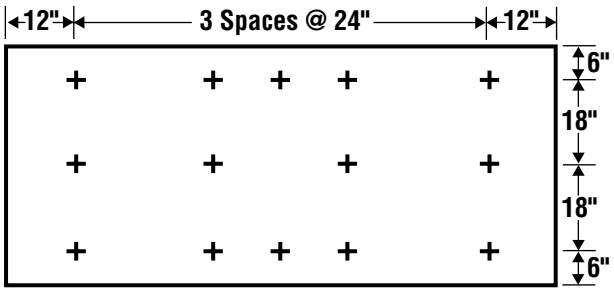

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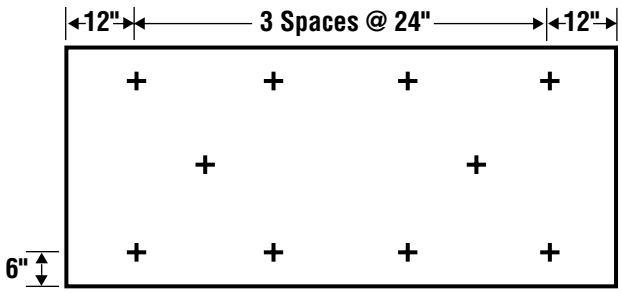

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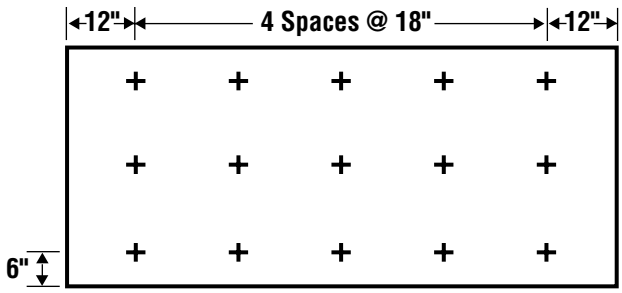
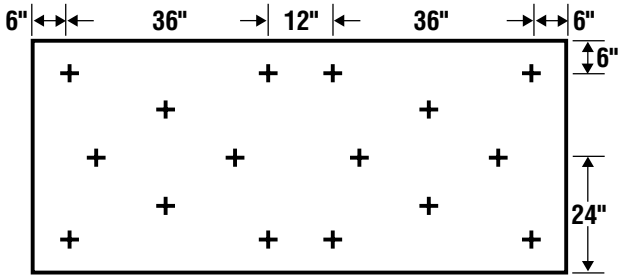


15 Fasteners/Board

4 X 8 FT. (1.2 X 2.4 M) BOARDS



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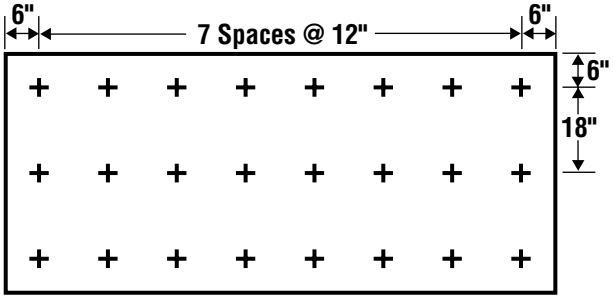
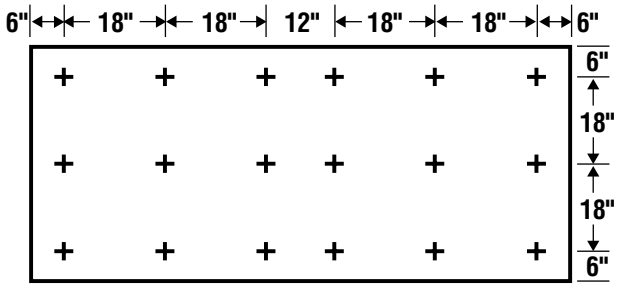


24 Fasteners/Board



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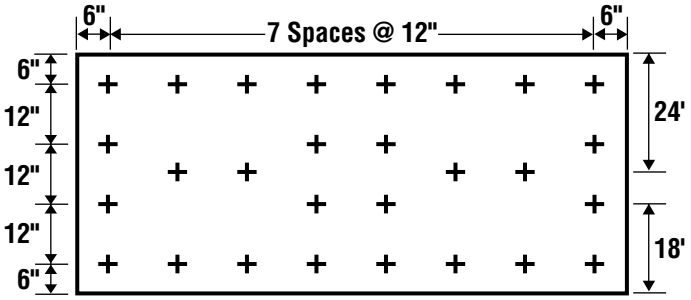
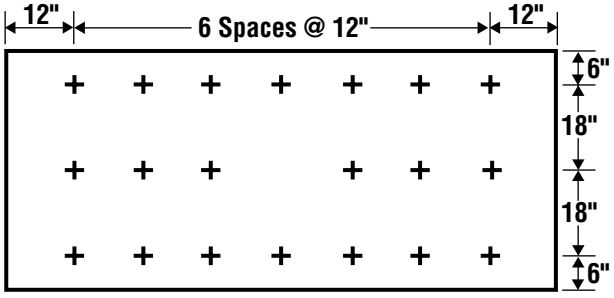


28 Fasteners/Board



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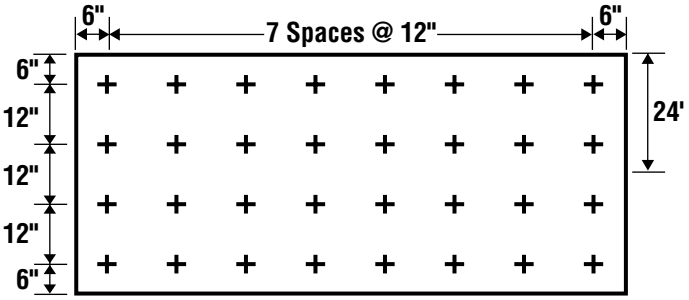
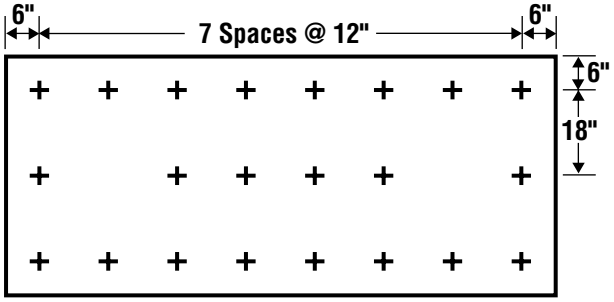


32 Fasteners/Board



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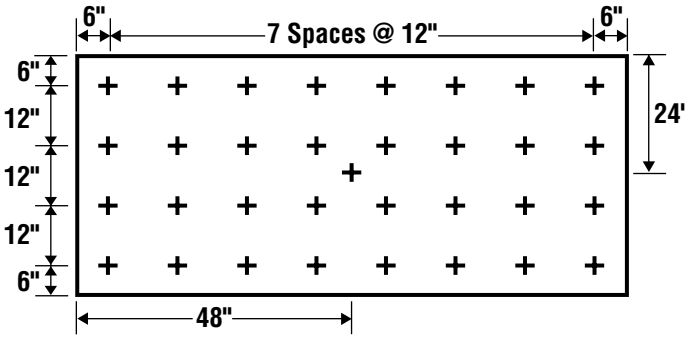
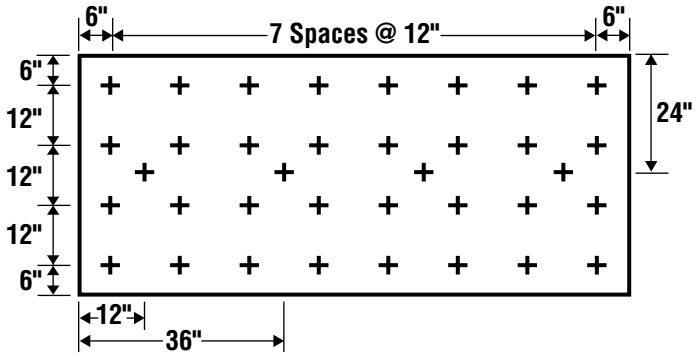
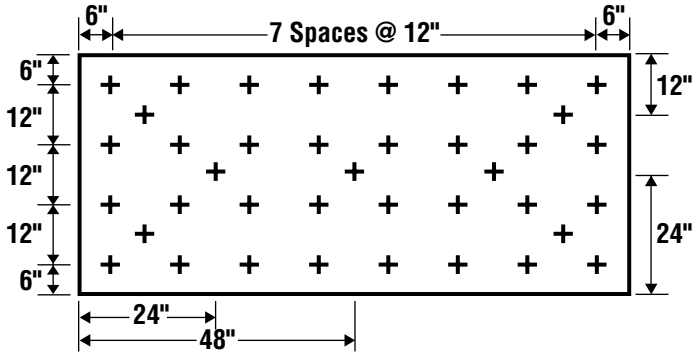


33 Fasteners/Board

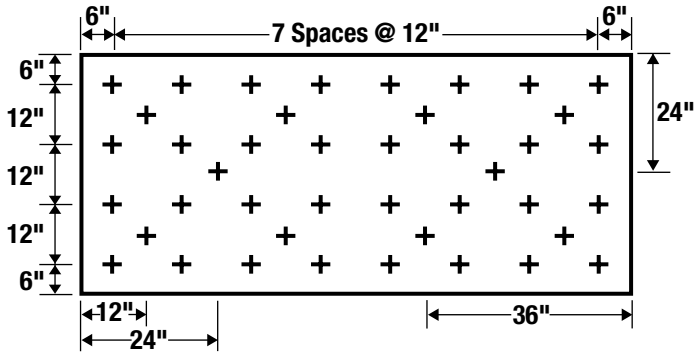
4 X 8 FT. (1.2 X 2.4 M) BOARDS



36 Fasteners/Board



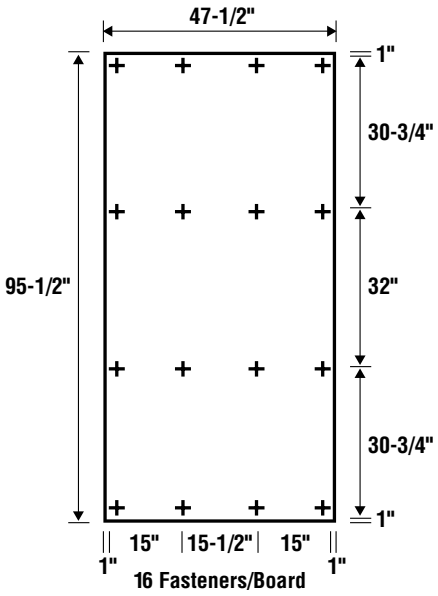
39 Fasteners/Board



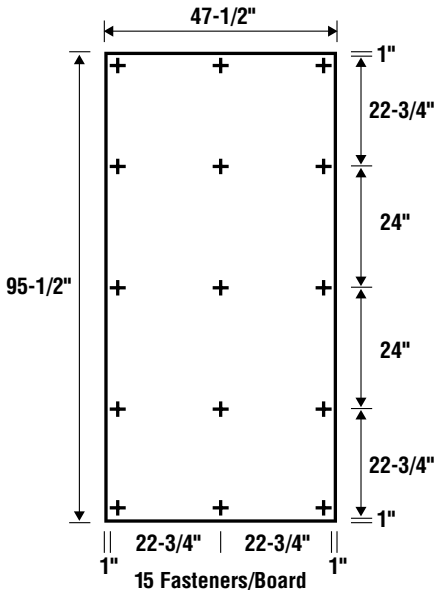
42 Fasteners/Board

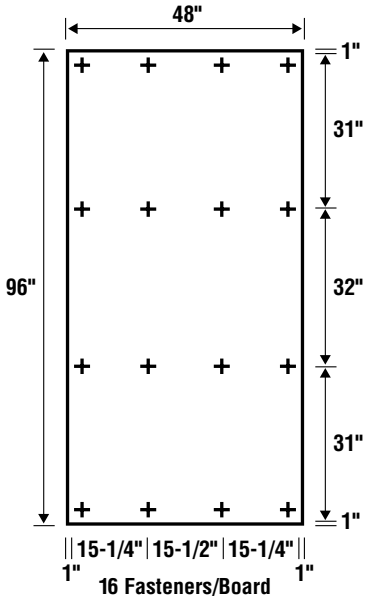
FLINTBOARD ISO NB FASTENER PLACEMENT

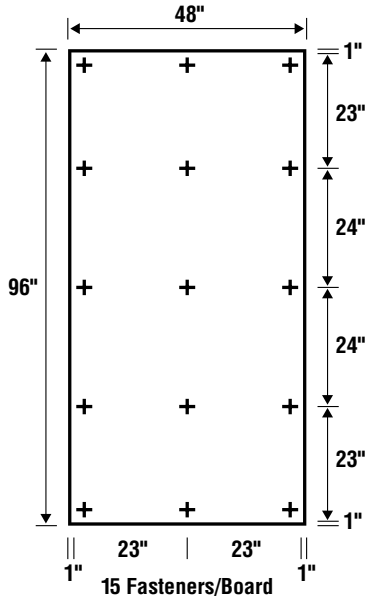
Deck Types
Wood Framing – 16″ or 32″ oc
Concrete
Steel



Deck Types
Wood Framing – 16″ or 32″ oc
Concrete
Steel





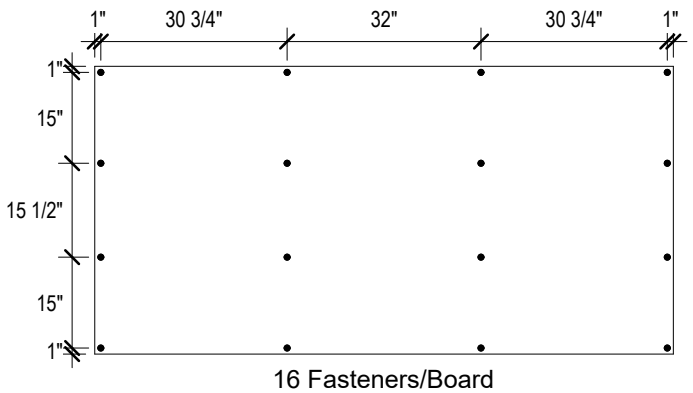


NOTE:

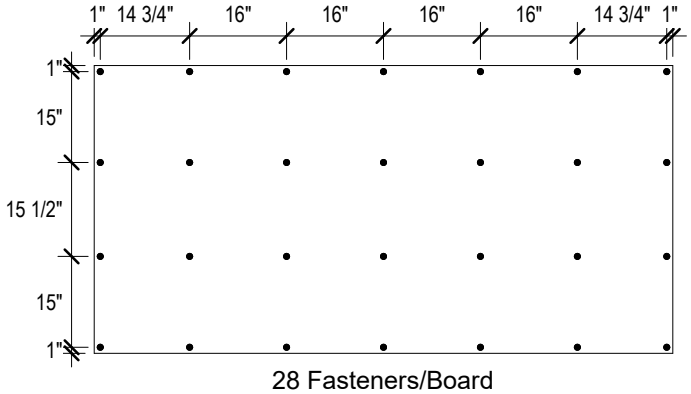
- FlintBoard ISO NB must be installed on a structural deck; Do not install directly to framing; FlintBoard ISO NB is not a structural panel
- Use SIP fasteners

FLINTBOARD ISO NB FASTENER PLACEMENT

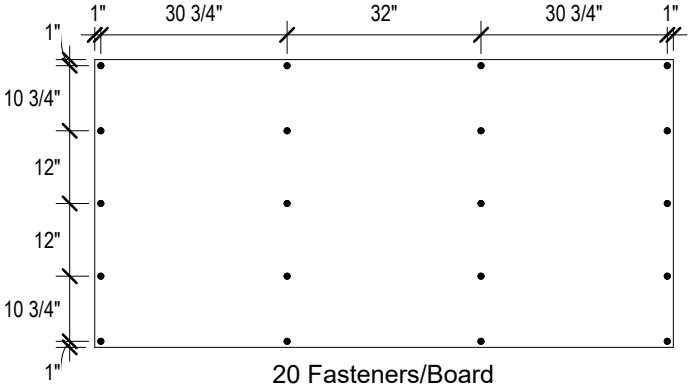
Deck Types
Wood Framing – 16″ or 32″ oc
Concrete
Steel



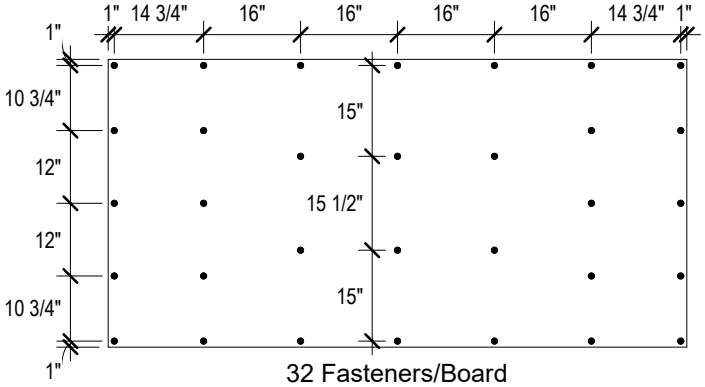
16 Fasteners/Board



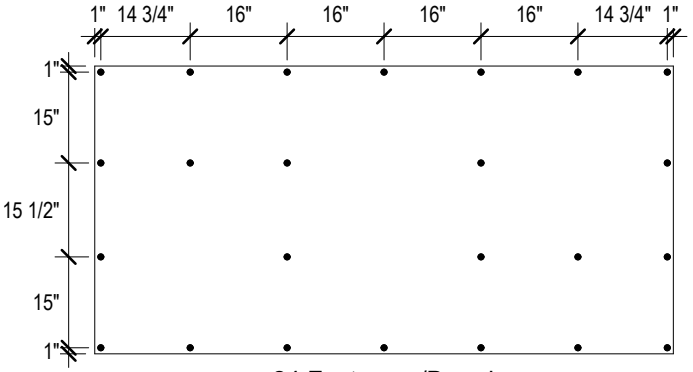
28 Fasteners/Board



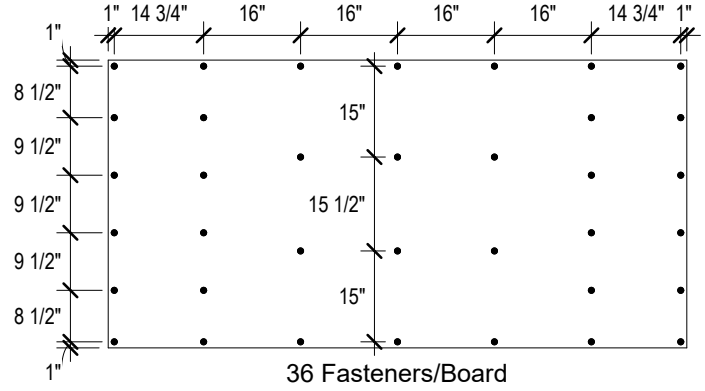
20 Fasteners/Board



32 Fasteners/Board



24 Fasteners/Board



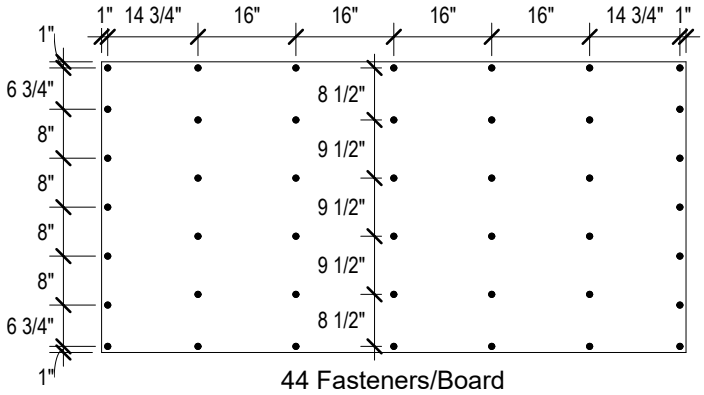
36 Fasteners/Board

NOTE:

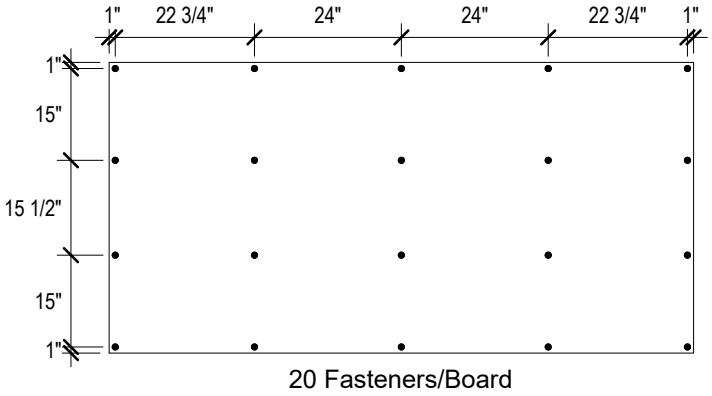
• Dimensions shown are approximate.

FLINTBOARD ISO NB FASTENER PLACEMENT

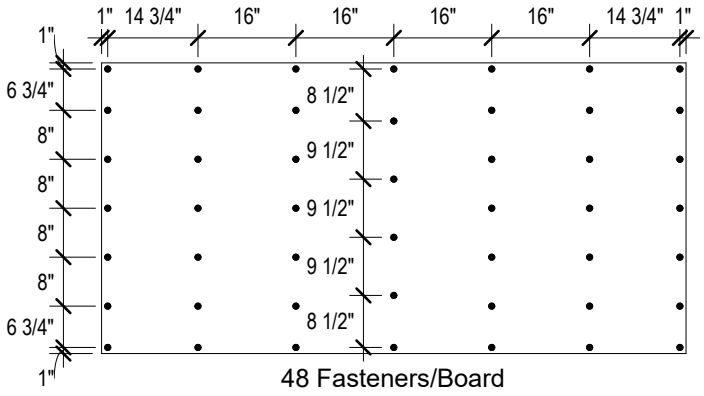
Deck Types
Wood Framing – 16″ or 24″ oc
Concrete
Steel



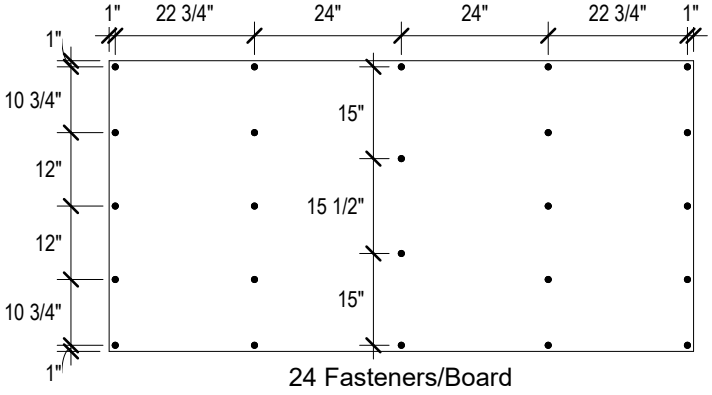
44 Fasteners/Board



20 Fasteners/Board



48 Fasteners/Board



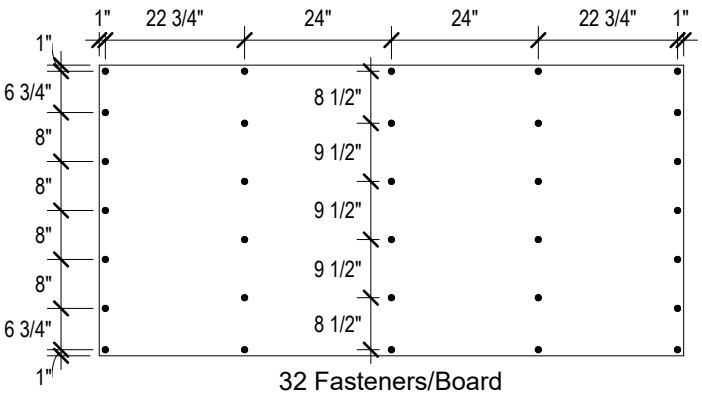
24 Fasteners/Board

NOTE:

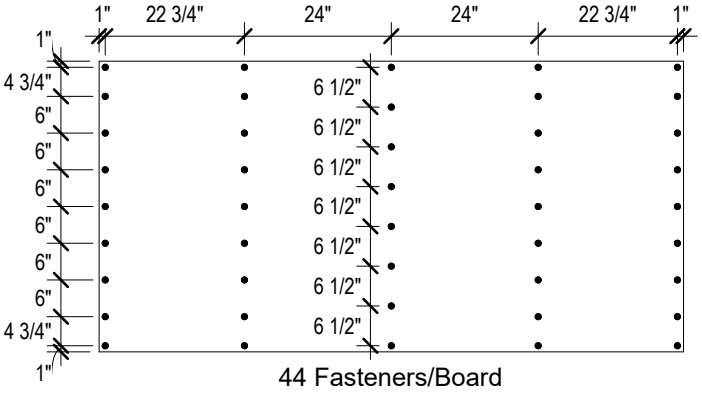
• Dimensions shown are approximate.

FLINTBOARD ISO NB FASTENER PLACEMENT

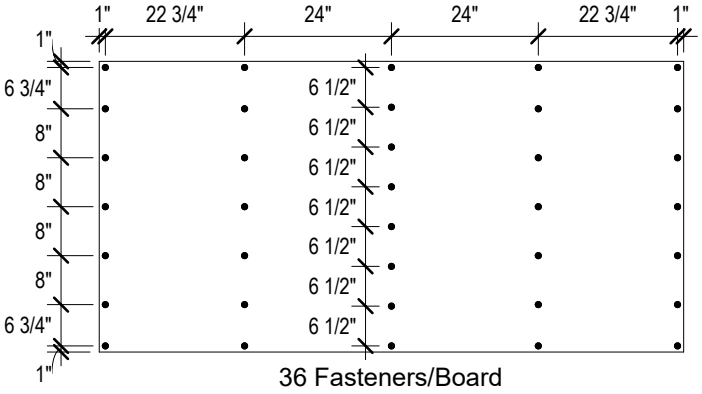
Deck Types
Wood Framing – 24″ oc
Concrete
Steel



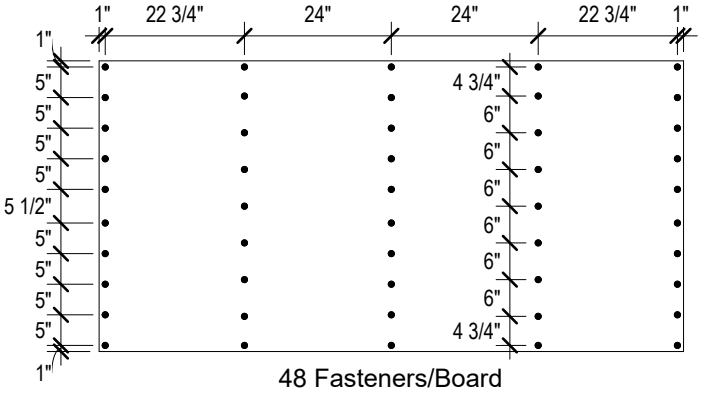
32 Fasteners/Board



44 Fasteners/Board



36 Fasteners/Board



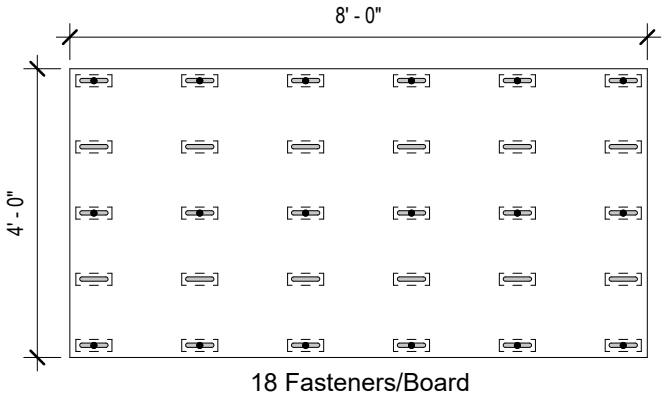
48 Fasteners/Board

NOTE:

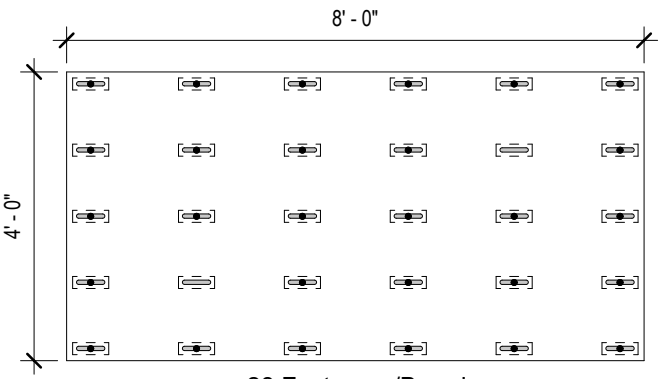
• Dimensions shown are approximate.

FLINTBOARD CV FASTENER PLACEMENT

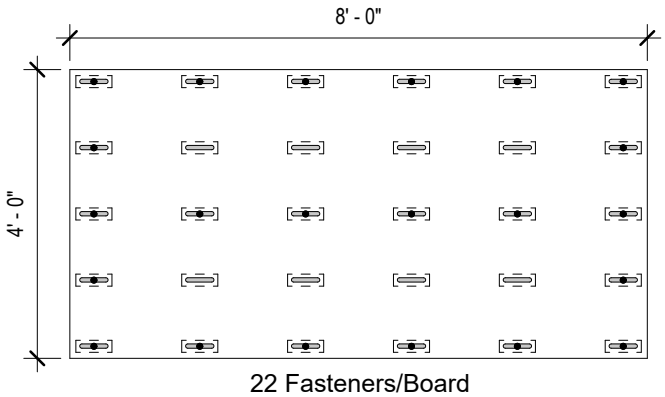
Deck Types
Wood Framing – 8′ x 4′
Concrete
Steel



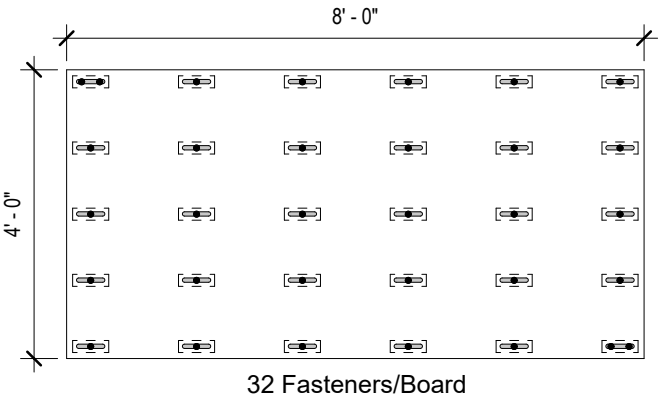
18 Fasteners/Board



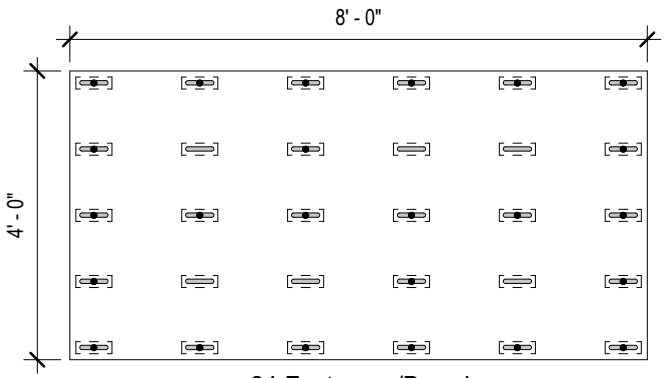
28 Fasteners/Board



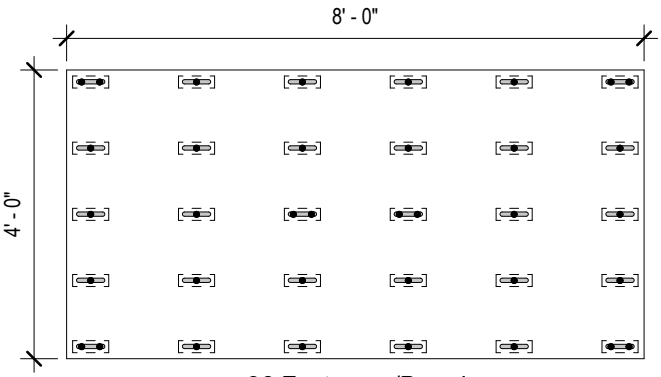
22 Fasteners/Board



32 Fasteners/Board



24 Fasteners/Board



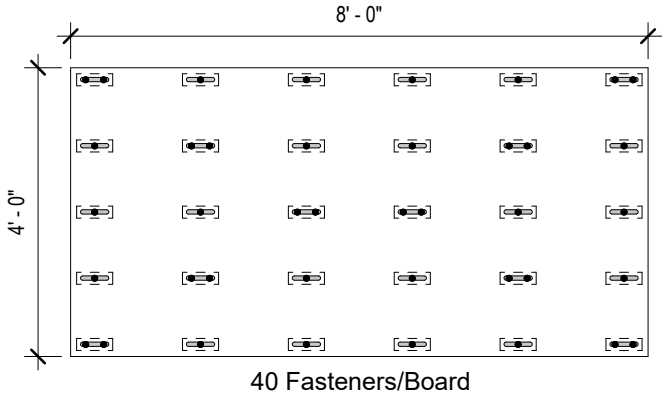
36 Fasteners/Board

NOTE:

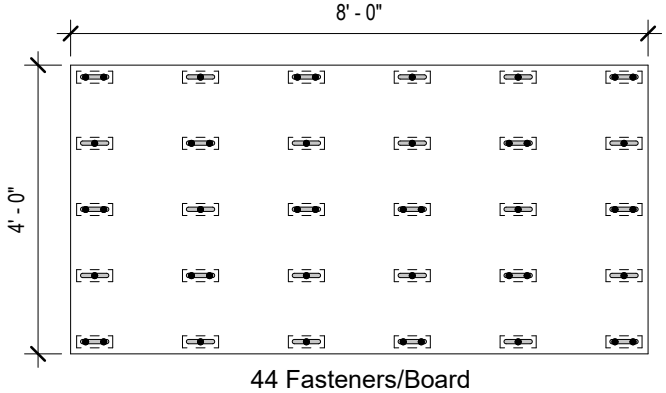
- FlintBoard CV panels have painted markings on the substrate to indicate block locations. Fasteners need to be installed within 1″ of this marked area on steel decks be sure to fasten into the top flute.

FLINTBOARD CV FASTENER PLACEMENT

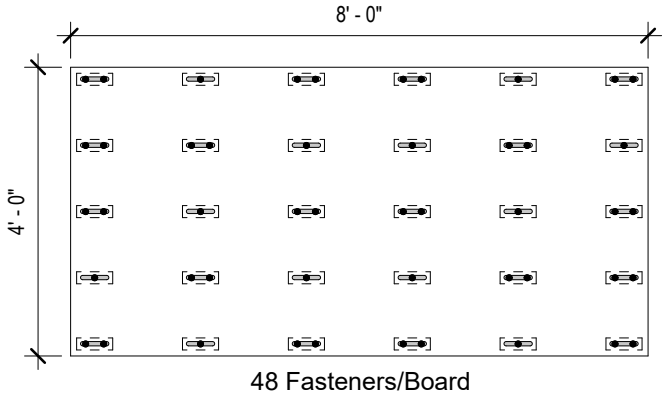
Deck Types
Wood Framing – 8′ x 4′
Concrete
Steel



40 Fasteners/Board



44 Fasteners/Board



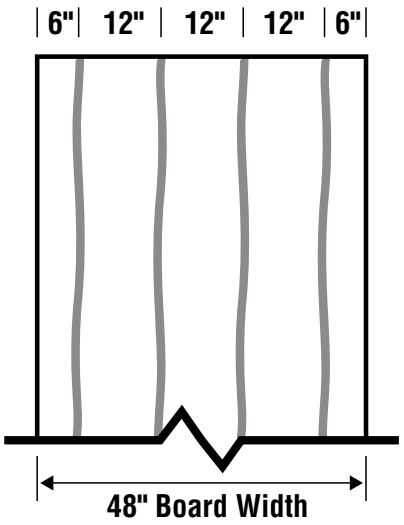
48 Fasteners/Board

NOTE:

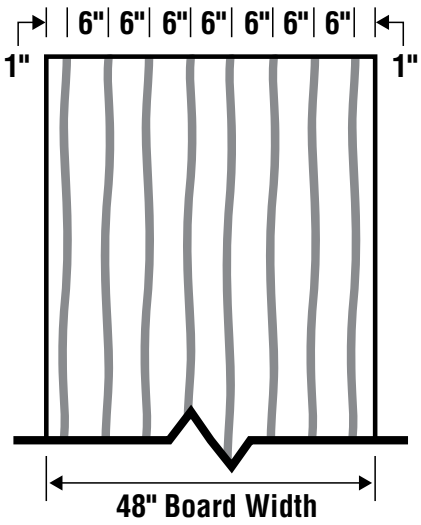
- FlintBoard CV panels have painted markings on the substrate to indicate block locations. Fasteners need to be installed within 1″ of this marked area on steel decks be sure to fasten into the top flute.

4B – Ribbon Patterns & Spacing for Vapor Retarder, Insulation and Cover Board

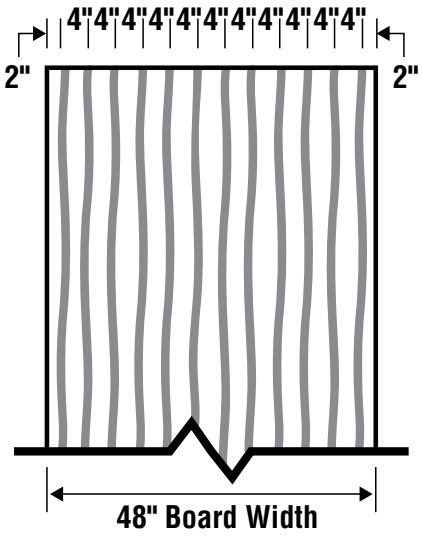
12″ o.c. Adhesive Spacing



6″ o.c. Adhesive Spacing



4″ o.c. Adhesive Spacing



Chapter 8 – Self-Test for Substrate Application

Questions

Test online https://certainteed.com/low-slope-test

1. Vapor retarders may be installed using the following application method:
   - ☐ a. Self-Adhered
   - ☐ b. Hot Asphalt
   - ☐ c. Cold Adhesive
   - ☐ d. All of the above

2. 4′ x 8′ insulation boards may be installed with adhesive or hot asphalt.
   - ☐ a. True
   - ☐ b. False

3. When mechanically fastening a 4’ x 8’ insulation board, the minimum number of fasteners per board should be:
   - ☐ a. 4
   - ☐ b. 8
   - ☐ c. 16
   - ☐ d. 32

4. Fasteners should be sized to engage the rib of a steel deck a minimum of 3/4″.
   - ☐ a. True
   - ☐ b. False

5. _____ Insulation Adhesive should rise 2-3 minutes before placing insulation boards into the adhesive while _____ Insulation Adhesive shall have boards placed immediately.
   - ☐ a. Millennium One-Step; Millennium Pump Grade
   - ☐ b. Millennium Pump Grade; Millennium One-Step

6. Which of the following is NOT an approved CertainTeed vapor retarder application method?
   - ☐ a. Self-Adhered
   - ☐ b. Torch-Welded
   - ☐ c. Hot Asphalt
   - ☐ d. Spray Foam

7. When mechanically fastening a 4′ x 8′ insulation board, what is the minimum number of fasteners required?
   - ☐ a. 8
   - ☐ b. 12
   - ☐ c. 16
   - ☐ d. 24

8. Which adhesive requires immediate placement of insulation boards after application?
   - ☐ a. Millennium Pump Grade
   - ☐ b. Millennium One-Step
   - ☐ c. FlintBond Brush
   - ☐ d. Hurricane Force

Chapter 9:
Self-Adhered Modified Bitumen Roofing

Your objective: To learn CertainTeed's procedures for the correct application and installation of the Flintlastic® Self-Adhered SBS-Modified Bitumen Roof Systems and other CertainTeed self-adhered membranes.

Self-Adhered Products and Systems for Low-Slope Roofs

One of CertainTeed's most frequently used and easy to install product families, Flintlastic SA, is a top choice when it comes to self-adhered SBS-modified bitumen roofing systems for low-slope roofs, commercial and residential alike, new construction, tear-off, or recover projects.

Additionally, CertainTeed offers two self-adhered base plies designed to be paired with non-self-adhered cap sheets. These hybrid systems have combine the benefits of multiple application methods in one roofing system.

Where can I use self-adhered roofing systems?

The value associated with labor savings and safety can be applied to any roof project. In addition, Flintlastic SA fully self-adhered roof systems are ideal when access to the roof is limited, such as high-rise buildings.

No torches or kettles are needed, which reduces fire hazards and asphalt fumes, making SA systems an ideal solution for healthcare, education, hospitality, and residences/condominiums where occupant comfort is tremendously desirable.

What tools do I need for a self-adhered system?

You will use familiar tools when you install self-adhered membranes:

- A weighted roller to press the membrane into place, 2″ to 4″ in diameter (~70 lbs.)
- Trowel for applying FlintBond® to flashing details
- Roofer's knife with hooked blade
- Caulk gun for applying beads of FlintBond
- Seam probing tool to check for voids
- Hot-air welder (in combination with a handheld silicone roller) for cold weather applications or in place of FlintBond for flashing details year-round
- Long-handled (standing) roller, only as needed, with 1/8″ - 1/4″ nap for applying primer (1/8″ nap for smooth surfaces, 1/4″ nap for more porous surfaces)

What are the components of a Flintlastic SA System?

CertainTeed® offers SBS-modified roll goods for self-adhered application with both fiberglass and polyester reinforcement mats. Trowel and caulk-grade adhesives that have been designed for use with self-adhered modified bitumen membranes are also available.

Flintlastic SA System

NOTE: *Flintlastic SA Cap (or SA Cap FR) cannot be applied to any other base sheets other than as described herein. Flintlastic SA base sheets may also be used in hybrid roof systems with a torch-applied cap; however, Flintlastic SA base sheets cannot be paired with cap sheets applied with hot asphalt or cold adhesive.*

CERTAINTEED MEMBRANES UTILIZED IN SELF-ADHERED SYSTEMS

	Product	Description	Weight	Coverage
Base/ Interplies	**Flintlastic SA NailBase**	Base sheet (MF*), SBS with Fiberglass Reinforcement	82 lbs.	2 Squares
	Flintlastic SA PlyBase	Base or interply (SA), SBS with Fiberglass Reinforcement	86 lbs.	2 Squares
	Flintlastic SA MidPly	Premium base or interply (SA) for extended warranty durations, SBS with Fiberglass Reinforcement	63 lbs.	1 Square
Cap Sheets	**Flintlastic SA Cap**	Workhorse cap (SA), SBS with Polyester Reinforcement	95 lbs.	1 Square
	Flintlastic SA Cap CoolStar*	Highly reflective cap (SA), SBS with Polyester Reinforcement	93.5 lbs.	1 Square
	Flintlastic SA Cap CoolStar* Ultra	Highly reflective cap (SA), SBS with stress resistant Polyester Reinforecment	95 lbs.	1 Square
	Flintlastic SA Cap FR	Fire retardant cap (SA), SBS with Fiberglass Reinforcement	88 lbs.	1 Square
	Flintlastic SA Cap FR CoolStar*	Highly reflective, fire retardant cap (SA), SBS with Fiberglass Reinforcement	88.5 lbs.	1 Square
	Flintlastic SA Cap FR CoolStar* Ultra	Highly reflective, Title 31 compliant, fire retardant cap (SA), SBS with heavy duty Fiberglass Reinforcement	95 lbs.	1 Square

*MF = Mechanically Fastened

CERTAINTEED SELF-ADHERED BASE/INTERPLY MEMBRANES USED WITH NON-SELF-ADHERED CAP SHEETS

Product	Description	Weight	Coverage
Black Diamond Base Sheet	Heat-activated[1], SBS-modified, dimensionally-stable, fiberglass reinforcement	78 lbs.	2.25 Squares
Flintlastic Ultra Glass SA*	Premium SBS-modified, Heavy duty fiberglass reinforcement	72 lbs.	1 Square

[1]Black Diamond Base Sheet must be paired with a torch-applied or hot-asphalt applied cap sheet for long-term bond; it may not be paired with a cap sheet set in cold adhesive

CERTAINTEED ACCESSORIES UTILIZED IN SELF-ADHERED SYSTEMS

	Product	Description
Primers	**FlintPrime* QD**	Quick-drying, solvent-based, highly penetrating asphalt primer designed to promote membrane adhesion for torch-welded, hot, or cold applications, or self-adhered membranes.
	FlintPrime Aerosol	Quick-drying, asphalt primer used for preparation of metal, concrete, gypsum, masonry, or brick substrates prior to application of modified asphalt membranes or built-up roofing sheets. Packaged in a 15 oz. spray can, the primer is specially designed to prime small detail areas where applying FlintPrime by brush or spray rig is not efficient.
Adhesives	**FlintBond* Trowel**	An all-weather, SBS-modified bitumen flashing and repair mastic specially formulated for use with modified bitumen membranes, base sheets, and ply sheets. FlintBond will not run, slip, sag, or mud crack.
	FlintBond Caulk	Ideal for SBS-modified membrane seam and flashing details and cracks in concrete or control joints on low-slope roofs, as well as skylights, chimneys, vent pipes, gravel guards, and downspouts. Also delivers excellent repair performance on all modified bitumen and built-up roofing membranes in wet or dry conditions. FlintBond will bond underwater and remain adhered where movement is expected to occur. NOTE: DO NOT use cold adhesives, such as FlintBond, with self-adhered membranes other than for flashing details and cap sheet overlaps, as described herein.
	Arctic Edge™ Cold Lap Tape	Use-as-needed, auxiliary tape engineered to significantly enable Flintlastic SA membrane application in cold weather.

TIP: Flintlastic SA roof systems require the use of FlintPrime for substrate preparation (if fully adhering the base sheet) or metal detail preparation and FlintBond SBS-Modified Adhesive (both caulk and trowel grades) for end laps or details where an overlap occurs over a granular surface.

Self-Adhered Roof System Specifications

Please refer to the CertainTeed Commercial Roof System Specifications manual for comprehensive specification options and details.

1. Precautions During Self-Adhered Roofing Installations

SAFETY FIRST!

Please review Chapter 1, Section 1 of this Manual for important safety guidelines prior to installation.

Material Handling and Storage Precautions

Please refer to Chapter 1, Section 2 of this Manual for important general material handling and storage information.

Cold Weather Application Precautions

Please refer to Chapter 1, Section 4 of this Manual for important weather precautions.

2. Installation Overview for Self-Adhered Roofing Systems

The application steps for a self-adhered roof system shall occur as follows:

1. Substrate Preparation: Assure that the existing substrate is completely clean and suitable to receive the new roofing system.

NOTE: *If primer is used, it must be applied at the specified rate and be allowed to cure, as specified.*

2. Rigid Insulation / Cover Board Application (Optional): If using rigid insulation or cover boards, ensure that they are properly installed and secured. See Chapter 8 of this Manual for information about installing rigid insulation and cover boards.

3. Base Sheet/Ply Application (Required): After preparing the substrate, follow the specific installation procedures described in Section 3 of this Chapter.

4. Interply Application (Optional): If the specified roofing system requires one or more ply sheets, install them following the specific application procedures described in Section 4 of this Chapter.

5. Cap Sheet Application (Required): After the base sheets/plies and/or interplies are installed, follow the specific application procedures for the cap sheet installation described in Section 6 of this Chapter.

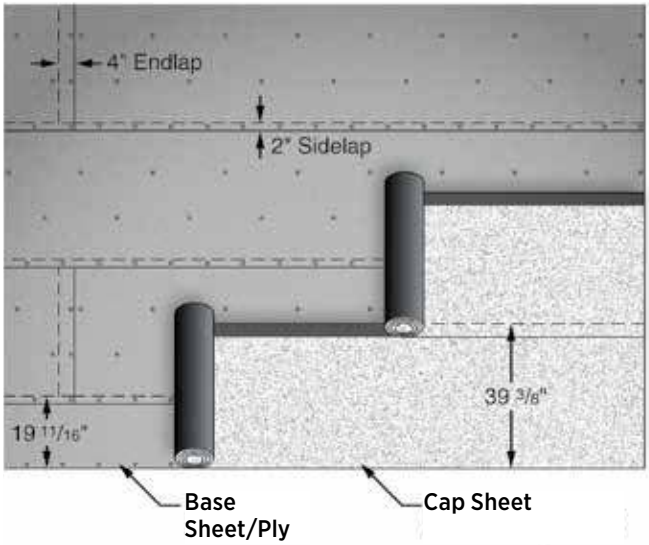
6. Surface Coatings (Optional): If required by specification or to satisfy the warranty, apply the specified surface coating as described in Section 7 of this Chapter.

7. Project Completion: To successfully complete the application and obtain a CertainTeed Warranty, see Chapter 15 of this Manual.

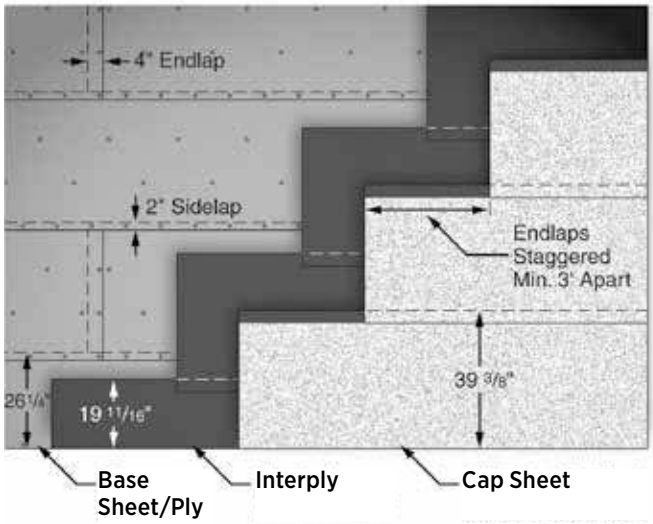
The roofing membrane (base, ply, and cap sheet) installation procedures are described in more detail in the following sections.

Roof Layout and Slope Guidelines

Layout: 2-Ply System



Layout, 3-Ply System



FIELD LAYOUT REFERENCE

	2-Ply Systems		3-Ply Systems		
	Base	**Cap**	**Base**	**Ply**	**Cap**
Starter row width	19-11/16" (1/2 roll)	39-3/8" (full roll)	26-1/4" (2/3 roll)	19-11/16" (1/2 roll)	39-3/8" (full roll)
Side laps	2"	3"	2"	2"	3"
End laps, staggered 36"	4"	6"	4"	4"	6"

- When membrane is self-adhered, where roof slope is 1" per foot or less, side laps are installed perpendicular to the direction of the roof slope.
- In situations where the roof slope exceeds 1" per foot, rolls are installed with the side laps running parallel to the slope direction.
- Refer to Nailing Requirements for blind and back nailing guidelines based on slope
- End laps are to be staggered a minimum of 3'.
- In multi-ply applications, membrane side laps of each layer must be staggered from those plies below.
- After slope has been considered and accounted for, start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection. Roof layout shall be designed so that no side laps are against the flow of water.

Substrate Guidelines

Whether you mechanically attach an anchor sheet or fully self-adhere a system depends upon your roof deck, use of insulation, and any code needs, such as FM requirements.

The following table is meant to provide guidance on attaching base ply and anchor sheets, as determined by the deck type.

SUBSTRATE GUIDELINES

Deck	Insulation/ Cover Board	Base Sheet/Ply
Steel	Required	NailBase (MF), PlyBase, MidPly Black Diamond Base Sheet, Flintlastic Ultra Glass SA (SA)
Wood, Concrete	Optional	NailBase (MF)
	Optional, FlintPrime QD required if base is self-adhered to deck	PlyBase, MidPly, Black Diamond Base Sheet, Flintlastic Ultra Glass SA (SA)
LWIC, Gypsum, Cementitious Wood Fiber, Wood Planks	Optional	NailBase (MF)
	Required if base is self-adhered	PlyBase, MidPly, Black Diamond Base Sheet, Flintlastic Ultra Glass SA (SA)

FlintPrime QD may be required. Contact CertainTeed Commercial Roofing Technical Services for more information.

Self-adhered base plies may be direct-adhered to approved substrates:

APPROVED SUBSTRATES FOR SELF-ADHERED BASE PLY

Base Sheets[1]	• Flintlastic® SA NailBase • Flintlastic® SA PlyBase • Flintlastic® SA MidPly
Insulation	• FlintBoard® ISO & ISO Cold (polyisocyanurate insulation)
Cover Board	• High density fiberboard (ASTM C208 & 209 - primed boards only) – i.e. STRUCTODECK High Density Fiberboard with Primed Red Coating • Asphalt coated cover boards • Gypsum based cover board products (priming may be required): – USG Securock® Gypsum-Fiber Roof Board • Georgia Pacific DensDeck® Roof Boards: – DensDeck (priming is required) – DensDeck Prime (priming is not required but will enhance adhesion) • Zip System® Sheathing
Decks	• Structural concrete decks* (priming is required) – *Lightweight Structural Concrete is subject to greater moisture content and not acceptable for direct adherence to Flintlastic SA self-adhering products • Wood (priming is recommended) – Approved Wood Types" • APA Rated Exterior Grade Plywood • APA Rated Exterior Grade Oriented Strand Board (OSB) ***Precautions:*** *Direct adhesion is not permitted by code in Miami-Dade County check your local business code); At the end fo the roofing membrane's life, roofing membranes directly adhered to a wood deck may not be able to be removed; if a re-roof is required, replacement of the roof deck may be necessary.*

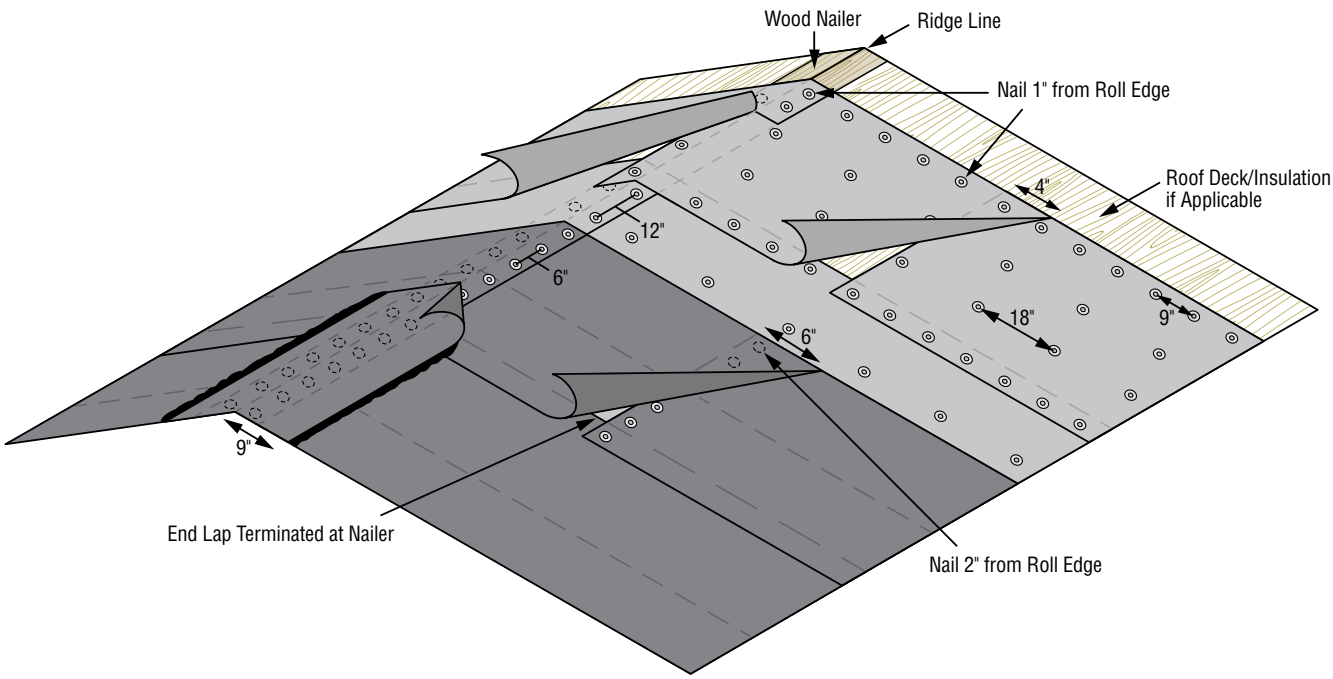
[1] These base sheets/plies are applicable only to Flintlastic SA PlyBase and/or Flintlastic SA MidPly when utilized as interplies; these are not applicable substrates for self-adhering Black Diamond Base Sheet and/or Flintlastic Ultra Glass SA for use as interplies - please refer to the Commercial Roof System Specifications manual, APP and/ or SBS specifications for allowable base sheets

Nailing/Back Nailing Requirements by Slope

SBS-modified membranes applied on slopes 1″:12″ and greater, are installed with the side laps running parallel to the slope direction and nailed as follows:

- **Nailable Substrates:** For all base sheets/plies and interplies, nail 1″ from ridge line of roof, 12″ o.c. through tin caps and annular ring shank nails. For cap sheets, nail 2″ from ridge line of roof. Nails shall penetrate through the nailable substrate a minimum of 1/4″ or shall penetrate wood plank a minimum of 3/4″. Additionally, all base, interply and cap sheets shall be back-nailed at end laps 2″ in from top edge, 6″ o.c. through tin discs with annular ring shank nails. See Appendix, Construction Detail CT-29A, Back Nailing
- **Insulated Substrates:** Install minimum 3-1/2″ wide nailers or woodblocking set flush to surface of deck at all eaves, ridges, rakes and base of curbs. Nailer spacing is membrane dependent, refer to Appendix, Construction Detail CT-29 Back Nailing. For all base sheets/plies and interplies, nail 1″ from ridge line of roof, 12″ o.c. through tin caps and annular ring shank nails. For cap sheets, nail 2″ from ridge line of roof. Additionally, all base, interply and cap sheets shall be back-nailed at end laps 2″ in from top edge, 6″ o.c. through tin discs with annular ring shank nails. Endlaps must occur at nailers such that the top edge of the overlapped sheet can be fastened to the nailer and the fastener completely covered. For base plies/interplies, fasten roll into each nailer throughout the deck even if length of a single roll covers the entire deck/substrate (no endlaps). For cap sheets, if length of roll covers the entire deck/substrate (no endlaps), roll should not be fastened at each nailer, just at the ridge.

Flintlastic SA modified bitumen roll roofing, when applied parallel to the slope, shall be back-nailed at end laps 2″ in from top edge, 6″ o.c. with appropriate fasteners into wood blocking. See also the Appendix, Construction Detail CT-29.



Slopes 2:12<, Side Laps Parallel to Slope, CT-29A Backnailing – Nailable Substrates

Pre-Application Considersations

SA Specific Tools

- A weighted roller for pressing the membrane into place, 2″ to 4″ in diameter (70 lbs.)
- Suitable trowel for applying FlintBond to flashing details
- Roofer's knife with hooked blade
- Caulk gun for applying beads of FlintBond
- Seam probing tool to check for voids
- Hot Air Welder for cold weather applications or, if preferred, for flashing details year round
- AS NEEDED: Long-handled (standing) roller with 1/8″- 1/4″ nap for applying primer (1/8″ nap for smooth surfaces, 1/4″ nap for more porous surfaces)

General Precautions

- Do not attempt application if ice, snow, moisture, or dew are present.
- When ambient temperatures are between 35°F and 49°F, cold weather application instructions must be followed. See Flintlastic SA Cold Weather Applicator Guide.
- In cold weather, rolls MUST be stored indoors, minimum 60°F, or in warming huts prior to application. Allow material to relax a minimum of 15 minutes prior to installation. Avoid allowing rolls to fall below 50°F to avoid material contraction.
- Flintlastic SA membranes are designed to be applied together in fully self-adhered roof systems. Flintlastic SA base sheets may also be used in hybrid roof systems with a torch-applied cap. However, Flintlastic SA base sheets cannot be paired with cap sheets applied with hot asphalt or cold adhesive. Flintlastic SA Cap (or SA Cap FR) cannot be applied to any other base sheets other than as described here.
- Cut rolls to manageable lengths and allow to relax, unrolled, at a minimum 50°F ambient temperature, for a minimum of 15 minutes prior to installation.
- All plies of the assembly should be installed in one day. If any other base sheet must be exposed for longer periods of time, cover with tarp or suitable alternate protection.
- Substrates must be free of dust, dirt, oil, debris and moisture.
- When applying Flintlastic self-adhered membranes on slopes exceeding 1″ in 12″, membranes shall be back nailed (see Appendix for detail).
- When applied parallel to the slope, Flintlastic self-adhered membranes shall be blind-nailed at end laps 2” in from top edge, 6” o.c. through tin discs and to wood nailers. (See General Requirements Section of CertainTeed Commercial Roof Systems Specifications Manual for details.)
- If the material isn't bonding, **STOP** the application immediately!
- Refer to **Field Layout Reference** on page 121 for width of starting course to ensure sidelaps within the roof system are staggered/offset from each other.

Primers & Adhesives

- If primer is used, it must be applied at the specified rate and be allowed to cure as specified.
- When using FlintBond® for flashing details, target 1/4″ FlintBond bleed out at endlap areas. Be careful not to roll weighted roller into bleed out.

Do not use cold adhesives, such as FlintBond, with Flintlastic self-adhered membranes other than for flashing details and cap sheet overlaps as described here.

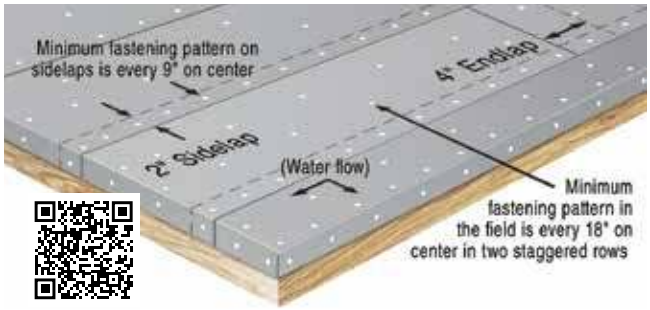
3. Base Sheet Installation, Mechanically Attached

Prior to application of the base sheet, inspect the roof substrate to make sure it is free of dust, dirt, oil, debris and moisture. Refer to **Field Layout Reference** for width of starter course.

Begin at the low point of the roof. Position base to allow for a 2″ overhang at perimeter edges. Mechanically fasten Flintlastic SA NailBase to nailable deck using appropriate fasteners (see **Fasteners Chart**).

Install so that no sidelaps are against the flow of water. A minimum fastening pattern is every 9″ on center on sidelaps and every 18″ on center in two staggered rows in the field of the sheet. Overlap base sheet sidelaps a minimum 2″ and endlaps 4″. Turn base sheet over fascia by 2″ and fasten. Offset endlaps of adjacent courses a minimum of 3′.

Do Not Leave Base Sheet Exposed To The Weather. Cover in the same day with optional SA interply and/or SA Cap (FR).

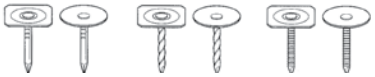


Mechanically Attached Base Sheet

FASTENERS CHART

Standard (Round Head) Roofing Nails and Cap
(Note: CertainTeed does not permit the use of plastic caps)
For use with Base Sheet, Flash/Termination Bar on
Plywood Decks, Non Veneer Decks, Wood Plank Decks

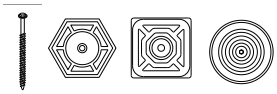
Large Head Roofing Nails
For use with Base Sheet, Flash/Termination Bar on
Plywood Decks, Non Veneer Decks, Wood Plank Decks



Base Sheet Fasteners for some Cementitious Roof Decks
For use with Base Sheet on Light Weight Insulation Concrete, Poured Gypsum

Self-Locking Fasteners
For use with Base Sheet on Cement/Wood Fiber

Insulation Fasteners



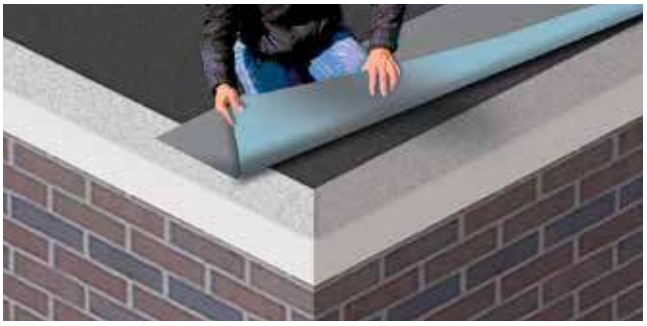
3A - Base Ply Installation, Self-Adhered

SA PlyBase or SA MidPly may be self-adhered to approved substrates.

(See **Approved Substrates For Self-Adhered Base Ply** *table. In accordance with published exclusions from warranty coverage CertainTeed shall not be held responsible for failure caused by settlement, deflection, movement, moisture content, inadequate attachment, or other deficiencies of the roof deck, preexisting roof system, walls, foundations or any other part of the building structure, insulation or other materials underlying the product.)*

If the roof system calls for a self-adhered base sheet, priming may be required. When using FlintPrime® QD allow to dry thoroughly. If substrate (i.e. FlintBoard ISO) is attached with fasteners, prime exposed metal with FlintPrime Aerosol before adhering either SA PlyBase or SA MidPly.

Before adhering a base ply, sweep the surface of the deck or insulation to remove any debris that could interfere with adhesion. Refer to **Field Details Reference** for starter course width.



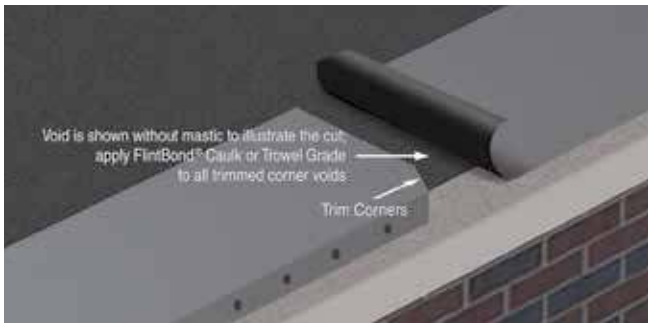
Begin at the low point of the roof. Position base to allow for a 2″ overhang at perimeter edges.

Fold the membrane back halfway lengthwise to remove the split release film.

Press membrane securely into place and repeat with the opposite half of the membrane. Turn base ply over fascia by 2″ and fasten.

Use a heavy, weighted roller over the entire surface of the PlyBase or MidPly to secure the membrane. Work from the center of the roll outwards across the width to eliminate air pockets; **DO NOT** roll lengthwise as it can cause the roll to stretch.

Overlap sidelaps of subsequent SA PlyBase or SA MidPly membrane courses a minimum 2″ and endlaps 4″. Offset endlaps of adjacent courses a minimum 3′.



Cut endlaps at opposing diagonal corners at an angle approximately 5-1/2″ long by the overlap dimension (2″ or 3″) to minimize water incursion at T-seams. See Appendix CT-22 ENDLAP DETAIL.

Apply a bead or small trowel dab (quarter size) of FlintBond SBS-Modified Bitumen Adhesive, Caulk or Trowel grade, at the edge of the angled cut. Use of a hand-held hot air gun at the joint area prior to rolling the membrane will maximize adhesion. It is recommended to apply a bead of FlintBond® SBS-Modified Bitumen Adhesive, Caulk grade, at all SA PlyBase or SA MidPly side and endlaps edges to eliminate a capillary.

Do Not Leave Base Sheet Exposed To The Weather. Cover in the same day with optional SA interply and/or SA Cap/SA Cap FR.

4. Interply Installation, Self-Adhered (Optional/Specification Dependent)

Note: Proceed to "Before Installing Flintlastic® SA Cap (or SA Cap FR)" if installing a 2-ply system. Before installing interply, sweep the underlying base sheet/ply to remove any debris that could interfere with adhesion. Refer to **Field Layout Reference** for starter course width.

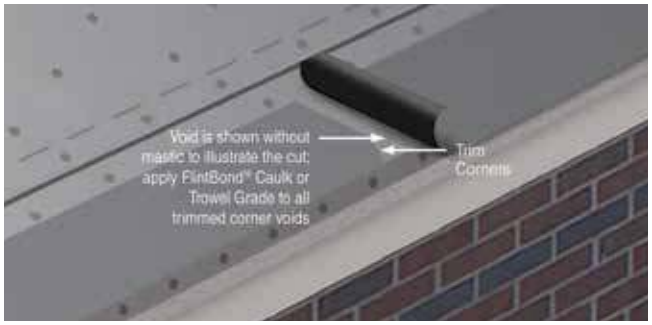
Begin at the low point of the roof. Position interply flush to roof edge. Install so that no sidelaps are against the flow of water.

Fold the membrane back halfway lengthwise to remove the split release film.

Press membrane securely into place and repeat with the opposite half of the membrane.

Use a heavy, weighted roller over the entire surface to secure the membrane. Work from the center of the roll outwards across the width to eliminate air pockets; **DO NOT** roll lengthwise as it can cause the roll to stretch.

Overlap sidelaps of subsequent SA PlyBase or SA MidPly membrane courses a minimum 2″ and endlaps 4″. Offset (stagger) endlaps of adjacent courses a minimum 3′.



Cut endlaps at opposing diagonal corners at an angle approximately 5-1/2″ long by the overlap dimension (2″ or 3″) to minimize water incursion at T-seams. See Appendix, CT-22 ENDLAP DETAIL. Apply a bead or small trowel dab (quarter size) of FlintBond® SBS Modified Bitumen Adhesive, Caulk or Trowel

grade, at the edge of the angled cut. Use of a hand-held hot air gun at the joint area prior to rolling the membrane will maximize adhesion.

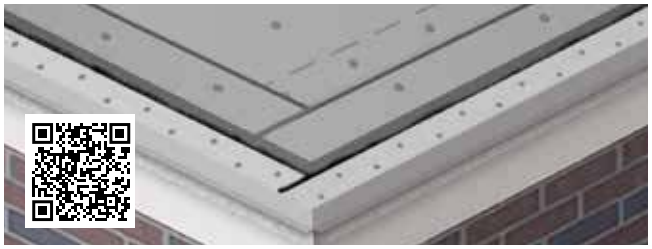
It is recommended to apply a bead of FlintBond® SBS Modified Bitumen Adhesive, Caulk grade, at all SA PlyBase or SA MidPly side and endlap edges to eliminate a capillary.

Do Not Leave Base Sheet Exposed To The Weather. Cover in the same day with SA Cap (FR).

5. Edge Metal Application

If roof edge detail utilizes edge metal, proceed as follows.

Edge Metal for Two-Ply Systems (with no interply)



If an interply is not installed, adhere a 9″ wide flashing strip of SA PlyBase or SA MidPly (material assumed to match base sheet if fully adhered) onto the field of the roof and flush to the roof edge; miter cut at corners to avoid overlap. Install minimum 26 gauge edge metal using appropriate fasteners, set entirely in a uniform 1/8″ - 1/4″ thick troweling of FlintBond. Fasten edge metal into the deck using appropriate fasteners **(see Fastener Chart)**, spaced 4″ on center in two staggered rows. See Appendix CT-01 EDGE FLASHING. Remove any oil from the metal surface using a vinegar and water solution. Prime the horizontal surface of the metal with FlintPrime Aerosol and allow primer to dry/tackify.

Edge Metal for Three-Ply Systems (with interply)

If an interply has been installed, install minimum 26 gauge edge metal using appropriate fasteners and set entirely in a uniform 1/8″ - 1/4″ thick troweling of FlintBond. Fasten edge metal through the metal surface, into the deck using appropriate fasteners **(see Fastener Chart)**, spaced 4″ on center in two staggered rows. Remove any oil from the metal surface using a vinegar and water solution. Prime the horizontal surface of the metal with FlintPrime® Aerosol and allow to dry/tackify. Before installing Flintlastic SA Cap or SA Cap FR, sweep the underlying sheet to remove any debris that could interfere with adhesion. Refer to **Field Layout Reference** for starter course width.

6. Cap Installation, Self-Adhered

Before installing Flintlastic® SA Cap or SA Cap FR, sweep the underlying sheet to remove any debris that could interfere with adhesion. Refer to **Field Layout Reference** for starter course width.

Begin at the low point of the roof. Position cap flush to roof edge with selvage edge at high side of the roof. Install so that no sidelaps are against the flow of water.

Fold back lower half of the cap to remove the split release film.

Press cap securely into place and repeat with the opposite half.

Use a heavy, weighted roller over the entire surface to secure the membrane. Work from the center of the roll outwards across the width to eliminate air pockets; **DO NOT** roll lengthwise as it can cause the roll to stretch.

Overlap sidelaps of subsequent courses a minimum 3″ and endlaps 6″. Offset endlaps of adjacent courses a minimum 3′. As subsequent membranes are installed, remove the selvage edge release strip just prior to overlapping to keep the adhesive area protected and clean.

Cut endlaps at opposing diagonal corners at an angle approx. 3″ by 5-1/2″ from the corners to minimize water incursion at T-seams. Treat rake edge application similarly, cutting diagonal corners off Cap selvage edge above rake metal.

One of the following options must be followed for any granule over granule overlap, such as an endlap:

1. Apply a uniform 1/8″ - 1/4″ troweling of FlintBond® adhesive to the entire 6” width of the underlying sheet, extending beyond underlying lap 1/4″ or;

2. Apply heat from a hot-air welder with a 2″ to 3″ tip to the overlapped sheet while applying rolling pressure from a silicone roller to the overlapping sheet.

With the hot air welder set between 900°F - 1,100° F (setting 8-10), apply heat to the overlapped granulated surface while bonding the overlapping cap with rolling pressure. Roll the overlapping SA Cap in place, moving the hod air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. A 6″ endlap requires two-three passes depending on welder tip size. Apply a bead of FlintBond Caulk along the edge.

WHEN AMBIENT TEMPERATURES ARE BETWEEN 35°F - 49°F THE HOT-AIR WELDER METHOD MUST BE APPLIED. (See Flintlastic SA Cold Weather Applicator Guide for further details.)

Once the membrane has had a chance to bond, check all laps and joints for full adhesion. If the membrane can be lifted at any area it is not properly adhered. A seam probing tool can be helpful to check for voids at laps. If necessary, use appropriate hand-held hot air welding tool and seam roller or an application of FlintBond to seal unbonded areas if they exist.

7. Flashing Details

Refer to Appendix for comprehensive asphaltic/bituminous construction details.

8. Surface Coatings (Optional)

When a roof coating is specified or desired, refer to Chapter 14, Liquid-Applied Roofing.

9. Project Completion for Self-Adhered Roof Systems

Follow the procedures for closing out the project successfully and applying for a warranty, as outlined in Chapter 15 of this Manual.

Chapter 9 – Self-Test for Self-Adhered Roofing Systems

Questions

Test online https://certainteed.com/low-slope-test

1. The following tool is critical to the successful performance of a self-adhered roofing system when temperatures are 50°F and rising:
   - ☐ a. Weighted roller
   - ☐ b. Propane Torch
   - ☐ c. Hot air welder
   - ☐ d. All of the above

2. When installing Flintlastic SA on slopes at or above ___ membranes shall be back nailed.
   - ☐ a. 1/2″ : 12″
   - ☐ b. 1″ : 12″
   - ☐ c. 2″ : 12″
   - ☐ d. Always

3. What is the main reason for staggering end laps in multi-ply self-adhered systems?
   - ☐ a. To reduce material waste
   - ☐ b. To improve aesthetics
   - ☐ c. To prevent water infiltration and increase system integrity
   - ☐ d. To speed up installation

4. End laps should be cut at opposing diagonal corners at an angle to minimize “T”-seams, which could otherwise result in leak points.
   - ☐ a. True
   - ☐ b. False

5. Cap sheet shall be installed prior to flashing and edge metal.
   - ☐ a. True
   - ☐ b. False

6. How many days can Flintlastic SA NailBase, SA PlyBase and SA MidPly be left exposed before application of Flintlastic SA Cap?
   - ☐ a. 2 days
   - ☐ b. 7 days
   - ☐ c. 30 days
   - ☐ d. No exposure; cap must be installed same day

7. Both Black Diamond Base Sheet and Flintlastic Ultra Glass SA are approved base sheets to be used with with Flintlastic SA Cap or Flintlastic SA Cap FR.
   - ☐ a. True
   - ☐ b. False

8. In situations where the roof slope exceeds 1″per foot, CertainTeed recommends rolls are installed with the side laps running parallel to the slope direction.
   - ☐ a. True
   - ☐ b. False

9. Why is using a weighted roller important during self-adhered membrane installation?
   - ☐ a. It speeds up the process
   - ☐ b. It ensures full contact and proper adhesion
   - ☐ c. It makes the membrane look smoother
   - ☐ d. It is required for warranty registration

10. When installing a self-adhered base ply over structural concrete, what is a critical preparation step?
    - ☐ a. Sweep the deck only
    - ☐ b. Prime the surface with FlintPrime QD and allow to dry
    - ☐ c. Wet the surface before application
    - ☐ d. Use a propane torch to dry the deck

Chapter 10:
Torch-Applied Modified Bitumen Roofing

Your objective: To learn CertainTeed's procedures for the correct application and installation of a Flintlastic® modified bitumen torch-applied roof system.

Flintlastic Torch-Applied Roof Systems for Low-Slope Roofs

Torch application of both APP-modified and SBS-modified bitumen membranes has been a trusted method for more than 50 years. In this chapter, you will learn the proper field application of a torch-applied modified bitumen roof system.

Where can I use torch-applied roofing systems?

The resilience and versatility of Flintlastic torch-applied roof systems can be appreciated with any low-slope roof project. This application type is ideal for cold weather applications where the heat of the flame can ensure a long-term bond. Precautions and oversight must be carefully demonstrated with any torch application to ensure the use of an open flame is managed safely.

What tools do I need for a torch-applied system?

- A torch/high-pressure hose, listed by Underwriters Laboratory (UL), designed for the application of modified bitumen membranes
- An appropriate length field torch for applying the field roof membrane, and a "detail" torch for accomplishing flashing details
- A UL listed regulator
- A propane tank with pressure gauge
- At least one fully charged (min. 20 lbs.) ABC type fire extinguisher per each operating torch
- A roofer's hooked blade knife (the hooked blade is ideal for cutting the membrane)
- A roofer's trowel with beveled edges and rounded tip (for smoothing of details without cutting or marking the membrane) and a handle that allows a safe distance between the roofer's gloved fingers and the warm membrane
- A small detail torch for applying flashing details
- Protective eyewear
- Appropriate attire, including clothing, shoes, and heavy-duty gloves

What are the components of a Flintlastic Torch-Applied System?

Roof systems are considered a "torch" system when the cap sheet is torch-applied. It is very common to install torch systems with mechanically fastened, self-adhered, or torch-applied base sheets/plies. Application of the base sheet/ply is typically determined by roof deck or substrate (some cannot withstand the heat of a torch flame), architectural specification, warranty duration requirement, or wind uplift requirement.

CertainTeed® non-torch-applied base/interply sheets commonly paired with torch-applied cap sheets are as follows

Mechanically Attached	Hot-Applied	Self-Adhered
Glasbase™ Base Sheet	Glasbase™ Base Sheet	Black Diamond Base Sheet
Flintlastic® APP Base T	Flintglas® Ply 4	Flintlastic® Ultra Glass SA
All Weather/Empire® Base Sheet	All Weather/Empire® Base Sheet	Flintlastic® SA PlyBase
Flintlastic® Base 20	Flintlastic® Base 20	Flintlastic® SA MidPly
Flintlastic® Poly SMS	Flintlastic® Poly SMS	
Flintlastic® Ultra Poly SMS[1]	Flintlastic® Ultra Poly SMS[1]	

[1]Flintlastic Ultra Poly SMS can be applied by mechanical attachment, hot asphalt, or torch; cold adhesive application is prohibited when paired with a torch-applied cap.

CertainTeed offers torch-applied roll goods comprised of both APP-modified and SBS-modified asphalt, and both fiberglass and polyester reinforcement mats. These products are manufactured with a polyethylene release film that is factory-applied to the bottom surface, and burned off during application.

CertainTeed products that may be torch-applied include the following.

CERTAINTEED ROLL MEMBRANE PRODUCTS THAT MAY BE TORCH-APPLIED

	Product	Description	Weight	Coverage
Base/ Interplies	**Flintlastic Base® 20 T**	SBS-modified, fire-resistant, heavy-duty fiberglass reinforced base sheet	80 lbs.	1 Square
	Flintlastic® APP Base T	APP-modified, extra-strength fiberglass reinforced base sheet	97 lbs.	2 Squares
	Flintlastic® Ultra Poly SMS Base Sheet	Premium SBS-modified, stress-resistant polyester reinforced base sheet	89 lbs.	1 Square
	Flintlastic® STA	APP-modified, stress-resistant polyester reinforced base, interply or cap membrane (with coating)	86 lbs.	1 Square
	Flintlastic® STA Plus	Premium APP-modified, stress-resistant polyester reinforced base, interply or cap membrane (with coating)	98 lbs.	1 Square
Cap Sheets	**Flintlastic® STA**	APP-modified, stress-resistant polyester reinforced base, interply or cap membrane (with coating)	86 lbs.	1 Square
	Flintlastic® STA Plus	Premium APP-modified, stress-resistant polyester reinforced base, interply or cap membrane (with coating)	98 lbs.	1 Square
	Flintlastic® GTA	APP-modified, stress-resistant polyester reinforced cap membrane with granule surface	103 lbs.	1 Square
	Flintlastic® GTA CoolStar®	APP-modified, stress-resistant polyester reinforced cap membrane with reflective CoolStar granule surface	93 lbs.	1 Square
	Flintlastic® GTA CoolStar® Ultra	APP-modified, stress-resistant polyester reinforced cap membrane with reflective CoolStar Ultra granule surface	95 lbs.	1 Square
	Flintlastic® GTA-FR	APP-modified, fire-resistant, stress-resistant polyester reinforced cap membrane with granule surface	103 lbs.	1 Square
	Flintlastic® GTA-FR CoolStar®	APP-modified, fire-resistant, stress- resistant polyester reinforced cap membrane with reflective CoolStar granule surface	98 lbs.	1 Square
	Flintlastic® GTA-FR CoolStar® Ultra	APP-modified, Title 31 compliant, fire-resistant, stress resistant polyester reinforced cap membrane with reflective CoolStar Ultra granule surface	95 lbs.	1 Square
	Flintlastic® GTS-FR	SBS-modified, fire-resistant extra-tough, and stress-resistant polyester reinforced cap membrane with granule surface	103 lbs.	1 Square
	Flintlastic® GTS-FR CoolStar®	SBS-modified, fire-resistant, extra-tough, and stress-resistant polyester reinforced cap membrane with reflective CoolStar granule surface0	103.5 lbs.	1 Square
Primers	**FlintPrime® QD**	Quick-dry, solvent-based, highly penetrating asphalt primer designed to promote membrane adhesion for torch, hot, or cold applications, or self-adhered membranes	—	—

Torch-Applied Roof System Specifications

Please refer to the CertainTeed Commercial Roof System Specifications manual for comprehensive specification options and details.

1. Precautions During Torch-Applied Roofing Installations

SAFETY FIRST!

Please review Chapter 1, Section 1 of this Manual for important safety guidelines prior to installation.

Material Handling and Storage Precautions

Please refer to Chapter 1, Section 2 of this Manual for important general material handling and storage information.

Cold Weather Application Precautions

Please refer to Chapter 1, Section 4 of this Manual for important weather precautions.

2. Installation Overview for Torch-Applied Roofing Systems

The application steps for a torch-applied roof system shall occur as follows:

1. Substrate Preparation: Assure that the existing substrate is completely clean and suitable to receive the new roofing system.

NOTE: *If primer is used, it must be applied at the specified rate and be allowed to cure, as specified.*

2. Rigid Insulation / Cover Board Application (Optional): If rigid insulation or cover boards are being used, they should be properly installed and secured. See Chapter 8 of this Manual for information about installing rigid insulation and cover boards.

3. Base Sheet/Ply Application (Required): After preparing the substrate, follow the specific installation procedures described in Section 3 of this Chapter.

4. Interply Application (Optional): If the specified roofing system requires one or more interply sheets, install them following the specific application procedures described in Section 4 of this Chapter.

5. Cap Sheet Application (Required): After the base sheets/plies and/or interplies are installed, follow the specific application procedures for the cap sheet installation described in Section 6 of this Chapter.

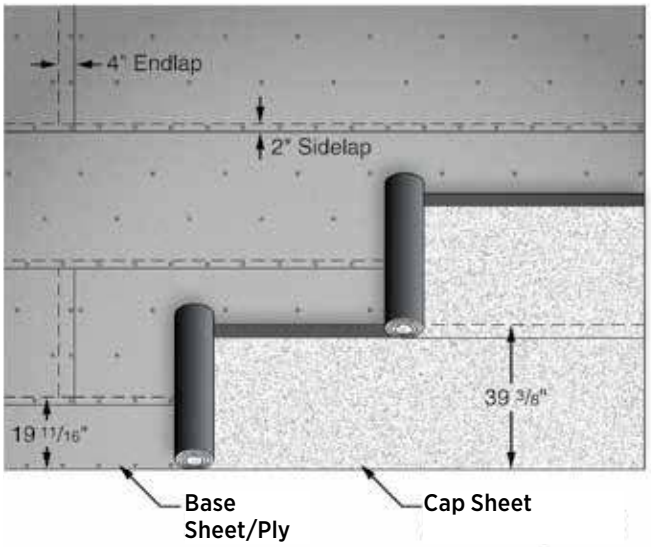
6. Surface Coatings (Optional): If required by specification or to satisfy the warranty, apply the specified surface coating as described in Section 7 of this Chapter.

7. Project Completion: To successfully complete the application and obtain a CertainTeed Warranty, see Chapter 15 of this Manual.

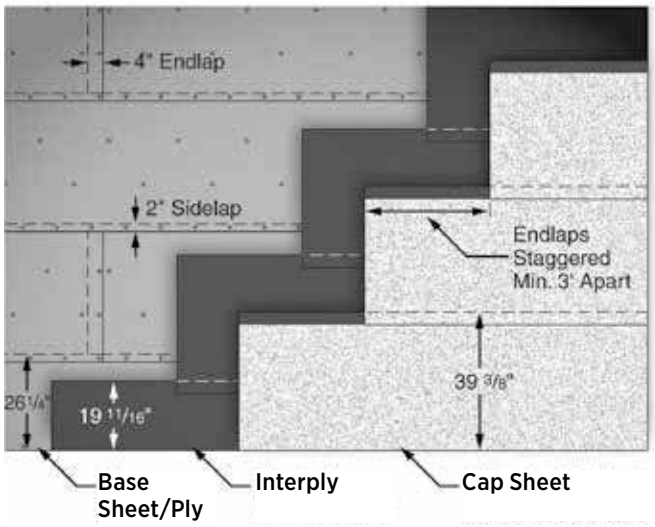
The roofing membrane (base, interply, and cap sheet) installation procedures are described in more detail in the following sections.

Roof Layout and Slope Guidelines

Layout: 2-Ply System



Layout, 3-Ply System



FIELD LAYOUT REFERENCE

	2-Ply Systems		3-Ply Systems		
	Base	**Cap**	**Base**	**Ply**	**Cap**
Starter row width	19-11/16" (1/2 roll)	39-3/8" (full roll)	26-1/4" (2/3 roll)	19-11/16" (1/2 roll)	39-3/8" (full roll)
Side laps	2"	3"	2"	2"	3"
End laps, staggered 36"	4"	6"	4"	4"	6"

- When APP-modified membrane is torch-applied, where roof slope is 1" per foot or less, side laps are installed perpendicular to the direction of the roof slope.
- In situations where the roof slope exceeds 2":12", APP rolls are installed with the side laps running parallel to the slope; the same applies to SBS rolls at slopes 2":12" or greater.
- End laps are to be staggered a minimum of 3'.
- In multi-ply applications, membrane side laps of each layer must be staggered from those plies below.
- After slope has been considered and accounted for, start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection. Roof layout shall be designed so that no side laps are against the flow of water.

Substrate Guidelines

Whether you mechanically attach a base sheet or torch a base ply depends upon your roof deck and use of insulation. Hybrid torch systems will include either a self-adhered or hot-applied base ply.

The following table is meant to provide guidance on attaching base sheets/plies, as determined by the deck type.

IMPORTANT: Never torch directly to insulation. Appropriate CertainTeed base sheet or cover board is required over all insulations. RIC/TIMA recommends that polyurethane and polyisocyanurate insulations be isolated from the roof membrane via the use of an additional layer of noncombustible insulation and base sheet, or an interim base ply acceptable to the membrane manufacturer.

SUBSTRATE AND BASE SHEET/PLIES ATTACHMENT GUIDELINES

Deck	Insulation/Cover Board*		Base Sheet/Ply
Steel	Required		Mechanically Attach, Torch-Weld*, Self-Adhere, or set in Hot Asphalt
Wood, LWIC, Gypsum, Cementitious Wood Fiber, Wood Planks	Optional	If no:	Mechanically Attach
		If yes:	Mechanically Attach, Torch-Weld*, Self-Adhere, or set in Hot Asphalt
Concrete	Optional	If "no," FlintPrime QD is required	Mechanically Attach, Torch-Weld, Self-Adhere, or set in Hot Asphalt
		If yes:	

*If torch-welding a base ply, a gypsum-based cover board is required.

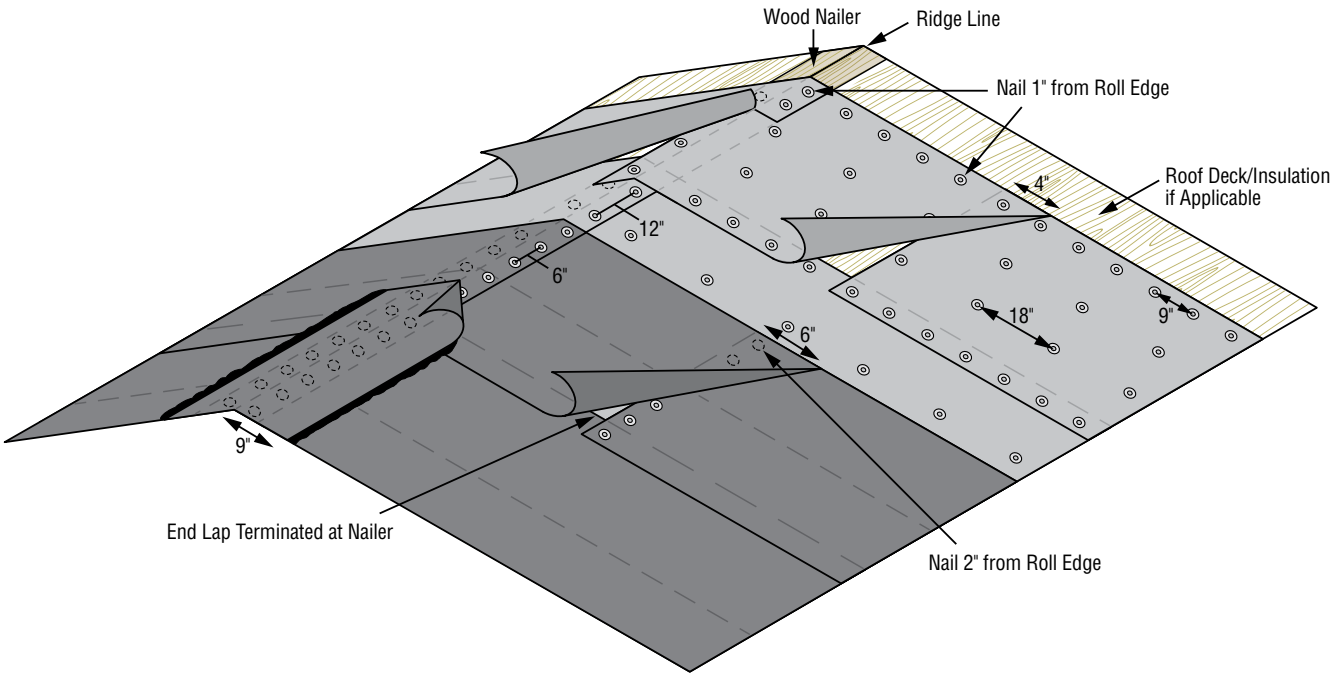
Nailing/Back Nailing Requirements by Slope

APP-modified bitumen membranes applied on slopes 2":12" and greater, are installed with the side laps running parallel to the slope; the same applies to SBS membranes applied on slopes 1":12" and greater. These membranes are nailed as follows:

- **Nailable Substrates:** For all base sheets/plies and interplies, nail 1" from ridge line of roof, 12" o.c. through tin caps and annular ring shank nails. For cap sheets, nail 2" from ridge line of roof. Nails shall penetrate through the nailable substrate a minimum of 1/4" or shall penetrate wood plank a minimum of 3/4". Additionally, all base, interply and cap sheets shall be back-nailed at end laps 2" in from top edge, 6" o.c. through tin discs with annular ring shank nails. See Appendix, Construction Detail CT-29A, Back Nailing.
- **Insulated Substrates:** Install minimum 3-1/2" wide nailers or woodblocking set flush to surface of deck at all eaves, ridges, rakes and base of curbs. Nailer spacing is membrane dependent, refer to Appendix, Construction Detail CT-29 Back Nailing. For all base sheets/plies and interplies, nail 1" from ridge line of roof, 12" o.c. through tin caps and annular ring shank nails. For cap sheets, nail 2" from ridge line of roof. Additionally, all base, interply and cap sheets shall be back-nailed at end laps 2" in from top edge, 6" o.c. through tin discs with annular ring shank nails. Endlaps must occur at nailers such that the top edge of the overlapped sheet can be fastened to the nailer and the fastener completely covered. For base plies/interplies, fasten roll into each nailer throughout the deck even if length of a single roll covers the entire deck/substrate (no endlaps). For cap sheets, if length of

roll covers the entire deck/substrate (no endlaps), roll should not be fastened at each nailer, just at the ridge.

Modified bitumen roll roofing, when applied parallel to the slope, shall be back-nailed at end laps 2″ in from top edge, 6″ o.c. with appropriate fasteners into wood blocking. See also the Appendix, Construction Detail CT-29.



Slopes 2:12<, Side Laps Parallel to Slope, CT-29A Backnailing – Nailable Substrates

3. Base Sheet Installation for Torch-Applied Roofing Systems

In this Section we will review the mechanical attachment of base sheets and the torch-welding of base plies. In hybrid systems base plies may also be self-adhered (refer to Chapter 9) or set in hot asphalt (refer to Chapter 12).

3A – Base Sheet Installation, Mechanically Attached

Planning and Preparation

- Before starting application, as always, make sure the roof substrate is free of dust, dirt, oil, debris, and moisture.
- Start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection.
- Cut rolls into manageable lengths and allow to relax a minimum of 15 minutes.
- Start at the low point of the roof to ensure that water flows over, not against, it for proper drainage, and unroll the membrane. Align membrane so that it is straight for application.

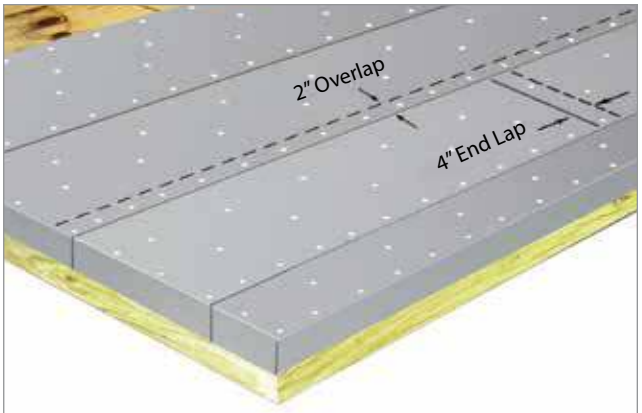
Mechanical Fasteners

Please refer to Chapter 6, Section 1 for approved fasteners for mechanically attached base sheets.

Base Sheet Installation

Follow these procedures when mechanically attaching base sheets:

- Start at the low point of the roof to ensure that water flows over, not against, the roof for proper drainage, and unroll the membrane. Align membrane so that it is straight for application. Mechanically fasten an approved CertainTeed base sheet to a nailable deck using the appropriate fasteners.
- If roof terminates at edge, as opposed to parapet wall or other, base ply shall be turned over fascia by 2″ and fastened.
- CertainTeed's minimum fastening pattern is 9″ o.c. in side laps and 18″ o.c. in two staggered rows in the field of the sheet. Perimeters and corners may require enhanced fastening patterns. At a minimum, fastener density should be increased by 50% in perimeters and 100% in corners (not to exceed one fastener per 1ft^2).



Mechanically Attached Base Sheet

- Overlap base sheet side laps a minimum of 2″ and end laps 4″.
- Offset end laps of adjacent courses a minimum of 3′.
- DO NOT leave base sheet exposed to the weather. **All plies in the assembly should be installed in one day. If unable to install cap sheet, tarps or other suitable protection should be used.**

3B – Base Ply Installation, Torch-Applied

Planning and Preparation

- Prime any exposed metal, such as fasteners or plates, with FlintPrime Aerosol before torch-welding a base ply; when torch-welding directly to a structural concrete roof deck or approved cover board, the use of FlintPrime® QD or CertainTeed-approved primer is required. When using FlintPrime QD, allow to dry thoroughly, typically three hours.
- Before starting application, as always, make sure the roof substrate is free of dust, dirt, oil, debris and moisture.
- Start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection.
- Cut rolls into manageable lengths and allow to relax a minimum of 15 minutes.

Primer Installation

Base Ply Application

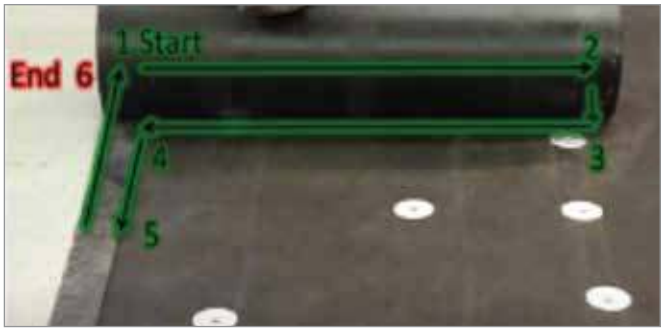
NOTE: *Use of a mechanical torching wagon for membrane application requires careful monitoring of flame positioning to ensure uniform flame application across entire width of the roll along with roll alignment. The use of torching wagons during windy conditions is not recommended.*

- Start at the low point of the roof to ensure that water flows over, not against, the roof for proper drainage, and unroll the membrane. Align membrane so that it is straight for application.
- Tightly re-roll one end of the roll approximately halfway, keeping the membrane in alignment.
- If roof terminates at edge, as opposed to parapet wall or other, base ply shall be turned over fascia by 2″ and fastened
- A supporting non-torching crew member shall stand on the unrolled portion to prevent shifting

NOTE: Proper torching during roll application is critical. Overheating or under-heating is detrimental to the performance of the system and may damage the membrane. Flow properties of APP- and SBS-modified bitumen membranes are different. Test applications prior to actual installation are recommended to ensure proper torching technique for each type of membrane. For further information on torch applications, contact CertainTeed Commercial Roofing Technical Services.

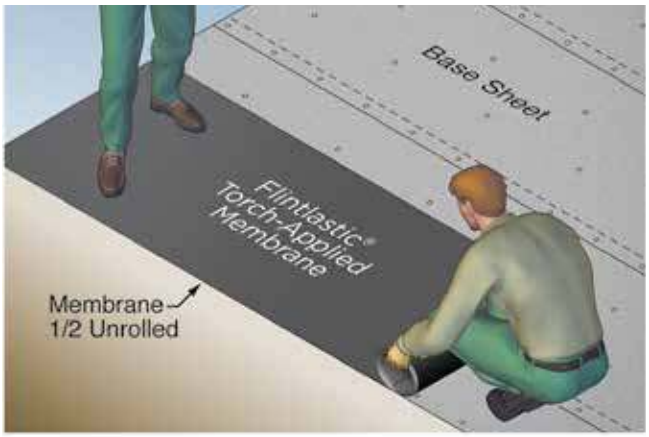
Option 1: Pull Method (SBS and APP)

- While standing on deck or substrate begin torching the exposed polyethylene side of the rolled portion with an even motion across the full width of the roll.
- Continuously pass torch flame across the coiled portion of the roll and up the side lap area in an L pattern.
- Apply approximately 80% of the heat to the membrane and 20% to the substrate. Start unrolling the membrane as soon as the bitumen starts to flow.
- As the roll is heated, it becomes shiny, and the polyethylene film melts away.



Pull Method - Flame Position

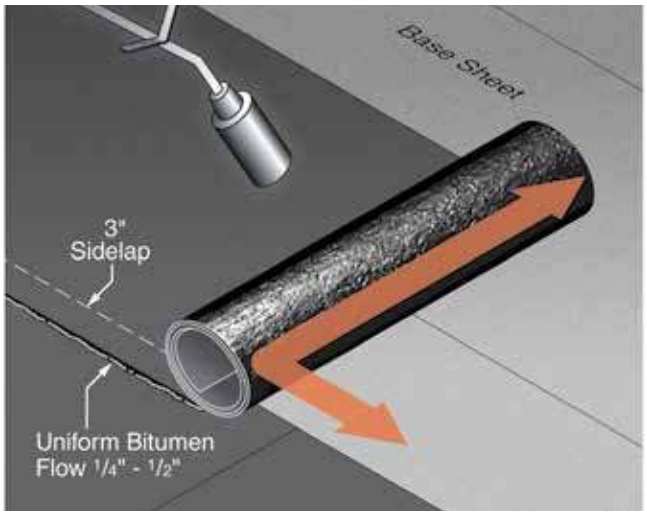
- Once at the end of the first half roll, rewind the balance of the roll to the point where it is fully bonded to the underlying surface and torch-weld the remaining membrane in the same manner as described above.
  - ***NOTE:*** *If heavy smoke occurs, the temperature is probably too hot. If bleed out is greater than 1″, this also means the temperature is too hot.*
  - You will know heat is adequate when a uniform flow of melted bitumen flows evenly in a 1/4″ - 1/2″ uniform bead that oozes from the applied membrane's edges. This temperature is approximately 330°F (166°C).
  - As the bitumen melts and flows, slowly pull the roll toward you using a hook. For safety purposes, the torch operator should always have a spotter with them to prevent accidents.



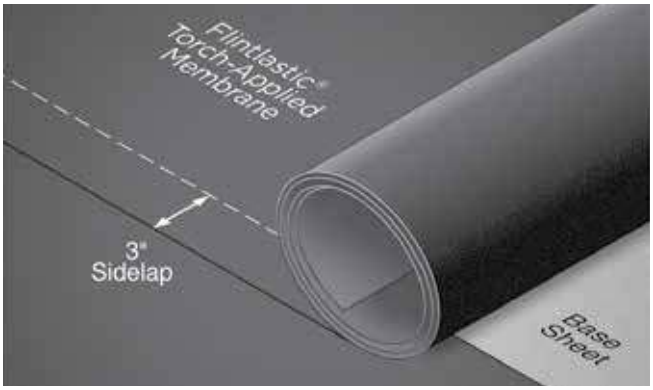
Torch Applied Base Sheet Unrolled

Option 2: Push Method (APP only; DO NOT use with SBS membranes)

- While standing in front of non-torching crew member on unrolled portion of sheet begin torching the exposed polyethylene side of the rolled portion with an even motion across the full width of the roll.
- Continuously pass torch flame across the coiled portion of the roll and up the side lap area in an L pattern.
- Apply approximately 80% of the heat to the membrane and 20% to the substrate. Start unrolling the membrane as soon as the bitumen starts to flow.
- As the roll is heated, it becomes shiny, and the polyethylene film melts away.
  - NOTE: If heavy smoke occurs, the temperature is probably too hot. If bleed out is greater than 1", this also means the temperature is too hot.
  - You will know heat is adequate when a uniform flow of melted bitumen flows evenly in a 1/4" - 1/2" uniform bead that oozes from the applied membrane's edges. This temperature is approximately 330°F (166°C).

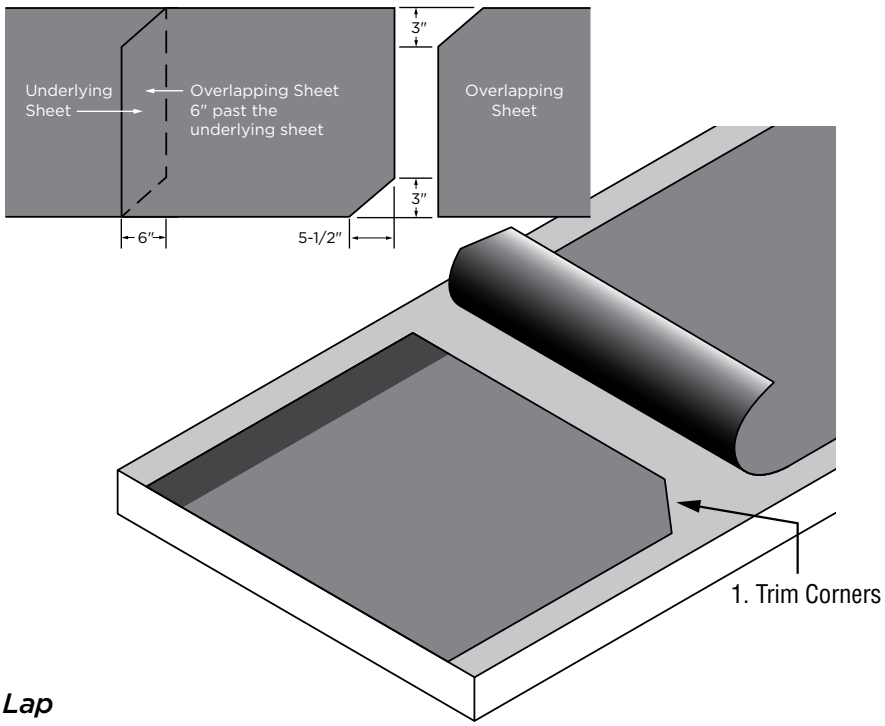


Push Method - Flame Position



Torch Applied Base Sheet Side Laps

- Apply even pressure to the deck while pushing the heated coil forward and into place with your boot. Initially, the weight of the roll will provide adequate pressure to bond with the underlying surface. As the weight of the roll is reduced, additional weight is required. Walking with a roller following behind no less than 3′ and no more than 4′ is helpful as well.
- The flame should be positioned at a point approximately halfway between the top of the roll and the substrate surface until the bitumen back coating reaches sufficient temperature to create surface melting and flow. As you proceed, use your trowel to help maneuver the roll and to smooth it down, if necessary.
- Be sure to heat the entire roll evenly, not just the lap areas, with extra concentration at the laps. Proper torch application will result in complete adhesion of the membrane to the underlying substrate. Probe all laps after the membrane has cooled. Treat any voids with a heated trowel and push the membrane into place.
- Once at the end of the first half roll, rewind the balance of the roll to the point where it is fully bonded to the underlying surface and torch-weld the remaining membrane in the same manner as described above.



End Lap

- Install succeeding rolls and courses in a similar manner.
- Side laps shall be aligned for a 3" overlap and end laps shall have a minimum 6" lap. End laps should be staggered a minimum of 36" apart so that no course ends match up with each other.
- Cut end laps at opposing diagonal corners at an angle approximately 5-1/2" long by the selvage dimension from the corners to minimize "T"-seams; See CertainTeed construction detail CT-22
- ***All plies in the assembly should be installed in one day. If unable to install cap sheet, tarps or other suitable protection should be used.***

Important Quality Control Considerations

Rolls shall rest fully upon the roof deck to provide adequate pressure for bonding. Laps shall be walked-in during application. It is strongly recommended that a test section of membrane be applied each day to ensure proper placement of flames and application of pressure on the entire roll.

Side and end laps should be checked during application with a probe. Probing should be carried out under a quality assurance program. Open laps and areas without bitumen bleed-out should be corrected with a heated trowel and repair torch. DO NOT attempt to repair laps by torching the top surface of the membrane.

4. Interply Installation, Torch-Applied (Optional/Specification Dependent)

Interply layers are optional in some roof systems or may be required, when specified.

NOTE: *Proceed to "Cap Installation" if installing a two-ply system (without an interply).*

NOTE: Proper torching during roll application is critical. Overheating or under-heating is detrimental to the performance of the system and may damage the membrane. Flow properties of APP- and SBS-modified bitumen membranes are different. Test applications prior to actual installation are recommended to ensure proper torching technique for each type of membrane. For further information on torch applications, contact CertainTeed Commercial Roofing Technical Services.

Planning and Preparation

- Before installing a Flintlastic torch-applied interply, sweep the underlying base sheet/ply to remove any debris that could interfere with adhesion.
- Start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection.
- Cut rolls into manageable lengths and allow to relax a minimum of 15 minutes.

Interply Installation

- Installation of the interply layer(s) is the same as the installation of torch-applied base plies, with the exception of the 2" turn down over the fascia of the roof; the interply layer is installed flush to the roof's edge. Refer to Base Ply Application (above) for guidance.
- **All plies in the assembly should be installed in one day. If unable to install cap sheet, tarps or other suitable protection should be used.**

5. Edge Flashing

Edge Metal

Please refer to Chapter 6, Section 5 for CertainTeed edge metal solutions.

If roof terminates at the edge, follow these procedures for edge metal flashing and installation prior to Cap installation.

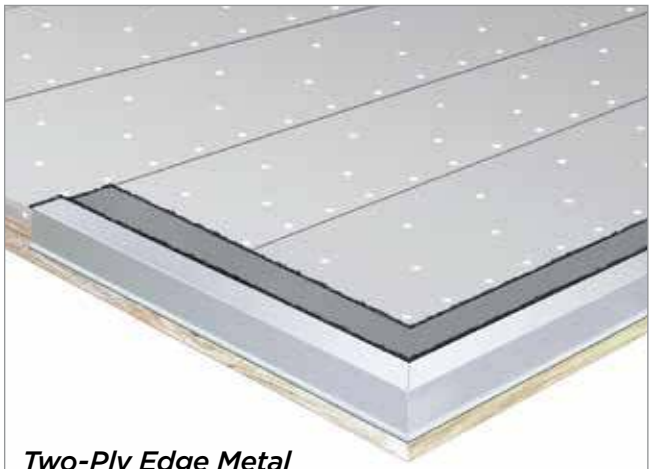
Edge Metal for Two-Ply Systems (with no interply)

- If an interply is not installed, self-adhere a 9" wide flashing strip (material assumed, but not required, to match base ply) onto the field of the roof and flush to the roof edge.
- Any metal edging to be installed should be a minimum 26-gauge. Prior to installing, remove oil from the metal surface using a vinegar and water solution.
- Set the metal entirely in a uniform 1/8" - 1/4" thick application of FlintBond Trowel.
- Using appropriate fasteners, secure edge metal through the surface, through the base sheet/ply and flashing strip, and into the deck, spaced 4" o.c. in two staggered rows.
- Prime the horizontal surface of the metal with FlintPrime QD or Aerosol and allow primer to dry/tackify.

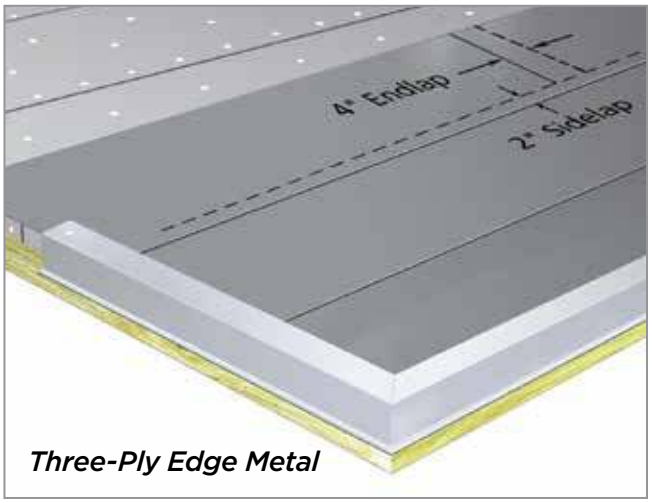
- Apply a bead of caulk grade FlintBond at the roof side edge of the metal where it meets the flashing strip.
- Proceed to 6, Cap Installation for Self-Adhered Roof Systems.

Edge Metal for Three-Ply Systems (with interply)

- If an interply has been installed over the base sheet, proceed with the same instructions as the two-ply system without adding an additional 9″ flashing strip.
- Proceed to 6, Cap Installation for Self-Adhered Roof Systems



Two-Ply Edge Metal



Three-Ply Edge Metal

6. Cap Installation, Torch-Applied

Installation of the cap sheet layer is critical to the roofing performance since this is the first line of defense against weather. Torch applied installation of the cap is similar to procedures followed in the installation of base and interply layers.

NOTE: Proper torching during roll application is critical. Overheating or under-heating is detrimental to the performance of the system and may damage the membrane. Flow properties of APP- and SBS-modified bitumen membranes are different. Test applications prior to actual installation are recommended to ensure proper torching technique for each type of membrane. For further information on torch applications, contact CertainTeed Commercial Roofing Technical Services.

Planning and Preparation

- As always, before torch-welding a cap, sweep the underlying base sheet/ply, or interply to remove any debris that could interfere with adhesion.
- If base or interply is dirty or has been left exposed for phased construction (though not recommended), clean and prime it. Allow it to dry completely before proceeding with cap installation.
- Start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection.
- Cut rolls into manageable lengths and allow to relax a minimum of 15 minutes.

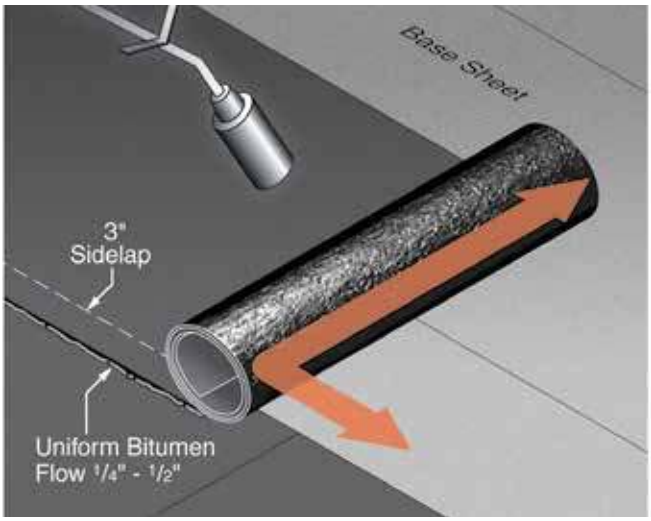
Cap Sheet Installation

NOTE: *Use of a mechanical torching wagon for membrane application requires careful monitoring of flame positioning to ensure uniform flame application across entire width of the roll along with roll alignment. The use of torching wagons during windy conditions is not recommended.*

- Start at the low point of the roof to ensure that water flows over, not against, the roof for proper drainage, and unroll the membrane. Align membrane so that it is straight for application. Position Cap with selvage edge release strip at high side of roof and the opposite side flush to the roof's edge.
- Tightly re-roll one end of the roll approximately halfway, keeping the membrane in alignment.
- A supporting non-torching crew membrane shall stand on the unrolled portion to prevent shifting

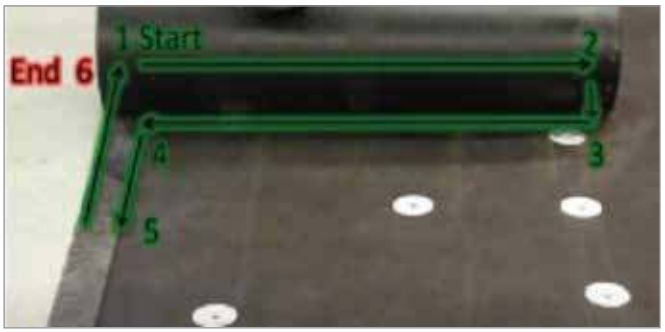
Option 1: Pull Method (SBS and APP)

- While standing on previously installed base sheet/interply begin torching the exposed polyethylene side of the rolled portion with an even motion across the full width of the roll.

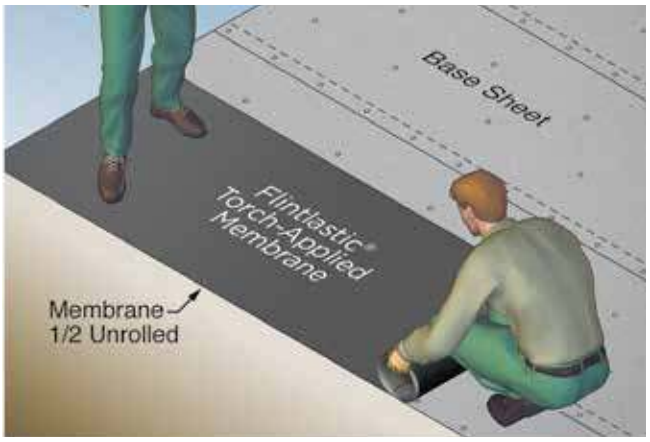


Torch Applied Base Sheet Flame Position

- Continuously pass torch flame across the coiled portion of the roll and up the side lap area in an L pattern.
- Apply approximately 80% of the heat to the membrane and 20% to the substrate. Start unrolling the membrane as soon as the bitumen starts to flow.
- As the roll is heated, it becomes shiny, and the polyethylene film melts away.
- Once at the end of the first half roll, rewind the balance of the roll to the point where it is fully bonded to the underlying surface and torch-weld the remaining membrane in the same manner as described above.

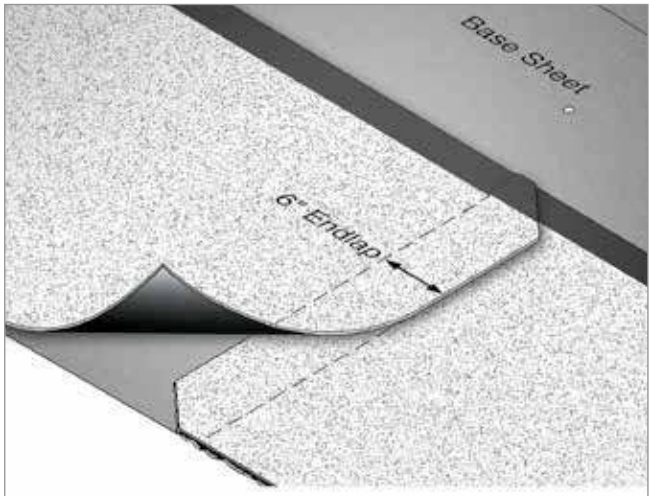


Pull Method - Flame Position



Torch Applied Base Sheet Unrolled

- ***NOTE:*** *If heavy smoke occurs, the temperature is probably too hot. If bleed out is greater than 1", this also means the temperature is too hot.*
- You will know heat is adequate when a uniform flow of melted bitumen flows evenly in a 1/4" - 1/2" uniform bead that oozes from the applied membrane's edges. This temperature is approximately 330°F (166°C).
- As the bitumen melts and flows, slowly pull the roll toward you using a hook. For safety purposes, the torch operator should always have a spotter with them to prevent accidents.



Cap Sheet, End Lap

Option 2: Push Method (APP only; DO NOT use with SBS membranes)

- While standing in front of non-torching crew member on unrolled portion of sheet begin torching the exposed polyethylene side of the rolled portion with an even motion across the full width of the roll.
- Continuously pass torch flame across the coiled portion of the roll and up the side lap area in an L pattern.
- Apply approximately 80% of the heat to the membrane and 20% to the substrate. Start unrolling the membrane as soon as the bitumen starts to flow.
- As the roll is heated, it becomes shiny, and the polyethylene film melts away.
  - NOTE: If heavy smoke occurs, the temperature is probably too hot. If bleed out is greater than 1", this also means the temperature is too hot.
  - You will know heat is adequate when a uniform flow of melted bitumen flows evenly in a 1/4" - 1/2" uniform bead that oozes from the applied membrane's edges. This temperature is approximately 330°F (166°C).
- Apply even pressure to the deck while pushing the heated coil forward and into place with your boot. Initially, the weight of the roll will provide adequate pressure to bond with the underlying surface. As the weight of the roll is reduced, additional weight is required. Walking with a roller following behind no less than 3′ and no more than 4′ is helpful as well.
- The flame should be positioned at a point approximately halfway between the top of the roll and the substrate surface until the bitumen back coating reaches sufficient temperature to create surface melting and flow. As you proceed, use your trowel to help maneuver the roll and to smooth it down, if necessary.
- Be sure to heat the entire roll evenly, not just the lap areas, with extra concentration at the laps. Proper torch application will result in complete adhesion of the membrane to the underlying substrate. Probe all laps after the membrane has cooled. Treat any voids with a heated trowel and push the membrane into place.
- Once at the end of the first half roll, rewind the balance of the roll to the point where it is fully bonded to the underlying surface and torch-weld the remaining membrane in the same manner as described above.
- Install succeeding rolls and courses in a similar manner.

- Side laps shall be aligned for a 3″ overlap and end laps shall have a minimum 6″ lap; cap sheet side laps should and must be staggered from base or interply side laps
- End laps should be staggered a minimum of 36″ apart so that no course ends match up with each other.
- Cut end laps at opposing diagonal corners at an angle approximately 5-1/2″ long by the selvage dimension from the corners to minimize "T"-seams; See CertainTeed construction detail CT-22
- To enhance adhesion, the bottom cap sheet end laps must have granules either sunk into the membrane by heating and pressing them in with a trowel or scraping them off prior to lapping.
- DO NOT attempt to reseal by torching the top surface of the membrane.
- If desired for aesthetics, before any lap or detail edge bleed out cools and becomes hard, broadcast granules matching the color of the cap sheet into the bleed out to create a uniform look.

Important Quality Control Considerations

Rolls shall rest fully upon the roof deck to provide adequate pressure for bonding. Laps shall be walked-in during application. It is strongly recommended that a test section of membrane be applied each day to ensure proper placement of flames and application of pressure on the entire roll.

Side and end laps should be checked during application with a probe. Probing should be carried out under a quality assurance program. Open laps and areas without bitumen bleed-out should be corrected with a heated trowel and repair torch. DO NOT attempt to repair laps by torching the top surface of the membrane.

7. Flashing Details

Refer to Appendix for comprehensive asphaltic/bituminous construction details.

8. Surface Coatings (Optional)

When a roof coating is specified or desired, refer to Chapter 14, Liquid-Applied Roofing.

9. Project Completion for Torch-Applied Roof Systems

Follow the procedures for closing out the project successfully and applying for a warranty, as outlined in Chapter 15 of this Manual.

Chapter 10 – Self-Test for Torch-Applied Roofing Systems

Questions

Test online https://certainteed.com/low-slope-test

1. Torching a base sheet directly to insulation is an approved application method.
   - ☐ a. True
   - ☐ b. False

2. End laps are staggered a minimum of _____.
   - ☐ a. 6″
   - ☐ b. 1′
   - ☐ c. 2′
   - ☐ d. 3′

3. In order to achieve optimal adherence, an L-shaped pattern should be used to heat the roll and side lap. Approximately ___ ____ of the heat should be applied to the membrane and _____ to the substrate.
   - ☐ a. 80%; 20%
   - ☐ b. 60%; 40%
   - ☐ c. 50%; 50%
   - ☐ d. 20%; 80%

4. There are two application methods for torch applied membranes – Pull Method and Push Method. Which method must be used for SBS-modified membranes?
   - ☐ a. Pull Method
   - ☐ b. Push Method

5. To ensure water-tightness, an even amount of bleed out must be achieved on the edges of the roll. Target bleed out amount is _____.
   - ☐ a. 1/8″ – 1/4″
   - ☐ b. 1/4″ – 1/2″
   - ☐ c. 3/4″ - 1″
   - ☐ d. >1″

6. Open laps and areas without bleed-out can be repaired by torching the top surface of the membrane.
   - ☐ a. True
   - ☐ b. False

7. Cap sheet end laps must have the granules either sunk into the membrane or scraped off prior to lapping to enhance adhesion.
   - ☐ a. True
   - ☐ b. False

8. Flow properties of APP and SBS modified bitumen membranes are same.
   - ☐ a. True
   - ☐ b. False

9. Why is diagonal cutting of end laps important in torch-applied systems?
   - ☐ a. It saves material
   - ☐ b. It prevents T-seams and potential leaks
   - ☐ c. It makes the roof look better
   - ☐ d. It is only required for cold-applied systems

10. What is the correct installation sequence for a three-ply torch-applied system?
    - ☐ a. Cap sheet, base sheet, interply
    - ☐ b. Base sheet, interply, cap sheet
    - ☐ c. Interply, base sheet, cap sheet
    - ☐ d. Cap sheet, interply, base sheet

Chapter 11:
Hot-Applied Modified Bitumen Roofing Systems

Your objective: To learn CertainTeed's procedures for the correct application and installation of a Flintlastic® modified bitumen hot-applied roof system.

Hot-Applied Modified Bitumen Roof Systems for Low-Slope Roofs

Hot-applied modified bitumen roof systems are time tested and chosen for their multiple watertight layers, ease of maintenance, and unparalleled bond strength. In this chapter, you will learn the proper field application of a hot-applied modified bitumen roof system.

Where can I use Hot-Applied Modified Bitumen Roofing?

A hot mopped roofing systems is valued for it's time tested performance and long term durability. However, sometimes, the smell of hot asphalt and its effect on the client, along with the potential mess of hot mopping, may outweigh its advantages. It may not be a good choice if the use of a heated kettle of asphalt cannot be accommodated to meet safety requirements, if the asphalt fumes are not acceptable in an occupied building, or if all members of the crew are not adequately trained to safely and correctly implement this application method.

What tools do I need for a Hot-Applied Modified Bitumen application?

- A safety plan
- An asphalt kettle with working temperature gauge
- Propane
- Hot lugger
- Mop carts
- Optional mechanical asphalt applicator
- Cleveland open-cup tester
- Rotational viscometer
- Mop buckets
- Asphalt mops (mop size should not be less than 32 oz.)
- Stiff bristle broom
- Fire extinguishers
- Roofer's hooked blade knife (the hooked blade is ideal for cutting the membrane)
- A roofer's trowel with beveled edges and rounded tip (for smoothing of details without cutting or marking the membrane) and a handle that allows a safe distance between the roofer's gloved fingers and the warm membrane
- Protective eyewear
- Appropriate protective attire, including clothing, shoes, and heavy-duty gloves

What are the components of a CertainTeed® Hot-Applied Modified Bitumen System?

Roof systems are considered a "hot" system when the cap sheet is hot mop-applied. It is very common to install "hot" systems with mechanically fastened, self-adhered, or hot mop-applied base sheets.

Application of the base sheet/ply is typically determined by roof deck or substrate, architectural specification, warranty duration requirement, or wind uplift requirement.

CertainTeed base/interply sheets commonly paired with a hot mop-applied cap include the following.

Mechanically Attached	Self-Adhered	Torch-Applied	Hot Asphalt Mop-Applied
Glasbase™ Base Sheet	Black Diamond® Base Sheet	Flintlastic Base 20 T	Glasbase Base Sheet
All Weather/Empire® Base Sheet	Flintlastic Ultra Glass SA	Flintlastic Ultra Poly SMS[1]	Flintglas® Ply 4
Flintlastic Base 20			All Weather/Empire Base Sheet
Flintlastic Poly SMS			Flintlastic Base 20
Flintlastic Ultra Poly SMS[1]			Flintlastic Poly SMS
			Flintlastic Ultra Poly SMS[1]

[1]Flintlastic Ultra Poly SMS can be applied by hot asphalt or torch.

CertainTeed offers hot-applied roll goods comprised of both BUR (non-modified asphalt) and SBS-modified asphalt and both fiberglass and polyester reinforcement mats. These products are manufactured with a light sand release agent on the bottom surface. APP membranes shall not be applied in hot asphalt.

CERTAINTEED PRODUCTS THAT MAY BE USED FOR HOT-APPLIED SYSTEMS

	Product	Description	Weight	Coverage
Base/ Interplies	**Glasbase™ Base Sheet**	Non-modified (oxidized asphalt), extra-strength fiberglass reinforced base sheet	75 lbs.	3 Squares
	Flintglas® Ply 4	Non-modified (oxidized asphalt), extra-strength fiberglass reinforced base or interply	36 lbs.	5 Squares
	All Weather/Empire® Base Sheet	SBS-modified, dimensionally-stable fiberglass reinforced base sheet; may be used as tile underlayment	79 lbs.	2 Square
	Flintlastic® Poly SMS Base Sheet	SBS-modified, stress-resistant polyester reinforced base sheet	89 lbs.	2 Square
	Flintlastic® Ultra Poly SMS Base Sheet	SBS-modified, premium stress-resistant polyester reinforced base sheet	89 lbs.	1 Square
	Flintlastic® Base 20	SBS-modified, fire-resistant, heavy-duty fiberglass reinforced base sheet	88 lbs.	1.50 Squares
Cap Sheets	**Flintlastic® GMS**	SBS-modified, stress-resistant polyester reinforced cap membrane with granule surface	93 lbs.	1 Square
	Flintlastic® FR-P	SBS-modified, fire-resistant, stress- resistant polyester reinforced cap membrane with granule surface	100 lbs.	1 Square
	Flintlastic® Premium FR-P	SBS-modified, fire-resistant, extra-tough, stress-resistant polyester reinforced cap membrane with granule surface	100 lbs.	1 Square
	Flintlastic® Premium FR-P CoolStar®	SBS-modified, fire-resistant, stress- resistant polyester reinforced cap membrane with reflective CoolStar granule surface	99.5 lbs.	1 Square

Hot Asphalt-Applied Roof System Specifications

Please refer to the CertainTeed Commercial Roof System Specifications manual for comprehensive specification options and details.

TIP: Most CertainTeed roll goods that can be applied in hot asphalt can also be applied in cold adhesive, with the exception of Flintglas Ply 4.

1. Precautions During Hot-Applied Installation

SAFETY FIRST!

Please review Chapter 1, Section 1 of this Manual for important safety guidelines prior to installation.

Material Handling and Storage Precautions

Please refer to Chapter 1, Section 2 of this Manual for important general material handling and storage information.

Cold Weather Application Precautions

Please refer to Chapter 1, Section 4 of this Manual for important weather precautions.

2. Installation Overview for Hot-Applied Roofing Systems

The basic application steps for a Hot-Applied Modified Bitumen system shall occur as follows:

1. Substrate Preparation: Make sure the existing substrate is completely clean, dry, and suitable to receive the new roofing system.

NOTE: *If primer is used, it must be applied at the specified rate and be allowed to cure, as specified.*

2. Rigid Insulation / Cover Board Application (Optional): If rigid insulation or cover boards are being used, they should be properly installed and secured. See Chapter 8 of this Manual for information about installing rigid insulation and cover boards.

3. Base Sheet/Ply Application (Required): After preparing the substrate, follow the specific installation procedures described in Section 3 of this Chapter.

4. Interply Application (Optional): If the specified roofing system requires one or more interply sheets, install them following the specific application procedures described in Section 4 of this Chapter.

5. Cap Sheet Application (Required): After the base sheets/plies and/or interplies are installed, follow the specific application procedures for the cap sheet installation described in Section 6 of this Chapter.

6. Surface Coatings (Optional): If required by specification or to satisfy the warranty, apply the specified surface coating as described in Section 7 of this Chapter.

7. Project Completion: To successfully complete the application and obtain a CertainTeed Warranty, see the information described in Section 7 of this Chapter and in Chapter 15 of this Manual.

Asphalt Preparation Process

Asphalt shall be prepared and heated for use in the layers that are secured using asphalt, all based upon the following application procedures:

Hot Asphalt Specifications

The U.S. product standard for asphalt used in roofing applications is ASTM D312, "Standard Specification for Asphalt Used in Roofing," which classifies asphalt into four different types based upon the asphalt's softening point, penetration (hardness) and ductility. Hot asphalt used with CertainTeed roll goods shall comply with ASTM D312 Type III asphalt for slopes up to 1″:12″ or ASTM D312 Type IV asphalt for slopes of 1″:12″ or greater. CertainTeed recommends the use of Type IV asphalt when mopping SBS-modified asphalt membranes, notwithstanding the slope. The asphalt application temperature should not fall below 425°F.

The asphalt producer shall provide certification upon request. Asphalt shall be homogenous, and free from water and any foreign debris. A safety program shall be developed to address the storage, heating, pumping, and transport to the point of application. The contractor shall convey the safety plan to all members of the roofing crew. Make sure to store all roofing asphalt in such a manner as to prevent leakage, carton deterioration, and moisture contamination.

Equiviscous Temperature (EVT)

CertainTeed supports the use of Equiviscous Temperature (EVT) as a guide for proper mopping temperature. Use of this concept will facilitate proper interply asphalt weights, adhesion, and uniformity. The roofing contractor shall consult the asphalt manufacturer for information regarding EVT and flash point.

- All asphalt shall be labeled with product "Type" EVT for both mop and mechanical spreader applications, and flash point as determined by ASTM D9214.
- Temperature measurement equipment shall be installed on all kettles and heating equipment. The contractor shall monitor the temperature measurement equipment and maintain recommended temperatures as noted below.
- Asphalt should not be heated above the flash point. Asphalt should never be heated above 525˚F and should not be held at 500˚F or above for more than four hours.

NOTE: *if outside temperatures keep asphalt from maintaining proper temperature, application should be halted. Flash and fire points can be tested by using the Cleveland Open-Cup Tester.*

Hot Asphalt Heating

- Asphalt shall be heated to +/-25 degrees of the published EVT, as measured at the mop cart or mechanical spreader.
- Where simultaneous mop and mechanical applications exist, the EVT for mechanical spreader application shall be used for both application methods.
- Asphalt shall be heated to the EVT, as published by the asphalt producer. The EVT is the temperature at which the proper viscosity for application has been attained. The apparent viscosity is 125 centipoise, as measured in compliance with ASTM D4402.
- Mechanical spreader viscosity shall be 75 centipoise. Viscosity should be measured with a rotational viscometer.
- Always circulate asphalt while heating.

Hot Asphalt Application

- Verify that temperature at point of application is within the range specified consistent with the heating section above.
- Asphalt should be loaded into carts or other equipment as close to the point of application as possible.
- Use of insulated carts or spreaders is recommended.

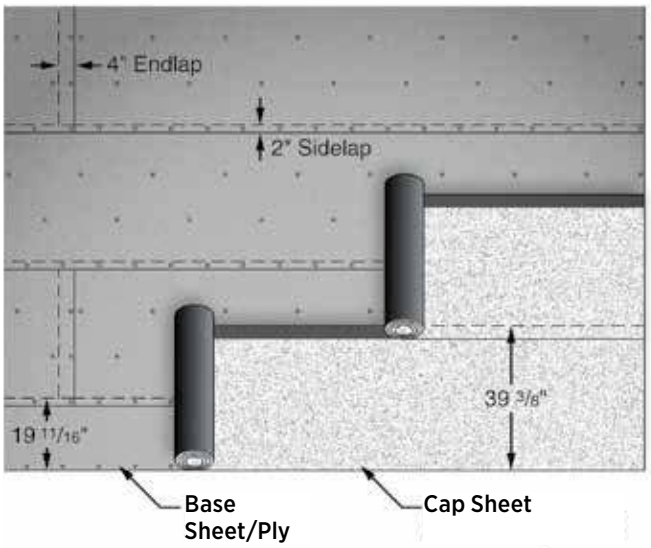
The roofing membrane (base, ply, and cap sheet) installation procedures are described in more detail in the following sections.

ASTM D 312 TYPE	MOPPING TEMPERATURE	HEATING TEMPERATURE	MAX SLOPE IN./FT.
TYPE III	400˚F +/-25˚	500˚F*	≤ 1″
TYPE IV	425˚F +/-25˚	500˚F*	≤ 3″

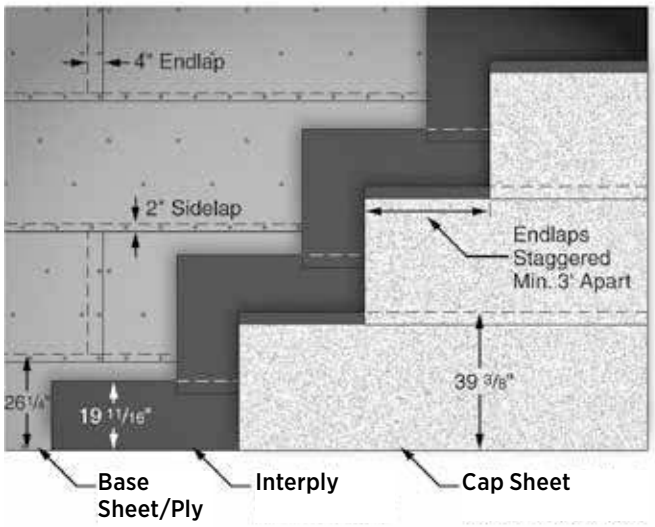
* Type III and IV asphalt may be heated to 500˚F in a re-circulating kettle.

Roof Layout and Slope Guidelines

Layout: 2-Ply System



Layout, 3-Ply System



FIELD LAYOUT REFERENCE

	2-Ply Systems		3-Ply Systems		
	Base	**Cap**	**Base**	**Ply**	**Cap**
Starter row width	19-11/16″ (1/2 roll)	39-3/8″ (full roll)	26-1/4″ (2/3 roll)	19-11/16″ (1/2 roll)	39-3/8″ (full roll)
Side laps	2″	3″	2″	2″	3″
End laps, staggered 36″	4″	6″	4″	4″	6″

- When membrane is applied with hot asphalt, where roof slope is 1″ per foot or less, side laps are installed perpendicular to the direction of the roof slope.
- In situations where the roof slope exceeds 1″ per foot, rolls are installed with the side laps running parallel to the slope direction.
- End laps are to be staggered a minimum of 3′.
- In multi-ply applications, membrane side laps of each layer must be staggered from those plies below.
- After slope has been considered and accounted for, start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection. Roof layout shall be designed so that no side laps are against the flow of water.

Substrate Guidelines

Whether you mechanically attach an base sheet or hot-apply a base ply depends upon the type of roof deck and whether or not insulation is used. Hybrid hot-applied systems may also include a self-adhered base sheet.

The following table is meant to provide guidance on attaching base sheets/plies, as determined by the deck type.

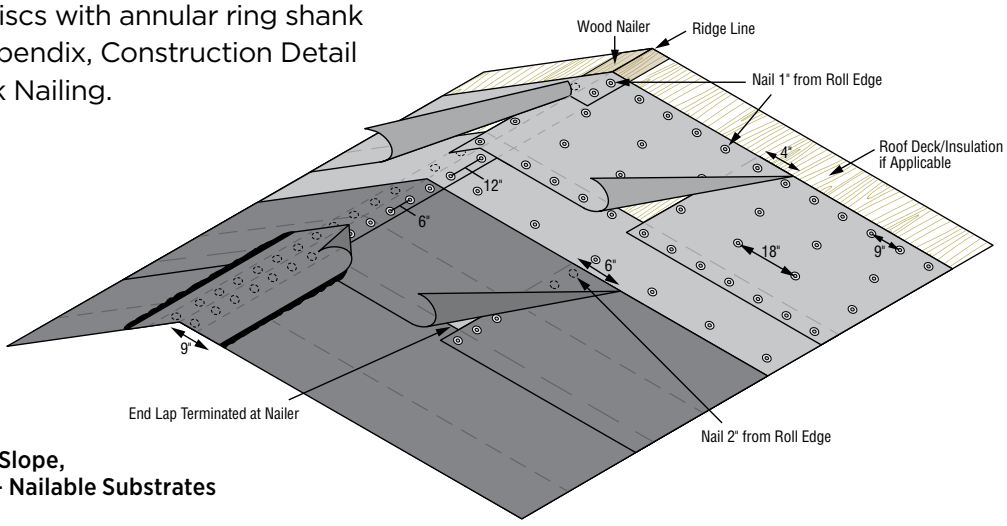
Deck	Insulation/Cover Board*	Anchor/Base
Steel	Required	Mechanically Attach or Set in Hot Asphalt
Wood, Concrete	Optional	Mechanically Attach
	Optional, FlintPrime QD required if base is self-adhered to deck	Set in Hot Asphalt
LWIC, Gypsum, Cementitious Wood Fiber, Wood Planks	Optional	Mechanically Attach
	Required if base is self-adhered	Set in Hot Asphalt

FlintPrime QD may be required. Contact CertainTeed Commercial Roofing Technical Services for more information.

Nailing/Back Nailing Requirements by Slope

SBS-modified bitumen membranes applied on slopes 1″:12″ and greater, are installed with the side laps running parallel to the slope and are nailed as follows:

- **Nailable Substrates:** For all base sheets/plies and interplies, nail 1″ from ridge line of roof, 12″ o.c. through tin caps and annular ring shank nails. For cap sheets, nail 2″ from ridge line of roof. Nails shall penetrate through the nailable substrate a minimum of 1/4″ or shall penetrate wood plank a minimum of 3/4″. Additionally, all base, interply and cap sheets shall be back-nailed at end laps 2″ in from top edge, 6″ o.c. through tin discs with annular ring shank nails. See Appendix, Construction Detail CT-29A, Back Nailing.
- **Insulated Substrates:** Install minimum 3-1/2″ wide nailers or woodblocking set flush to surface of deck at all eaves, ridges, rakes and base of curbs. Nailer spacing is membrane dependent, refer to Appendix, Construction Detail CT-29 Back Nailing. For all base sheets/plies and interplies, nail 1″ from ridge line of roof, 12″ o.c. through tin caps and annular ring shank nails. For cap sheets, nail 2″ from ridge line of roof. Additionally, all base, interply and cap sheets shall be back-nailed at end laps 2″ in from top edge, 6″ o.c. through tin discs with annular ring shank nails. Endlaps must occur at nailers such that the top edge of the overlapped sheet can be fastened to the nailer and the fastener completely covered.



Slopes 2:12<,
Side Laps Parallel to Slope,
CT-29A Backnailing – Nailable Substrates

For base plies/interplies, fasten roll into each nailer throughout the deck even if length of a single roll covers the entire deck/substrate (no endlaps). For cap sheets, if length of roll covers the entire deck/substrate (no endlaps), roll should not be fastened at each nailer, just at the ridge.

Modified bitumen roll roofing, when applied parallel to the slope, shall be back-nailed at end laps 2″ in from top edge, 6″ o.c. with appropriate fasteners into wood blocking. See also the Appendix, Construction Detail CT-29.

3. Base Sheet Installation for Hot-Applied Roofing Systems

In this Section we will review the mechanical attachment of base sheets and the hot asphalt application of base plies. In hybrid systems base plies may also be self-adhered (refer to Chapter 9) or torch-welded (refer to Chapter 10).

3A – Base Sheet Installation, Mechanical Attachment

Planning and Preparation

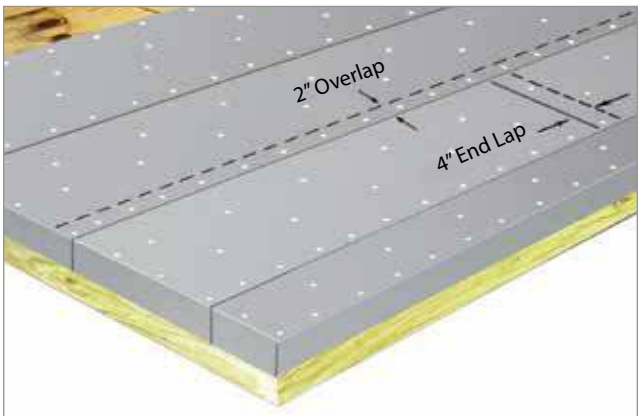
- Before starting application, as always, make sure the roof substrate is free of dust, dirt, oil, debris, and moisture.
- Start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection.
- Cut rolls into manageable lengths and allow to relax a minimum of 15 minutes.

Mechanical Fasteners

Please refer to Chapter 6, Section 1 for approved fasteners for mechanically attached base sheets within self-adhered roof systems.

Base Sheet Installation

- Start at the low point of the roof to ensure that water flows over, not against, the roof for proper drainage, and unroll the membrane. Align membrane so that it is straight for application, flush to roof's edge. Mechanically fasten an approved CertainTeed base sheet to a nailable deck using the appropriate fasteners.
- Turn base sheet over fascia by 2″ and fasten.
- A minimum fastening pattern is every 9″ o.c. on side laps and every 18″ o.c. in two staggered rows in the field of the sheet. Perimeters and corners may require enhanced fastening patterns. At a minimum, fastener density should be increased by 50% in perimeters and 100% in corners (not to exceed one fastener per 1ft^2).
- Overlap base sheet side laps a minimum of 2″ and end laps 4″.
- Offset end laps of adjacent courses a minimum of 3′.
- DO NOT leave base sheet exposed to the weather. **All plies in the assembly should be installed in one day. If unable to install cap sheet, tarps or other suitable protection should be used.**



Mechanically Attached Base Sheet

3B – Base Ply Installation - Hot-Applied

Planning and Preparation

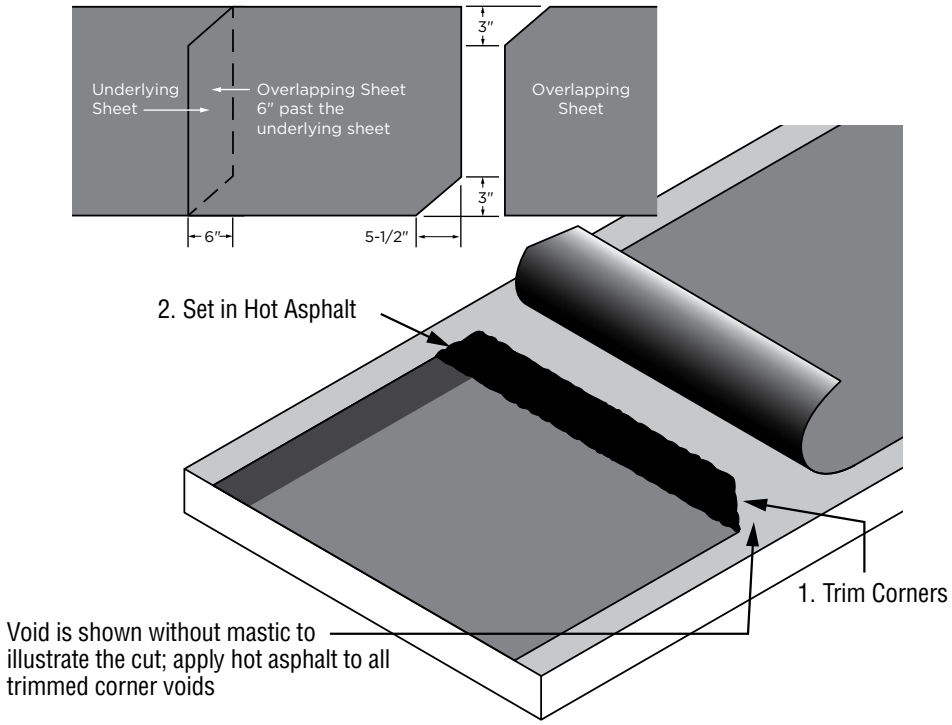
- Prime any exposed metal, such as fasteners or plates, with FlintPrime Aerosol before adhering a base ply; when mopping directly to a structural concrete roof deck or approved cover board, the use of FlintPrime® QD or CertainTeed-approved primer is required. When using FlintPrime QD, allow to dry thoroughly, typically three hours.
- Before starting application, as always, make sure the roof substrate is free of dust, dirt, oil, debris, and moisture.
- Start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection.
- Cut rolls into manageable lengths and allow to relax a minimum of 15 minutes.
- Several workers are needed for hot-mopping application.

Base Ply Application

- Start at the low point of the roof to ensure that water flows over, not against, the roof for proper drainage, and unroll the membrane. Align membrane so that it is straight for application.
- Tightly re-roll one end of the roll approximately halfway, keeping the membrane in alignment.
- If roof terminates at edge, as opposed to parapet wall or other, base ply shall be turned over fascia by 2″ and fastened.
- Standing on the unrolled portion to prevent shifting, begin mopping the base substrate with hot asphalt. DO NOT mop further away than 6 feet to prevent asphalt cooling – less in cooler weather; adequate heat is critical to proper adhesion of the membrane plies. Asphalt should be verified to be at the required temperature, as specified.
- Unroll the plies into the freshly applied asphalt. Make sure that dispensing equipment (bucket or mechanical applicator) has balloon tires to help keep weight off of the membrane.
- Press the sheet into the asphalt using a broom or roller to ensure it is properly adhered while asphalt is hot. Make sure a small bead of asphalt bleeds at edge of membrane and all lap areas.
  - **NOTE**: CertainTeed does not endorse "flying in" or mop and flop application.
- Solid mopping of base and interply layers requires a minimum of 25 lbs./100 ft² hot asphalt application +/- 15%; apply asphalt uniformly and evenly without voids.
- Spot mopping of base ply, when applying in a recover application or when specified, is generally accomplished using a minimum of 12″ diameter hot asphalt circles spaced every 24″ o.c. in three staggered rows. (Certain Factory Mutual listed specifications may have different requirements; refer to www.roofnav.com for complete details.)
- Side laps shall be aligned for a 3″ overlap and end laps shall have a minimum 6″ lap. End laps should be staggered a minimum of 36″ apart so that no course ends match up with each other.
- Cut end laps at opposing diagonal corners at an angle approximately 5-1/2″ long by the selvage dimension from the corners to minimize “T”-seams.

Correcting Fishmouths

- In the event a wrinkle or a fishmouth forms during application of the membrane, DO NOT “walk it down,” as the memory of the felts may cause it to reappear.
- Fishmouths or wrinkles shall be sliced open and patched with hot asphalt and additional plies/membrane.
- Avoid cutting into the plies below the fishmouth or wrinkle by angling the knife blade to the side.



End Lap

4. Interply Application - Hot-Applied (Optional/Specification Dependent)

Interply layers are optional in some roof systems or may be required, when specified.

NOTE: Proceed to "Cap Installation" if installing a two-ply system (without an interply).

Planning and Preparation

- Before installing a hot asphalt-applied interply sheet, sweep the underlying base sheet/ply to remove any dirt or debris that could interfere with adhesion.
- Start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection.
- Cut rolls into manageable lengths and allow to relax a minimum of 15 minutes.

Interply Installation

- Installation of the interply layer(s) is the same as the installation of hot-applied base plies, with the exception of the 2" turn down over the fascia of the roof; the interply layer is installed flush to the roof's edge. Refer to Base Ply Application (above) for guidance.
- **All plies in the assembly should be installed in one day. If unable to install cap sheet, tarps or other suitable protection should be used.**

5. Edge Flashing

Edge Metal

Please refer to Chapter 6, Section 5 for CertainTeed edge metal solutions.

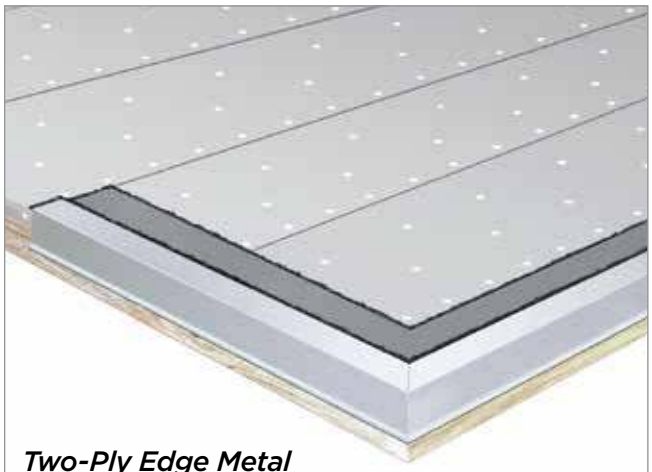
If roof terminates at the edge, follow these procedures for edge metal flashing and installation prior to Cap installation.

Edge Metal for Two-Ply Systems (with no interply)

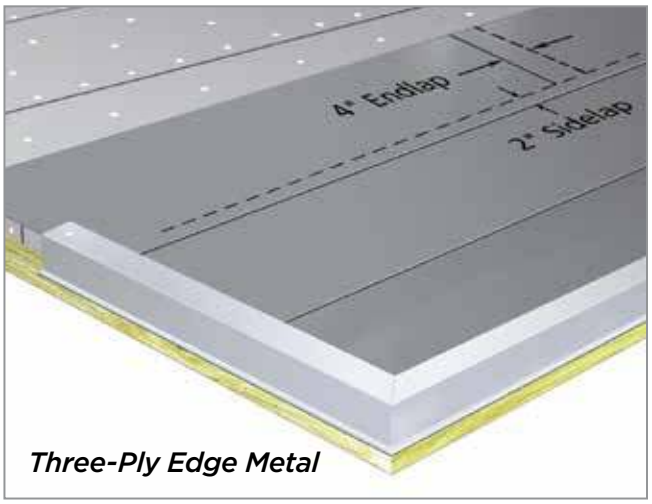
- If an interply is not installed, self-adhere a 9″ wide flashing strip (material assumed, but not required, to match base ply) onto the field of the roof and flush to the roof edge.
- Any metal edging to be installed should be a minimum 26-gauge. Prior to installing, remove oil from the metal surface using a vinegar and water solution.
- Set the metal entirely in a uniform 1/8″ - 1/4″ thick application of FlintBond Trowel.
- Using appropriate fasteners, secure edge metal through the surface, through the base sheet/ply and flashing strip, and into the deck, spaced 4″ o.c. in two staggered rows.
- Prime the horizontal surface of the metal with FlintPrime QD or Aerosol and allow primer to dry/tackify.
- Apply a bead of caulk grade FlintBond at the roof side edge of the metal where it meets the flashing strip.
- Proceed to 6, Cap Installation for Self-Adhered Roof Systems.

Edge Metal for Three-Ply Systems (with interply)

- If an interply has been installed over the base sheet, proceed with the same instructions as the two-ply system without adding an additional 9″ flashing strip.
- Proceed to 6, Cap Installation for Self-Adhered Roof Systems



Two-Ply Edge Metal



Three-Ply Edge Metal

6. Cap Installation - Hot-Applied

Installation of the cap sheet layer is critical to roofing performance since this is the first line of defense against weather. Hot asphalt installation of the cap is similar to procedures followed in the installation of base and ply layers.

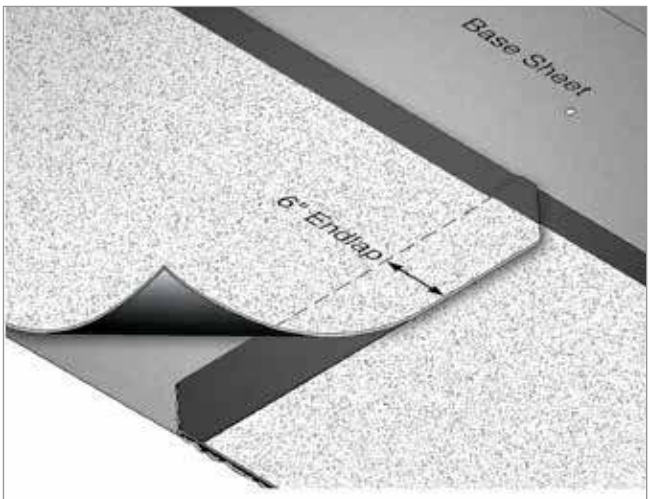
Planning and Preparation

- As always, before installing a hot asphalt-applied cap, clean the underlying interply to remove any dirt or debris that could interfere with adhesion.

- If base or interply is dirty or has been left exposed for phased construction (though not recommended), clean and prime it. Allow it to dry completely before proceeding with cap installation.
- Start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection.
- Cut rolls into manageable lengths and allow to relax a minimum of 15 minutes.

Cap Sheet Installation

- Start at the low point of the roof to ensure that water flows over, not against, the roof for proper drainage, and unroll the membrane. Align membrane so that it is straight for application. Position Cap with selvage edge release strip at high side of roof and the opposite side flush to the roof's edge.
- Tightly re-roll one end of the roll approximately halfway, keeping the membrane in alignment.
- Standing on the unrolled portion to prevent shifting, begin hot asphalt application to the substrate at the rate of 22 lbs./100 ft^2, +/-15%.
- DO NOT apply asphalt more than 6′ in front of the roll at any time to prevent premature cooling - less in cooler weather; adequate heat is critical to proper adhesion of the membrane plies. Asphalt should be verified to be at the required temperature, as specified.
- Unroll the plies into the freshly applied asphalt. Make sure that dispensing equipment (bucket or mechanical applicator) has balloon tires to help keep weight off of the membrane.
- Press the sheet into the asphalt using a broom or roller to ensure it is properly adhered while asphalt is hot. Make sure a small bead of asphalt bleeds at edge of membrane and all lap areas.
  - NOTE: CertainTeed does not endorse "flying in" or mop and flop application.
- Solid mopping of a ply sheet as the top layer, as opposed to a cap membrane, requires a minimum of 25 lbs./100 ft^2 hot asphalt application +/- 15%.
- Side laps shall be aligned for a 3" overlap and end laps shall have a minimum 6" lap; cap sheet side laps should and must be staggered from base or interply side laps
- End laps should be staggered a minimum of 36" apart so that no course ends match up with each other.
- Cut end laps at opposing diagonal corners at an angle approximately 5-1/2" long by the selvage dimension from the corners to minimize "T"-seams.
- If desired for aesthetics, before any lap or detail edge bleed out cools and becomes hard, broadcast granules matching the color of the cap sheet into the bleed out to create a uniform look.



Cap Sheet, End Lap

7. Flashing Details

Refer to Appendix for comprehensive asphaltic/bituminous construction details.

8. Surface Coatings (Optional)

When a roof coating is specified or desired, refer to Chapter 14, Liquid-Applied Roofing.

9. Project Completion for Hot-Applied Roofing Systems

Follow the procedures for closing out the project successfully and applying for a warranty, as outlined in Chapter 15 of this Manual.

Chapter 11 – Self-Test for Hot-Applied Roofing Systems

Questions

Test online https://certainteed.com/low-slope-test

1. Kettle temperatures should not exceed _____.
   - ☐ a. 325°F (149°C)
   - ☐ b. 425°F (204°C)
   - ☐ c. 525°F (260°C)
   - ☐ d. 625°F (316°C)

2. Type IV asphalt mopping temperature is 425°F and can be used for slopes < 3″:12″.
   - ☐ a. True
   - ☐ b. False

3. The target application rate for membrane applications is_____.
   - ☐ a. 20 lbs per 100 sqft
   - ☐ b. 22 lbs per 100 sqft
   - ☐ c. 25 lbs per 100 sqft
   - ☐ d. 28 lbs per 100 sqft

4. When spot mopping a base sheet, _____ diameter circles of asphalt should be spaced every _____ in three staggered rows.
   - ☐ a. 8″; 24″ o.c.
   - ☐ b. 8″; 12″ o.c.
   - ☐ c. 12″; 12″ o.c.
   - ☐ d. 12″; 24″ o.c.

5. If a fishmouth or wrinkle occurs, the best fix is to slice open the sheet and patch with hot asphalt and additional plies/membrane.
   - ☐ a. True
   - ☐ b. False

6. Hot asphalt used with CertainTeed roll goods shall comply with ASTM D312 Type III asphalt for slopes up to 1″:12″ or ASTM D312 Type IV asphalt for slopes of 1″:12″ or greater..
   - ☐ a. True
   - ☐ b. False

7. When is spot mopping preferred over solid mopping in hot-applied systems?
   - ☐ a. For all new construction
   - ☐ b. For recover applications or rough substrates
   - ☐ c. For cap sheet installation
   - ☐ d. For cold weather only

8. If foaming is observed when applying asphalt to a substrate, what does this indicate?
   - ☐ a. Asphalt is at the correct temperature
   - ☐ b. Substrate is too cold
   - ☐ c. Presence of moisture in the substrate
   - ☐ d. Asphalt is too thick

Chapter 12:
Cold-Applied Modified Bitumen Roofing

Your objective: To learn CertainTeed's procedures for the correct application and installation of a Flintlastic® cold-applied modified bitumen roof system.

Flintlastic Cold-Applied Roof Systems for Low-Slope Roofs

Roof systems are considered a "cold-process" or "cold-applied" system when the cap sheet is set in cold adhesive, such as FlintBond® Brush Grade SBS Modified Bitumen Adhesive. Cold applied cap sheets can be installed over a variety of base sheets including, cold applied, mechanically fastened, self adhered, or torch applied. Cold-applied systems are valued for delivering a bond akin to that of hot asphalt without the need for a kettle.

Where can I use cold-applied roofing systems?

A cold-applied roofing system is a good choice when a tried-and-true roofing system with multiple layers is sought, but the use of hot asphalt kettles or propane torches is not practical, possible, or desired. Cold-process adhesives have been designed to provide an alternative to hot- and torch-applied membrane systems. Note that most adhesives used in a cold-applied system contain solvents that allow the material to flow without using heat. Some roof decks or substrates DO NOT tolerate the solvents used and are not compatible with cold-applied systems. The standard facers of FlintBoard ISO are not compatible with membrane adhesives. FlintBoard ISO Cold has a heavy-duty inorganic glass-reinforced facers suitable for cold process membrane adhesion. If you have a question on compatibility, contact CertainTeed® Commercial Technical Services at 800-396-8134, ext. 2.

What tools do I need for a cold-applied system?

- A long-handled roofer's brush
- A long-handled 1/4" (0.6 cm) notched or serrated squeegee
- A 4-inch steel roller
- Roofer's hooked blade knife (the hooked blade is ideal for cutting the membrane)
- Roofer's trowel with beveled edges and rounded tip (for smoothing of details without cutting or marking the membrane) and a handle that allows a safe distance between the roofer's gloved fingers and the membrane
- Protective eyewear
- Appropriate attire, including clothing, shoes, and heavy-duty gloves

What are the components of a Flintlastic Cold-Applied System?

CertainTeed offers cold-process roll goods comprised of both BUR (non-modified) and SBS-modified asphalt with both fiberglass and polyester reinforcement mats.

CERTAINTEED PRODUCTS THAT MAY BE COLD-APPLIED

	Product	Description	Weight	Coverage
Base/ Interplies	**Glasbase™ Base Sheet**	Non-modified, extra-strength fiberglass reinforced base sheet	75 lbs.	3 Square
	All Weather/Empire® Base Sheet	SBS-modified, dimensionally-stable fiberglass reinforced base sheet	79 lbs.	2 Squares
	Flintlastic® Poly SMS Base Sheet	SBS-modified, stress-resistant polyester reinforced base sheet	89 lbs.	2 Squares
	Flintlastic® Ultra Poly SMS Base Sheet	Premium SBS-modified, stress-resistant polyester reinforced base sheet	89 lbs.	1 Square
	Flintlastic® Base 20	SBS-modified, fire-resistant, heavy-duty fiberglass reinforced base sheet	88 lbs.	1.5 Squares
Cap Sheets	**Flintlastic® GMS**	SBS-modified, stress-resistant polyester reinforced cap membrane with granule surface	93 lbs.	1 Square
	Flintlastic® FR-P	SBS-modified, fire-resistant, stress- resistant polyester reinforced cap membrane with granule surface	100 lbs.	1 Square
	Flintlastic® Premium FR-P	SBS-modified, fire-resistant, extra-tough, stress-resistant polyester reinforced cap membrane with granule surface	100 lbs.	1 Square
	Flintlastic® Premium FR-P CoolStar®	SBS-modified, fire-resistant, stress- resistant polyester reinforced cap membrane with reflective CoolStar granule surface	99.5 lbs.	1 Square
	Flintlastic® Ultra Glass SA	Premium SBS-modified, heavy-duty fiberglass reinforced base sheet	72 lbs.	1 Square
	Flintglas® MS Cap Sheet	Non-modified, heavy duty fiberglass reinforced mat	77 lbs.	1 Square

CERTAINTEED PRIMER AND ADHESIVE PRODUCTS THAT MAY BE COLD-APPLIED

	Product	Description
Primers	**FlintPrime® QD**	Quick-dry, solvent-based, highly penetrating asphalt primer designed to promote membrane adhesion for torch, hot or cold applications, or self-adhered membranes
	FlintPrime® Aerosol	An asphalt primer used for preparation of metal, concrete, gypsum, masonry, or brick substrates prior to application of modified asphalt membranes or built-up roofing sheets; specially designed to prime small detail areas where applying FlintPrime QD by brush or spray rig is not efficient; packaged in a 15 oz. spray can
Adhesives	**FlintBond® Brush**	A professional grade, SBS modified, cold-applied adhesive specially formulated for use with modified bitumen membranes, base sheets, and ply sheets
	FlintBond® Trowel	An all-weather, SBS-modified bitumen flashing and repair mastic specially formulated for use with modified bitumen membranes, base sheets, and ply sheets; will not run, slip, sag, or mud crack
	FlintBond® Caulk	Ideal for SBS-modified membranes seam and flashing details and cracks in concrete or control joints on low-slope roofs, as well as skylights, chimneys, vent pipes, gravel guards, and downspouts; delivers excellent repair performance on all modified bitumen and built-up roofing membranes in wet or dry conditions; will bond underwater and remain adhered where movement is expected to occur
	Millennium Hurricane Force® 1-Part Membrane Adhesive	Premium highly elastomeric, one-part asphalt-modified urethane adhesive that is solvent-free and does not require mixing; formulated for use with modified bitumen membranes, base sheets, ply sheets, and vapor retarders; applied with trowels or squeegees
	Millennium Hurricane Force® 1-Part Flashing Adhesive	Premium highly elastomeric, one-part asphalt-modified urethane adhesive that is solvent-free and does not require mixing; formulated for use with flashings and repairs; applied using trowels or brushes

TIP: Most CertainTeed roll goods that can be applied in hot asphalt can also be applied in cold adhesive, with the exception of Flintglas Ply 4.

Cold Adhesive Roof System Specifications

Please refer to the CertainTeed Commercial Roof System Specifications manual for comprehensive specification options and details.

1. Precautions During Cold-Applied Roofing Installations

SAFETY FIRST!

Please review Chapter 1, Section 1 of this Manual for important safety guidelines prior to installation.

Material Handling and Storage Precautions

Please refer to Chapter 1, Section 2 of this Manual for important general material handling and storage information.

Cold Weather Application Precautions

Please refer to Chapter 1, Section 4 of this Manual for important weather precautions.

2. Installation Overview for Cold-Applied Roofing Systems

The application steps for a cold-applied roof system shall occur as follows:

1. Substrate Preparation: Assure that the existing substrate is completely clean and suitable to receive the new roofing system.

NOTE: *If primer is used, it must be applied at the specified rate and be allowed to cure, as specified.*

2. Rigid Insulation / Cover Board Application (Optional): If rigid insulation or cover boards are being used, they should be properly installed and secured. See Chapter 8 of this Manual for information about installing rigid insulation and cover boards.

3. Base Sheet/Ply Application (Required): After preparing the substrate, follow the specific installation procedures described in Section 3 of this Chapter.

4. Interply Application (Optional): If the specified roofing system requires one or more interplies, install them following the specific application procedures described in Section 4 of this Chapter.

5. Cap Sheet Application (Required): After the base sheets/plies and/or interplies are installed, follow the specific application procedures for the cap sheet installation described in Section 6 of this Chapter.

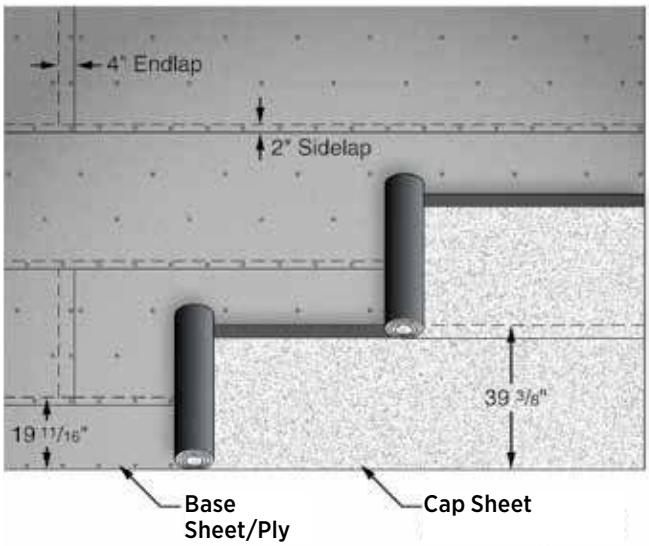
6. Surface Coatings (Optional): If required by specification or to satisfy the warranty, apply the specified surface coating as described in Section 7 of this Chapter.

7. Project Completion: To successfully complete the application and obtain a CertainTeed Warranty, see Chapter 15 of this Manual.

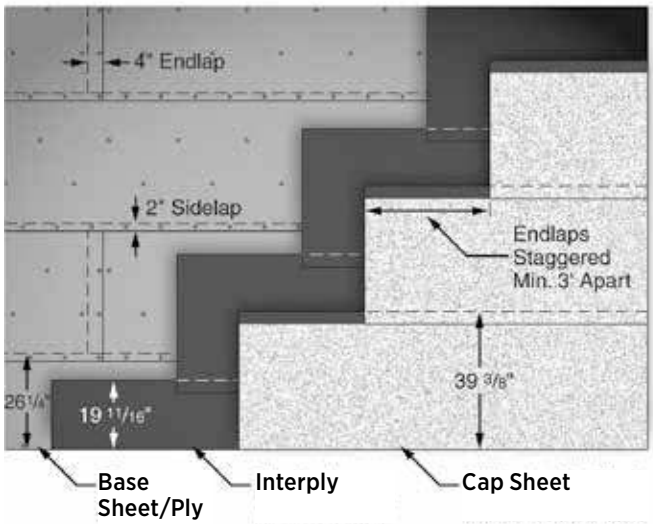
The roofing membrane (base, interply, and cap sheet) installation procedures are described in more detail in the following sections.

Roof Layout and Slope Guidelines

Layout: 2-Ply System



Layout, 3-Ply System



FIELD LAYOUT REFERENCE

	2-Ply Systems		3-Ply Systems		
	Base	**Cap**	**Base**	**Ply**	**Cap**
Starter row width	19-11/16″ (1/2 roll)	39-3/8″ (full roll)	26-1/4″ (2/3 roll)	19-11/16″ (1/2 roll)	39-3/8″ (full roll)
Side laps	2″	3″	2″	2″	3″
End laps, staggered 36″	4″	6″	4″	4″	6″

- When membrane is cold-applied, where roof slope is 1″ per foot or less, side laps are installed perpendicular to the direction of the roof slope.
- In situations where the roof slope exceeds 1″ per foot, it is recommended that rolls be installed with the side laps running parallel to the slope direction..
- End laps are to be staggered a minimum of 3′.
- In multi-ply applications, membrane side laps of each layer must be staggered from those plies below.
- After slope has been considered and accounted for, start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection. Roof layout shall be designed so that no laps are against the flow of water.

Substrate Guidelines

Deck	Insulation/Cover Board	Base Sheet/Ply
Steel	Required	Mechanically Attach or Cold-Apply
Wood	Optional	Mechanically Attach or Cold-Apply if insulation is used
Concrete	Optional	Mechanically Attach or Cold-Apply
LWIC, Gypsum, Cementitious Wood Fiber	Optional	Mechanically Attach or Cold-Apply
	Required	Cold-Apply

Nailing/Back Nailing Requirements by Slope

SBS-modified bitumen membranes applied on slopes 1″:12″ and greater, are recommended to be installed with the side laps running parallel to the slope and are nailed as follows:

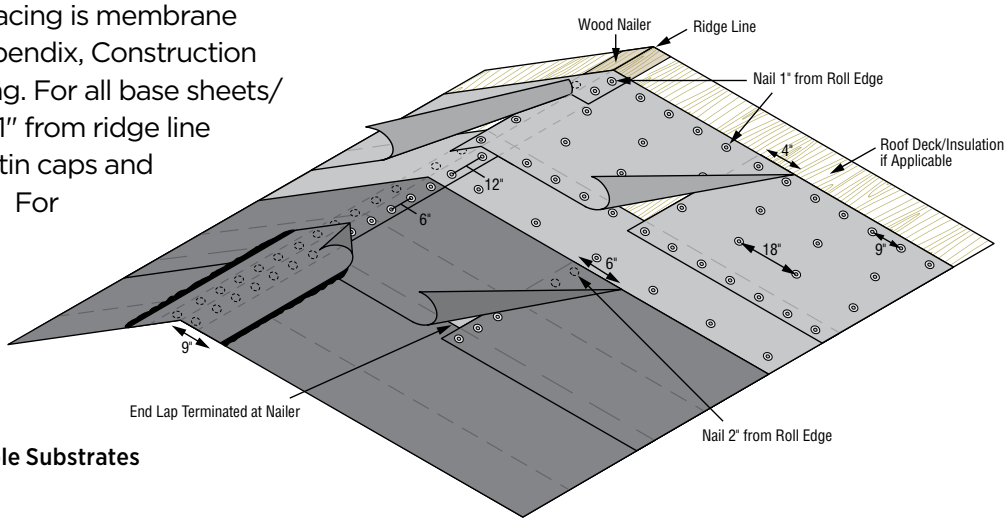
- **Nailable Substrates:** For all base sheets/plies and interplies, nail 1″ from ridge line of roof, 12″ o.c. through tin caps with annular ring shank nails or metal cap nails. For cap sheets, nail 2″ from ridge line of roof. Nails shall penetrate through the nailable substrate a minimum of 1/4″ or shall penetrate wood plank a minimum of 3/4″. Additionally, all base and interply sheets shall be back-nailed at the end laps 2″ in from the edge, 12″ o.c. through tin discs with annular ring shank nails or metal cap nails. See Appendix, Construction Detail CT-29A, Back Nailing.
- **Insulated Substrates:** Install minimum 3-1/2″ wide nailers or woodblocking set flush to surface of deck at all eaves, ridges, rakes and base of curbs. Nailer spacing is membrane dependent, refer to Appendix, Construction Detail CT-29 Back Nailing. For all base sheets/plies and interplies, nail 1″ from ridge line of roof, 12″ o.c. through tin caps and annular ring shank nails. For cap sheets, nail 2″ from ridge line of roof.

Additionally, all base, interply sheets shall be back nailed at end laps 2″ in from top edge, 12″ o.c. through tin discs with annular ring shank nails or metal cap nails.

Cap sheets shall be back nailed at end laps 2″ in from top edge, 6″ o.c. through tin discs with annular ring shank nails or metal cap nails. Endlaps must occur at nailers such that the top edge of the overlapped sheet can be fastened to the nailer and the fastener completely covered.

For base plies/interplies, fasten roll into each nailer throughout the deck even if length of a single roll covers the entire deck/substrate (no endlaps). For cap sheets, if length of roll covers the entire deck/substrate (no endlaps), roll should not be fastened at each nailer, just at the ridge.

Modified bitumen roll roofing, when applied parallel to the slope, shall be back-nailed at end laps 2″ in from top edge, 6″ o.c. with appropriate fasteners into wood blocking. See also the Appendix, Construction Detail CT-29.



Slopes 1:12 <,
Side Laps Parallel to Slope,
CT-29A Backnailing – Nailable Substrates

3. Base Sheet Installation for Cold-Applied Roofing Systems

In this Section we will review the mechanical attachment of base sheets and the cold adhesive application of base plies. CertainTeed cold-process systems are typically designed as a sole system and should not be mixed with self-adhered, hot asphalt or torch-welded products. However, CertainTeed's most versatile premium base sheet, Ultraglass SA, can be used as a base or ply sheet prior of installation to a cold-process cap. There is one approved SA base sheet suitable to accept cold process caps.

3A – Base Sheet Installation - Mechanical Attachment

Planning and Preparation

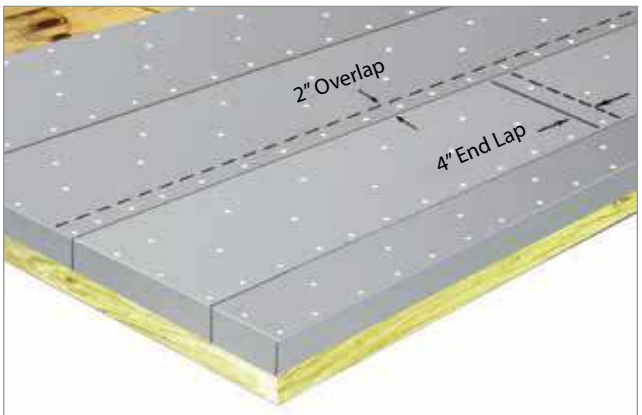
- Before starting application, as always, make sure the roof substrate is free of dust, dirt, oil, debris, and moisture.
- Start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection.
- Cut rolls into manageable lengths and allow to relax a minimum of 15 minutes.

Mechanical Fasteners

Please refer to Chapter 6, Section 1B for approved fasteners for mechanically attached base sheets.

Base Sheet Installation

- Start at the low point of the roof to ensure that water flows over, not against, the roof for proper drainage, and unroll the membrane. Align membrane so that it is straight for application, flush to roof's edge. Mechanically fasten an approved CertainTeed base sheet to a nailable deck using the appropriate fasteners.
- Turn base sheet over fascia by 2″ and fasten.
- CertainTeed's minimum fastening pattern is 9″ o.c. in side laps and 18″ o.c. in two staggered rows in the field of the sheet. Perimeters and corners may require enhanced fastening patterns. At a minimum, fastener density should be increased by 50% in perimeters and 100% in corners (not to exceed one fastener per 1ft^2).
- Overlap base sheet side laps a minimum of 2″ and end laps 4″.
- Offset end laps of adjacent courses a minimum of 3′.
- DO NOT leave base sheet exposed to the weather. **All plies in the assembly should be installed in one day. If unable to install cap sheet, tarps or other suitable protection should be used.**



Mechanically Attached Base Sheet

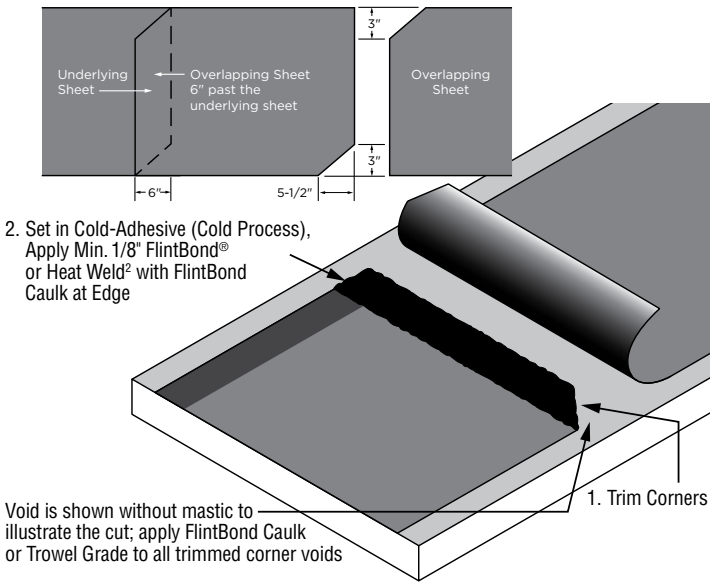
3B – Base Ply Installation - Cold-Applied

Planning and Preparation

- Before starting application, as always, make sure the roof substrate is free of dust, dirt, oil, debris, and moisture.
- Start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection.
- Cut rolls into manageable lengths and allow to relax a minimum of 15 minutes.
- Several workers are needed for cold adhesive application.

Base Ply Application

- Start at the low point of the roof to ensure that water flows over, not against, the roof for proper drainage, and unroll the membrane. Align membrane so that it is straight for application.
- Tightly re-roll one end of the roll approximately halfway, keeping the membrane in alignment.
- If roof terminates at edge, as opposed to parapet wall or other, base ply shall be turned over fascia by 2″ and fastened.
- Standing on the unrolled portion to prevent shifting, begin applying the base substrate with adhesive using a brush; apply adhesive uniformly and evenly without voids.
- Solid adhesions require a minimum application rate of 1 gallon per square; on porous or irregular surfaces, a rate of 1-1/2 to 2 gallons per square may be required. Insufficient or excessive quantities may cause roof membrane failure or poor performance of the roof assembly.
- Unroll the membrane into the freshly applied adhesive.
- Follow behind with a roller to press the sheet into the substrate to make sure that base and membrane have properly adhered. Make sure a 1/4″ minimum bead of adhesive bleeds out at the edge and all lap areas of membrane.
- Side laps shall be aligned for a minimum 2″ overlap, and end laps shall have a minimum 6″ lap. End laps should be staggered a minimum of 36″ apart so that no course ends match up with each other.
- Cut end laps at opposing diagonal corners at an angle approximately 5-1/2″ long by the selvage dimension from the corners to minimize “T”-seams.
- Install succeeding rolls and courses in a similar manner.



End Lap

Correcting Fishmouths

- In the event a wrinkle or a fishmouth forms during the application of the membrane, DO NOT “walk it down,” as the memory of the sheet or felt may cause it to reappear.
- Fishmouths or wrinkles shall be sliced open and patched with cold adhesive, trowel-applied, and additional membrane.
- Avoid cutting into the plies below the fishmouth or wrinkle by angling the knife blade to the side and or using a hooked blade.

4. Interply Application - Cold-Applied (Optional/Specification Dependent)

Interply layers are optional in some roof systems or may be required, when specified.

NOTE: *Proceed to "Cap Installation" if installing a two-ply system (without an interply)*

Planning and Preparation

- Before installing a Flintlastic cold-applied interply, sweep the underlying base sheet/ply to remove any debris that could interfere with adhesion.
- Start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection.
- Cut rolls into manageable lengths and allow to relax a minimum of 15 minutes.

Interply Installation

- Installation of the interply layer(s) is the same as the installation of cold-applied base plies, with the exception of the 2" turn down over the fascia of the roof; the interply layer is installed flush to the roof's edge. Refer to Base Ply Application (above) for guidance.
- **All plies in the assembly should be installed in one day. If unable to install cap sheet, tarps or other suitable protection should be used.**

5. Edge Flashing

Edge Metal

Please refer to Chapter 6, Section 5 for CertainTeed edge metal solutions.

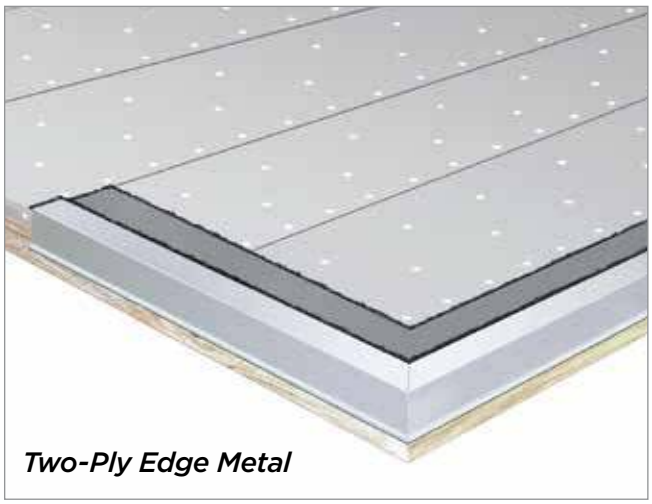
If roof terminates at the edge, follow these procedures for edge metal flashing and installation prior to Cap installation.

Edge Metal for Two-Ply Systems (with no interply)

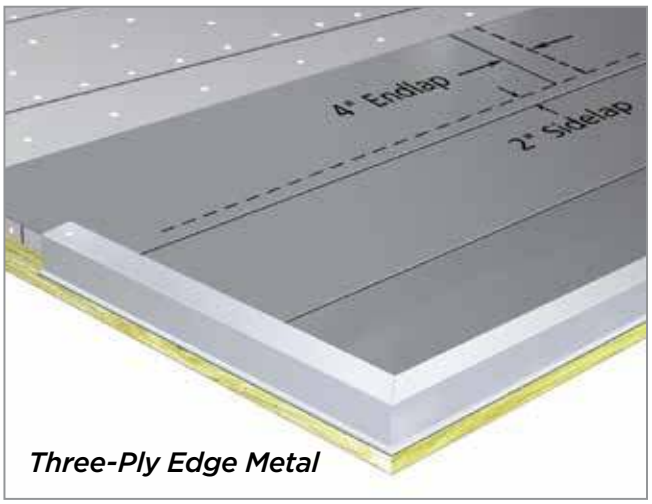
- If an interply is not installed, self-adhere a 9" wide flashing strip (material assumed, but not required, to match base ply) onto the field of the roof and flush to the roof edge.
- Any metal edging to be installed should be a minimum 26-gauge. Prior to installing, remove oil from the metal surface using a vinegar and water solution.
- Set the metal entirely in a uniform 1/8" - 1/4" thick application of FlintBond Trowel.
- Using appropriate fasteners, secure edge metal through the surface, through the base sheet/ply and flashing strip, and into the deck, spaced 4" o.c. in two staggered rows.
- Prime the horizontal surface of the metal with FlintPrime QD or Aerosol and allow primer to dry/tackify.
- Apply a bead of caulk grade FlintBond at the roof side edge of the metal where it meets the flashing strip.
- Proceed to 6, Cap Installation for Self-Adhered Roof Systems.

Edge Metal for Three-Ply Systems (with interply)

- If an interply has been installed over the base sheet, proceed with the same instructions as the two-ply system without adding an additional 9" flashing strip.
- Proceed to 6, Cap Installation for Self-Adhered Roof Systems



Two-Ply Edge Metal



Three-Ply Edge Metal

6. Cap Installation - Cold-Applied

Installation of the cap sheet layer is critical to roofing performance since this is the first line of defense against weather. Cold-applied installation of the cap is similar to procedures followed in the installation of base and interply layers.

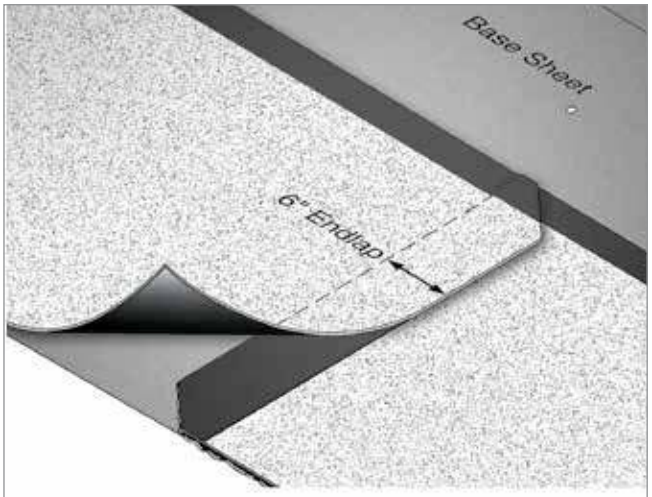
Planning and Preparation

- As always, before installing a Flintlastic cold-applied cap, sweep the underlying anchor sheet, base ply, or interply to remove any debris that could interfere with adhesion.
- If base or interply is dirty or has been left exposed for phased construction (though not recommended), clean and prime it. Allow it to dry completely before proceeding with cap installation.
- Start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection.
- Cut rolls into manageable lengths and allow to relax a minimum of 15 minutes.

Cap Sheet Installation

- Start at the low point of the roof to ensure that water flows over, not against, the roof for proper drainage, and unroll the membrane. Align membrane so that it is straight for application. Position Cap with selvage edge release strip at high side of roof and the opposite side flush to the roof's edge.
- Tightly re-roll one end of the roll approximately halfway, keeping the membrane in alignment.
- Standing on the unrolled portion to prevent shifting, begin cold adhesive application to the substrate at a rate of 1 gallon per 100 ft.^{2}, apply adhesive uniformly and evenly without voids.
- Unroll the membrane into the freshly applied adhesive.
- Follow behind with a roller to press the sheet into the substrate to make sure that base and membrane have properly adhered. Make sure a 1/4" minimum bead of adhesive bleeds out at the edge and all lap areas of membrane.

- All side and end laps shall be fully coated with adhesive and, after alignment and placement, rolled with a 4″ steel roller.
- Base flashings, wall coverings, and vertical details shall be adhered with FlintBond Trowel Grade adhesive and conform with CertainTeed's published Construction Details, see Appendix.
- Side laps shall be aligned for a 3″ overlap and end laps shall have a minimum 6″ lap; cap sheet side laps should and must be staggered from base or interply side laps
- End laps should be staggered a minimum of 18″ apart so that no course ends match up with each other.
- Cut end laps at opposing diagonal corners at an angle approximately 5-1/2″ long by the selvage dimension from the corners to minimize "T"-seams.
- Apply a bead or small trowel dab (quarter size) of FlintBond SBS Modified Bitumen Adhesive, Caulk, or Trowel grade at the edge of the angled cut to seal the cut edge and avoid a capillary.
- If desired for aesthetics, before any lap or detail edge bleed out cools and becomes hard, broadcast granules matching the color of the cap sheet into the bleed out to create a uniform look.
- Initial bonding typically occurs in about three days but can vary, depending upon weather conditions. Full adhesive cure time is typically 30 – 45 days. Multiple layers of cold process adhesive will take longer periods to fully cure out.



Cap Sheet, End Lap

7. Flashing Details

Refer to Appendix for comprehensive asphaltic/bituminous construction details.

8. Surface Coatings (Optional)

When a roof coating is specified or desired, refer to Chapter 14, Liquid-Applied Roofing.

9. Project Completion for Cold-Applied Roofing Systems

Follow the procedures for closing out the project successfully and applying for a warranty, as outlined in Chapter 15 of this Manual.

Chapter 12 – Self-Test for Cold-Applied Roofing Systems

Questions

Test online https://certainteed.com/low-slope-test

1. Which SA Base Sheet can be used with cold process caps?
   - ☐ a. Black Diamond
   - ☐ b. Flintlastic SA Plybase
   - ☐ c. Flintlastic Ultra glass SA
   - ☐ d. Flintlastis SA Midply

2. The target bleed-out for cold adhesive is?
   - ☐ a. 1/4″
   - ☐ b. 1″
   - ☐ c. 1/2″
   - ☐ d. 3/4″

3. Which statement about cold-process adhesives is correct?
   - ☐ a. They never contain solvents.
   - ☐ b. They require a kettle to heat before application.
   - ☐ c. They contain solvents that allow the material to flow without heat.
   - ☐ d. They are identical to torch-applied adhesives.

4. What is the minimum adhesive application rate for solid adhesion of base plies on typical substrates?
   - ☐ a. 0.25 gallon per square
   - ☐ b. 0.5 gallon per square
   - ☐ c. 1 gallon per square
   - ☐ d. 3 gallons per square

5. When installing cold-applied membranes it is recommended that the temperature be what?
   - ☐ a. 45° F
   - ☐ b. 55° F
   - ☐ c. 60° F
   - ☐ d. 65° F

6. If a fishmouth or wrinkle forms during membrane application, the manual instructs you to:
   - ☐ a. Walk it down until it flattens out
   - ☐ b. Slice it open and patch with cold adhesive and additional membrane
   - ☐ c. Ignore it; it will settle as adhesive cures
   - ☐ d. Heat the area with a torch to reshape it

7. Which deck condition always requires insulation or barrier board to be installed prior to a base sheet?
   - ☐ a. Steel deck
   - ☐ b. Wood deck only
   - ☐ c. Any deck type
   - ☐ d. None; all sheets can be applied to any deck type

8. Typical full cure time for cold-applied adhesive under normal weather conditions is approximately:
   - ☐ a. 1–3 days
   - ☐ b. 7–14 days
   - ☐ c. 30–45 days
   - ☐ d. 90–120 days

Chapter 13:
Hot-Applied Built-Up Roofing (BUR) Systems

Your objective: To learn CertainTeed's procedures for the correct application and installation of a Built-Up Roofing (BUR) system.

Built-Up Roof System for Low-Slope Roofs

A built-up roof system derives its name directly from its application, which consists of multiple layers (typically between three and five plies) of permeable asphalt saturated fiberglass or polyester sheets (felts) and hot asphalt/bitumen. In BUR roof systems, the hot asphalt, once cured, serves as the weatherproofing element, and the felts serve to give the system dimensional stability and tensile strength.

BUR is the oldest form of multi-ply, asphaltic roofing. And while labor trends and material developments have significantly contracted its use, many old BUR roofs remain in service today and few would argue their ability to perform.

Where can I use Built-Up Roofing?

A BUR system is a good choice when a tried-and-true system is sought using familiar products and materials in a traditional manner. BUR systems have been installed for more than a century and are valued for their dependability and durability.

NOTE: *CertainTeed® BUR systems are installed utilizing hot asphalt — CertainTeed does not allow the use of cold-process adhesives in BUR roof membranes. Therefore, BUR may not be a good choice if the use of heated kettle of asphalt cannot be accommodated either to meet safety requirements or if the asphalt fumes are not acceptable in an occupied building.*

What tools do I need for a Hot-Applied Built-Up Roofing application?

- A safety plan
- An asphalt kettle with working temperature gauge
- Propane
- Mop carts
- Optional mechanical asphalt applicator
- Mop buckets
- Asphalt mops (mop size should not be less than 32 oz.)
- Stiff bristle broom
- Fire extinguishers
- Roofer's hooked blade knife (the hooked blade is ideal for cutting the membrane)
- A roofer's trowel with beveled edges and rounded tip (for smoothing of details without cutting or marking the membrane) that allow a safe distance between the roofer's gloved fingers and the warm membrane
- Protective eyewear
- Appropriate protective attire, including clothing, shoes, and heavy-duty gloves

What are the components of a CertainTeed Built-Up Roofing System?

CertainTeed offers BUR roll goods comprised of non-modified asphalt and fiberglass reinforcement mats. Cap sheets are granule surfaced.

CERTAINTEED PRODUCTS THAT MAY BE USED FOR BUR SYSTEMS

	Product	Description	Weight	Coverage
Base/ Interplies	**Glasbase™ Base Sheet**	Non-modified, extra-strength fiberglass reinforced base sheet	75 lbs.	3 Squares
	Flintglas® Ply 4	Non-modified, extra-strength fiberglass reinforced base or interply	36 lbs.	5 Squares
Cap Sheets	**Flintglas® MS Cap Sheet**	Non-modified, extra-strength fiberglass reinforced cap sheet with granule surface	77 lbs.	1 Square
	Flintglas® MS Cap Sheet CoolStar®	Non-modified, extra-strength fiberglass reinforced cap sheet with reflective CoolStar granule surface	74 lbs.	1 Square

BUR Roof System Specifications

Please refer to the CertainTeed Commercial Roof System Specifications manual for comprehensive specification options and details.

1. Precautions During During BUR Installation

SAFETY FIRST!

Please review Chapter 1, Section 1 of this Manual for important safety guidelines prior to installation.

Material Handling and Storage Precautions

Please refer to Chapter 1, Section 2 of this Manual for important general material handling and storage information.

Cold Weather Application Precautions

Please refer to Chapter 1, Section 4 of this Manual for important weather precautions.

2. Installation Overview for Built-Up Roofing Systems

The basic application steps for a Built-Up Roofing System shall occur as follows.

1. Substrate Preparation: Assure that the existing substrate is completely clean and suitable to receive the new roofing system.

NOTE: *If primer is used, it must be applied at the specified rate and be allowed to cure, as specified.*

2. Rigid Insulation / Cover Board Application (Optional): If rigid insulation or cover boards are being used, they should be properly installed and secured. See Chapter 8 of this Manual for information about installing rigid insulation and cover boards.

3. Base Sheet/Ply Application (Required): After preparing the substrate, follow the specific installation procedures described in Section 3 of this Chapter.

4. Ply Sheet Application (Optional): If the specified roofing system requires one or more ply sheets, install them following the specific application procedures described in Section 4 of this Chapter.

5. Cap Sheet Application (Optional if Surfacing with Flood Coat/Gravel): After the base sheet and or ply sheet(s) are installed, follow the specific application procedures for the cap sheet installation described in Section 6 of this Chapter.

6. Surface Coatings (Optional): If required by specification or to satisfy the warranty, apply the specified surface coating as described in Section 7 of this Chapter.

7. Project Completion: To successfully complete the application and obtain a CertainTeed Warranty, see Chapter 15 of this Manual.

Asphalt Preparation Process

Asphalt shall be prepared and heated for use in the layers that are secured using asphalt, all based upon the following application procedures:

Hot Asphalt Specifications

The U.S. product standard for asphalt used in roofing applications is ASTM D312, "Standard Specification for Asphalt Used in Roofing," which classifies asphalt into four different types based upon the asphalt's softening point, penetration (hardness) and ductility. Hot asphalt used with CertainTeed roll goods shall comply with ASTM D312 Type III asphalt for slopes up to 1″:12″ or ASTM D312 Type IV asphalt for slopes of 1″:12″ or greater. CertainTeed recommends the use of Type IV asphalt when mopping SBS-modified asphalt membranes, notwithstanding the slope. The asphalt application temperature should not fall below 425°F.

The asphalt producer shall provide certification upon request. Asphalt shall be homogenous, and free from water and any foreign debris. A safety program shall be developed to address the storage, heating, pumping, and transport to the point of application. The contractor shall convey the safety plan to all members of the roofing crew. Make sure to store all roofing asphalt in such a manner as to prevent leakage, carton deterioration, and moisture contamination.

Equiviscous Temperature (EVT)

CertainTeed supports the use of Equiviscous Temperature (EVT) as a guide for proper mopping temperature. Use of this concept will facilitate proper interply asphalt weights, adhesion, and uniformity. The roofing contractor

ASTM D 312 TYPE	MOPPING TEMPERATURE	HEATING TEMPERATURE	MAX SLOPE IN./FT.
TYPE III	400˚F +/-25˚	500˚F*	≤ 3″
TYPE IV	425˚F +/-25˚	500˚F*	3″ < slope ≤ 6″

* Type III and IV asphalt may be heated to 500˚F in a re-circulating kettle.

shall consult the asphalt manufacturer for information regarding EVT and flash point.

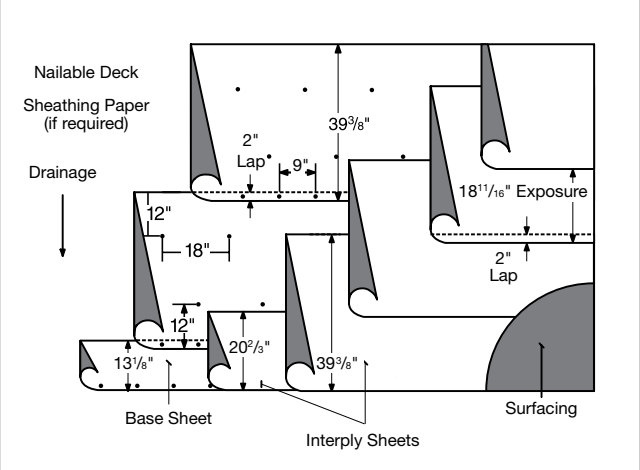
- All asphalt shall be labeled with product "Type" EVT for both mop and mechanical spreader applications, and flash point, as determined by ASTM D9214.
- Temperature measurement equipment shall be installed on all kettles and heating equipment. The contractor shall monitor the temperature measurement equipment and maintain recommended temperatures, as noted below.
- Asphalt should not be heated above the flash point. Asphalt should never be heated above 525˚F and should not be held at 500˚F or above for more than four hours.
- ***NOTE:*** *If outside temperatures keep asphalt from maintaining proper temperature, application should be halted. Flash and Fire Points can be tested by Cleveland Open-Cup Tester.*

Hot Asphalt Heating

- Asphalt shall be heated to +/-25 degrees of the published EVT, as measured at the mop cart or mechanical spreader.
- Where there are simultaneous mop and mechanical applications, the EVT for mechanical spreader application shall be used for both application methods.
- Asphalt shall be heated to the EVT, as published by the asphalt producer. The EVT is the temperature at which the proper viscosity for application has been attained. The apparent viscosity is 125 centipoise as measured in compliance with ASTM D4402.
- Mechanical spreader viscosity shall be 75 centipoise. Viscosity should be measured with a Rotational Viscometer.
- Always circulate bitumen while heating.

The roofing membrane (base, ply, and cap sheet) installation procedures are described in more detail in the following sections.

Roof Layout and Slope Guidelines



BUR(G)-N-3-A, 3-ply

- When membrane is applied with hot asphalt, where roof slope is 1″ per foot or less, side laps are installed perpendicular to the direction of the roof slope.
- In situations where the roof slope exceeds 1″ per foot, it is recommended that rolls be installed with the side laps running parallel to the slope direction.
- End laps are to be staggered a minimum of 3′.
- In multi-ply applications, membrane side laps of each layer must be staggered from those plies below.
- After slope has been considered and accounted for, start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection. Roof layout shall be designed so that no side laps are against the flow of water.

Substrate Guidelines

Whether you mechanically attach an anchor sheet or hot apply a base sheet depends upon the type of roof deck and whether or not insulation is used.

The following table is meant to provide guidance on attaching base sheets/plies, as determined by the deck type.

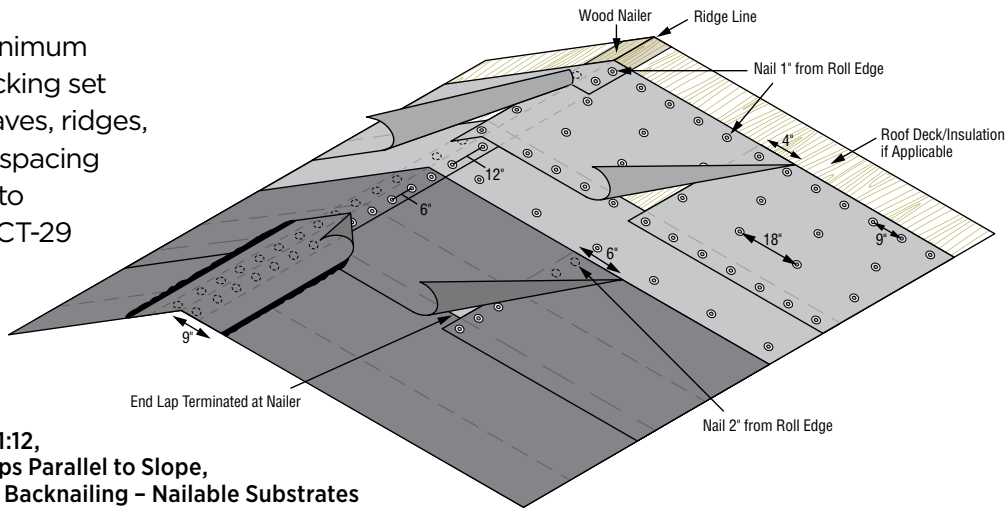
Deck	Insulation/Cover Board*		Anchor/Base
Steel	Required		Mechanically Attach or Hot Apply
Wood/LWIC Other, (i.e., Gypsum, Cementitious Wood Fiber, Wood Planks, Structural Wood Fiber, etc.)	Optional	If no:	Mechanically Attach
		If yes:	Mechanically Attach or Hot Apply
Concrete	Optional	If "no," FlintPrime® QD is required	Mechanically Attach or Hot Apply
		If yes:	

Nailing/Back Nailing Requirements by Slope

BUR sheets applied on slopes 1":12" and greater, are recommended to be installed with the side laps running parallel to the slope and are nailed as follows: Additionally, if the roof slope exceeds 3":12" pitch type 4 asphalt must be used.

- **Nailable Substrates:** For all base sheets/plies and interplies, nail 1" from ridge line of roof, 12" o.c. through tin caps and annular ring shank nails. For cap sheets, nail 2" from ridge line of roof. Nails shall penetrate through the nailable substrate a minimum of 1/4" or shall penetrate wood plank a minimum of 3/4". Additionally, all base, interply and cap sheets shall be back-nailed at end laps 2" in from top edge, 6" o.c. through tin discs with annular ring shank nails. See Appendix, Construction Detail CT-29A, Back Nailing
- **Insulated Substrates:** Install minimum 3-1/2" wide nailers or woodblocking set flush to surface of deck at all eaves, ridges, rakes and base of curbs. Nailer spacing is membrane dependent, refer to Appendix, Construction Detail CT-29

Back Nailing. For all base sheets/plies and interplies, nail 1" from ridge line of roof, 12" o.c. through tin caps and annular ring shank nails. For cap sheets, nail 2" from ridge line of roof. Additionally, all base and interply sheets shall be back-nailed at the end laps 2" in from the edge, 12" o.c. through tin discs with annular ring shank nails or metal cap nails. Endlaps must occur at nailers such that the top edge of the overlapped sheet can be fastened to the nailer and the fastener completely covered. For base plies/interplies, fasten roll into each nailer throughout the deck even if length of a single roll covers the entire deck/substrate (no endlaps). For cap sheets, if length of roll covers the entire deck/substrate (no endlaps), roll should not be fastened at each nailer, just at the ridge.



Slopes 1:12,
Side Laps Parallel to Slope,
CT-29A Backnailing – Nailable Substrates

When applied parallel to the slope, BUR sheet shall be back-nailed at end laps 2″ in from top edge, 6″ o.c. with appropriate fasteners into wood blocking. See also the Appendix, Construction Detail CT-29.

3. Base Sheet Installation for Built-Up Roofing Systems

In this Section we will review the mechanical attachment of base sheets and the hot asphalt application of base plies. CertainTeed BUR systems are designed as a sole system and should not be mixed with self-adhered, cold asphalt or torch-welded products.

3A – Base Sheet Installation - Mechanically Attached

NOTE: *The only CertainTeed BUR Sheet that can be mechanically attached as a base sheet is Glasbase™ Base Sheet. Other products are available for hot-applied attachment.*

Planning and Preparation

- Before starting application, as always, make sure the roof substrate is free of dust, dirt, oil, debris, and moisture.
- Start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection.
- Cut rolls into manageable lengths and allow to relax a minimum of 15 minutes.
- Several workers are needed for hot-mopping application.

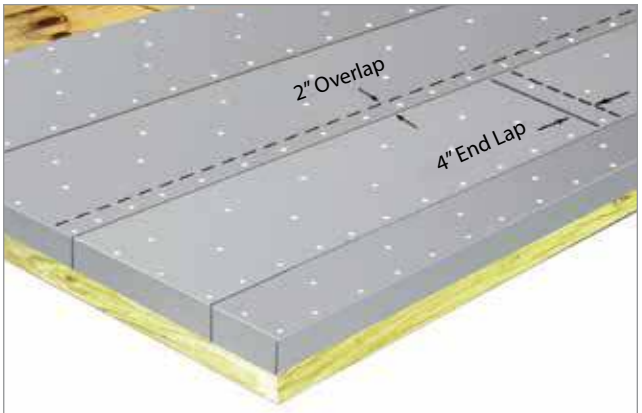
Mechanical Fasteners

Please refer to Chapter 6, Section 1 for approved fasteners for mechanically attached base sheets within self-adhered roof systems.

Base Sheet Installation

Follow these procedures when mechanically attaching base sheets:

- Start at the low point of the roof to ensure that water flows over, not against, the roof for proper drainage, and unroll the membrane. Align membrane so that it is straight for application, flush to roof's edge.



Mechanical Base Sheet

Mechanically fasten Glasbase Base Sheet to a nailable deck using the appropriate fasteners.

- Turn base sheet over fascia by 2″ and fasten.
- A minimum fastening pattern is every 9″ o.c. on side laps and every 18″ o.c. in two staggered rows in the field of the sheet. Perimeters and corners may require enhanced fastening patterns. At a minimum, fastener density should be increased by 50% in perimeters and 100% in corners (not to exceed one fastener per 1ft^2).
- The overlap base sheet side laps a minimum of 2″ and end laps 4″.
- Offset end laps of adjacent courses a minimum of 3′.
- DO NOT leave base sheet exposed to the weather. **All plies in the assembly should be installed in one day. If unable to install cap sheet, tarps or other suitable protection should be used.**

3B – Base Ply Installation - Hot-Applied

Planning and Preparation

- Before starting application, as always, make sure the roof substrate is free of dust, dirt, oil, debris, and moisture.
- Start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection.
- Cut rolls into manageable lengths and allow to relax a minimum of 15 minutes.

Base Ply Application

- Start at the low point of the roof to ensure that water flows over, not against, the roof for proper drainage, and unroll the membrane. Align membrane so that it is straight for application.
- Tightly re-roll one end of the roll approximately halfway, keeping the membrane in alignment.
- If roof terminates at edge, as opposed to parapet wall or other, base ply shall be turned over fascia by 2″ and fastened.
- Standing on the unrolled portion to prevent shifting, begin mopping the base substrate with hot asphalt. DO NOT mop further away than 6′ to prevent asphalt cooling – less in cooler weather; adequate heat is critical to proper adhesion of the membrane plies. Asphalt should be verified to be at the required temperature, as specified.
- Unroll the plies into the freshly applied asphalt. Make sure that dispensing equipment (bucket or mechanical applicator) has balloon tires to help keep weight off of the membrane.
- Press the sheet into the asphalt using a broom or roller to ensure it is properly adhered while asphalt is hot. Make sure a small bead of asphalt bleeds at edge of membrane and all lap areas.
  - **NOTE**: CertainTeed does not endorse "flying in" or mop and flop application.

Hot Asphalt

- Solid mopping of plies requires a minimum of 25 lbs./100 ft^2 hot asphalt application +/- 15 %. Apply asphalt uniformly and evenly without voids.
- For membrane (not ply sheet) applications, the mopping may be reduced to 22 lbs./100 ft^2, +/-15%.
- Spot mopping of base sheet, when appropriate, is generally accomplished using a minimum of 12″ diameter hot asphalt circles spaced every 24″ o.c. in three staggered rows. (Certain Factory Mutual listed specifications may have different requirements; refer to www.roofnav.com for complete details.)
- Side laps shall be aligned for a 3″ overlap and end laps shall have a minimum 6″ lap. End laps should be staggered a minimum of 36″ apart so that no course ends match up with each other.

Correcting Fishmouths

- In the event a wrinkle or a fishmouth forms during application of the membrane, DO NOT “walk it down,” as the memory of the felts may cause it to reappear.
- Fishmouths or wrinkles shall be sliced open and patched with hot asphalt and additional plies/membrane.
- Avoid cutting into the plies below the fishmouth or wrinkle by angling the knife blade to the side.

4. Ply Sheet(s) Installation for Built-Up Roofing Systems

Multiple plies are required in BUR roofing systems, although the number may vary, based upon the roof system specification or warranty requirements.

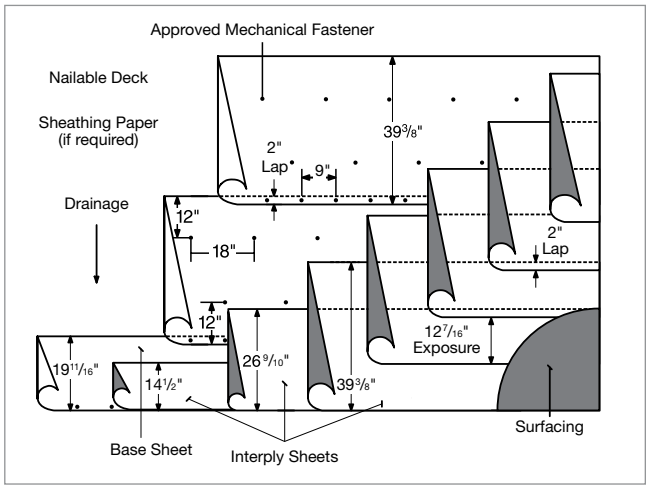
Installation of the plies is similar to the installation of the hot mop-applied base ply:

Planning and Preparation

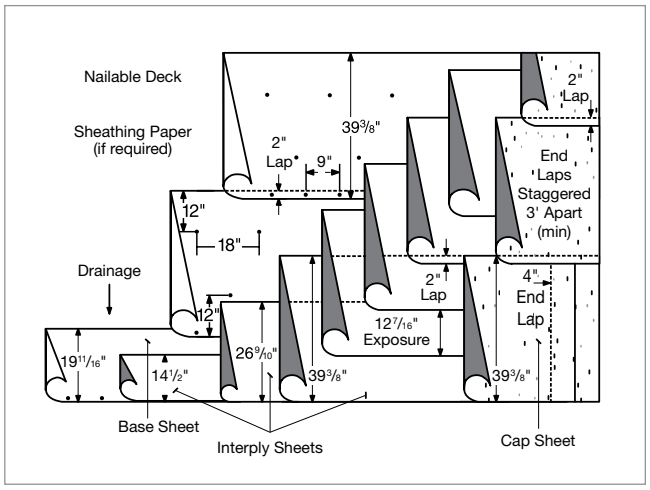
- Before installing a hot asphalt-applied ply sheet, sweep the underlying anchor sheet or base ply to remove any dirt or debris that could interfere with adhesion.
- Start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection.
- Cut rolls into manageable lengths and allow to relax a minimum of 15 minutes.

Ply Sheet Installation

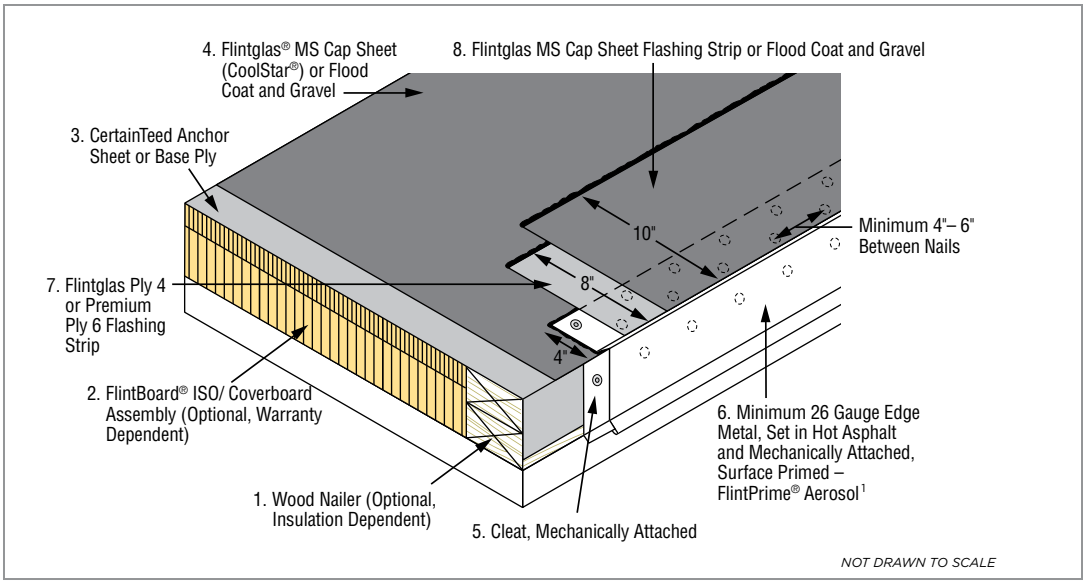
- Installation of the interply layer(s) will have 1/3 or 1/2 sheet exposure. depending on the system installed. Look at diagram.
- **All plies in the assembly should be installed in one day. If unable to install cap sheet, tarps or other suitable protection should be used.**



BUR(G)-N-4-A, 4-ply



BUR(M)-N-5-A, 5-ply



Edge Flashing – BUR

5. Cap Sheet Installation for Built-Up Roofing Systems

Installation of the cap sheet layer is critical to roofing performance since this is the first line of defense against weather. Hot installation of the cap is similar to procedures followed in the installation of base and ply layers.

NOTE: *If roof system calls for Flood Coat and Gravel, proceed to "Surface Coatings".*

Planning and Preparation

- As always, before installing a hot asphalt-applied cap, clean the underlying interply to remove any dirt or debris that could interfere with adhesion.
- If base or interply is dirty or has been left exposed for phased construction (though not recommended), clean and prime it. Allow it to dry completely before proceeding with cap installation.
- Start with an appropriate roll width (see Field Layout Reference) to accommodate offsetting of side laps of subsequent layers in the roof system for increased water protection.
- Cut rolls into manageable lengths and allow to relax a minimum of 15 minutes.
- Several workers are needed for hot-mopping application

Cap Sheet Installation

- Start at the low point of the roof to ensure that water flows over, not against, the roof for proper drainage, and unroll the membrane. Align membrane so that it is straight for application. Position Cap with selvage edge release strip at high side of roof and the opposite side flush to the roof's edge.
- Tightly re-roll one end of the roll approximately halfway, keeping the membrane in alignment.
- Standing on the unrolled portion to prevent shifting, begin hot asphalt application to the substrate at the rate of 25 lbs./100 ft^2. DO NOT apply asphalt more than 6′ in front of the roll at any time to prevent premature cooling — less in cooler weather; adequate heat is critical to proper adhesion of the membrane plies. Asphalt should be verified to be at the required temperature, as specified.

- Unroll the plies into the freshly applied asphalt. Make sure that dispensing equipment (bucket or mechanical applicator) has balloon tires to help keep weight off of the membrane.
- Press the sheet into the asphalt using a broom or roller to ensure it is properly adhered while asphalt is hot. Make sure a small bead of asphalt bleeds at edge of membrane and all lap areas.
- ***NOTE:*** *CertainTeed does not endorse "flying in" or mop and flop application.*
- Solid mopping of plies requires a minimum of 25 lbs./100 ft^2 hot asphalt application +/- 15%.
- Side laps shall be aligned for a 3" overlap and end laps shall have a minimum 6" lap; cap sheet side laps should and must be staggered from base or interply side laps
- End laps should be staggered a minimum of 36" apart so that no course ends match up with each other.
- Cut end laps at opposing diagonal corners at an angle approximately 5-1/2" long by the selvage dimension from the corners to minimize "T"-seams.
- If desired for aesthetics, before any lap or detail edge bleed out cools and becomes hard, broadcast granules matching the color of the cap sheet into the bleed out to create a uniform look.

6. Flashing Details

Refer to Appendix for comprehensive asphaltic/bituminous construction details.

7. Surface Coatings (Required Only for Flood Coat and Gravel Roof Systems)

Gravel or Slag

- Moisture content shall not exceed 2% by weight and shall conform to ASTM D186319.
- Gravel or slag shall be 1/4" to 5/8" in size, opaque and clean, and installed in a flood coat of Type III/Type IV asphalt.
- Flood coat shall be applied in a uniform manner at the rate of 60 lbs./100 ft^2.
- Gravel or slag shall be applied at the rate of 400 lbs. gals/100 ft^2, with a minimum of 50 % embedment into the flood coat

8. Project Completion for Built-Up Roofing Systems

Follow the procedures for closing out the project successfully and applying for a warranty, as outlined in Chapter 15 of this Manual.

Chapter 13 – Self-Test for BUR Roofing Systems

Questions

Test online https://certainteed.com/low-slope-test

1. What is the primary weatherproofing element in a Built-Up Roofing (BUR) system?
   - ☐ a. Fiberglass reinforcement mats
   - ☐ b. Hot asphalt
   - ☐ c. Cap sheet granules
   - ☐ d. Primer coating

2. How many plies are typically used in a BUR system?
   - ☐ a. 1–2
   - ☐ b. 2–3
   - ☐ c. 3–5
   - ☐ d. 6–8

3. What is the minimum asphalt application rate for solid mopping of plies?
   - ☐ a. 15 lbs./100 ft^2
   - ☐ b. 22 lbs./100 ft^2
   - ☐ c. 25 lbs./100 ft^2
   - ☐ d. 30 lbs./100 ft^2

4. Which CertainTeed product can be mechanically attached as a base sheet in a BUR system?
   - ☐ a. Flintglas® Ply 4
   - ☐ b. Glasbase™ Base Sheet
   - ☐ c. Flintglas® MS Cap Sheet
   - ☐ d. CoolStar® Cap Sheet

5. Which of the following is NOT allowed in CertainTeed BUR systems??
   - ☐ a. Hot asphalt application
   - ☐ b. Cold-process adhesives
   - ☐ c. Granule-surfaced cap sheets
   - ☐ d. Mechanical spreader

6. What is the maximum temperature asphalt should never exceed during heating?
   - ☐ a. 425°F
   - ☐ b. 500°F
   - ☐ c. 525°F
   - ☐ d. 550°F

Chapter 14:
Liquid-Applied Coatings

Your objective: To learn how to prepare the roof surface and apply a liquid-applied coating over a new, modified asphalt, low-slope roof system.

Reflective Coatings

Reflective coatings are intended to reflect heat to lower membrane surface temperatures and can be applied to provide a pleasing aesthetic appearance. Common reflective coating chemistries include acrylic, silicone, and aluminum products. Each chemistry and formulation offers benefits and limitations that make it appropriate for different roofing applications based upon climate, roof condition, roof features, and desired performance.

Where can I use liquid-applied coatings?

Most existing low-slope roofs, whether membrane or metal, could be considered a candidate for a full roof restoration with a liquid-applied roof system. The scope of this chapter, however, is the use of liquid-applied coatings as a protective, sacrificial layer for new smooth, asphaltic roof systems or to extend the warranty of a new granulated roof system by 5-years.

Sprayer

What tools do I need for a liquid-applied roof system or coating application?

To properly apply liquid-applied roof systems:

- Safety Equipment
- Protective eyewear
- Appropriate attire, including clothing, shoes, heavy-duty gloves, and hat
- Power washer with minimum 3500 psi and 4 gallons per minute flow.
- Power Mixer: Corded 1/2" drive with jiffy mixer
- Long handled adjustable roller poles
- Double sided roller frames
- 3/4" nap rollers
- Appropriate spray equipment, if spraying
- Scissors
- Chalk line reel
- Mill gauges
- Rags
- Screw Drivers for Opening Pails
- Solvents, such as mineral spirits, for tool clean-up post installation (required for silicone, not acrylic)

NOTE: *Some contractors may prefer to apply a coating with a tank spreader or spray system; a long-handled roller is still a necessary tool to support application and achieve a uniform, specified mil thickness.*

What are the components of a CertainTeed SMARTCOAT Roof Coating System?

CertainTeed SMARTCOAT products are categorized by a numeric series that indicates the type of product by its function in a system.

NOTE: *300 Series mastics and sealants are not included because they would not typically be required when coating a new modified asphalt roof system. Refer to the Master Craftsman Liquid-Applied Roofing Applicator Manual for a comprehensive list of SMARTCOAT products.*

SMARTCOAT PRODUCT	Description	Packaging
100 Roof Wash	Industrial strength roof detergent.	1G 4/carton
200 Asphalt Bleed Blocker	Prevents asphaltic exudate from staining coating	5G
400 High Performance Acrylic Coating	100% acrylic polymers, meets D6083 Type I	5G, 55G, 275G
401 High Solids Acrylic Coating	100% acrylic polymers, workhorse	5G, 55G, 275G
420 Fibered Aluminum Coating	Premium paint-grade leafing aluminum	5G, 55G
450 High Solids Silicone Coating	100% silicone, self-leveling, recoatable	5G, 55G

1. Precautions During Liquid-Applied Coating Installation

SAFETY FIRST!

Please review Chapter 1, Section 1 of this Manual for important safety guidelines prior to installation.

Material Handling and Storage Precautions

Please refer to Chapter 1, Section 2 of this Manual for important general material handling and storage information.

Cold Weather Application Precautions

Please refer to Chapter 1, Section 4 of this Manual for important weather precautions.

2. Installation Overview

Each of the following steps is typically required when applying liquid-applied coatings/surfacing on new asphaltic roof systems, as discussed briefly below and in greater detail in subsequent sections of this Chapter. Additionally, it's helpful to understand that liquid-applied roof coating specifications are offered in wet and/or dry mils, and/or gallons per square. A mil is equal to one-thousandth of an inch or 0.001". As a reference point, a one-dollar bill is 9 mils thick. Further, a gallon of any liquid, applied evenly over 1 square or 100 square feet will yield 16 wet mils

1. Age: New bituminous membranes require exposure to the elements for at least 30 days, followed by power washing.

2. Clean/Roof Wash: (SMARTCOAT 100 Series Products) and power-washing. The coating needs to adhere to the roof surface that it is being applied to. Nothing sticks to dirt, though, so ensure that the existing substrate is completely clean and suitable to receive the roof coating. In some cases, power washing without the addition of SMARTCOAT 100 Roof Wash is sufficient. Follow the specific installation procedures described in Section 4 of this Chapter.

3. Prime/Prepare (Optional as Needed): (SMARTCOAT 200 Series Products) In the case of silicone and acrylic coatings, a bleed blocker prevents latent oils in the asphalt membrane from migrating to the surface of the coating and causing a stained/yellow coloring to occur..

4. Coating: (SMARTCOAT 400 Series Products) SMARTCOAT 400 Series Coatings are direct-bond optimized to deliver excellent bond strength to smooth and granulated asphaltic membranes; a bleed blocker is recommended to prevent staining but is not required for adhesion.

5. Project Completion: To successfully complete the application and obtain a CertainTeed Warranty, see the information described in Chapter 15 of this Manual.

3. Cleaning / Roof Wash / Aging

All existing roofs shall be clean prior to coating. All new roofs must be allowed to age for at least 30 days and be cleaned before applying a liquid roof coating. In all cases, remove all loose materials and debris. SMARTCOAT 100 Roof Wash is a highly versatile industrial cleaner and degreaser intended for application prior to power washing in preparation for application of SMARTCOAT Coatings. This product lifts dirt and grease from the surface of the roof, including small pores and irregularities. On EPDM restorations, SMARTCOAT 100 Roof Wash is required, using two passes. On metal restorations, where surface rust exists, the use of a solvent, such as Xylene, may be necessary to thoroughly clean the rusted surface.

SMARTCOAT 100 is both a safer and more sustainable alternative to toxic cleaners, bleaches, and solvents. The concentrated formula cleans, degreases, and deodorizes without harsh chemicals, and is non-toxic, non-abrasive, non-corrosive, and safe for use on all water-safe washable surfaces.

SMARTCOAT 100 Roof Wash	
Color	Translucent blue
Packaging	1G, Carton of 4
VOC	Compliant with all national, state and district VOC regulations.

Installation of Roof Wash

Dilute the material with water ata 10 parts water to 1 part SMARTCOAT ratio.

- Heavy-duty: Full strength to 1:1 dilution
- General purpose: Up to 1:10 dilution
- Light cleaning: Up to 1:30 dilution

Apply to the roof with a low-pressure Hudson sprayer at the rate of 1 gallon/100 ft^2. Avoid contact with painted surfaces or vinyl siding. Allow wet contact with the roof surface for a minimum of 15 minutes. Agitate roof surface with stiff bristle broom or orbital scrubber.

While still tacky but not dry, rinse the roof surface with clean water and a minimum 2000 psi power washer until no SMARTCOAT 100 residue remains. There are times on very flat roofs where dams need to be created to prevent SMARTCOAT 100 from back-washing onto already rinsed areas of the roof. Use caution to avoid saturating roof. Allow roof to dry completely prior to system installation.

4. Prime / Prepare (Optional, As Needed)

If an adhesion test indicates that a primer is necessary, SMARTCOAT 210 is a highly engineered, single-component, water-based primer designed for application over properly prepared TPO, Concrete, Galvalume, Galvanized Steel, Aluminum, and other common roofing substrates – including difficult to adhere to membranes or surfaces. Areas of the roof with rusted metal, after as much rust has been removed as possible, must be primed with SMARTCOAT 210 Universal Primer. DO NOT apply over silicone. SMARTCOAT 210 is designed to improve adhesion of SMARTCOAT 400 series coatings to the substrate and imparts water-resistant qualities before these coatings are applied.

SMARTCOAT 210 Universal Primer	
Color	Dark Grey
Packaging	5G
Dry Time	2-4 hours
VOC	<50 g/L

Installation of SMARTCOAT 210 Universal Primer

Coverage Rate: 1 - 1.5 gallons/100 ft^2, depending upon surface porosity.

The surface must be sound, clean and dry, and free of moisture both on and beneath the surface before applying primer. Apply only at temperatures between 50°F and 110°F and when there is no threat of rain for 48 - 72 hours. Apply on warm, sunny days, preferably in the morning hours, to provide maximum cure time.

1. Measure/grid roof to assure proper application rates of 210 Universal Primer.
2. Lightly hand mix before using. DO NOT dilute.
3. Using roller, brush, or spray equipment, apply to the properly prepared surface at the stated coverage rate. **DO NOT puddle**. Allow to completely dry, typically 4 - 6 hours prior to the application of SMARTCOAT 400 Series Coating. SMARCOAT 210 is dark gray and glossy when applied; the product will be darker with a matte surface when dry. Once dry, SMARTCOAT 400 Series Coating shall be applied as quickly as possible to avoid compromised adhesion.
4. Clean wet primer with soap and water. Dry primer may be removed with mineral spirits. Use care when handling solvents. All soap residues must be completely removed/rinsed away from tools and substrate prior to coating.

When coating with acrylic or silicone, it is best practice to prepare an existing bituminous roof surface with SMARTCOAT 200 Asphalt Bleed Blocker, a water-based formulation manufactured with premium acrylic resins designed to block bituminous oil exudate or "bleed-through" and staining SMARTCOAT 400 series coatings.

- The use of SMARTCOAT 200 Asphalt Bleed Blocker is recommended under acrylic coatings.
- The use of SMARTCOAT 200 is required under SMARTCOAT 450 silicone coating.
- The use of SMARTCOAT 200 Bleed Blocker is not required for SMARTCOAT 420/421 Aluminum coatings.

Installation of SMARTCOAT 200 Bleed Blocker

Coverage Rate: 1 - 1.5 gallons/100 ft^2, depending upon surface porosity.

Surface must be sound, clean, and dry, and free of moisture both on and beneath the surface before applying primer. Apply only at temperatures between 50°F and 110°F and when there is no threat of rain for 48 - 72 hours. Apply on warm, sunny days, preferably in the morning hours, to provide maximum cure time.

SMARTCOAT 200 Bleed Blocker	
Color	Light Grey
Packaging	5G
Dry Time	4-6 hours
VOC	<50 g/L

1. Measure/grid roof to assure proper application rates of 200 Bleed Blocker.
2. Lightly hand mix before using. DO NOT dilute.
3. Using roller, brush, or spray equipment, apply to the properly prepared surface at the stated coverage rate. **DO NOT puddle.** Allow to completely dry, typically 4 - 6 hours prior to the application of SMARTCOAT 400 Series Coating. SMARCOAT 200 is light gray and glossy when applied; the product will be darker with a matte surface when dry. Once dry, SMARTCOAT 400 Series Coating shall be applied as quickly as possible to avoid compromised adhesion.
4. Clean wet Bleed Blocker with soap and water. Dry Bleed Blocker may be removed with mineral spirits. Use care when handling solvents. All soap residues must be completely removed/rinsed away from tools and substrate prior to coating.

Highly aged, weathered, or brittle asphaltic surfaces may be rejuvenated with SMARTCOAT 220 Asphalt Emulsion prior to coating. SMARTCOAT™ 220 Asphalt Emulsion is a versatile, protective, solvent-free water-based, all-purpose, non-fibered roof and waterproof coating ideal for use as a surface preparation for bituminous built-up or modified-asphalt roofing, metal, and masonry surfaces – and for pipes and tanks above or below ground level. SMARTCOAT 220 is made from asphalt emulsified with bentonite clay and water. It is cold-applied, corrosion-resistant, and non-flammable while wet, and waterproof when dry – while also resisting most corrosive fumes and spray. SMARTCOAT 220 will not run, sag, crack, or "alligator" under the harshest of weather conditions. This product meets or exceeds the requirements of ASTM D1227 Type III, Class 1.

Installation of SMARTCOAT 220 Asphalt Emulsion

Coverage Rate: 3 - 4 gallons/100 ft^2 per coat as a roof sealer; 6 - 8 gallons total for SMARTCOAT roof restoration systems, or as specified.

Precautions: Application over hot-applied asphalt may not prevent alligatoring. This coating is not recommended over gravel, rubber, or PVC sheet roofing, or old roofs that are too dry and brittle or damaged. Apply only at temperatures between 50°F and 110°F rising and when there is no threat of rain or temperatures below 40°F for 48 - 72 hours.

SMARTCOAT 220 Asphalt Emulsion	
Color	Black
Packaging	5G
VOC	<30 g/L

1. Clean roof surface thoroughly; surfaces shall be free from rust, dirt, and all other foreign matter. A better bond will result if the surface is damp when SMARTCOAT 220 is applied, but the surface must be free of standing water. All surfaces must have positive drainage.
2. Apply SMARTCOAT 220 by roofing brush, roller, or spray, evenly covering the surface. Allow to dry completely between coats, typically 6 - 24 hours. In cool, damp weather, drying will be slower, 2 - 7 days. For SMARTCOAT roof restoration systems, embed SMARTFAB 501 Polyester Reinforcement into SMARTCOAT 220 while wet. DO NOT walk on reinforcement before SMARTCOAT 220 is cured to avoid material displacement and or full saturation of the polyester. Ideally, the polyester is partially saturated and remains on the upper surface of the emulsion.
3. Clean wet emulsion with soap and water. Dry emulsion may be removed with mineral spirits. Use care when handling solvents. All soap residues must be completely removed/rinsed away from tools and substrate before coating.

5. Coat

The appropriate coating product should be selected to suit the project conditions and requirements. It can then be installed according to the following:

5A – Acrylic Coatings

SMARTCOAT 400/401 Acrylic Coatings are heavy-bodied, elastomeric roof coatings manufactured with 100% acrylic-based polymers, reflective white pigments, and high-grade biocides. SMARTCOAT 400 Series Acrylic Coatings remain bright white after weathering and deliver extremely high thermal and IR resistance. These products achieve excellent bond strength to most common roof substrates, including metal, single-ply, built-up, and modified bitumen roofs. Conditions on roofs vary greatly, which is why adhesion tests are required to be performed prior to system applications.

- **SMARTCOAT 400 High Performance Acrylic Coating** is formulated to exceed the parameters of ASTM D 6083 Type I, with extremely high elastomeric properties — even in cold temperatures — making it a tough and durable solution to seal roof surfaces in all North American climates.
- **SMARTCOAT 401 High Solids Acrylic Coating** is valued for its solids content relative to coatings typically found in the acrylic category. A high solid formulation results in a thicker membrane after both cure and water evaporation have taken place.

SMARTCOAT 400/401 Acrylic Coatings		
	400	**401**
Color	White, Tan	White, Tan
Packaging	5G, 55G, 275G	5G, 55G, 275G
Maximum VOC	49g/L	< 50g/L
Solar Reflectivity (Initial/Aged)	0.86/0.69	0.83/0.80
Thermal Emissivity (Initial/Aged)	0.88/0.91	0.90/0.90
Tack Free	4-8 hours	4-8 hours
Full Cure	24-48 hours	24-48 hours
Solids by Volume	51%	54% +/-2%

Instalation of Acrylic Coatings

Coverage Rate: 1.5 gallons/100 ft^2, minimum 3 gallons/100 ft^2 in two coat.

Surface must be free of contamination that may inhibit adhesion. Surface must be sound, clean, and dry, and free of moisture both on and beneath the surface prior to applying coating.

Apply only at temperatures between 50°F and 110°F and when there is no threat of rain for 48 - 72 hours. Apply on warm, sunny days, preferably in the morning hours, to provide maximum cure time. DO NOT APPLY to flat surfaces with poor drainage or where ponding water will exist. SMARTCOAT 400 Series Acrylic Coatings are not recommended for use over gravel, walking decks, or old roofs that are too brittle and dry.

1. Measure/grid roof to assure proper application rates of coating.
2. Mechanically mix COATING before using.
3. Apply SMARTCOAT 400/401 with a heavy-duty roller, squeegee, tank spreader, or suitable spray equipment at the minimum stated coverage rate, or in accordance with SMARTCOAT specification.
4. The specified application rate per coat is the maximum recommended; CertainTeed permits the application of additional coats at thinner-than-specified application rate, assuming the total specified dry mil thickness is achieved. Applying thinner coats may help to accelerate the cure times between coats.
5. On roofs with greater than 3″:12″ slope or on vertical surfaces, it is not recommended to apply more than 1 gallon/100 ft^2 in a single coat to avoid material sagging. It is difficult to achieve much more than 1/2 - 2/3 gallon/100 ft^2 without running or sagging on vertical surfaces. Please refer to the equipment manufacturer's specifications for selection and use of spray equipment.
6. Average cure time per coat is 4 hours minimum, and can be up to 48 hours, depending upon environmental conditions/ time of year. Use the thumb test to determine if a coat is cured before applying a second coat: apply pressure with thumb perpendicular to roof and twist. If thumb leaves an imprint, coat is not cured.
7. Clean tools with mineral spirits or paint thinner if coating has dried, or with warm and soapy water if coating is still wet.

5B – High Solids Silicone Coating

SMARTCOAT 450 High Solids Silicone Coating is a 100% silicone-based, solvent-free, single-part roof coating. SMARTCOAT 450 creates a membrane that is vapor permeable, adaptive to temperature extremes, UV-resistant, watertight, and weatherproof. This product exhibits outstanding ponded water resistance for direct bond over architectural surfaces such as low-sloped or flat roofing systems, vertical walls, masonry, granulated BUR/Modified Bitumen, granulated APP, concrete, metal, single-ply membranes, and spray polyurethane foam (SPF) systems. While not in scope for this manual, the product may be used to re-coat existing silicone roof coatings and existing acrylic roof coatings. SMARTCOAT 450 meets or exceeds ASTM D 6694.

Installation of High Solids Silicone Coating

Coverage Rate: 1.5 - 2.5 gallons/100 ft^2, specification and warranty duration dependent.

Surface must be free of contamination that may inhibit adhesion. Surface must be clean and dry, and free of moisture both on and beneath the surface prior to applying coating. Apply only at temperatures between 40˚F and 110˚F and no threat of rain during application window or within one hour after application has ended. SMARTCOAT 450 High Solids Silicone Coating can be applied over properly prepared surfaces that exhibit ponded water; however, the National Roofing Contractors Association (NRCA) considers ponding water an undesirable, nonstandard roofing practice and recommends that all roof systems be designed and built to ensure positive drainage. (See the NRCA Roofing and Waterproofing Manual).

SMARTCOAT 450 High Solids Coating	
Color	White, Light Grey, Dark Grey, Santa Fe Tan, Black
Packaging	5G, 55G
Maximum VOC	50g/L
Solar Reflectivity (Initial/Aged)	0.88/0.80
Thermal Emissivity (Initial/Aged)	0.90/0.90
Tack Free	Less than 8 hours (RH dependent)
Full Cure	8-72 hours
Solids by Volume	>95%
Shelf Life	18 months (unopened containers, stored between 35°-75°F)

SMARTCOAT 450 High Solids Silicone is slippery when wet. Granulate the coated surface, as described below, to define walkways and or create a non-slip surface is required where fall hazards exist, such as – but not limited to – open roof edges, roof hatches, or leading to and around rooftop equipment.

1. Measure/grid roof to assure proper application rates of coating.
2. Mechanically mix COATING before using. Avoid entraining air when mixing. DO NOT thin product with solvent or other solutions. Open and partially full containers will skin over quickly. If this occurs, remove the skin and continue using the remaining product.
3. Apply with a heavy-duty roller, squeegee, tank spreader, or suitable spray equipment at a rate of 1.5 gallons/100 ft^2. in a single pass or application.
4. On roofs with greater than 3″:12″ slope or on vertical surfaces, it is not recommended to apply more than 1 gallon/100 ft^2 in a single coat to avoid material sagging.
5. Please refer to the equipment manufacturer's specifications for selection and use of spray equipment.
6. Use two applicators rolling at 90˚angles for best results. The first applicator should distribute the material, and the second should ensure complete and even coverage.
7. Material is fast drying. DO NOT distribute excessive amounts onto the roof prior to rolling. DO NOT over roll while drying, or a textured finish will result.
8. When spraying, use a multi-pass technique for even coverage. Protect unintended surfaces from overspray on roof, building, and surrounding ground areas, including vehicles.
9. If granulating the roof surface, apply SMARTCOAT 450 in two passes, utilizing contrasting colors for the first and second pass, immediately broadcast #11 ceramic granules to completely saturate the surface to refusal/rejection/saturation on top of the second pass. The second pass should be approximately 1 gallon per square to ensure bonding of granules. Granulation of the surface also makes the system stronger, and helps to wick off water more quickly, discourage birds from landing on the roof, and hide dirt while maintaining an aesthetically appealing, monolithic roof.
10. SMARTCOAT 450 will be dry to touch in 2 - 8 hours, with a completely cured and walkable surface in approximately 72 hours. SMARTCOAT 450 cures through absorption of moisture from both the substrate and the air. Cure time will be faster in humid conditions and on substrates that hold moisture, such as concrete.
11. Clean tools with mineral spirits or paint thinner. Use disposable tools whenever possible when applying silicone materials.

5C – Fibered/Non-Fibered Aluminum Coatings

SMARTCOAT 420 Fibered Aluminum Coating is a heavy-duty, fibered aluminum coating that provides maximum reflectivity while offering unsurpassed protection against moisture and corrosion. Our unique formulation forms a heavy and brilliant silvery finish that preserves, prevents rust, inhibits fungus, and reflects more than 70% of the sun's damaging rays while reducing interior temperatures. Our use of paint-grade aluminum pigment (as opposed to the coarser, less leafing "roofing" grade) results in a much finer leafing effect and a vastly superior coating to many other brands. Our use of naturally occurring bituminous resins fortifies the asphalt with unparalleled strength to give it greater resistance to the damaging effects of the elements. SMARTCOAT 420 Fibered Aluminum Coating meets or exceeds all the requirements of ASTM D 2824-06 Type III and Federal Specification TTC 1079.

SMARTCOAT 420 Fibered Aluminum Coatings	
Color	Silver
Packaging	5G
Maximum VOC	500g/L
Dry Time	1-2 hours

Installation of Fibered Aluminum Coating

Coverage Rate: 1 - 1.5 gallons/100 ft^2, surface porosity dependent.

Surface must be free of any contamination that may inhibit adhesion. Surface must be clean and dry, and free of moisture both on and beneath the surface before coating. Apply at temperatures between 50°F and 110°F rising and when there is no threat of rain for 24 hours, ideally on warm, sunny days and preferably in the morning hours to provide maximum cure time.

1. Mechanically mix COATING before using. Stir thoroughly before and during application.
2. Apply with a soft-bristle brush, paint roller, or heavy-duty spray equipment at stated coverage rate. Avoid over-application. DO NOT work coating excessively during application. Attempt to brush or roll on in one direction.
3. Clean tools with mineral spirits or paint thinner.

6. Project Completion for Liquid-Applied Roof Systems

Follow the procedures for closing out the project successfully and applying for a warranty, as outlined in Chapter 15 of this Manual.

Chapter 14 – Self-Test for Liquid-Applied Roofing

Questions

Test online https://certainteed.com/low-slope-test

1. Why must a new asphaltic roof membrane "age" before the application of an acrylic or silicone coating?
   - ☐ a. To reduce asphalt odor prior to coating
   - ☐ b. To allow asphaltic oils to migrate and stabilize, improving coating adhesion
   - ☐ c. To allow trapped moisture to escape from below the insulation
   - ☐ d. To prevent premature curing of the coating due to membrane heat

2. Which SMARTCOAT product is used to prevent asphalt bleed-through when coating a smooth new modified bitumen cap sheet?
   - ☐ a. SMARTCOAT 210 Universal Primer
   - ☐ b. SMARTCOAT 220 Asphalt Emulsion
   - ☐ c. SMARTCOAT 200 Asphalt Bleed Blocker
   - ☐ d. SMARTCOAT 400 High Performance Acrylic

3. When applying a liquid-applied coating to a new SBS- or APP-modified bitumen membrane, which substrate condition most strongly determines whether a bleed blocker is required?
   - ☐ a. Color of the membrane
   - ☐ b. Smooth-surfaced sheets where asphaltic oils can migrate upward
   - ☐ c. Bleed Blocker is required over all asphaltic membranes when receiving a silicone coating.
   - ☐ d. Whether the membrane incorporates CoolStar granules

4. Prior to coating a new asphaltic roof system, which cleaning method aligns with CertainTeed's required preparation standards?
   - ☐ a. Dry sweeping followed by solvent wiping
   - ☐ b. Power washing using SMARTCOAT 100 Roof Wash, then rinsing to a clean, dirt-free surface
   - ☐ c. Scrubbing with a steel brush to expose fresh asphalt
   - ☐ d. Rinsing with water only, no detergent permitted

5. What is the primary function of SMARTCOAT 400/401 Acrylic Coatings when applied over new asphaltic roof systems?
   - ☐ a. To waterproof and serve as the primary membrane
   - ☐ b. To provide UV and weather protection, reducing membrane temperature and extending service life
   - ☐ c. To act as a vapor retarder
   - ☐ d. To bond insulation boards to the roof deck

6. SMARTCOAT 450 High Solids Silicone is commonly applied in a single coat over new asphaltic roof systems. What is the typical coverage rate required to achieve the minimum dry film thickness for warranty compliance?
   - ☐ a. 1 gallon per 200 sq. ft.
   - ☐ b. 1.5 gallons per 100 sq. ft.
   - ☐ c. 2 gallons per 100 sq. ft.
   - ☐ d. 3 gallons per 50 sq. ft.

PART 4

Completion

Chapter 15:
Project Closeout

Your objective: To learn CertainTeed's procedures for successfully closing out a project and applying for warranty coverage for the building owner.

Procedures at Project Completion

After following the application instructions for any of the roofing work and systems described in this Manual, there is a final set of procedures that need to be followed to successfully close out a project. The important purpose of these procedures includes multiple aspects, as follows:

- Maintain the integrity of the roofing system just installed
- Avoid call-backs from facility owners or managers
- Ensure that the appropriate warranty is filed and in place
  - NDL warranties must be applied for a minimum of 5 days prior to project start (not project completion); contact CertainTeed® Commercial Technical Services for details
- Transfer responsibility for roofing maintenance to the property owner or manager

Where does this apply?

Project closeout procedures as described in this Chapter apply to ALL CertainTeed roofing systems. This is true regardless of application type, project size, or warranty duration.

What tools do I need for project closeout?

The tools for this part of the project are administrative in nature rather than physical. They include:

- Warranty forms and applications
- Maintenance information to transfer to owner/manager
- Payment for any outstanding warranty fees

What are the steps of the project closeout process?

Five primary steps must be addressed at the end of the project:

1. Final Inspection(s)
2. Punch List Completion/Final Repairs (as needed)
3. Final Cleaning
4. Warranty Application Review and Update
5. Maintenance Information Transfer

Each of these are discussed in more detail in the following sections.

1. Final Inspection

Once the roofing contractor has performed a final review of the completed roof system, a CertainTeed representative can conduct a final inspection for an NDL warranted roof, including, but not limited to:

- Walk the entire roof and look for any irregularities or inconsistencies in the work.
- Check all visible laps for any signs of unbonded areas (a trowel or seam probe can be used for this purpose).
- If applicable, check all flood-coated or gravel surfaces for uniformity and consistency.
- Check all flashing details to ensure they are secure and watertight.
- Check all other details, joints, penetrations, or changes in roof conditions for watertightness.

In the event that any deficiencies are discovered on an NDL warranted roof, CertainTeed will issue a Pre-Warranty Punch List of corrections and final repairs required to be made prior to the issuance of the warranty..

2. Pre-Warranty Punch List Guidelines

Should any corrections or repairs need to be made to a roof system prior to warranty issuance, the nature of any repairs will be directly related to the type of roof system installed:

- **Liquid Flashing:** CertainTeed SmartFlash® One may be used on any CertainTeed modified bitumen or BUR roof membrane for repairs or flashings.
- ***NOTE:*** **Asphaltic membrane repairs:** *DO NOT mix SBS and APP membranes – use only the same products for repair as were installed in the roofing system; please refer to installation procedures as described in preceding chapters.*
- ***NOTE:*** *DO NOT use hot asphalt for repairs of cold-applied modified bitumen roofing systems.*
- **SMARTCOAT Repairs:** DO NOT repair silicone-based systems with an acrylic products; silicone may be utilized to repair acrylic.

The contractor notifies CertainTeed once all deficiencies included on the Punch List have been addressed. CertainTeed may conduct a final site visit to confirm completion prior to warranty issuance.

3. Final Cleaning

After the roof has been inspected and any repairs completed, steps should be taken to leave the entire roof and premises clean and free of any debris.

- Remove all excess roofing products, including cut pieces of roll goods, pails or cans of primer, adhesives, flashing, etc.
- Remove all tools.
- Remove any equipment, including asphalt kettles, propane torches, etc.
- Walk the entire roof and pick up (or sweep where practical) any debris, discarded fasteners, pieces of wrappings, etc.
- Walk the work area of the roof where materials and or equipment may have been stored or used, and perform all of the above steps in those locations as well.
- ***NOTE:*** *Remove all equipment related to safety last.*

4. Warranty Issuance

For NDL warranted roofs: Upon receipt of Warranty Fees, completion of Final Inspection and Punch List, if applicable, CertainTeed Commercial Roofing Technical Services Department will issue the project Warranty to the roofing contractor.

Please familiarize yourself with CertainTeed Low-Slope Limited Warranties, Procedures and Fees in Appendix 2.

5. Maintenance Information Transfer

All roofs require maintenance. It is incumbent upon the roofing contractor to provide the building owner with the following roof system information to support future maintenance as needed:

- Copy of the project Warranty
- Copies of product information from CertainTeed
- Copy of the roofing specification
- Copy of the roof drawings
- Copy of CertainTeed Commercial Roof Maintenance Program paperwork that is issued with all NDL Limited Warranties, please refer to the Appendix Maintenance Program forms

Chapter 15 – Self-Test for Project Completion

Questions

Test online https://certainteed.com/low-slope-test

1. What is the primary objective of project closeout?
   - ☐ a. To prepare for the next project
   - ☐ b. To ensure proper installation of flashing
   - ☐ c. To successfully close out a project and apply for warranty coverage
   - ☐ d. To remove all roofing materials from the site

2. Which of the following is the FIRST step in the project closeout process?
   - ☐ a. Final Cleaning
   - ☐ b. Punch List Completion
   - ☐ c. Final Inspection
   - ☐ d. Warranty Application Review

3. When must NDL warranties be applied for?
   - ☐ a. After project completion
   - ☐ b. At least 5 days prior to project start
   - ☐ c. During final inspection
   - ☐ d. After warranty fees are paid

4. What is the purpose of the Pre-Warranty Punch List
   - ☐ a. To schedule future maintenance
   - ☐ b. To list corrections and repairs required before warranty issuance
   - ☐ c. To confirm payment of warranty fees
   - ☐ d. To document roof drawings

5. What information must the roofing contractor provide to the building owner for future maintenance?
   - ☐ a. Copy of the project warranty
   - ☐ b. Copies of product information
   - ☐ c. Roof drawings and specifications
   - ☐ d. All of the above

Appendix 1
Construction Details

Use of Construction Details

This Construction Details Appendix has been assembled to provide technical information regarding the installation and design of quality low-slope membrane roofing and flashing details.

Contractors and designers should be aware that these details may need to be modified to suit the specific flashing conditions on any given roofing project. The design of the actual details for any project is the responsibility of the project designer.

Some design details, criteria, and application techniques may vary based upon climatic conditions, and each geographical area may utilize "area practices" that are sound and time proven.

CertainTeed® recommends that any roof assembly be designed only after a number of criteria have been carefully considered, including:

- Building and roof life expectancy
- Type of roof deck
- Code requirements
- Climate
- Exterior and interior temperature and humidity conditions
- Slope and drainage
- Thermal requirements
- Fire, wind, and impact resistance

Criteria like these play an important role in the ultimate success or failure of every roof assembly. They should be considered by the designer to determine the applicable specification, correct components of the roof assembly, and construction details to be used.

NOTE: *Published Construction Details in this manual are intended for guidance only.*

NRCA, WSRCA, and MRCA construction details also meet CertainTeed warranty requirements.

Related Reference Literature

In addition to the construction details provided here, the following reference publications are available from CertainTeed to address specific project needs.

- CertainTeed FlintBoard® Polyisocyanurate Roof Insulation Products Fastening Guide
- CertainTeed Flashing Specifications
- Product Selection Guide - CertainTeed Low-Slope Roofing

Construction Details

Based on all of the aforementioned, the following Construction Details are listed below and provided on the subsequent pages of this Appendix for reference and use.

CT-01 Edge Flashing

CT-01A Edge Flashing - Alternate

CT-01B Edge Flashing - Gutter

CT-02 Edge Flashing - BUR, Gravel Stop

CT-03 Curb Flashing

CT-04 Curb Equipment Flashing

CT-05 Wood Area Divider Flashing

CT-06 Base Flashing and Wall Covering on Wood Parapet Wall

CT-06A Base Flashing and Wall Covering on Concrete/Masonry Parapet Wall

CT-07 Base Flashing on Concrete/Masonry Wall with Metal Counterflashing

CT-08 Base Flashing and Wall Covering on Steel or Stucco Wall with "Z" Bar

CT-09 Base Flashing on Parapet Wall, Inside Corner

CT-10 Base Flashing on Parapet Wall, Outside Corner

CT-11 Through-Wall Scupper Flashing

CT-12 Drain Flashing

CT-13 Pipe Flashing - Lead or Sheet Metal

CT-13A Pipe Flashing - Lead or Sheet Metal - Surface Mounted (Retrofit)

CT-14 Pipe Flashing - Lead or Sheet Metal - BUR Only

CT-15 Penetration Pan (Pitch Pan) Flashing

CT-16 Multi-Piping through Roof Deck Flashing

CT-17 Mechanical Equipment Stand Flashing

CT-18 Pipe Roller Support Flashing

CT-19 Low Profile Flexible Expansion Joint Flashing

CT-19A Raised Flexible Expansion Joint Flashing

CT-19B Roof to Wall Expansion Joint Flashing

CT-20 Roof Vent Flashing

CT-21 Seismic Strap Flashing

CT-22 End Lap Detail

CT-23 Steep to Low-Slope Roof Transition Flashing

CT-24 Mansard Roof Transition Flashing

CT-25 Termination Bar Flashing

CT-26 Hot Pipe Flashing

CT-27 Structural Member Thru Roof Deck Flashing

CT-28 Lightning Terminal Flashing

CT-29 Back Nailing - Insulated or Non-Nailable Substrates

CT-29A Back Nailing - Nailable Substrates

CT-30 Vapor Retarder

CT-30A Vapor Retarder - Alternate

CTL-SF-00 Three Course Flashing, SmartFlash ONE

CTL-SF-00A Five Course Flashing, SmartFlash ONE

CTL-SF-01 Curb Equipment Flashing, SmartFlash ONE

CTL-SF-02 Wood Area Divider Flashing, SmartFlash ONE

CTL-SF-03 Base Flashing and Wall Covering on Parapet Wall, SmartFlash ONE

CTL-SF-04A Through-wall Scupper Flashing, SmartFlash ONE

CTL-SF-05 Drain Flashing, SmartFlash ONE

CTL-SF-06 Pipe Flashing, SmartFlash ONE

CTL-SF-07 Multi-Piping Through Roof Deck Flashing, SmartFlash ONE

CTL-SF-08 Mechanical Equipment Stand, SmartFlash ONE

CTL-SF-09 Hot Pipe Flashing, SmartFlash ONE

CTL-SF-10 Structural Member Thru Roof Deck, SmartFlash ONE

CTL-SF-11 Low Profile Expansion Joint Flashing, SmartFlash ONE

CTL-SF-12 Raised Door Sill Flashing, SmartFlash ONE

CTL-SF-13 Lighting Terminal

CTL-SF-15 Seam/Surface Split or Puncture, SmartFlash ONE

CT-01 Edge Flashing

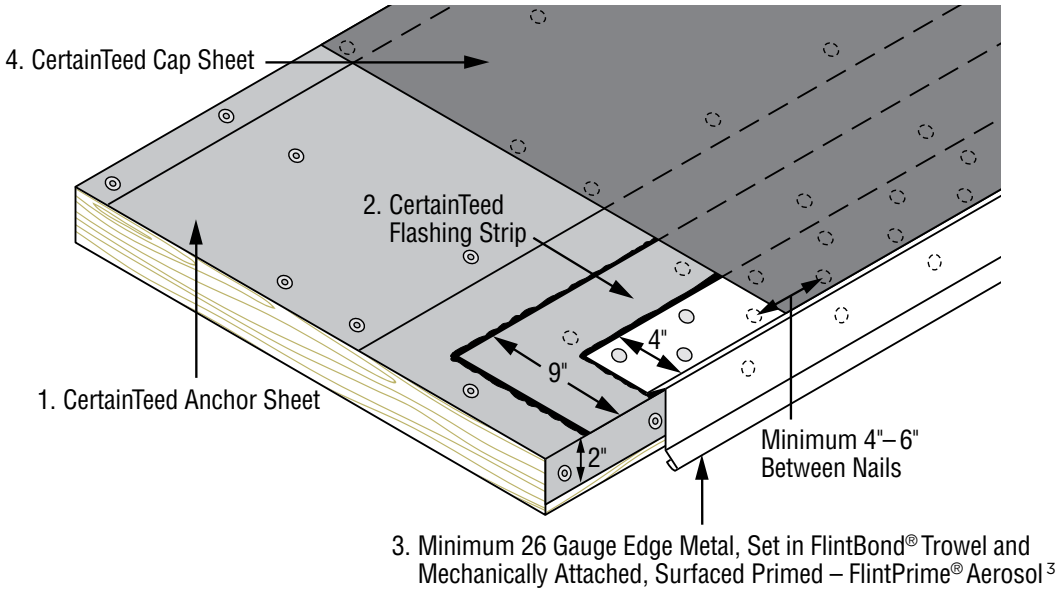
Anchor Sheet
Attach with appropriate fasteners spaced a minimum 9″ o.c. in the laps with two additional rows spaced 18″ o.c. in the field, staggered OR as required by code.

Fasten starting fasteners 6″ in from the edge of the roof to avoid edge metal fastener overlap.

Flashing Strip
Fully adhere (self-adhered, torch, cold process or hot asphalt). **If self-adhered** apply FlintBond® Caulk to edge; **If torch-welded** ensure 1/4″ bleed out at edge; **If using cold process** set in FlintBond Trowel with 1/4″ bleed out at edge; **if using hot asphalt** ensure 1/4″ bleed out at edge.

Edge Metal
Mechanically attach a minimum two staggered rows, 6″ o.c. or as required by building code; endlaps should receive two nails. Edge Metal shall have a minimum 3/4″ rise for gravel surfaced membranes and a 3/8″ rise for smooth or mineral surfaced membranes. Prime surface with FlintPrime Aerosol.[3]

Cap Sheet
Fully adhere (self-adhered, torch, cold process or hot asphalt). **If self-adhered,** in cold weather[1] where Flintlastic® SA Cap (FR) Sheet overlaps Edge Metal surface, affix Arctic Edge Cold Lap Tape[2] to top surface of Metal prior to installing the Cap. Finish with a bead of FlintBond Caulk at edge, kept in a warm location when not in use.



NOT DRAWN TO SCALE

[1] 35°F–49°F (2°C–9°C)

[2] Please refer to Arctic Edge Applicator Guide for comprehensive installation instructions.

[3] Not required in cold weather conditions when Arctic Edge is used.

Scan to View Detail Installation

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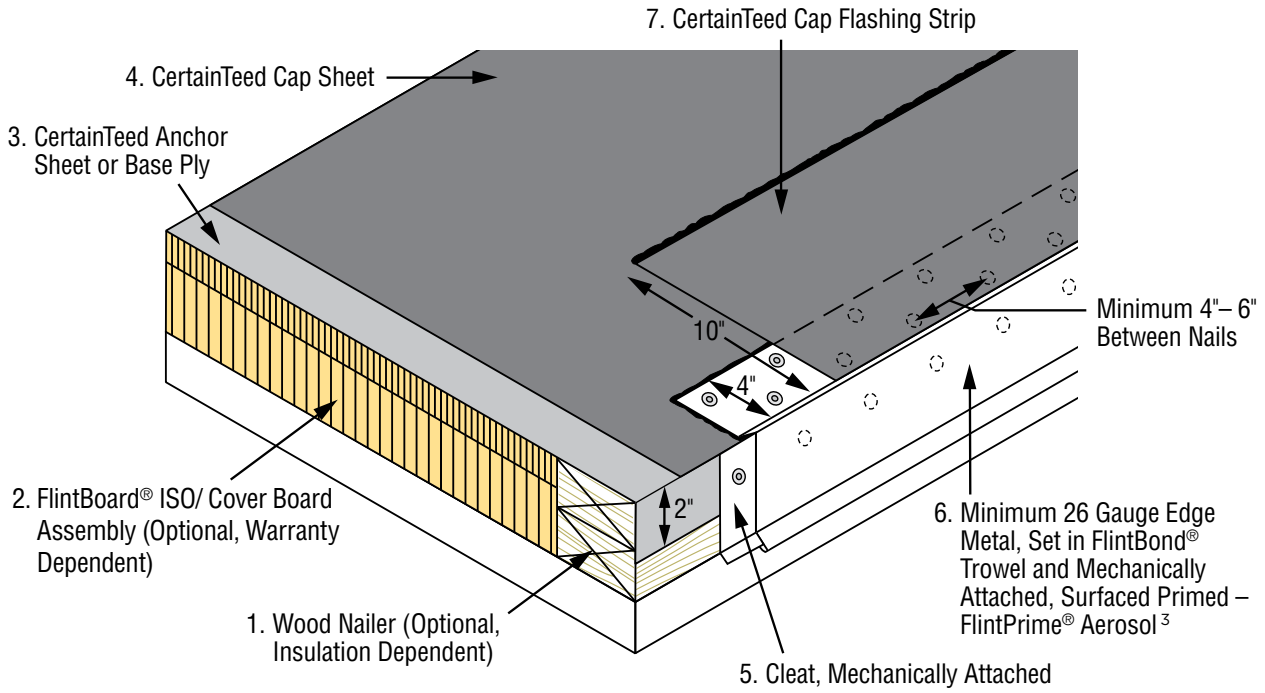
CT-01A Edge Flashing - Alternate

Anchor Sheet or Base Ply
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt) Proper attachment is defined by specified system, product selection and deck type.

Edge Metal
Mechanically attach a minimum two staggered rows, 6" o.c. or as required by building code; endlaps should receive two nails. Edge Metal shall have a minimum 3/4" rise for gravel surfaced membranes and a 3/8" rise for smooth or mineral surfaced membranes. Prime surface with FlintPrime Aerosol.[3]

Cap Sheet
Fully adhere in accordance with the approved, published product application method.

Cap Sheet Flashing Strip
Treat the granulated surface of Cap Sheet where granule overlap occurs: **If self-adhered or cold process** apply FlintBond® Trowel to entire lapped surface or (in cold weather[1]) hot air weld[2] with bead of FlintBond Caulk at edge; **If torch-welded** heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4" bleed out; **if using hot asphalt** ensure 1/4" bleed out.



NOT DRAWN TO SCALE

[1] 20°F – 49°F (-6°C – 9°C)

[2] Apply heat from a hot-air welder with a 2" tip to the overlapped granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 900°F-1,100°F (setting 8-10), apply heat to the overlap interface while bonding Cap with rolling pressure on the granulated surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. Apply a bead of FlintBond Caulk along the edge. Continue overlap application, 2" per pass.

[3] Arctic Edge Cold Lap Tape may be utilized in lieu of FlintPrime Aerosol when ambient temperatures are 35°F – 49°F (2°C – 9°C). Please refer to Arctic Edge Applicator Guide for comprehensive installation instructions.

Rev 04/26

CT-01B Edge Flashing - Gutter

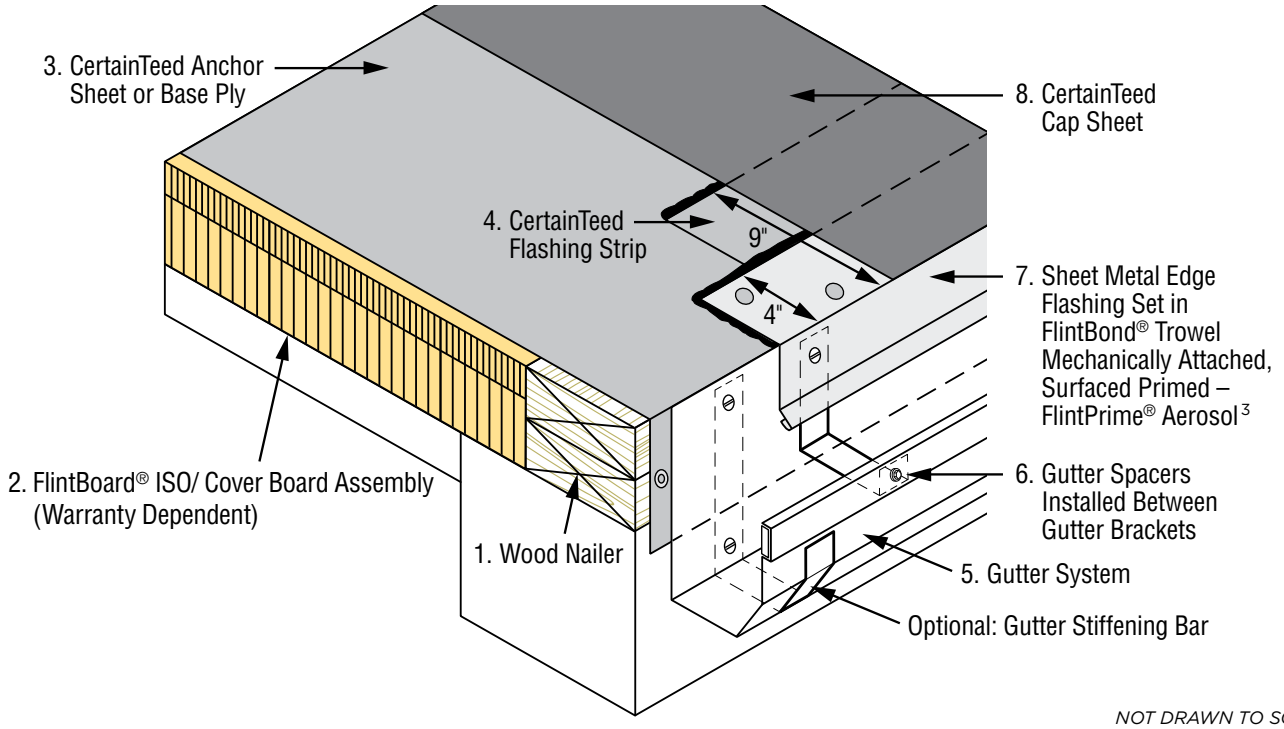
Anchor Sheet or Base Ply, Field
Mechanically attach or Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment of the base layer is defined by specified system, product selection and deck type. Ensure base sheet is extended below wood nailer blocking.

Flashing Strip
Fully adhere (self-adhered, torch, cold process or hot asphalt). **If self-adhered** apply FlintBond® Caulk to edge; **If torch-welded** ensure 1/4″ bleed out at edge; **If using cold process** set in FlintBond Trowel with 1/4″ bleed out at edge; **if using hot asphalt** ensure 1/4″ bleed out at edge.

Gutter System
Refer to the Architectural Metal Flashing section of the NRCA Roofing Manual for securement options.

Edge Metal
Set in FlintBond Trowel. Mechanically attach a minimum two staggered rows, 6″ o.c. or as required by building code; endlaps should receive two nails. Prime surface with FlintPrime Aerosol.[3]

Cap Sheet
Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by product selection. **If self-adhered,** in cold weather[1] where Flintlastic® SA Cap (FR) Sheet overlaps Edge Metal surface, affix Arctic Edge Cold Lap Tape[2] to top surface of Metal prior to installing the Cap. Finish with a bead of FlintBond Caulk at edge, kept in a warm location when not in use.



NOT DRAWN TO SCALE

[1] 35°F – 49°F (2°C – 9°C)

[2] Please refer to Arctic Edge Applicator Guide for comprehensive installation instructions.

[3] Not required in cold weather conditions when Arctic Edge is used.

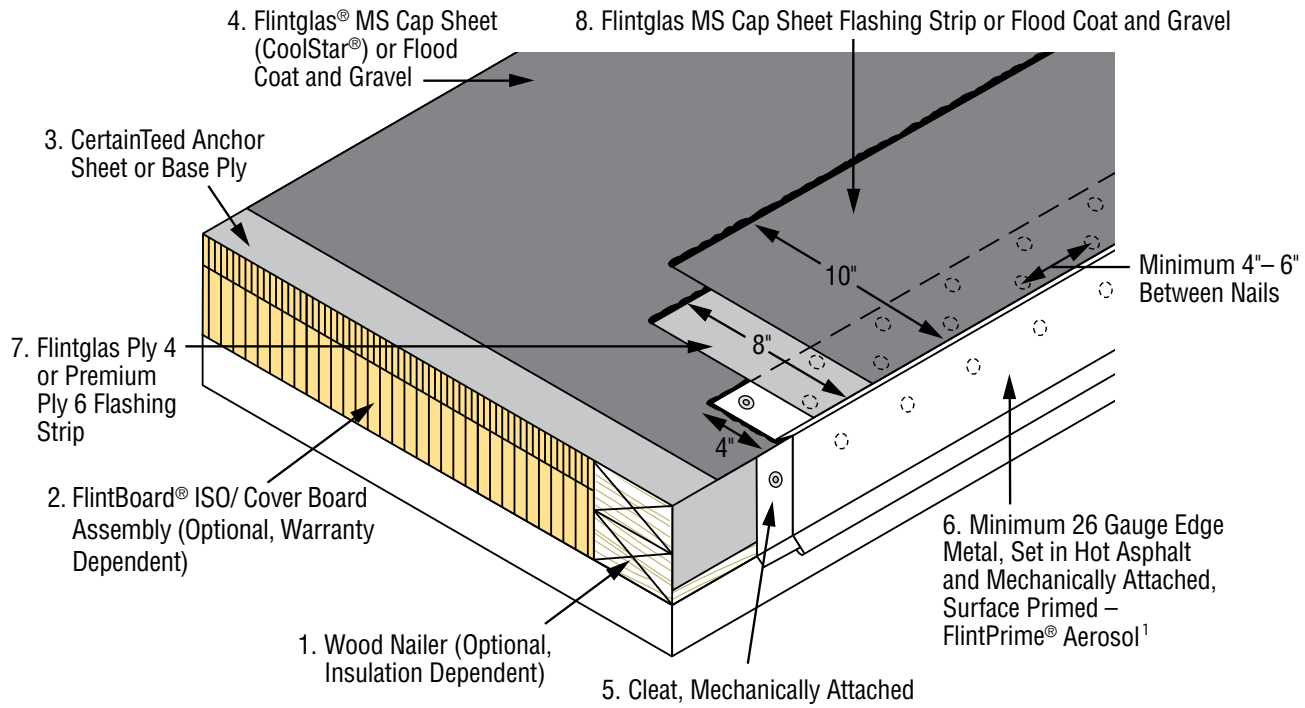
Rev 04/26

CT-02 Edge Flashing - BUR, Gravel Stop

Anchor Sheet or Base Ply
Mechanically attach or fully adhere (self-adhered, torch, or hot asphalt). Proper attachment of the base layer is defined by specified system, product selection and deck type.

Edge Metal
Mechanically attach a minimum two staggered rows, 6" o.c. or as required by building code; endlaps should receive two nails. Edge Metal shall have a minimum 3/4" rise for gravel surfaced membranes and a 3/8" rise for smooth or mineral surfaced membranes. Prime surface with FlintPrime Aerosol.[1]

Flashing Strips
Apply with hot asphalt and ensure 1/4" bleed out.



NOT DRAWN TO SCALE

[1] Arctic Edge Cold Lap Tape may be utilized in lieu of FlintPrime Aerosol when ambient temperatures are 35°F–49°F (2°C–9°C). Please refer to Arctic Edge Applicator Guide for comprehensive installation instructions.

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CT-03 Curb Flashing

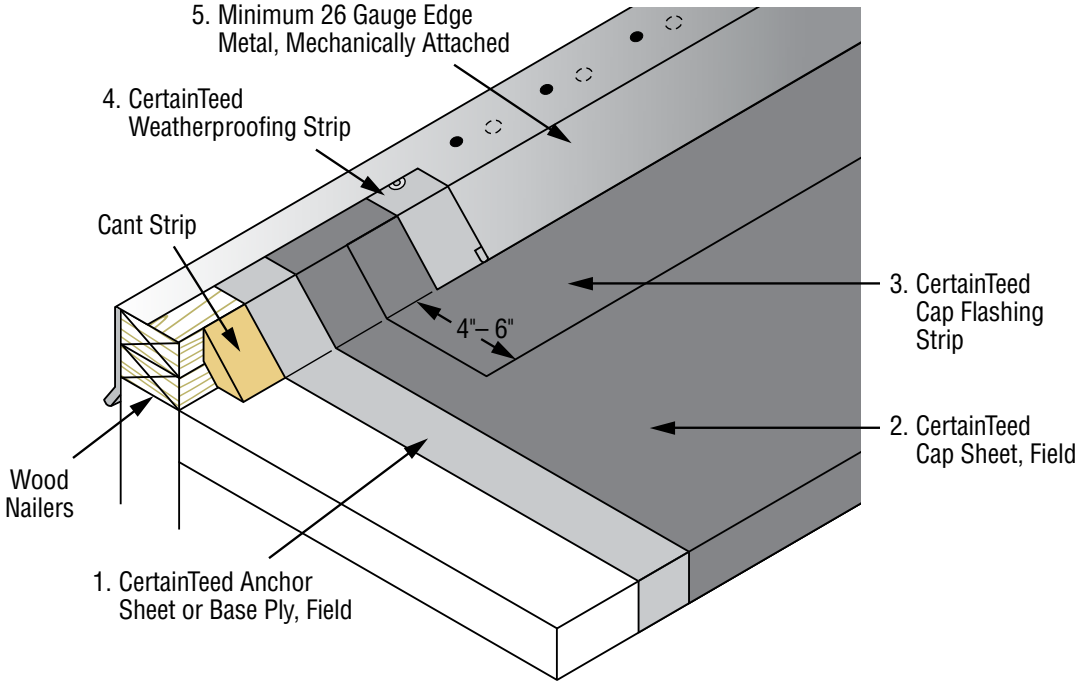
Anchor Sheet or Base Ply, Field
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment of the base layer is defined by specified system, product selection and deck type.

Cap Sheet, Field
Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by product selection.

Cap Sheet Flashing Strip
Treat the granulated surface of Cap Sheet, Field, where the Flashing Strip overlap occurs: **If self-adhered or using cold process** apply FlintBond® Trowel to entire lapped surface with 1/4″ bleed out or (in cold weather[1]) hot air weld[2] with bead of FlintBond Caulk at edge; **If torch-welded (cap only[3])** heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4″ bleed out; **if using hot asphalt** apply to entire lapped surface with 1/4″ bleed out.

Weatherproofing Strip
Self-adhere WinterGuard® Metal, WinterGuard® HT or Flintlastic® PlyBase/MidPly and mechanically attach top edge according to building code.

Edge Metal
Mechanically attach as required by building code; space fasteners so as not to overlap weatherproofing fasteners.



NOT DRAWN TO SCALE

[1] 20°F – 49°F (-6°C – 9°C)

[2] Apply heat from a hot-air welder with a 2″ tip to the overlapped granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 900°F-1,100°F (setting 8-10), apply heat to the overlap interface while bonding Cap with rolling pressure on the granulated surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. Apply a bead of FlintBond Caulk along the edge. Continue overlap application, 2″ per pass.

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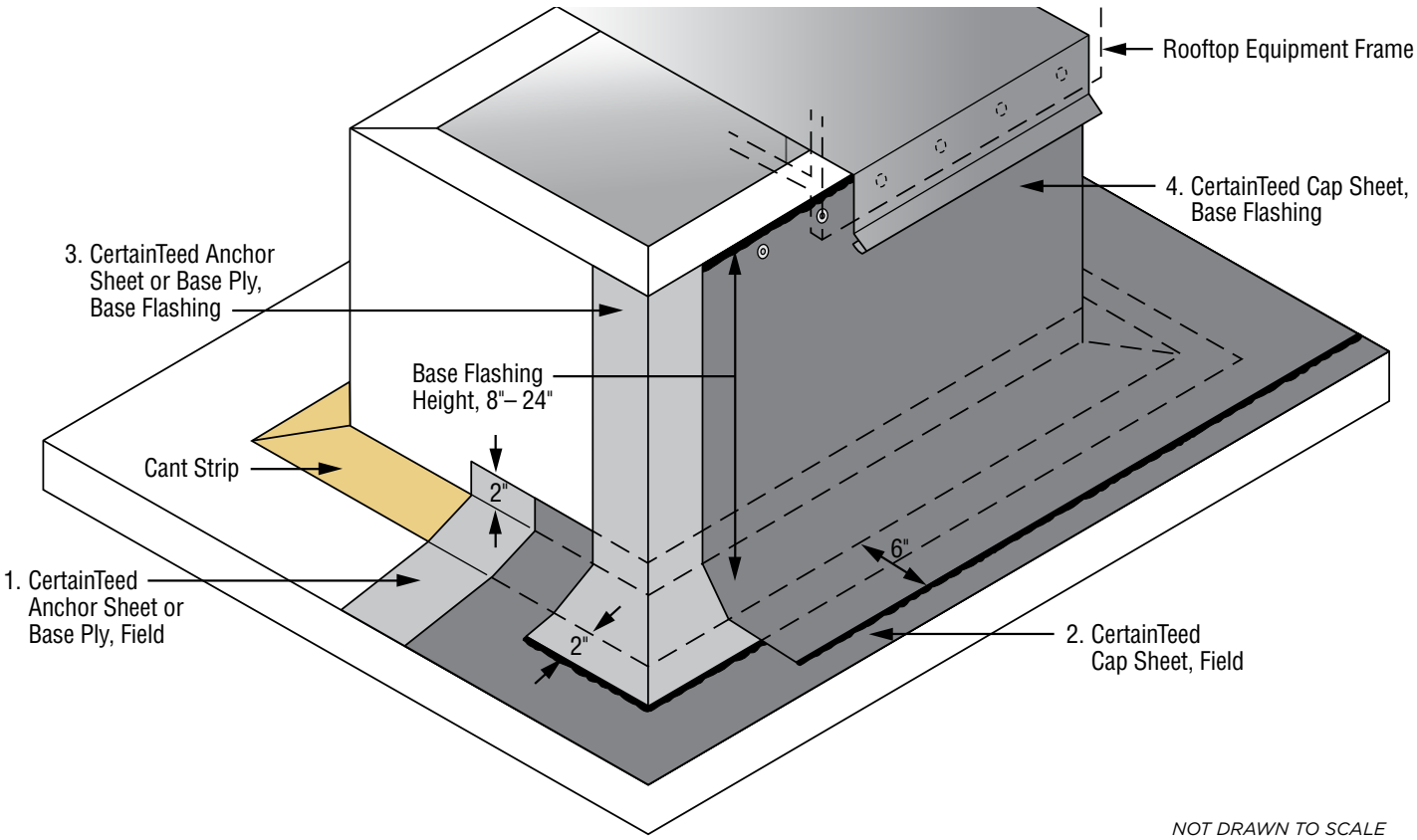
CT-04 Curb Equipment Flashing

Anchor Sheet or Base Ply, Field
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment of the base layer is defined by specified system, product selection and deck type.

Cap Sheet, Field
Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by product selection. Extend base ply and cap sheet 2″ above cant strip; adhere to cant strip only.

Base Flashing
VERTICAL ATTACHMENT: Mechanically attach Anchor 12″ o.c. or self-adhere Base Ply; Fully adhere Cap (self-adhered, torch-weld, cold process or hot asphalt; Gang fasten Base and Cap at top edge 9″ o.c. with tin discs; Ensure 1.4″ bleed out on top edge or apply FlintBond® Caulk.

FIELD ATTACHMENT: Treat the granulated surface of Cap Sheet, Field, where the Base Flashing overlap occurs: **If self-adhered or using cold process** apply FlintBond Trowel to entire lapped surface with 1/4″ bleed out or (in cold weather[1]) hot air weld[2] with bead of FlintBond Caulk at edge; **If torch-welded** heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4″ bleed out; **if using hot asphalt** apply to entire lapped surface with 1/4″ bleed out.



NOT DRAWN TO SCALE

Premium Application
Add a CertainTeed Modified Bitumen Base Ply behind the Cap Sheet, Counterflashing. Extend it a minimum of 4″ out onto the Cap Sheet, Field. Extend the Cap Sheet, Counterflashing out onto the Cap Sheet, Field a minimum of 4″ beyond the underlying additional ply.

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CT-05 Wood Area Divider Flashing

Anchor Sheet or Base Ply, Field
Mechanically attach or fully adhere (self-adhered, torch, cold-process or hot asphalt). Proper attachment of the base layer is defined by specified system, product selection and deck type.

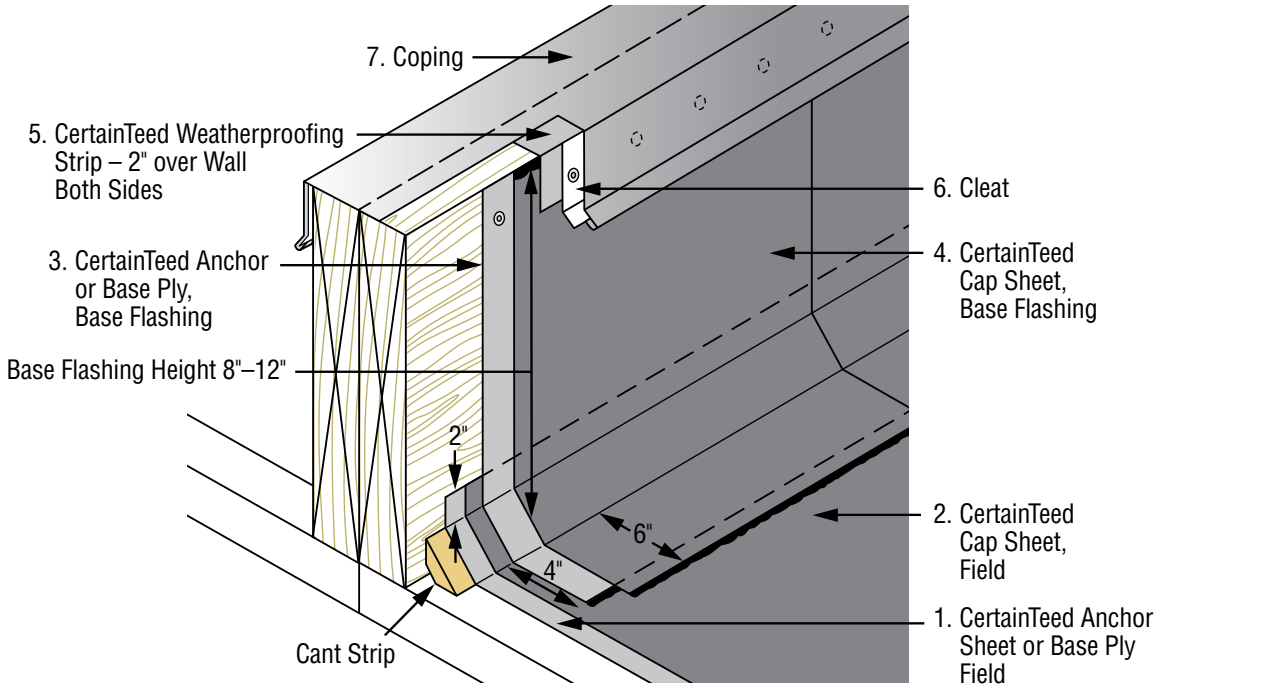
Cap Sheet, Field
Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by product selection. Extend base ply and cap sheet 2″ above cant strip; adhere to cant strip only.

Base Flashing
WALL ATTACHMENT: Mechanically attach Anchor 12″ o.c. or self-adhere Base Ply; Fully adhere Cap (self-adhered, torch-weld, cold process or hot asphalt; Gang fasten Base and Cap at top edge 9″ o.c. with tin discs; Ensure 1.4″ bleed out on top edge or apply FlintBond® Caulk. FIELD ATTACHMENT: Treat the granulated surface of Cap Sheet, Field, where the Base Flashing overlap occurs: **If self-adhered or using cold process** apply FlintBond Trowel to entire lapped surface with 1/4″ bleed out or (in cold weather[1]) hot air weld[2] with bead of FlintBond Caulk at edge; **If torch-welded** (cap only[3]) heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4″ bleed out; **if using hot asphalt** apply to entire lapped surface with 1/4″ bleed out.

Weatherproofing Strip
Self-adhere WinterGuard® Metal, WinterGuard® HT or Flintlastic® PlyBase/MidPly. Turn down over wall 2″ both sides (to be gang fastened when cleat is attached).

Metal Cleat
Mechanically attach 9″ o.c. through tin discs.

CertainTeed recommends strapping all Base Flashing and Counterflashing rolls, running the width of the roll up or perpendicular to the vertical surface.



NOT DRAWN TO SCALE

[1] 20°F – 49°F (-6°C – 9°C)

[2] Apply heat from a hot-air welder with a 2″ tip to the overlapped granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 900°F-1,100°F (setting 8-10), apply heat to the overlap interface while bonding Cap with rolling pressure on the granulated surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. Apply a bead of FlintBond Caulk along the edge. Continue overlap application, 2″ per pass.

[3] When potential fire hazards can be mitigated CertainTeed considers it acceptable to direct torch provided low output (50,000 BTU or less) equipment is used; when potential fire hazards cannot be mitigated indirect torching methods should be utilized.

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CT-06 Base Flashing and Wall Covering on Wood Parapet Wall

Anchor Sheet or Base Ply, Field
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment of the base layer is defined by specified system, product selection and deck type.

Cap Sheet Field
Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by product selection. Extend base ply and cap sheet 2″ above cant strip; adhere to cant strip only.

Base Flashing
WALL ATTACHMENT: Mechanically attach Anchor 12″ o.c. or self-adhere Base Ply, turn down 2″ over outside edge of wall (to be gang fastened when cleat is attached, minimum 4″ o.c.); Fully adhere Cap (self-adhered, torch-weld, cold process or hot asphalt; Gang fasten Base and Cap at top edge 9″ o.c. with tin discs; Ensure 1.4″ bleed out on top edge or apply FlintBond® Caulk. FIELD ATTACHMENT: Treat the granulated surface of Cap Sheet, Field, where the Base Flashing overlap occurs: **If self-adhered or using cold process** apply FlintBond Trowel to entire lapped surface with 1/4″ bleed out or (in cold weather[1]) hot air weld[2] with bead of FlintBond Caulk at edge; **If torch-welded (cap only[3])** heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4″ bleed out; **if using hot asphalt** apply to entire lapped surface with 1/4″ bleed out.

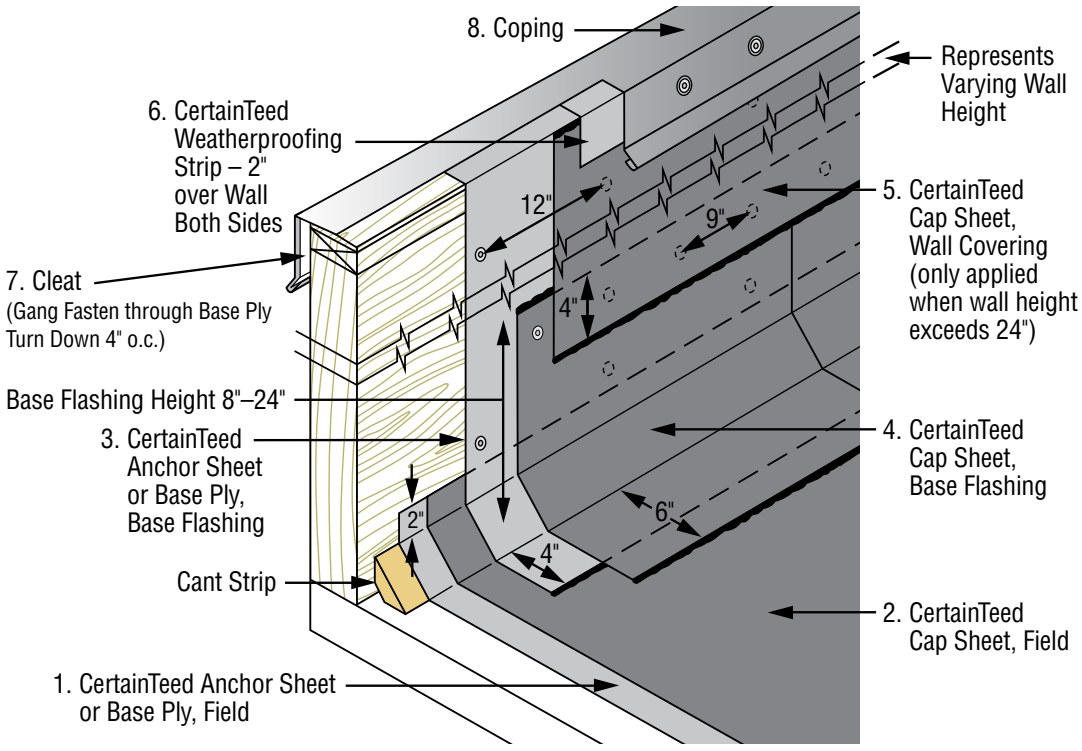
Cap Sheet Counterflashing
NOTE: This layer is only applied when wall height exceeds 24″. **If self-adhered** apply FlintBond Caulk to top edge; **If torch-welded** ensure 1/4″ bleed out at top edge; **If using cold process** set in FlintBond Trowel with 1/4″ bleed out at top edge; **if using hot asphalt** apply hot asphalt or set in FlintBond Trowel with 1/4″ bleed out at top edge. BASE FLASHING OVERLAP: Follow application method as noted for Base Flashing, FIELD OVERLAP.

Weatherproofing Strip
Self-adhere WinterGuard® Metal, WinterGuard® HT or Flintlastic® PlyBase/MidPly. Turn down over wall 2″ both sides, or 1″ beyond the wood nailer (to be gang fastened when cleat is attached).

NOTE: For walls 24″ or less in height, vertical termination of Base Flashing will match/replace vertical termination of Wall Covering as shown below.

CertainTeed recommends strapping all Base Flashing and Counterflashing rolls, running the width of the roll up or perpendicular to the vertical surface.

Scan to View Detail Installation



NOT DRAWN TO SCALE

[1] 20°F – 49°F (-6°C – 9°C)

[2] Apply heat from a hot-air welder with a 2″ tip to the overlapped granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 900°F-1,100°F (setting 8-10), apply heat to the overlap interface while bonding Cap with rolling pressure on the granulated surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. Apply a bead of FlintBond Caulk along the edge. Continue overlap application, 2″ per pass.

[3] When potential fire hazards can be mitigated CertainTeed considers it acceptable to direct torch provided low output (50,000 BTU or less) equipment is used; when potential fire hazards cannot be mitigated indirect torching methods should be utilized.

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CT-06A Base Flashing and Wall Covering on Concrete/Masonry Parapet Wall

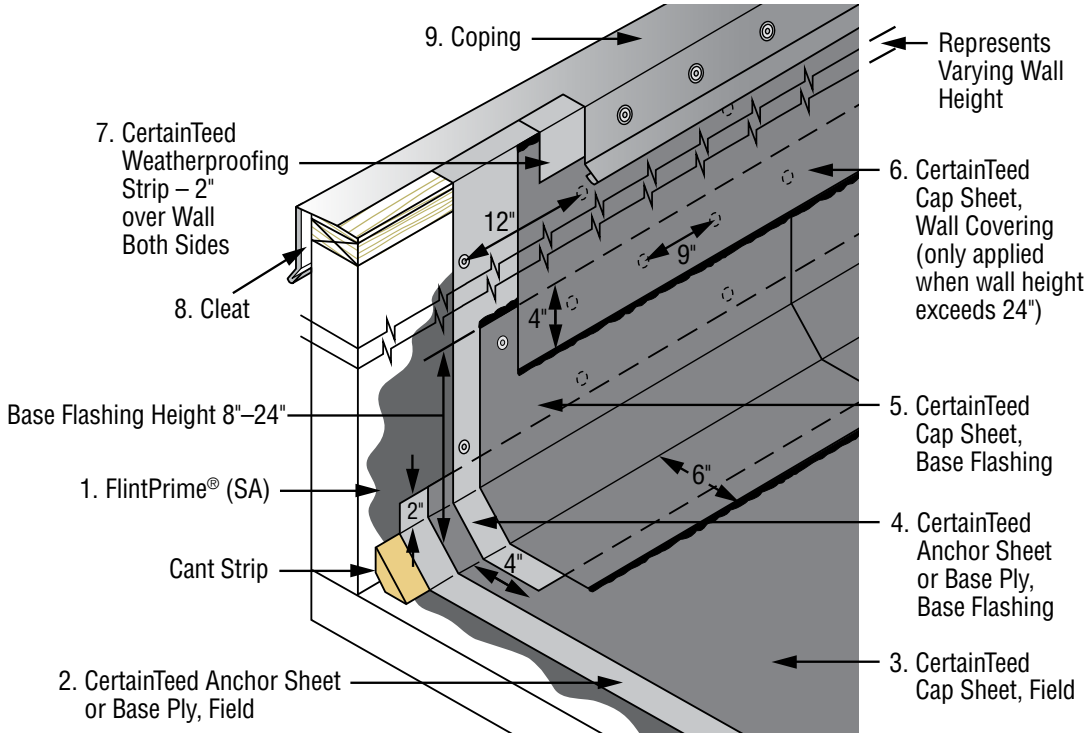
Base Ply and Cap Sheet, Field
Fully adhere (self-adhered, torch, cold process or hot asphalt) base and cap layer. Proper attachment is defined by specified system, product selection and deck type. Extend base ply and cap sheet 2″ above cant strip; adhere to cant strip only.

Base Flashing
WALL ATTACHMENT: Mechanically attach Anchor 12″ o.c. or self-adhere Base Ply, turn down 2″ over outside edge of wall (to be gang fastened when cleat is attached); Fully adhere Cap (self-adhered, torch-weld, cold process or hot asphalt; Gang fasten Base and Cap at top edge 9″ o.c. with tin discs; Ensure 1.4″ bleed out on top edge or apply FlintBond® Caulk. FIELD OVERLAP: Treat the granulated surface of Cap Sheet, Field, where Base Flashing overlap occurs: **If self-adhered** apply FlintBond Trowel to entire lapped surface or (in cold weather[1]) hot air weld[2] with bead of FlintBond Caulk at edge; **If torch-welded** heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4″ bleed out; **If using cold process** apply FlintBond Trowel with 1/4″ bleed out; **if using hot asphalt** ensure 1/4″ bleed out.

Cap Sheet Counterflashing
NOTE: This layer is only applied when wall height exceeds 24″. **If self-adhered** apply FlintBond Caulk to top edge; **If torch-welded** ensure 1/4″ bleed out at top edge; **If using cold process** set in FlintBond Trowel with 1/4″ bleed out at top edge; **if using hot asphalt** apply hot asphalt or set in FlintBond Trowel with 1/4″ bleed out at top edge. BASE FLASHING OVERLAP: Follow application method as noted for Cap Sheet Base Flashing, FIELD OVERLAP.

Weatherproofing Strip
Self-adhere WinterGuard® Metal, WinterGuard® HT or Flintlastic® PlyBase/MidPly. Turn down over wall 2″ both sides, or 1″ beyond the wood nailer (to be gang fastened when cleat is attached).

CertainTeed recommends strapping all Base Flashing and Counterflashing rolls, running the width of the roll up or perpendicular to the vertical surface.



[1] 20°F – 49°F (-6°C – 9°C)

[2] Apply heat from a hot-air welder with a 2″ tip to the overlapped granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 900°F-1,100°F (setting 8-10), apply heat to the overlap interface while bonding Cap with rolling pressure on the granulated surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. Apply a bead of FlintBond Caulk along the edge. Continue overlap application, 2″ per pass.

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CT-07 Base Flashing on Concrete/Masonry Wall with Metal Counterflashing

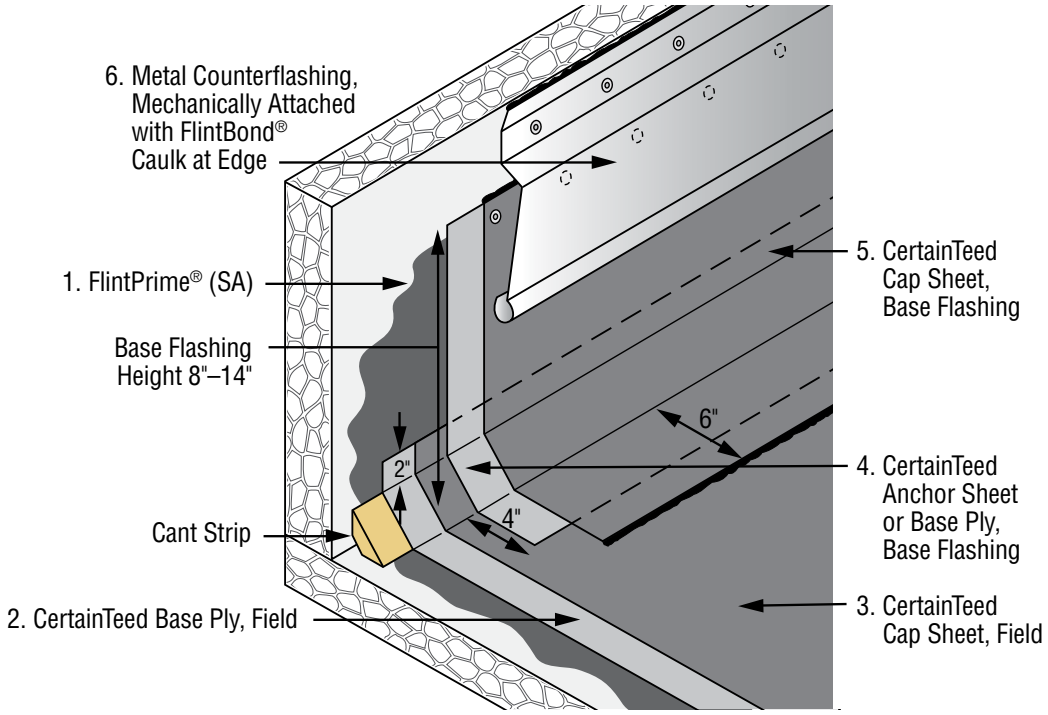
Base Ply and Cap Sheet, Field
Fully adhere (self-adhered, torch, cold process or hot asphalt) base and cap layer. Proper attachment is defined by specified system, product selection and deck type. Extend base ply and cap sheet 2″ above cant strip; adhere to cant strip only.

Base Flashing
WALL ATTACHMENT: Mechanically attach top edge to wall, 9″ o.c. through tin discs with concrete fasteners; **If self-adhered** apply FlintBond® Caulk to top edge; **If torch-welded** ensure 1/4″ bleed out at top edge; **If using cold process** set in FlintBond Trowel with 1/4″ bleed out at top edge; **if using hot asphalt** ensure 1/4″ bleed out at top edge.
FIELD OVERLAP: Treat the granulated surface of Cap Sheet, Field, where Base Flashing overlap occurs:

If self-adhered apply FlintBond Trowel to entire lapped surface or (in cold weather[1]) hot air weld[2] with bead of FlintBond Caulk at edge; **If torch-welded** heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4″ bleed out; **If using cold process** apply FlintBond Trowel with 1/4″ bleed out; **if using hot asphalt** ensure 1/4″ bleed out.

Metal Counterflashing
Mechanically attach a minimum 6″ o.c. or as required by building code.

CertainTeed recommends strapping all Base Flashing and Counterflashing rolls, running the width of the roll up or perpendicular to the vertical surface.



NOT DRAWN TO SCALE

[1] 20°F – 49°F (-6°C – 9°C)

[2] Apply heat from a hot-air welder with a 2″ tip to the overlapped granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 900°F-1,100°F (setting 8-10), apply heat to the overlap interface while bonding Cap with rolling pressure on the granulated surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. Apply a bead of FlintBond Caulk along the edge. Continue overlap application, 2″ per pass.

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CT-08 Base Flashing and Wall Covering on Steel or Stucco Wall with "Z" Bar

Plywood Backing
Install plywood backing with appropriate thickness to create wall surface that vertically aligns with plaster or hardboard (stucco) siding.

Anchor Sheet or Base Ply, Field
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment of the base layer is defined by specified system, product selection and deck type.

Cap Sheet, Field
Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by product selection. Extend base ply and cap sheet 2″ above cant strip; adhere to cant strip only.

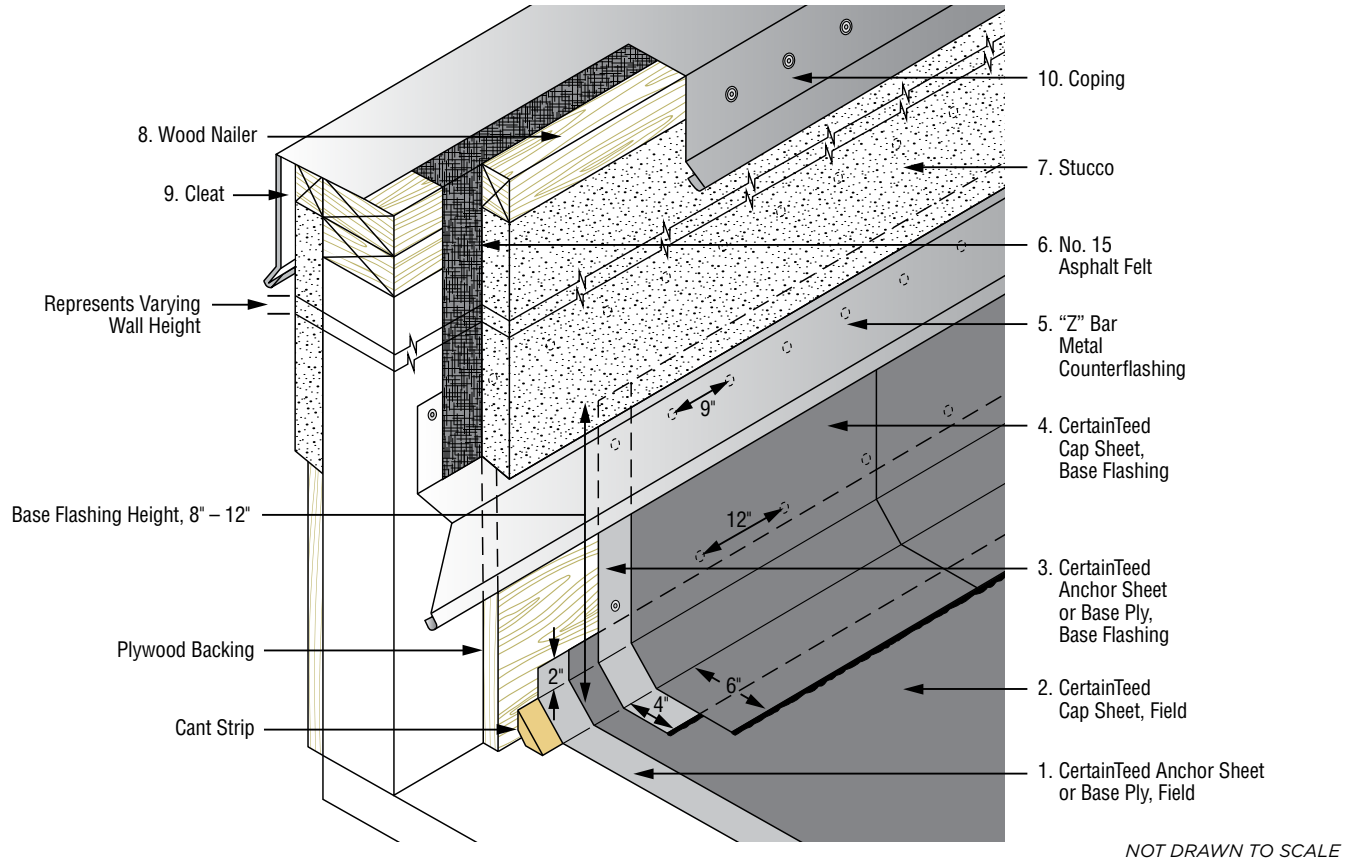
Base Flashing
WALL ATTACHMENT: Mechanically attach Anchor 12″ o.c. or self-adhere Base Ply; Fully adhere Cap (self-adhered, torch-weld, cold process or hot asphalt; Gang fasten Base and Cap at top edge 9″ o.c. with tin discs; Ensure 1.4″ bleed out on top edge or apply FlintBond® Caulk.

FIELD ATTACHMENT: Treat the granulated surface of Cap Sheet, Field, where the Base Flashing overlap occurs: **If self-adhered or using cold process** apply FlintBond Trowel to entire lapped surface with 1/4″ bleed out or (in cold weather[1]) hot air weld[2] with bead of FlintBond Caulk at edge; **If torch-welded (cap only[3])** heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4″ bleed out; **if using hot asphalt** apply to entire lapped surface with 1/4″ bleed out.

"Z" Bar Counterflashing
Fit top flange into channel behind plaster or hardboard (stucco) siding.

#15 Asphalt Felt
Loose lay, turn over outside edge 2″. Gang fasten with Cleat both sides.

CertainTeed recommends strapping all Base Flashing and Counterflashing rolls, running the width of the roll up or perpendicular to the vertical surface.



NOT DRAWN TO SCALE

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[1] 20°F – 49°F (-6°C – 9°C)

[2] Apply heat from a hot-air welder with a 2″ tip to the overlapped granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 900°F-1,100°F (setting 8-10), apply heat to the overlap interface while bonding Cap with rolling pressure on the granulated surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. Apply a bead of FlintBond Caulk along the edge. Continue overlap application, 2″ per pass.

[3] When potential fire hazards can be mitigated CertainTeed considers it acceptable to direct torch provided low output (50,000 BTU or less) equipment is used; when potential fire hazards cannot be mitigated indirect torching methods should be utilized.

CT-09 Base Flashing on Parapet Wall, Inside Corner

NOTE: This detail is intended to illustrate inside corner cuts and application. See appropriate parapet wall detail for Base Flashing application instructions.

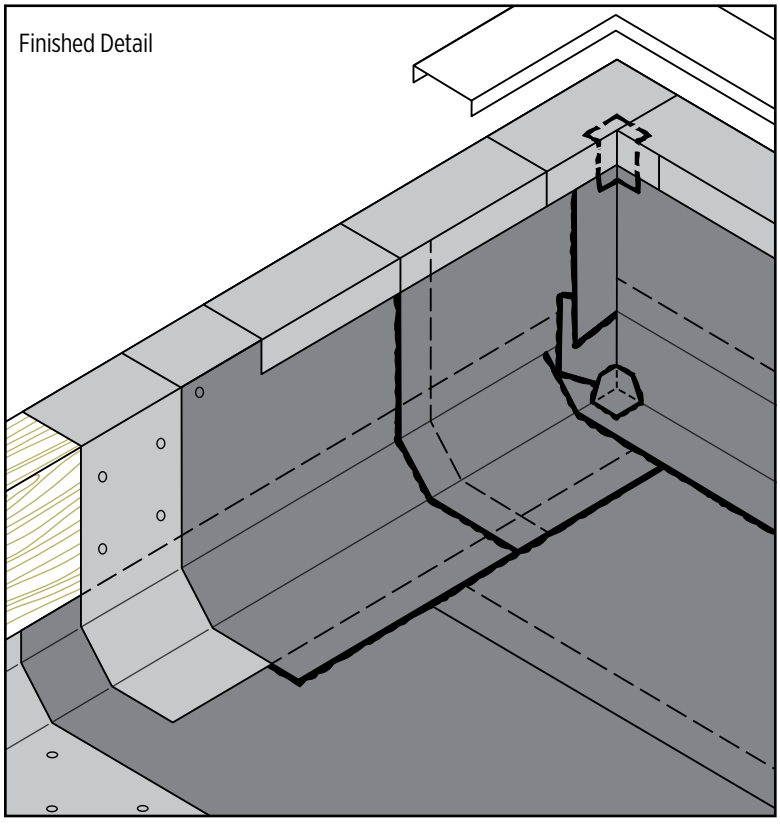
Base & Cap Field Corner Cuts
In order to allow a flat fit into the corner, make a cut from the bottom point of the cant strip out through the top edge of the roll; the cut will be parallel to the length of the roll. Repeat with a second cut from the top point of the cant strip.

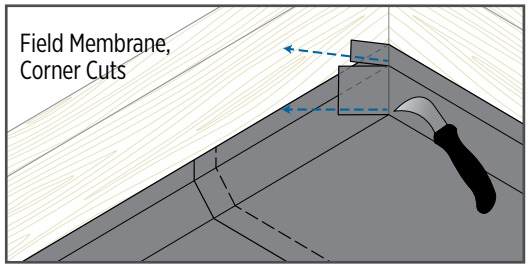
Base Sheet Base Flashing Corner Cuts
Base Sheet Base Flashing folds over the outer edge of the wall, top inner corner of the wall, and bottom inner corner of the wall onto the field. Several cuts are necessary to allow for a flat fit. Cut the membrane to the required length: The total length of the sheet equals 2 (2″ turn over) + width of top of wall + wall height + length of cant strip surface + 4 (4″ into the field).

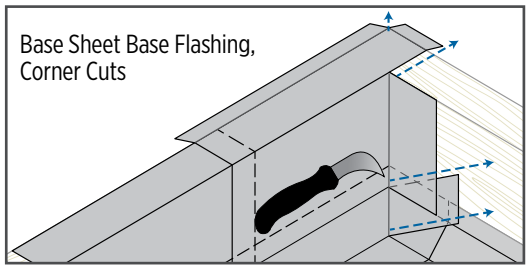
- Lay sheet with selvage edge perpendicular to the parapet wall so 2″ of the roll extends beyond the top outer edges. First, make a 45° cut from the outer corner of the wall through the outer corner of the roll. This will allow you to turn the roll down over the top edges of the wall.
- Second, make a cut from the inner top outer corner of the wall through the side edge of the roll; cut perpendicular to the roll's length. The roll will drop down and lay flat against the wall surface.
- Third, make a cut from the top point of the cant strip on a 45° angle upwards through the side edge of the roll.
- Fourth, cut from the bottom point of the cant strip. These two cuts will allow the roll to conform to the wall and cant and extend into the field.

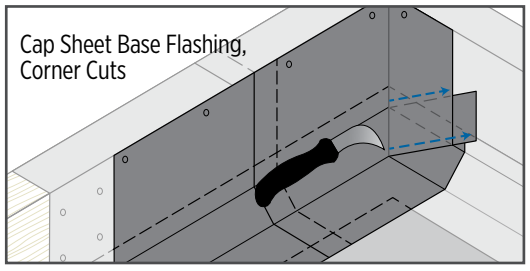
Cap Sheet Base Flashing Corner Cuts
Repeat the third and fourth cuts from Base Sheet Base Flashing to allow the roll to conform to the wall and cant and extend into the field.

Cap Sheet Corner Pieces
Cut cap sheet into rounds and slice horizontal edges to create a "bowtie". Apply to cover cut origin points of Cap Sheet Counterflashings.









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CT-10 Base Flashing on Parapet Wall, Outside Corner

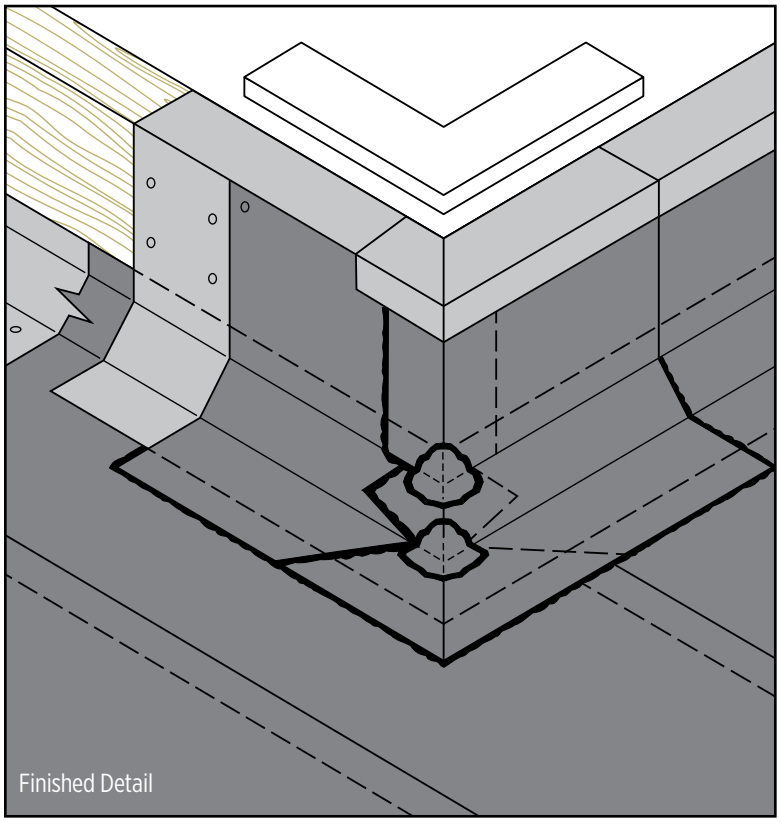
NOTE: This detail is intended to illustrate outside corner cuts and application. See appropriate parapet wall detail for Base Flashing application instructions.

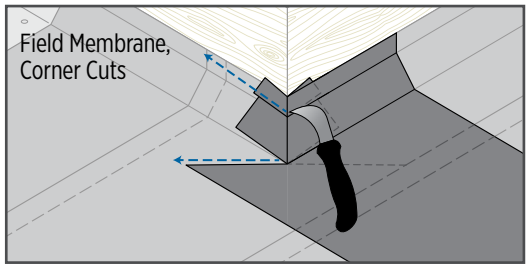
Base & Cap Field Corner Cuts
In order to allow a flat fit into the corner, make a cut from the bottom point of the cant strip out through the top edge of the roll; the cut will be parallel to the length of the roll. Repeat with a second cut from the top point of the cant strip.

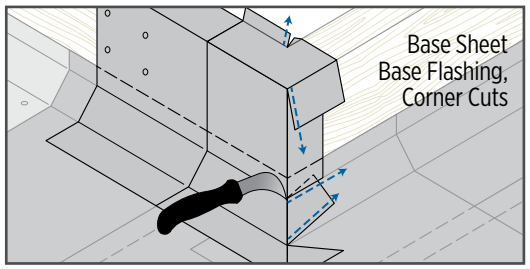
Base Sheet Base Flashing Corner Cuts
Base Sheet Base Flashing folds over the outer edge of the wall, top inner corner of the wall, and bottom inner corner of the wall onto the field. Several cuts are necessary to allow for a flat fit. Cut the membrane to the required length: The total length of the sheet equals 2 (2″ turn over) + width of top of wall + wall height + length of cant strip surface + 4 (4″ into the field).

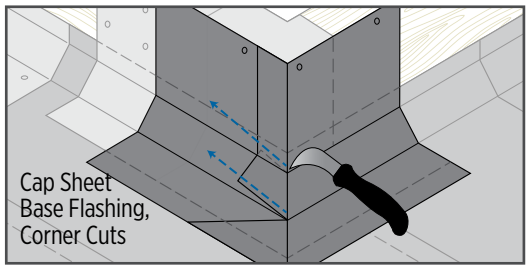
- Lay sheet with selvage edge perpendicular to the parapet wall so 2″ of the roll extends beyond the top outer edge of the wall. First, make a 45° cut from the top outer corner of the wall through the outer corner of the roll. This will allow you to turn the roll down over the top edges of the wall.
- Second, make a cut from the inner top corner of the wall through the side edge of the roll; cut perpendicular to the roll's length. The roll will drop down and lay flat against the wall surface.
- Third, make a cut from the top point of the cant strip on a 45° angle upwards through the side edge of the roll.
- Fourth, cut from the bottom point of the cant strip. These two cuts will allow the roll to conform to the wall and cant and extend into the field.

Cap Sheet Base Flashing Corner Cuts
Repeat the third and fourth cuts from Base Sheet Base Flashing to allow the roll to conform to the wall and cant and extend into the field.









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CT-11 Through-Wall Scupper Flashing

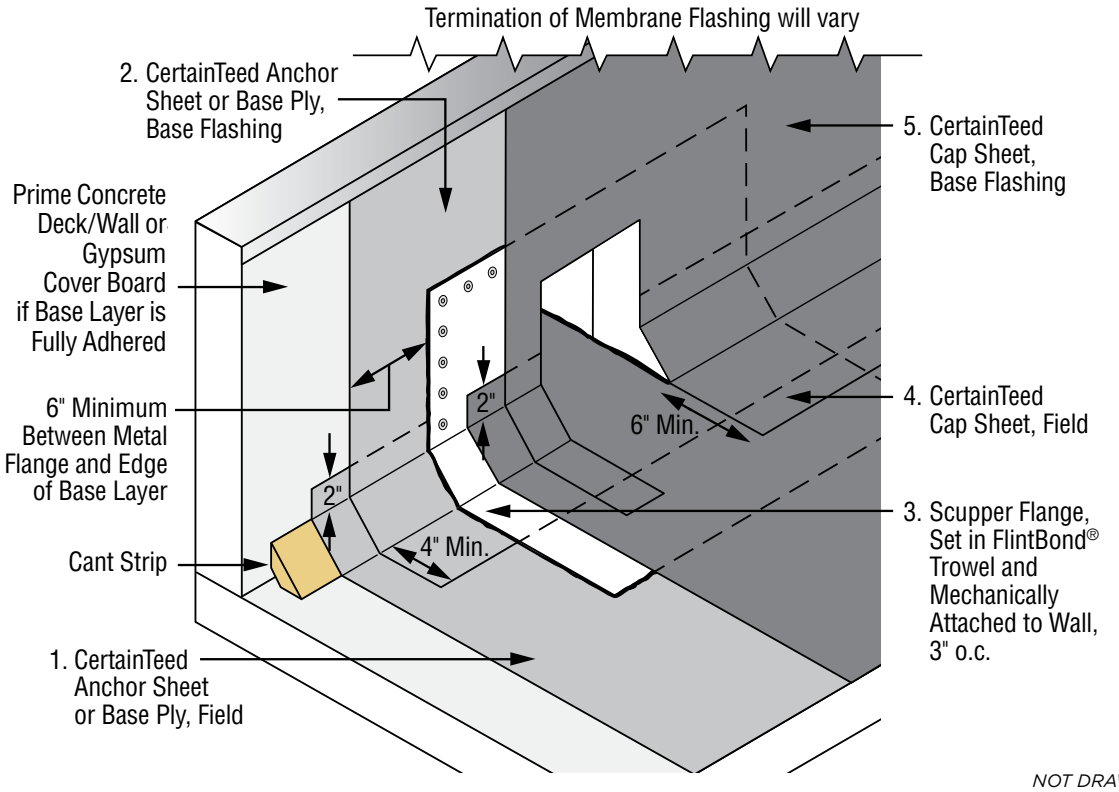
Anchor Sheet or Base Ply Field & Counterflashing
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by specified system, product selection and deck type. Extend base layer directly behind scupper without seams a minimum of 6″ beyond scupper flanges in all directions.

Scupper Flange
For nailable surfaces, flange must also be nailed 3″ o.c. along bottom edge, 3/4″ from perimeter. Prime surface with FlintPrime Aerosol.[3]

Cap Sheet, Field
Fully adhere (self-adhered, torch, cold adhesive or hot asphalt). Proper attachment is defined by product selection.

Base Flashing
WALL ATTACHMENT: Mechanically attach or fully adhere (self-adhered, torch-weld, cold adhesive or hot asphalt; *torch-weld is not an approved method for base ply wall attachment*), if Fully adhered, gang fasten top edge 9″ o.c. with tin discs; FIELD ATTACHMENT: Treat the granulated surface of Cap Sheet, Field, where the Base Flashing overlap occurs: **If self-adhered or using cold process** apply FlintBond® Trowel to entire lapped surface with 1/4″ bleed out or (in cold weather[1]) hot air weld[2] with bead of FlintBond Caulk at edge; **If torch-welded (cap only[3])** heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4″ bleed out; **if using hot asphalt** apply to entire lapped surface with 1/4″ bleed out.

CertainTeed recommends strapping all Base Flashing and Counterflashing rolls, running the width of the roll up or perpendicular to the vertical surface.



NOT DRAWN TO SCALE

Premium Application
Add a CertainTeed Modified Bitumen Base Ply behind the Cap Sheet, Counterflashing. Extend it a minimum of 4″ out onto the Cap Sheet, Field. Extend the Cap Sheet, Counterflashing out onto the Cap Sheet, Field a minimum of 4″ beyond the underlying additional ply.

[1] 20°F–49°F (-6°C–9°C)

[2] Apply heat from a hot-air welder with a 2″ tip to the overlapped granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 900°F-1,100°F (setting 8-10), apply heat to the overlap interface while bonding Cap with rolling pressure on the granulated surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. Apply a bead of FlintBond Caulk along the edge. Continue overlap application, 2″ per pass.

[3] Arctic Edge Cold Lap Tape may be utilized in lieu of FlintPrime Aerosol when ambient temperatures are 35°F-49°F (2°C-9°C). Please refer to Arctic Edge Applicator Guide for comprehensive installation instructions.

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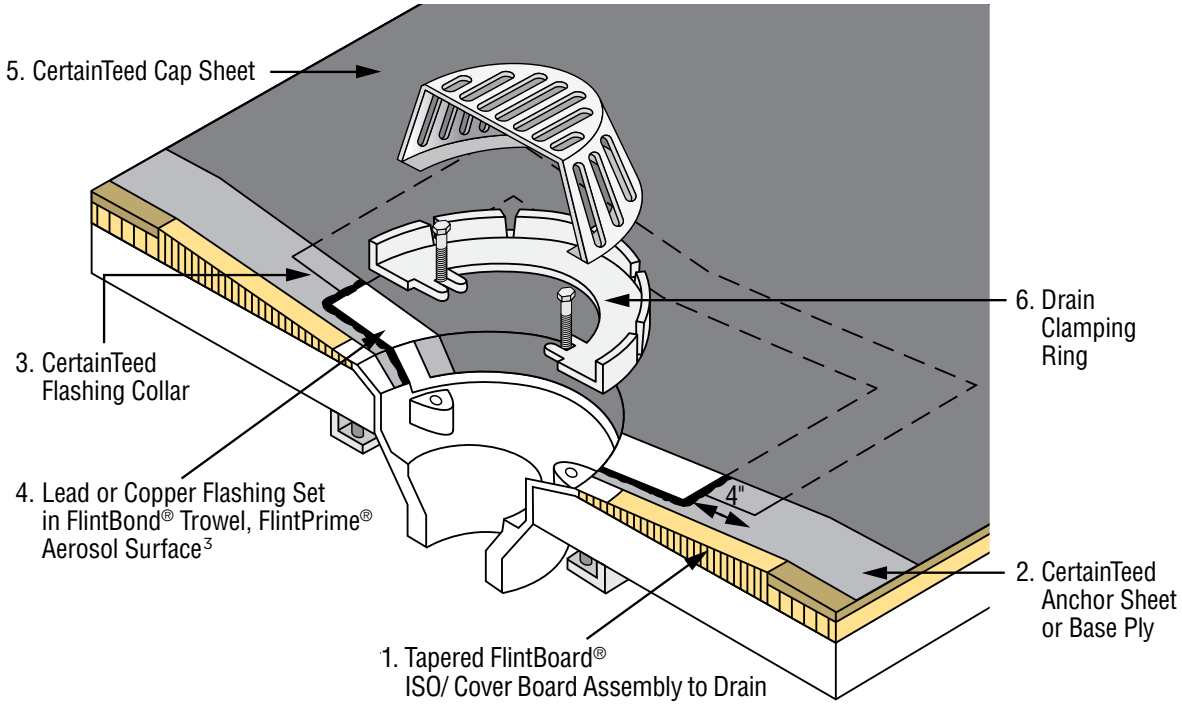
CT-12 Drain Flashing

Anchor Sheet or Base Ply
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by specified system, product selection and deck type. **If applying by cold process or hot asphalt** extend compound onto drain flange; **If the base layer is mechanically attached in the field,** base layer must be fully adhered beginning 9″ from the drain flange edge.

Flashing Collar
Fully adhere (self-adhered, torch, cold process or hot asphalt) a minimum 38″ x 38″ flashing collar. Proper attachment is defined by product selection.

Lead or Copper Flashing
Flashing should be a minimum 30″ x 30″, 2.5 lb. lead or 16 oz. soft copper, turned down into the drain bow. Prime surface with FlintPrime Aerosol.[1]

Cap Sheet
Fully adhere in accordance with the approved, published product application method.



NOT DRAWN TO SCALE

Three-Ply Application
Replace the Flashing Collar with a CertainTeed Modified Bitumen Interply, extending the full dimension of the field.

[1] Arctic Edge Cold Lap Tape may be utilized in lieu of FlintPrime Aerosol when ambient temperatures are 35°F-49°F (2°C-9°C). Please refer to Arctic Edge Applicator Guide for comprehensive installation instructions.

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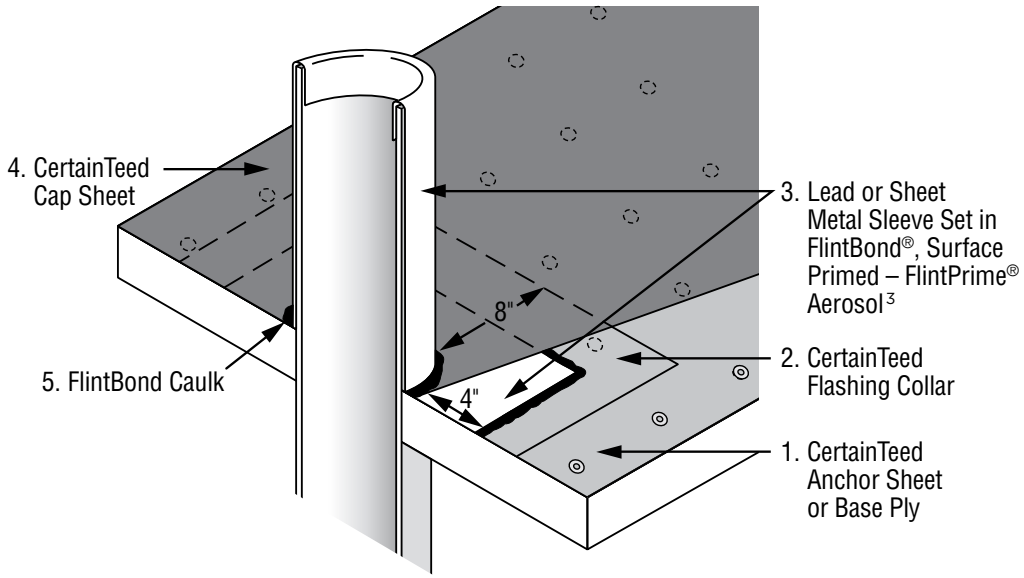
CT-13 Pipe Flashing - Lead or Sheet Metal

Anchor Sheet or Base Ply
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment of the base layer is defined by specified system, product selection and deck type.

Metal Flashing
Shall have a 4" wide, primed continuous flange. Prime surface with FlintPrime Aerosol.[3]

Flashing Collar & Cap Sheet
Fully adhere (self-adhered, torch, cold process or hot asphalt), extending a minimum 4" beyond the metal flange. Proper attachment is defined by product selection.

If self-adhered in cold weather[1] where Flintlastic® SA Cap (FR) Sheet overlaps Metal Flange, affix Arctic Edge Cold Lap Tape[2] to top surface of Metal prior to installing the Cap. Finish with a bead of FlintBond Caulk at edge, kept in a warm location when not in use.



NOT DRAWN TO SCALE

[1] 35°F–49°F (2°C–9°C)

[2] Please refer to Arctic Edge Applicator Guide for comprehensive installation instructions.

[3] Not required in cold weather conditions when Arctic Edge is used.

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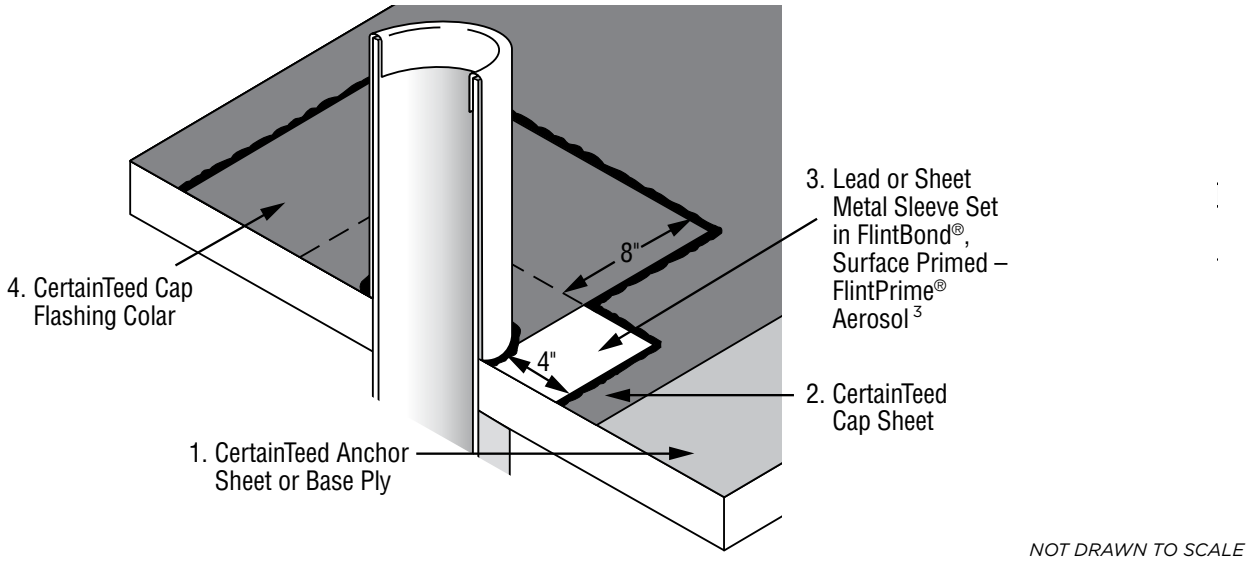
CT-13A Pipe Flashing - Lead or Sheet Metal - Surface Mounted (Retrofit)

Anchor Sheet or Base Ply, Field
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment of the base layer is defined by specified system, product selection and deck type.

Cap Sheet, Field
Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by product selection. Extend base ply and cap sheet 2″ above cant strip; adhere to cant strip only.

Metal Flashing
Shall have a 4″ wide primed continuous flange. Set in FlintBond® Trowel or hot asphalt. Prime surface with FlintPrime Aerosol.[3]

Cap Flashing Collar
Fully adhere (self-adhered, torch, cold process or hot asphalt), extending a minimum 8″ beyond the metal flange. Treat the granulated surface of Cap Sheet where the Cap Flashing Collar overlap occurs: **If self-adhered or using cold process** apply FlintBond Trowel to entire lapped surface with 1/4″ bleed out or (in cold weather[1]) hot air weld[2] with bead of FlintBond Caulk at edge; **If torch-welded** heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4″ bleed out; **if using hot asphalt** apply to entire lapped surface with 1/4″ bleed out.



NOT DRAWN TO SCALE

[1] 20°F – 49°F (-6°C – 9°C)

[2] Apply heat from a hot-air welder with a 2″ tip to the overlapped granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 900°F-1,100°F (setting 8-10), apply heat to the overlap interface while bonding Cap with rolling pressure on the granulated surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. Apply a bead of FlintBond Caulk along the edge. Continue overlap application, 2″ per pass.

[3] Arctic Edge Cold Lap Tape may be utilized in lieu of FlintPrime Aerosol when ambient temperatures are 35°F-49°F (2°C-9°C). Please refer to Arctic Edge Applicator Guide for comprehensive installation instructions.

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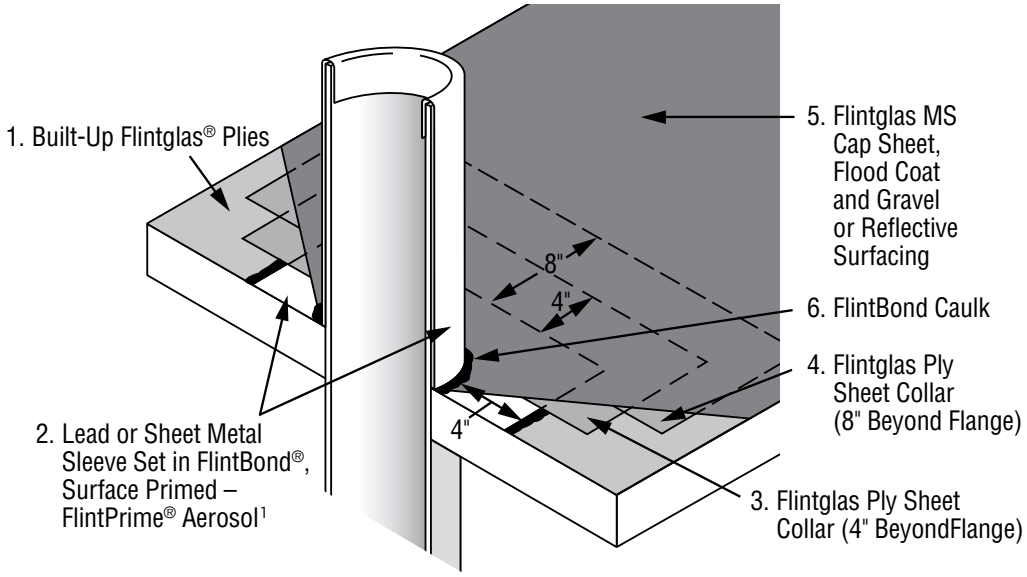
CT-14 Pipe Flashing - Lead or Sheet Metal - BUR Only

Built Up Ply Sheet
Ply sheets shall be set in hot asphalt; number of plies is defined by specification.

Metal Flashing
Shall have a 4″ wide primed continuous flange.
Set in FlintBond® Trowel or hot asphalt. Prime surface with FlintPrime Aerosol.[1]

Flashing Collars
Set two Flintglas Ply Sheet flashing collars in hot asphalt extending 4″ and 8″, respectively, beyond the metal flange.

Cap Sheet
Fully adhere in hot asphalt; if not using Flintglas® MS Cap, top layer ply sheet may be surfaced with flood coat and gravel or SMARTCOAT™ reflective coating.



NOT DRAWN TO SCALE

[1] Arctic Edge Cold Lap Tape may be utilized in lieu of FlintPrime Aerosol when ambient temperatures are 35°F-49°F (2°C-9°C). Please refer to Arctic Edge Applicator Guide for comprehensive installation instructions.

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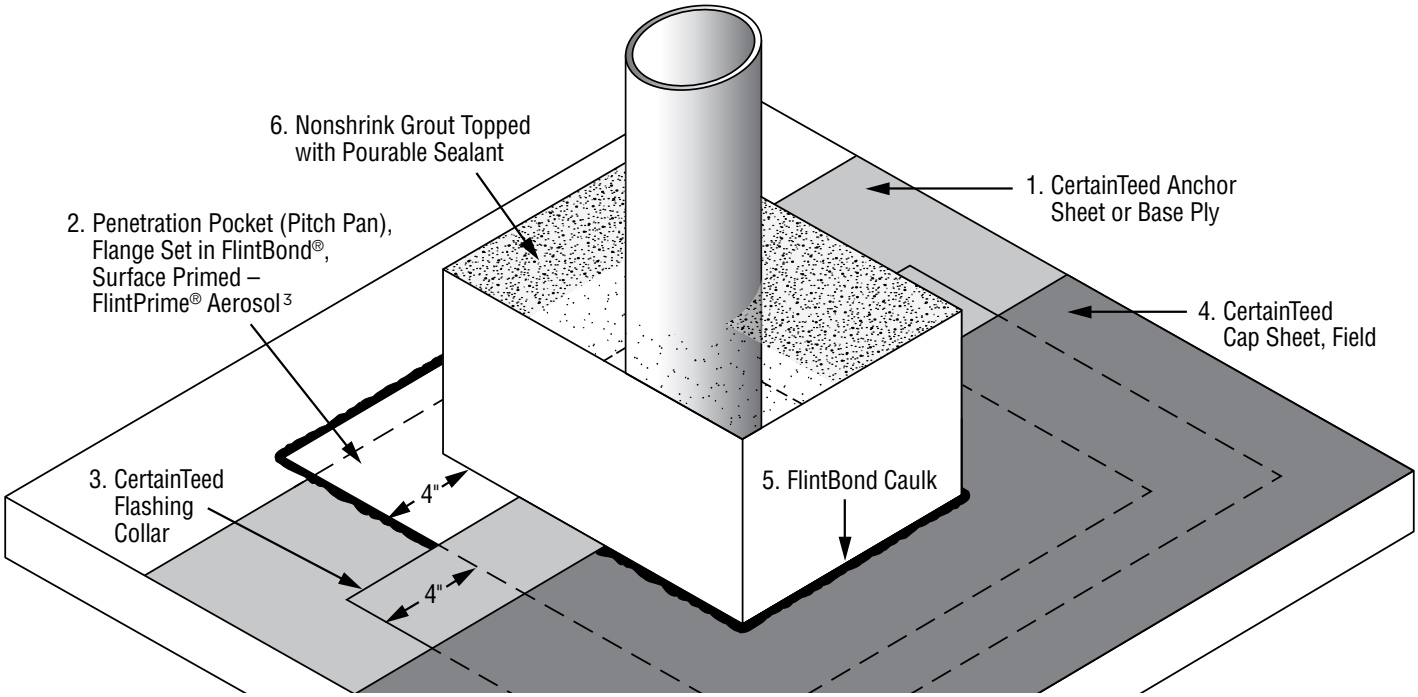
CT-15 Penetration Pan (Pitch Pan) Flashing

Anchor Sheet or Base Ply
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment of the base layer is defined by specified system, product selection and deck type.

Penetration Pocket
Shall have a 4″ wide primed continuous flange and a minimum 4″ height. Set in FlintBond® Trowel or hot asphalt. Prime surface with FlintPrime Aerosol.[3]

Flashing Collar & Cap Sheet
Fully adhere (self-adhered, torch, cold process or hot asphalt), extending a minimum 4″ beyond the metal flange. Proper attachment is defined by product selection. If self-adhered, in cold weather1 where Flintlastic® SA Cap (FR) Sheet overlaps Metal Flange, affix Arctic Edge Cold Lap Tape[2] to top surface of Metal prior to installing the Cap. Finish with a bead of FlintBond Caulk at edge, kept in a warm location when not in use.

Pan Fill
Fill the inside of the pan to within two inches (2″) of the top with a non-shrinking grout. After the grout has set, fill the remainder of the pan with a one part pourable sealant.



NOT DRAWN TO SCALE

Note:
Penetration Pockets are not the preferred flashing method at penetrations because they may be a maintenance problem. Please refer to SmartFlash ONE Details for the preferred flashing method.

[1] 35°F–49°F (2°C–9°C)

[2] Please refer to Arctic Edge Applicator Guide for comprehensive installation instructions.

[3] Not required in cold weather conditions when Arctic Edge is used.

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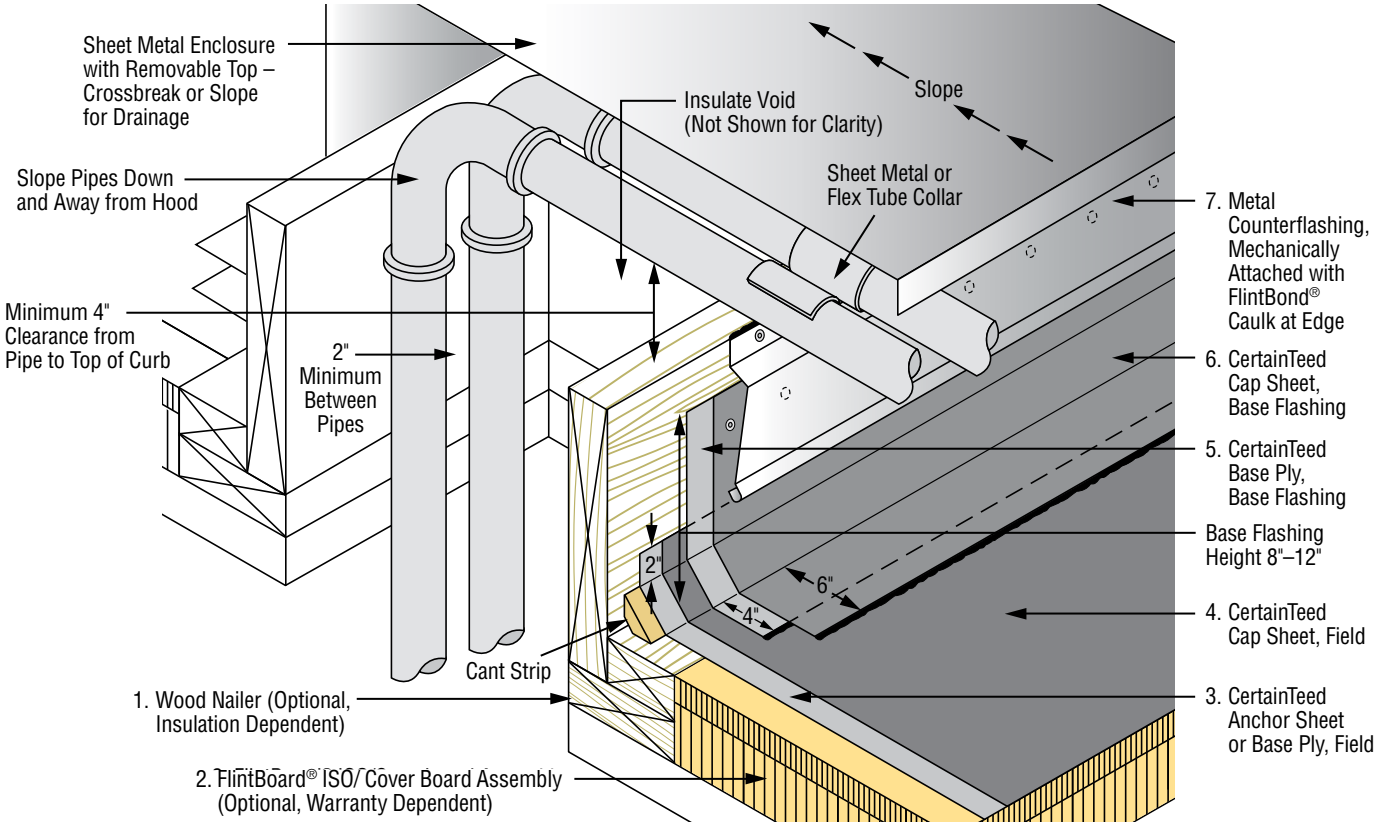
CT-16 Multi-Piping through Roof Deck Flashing

Anchor Sheet or Base Ply, Field
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment of the base layer is defined by specified system, product selection and deck type.

Cap Sheet, Field
Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by product selection. Extend base ply and cap sheet 2″ above cant strip; adhere to cant strip only.

Base Flashing
WALL ATTACHMENT: Mechanically attach Anchor 12″ o.c. or self-adhere Base Ply; Fully adhere Cap (self-adhered, torch-weld, cold process or hot asphalt; Gang fasten Base and Cap at top edge 9″ o.c. with tin discs; Ensure 1.4″ bleed out on top edge or apply FlintBond® Caulk. FIELD ATTACHMENT: Treat the granulated surface of Cap Sheet, Field, where the Base Flashing overlap occurs: **If self-adhered or using cold process** apply FlintBond Trowel to entire lapped surface with 1/4″ bleed out or (in cold weather[1]) hot air weld[2] with bead of FlintBond Caulk at edge; **If torch-welded (cap only[3])** heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4″ bleed out; **if using hot asphalt** apply to entire lapped surface with 1/4″ bleed out.

Metal Counterflashing
Mechanically attached with appropriate fastener approximately 24″ o.c., apply bead of FlintBond Caulk along top edge.



NOT DRAWN TO SCALE

[1] 20°F–49°F (-6°C–9°C)

[2] Apply heat from a hot-air welder with a 2″ tip to the overlapped granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 900°F-1,100°F (setting 8-10), apply heat to the overlap interface while bonding Cap with rolling pressure on the granulated surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. Apply a bead of FlintBond Caulk along the edge. Continue overlap application, 2″ per pass.

[3] When potential fire hazards can be mitigated, CertainTeed considers it acceptable to install torch-applied CertainTeed Counterflashing using the direct torching method provided low output (50,000 BTU output or less) torching equipment is used. When potential fire hazards cannot be mitigated, torch-applied Counterflashing must be installed using the indirect methods such as torch and flop.

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CT-17 Mechanical Equipment Stand Flashing

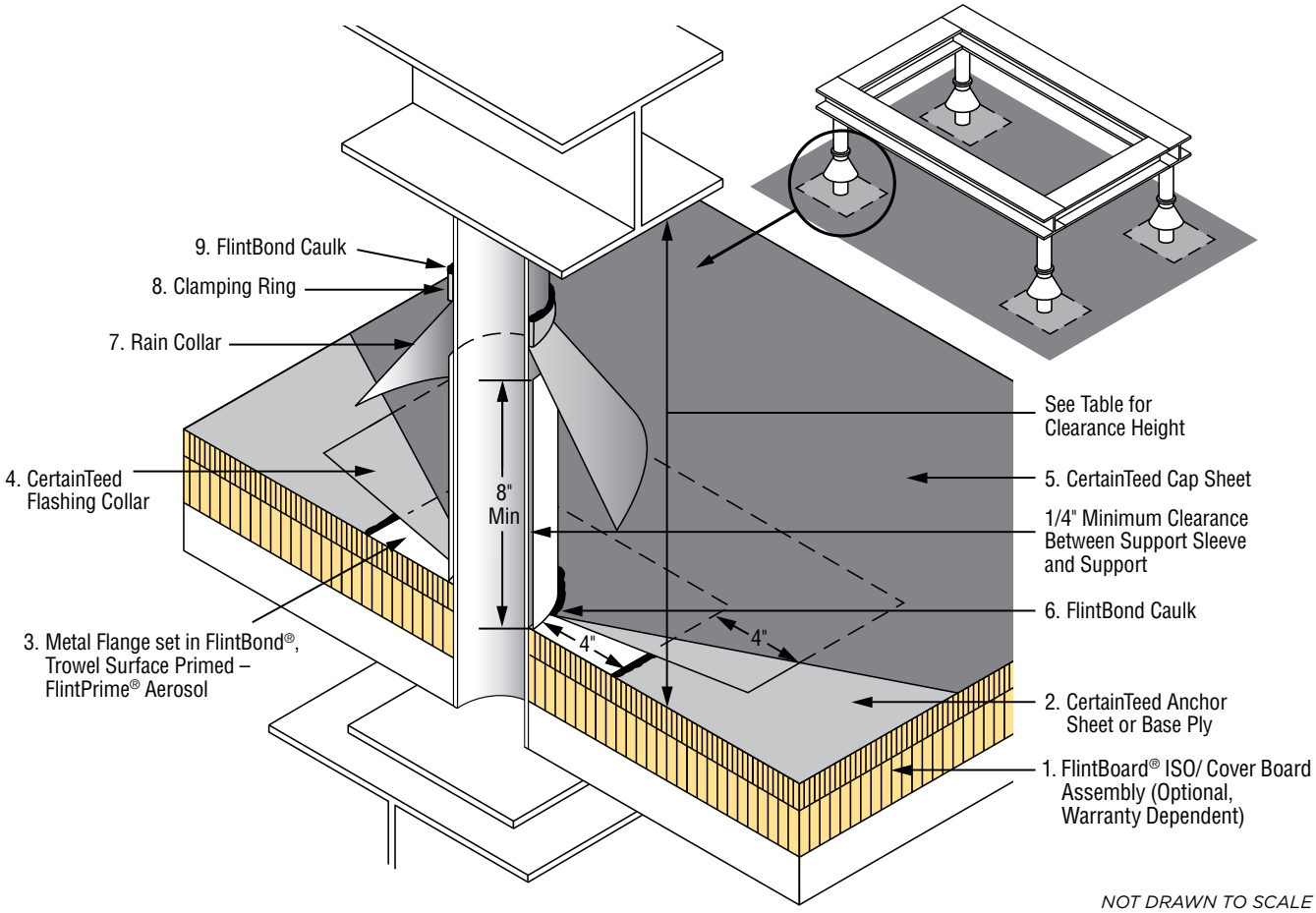
Base Ply
Fully adhere (self-adhered or cold process). Proper attachment is defined by product selection.

Cap Sheet
Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by product selection.

Metal Flange
Shall have a 4″ wide primed continuous flange. Set in FlintBond® Trowel or hot asphalt. Prime surface with FlintPrime Aerosol.[3]

Flashing Collar
Fully adhere (self-adhered, torch, cold process or hot asphalt), extending a minimum 4″ beyond the metal flange. Proper attachment is defined by product selection. **If self-adhered** in cold weather[1] where Flintlastic® SA Cap (FR) Sheet overlaps Metal Flange, affix Arctic Edge Cold Lap Tape[2] to top surface of Metal prior to installing the Cap. Finish with a bead of FlintBond Caulk at edge, kept in a warm location when not in use.

Cap Sheet
Fully adhere (self-adhered, torch, cold process or hot asphalt) cap sheet in the field. Proper attachment is defined by product selection.



NOT DRAWN TO SCALE

Width of Equipment	Clearance
Up to 24″	14″
25″ to 36″	18″
37″ to 48″	24″
49″ to 60″	30″
61″ and Wider	36″

[1] 35°F–49°F (2°C–9°C)

[2] Please refer to Arctic Edge Applicator Guide for comprehensive installation instructions.

[3] Not required in cold weather conditions when Arctic Edge is used.

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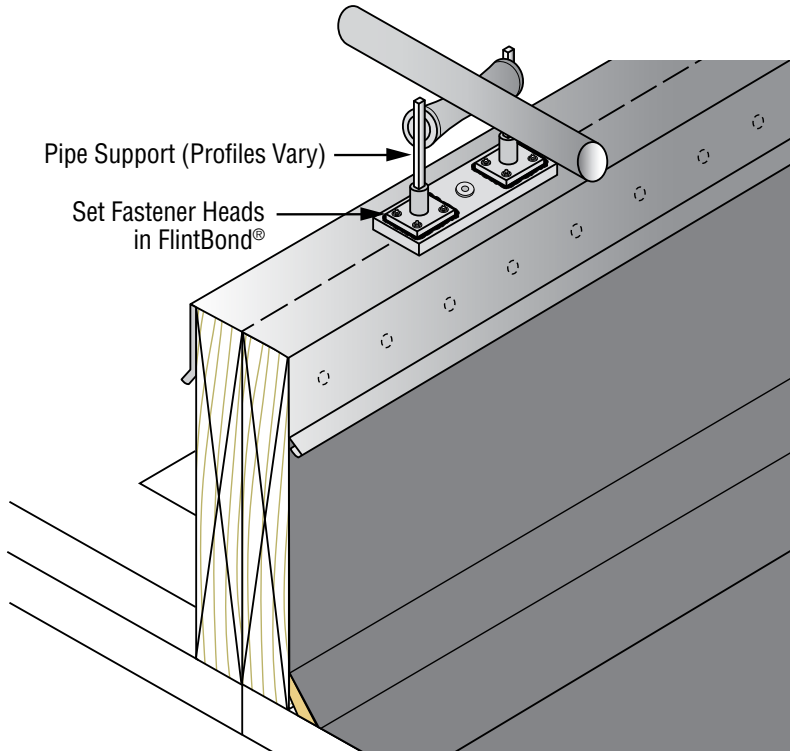
CT-18 Pipe Roller Support Flashing

NOTE: This detail is intended to illustrate pipe support application.
See appropriate parapet wall detail for Base Flashing application instructions.



NOT DRAWN TO SCALE

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CT-19 Low Profile Flexible Expansion Joint Flashing

Insulation and Wood Nailers
Chamfer/taper to create slope away from joint.

Base Ply
Fully adhere (self-adhered or cold process). Proper attachment is defined by product selection.

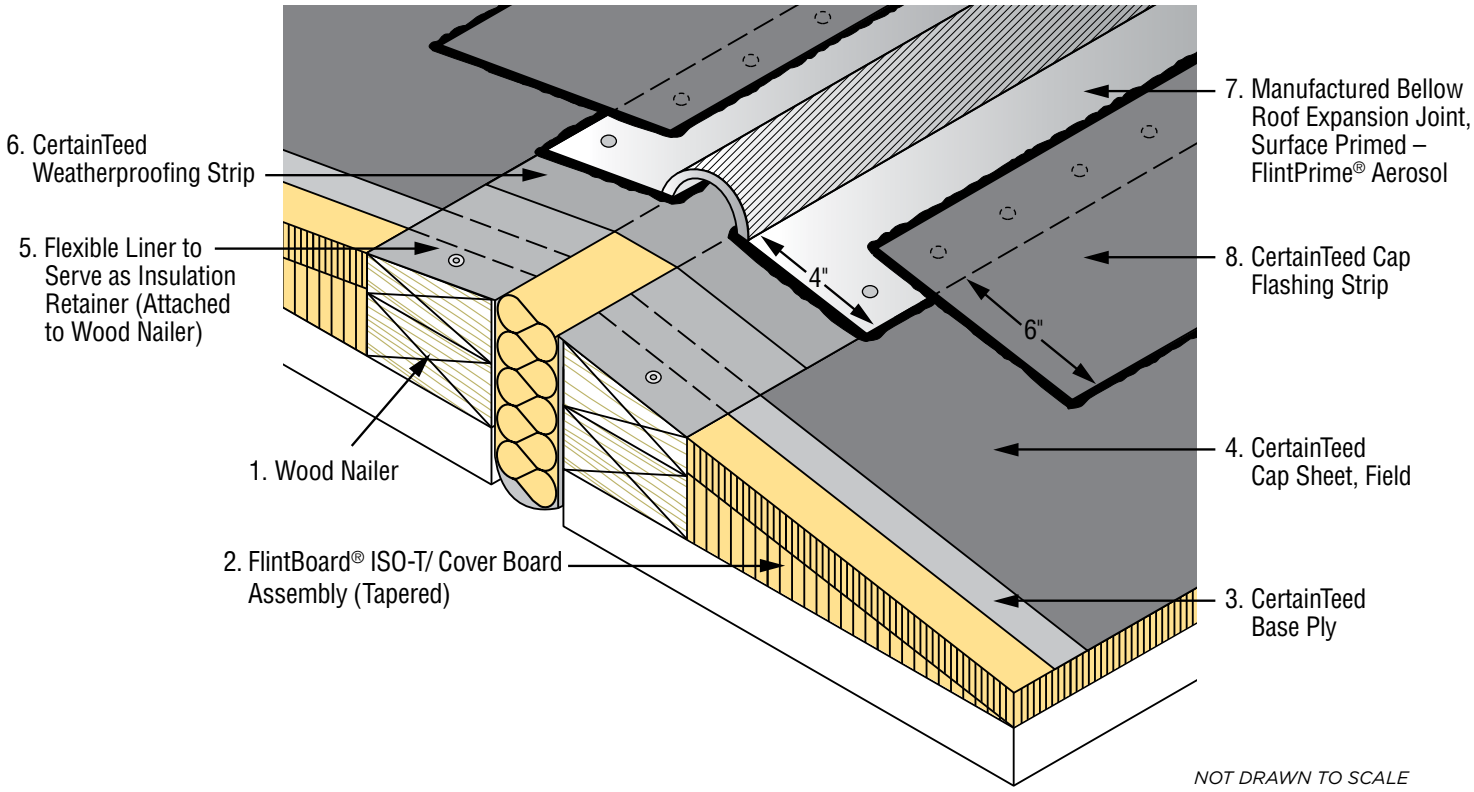
Cap Sheet, Field
Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by product selection.

Flexible Liner
Mechanically attach with appropriate fasteners, 9″ o.c.

Weatherproofing Strip
Self-adhere WinterGuard® Metal, WinterGuard® HT or Flintlastic® SA PlyBase/SA MidPly.

Manufactured Bellow
Set in 1/8″-1/4″ uniform bed of FlintBond® Trowel adhesive and mechanically attach with appropriate fasteners 4″ o.c.; endlaps shall be set in FlintBond® Trowel with two nails; prime surface of flange with FlintPrime® Aerosol.

Cap Sheet Flashing Strip
Fully adhere (self-adhered, torch, cold process or hot asphalt), extending a minimum 6″ beyond the metal flange. Proper attachment is defined by product selection. Treat the granulated surface of Cap Sheet, Field, where the Cap Flashing Strip overlap occurs: **If self-adhered or using cold process** apply FlintBond Trowel to entire lapped surface with 1/4″ bleed out or (in cold weather[1]) hot air weld[2] to metal and Cap Sheet, Field with bead of FlintBond Caulk at edge; **If torch-welded** heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4″ bleed out; **if using hot asphalt** apply to entire lapped surface with 1/4″ bleed out.



NOT DRAWN TO SCALE

[1] 20°F – 49°F (-6°C – 9°C)

[2] Apply heat from a hot-air welder with a 2″ tip to the metal/granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 300°F-500°F (setting 2-3), apply heat to the overlap interface while bonding Cap with rolling pressure onto the Metal/granular surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. Continue overlap application, 2″ per pass.

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CT-19A Raised Flexible Expansion Joint Flashing

Anchor Sheet or Base Ply, Field
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment of the base layer is defined by specified system, product selection and deck type.

Cap Sheet, Field
Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by product selection. Extend base ply and cap sheet 2″ above cant strip; adhere to cant strip only.

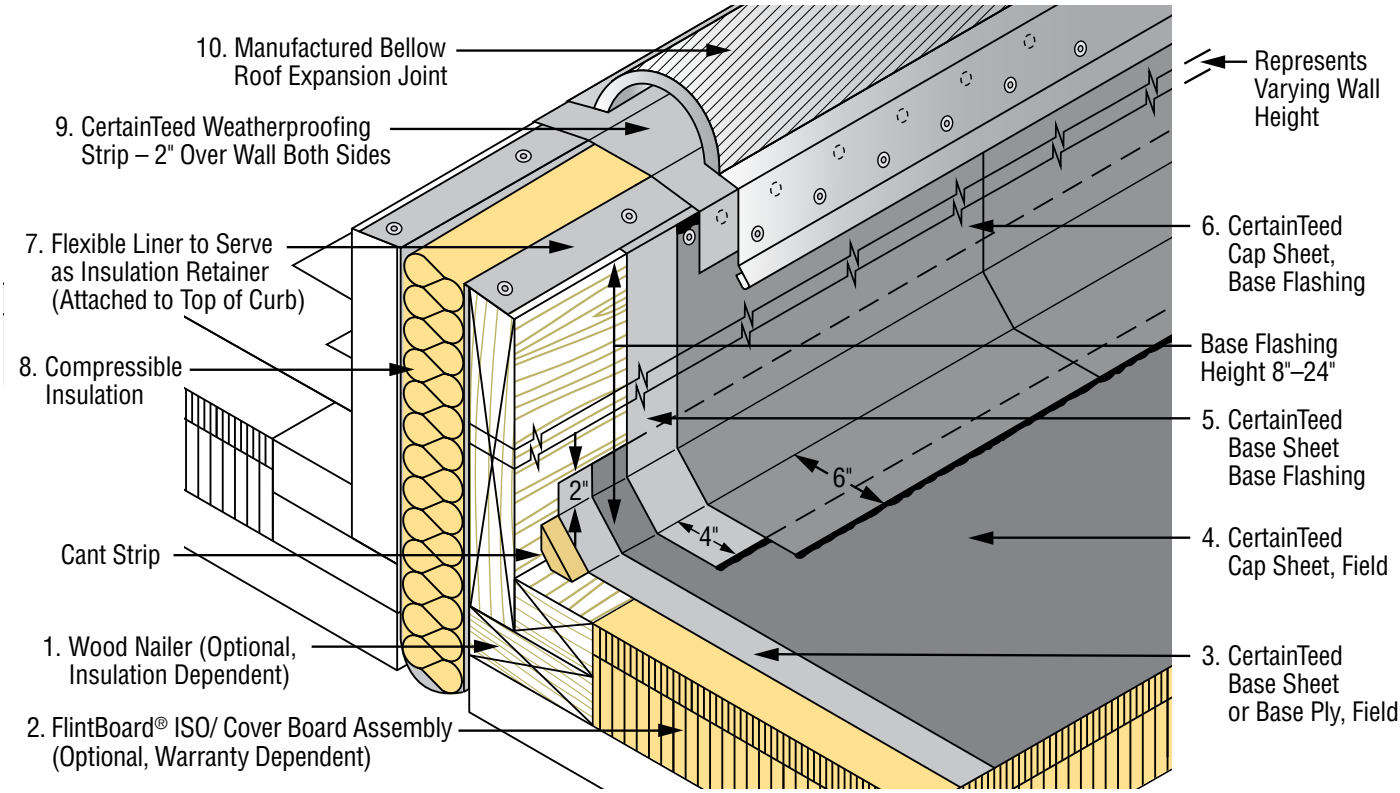
Base Flashing
WALL ATTACHMENT: Mechanically attach Anchor 12″ o.c. or self-adhere Base Ply; Fully adhere Cap (self-adhered, torch-weld, cold process or hot asphalt; Gang fasten Base and Cap at top edge 9″ o.c. with tin discs; Ensure 1.4″ bleed out on top edge or apply FlintBond® Caulk. FIELD ATTACHMENT: Treat the granulated surface of Cap Sheet, Field, where the Base Flashing overlap occurs: **If self-adhered** or using cold process apply FlintBond Trowel to entire lapped surface with 1/4″ bleed out or (in cold weather[1]) hot air weld[2] with bead of FlintBond Caulk at edge; **If torch-welded (cap only[3])** heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4″ bleed out; **if using hot asphalt** apply to entire lapped surface with 1/4″ bleed out.

Flexible Liner
Mechanically attach with appropriate fasteners, 9″ o.c.

Weatherproofing Strip
Self-adhere WinterGuard® Metal, WinterGuard® HT or Flintlastic® PlyBase/MidPly. Turn down over wall 2″ both sides (to be gang fastened when bellow is attached).

Manufactured Bellow
Mechanically attach with appropriate fasteners 9″ o.c.; endlaps shall be set in FlintBond Trowel with two nails; prime surface of flange with FlintPrime® Aerosol.

CertainTeed recommends strapping all Base Flashing and Counterflashing rolls, running the width of the roll up or perpendicular to the vertical surface.



NOT DRAWN TO SCALE

Rev 04/26

[1] 20°F–49°F (-6°C–9°C)

[2] Apply heat from a hot-air welder with a 2″ tip to the overlapped granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 900°F-1,100°F (setting 8-10), apply heat to the overlap interface while bonding Cap with rolling pressure on the granulated surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. Apply a bead of FlintBond Caulk along the edge. Continue overlap application, 2″ per pass.

[3] When potential fire hazards can be mitigated CertainTeed considers it acceptable to direct torch provided low output (50,000 BTU or less) equipment is used; when potential fire hazards cannot be mitigated indirect torching methods should be utilized.

CT-19B Roof to Wall Expansion Joint Flashing

Use this detail when the potential for differential movement may occur between the deck and a vertical surface. Wood members should not be fastened to the wall.

Anchor Sheet or Base Ply, Field
Mechanically attach or Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by specified system, product selection and deck type.

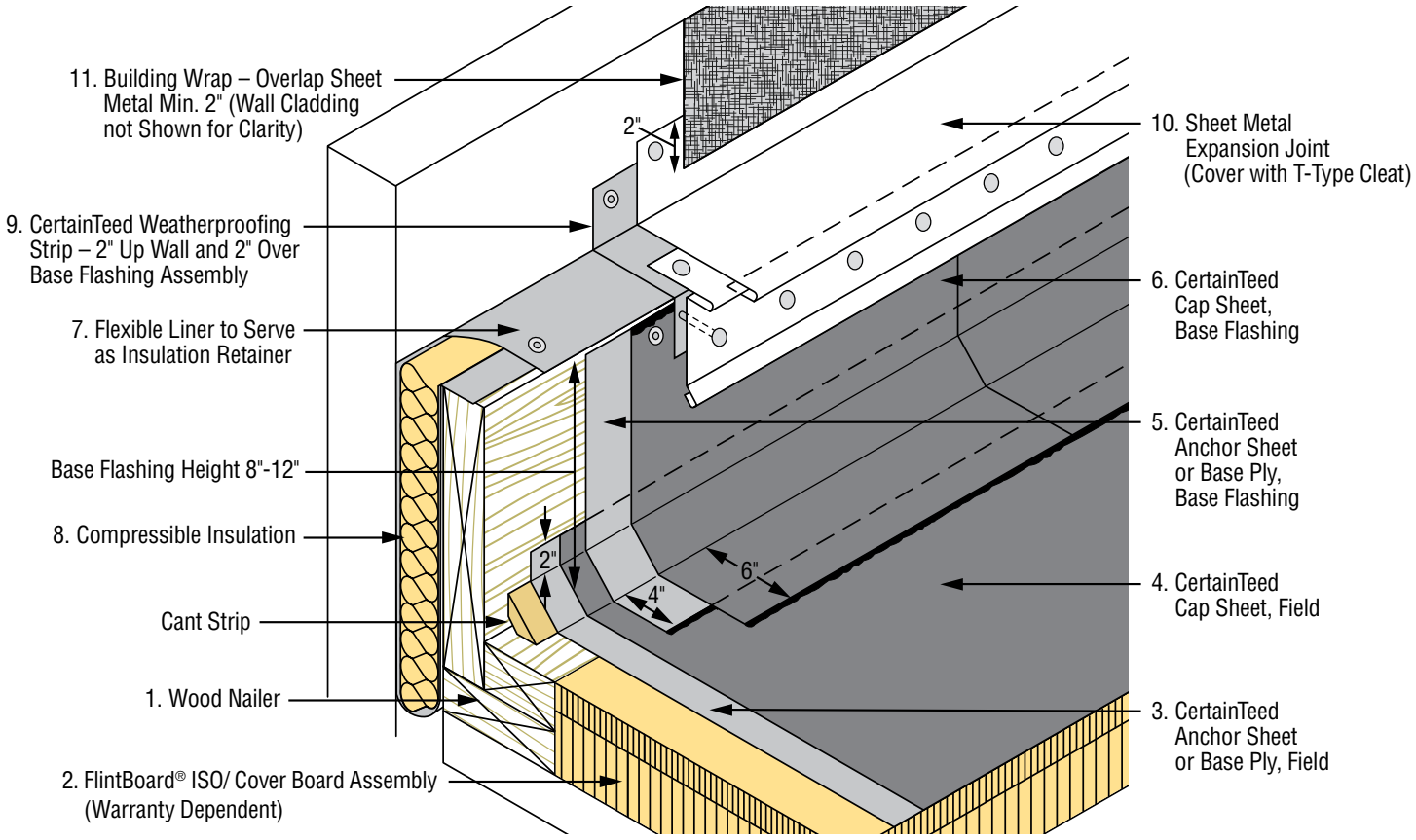
Cap Sheet, Field
Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by product selection. Extend base ply and cap sheet 2″ above cant strip; adhere to cant strip only.

Base Flashing
WALL ATTACHMENT: Mechanically attach Anchor 12″ o.c. or self-adhere Base Ply; Fully adhere Cap (self-adhered, torch-weld, cold process or hot asphalt; Gang fasten Base and Cap at top edge 9″ o.c. with tin discs; Ensure 1.4″ bleed out on top edge or apply FlintBond® Caulk. FIELD ATTACHMENT: Treat the granulated surface of Cap Sheet, Field, where the Base Flashing overlap occurs: **If self-adhered or using cold process** apply FlintBond Trowel to entire lapped surface with 1/4″ bleed out or (in cold weather[1]) hot air weld[2] with bead of FlintBond Caulk at edge; **If torch-welded (cap only[3])** heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4″ bleed out; **if using hot asphalt** apply to entire lapped surface with 1/4″ bleed out.

Weatherproofing Strip
Secure and self-adhere CertainTeed WinterGuard® Metal, WinterGuard® HT or Flintlastic® SA PlyBase 2″ up the wall and turned down over base flashing, nail top edge 12″ o.c. with 11 gauge ring shank nails.

Sheet Metal
Refer to the Architectural Metal Flashing section of the NRCA Roofing Manual for securement options.

CertainTeed recommends strapping all Base Flashing and Counterflashing rolls, running the width of the roll up or perpendicular to the vertical surface.



NOT DRAWN TO SCALE

Rev 04/26

[1] 20°F–49°F (-6°C–9°C)

[2] Apply heat from a hot-air welder with a 2″ tip to the overlapped granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 900°F-1,100°F (setting 8-10), apply heat to the overlap interface while bonding Cap with rolling pressure on the granulated surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. Apply a bead of FlintBond Caulk along the edge. Continue overlap application, 2″ per pass.

[3] When potential fire hazards can be mitigated CertainTeed considers it acceptable to direct torch provided low output (50,000 BTU or less) equipment is used; when potential fire hazards cannot be mitigated indirect torching methods should be utilized.

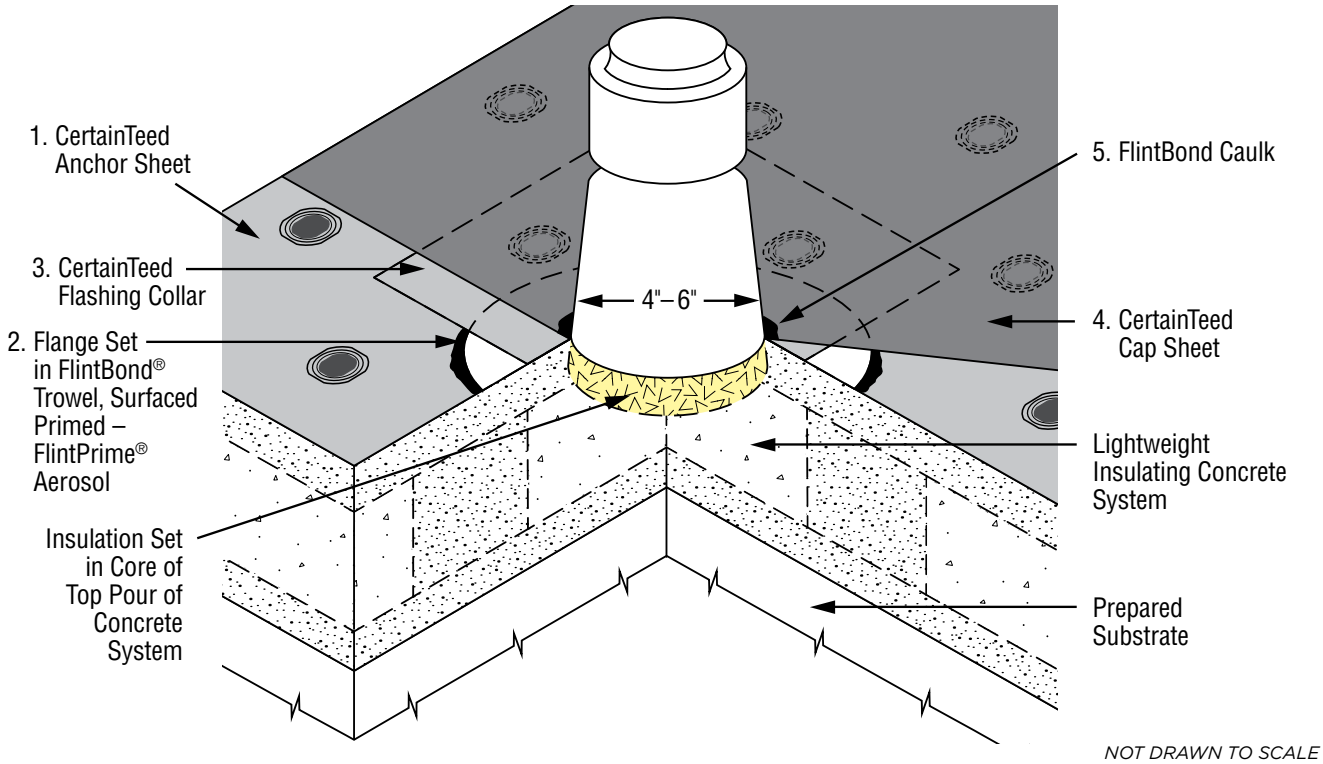
CT-20 Roof Vent Flashing

One way vents should be prefabricated from spun aluminum; plastic vents are not acceptable. Refer to CertainTeed Commercial Roof Systems Specifications, General Recommendations, Section 3.9 for application recommendations for Lightweight Insulating Concrete Decks.

Pressure Release Vent
Install a minimum 4″ diameter pressure release vent with 4″ wide primed continuous flange and weather resistant hood 20 feet from perimeter edges and 40 feet o.c. thereafter, located directly over 4″ diameter opening cut through the roof system and into the insulating fill not less than 2″; center the release vent over the prepared opening on top of the complete filed membrane. Prime surface with FlintPrime Aerosol.

Anchor Sheet
Mechanically attach with FlintFast® FM 90 Base Sheet Fastener, Twin Loc or Do-All Loc Nails a minimum 9″ o.c. in sidelaps and two staggered rows space 18″ o.c. in the field.

Flashing Collar & Cap Sheet
Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by product selection.



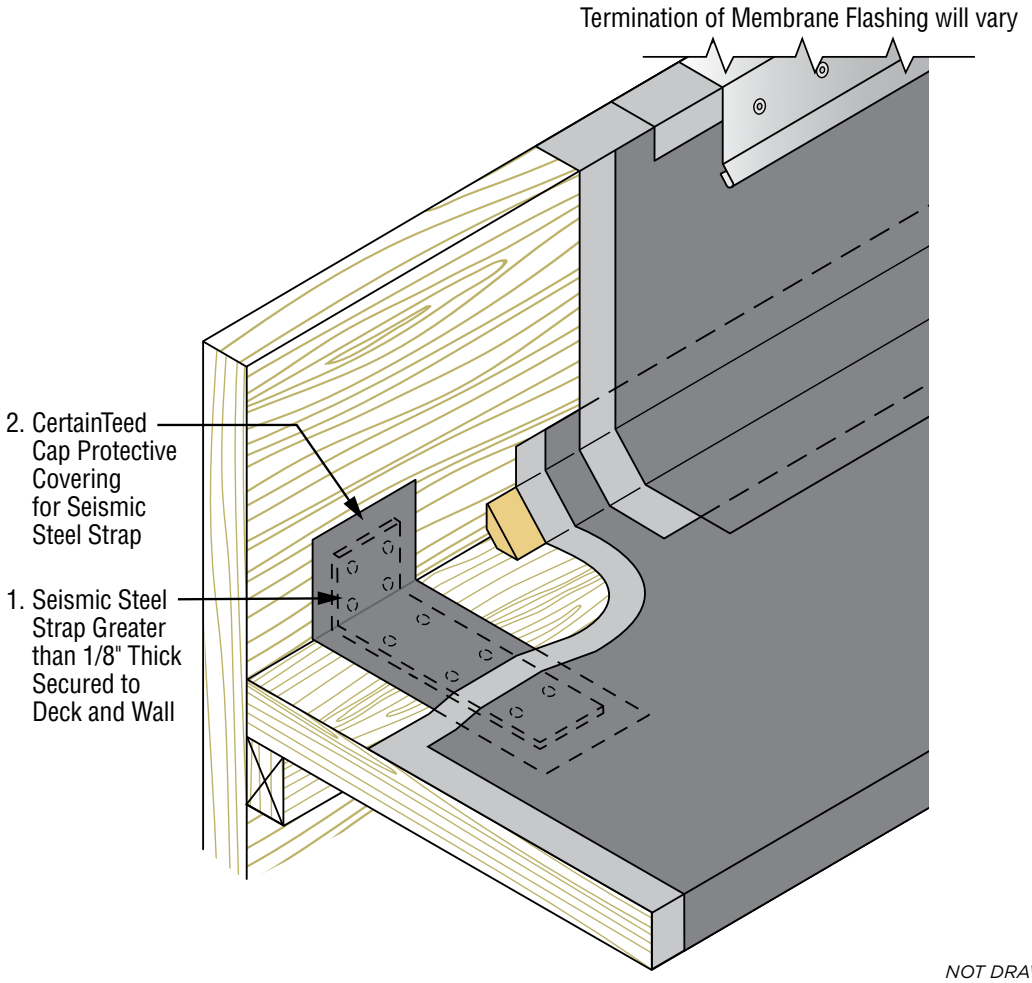
NOT DRAWN TO SCALE

Rev 01/23

CT-21 Seismic Strap Flashing

This detail is intended to illustrate application associated with a seismic strap. See appropriate parapet wall detail for Base Flashing application instructions.

To reduce stress on roof membrane from seismic strap friction and heat, loose lay Cap Protective Covering atop seismic strap, tack in place as needed.



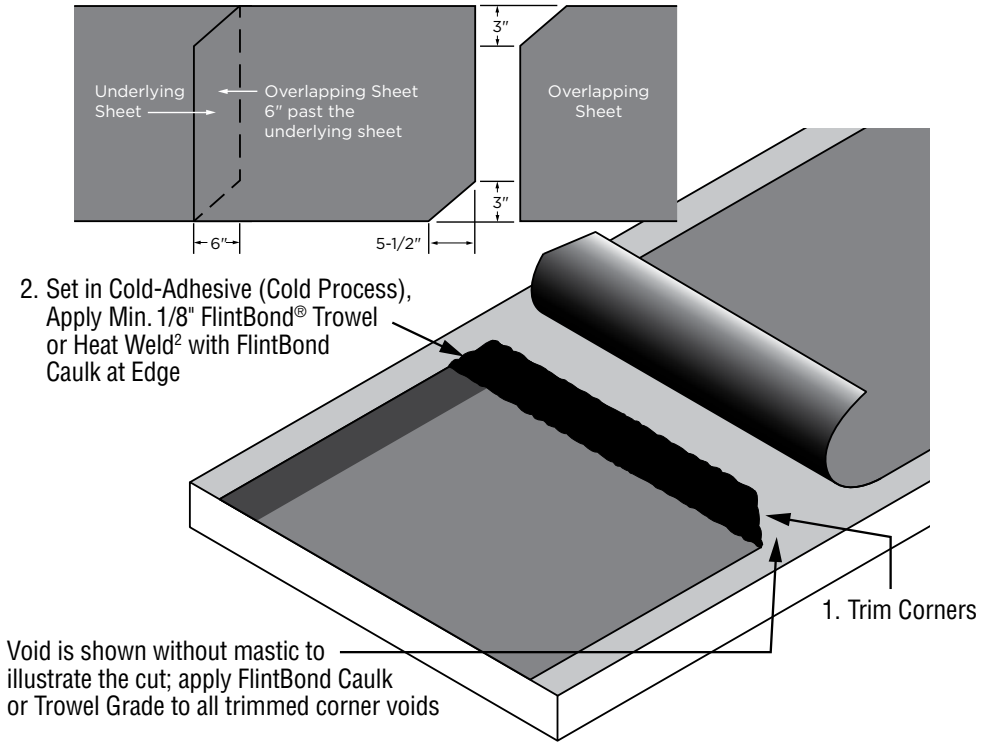
NOT DRAWN TO SCALE

Rev 01/23

CT-22 End Lap Detail

Base Ply, Interply, Cap Corner Treatment
For fully adhered Base Plies, Interplies and Cap Sheets, trim the underlying sheet's lower outside corner at the end of the roll as shown; follow with the overlapping sheet trimming the upper outside corner as shown.

If self-adhered or using cold adhesive apply FlintBond® Trowel to entire lapped surface with 1/4" bleed out or (in cold weather[1]) hot air weld[2] with bead of FlintBond Caulk at edge; **If torch-welded** heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4" bleed out; **if using hot asphalt** apply to entire lapped surface with 1/4" bleed out.



NOT DRAWN TO SCALE

[1] 20°F – 49°F (-6°C – 9°C)

[2] Apply heat from a hot-air welder with a 2" tip to the overlapped granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 900°F-1,100°F (setting 8-10), apply heat to the overlap interface while bonding Cap with rolling pressure on the granulated surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. Apply a bead of FlintBond Caulk along the edge. Continue overlap application, 2"-3" per pass.

Scan to View Detail Installation

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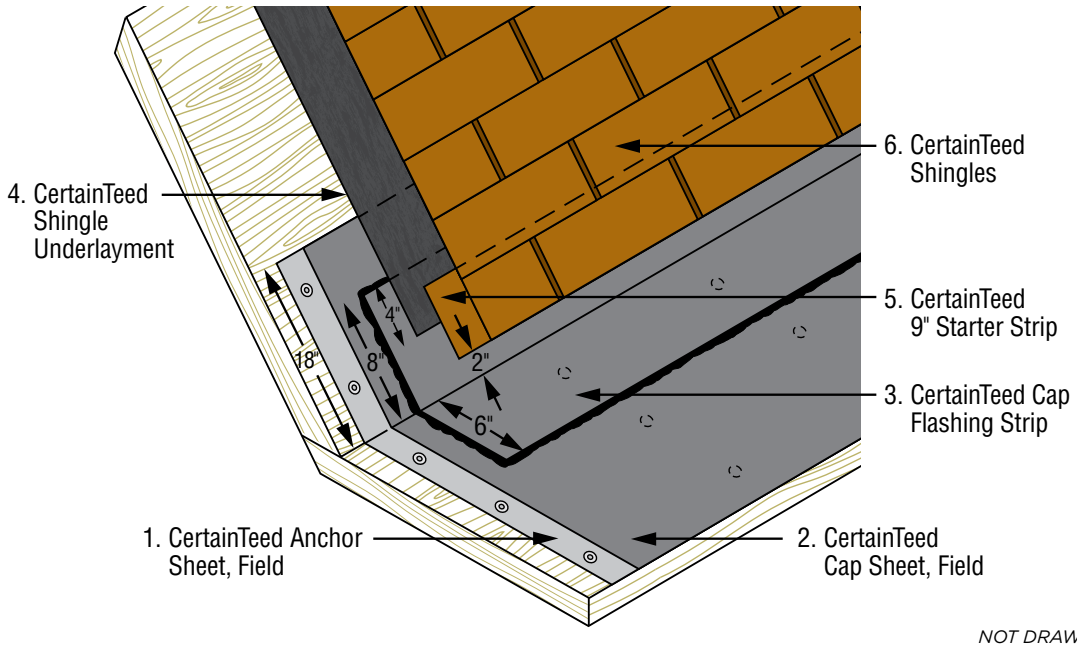
CT-23 Steep to Low-Slope Roof Transition Flashing

Refer to the CertainTeed Shingle Applicator Manual for shingle application guidance.

Anchor Sheet, Field
Mechanically attach with cap nails or approved fasteners spaced a minimum 9″ o.c. in sidelaps and two staggered rows space 18″ o.c. in the field.

Cap Sheet, Field
Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by product selection.

Cap Sheet Flashing Strip
Treat the granulated surface of Cap Sheet, Field, where the Flashing Strip overlap occurs: **If self-adhered or using cold process** apply FlintBond® Trowel to entire lapped surface with 1/4″ bleed out or (in cold weather[1]) hot air weld[2] with bead of FlintBond Caulk at edge; **If torch-welded** heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4″ bleed out; **if using hot asphalt** apply to entire lapped surface with 1/4″ bleed out.



NOT DRAWN TO SCALE

[1] 20°F – 49°F (-6°C – 9°C)

[2] Apply heat from a hot-air welder with a 2″ tip to the overlapped granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 900°F-1,100°F (setting 8-10), apply heat to the overlap interface while bonding Cap with rolling pressure on the granulated surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. Apply a bead of FlintBond Caulk along the edge. Continue overlap application, 2″-3″ per pass.

Scan to View Detail Installation

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CT-24 Mansard Roof Transition Flashing

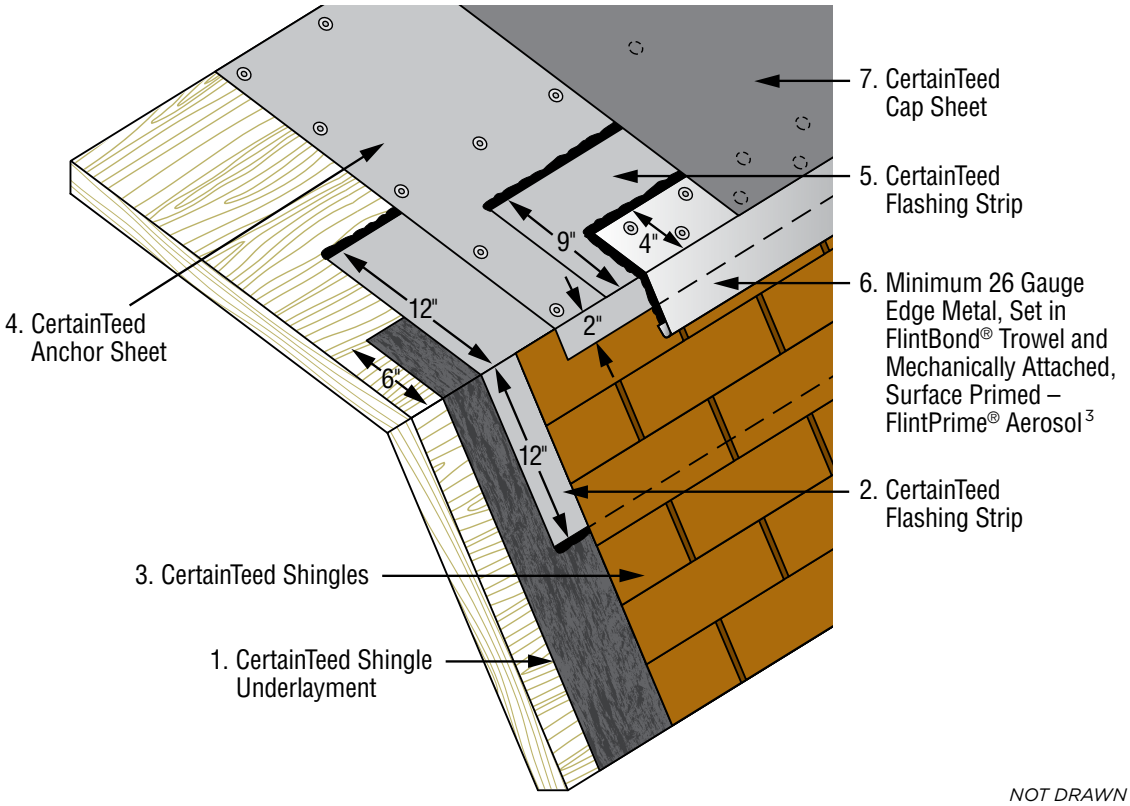
Refer to the CertainTeed Shingle Applicator Manual for underlayment and shingle application guidance.

CertainTeed Flintlastic Strip
Fully adhere (self-adhered, cold process). **If self-adhered** apply Flintbond® Caulk at edge; **if using cold process** set in FlintBond Trowel with 1/4″ bleed out at edge.

Anchor Sheet, Field
Mechanically attach with cap nails or approved fasteners spaced a minimum 9″ o.c. in sidelaps and two staggered rows space 18″ o.c. in the field.

Edge Metal
Set in FlintBond Trowel. Mechanically attach a minimum two staggered rows, 6″ o.c. or as required by building code; endlaps should receive two nails. Prime surface with FlintPrime® Aerosol.[3]

Cap Sheet
Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by product selection. **If self-adhered,** in cold weather[1] where Flintlastic® SA Cap (FR) Sheet overlaps Edge Metal, affix Arctic Edge Cold Lap Tape[2] to top surface of Metal prior to installing the Cap. Finish with a bead of FlintBond Caulk at edge, kept in a warm location when not in use.



NOT DRAWN TO SCALE

[1] 35°F–49°F (2°C–9°C)

[2] Please refer to Arctic Edge Applicator Guide for comprehensive installation instructions.

[3] Not required in cold weather conditions when Arctic Edge is used.

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CT-25 Termination Bar Flashing

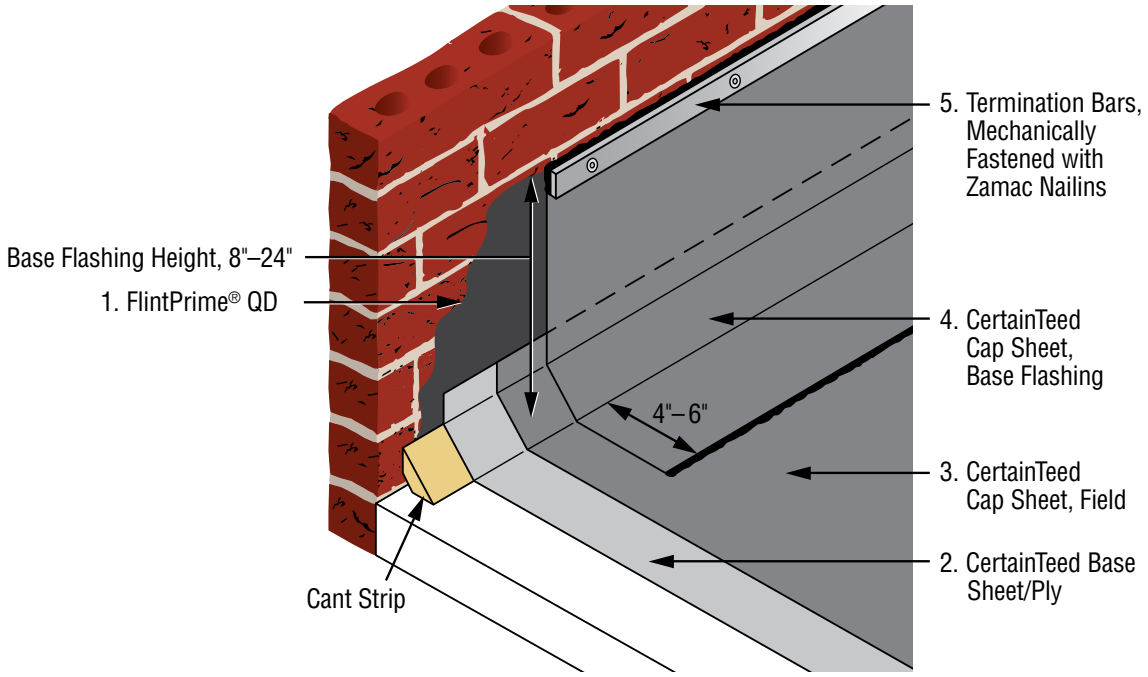
Prime vertical surface with FlintPrime® QD or FlintPrime SA, as appropriate for Cap Sheet Base Flashing application method.

Anchor Sheet or Base Ply, Field
Mechanically attach or Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by specified system, product selection and deck type.

Cap Sheet, Field
Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by product selection. Extend base ply and cap sheet 2″ above cant strip; adhere to cant strip only.

Base Flashing
WALL ATTACHMENT: **If self-adhered** apply FlintBond® Caulk to top edge; **If torch-welded** ensure 1/4″ bleed out at top edge; **If using cold adhesive** set in FlintBond Trowel with 1/4″ bleed out at top edge; if using hot asphalt ensure 1/4″ bleed out at top edge. Terminate top edge with FlintFast® Termination Bar and Zamac Nails. FIELD ATTACHMENT: Treat the granulated surface of Cap Sheet, Field, where the Base Flashing overlap occurs: **If self-adhered or using cold process** apply FlintBond Trowel to entire lapped surface with 1/4″ bleed out or (in cold weather[1]) hot air weld[2] with bead of FlintBond Caulk at edge; **If torch-welded** heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4″ bleed out; **if using hot asphalt** apply to entire lapped surface with 1/4″ bleed out.

CertainTeed recommends strapping all Base Flashing and Counterflashing rolls, running the width of the roll up or perpendicular to the vertical surface.



NOT DRAWN TO SCALE

Premium Application
Add a CertainTeed Modified Bitumen Base Ply behind the Cap Sheet, Counterflashing. Extend it a minimum of 4″ out onto the Cap Sheet, Field. Extend the Cap Sheet, Counterflashing out onto the Cap Sheet, Field a minimum of 4″ beyond the underlying additional ply.

[1] 20°F – 49°F (-6°C – 9°C)

[2] Apply heat from a hot-air welder with a 2″ tip to the overlapped granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 900°F-1,100°F (setting 8-10), apply heat to the overlap interface while bonding Cap with rolling pressure on the granulated surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. Apply a bead of FlintBond Caulk along the edge. Continue overlap application, 2″-3″ per pass.

Rev 01/23

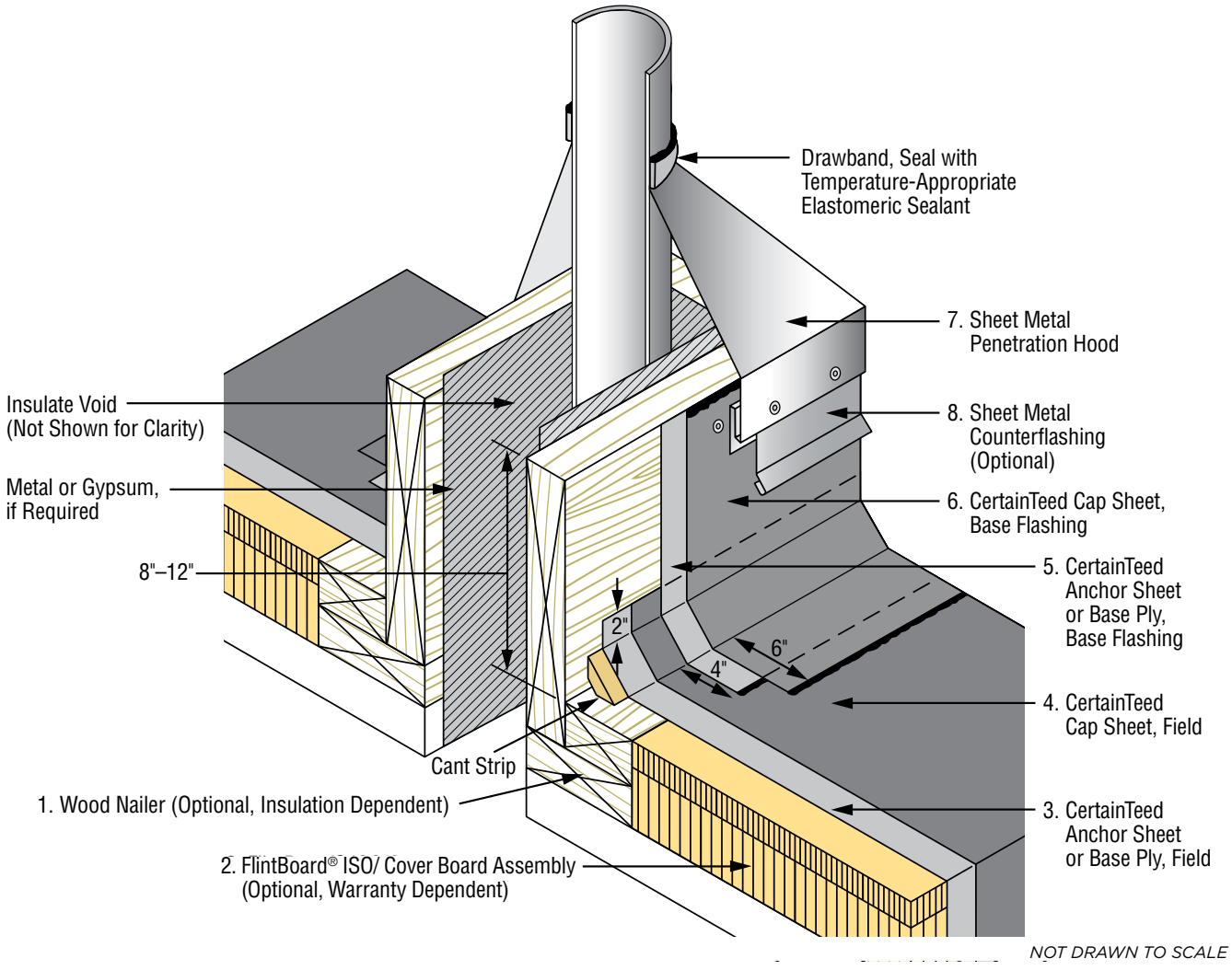
CT-26 Hot Pipe Flashing

Anchor Sheet or Base Ply, Field
Mechanically attach or Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by specified system, product selection and deck type.

Cap Sheet, Field
Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by product selection. Extend base ply and cap sheet 2″ above cant strip; adhere to cant strip only.

Base Flashing
CURB ATTACHMENT: Mechanically attach Anchor 12″ o.c. or self-adhere Base Ply; Fully adhere Cap (self-adhered, torch-weld, cold process or hot asphalt; Gang fasten Base and Cap at top edge 9″ o.c. with tin discs; Ensure 1.4″ bleed out on top edge or apply FlintBond® Caulk. FIELD ATTACHMENT: Treat the granulated surface of Cap Sheet, Field, where the Base Flashing overlap occurs: **If self-adhered or using cold process** apply FlintBond Trowel to entire lapped surface with 1/4″ bleed out or (in cold weather[1]) hot air weld[2] with bead of FlintBond Caulk at edge; **If torch-welded (cap only[3])** heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4″ bleed out; **if using hot asphalt** apply to entire lapped surface with 1/4″ bleed out.

Sheet Metal
Refer to the Architectural Metal Flashing section of the NRCA Roofing Manual for securement options.



NOT DRAWN TO SCALE

[1] 20°F–49°F (-6°C–9°C)

Rev 04/26

[2] Apply heat from a hot-air welder with a 2″ tip to the overlapped granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 900°F-1,100°F (setting 8-10), apply heat to the overlap interface while bonding Cap with rolling pressure on the granulated surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. Apply a bead of FlintBond Caulk along the edge. Continue overlap application, 2″ per pass.

[3] When potential fire hazards can be mitigated CertainTeed considers it acceptable to direct torch provided low output (50,000 BTU or less) equipment is used; when potential fire hazards cannot be mitigated indirect torching methods should be utilized.

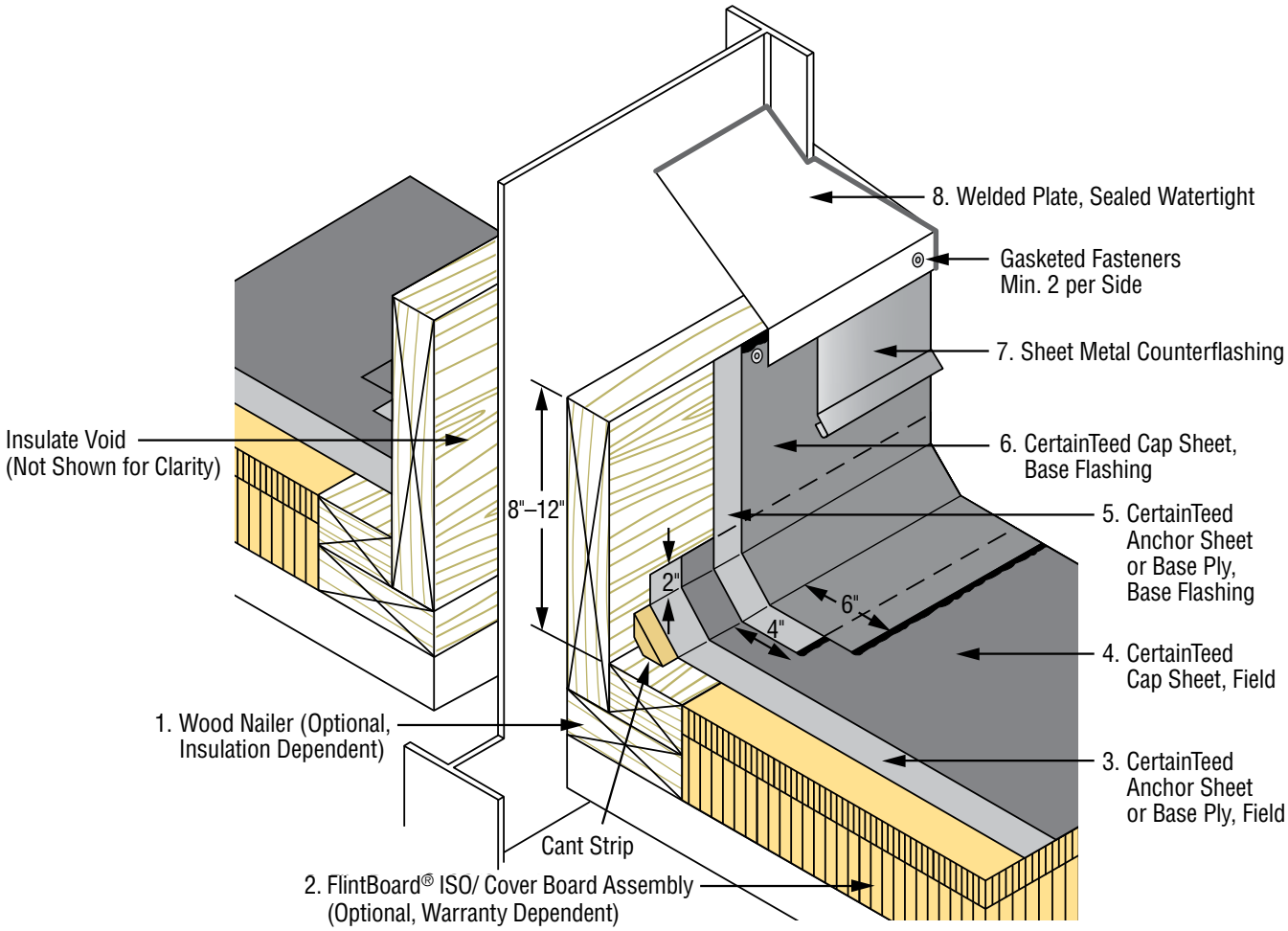
CT-27 Structural Member Thru Roof Deck Flashing

Anchor Sheet or Base Ply, Field
Mechanically attach or Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by specified system, product selection and deck type.

Cap Sheet, Field
Fully adhere (self-adhered, torch, cold process or hot asphalt). Proper attachment is defined by product selection. Extend base ply and cap sheet 2″ above cant strip; adhere to cant strip only.

Base Flashing
CURB ATTACHMENT: Mechanically attach Anchor 12″ o.c. or self-adhere Base Ply; Fully adhere Cap (self-adhered, torch-weld, cold process or hot asphalt; Gang fasten Base and Cap at top edge 9″ o.c. with tin discs; Ensure 1.4″ bleed out on top edge or apply FlintBond Caulk. FIELD ATTACHMENT: Treat the granulated surface of Cap Sheet, Field, where the Base Flashing overlap occurs: **If self-adhered or using cold process** apply FlintBond® Trowel to entire lapped surface with 1/4″ bleed out or (in cold weather[1]) hot air weld[2] with bead of FlintBond Caulk at edge; **If torch-welded (cap only[3])** heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4″ bleed out; **if using hot asphalt** apply to entire lapped surface with 1/4″ bleed out.

Sheet Metal
Refer to the Architectural Metal Flashing section of the NRCA Roofing Manual for securement options.



NOT DRAWN TO SCALE

[1] 20°F–49°F (-6°C–9°C)

Rev 04/26

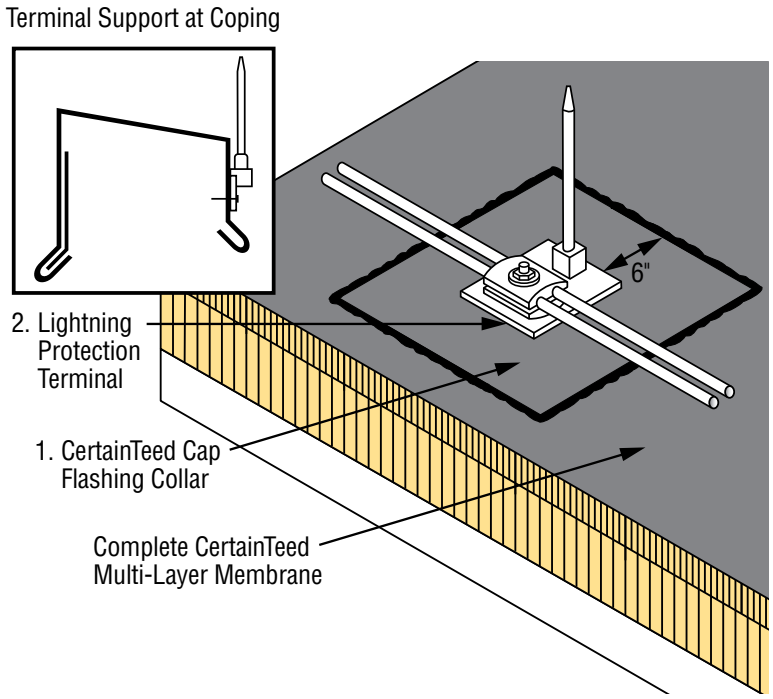
[2] Apply heat from a hot-air welder with a 2″ tip to the overlapped granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 900°F-1,100°F (setting 8-10), apply heat to the overlap interface while bonding Cap with rolling pressure on the granulated surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. Apply a bead of FlintBond Caulk along the edge. Continue overlap application, 2″ per pass.

[3] When potential fire hazards can be mitigated CertainTeed considers it acceptable to direct torch provided low output (50,000 BTU or less) equipment is used; when potential fire hazards cannot be mitigated indirect torching methods should be utilized.

CT-28 Lightning Terminal Flashing

This detail depicts the weatherproofing protection and does not represent lightning protection design.

Extend Flashing Collar a minimum 6″ beyond edge of Terminal. Treat the granulated surface of Cap Sheet, Field, where the Cap Sheet Flashing Collar overlap occurs: **If self-adhered or using cold adhesive** apply FlintBond® Trowel to entire lapped surface with 1/4″ bleed out or (in cold weather[1]) hot air weld[2] with bead of FlintBond Caulk at edge; **If torch-welded** heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4″ bleed out; **if using hot asphalt** apply to entire lapped surface with 1/4″ bleed out.



NOT DRAWN TO SCALE

[1] 20°F – 49°F (-6°C – 9°C)

[2] Apply heat from a hot-air welder with a 2″ tip to the overlapped granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 900°F-1,100°F (setting 8-10), apply heat to the overlap interface while bonding Cap with rolling pressure on the granulated surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward.

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CT-29 Back Nailing - Insulated or Non-Nailable Substrates

Use this detail when applying CertainTeed built-up and SBS-modified bitumen roll goods on slopes greater than 1:12 and APP-modified bitumen membranes on slopes greater than 2:12.

Nailers
Install minimum 3-1/2" wide nailers or woodblocking set flush to surface of deck at all eaves, ridges, rakes and base of curbs. Nailer spacing is membrane dependent:

	Membrane	Polyester Reinforced		Fiberglass Reinforced
		SBS-Modified	APP-Modified	
SLOPE	1"	32' o.c.	N/A (do not backnail)	8' o.c.
	2"-3"		32' o.c.	
	3"<	16' o.c.	16' o.c.	

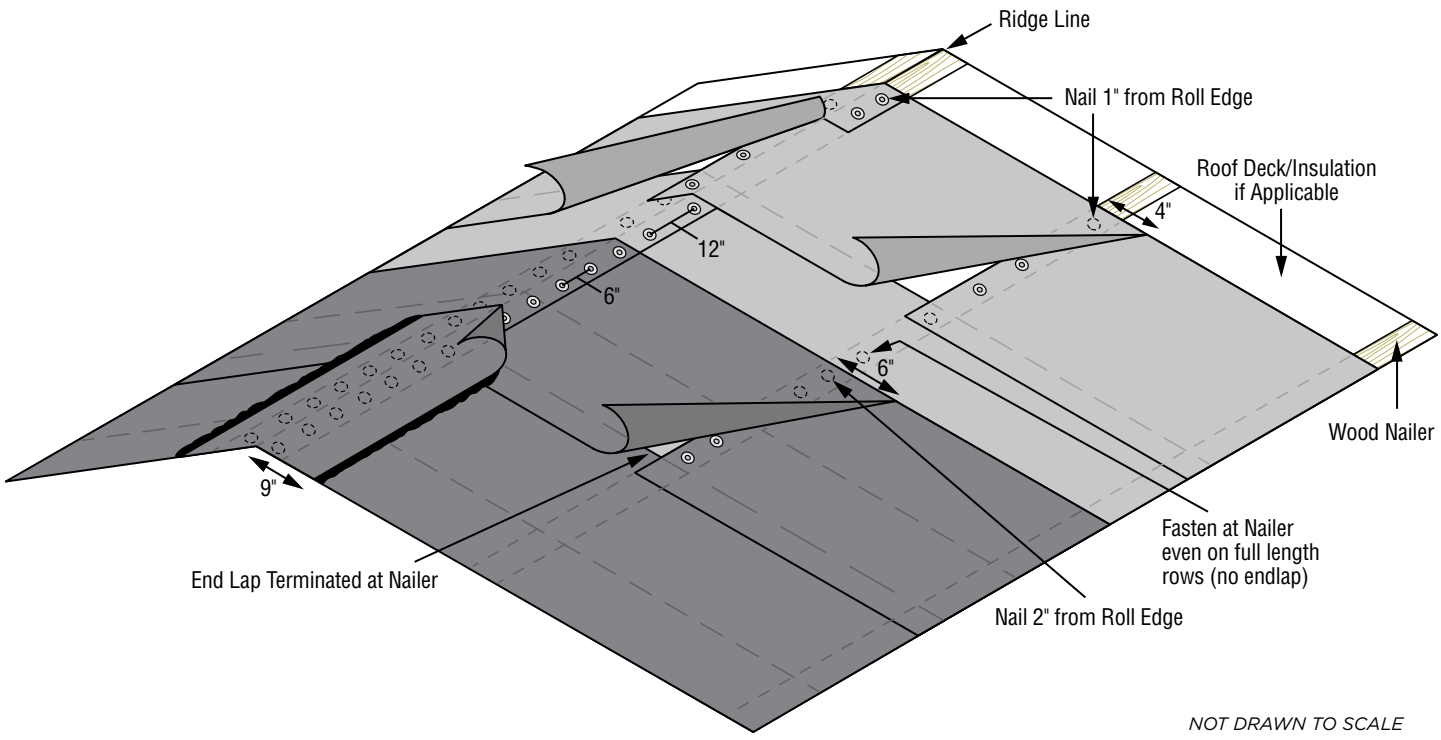
Base Sheet
Fully adhere (self-adhered, torch, cold adhesive or hot asphalt). Proper attachment is defined by specified system, product selection, and substrate type. As with standard application, the width of the first sheet shall be cut to allow all side laps to be staggered:

	2-PLY SYSTEMS		3-PLY SYSTEMS		
	Base	Cap	Base	Interply	Cap
Starter Row Width	19-11/16" (1/2 roll)	39-3/8" (full roll)	26-1/4" (2/3 roll)	19-11/16" (1/2 roll)	39-3/8" (full roll)

Apply parallel to slope, overlapping side laps minimum 2" and/or as building code requires. Beginning 1" from the leading edge of the sheet, fasten to nailers with ring shank nails through tin discs spaced 12" o.c. Overlap all end laps 4". Endlaps must occur at nailers such that the top edge of the overlapped sheet can be fastened to the nailer and the fastener completely covered. Fasten roll into each nailer throughout the deck even if length of a single roll covers the entire deck/substrate (no endlaps).

Cap Sheet
Fully adhere (self-adhered, torch, cold adhesive or hot asphalt). Proper attachment is defined by specified system, product selection, and substrate type. Apply parallel to slope, overlapping side laps minimum 3" and/or as building code requires. Beginning at the ridge line nailer, and 2" from the leading edge of the sheet, fasten to nailer with ring shank nails through tin discs spaced 6" o.c. Overlap all end laps 6". Endlaps must occur at nailers such that the top edge of the overlapped sheet can be fastened to the nailer and the fastener completely covered. If length of roll covers the entire deck/substrate (no endlaps), roll should not be fastened at each nailer, just at the ridge.

Header Flashing Strip
Install a minimum 9" beyond field sheets on both sides of the ridge. Properly treat the granulated surface of Cap Sheet where the Header Flashing Strip overlap occurs: **If self-adhered or using cold adhesive** apply FlintBond® Trowel to entire lapped surface with 1/4" bleed out or (in cold weather[1]) hot air weld[2] with bead of FlintBond Caulk at edge; **If torch-welded** (cap only[3]) heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4" bleed out; **if using hot asphalt** apply to entire lapped surface with 1/4" bleed out.



NOT DRAWN TO SCALE

[1] 20°F–49°F (-6°C–9°C)

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[2] Apply heat from a hot-air welder with a 2" tip to the overlapped granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 900°F-1,100°F (setting 8-10), apply heat to the overlap interface while bonding Cap with rolling pressure on the granulated surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. Apply a bead of FlintBond Caulk along the edge. Continue overlap application, 2"-3" per pass.

[3] When potential fire hazards can be mitigated CertainTeed considers it acceptable to direct torch provided low output (50,000 BTU or less) equipment is used; when potential fire hazards cannot be mitigated indirect torching methods should be utilized.

CT-29A Back Nailing - Nailable Substrates

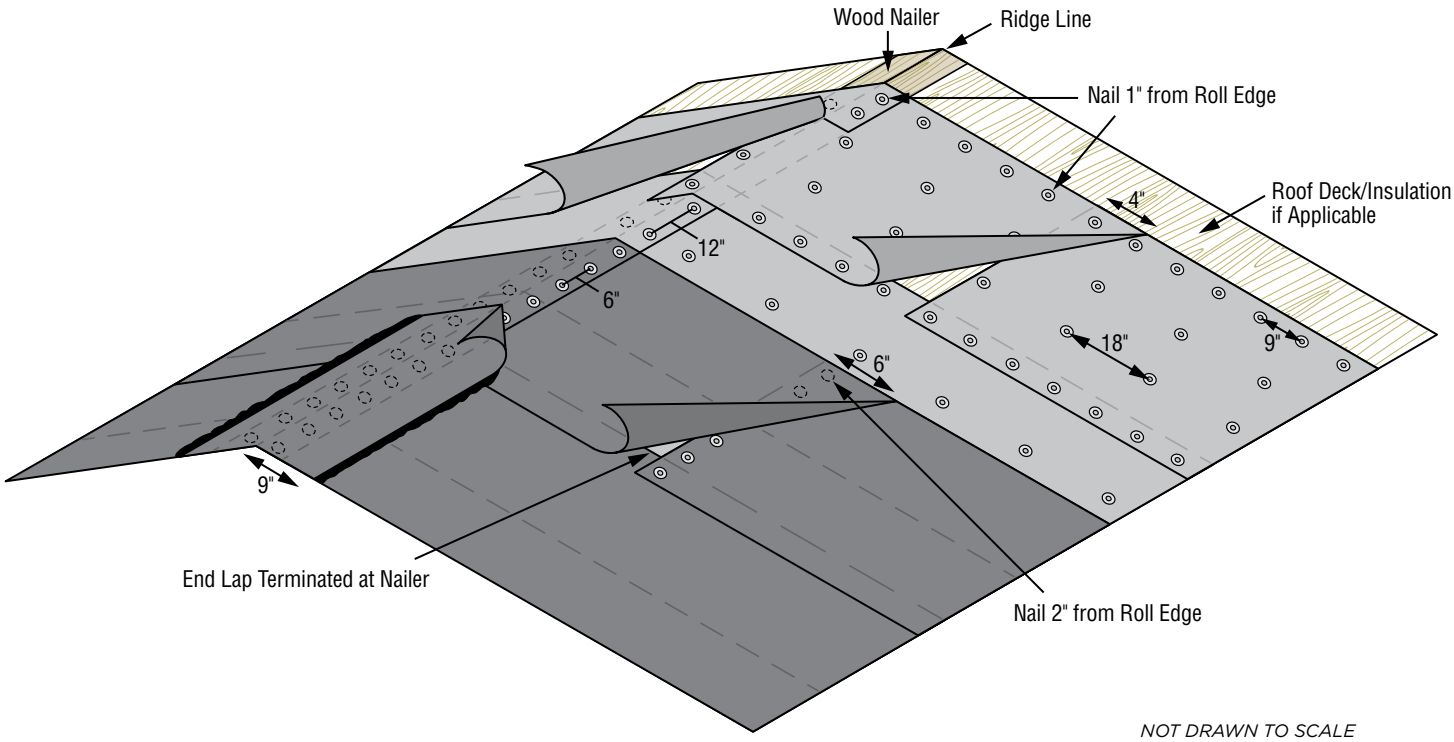
Use this detail when applying CertainTeed built-up and SBS-modified bitumen roll goods on slopes greater than 1:12 and APP-modified bitumen membranes on slopes greater than 2:12

Base Sheet
As with standard application, the width of the first sheet shall be cut to allow all side laps to be staggered:

	2-PLY SYSTEMS		3-PLY SYSTEMS		
	Base	**Cap**	**Base**	**Interply**	**Cap**
Starter Row Width	19-11/16″ (1/2 roll)	39-3/8″ (full roll)	26-1/4″ (2/3 roll)	19-11/16″ (1/2 roll)	39-3/8″ (full roll)

Apply parallel to slope, overlapping side laps minimum 2″ and/or as building code requires. Mechanically attach with ring shank nails through tin discs or other approved fasteners[1] spaced a minimum 9″ o.c. in sidelaps and 18″ o.c. in the field, two staggered rows. At the ridge line, beginning 1″ from the leading edge of the sheet, fasten 12″ o.c. Overlap all end laps 4″. At endlaps, fasten the top edge of the overlapped sheet 12″ o.c: **Cap Sheet** Fully adhere (self-adhered, torch, cold adhesive or hot asphalt). Proper attachment is defined by specified system, product selection, and substrate type. Apply parallel to slope, overlapping side laps minimum 3″ and/or as building code requires. Beginning at the ridge line nailer, and 2″ from the leading edge of the sheet, fasten to nailer with ring shank nails through tin discs or other approved fasteners[1] spaced 6″ o.c. Overlap all end laps 6″. At endlaps, fasten the top edge of the overlapped sheet 12″ o.c.

Header Flashing Strip
Install a minimum 9″ beyond field sheets on both sides of the ridge. Properly treat the granulated surface of Cap Sheet where the Header Flashing Strip overlap occurs: **If self-adhered or using cold adhesive** apply FlintBond® Trowel to entire lapped surface with 1/4″ bleed out or (in cold weather[2]) hot air weld[3] with bead of FlintBond Caulk at edge; **If torch-welded** (cap only[4]) heat sink/scrape the granules with heated trowel or granular embedment tool and ensure 1/4″ bleed out; **if using hot asphalt** apply to entire lapped surface with 1/4″ bleed out.



NOT DRAWN TO SCALE

[1]See Low-Slope Roofing Applicator's Manual – Reference Table – General Guide to Mechanical Fasteners.

[2] 20°F–49°F (-6°C–9°C)

[3]Apply heat from a hot-air welder with a 2″ tip to the overlapped granular surface while applying rolling pressure from a silicone roller to the overlapping Cap. With the hot air welder set between 900°F-1,100°F (setting 8-10), apply heat to the overlap interface while bonding Cap with rolling pressure on the granulated surface. Roll the overlapping Cap in place, moving the hot air welder to allow for forward progress. Avoid applying so much heat or moving at a pace that results in smoke. Apply a bead of FlintBond Caulk along the edge. Continue overlap application, 2″-3″ per pass.

[4]When potential fire hazards can be mitigated CertainTeed considers it acceptable to direct torch provided low output (50,000 BTU or less) equipment is used; when potential fire hazards cannot be mitigated indirect torching methods should be utilized.

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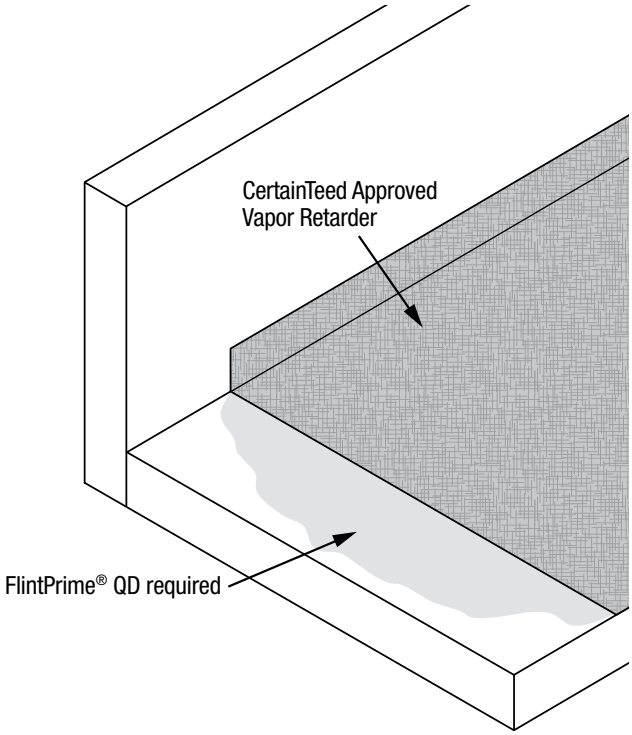
CT-30 Vapor Retarder

Vapor retarders minimize the incursion of water vapor rising from the building interior into the roof membrane where it can accumulate and condense. The need for a vapor retarder should be evaluated by a design professional that has knowledge of the structure and local environment.

CertainTeed's Black Diamond® Base Sheet
This SBS-modified, self-adhered membrane, can be utilized as a vapor retarder and left exposed up to six months. Alternatively, the following CertainTeed membranes may be utilized as a vapor retarder:

- Flintglas® Ply 4 applied in hot asphalt
- Any Flintlastic® base sheet (surface must be covered within 24 hours or primed prior to application of insulation or waterproofing/weathering roof membrane)
- Any Flintlastic cap sheet

The proper attachment of the vapor retarder is defined by product selection and substrate: Prime the deck surface with FlintPrime QD before vapor retarder application.



NOT DRAWN TO SCALE

Rev 01/23

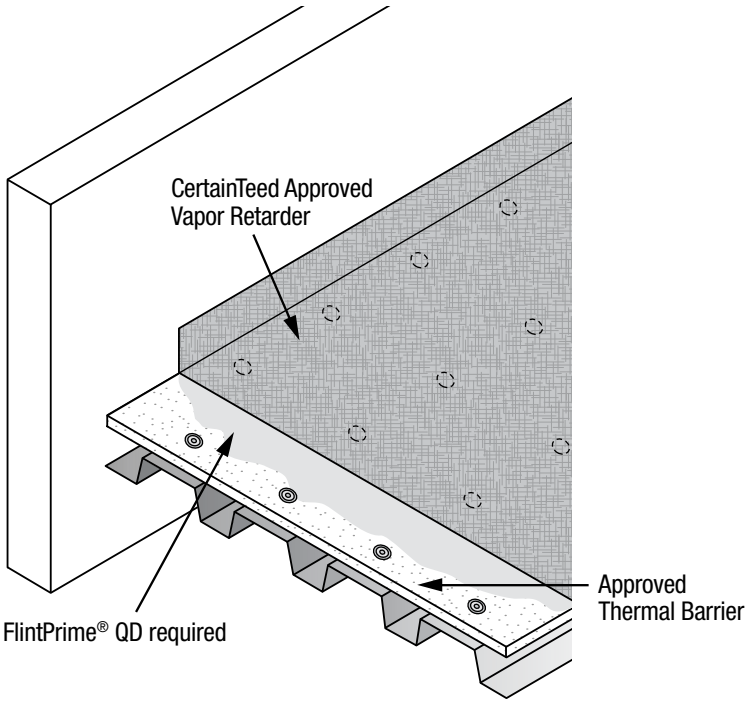
CT-30A Vapor Retarder - Alternate

Vapor retarders minimize the incursion of water vapor rising from the building interior into the roof membrane where it can accumulate and condense. The need for a vapor retarder should be evaluated by a design professional that has knowledge of the structure and local environment.

CertainTeed's Black Diamond® Base Sheet
This SBS-modified, self-adhered membrane, can be utilized as a vapor retarder and left exposed up to six months. Alternatively, the following CertainTeed membranes maybe utilized as a vapor retarder:

- Flintglas® Ply 4 applied in hot asphalt
- Any Flintlastic® base sheet (surface must be covered within 24 hours or primed prior to application of insulation or waterproofing/weathering roof membrane)
- Any Flintlastic cap sheet

The proper attachment of the vapor retarder is defined by product selection and substrate: Prime the deck surface with FlintPrime QD before vapor retarder application. NOTE: Thermal Barriers such as FlintBoard® ISO HD must be installed over steel roof decks prior to the application of a vapor retarder.



NOT DRAWN TO SCALE

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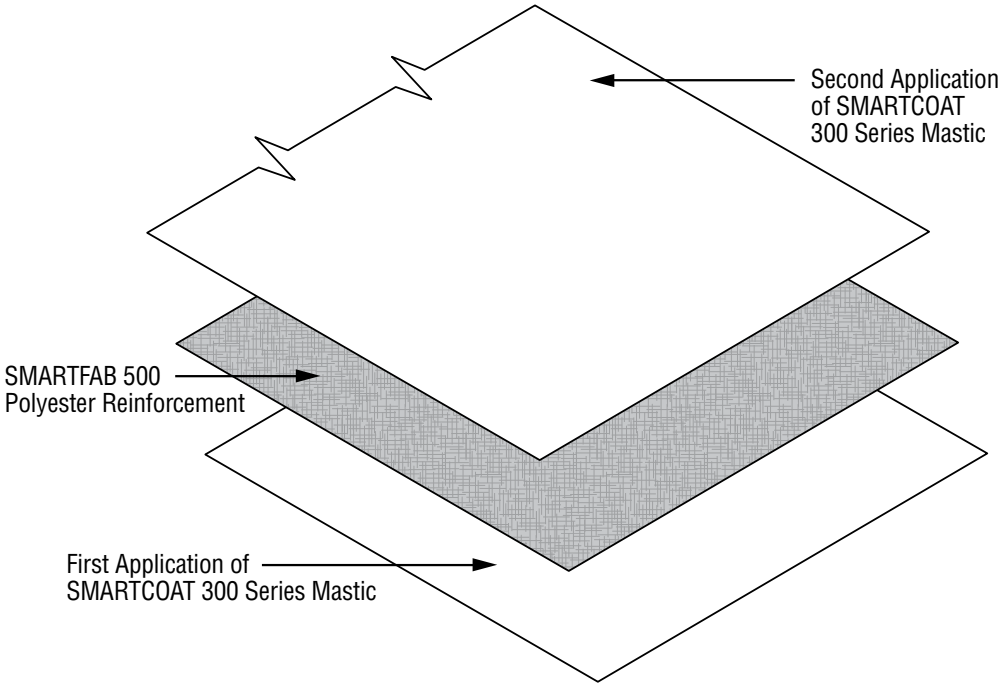
CTL-SC-00 Three/Five Course Flashing

This detail is intended to provide a conceptual approach to repairs or details that call for reinforced mastic, commonly referred to as “3-coursing” or “5-coursing”.

The substrate shall be clean and free of loose or flaking materials prior to application of SMARTCOAT 300 Series Mastic.

1. Apply the first application of SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300 Acrylic Mastic and 1/4″ for 350 Silicone Mastic; thickness shall be sufficient to encapsulate SMARTFAB 500 Polyester Reinforcement. Extend mastic beyond the Reinforcement application to follow to encapsulate polyester surface and edges.
2. Immediately embed the SMARTFAB 500 Reinforcement into the wet material ensuring that the polyester is free of all air pockets and wrinkles.
3. Apply the second application of SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300 Acrylic Mastic and 1/4″ for 350 Silicone Mastic; thickness shall be sufficient to encapsulate edges and surface of reinforcement. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.



NOT DRAWN TO SCALE

NOTE: SMARTCOAT 300 Acrylic Mastic and SMARTCOAT 350 Silicone Mastic are recommended when 3-coursing is required; SMARTCOAT 301 and SMARTCOAT 365 Mastics are fiber reinforced; saturating through polyester can be challenging.

Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone.

Do not apply Mastic at greater than thicknesses prescribed herein as this may cause improper curing. If thicker applications are required, allow initial application to cure prior to applying additional coat(s).

When 3-coursing horizontal details, thinning the viscosity of SMARTCOAT 350 Silicone Mastic with SMARTCOAT 450 High Solids Silicone Coating will not impact performance; do not thin with any other material. Do not thin SMARTCOAT 300/301 Acrylic Mastics.

If 5-course detailing is deemed as required for warranty coverage, once first 3-course is cured, repeat steps 2 and 3.

For additional questions or support contact CertainTeed Commercial Roofing Technical Services Department 1-800-396-8134 x2 or rpg@saint-gobain.com

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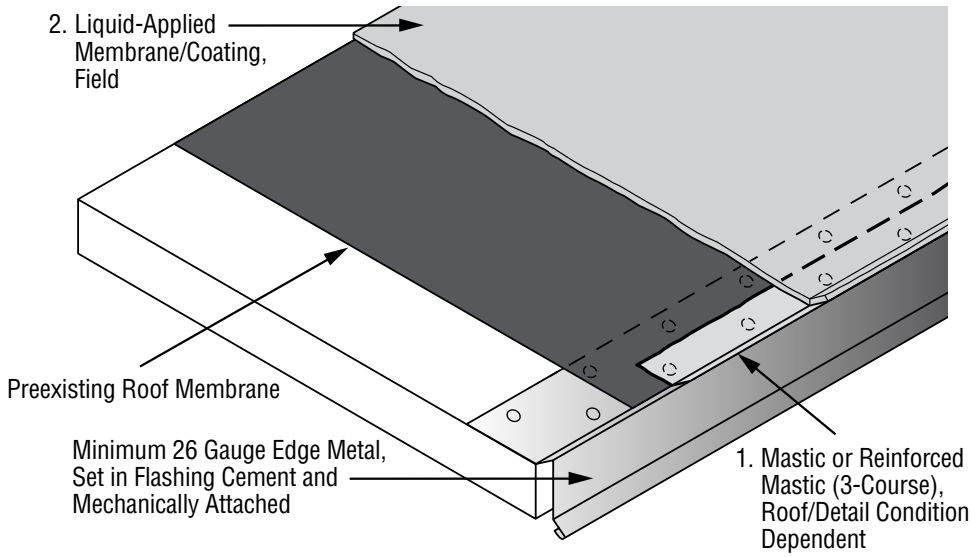
CTL-SC-01 Edge Flashing – Existing Flashing Firm Adhesion

NOTE: Proper edge flashing restoration is condition dependent; CertainTeed offers multiple details for use as required based on the condition of the existing flashing; multiple details could be implemented on a single roof. This detail is applicable to portions of the preexisting edge flashing which are firmly adhered and left in place. See CTL-SC-01A for portions of edge flashing left in place but with points of weak adhesion along the edge or CTL-SC-01B/C for edge flashing that is not firmly adhered and shall be cut back. If weak adhesion points exist at multiple points along the existing edge flashing, potential for movement is throughout and CTL-SC-01A shall be utilized for the entire section; areas of the membrane that are not adhered can be removed.

Edge Metal
Clean exposed metal, completely removing any rust; preexisting edge metal typically does not require primer for adhesion though any rusted areas shall be primed with SMARTCOAT 210 Universal Primer.

Mastic/Reinforced Mastic (3-Course)
Where the preexisting edge flashing is firmly adhered, apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8" for 300/301 Acrylic Mastic and 1/4" for 350/365 Silicone Mastic. If portions of edge flashing have week adhesion points or visually indicate stress/potential movement, where the preexisting membrane meets the metal, reinforce SMARTCOAT 300/350 Mastics: embed SMARTFAB 500 Polyester Reinforcement, minimum 4" width, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

Liquid-Applied Membrane/Coating, Field
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone. If new metal is installed, clean and remove any oil or residue that could inhibit adhesion.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop; if the repair was made with incompatible materials, is failing or has potential for high movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate).

For additional questions or support contact CertainTeed Commercial Roofing Technical Services Department 1-800-396-8134 x2 or rpg@saint-gobain.com

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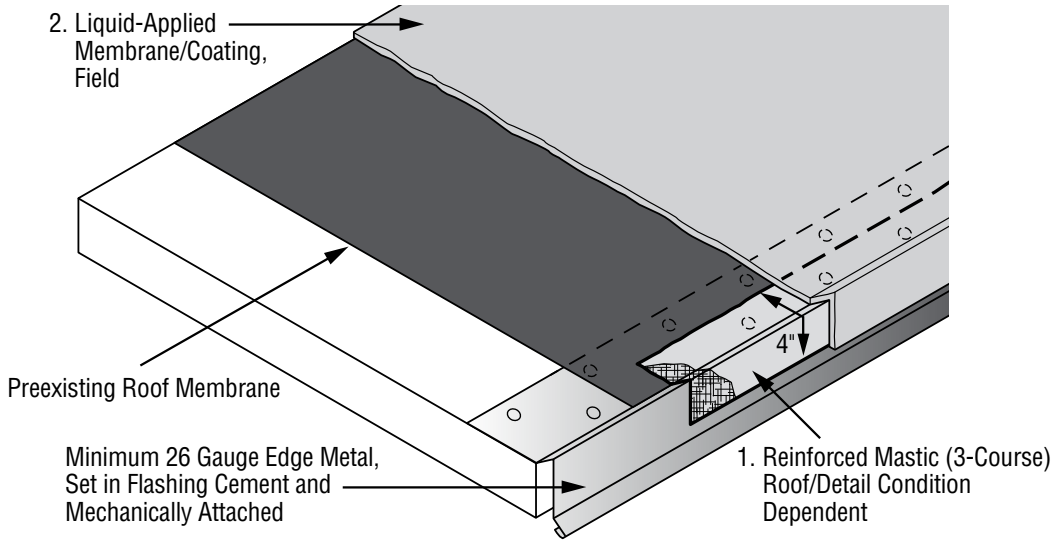
CTL-SC-01A Edge Flashing – Weak Edge Adhesion

NOTE: Proper edge flashing restoration is condition dependent; CertainTeed offers multiple details for use as required based on the condition of the existing flashing; multiple details could be implemented on a single roof. This detail is applicable to portions of the preexisting edge flashing that is left in place but with points of weak adhesion along the edge. If the edge flashing is poorly adhered such that metal can be exposed, it should be cut back, see CTL-SC-01B or CTL-SC-01C.

Edge Metal
Clean exposed metal, completely removing any rust; preexisting edge metal typically does not require primer for adhesion though any rusted areas shall be primed with SMARTCOAT 210 Universal Primer.

Mastic/Reinforced Mastic (3-Course)
Apply SMARTCOAT 300 Acrylic Mastic or 350 Silicone Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300 and 1/4″ for 350, up and over the edge metal extending 2″ onto the façade surface. Immediately embed SMARTFAB 500 Polyester Reinforcement, minimum 4″ width, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

Liquid-Applied Membrane/Coating, Field
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone. If new metal is installed, clean and remove any oil or residue that could inhibit adhesion.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop; if the repair was made with incompatible materials, is failing or has potential for high movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate).

For additional questions or support contact CertainTeed Commercial Roofing Technical Services Department 1-800-396-8134 x2 or rpg@saint-gobain.com

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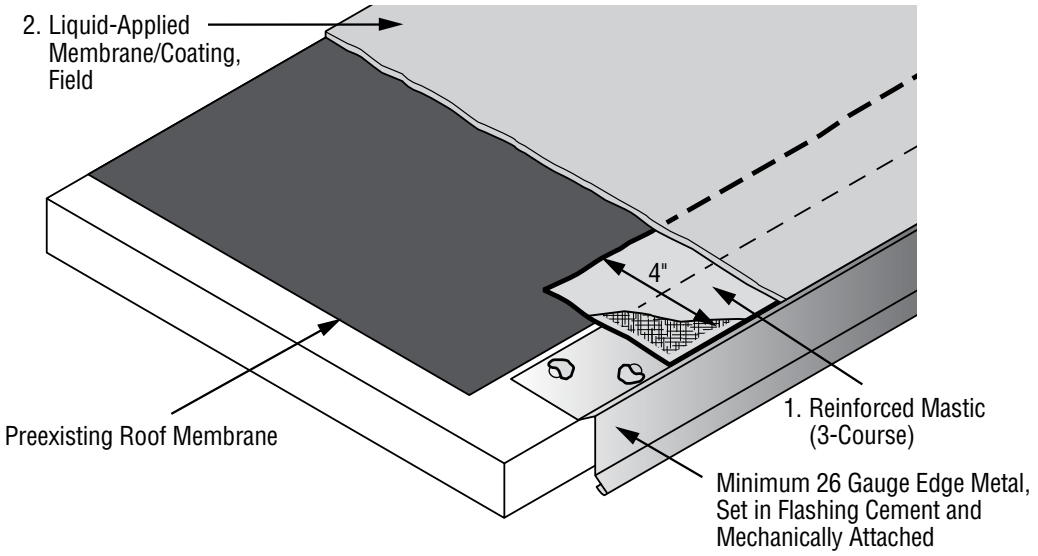
CTL-SC-01B Edge Flashing – Existing Flashing Poor Adhesion

NOTE: Proper edge flashing restoration is condition dependent; CertainTeed offers multiple details for use as required based on the condition of the existing flashing; multiple details could be implemented on a single roof. This detail is applicable to portions of the preexisting edge flashing which are poorly or not adhered and shall be cut back and removed to expose the edge metal.

Edge Metal
Typically, preexisting edge metal does not require primer for adhesion; if edge metal is replaced with new, clean metal surface with acetone and/or abrade as necessary; prime metal surface with SMARTCOAT 210 Universal Primer as needed. Loose nails or fasteners shall be removed and replaced.

Reinforced Mastic (3-Course)
Apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300 Acrylic Mastic and 1/4″ for 350 Silicone Mastic. Immediately embed SMARTFAB 500 Polyester Reinforcement, minimum 4″ width, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate surface and edges polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

Liquid-Applied Membrane/Coating, Field
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone. If new metal is installed, clean and remove any oil or residue that could inhibit adhesion.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop; if the repair was made with incompatible materials, is failing or has potential for high movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate).

For additional questions or support contact CertainTeed Commercial Roofing Technical Services Department 1-800-396-8134 x2 or rpg@saint-gobain.com

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CTL-SC-01C Edge Flashing – Existing Flashing Poor Adhesion, Large Movement

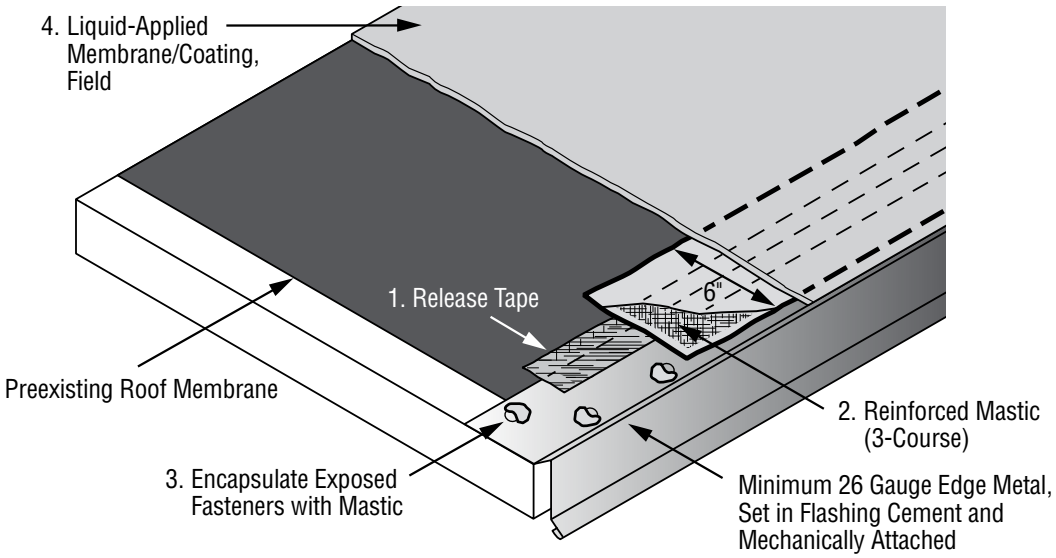
NOTE: Proper edge flashing restoration is condition dependent; CertainTeed offers multiple details for use as required based on the condition of the existing flashing; multiple details could be implemented on a single roof. This detail is applicable to portions of the preexisting roof edge that are poorly or not adhered and cut back to expose the edge metal. Additionally, the existing detail has visual indication of high stress/potential movement.

Edge Metal
Typically, preexisting edge metal does not require primer for adhesion; if edge metal is replaced with new, clean metal surface with acetone and/or abrade as necessary; prime metal surface with SMARTCOAT 210 Universal Primer as needed. Loose nails or fasteners shall be removed and replaced.

Release Tape
Where the preexisting membrane meets the metal, affix a minimum 2″ wide release tape, such as painter's tape. This tape will not permanently adhere but rather will serve to allow movement while deflecting some strain from the subsequent layer of 3-course reinforced mastic.

Reinforced Mastic (3-Course)
Apply atop the Release Tape and extending a minimum 2″ on either side, apply SMARTCOAT 300/350 Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300 Acrylic Mastic and 1/4″ for 350 Silicone Mastic. Immediately embed SMARTFAB 500 Polyester Reinforcement, minimum 6″ width and sufficient to ensure a minimum 2″ on either side of the tape, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

Liquid-Applied Membrane/Coating, Field
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone. If new metal is installed, clean and remove any oil or residue that could inhibit adhesion.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop; if the repair was made with incompatible materials, is failing or has potential for high movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate).

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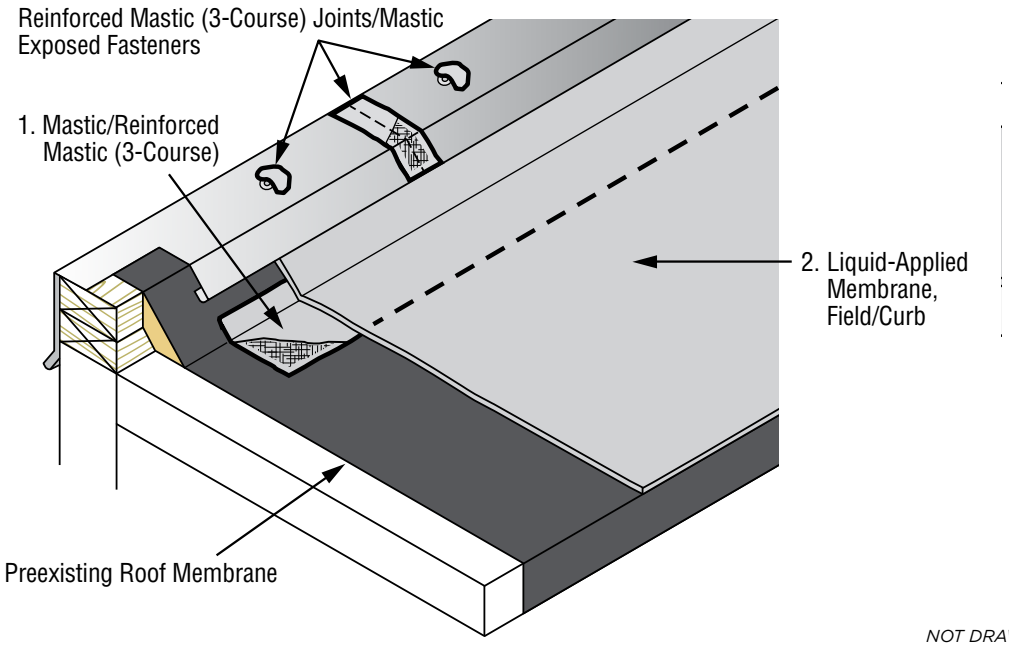
CTL-SC-02 Raised Perimeter

NOTE: This detail assumes a preexisting roof membrane and raised perimeter flashing is left in place.

Mastic/Reinforced Mastic (3-Course)
Where preexisting perimeter flashing is sound, apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8" for 300/301 Acrylic Mastic and 1/4" for 350/365 Silicone Mastic.
If portions of perimeter flashing have previously been repaired or indicate stress/potential movement, reinforce SMARTCOAT 300/350 Mastics: embed SMARTFAB 500 Polyester Reinforcement, minimum 4" width, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

Liquid-Applied Membrane, Field/Curb
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application. As possible, extend coating up beneath metal coping to protect the preexisting membrane; be cautious to avoid sealing the bottom edge of the metal to the membrane.

Mastic – Metal
Seal all exposed metal fasteners with mastic; seal all exposed metal joints with reinforced mastic (3-course). Loose nails or fasteners shall be removed and replaced.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone. If new metal is installed, clean and remove any oil or residue that could inhibit adhesion.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop; if the repair was made with incompatible materials, is failing or has potential for high movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate).

For additional questions or support contact CertainTeed Commercial Roofing Technical Services Department 1-800-396-8134 x2 or rpg@saint-gobain.com

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CTL-SC-03 Curb Equipment Flashing

NOTE: This detail assumes a preexisting roof membrane is left in place.

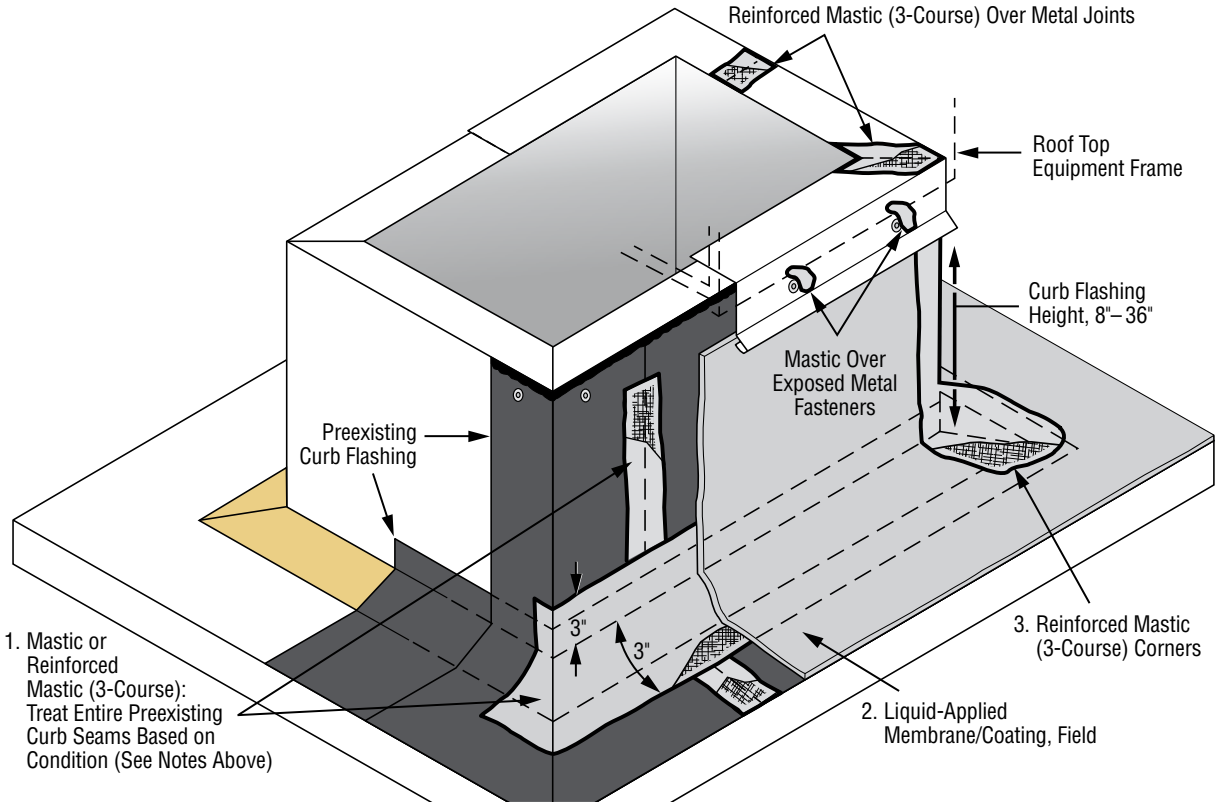
Mastic or Reinforced Mastic (3-Course), Curb Flashing and Seams
Tight, well-bonded seams: Apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8" for 300/301 Acrylic Mastic and 1/4" for 350/365 Silicone Mastic. Seams with visual strain, open or weak bonds, previous repairs or potential for large movement/vibration: After mastic is applied immediately embed SMARTFAB 500 Polyester Reinforcement, minimum 4" width, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

Liquid-Applied Membrane/Coating, Field/Curb
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application. As possible, extend coating up beneath metal coping to protect the preexisting membrane; be cautious to avoid sealing the bottom edge of the metal to the membrane.

Multiple coats will be required to achieve specified mil thickness on vertical surfaces; it is not recommended to apply more than 1G per 100 sq. ft. in a single coat to avoid material sagging.

Reinforced Mastic (3-Course) Corners/Metal Joints
Reinforce SMARTCOAT 300 Series Mastic, applied with a brush, trowel or gloved hand at a maximum thickness of 1/8" for 300 Acrylic Mastic and 1/4" for 350 Silicone Mastic, with SMARTFAB 500 Reinforcement, at all curb corners and metal joints.

Mastic/Sealant
Remove and replace loose or damaged fasteners, seal all exposed metal fasteners with SMARTCOAT 300 Series Mastic or Sealant.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop; if the repair was made with incompatible materials, is failing or has potential for high movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate).

For additional questions or support contact CertainTeed Commercial Roofing Technical Services Department 1-800-396-8134 x2 or rpg@saint-gobain.com

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CTL-SC-04 Wood Area Divider Flashing

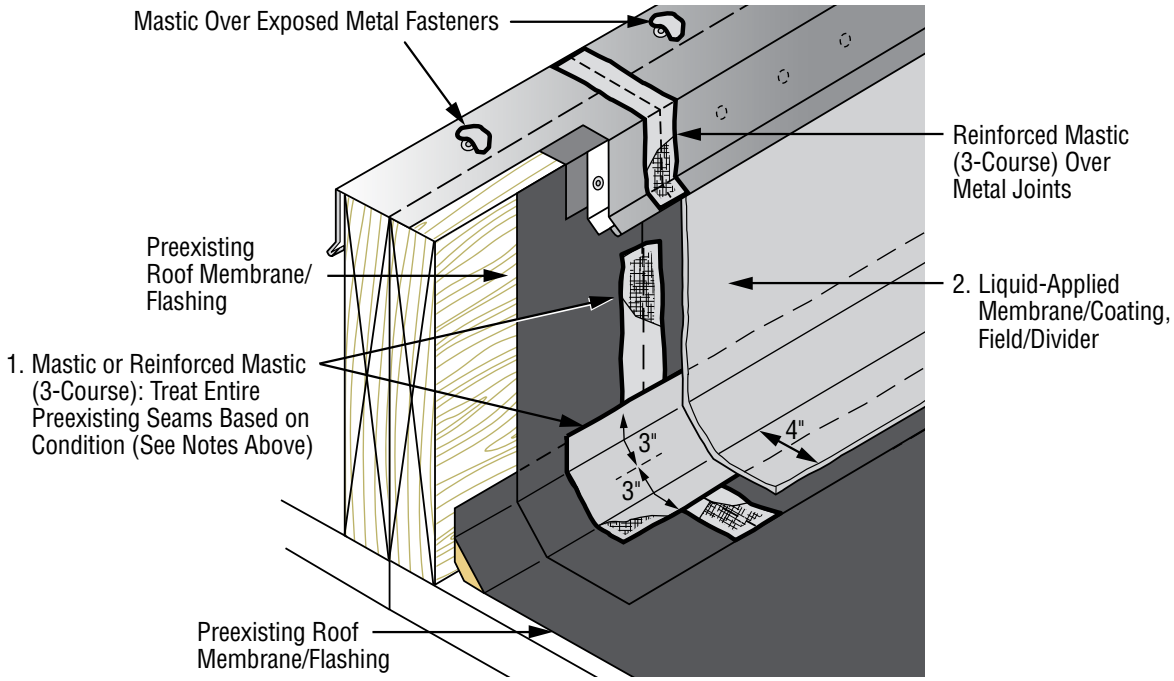
NOTE: This detail assumes a preexisting roof membrane is left in place.

Mastic or Reinforced Mastic (3-Course)
Tight, well-bonded seams: Apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300/301 Acrylic Mastic and 1/4″ for 350/365 Silicone Mastic. Seams with visual strain, open or weak bonds, previous repairs or potential for large movement/vibration: After mastic is applied immediately embed SMARTFAB 500 Polyester Reinforcement, minimum 6″ width, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

Liquid-Applied Membrane, Field/Divider
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application. As possible, extend coating up beneath metal coping to protect the preexisting membrane; be cautious to avoid sealing the bottom edge of the metal to the membrane.

Multiple coats will be required to achieve specified mil thickness on vertical surfaces; it is not recommended to apply more than 1G per 100 sq. ft. in a single coat to avoid material sagging.

Mastic/Reinforced Mastic (3-Course)
Metal Joints/Fasteners/Corners
Seal all exposed metal fasteners with SMARTCOAT 300 Series Mastic or Sealant. Reinforce SMARTCOAT 300 Series Mastic applied with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300 Acrylic Mastic and 1/4″ for 350 Silicone Mastic,with SMARTFAB 500 Reinforcement, at all corners and metal joints.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop; if the repair was made with incompatible materials, is failing or has potential for high movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate).

For additional questions or support contact CertainTeed Commercial Roofing Technical Services Department 1-800-396-8134 x2 or rpg@saint-gobain.com

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CTL-SC-04A Membrane Roof Restoration

NOTE: This detail is intended for a liquid-applied roof restoration project. It assumes a preexisting roof membrane is being left in place in the field but divider flashing removed and sheet metal replaced.

Flintlastic/Bituminous Flashing Ply
For wood-based area dividers only, prior to applying SMARTCOAT, mechanically attach top and bottom edge of both sides of divider 9″o.c. with tin discs, see CertainTeed Commercial Roof Systems Specifications manual, General Recommendations, Section 15 for fastener details.

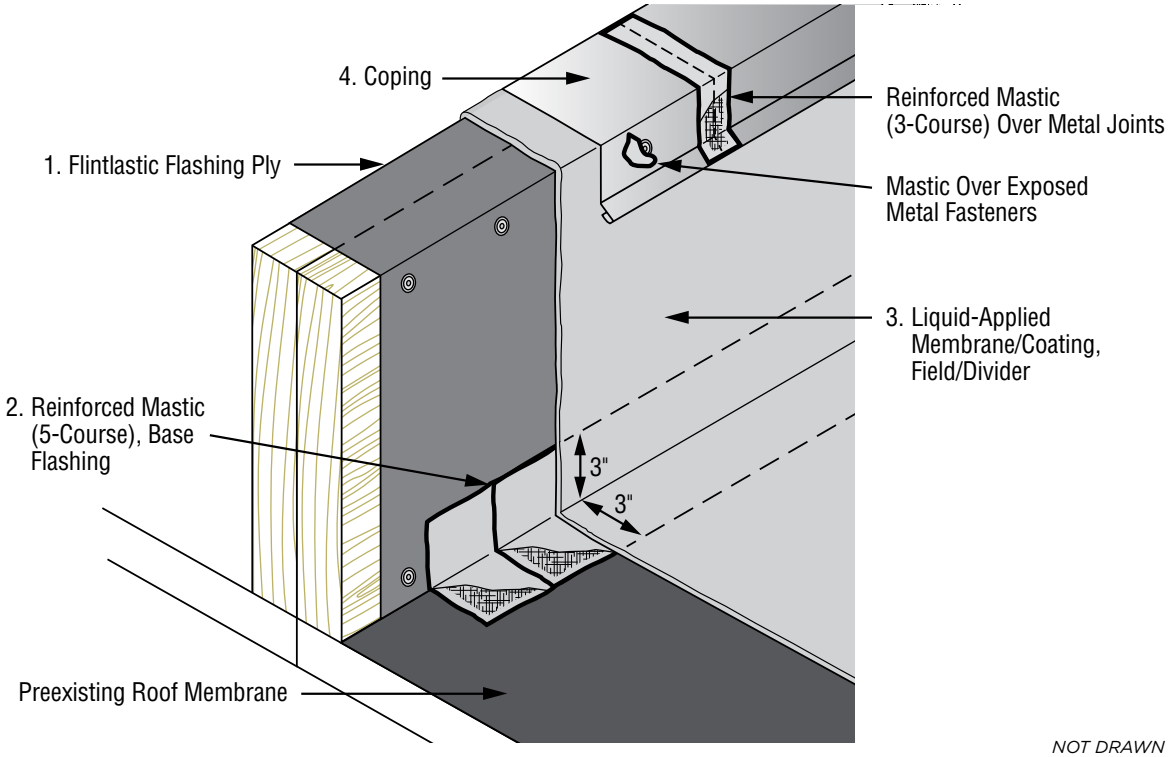
Reinforced Mastic (5-Course)
Apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300 Acrylic Mastic and 1/4″ for 350 Silicone Mastic. Immediately embed SMARTFAB 500 Polyester Reinforcement, minimum 6″ width, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered. Once cured, repeat Mastic-Polyester-Mastic as prescribedabove.

Liquid-Applied Membrane, Field/Divider
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application. Extend coating up and over divider.

Multiple coats will be required to achieve specified mil thickness on vertical surfaces; it is not recommended to apply more than 1G per 100 sq. ft. in a single coat to avoid material sagging.

Allow SMARTCOAT to fully cure before installing Coping.

Mastic/Reinforced Mastic (3-Course)
Metal Joints/Fasteners
Seal all exposed metal fasteners with SMARTCOAT 300 Series Mastic or Sealant. Reinforce SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300/301 Acrylic Mastic and 1/4″ for 350 Silicone Mastic,with SMARTFAB 500 Reinforcement, at all corners and metal joints.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop; if the repair was made with incompatible materials, is failing or has potential for high movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate).

For additional questions or support contact CertainTeed Commercial Roofing Technical Services Department 1-800-396-8134 x2 or rpg@saint-gobain.com

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CTL-SC-05 Base Flashing & Wall Covering on Parapet Wall

NOTE: This detail assumes a preexisting roof membrane and base flashing and wall covering are left in place.

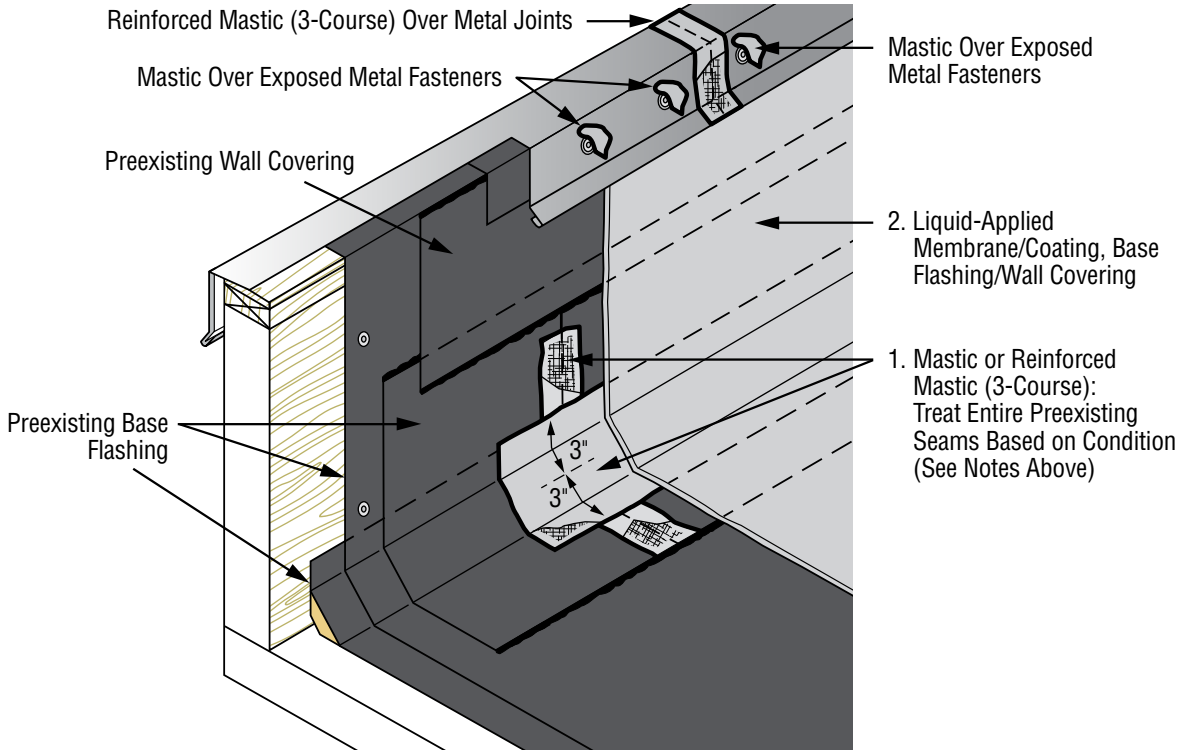
Mastic or Reinforced Mastic (3-Course)
Tight, well-bonded seams: Apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8" for 300/301 Acrylic Mastic and 1/4" for 350/365 Silicone Mastic. Seams with visual strain, open or weak bonds, previous repairs or potential for large movement/vibration: After mastic is applied immediately embed SMARTFAB 500 Polyester Reinforcement, minimum 6" width, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate polyester.

Liquid-Applied Membrane, Base Flashing/Wall Covering
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application. As possible, extend coating up beneath metal coping to protect the preexisting membrane; be cautious to avoid sealing the bottom edge of the metal to the membrane.

Multiple coats will be required to achieve specified mil thickness on vertical surfaces; it is not recommended to apply more than 1G per 100 sq. ft. in a single coat to avoid material sagging.

Mastic/Sealant
Remove and replace damaged fasteners, seal all exposed metal fasteners with SMARTCOAT 300 Series Mastic or Sealant.

Reinforced Mastic (3-Course) Corners/Metal Joints
Reinforce SMARTCOAT 300 Series Mastics, applied with a brush, trowel or gloved hand at a maximum thickness of 1/8" for 300 Acrylic Mastic and 1/4" for 350 Silicone Mastic, with SMARTFAB 500 Reinforcement, at all corners and metal joints.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop; if the repair was made with incompatible materials, is failing or has potential for high movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate).

For additional questions or support contact CertainTeed Commercial Roofing Technical Services Department 1-800-396-8134 x2 or rpg@saint-gobain.com

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CTL-SC-06 Through-wall Scupper Flashing

NOTE: Proper scupper restoration will vary based on scupper type, size and preexisting condition of the scupper and transition areas. If the existing scupper exhibits signs of potential leak points, a comprehensive inspection for trapped moisture shall be conducted. If trapped moisture is found or if previous repairs have built up the material around the scupper such that the scupper is not properly draining water, existing material/flashing shall be removed and replaced; if the scupper is not performing properly it shall be replaced.

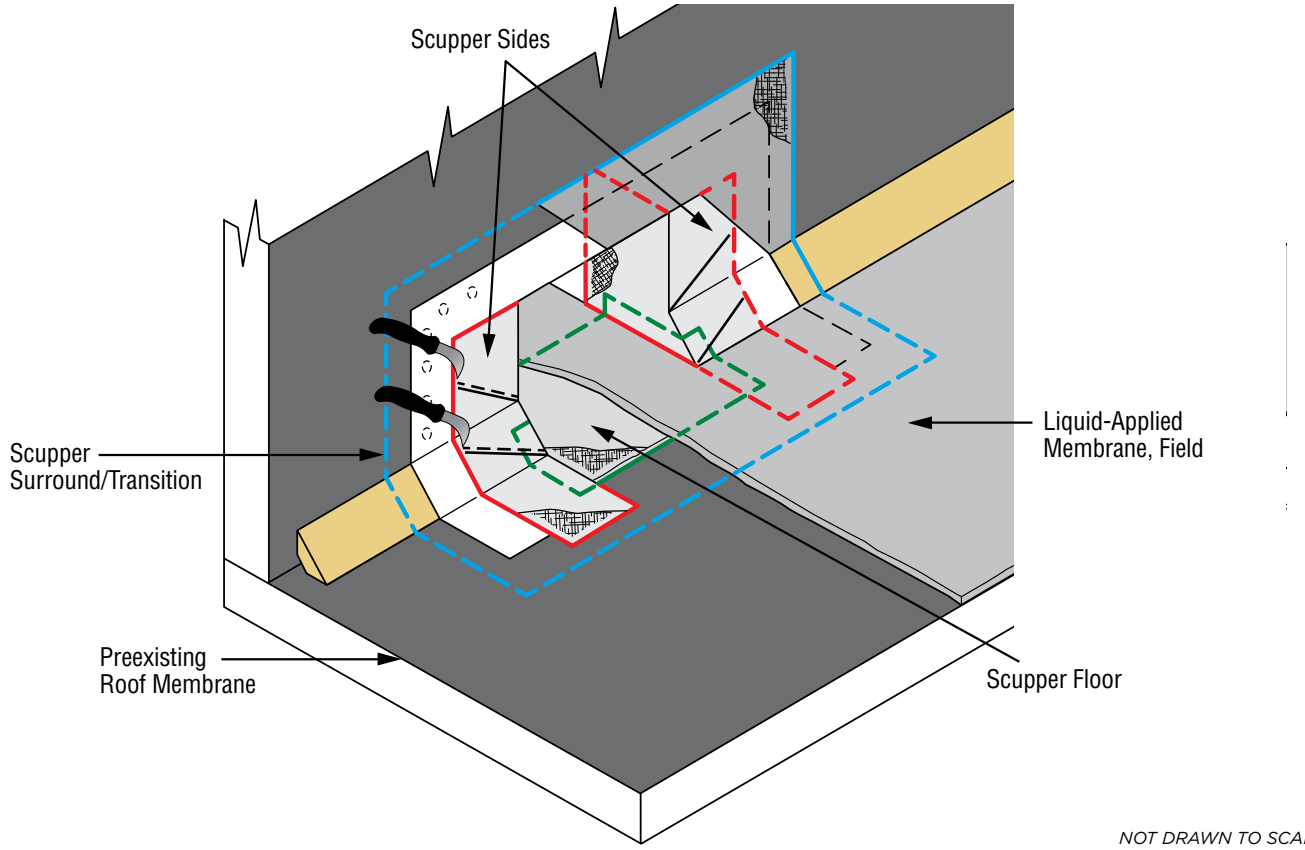
This detail illustrates various reinforcement elements/layers to guide repairs as needed. As conditions will vary, reinforce SMARTCOAT 300/350 Series Mastic as necessary to ensure a watertight condition.

Apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300/301 Acrylic Mastic and 1/4″ for 350/365 Silicone Mastic.

When reinforcing, after mastic is applied immediately embed SMARTFAB 500 Polyester Reinforcement at appropriate widths and lengths (depending on size of the scupper) into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate polyester. Polyester shall be turned over a minimum 2″ onto the parapet wall surface and extending a minimum 2″ into the field. SMARTCOAT 300 Series Mastic shall extend a minimum 2″ beyond Polyester.

Liquid-Applied Membrane, Field
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application.

Multiple coats will be required to achieve specified mil thickness on vertical surfaces; it is not recommended to apply more than 1G per 100 sq. ft. in a single coat to avoid material sagging.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop; if the repair was made with incompatible materials, is failing or has potential for high movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate).

For additional questions or support contact CertainTeed Commercial Roofing Technical Services Department 1-800-396-8134 x2 or rpg@saint-gobain.com

Rev 4/21

CTL-SC-07 Drain Flashing

NOTE: This detail assumes a preexisting roof membrane and drain flashing is left in place. Proper drain restoration will vary based on drain type, size and preexisting condition of the drain and transition areas. If the existing drain exhibits signs of potential leak points, a comprehensive inspection for trapped moisture shall be conducted. If trapped moisture is found or if previous repairs have built up the material around the drain such that it is not properly draining water; existing material/flashing shall be removed and replaced; if the drain is not performing properly it shall be replaced. Missing or damaged bolts should be replaced; the drain shall be firmly in place.

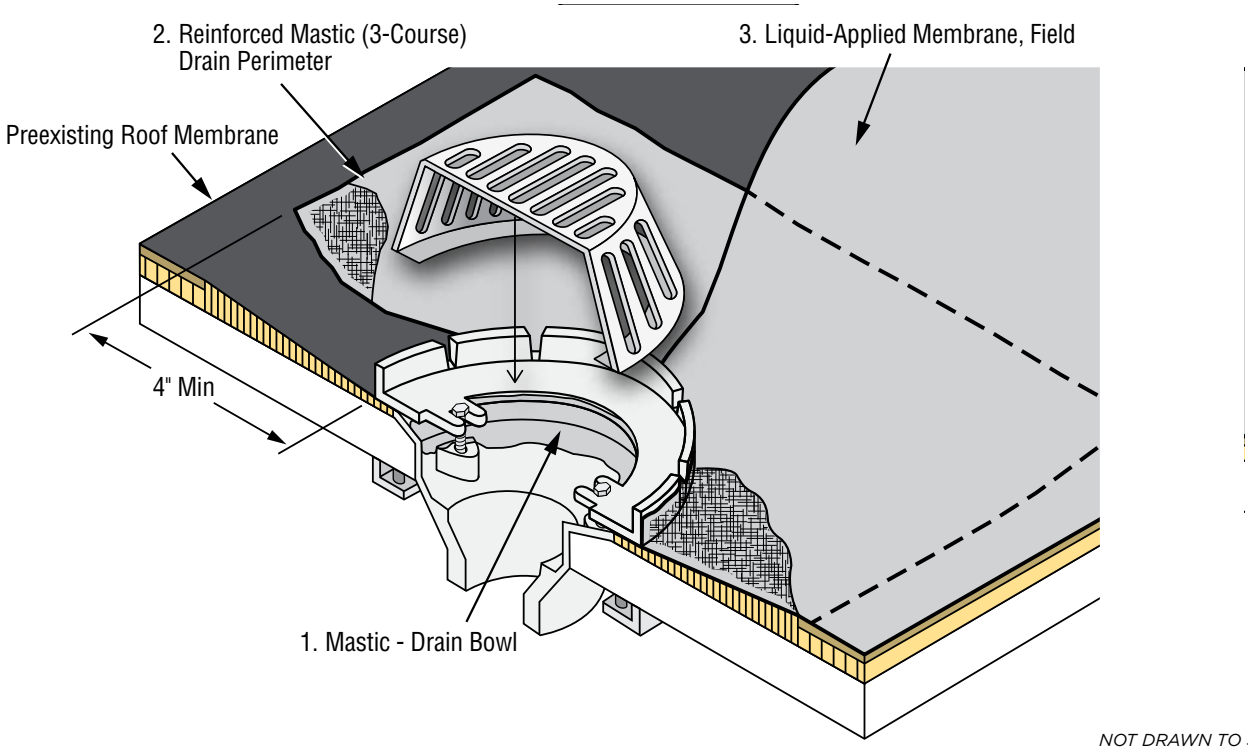
As conditions will vary, reinforce SMARTCOAT 300 Series Mastic as necessary to ensure a watertight condition.

Mastic – Drain Bowl
Extend SMARTCOAT 300 Series Mastic bridging the seam between the clamping ring and the drain bowl with a brush or gloved hand at a maximum thickness of 1/8″ for 300/301 Acrylic Mastic and 1/4″ for 350/365 Silicone Mastic.

Reinforced Mastic (3-Course) Drain Perimeter
Apply SMARTCOAT 300 Series Mastic bridging the seam between the clamping ring and the field of roof with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300 Acrylic Mastic and 1/4″ for 350 Silicone Mastic. After mastic is applied immediately embed SMARTFAB 500 Polyester Reinforcement at appropriate widths and lengths (depending on size of the drain) into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate polyester.

Liquid-Applied Membrane, Field
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application.

Multiple coats will be required to achieve specified mil thickness on vertical surfaces; it is not recommended to apply more than 1G per 100 sq. ft. in a single coat to avoid material sagging.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop; if the repair was made with incompatible materials, is failing or has potential for high movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate).

For additional questions or support contact CertainTeed Commercial Roofing Technical Services Department 1-800-396-8134 x2 or rpg@saint-gobain.com

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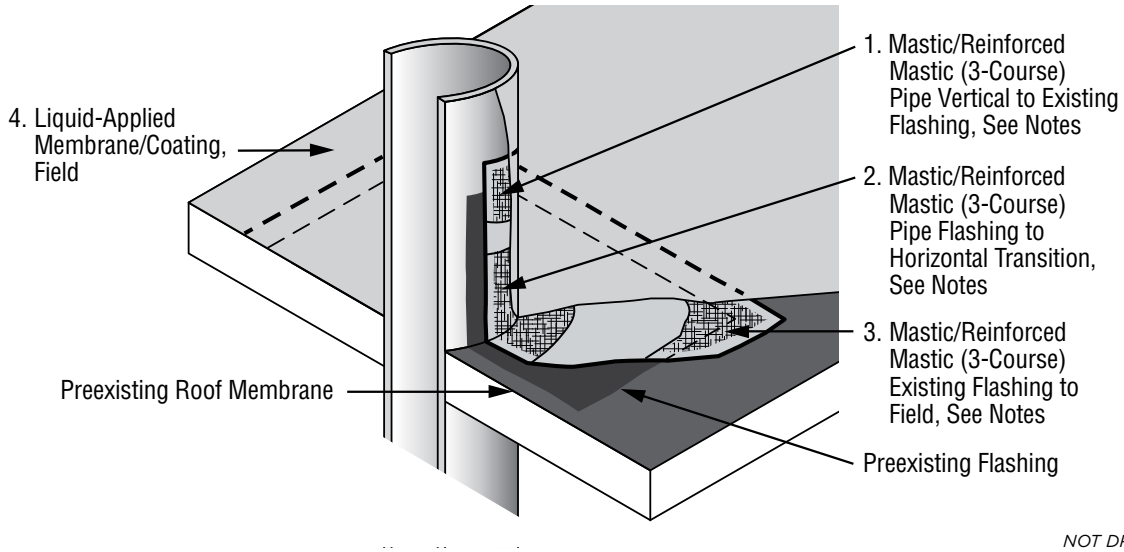
CTL-SC-08 Pipe Flashing – Existing Flashing

NOTE: Proper pipe restoration will vary based on type, size and preexisting condition of the pipe and transition areas. If the existing pipe exhibits signs of potential leak points, a comprehensive inspection for trapped moisture shall be conducted. If trapped moisture is found or if previous repairs have built up, potentially creating water dams, existing material/flashing shall be removed and replaced.

Mastic/Reinforced Mastic (3-Course):
1. Pipe Vertical to Existing Flashing
2. Existing Pipe Flashing Vertical to Horizontal Transition
3. Existing Flashing to Field
The above noted areas are the three critical waterproofing elements of a pipe flashing. If these areas are firmly adhered with no previous repairs or signs of potential strain, apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8" for 300/301 Acrylic Mastic and 1/4" for 350/365 Silicone Mastic. If these areas show visual strain, open or weak bonds, previous repairs or potential for large movement/constant vibration: After mastic is applied immediately embed SMARTFAB 500 Polyester Reinforcement, minimum 4" width, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

NOTE: These areas can be treated differently based on their individual condition. For example, reinforcement may be necessary where the existing flashing meets the field, but mastic alone may be sufficient where the pipe vertical meets the existing flashing.

Liquid-Applied Membrane/Coating, Field & Pipe
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application. Extend coating up existing flashing to top of pipe. Multiple coats will be required to achieve specified mil thickness on vertical surfaces; it is not recommended to apply more than 1G per 100 sq. ft. in a single coat to avoid material sagging.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop; if the repair was made with incompatible materials, is failing or has potential for high movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate).

For additional questions or support contact CertainTeed Commercial Roofing Technical Services Department 1-800-396-8134 x2 or rpg@saint-gobain.com

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CTL-SC-08A Pipe Flashing – Existing Pipe Boot

Proper pipe restoration will vary based on type, size and preexisting condition of the pipe and transition areas. If the existing pipe exhibits signs of potential leak points, a comprehensive inspection for trapped moisture shall be conducted. If trapped moisture is found or if previous repairs have built up, potentially creating water dams, existing material/flashing shall be removed and replaced.

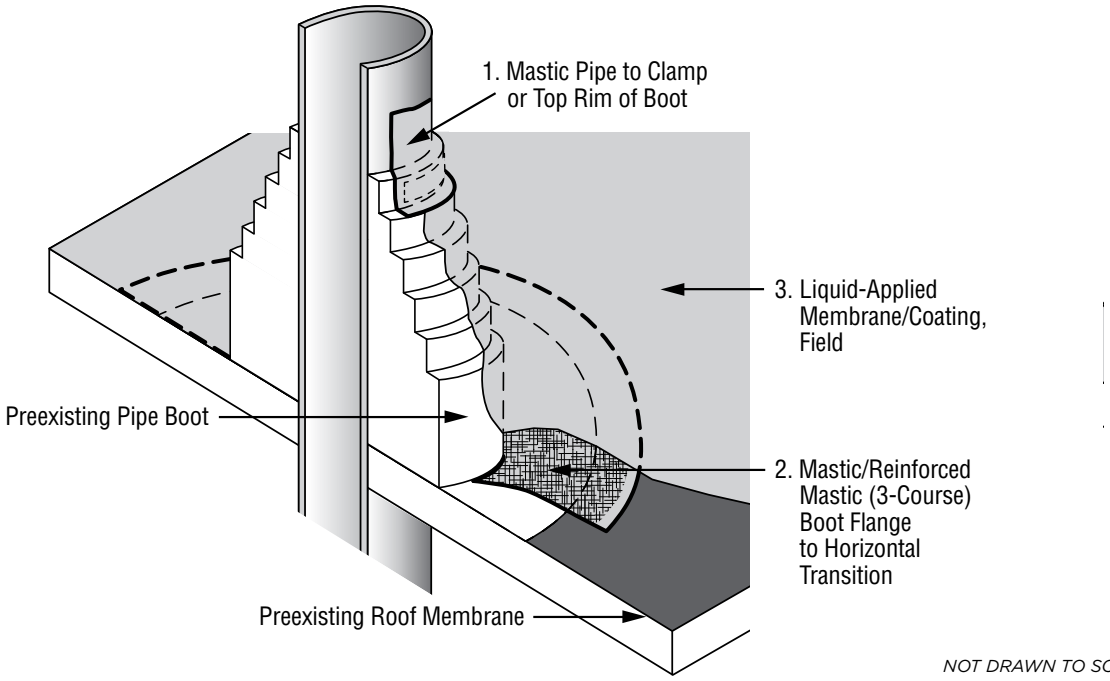
Mastic/Reinforced Mastic (3-Course):
1. Pipe Vertical to Clamp/ Existing Boot Rim
2. Existing Pipe Boot Flange to Horizontal Transition
The above noted areas are the critical waterproofing elements of a pipe boot flashing. If these areas are firmly adhered with no previous repairs or signs of potential strain, apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300/301 Acrylic Mastic and 1/4″ for 350 Silicone Mastic. If these areas show visual strain, open or weak bonds, previous repairs or potential for large movement/constant vibration: After mastic is applied immediately embed SMARTFAB 500 Polyester Reinforcement, minimum 4″ width, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

NOTE: These areas can be treated differently based on their individual condition. For example, reinforcement may be necessary where the existing flashing meets that field but mastic alone may be sufficient where the pipe vertical meets the existing flashing.

NOTE: Where the pipe vertical meets the existing boot rim, if a clamp is present, polyester reinforcement is not recommended; apply mastic only.

Mastic – Pipe Boot
Though uncommon, should an area of the existing pipe boot be cracked or unsound, apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300/301 Acrylic Mastic and 1/4″ for 350 Silicone Mastic, to the troubled area, extending 2″ on all sides.

Liquid-Applied Membrane/Coating, Field & Pipe
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application. Extend coating up existing flashing to top of pipe. Multiple coats will be required to achieve specified mil thickness on vertical surfaces; it is not recommended to apply more than 1G per 100 sq. ft. in a single coat to avoid material sagging.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop; if the repair was made with incompatible materials, is failing or has potential for high movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate).

For additional questions or support contact CertainTeed Commercial Roofing Technical Services Department 1-800-396-8134 x2 or rpg@saint-gobain.com

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CTL-SC-08B Pipe Flashing – New Pipe/Prior Flashing Removed

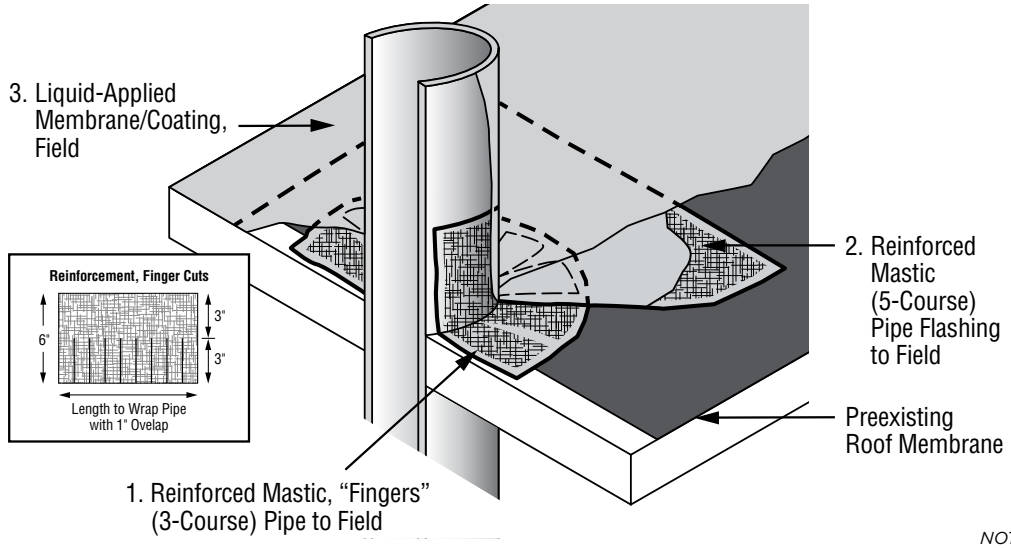
NOTE: Proper pipe restoration will vary based on type, size and preexisting condition of the pipe and transition areas. If the existing pipe exhibits signs of potential leak points, a comprehensive inspection for trapped moisture shall be conducted. If trapped moisture is found or if previous repairs have built up, potentially creating water dams, existing material/flashing shall be removed and replaced.

This detail assumes a new pipe is being installed or previously installed flashing on an existing pipe is completely removed.

Reinforced Mastic "Fingers" (3-Course) Pipe to Field
Apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8" for 300 Acrylic Mastic and 1/4" for 350 Silicone Mastic. Cut edge of SMARTFAB 500 Polyester Reinforcement into "fingers" to accommodate the circular/radial nature of this detail. See illustration: Reinforcement "Fingers". Immediately embed reinforcement, minimum 6" width, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

Reinforced Mastic (5-Course) Pipe Flashing to Field
After the first course of mastic is cured, apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8" for 300 Acrylic Mastic and 1/4" for 350 Silicone Mastic. Immediately embed SMARTFAB 500 Polyester Reinforcement, minimum 6" width, into wet mastic abutting the pipe vertical and extending a minimum 2" beyond the reinforcement "fingers". A large width polyester may be utilized with a center hole to accommodate the pipe. If 6" width polyester is utilized, all overlaps shall be a minimum 2"; mastic shall be applied to all overlapped surfaces. Apply a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

Liquid-Applied Membrane/Coating, Field & Pipe
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application. Extend coating up existing flashing to top of pipe. Multiple coats will be required to achieve specified mil thickness on vertical surfaces; it is not recommended to apply more than 1G per 100 sq. ft. in a single coat to avoid material sagging.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop; if the repair was made with incompatible materials, is failing or has potential for high movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate).

For additional questions or support contact CertainTeed Commercial Roofing Technical Services Department 1-800-396-8134 x2 or rpg@saint-gobain.com

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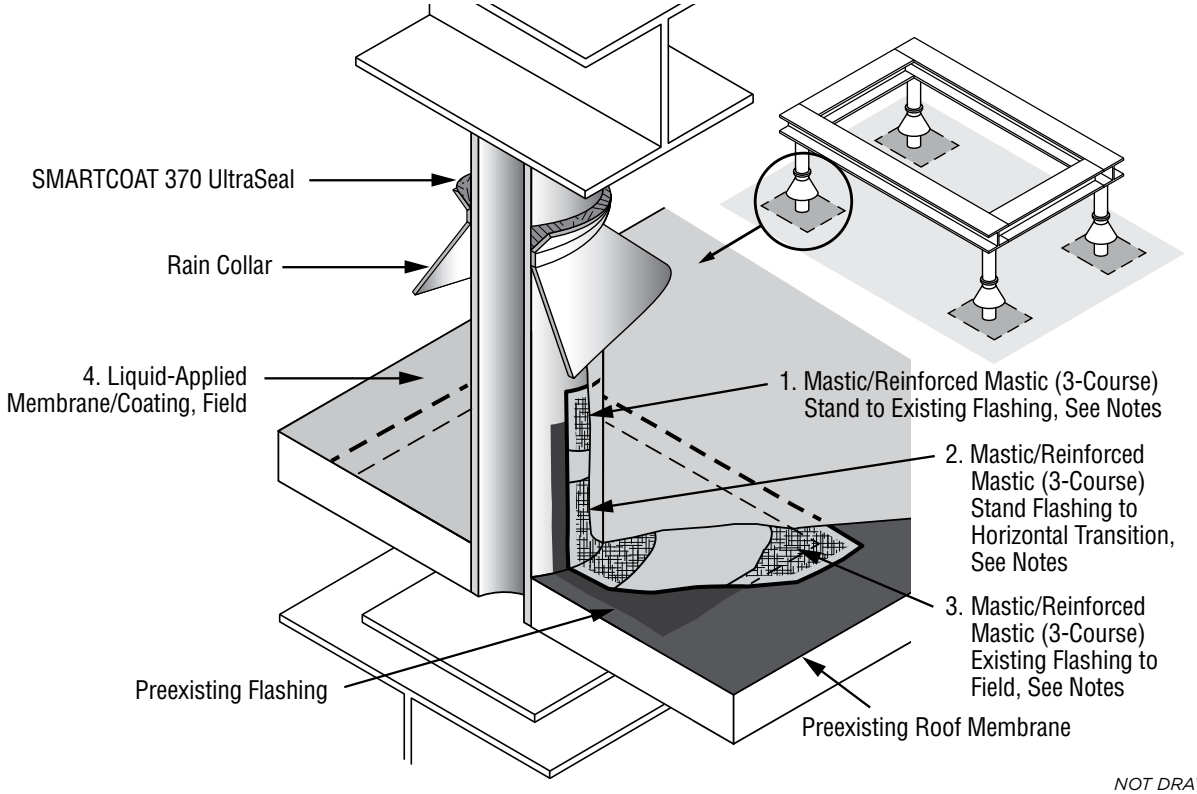
CTL-SC-09 Mechanical Equipment Stand – Existing Flashing

Proper stand restoration will vary based on type, size and preexisting condition of the stand flashing and transition areas. If the existing stand exhibits signs of potential leak points, a comprehensive inspection for trapped moisture shall be conducted. If trapped moisture is found or if previous repairs have built up, potentially creating water dams, existing material/flashing shall be removed and replaced.

Mastic/Reinforced Mastic (3-Course):
1. Stand Vertical to Existing Flashing
2. Existing Stand Vertical Flashing to Horizontal Transition
3. Existing Flashing to Field
The above noted areas are the three critical waterproofing elements of an equipment stand flashing. If these areas are firmly adhered with no previous repairs or signs of potential strain, apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8" for 300/301 Acrylic Mastic and 1/4" for 350/365 Silicone Mastic. If these areas show visual strain, open or weak bonds, previous repairs or potential for large movement/vibration: After mastic is applied immediately embed SMARTFAB 500 Polyester Reinforcement, minimum 4" width, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

NOTE: These areas can be treated differently based on their individual condition. For example, reinforcement may be necessary where the existing flashing meets the field, but mastic alone may be sufficient where the stand vertical meets the existing flashing.

Liquid-Applied Membrane/Coating, Field & Stand
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application. Extend coating up existing flashing to top of stand vertical(s). Multiple coats will be required to achieve specified mil thickness on vertical surfaces; it is not recommended to apply more than 1G per 100 sq. ft. in a single coat to avoid material sagging.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop; if the repair was made with incompatible materials, is failing or has potential for high movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate).

For additional questions or support contact CertainTeed Commercial Roofing Technical Services Department 1-800-396-8134 x2 or rpg@saint-gobain.com

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CTL-SC-09A Mechanical Equipment Stand – New/Existing Flashing Removed

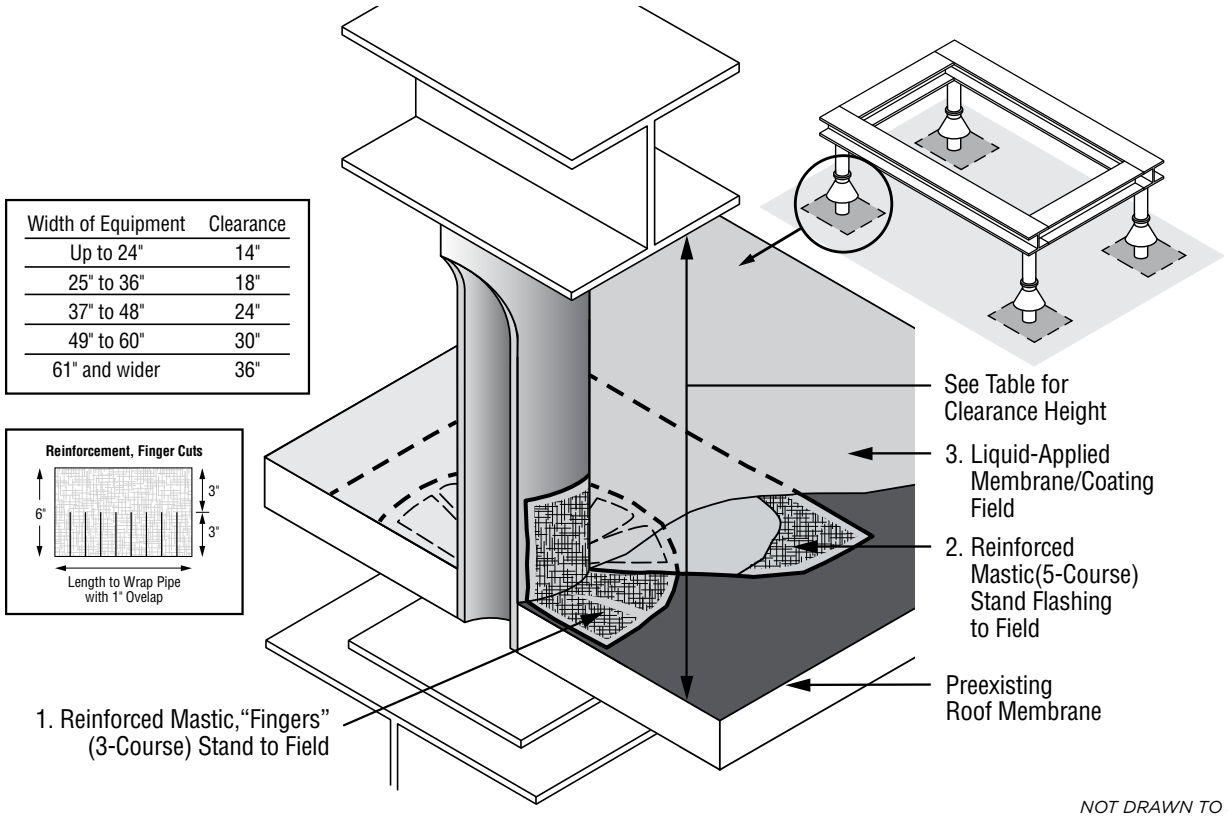
Proper stand restoration will vary based on type, size and preexisting condition of the stand flashing and transition areas. If the existing flashing exhibits signs of potential leak points, a comprehensive inspection for trapped moisture shall be conducted. If trapped moisture is found or if previous repairs have built up, potentially creating water dams, existing material/flashing shall be removed and replaced.

This detail assumes a new stand is being installed or previously installed flashing on an existing stand is completely removed.

Reinforced Mastic "Fingers" (3-Course) Stand to Field
Apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8" for 300 Acrylic Mastic and 1/4" for 350 Silicone Mastic. Cut edge of SMARTFAB 500 Polyester Reinforcement into "fingers" to accommodate the circular/radial nature of this detail. See illustration: Reinforcement "Fingers". Immediately embed reinforcement, minimum 6" width, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

Reinforced Mastic (5-Course) Stand Flashing to Field
After the first course of mastic is cured, apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8" for 300 Acrylic Mastic and 1/4" for 350 Silicone Mastic. Immediately embed SMARTFAB 500 Polyester Reinforcement, minimum 6" width, into wet mastic abutting the stand vertical and extending a minimum 2" beyond the reinforcement "fingers". A large width polyester may be utilized with a center hole to accommodate the stand. If 6" width polyester is utilized, all overlaps shall be a minimum 2"; mastic shall be applied to all overlapped surfaces. Apply a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

Liquid-Applied Membrane/Coating, Field
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application. Extend coating up existing flashing to top of pipe. Multiple coats will be required to achieve specified mil thickness on vertical surfaces; it is not recommended to apply more than 1G per 100 sq. ft. in a single coat to avoid material sagging.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-base product; acrylic materials will not bond to silicone.

For additional questions or support contact CertainTeed Commercial Roofing Technical Services Department 1-800-396-8134 x2 or rpg@saint-gobain.com

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CTL-SC-10 Roof to Wall Expansion Joint Flashing

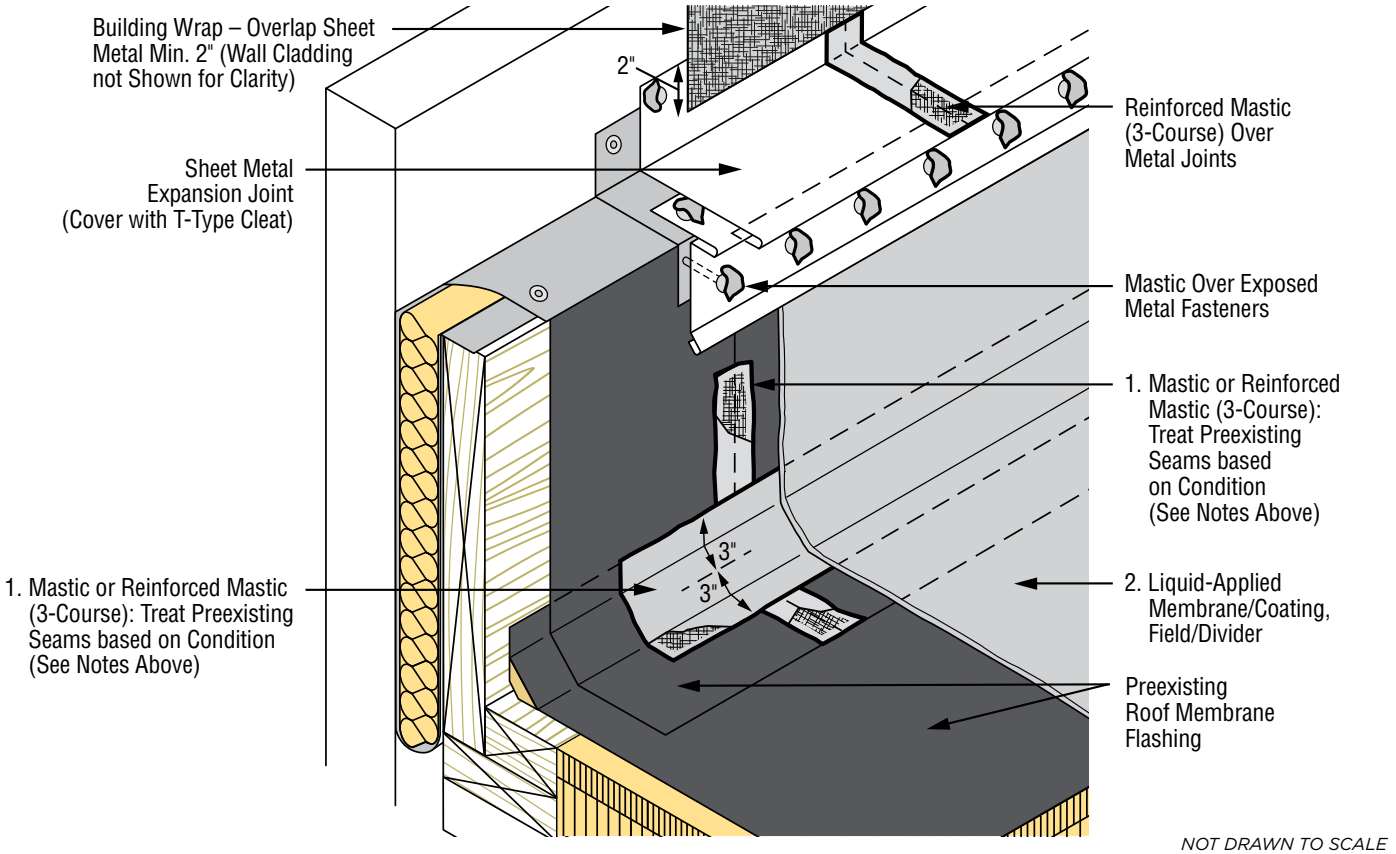
NOTE: This detail assumes a preexisting roof membrane and expansion flashing is left in place.

Mastic or Reinforced Mastic (3-Course)
Tight, well-bonded seams: Apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300/301 Acrylic Mastic and 1/4″ for 350/365 Silicone Mastic. Seams with visual strain, open or weak bonds, previous repairs or potential for large movement/vibration: After mastic is applied immediately embed SMARTFAB 500 Polyester Reinforcement, minimum 6″ width, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

Liquid-Applied Membrane, Field/Divider
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application. As possible, extend coating up beneath metal coping to protect the preexisting membrane; be cautious to avoid sealing the bottom edge of the metal to the membrane.

Multiple coats will be required to achieve specified mil thickness on vertical surfaces; it is not recommended to apply more than 1G per 100 sq. ft. in a single coat to avoid material sagging.

Mastic/Reinforced Mastic (3-Course)
Metal Joints/Fasteners/Corners
Replace any loose or damaged fasteners. Seal all exposed metal fasteners with SMARTCOAT 300 Series Mastic or Sealant. Reinforce SMARTCOAT 300 Series Mastic applied with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300 Acrylic Mastic and 1/4″ for 350 Silicone Mastic, with SMARTFAB 500 Reinforcement, at all corners and metal joints.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop; if the repair was made with incompatible materials, is failing or has potential for high movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate).

For additional questions or support contact CertainTeed Commercial Roofing Technical Services Department 1-800-396-8134 x2 or rpg@saint-gobain.com

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CTL-SC-11 Termination Bar Flashing

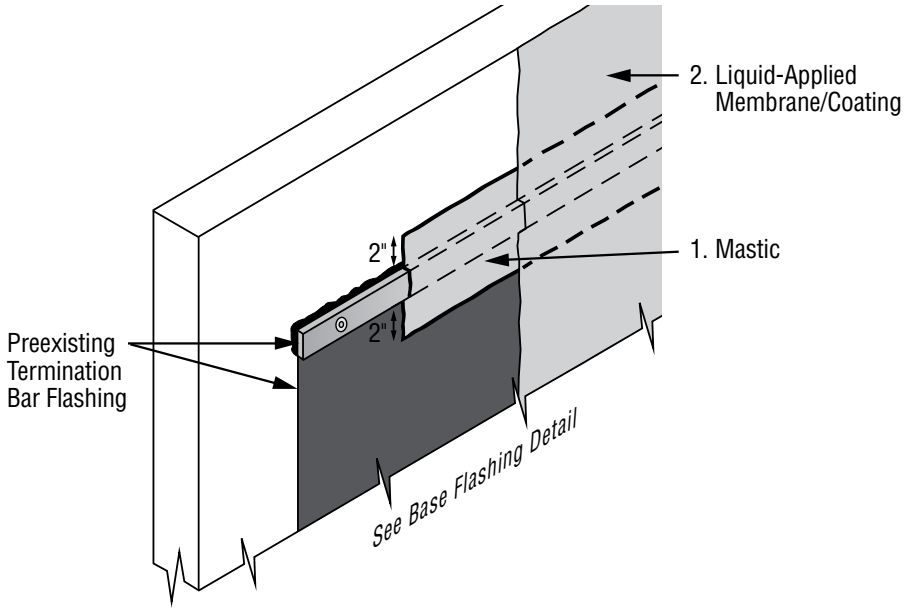
NOTE: This detail is intended for a liquid-applied roof restoration project. It assumes a preexisting roof termination bar flashing is left in place. Please see CTL-SC-05 Base Flashing & Wall Covering on Parapet Wall for proper flashing application below the termination bar. Prior to applying mastic or coating, conduct a thorough inspection of the termination bar. Any loose or damaged fasteners shall be removed and replaced. Any bent elements or elements of the termination bar that allow movement shall be removed and replaced. Encapsulation of the existing termination bar shall only occur where the bar is sound and firmly affixed.

Mastic
Apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300/301 Acrylic Mastic and 1/4″ for 350/365 Silicone Mastic.

Ensure the termination bar is evenly covered, completely encapsulated and the edges of the detail are properly feathered.

Liquid-Applied Membrane/Coating
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application. As possible, extend coating up beneath metal coping to protect the preexisting membrane; be cautious to avoid sealing the bottom edge of the metal to the membrane.

Multiple coats will be required to achieve specified mil thickness on vertical surfaces; it is not recommended to apply more than 1G per 100 sq. ft. in a single coat to avoid material sagging.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone.

For additional questions or support contact CertainTeed Commercial Roofing Technical Services Department 1-800-396-8134 x2 or rpg@saint-gobain.com

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CTL-SC-12 Stack Vent Flashing (Hot or Not)

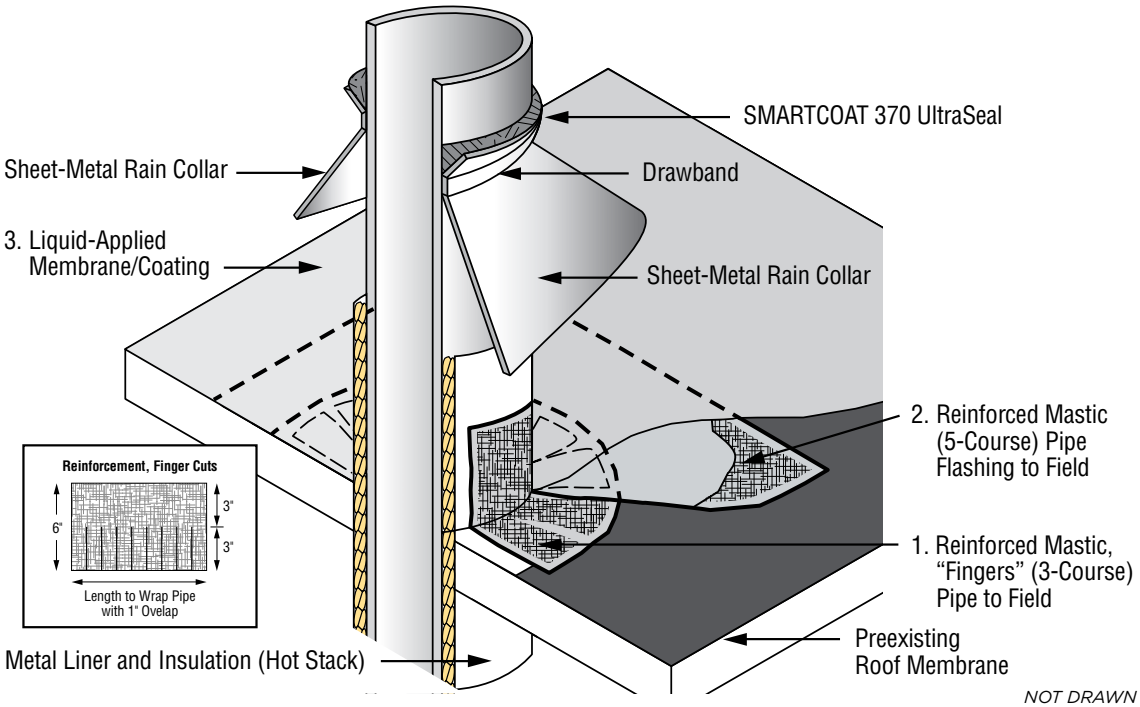
Proper pipe restoration will vary based on type, size and preexisting condition of the stand flashing and transition areas. If the existing flashing exhibits signs of potential leak points, a comprehensive inspection for trapped moisture shall be conducted. If trapped moisture is found or if previous repairs have built up, potentially creating water dams, existing material/flashing shall be removed and replaced.

This detail assumes a new pipe is being installed or previously installed flashing on an existing stand is completely removed.

Reinforced Mastic "Fingers" (3-Course) Pipe to Field
Apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8" for 300 Acrylic Mastic and 1/4" for 350 Silicone Mastic. Cut edge of SMARTFAB 500 Polyester Reinforcement into "fingers" to accommodate the circular/radial nature of this detail. See illustration: Reinforcement "Fingers". Immediately embed reinforcement, minimum 6" width, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

Reinforced Mastic (5-Course) Pipe Flashing to Field
After the first course of mastic is cured, apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8" for 300 Acrylic Mastic and 1/4" for 350 Silicone Mastic. Immediately embed SMARTFAB 500 Polyester Reinforcement, minimum 6" width, into wet mastic abutting the pipe vertical and extending a minimum 2" beyond the reinforcement "fingers". A large width polyester may be utilized with a center hole to accommodate the pipe. If 6" width polyester is utilized, all overlaps shall be a minimum 2"; mastic shall be applied to all overlapped surfaces. Apply a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

Liquid-Applied Membrane/Coating, Field
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application. Extend coating up existing flashing to top of pipe. Multiple coats will be required to achieve specified mil thickness on vertical surfaces; it is not recommended to apply more than 1G per 100 sq. ft. in a single coat to avoid material sagging.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop; if the repair was made with incompatible materials, is failing or has potential for high movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate).

For additional questions or support contact CertainTeed Commercial Roofing Technical Services Department 1-800-396-8134 x2 or rpg@saint-gobain.com

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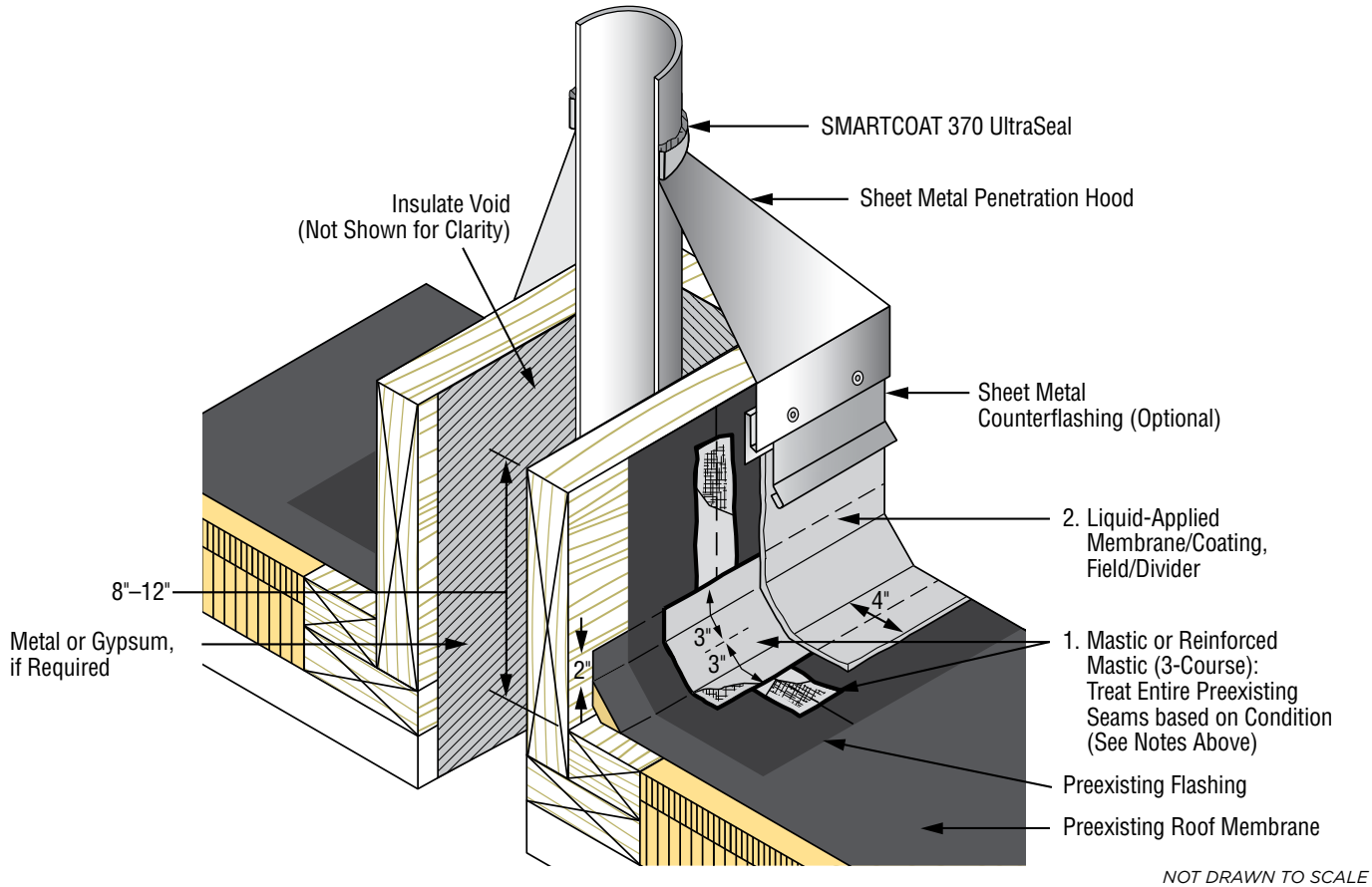
CTL-SC-12A Stack Vent Flashing (Hot or Not) – Alternate

NOTE: This detail assumes a preexisting roof membrane and pipe flashing/curb is left in place.

Mastic or Reinforced Mastic (3-Course)
Tight, well-bonded seams: Apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300/301 Acrylic Mastic and 1/4″ for 350/365 Silicone Mastic. Seams with visual strain, open or weak bonds, previous repairs or potential for large movement/vibration: After mastic is applied immediately embed SMARTFAB 500 Polyester Reinforcement, minimum 6″ width, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

Liquid-Applied Membrane, Field/Curb
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application. As possible, extend coating up beneath sheet metal to protect the preexisting membrane; be cautious to avoid sealing the bottom edge of the metal to the membrane. Multiple coats will be required to achieve specified mil thickness on vertical surfaces; it is not recommended to apply more than 1G per 100 sq. ft. in a single coat to avoid material sagging.

Mastic/Reinforced Mastic (3-Course)
Metal Joints/Fasteners/Corners
Seal all exposed metal fasteners with SMARTCOAT 300 Series Mastic or Sealant. Reinforce SMARTCOAT 300 Series Mastic applied with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300 Acrylic Mastic and 1/4″ for 350 Silicone Mastic, with SMARTFAB 500 Reinforcement, at all curb corners and metal joints.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop; if the repair was made with incompatible materials, is failing or has potential for high movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate).

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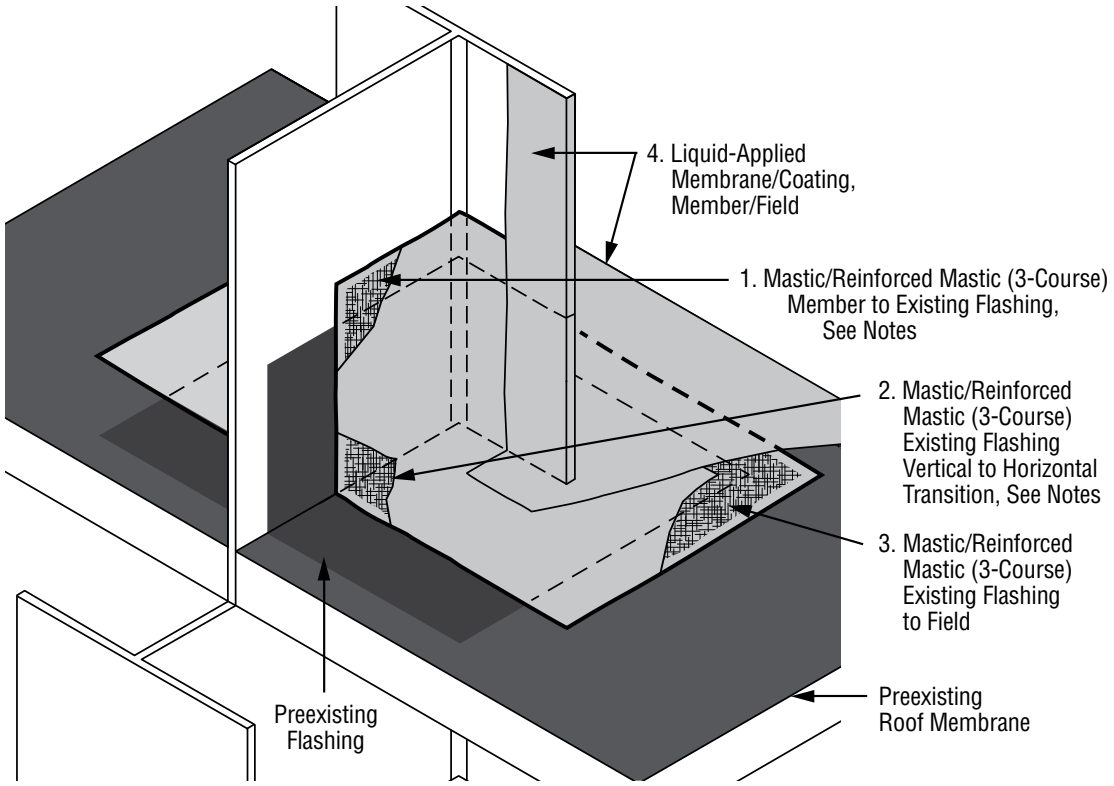
CTL-SC-13 Structural Member Through Roof Deck

Proper restoration will vary based on condition of the existing flashing and transition areas. If the existing member or flashing exhibits signs of potential leak points, a comprehensive inspection for trapped moisture shall be conducted. If trapped moisture is found or if previous repairs have built up, potentially creating water dams, existing material/flashing shall be removed and replaced.

Mastic/Reinforced Mastic (3-Course):
1. Member Vertical to Existing Flashing
2. Existing Member Vertical Flashing to Horizontal Transition
3. Existing Flashing to Field
The above noted areas are the three critical waterproofing elements of a structural member penetrating a roof deck. If these areas are firmly adhered with no previous repairs or signs of potential strain, apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8" for 300/301 Acrylic Mastic and 1/4" for 350/365 Silicone Mastic. If these areas show visual strain, open or weak bonds, previous repairs or potential for large movement/vibration: After mastic is applied immediately embed SMARTFAB 500 Polyester Reinforcement, minimum 4" width, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

NOTE: These areas can be treated differently based on their individual condition. For example, reinforcement may be necessary where the existing flashing meets the field, but mastic alone may be sufficient where the member vertical meets the existing flashing.

Liquid-Applied Membrane/Coating, Field & Member
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application. Extend coating up existing flashing to top of member vertical(s). Multiple coats will be required to achieve specified mil thickness on vertical surfaces; it is not recommended to apply more than 1G per 100 sq. ft. in a single coat to avoid material sagging.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop; if the repair was made with incompatible materials, is failing or has potential for high movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate).

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CTL-SC-14 Surface Preparation

All roof substrates shall be sound, clean and dry prior to SMARTCOAT restoration. This detail is intended to provide specific instruction associated with preparation of a metal roof.

Rust
Clean the surface of rusted areas with a wire brush. In some cases, a wet cleaning maybe preferred, using SMARTCOAT 100 Roof Wash as needed. A solvent, such as Xylene, may also be introduced as needed. Remove all flaking material. NOTE: The surface will still have a rusted appearance once clean. Once clean and dry, SMARTCOAT 210 Universal Primer shall be utilized over any rusted surface prior to coating with SMARTCOAT 400 Series Coatings. See Figures 1 and 2.

Panel Replacement or Repair
Existing metal roof panels shall be thoroughly inspected for deficiencies including but not limited to rust, dents, holes, etc. Inspection shall include both the top and bottom surface of the panel. In some cases, rusted panels will give way to holes.

Conditional Repair
If a hole is less than 2″ in circumference, is not adjacent to or on a panel rib, and is not surrounded by blooming rust, the hole may be safe to repair with reinforced mastic (3-course), see Figure 3. Apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300/301 Acrylic Mastic and 1/4″ for 350/365 Silicone Mastic. After mastic is applied immediately embed SMARTFAB 500 Polyester Reinforcement, minimum 6″ width, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered. Please consult with CertainTeed's Technical Services Department for confirmation that a hole is safe to repair.

Panel Replacement
If a hole is greater than 2″ in circumference, is adjacent to or on a panel rib, or if a hole is surrounded by blooming rust, the panel shall be replaced, see Figure 4.

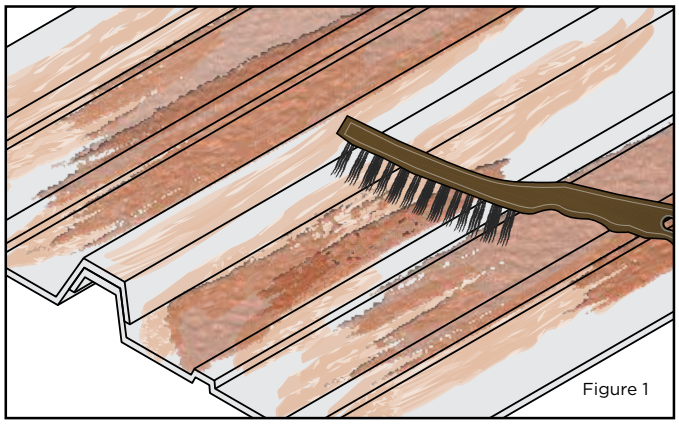
Figure 1

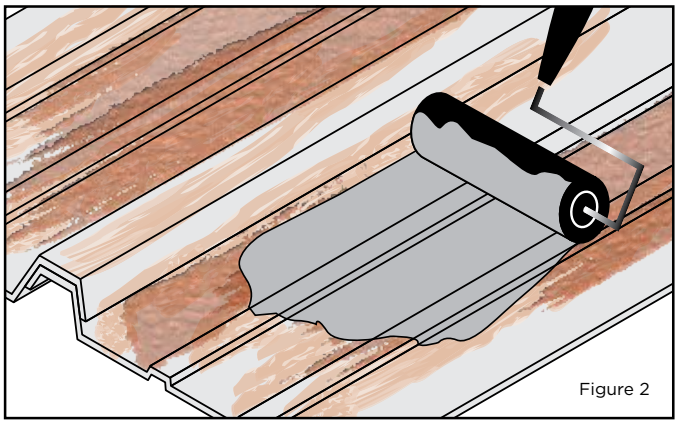
Figure 2

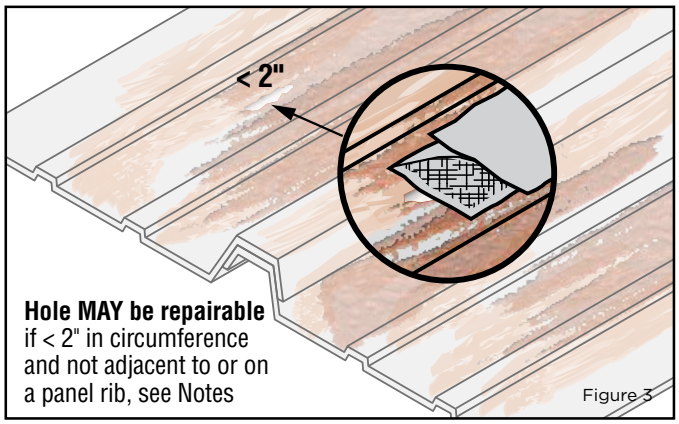

Figure 3

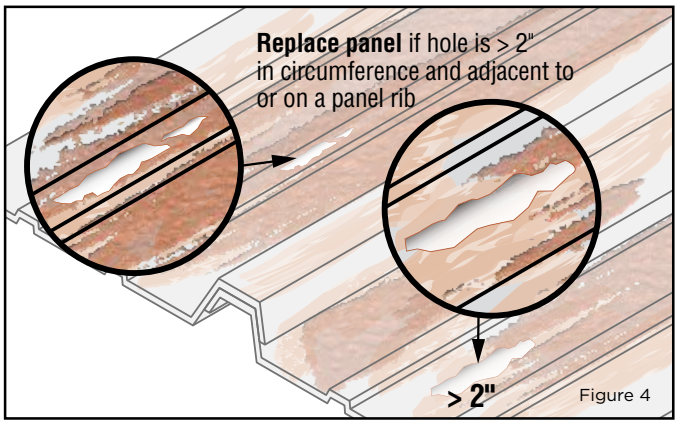

Figure 4

NOT DRAWN TO SCALE

For additional questions or support contact CertainTeed Commercial Roofing Technical Services Department 1-800-396-8134 x2 or rpg@saint-gobain.com

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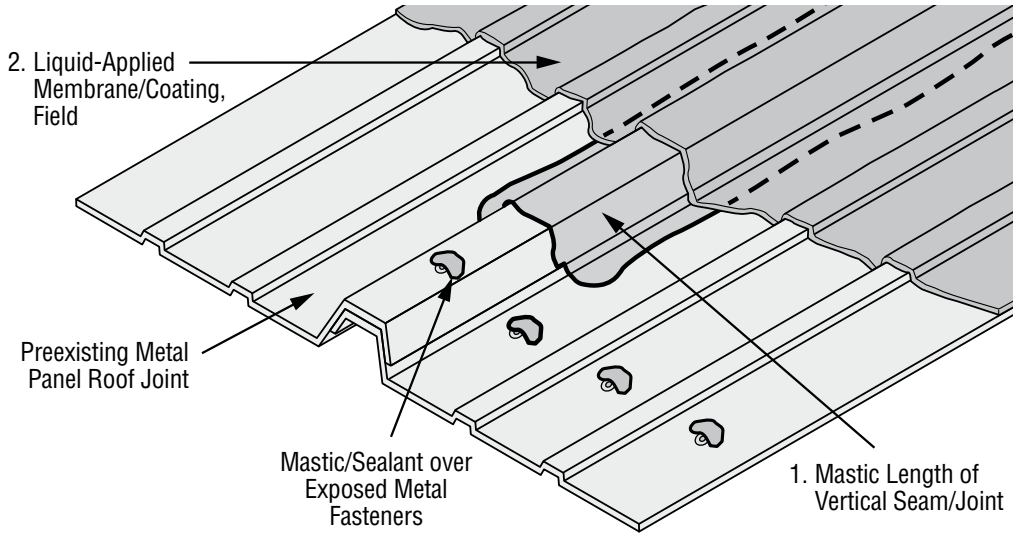
CTL-SC-15 Panel Vertical Seam

Mastic – Vertical Seam Length
Apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300/301 Acrylic Mastic and 1/4″ for 350/365 Silicone Mastic, running the full length of the vertical seam. Ensure the edges of the detail are properly feathered.

Mastic/Sealant - Fasteners
Remove and replace damaged fasteners, seal all exposed metal fasteners with SMARTCOAT 300 Series Mastic by brush, trowel or gloved hand or gun SMARTCOAT 370 UltraSeal.

Liquid-Applied Coating/Membrane, Field
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application. Multiple coats will be required to achieve specified mil thickness on roofs with greater than 3:12 slope or on vertical surfaces; it is not recommended to apply more than 1G per 100 sq. ft. in a single coat to avoid material sagging.



NOT DRAWN TO SCALE

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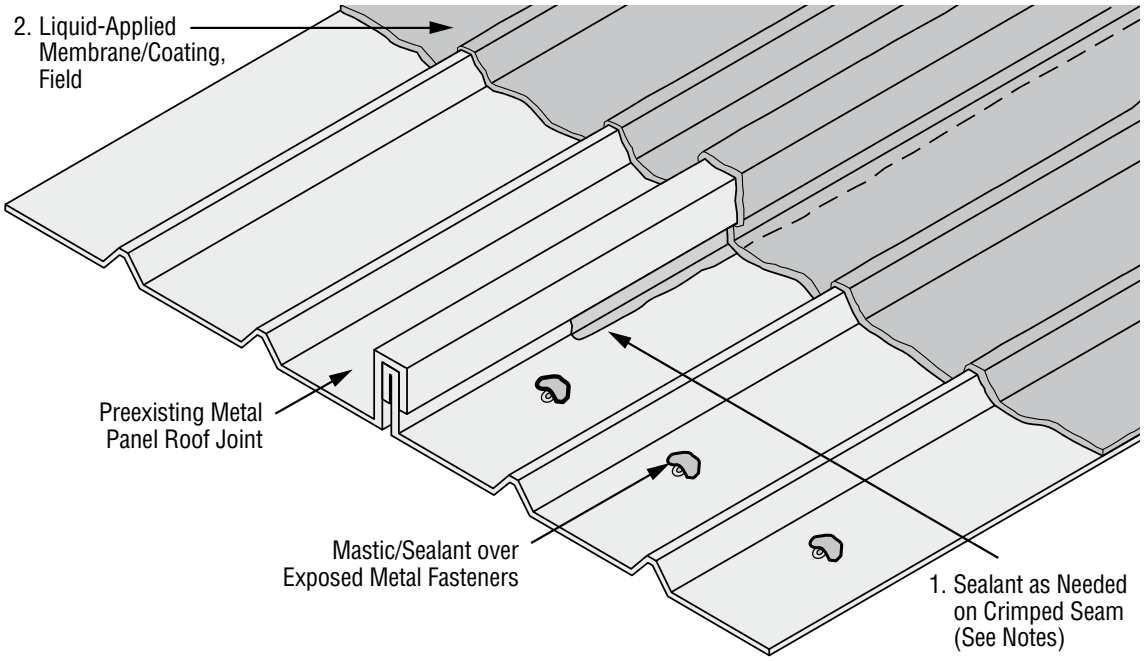
CTL-SC-16 Structural Standing Seam

Sealant – Vertical Seam Deficiencies
Thoroughly inspect length of crimped seam for deficiencies, such as but not limited to dents. Gun a minimum 1/4″ bead of SMARTCOAT 370 UltraSeal over any deficiencies, extending a minimum 2″ beyond area of concern in both vertical directions. Deficiency shall be fully encapsulated.

Mastic/Sealant - Fasteners
Remove and replace damaged fasteners, seal all exposed metal fasteners with SMARTCOAT 300 Series Mastic by brush, trowel or gloved hand or gun SMARTCOAT 370 UltraSeal.

Liquid-Applied Coating/Membrane, Field
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application. Multiple coats will be required to achieve specified mil thickness on roofs with greater than 3:12 slope or on vertical surfaces; it is not recommended to apply more than 1G per 100 sq. ft. in a single coat to avoid material sagging.



NOT DRAWN TO SCALE

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7/21

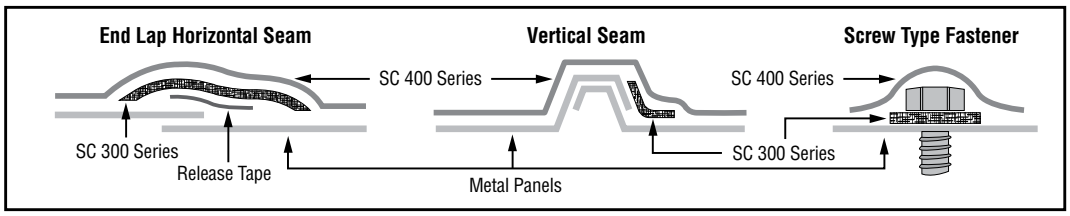
CTL-SC-17 Horizontal Seam

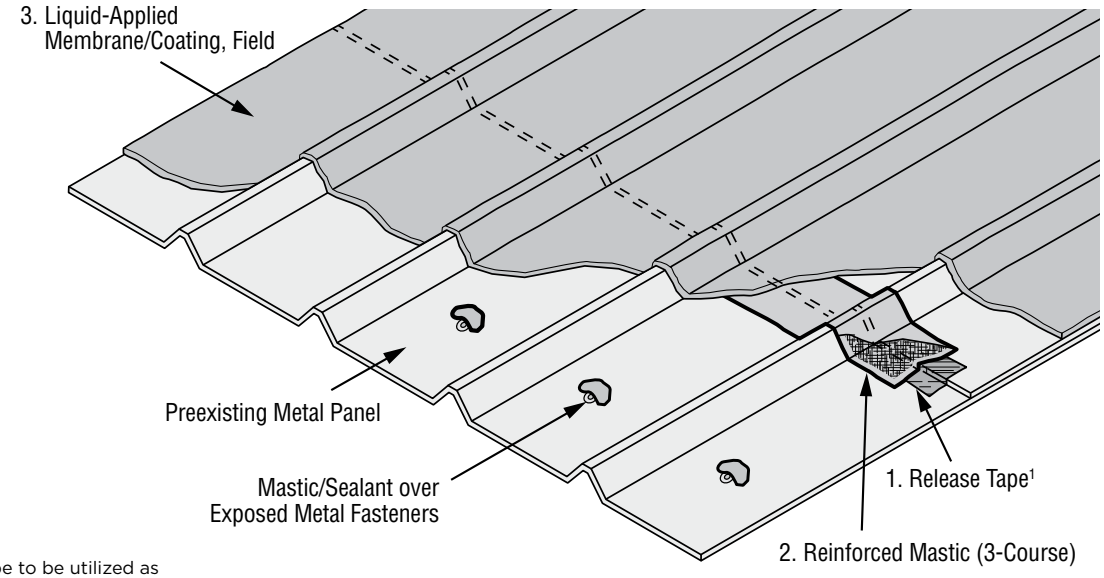
Release Tape – Horizontal Seam
(as determined to be needed or beneficial)
On horizontal seams with potential for large movement, affix a minimum 2″ wide release tape, such as painter's tape. This tape will not permanently adhere but rather will serve to allow movement while deflecting some strain from the subsequent layer of 3-course reinforced mastic.

Reinforced Mastic (3-Course) – Horizontal Seam
When included, apply atop the Release Tape and extending a minimum 2″ on either side, apply SMARTCOAT 300/350 Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8″ for 300 Acrylic Mastic and 1/4″ for 350 Silicone Mastic. Immediately embed SMARTFAB 500 Polyester Reinforcement, minimum 4″ width when no release tape is utilized; minimum 6" width and sufficient to ensure a minimum 2″ on either side of the tape when present, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

Mastic/Sealant - Fasteners
Remove and replace damaged fasteners, seal all exposed metal fasteners with SMARTCOAT 300 Series Mastic by brush, trowel or gloved hand or gun SMARTCOAT 370 UltraSeal.

Liquid-Applied Coating/Membrane, Field
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application. Multiple coats will be required to achieve specified mil thickness on roofs with greater than 3:12 slope or on vertical surfaces; it is not recommended to apply more than 1G per 100 sq. ft. in a single coat to avoid material sagging.





[1]Release Tape to be utilized as determined to be needed or beneficial

NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop; if the repair was made with incompatible materials, is failing or has potential for high movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate).

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CTL-SC-18 Pipe Flashing

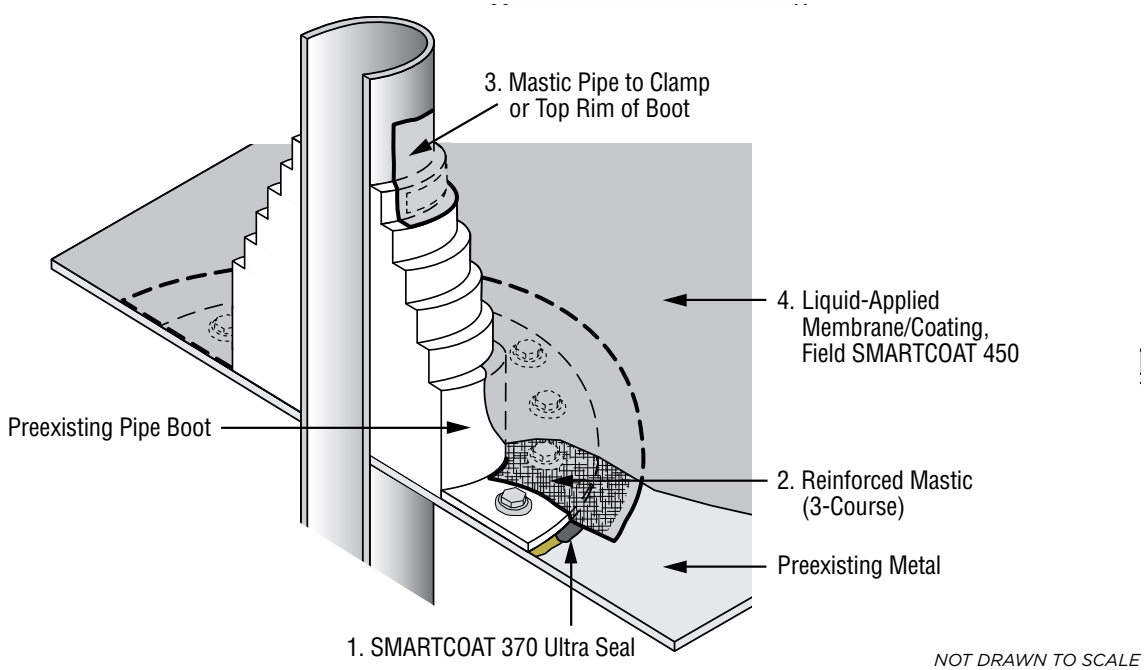
NOTE: Proper pipe restoration will vary based on type, size and preexisting condition of the pipe and transition areas. If the existing pipe exhibits signs of potential leak points, a comprehensive inspection for trapped moisture shall be conducted. If trapped moisture is found or if previous repairs have built up, potentially creating water dams, existing material/flashing shall be removed and replaced.

SMARTCOAT 370 UltraSeal, Boot Perimeter
Apply a bead of SMARTCOAT 370 UltraSeal around the entire perimeter where the boot meets the roof field. While SMARTCOAT 370 is recommended for ease of use, any SMARTCOAT 300 series mastic is acceptable, assuming it is approved for use with the SMARTCOAT 400 series coating to be applied.

Reinforced Mastic (3-Course), Boot Flange to Field
Apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8" for 300/301 Acrylic Mastic and 1/4" for 350/365 Silicone Mastic. Immediately embed SMARTFAB 500 Polyester Reinforcement, minimum 4" width, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

Mastic/Reinforced Mastic (3-Course), Top Rim/Boot to Pipe Vertical
If this area is firmly adhered with no previous repairs or signs of potential strain, apply SMARTCOAT 300 Series Mastic with a brush, trowel or gloved hand at a maximum thickness of 1/8" for 300/301 Acrylic Mastic and 1/4" for 350/365 Silicone Mastic. If this area shows visual strain, open or weak bonds, previous repairs or potential for large movement/constant vibration: After mastic is applied immediately embed SMARTFAB 500 Polyester Reinforcement, minimum 4" width, into wet mastic followed by a second coat of mastic at prescribed thickness to encapsulate edges and surface of polyester. Ensure the polyester is evenly covered and the edges of the detail are properly feathered.

Liquid-Applied Coating/Membrane, Field/Boot/Pipe
Once mastic is cured, apply coating in accordance with specified SMARTCOAT application. Extend coating up existing flashing to top of pipe. Multiple coats will be required to achieve specified mil thickness on vertical surfaces; it is not recommended to apply more than 1G per 100 sq. ft. in a single coat to avoid material sagging.



NOT DRAWN TO SCALE

NOTE: Never repair or coat-over silicone-based mastic or coating with anything other than a compatible silicone-based product; acrylic materials will not bond to silicone.

NOTE: When portions of the detail have undergone previous repairs and if the repairs have been made with compatible materials and are sound, repair can be left in place and reinforced mastic (3-course) applied atop ensuring existing flashing or mastic is fully encapsulated; if the repair was made with incompatible materials, is failing or has potential for large movement, remove these materials and proceed with reinforced mastic (3-course/5-course as appropriate.

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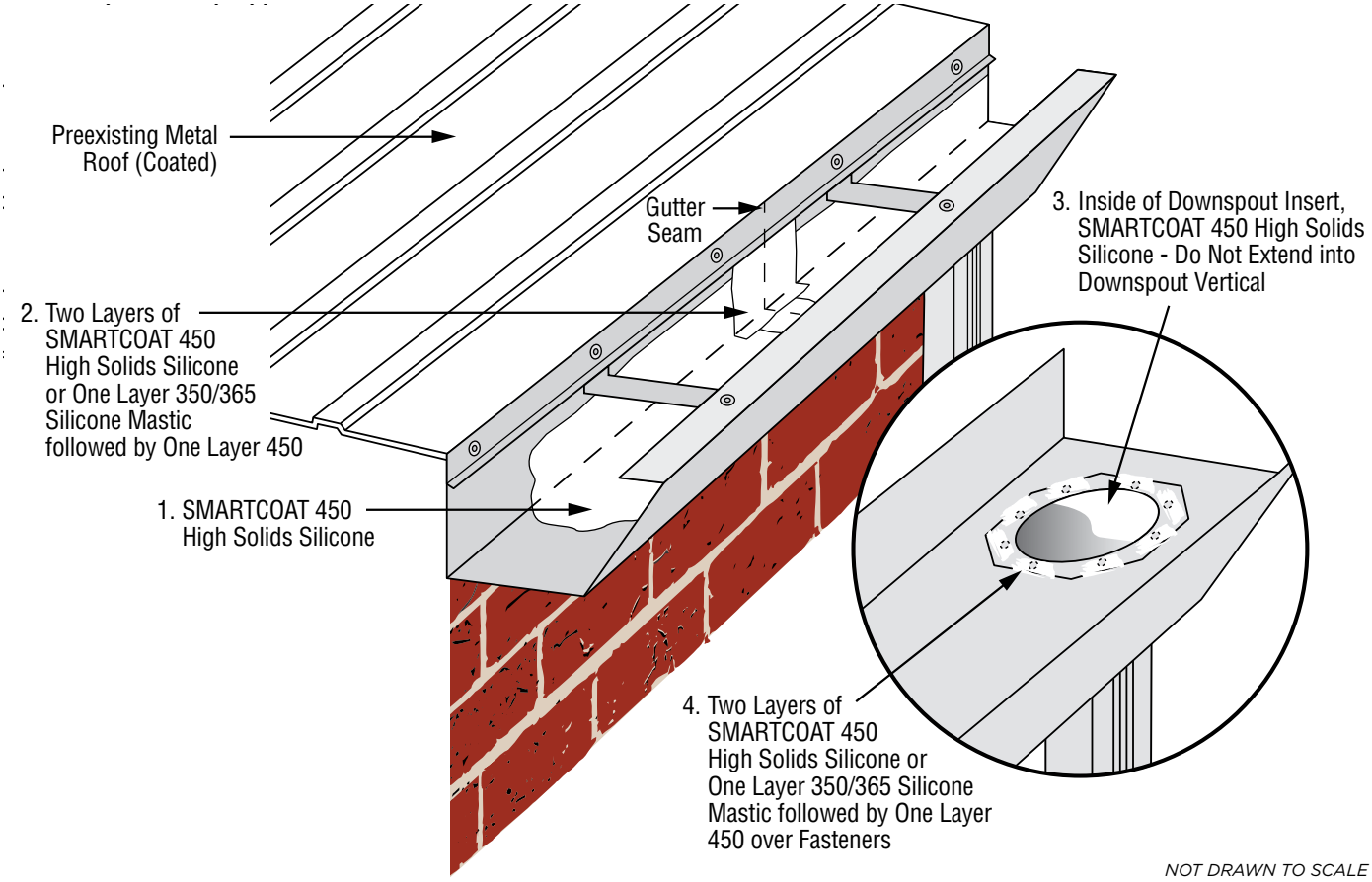
CTL-SC-20 Gutter Flashing, Metal Roofing

Clean gutter interior. Surface must be free of dirt, dust, oil, grease, wax, rust, chalky or loose paint, mildew and any other surface contamination that may inhibit adhesion. *NOTE: Recommended application thickness for SMARTCOAT 450 High Solids Silicone in a gutter are relatively high to accommodate for common debris and debris removal, increasing the risk of membrane puncture.*

Gutter, Main & Downspout Insert
Apply approximately 40 wet mils of SMARTCOAT 450 High Solids Silicone Coating with a brush. Do not extend coating into downspout vertical.

Gutter, Seams & Exposed Fasteners
If utilizing only SMARTCOAT 450 High Solids Silicone, apply approximately 40 wet mils of SMARTCOAT 450 High Solids Silicone Coating with a brush. Allow to skin over such that a second coat would not displace first coat. Apply a second coat, approximately 40 wet mils thick of SMARTCOAT 450 High Solids Silicone Coating.

If utilizing SMARTCOAT 350/365 Silicone Mastic, apply with a brush, trowel or gloved hand at an approximate thickness of 1/4". Allow to skin over such that a subsequent coating will not displace material. Once sufficiently skinned/dry, apply a minimum 24 wet mils of SMARTCOAT 450 High Solids Silicone Coating with a brush



NOT DRAWN TO SCALE

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1/22

CTL-SF-00 Three (3) Course Flashing, SmartFlash ONE

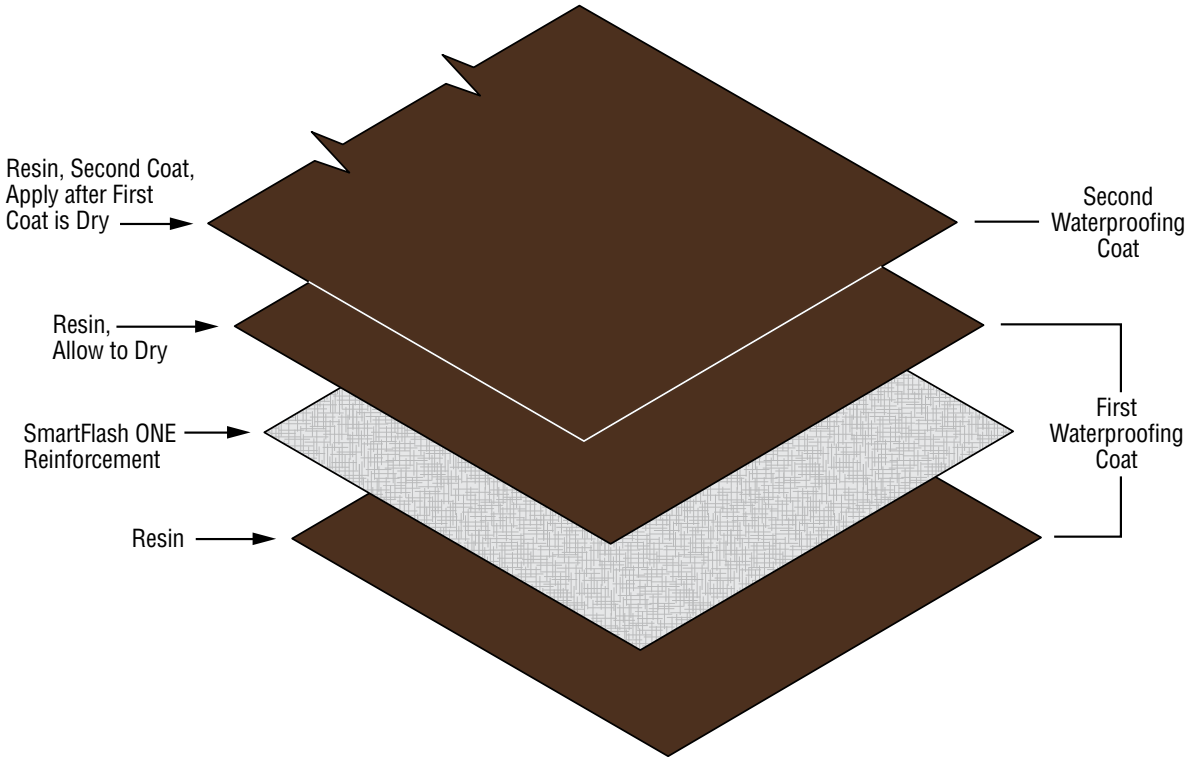
1. The substrate shall be clean and free of loose or flaking materials prior to application of SmartFlash ONE resin. Recommend working in manageable sections, approximately 10 ft (3 m) or less, to ensure resin adequately saturates polyester.

First Waterproofing Coat

2. Using a paint brush, roller or trowel for resin application, apply approximately 30 mils of wet resin to the substrate.
3. Immediately lightly press SmartFlash ONE Reinforcement into wet resin.
4. Saturate and coat field and Reinforcement with resin such that no Reinforcement is visible. Allow to dry 2-3 hours (assumes 70°F or 20°C).

Second Waterproofing Coat

5. Apply approximately 30 mils of wet resin to entire surface covered by first coat.
6. Optional: If desired, broadcast granules into the second waterproofing coat before it forms a skin.



NOT DRAWN TO SCALE

NOTE: The first waterproofing coat will not be dry enough for foot traffic after 2-3 hours; the second waterproofing coat shall be able to be applied without standing on the flashing area.

Scan to View Detail Installation

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CTL-SF-00A Five (5) Course Flashing, SmartFlash ONE

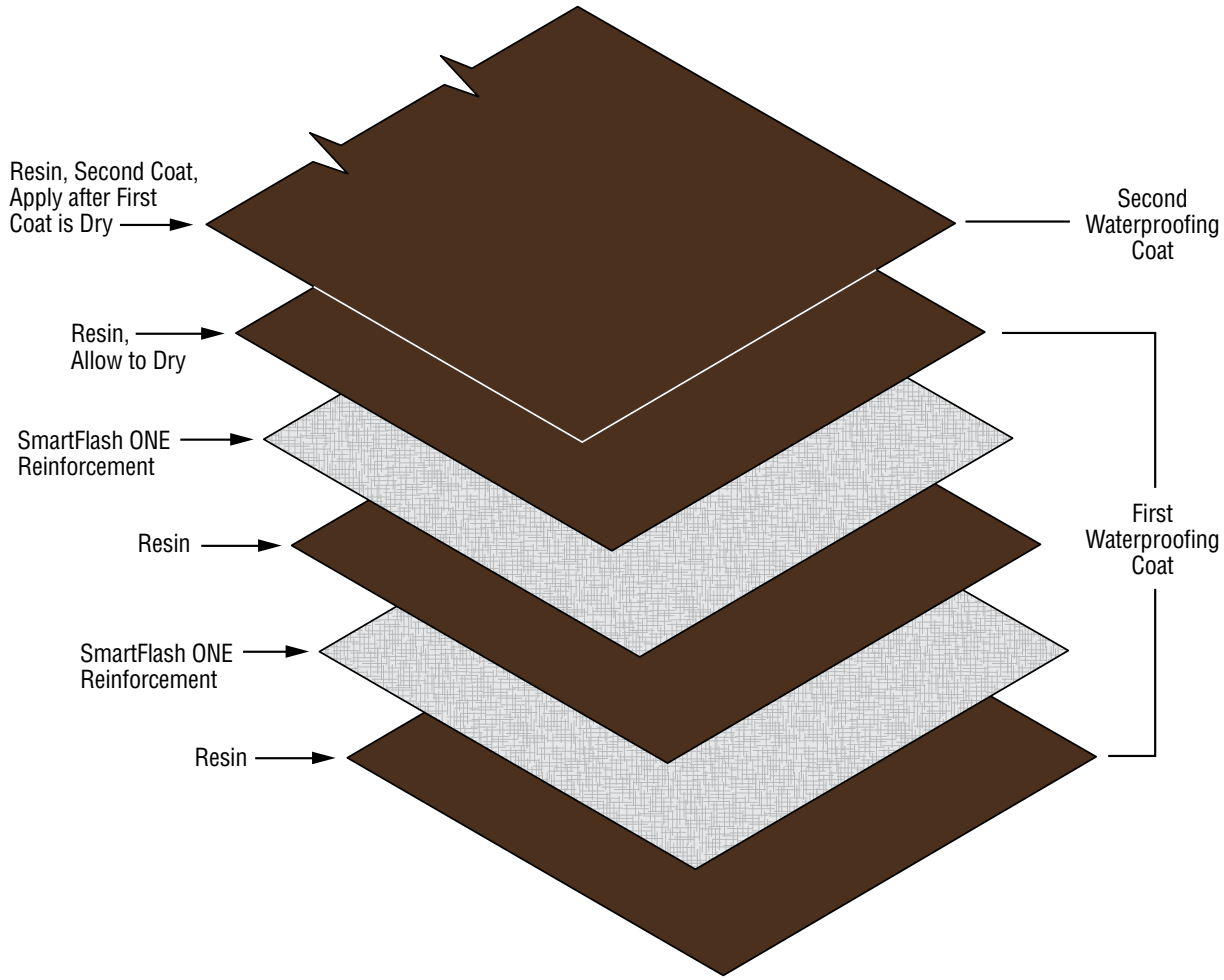
1. The substrate shall be clean and free of loose or flaking materials prior to application of SmartFlash ONE resin. Recommend working in manageable sections, approximately 10 ft (3 m) or less, to ensure resin adequately saturates polyester.

First Waterproofing Coat

2. Using a paint brush, roller or trowel for resin application, apply approximately 30 mils of wet resin to the substrate.
3. Immediately lightly press SmartFlash ONE Reinforcement into wet resin.
4. Saturating and coat Reinforcement such that no Reinforcement is visible. Extend resin out to final detail edges at approximately 30 wet mils.
5. Immediately lightly press SmartFlash ONE Reinforcement into wet resin.
6. Saturate and coat field and Reinforcement with resin such that no Reinforcement is visible. Allow to dry 2-3 hours (assumes 70°F or 20°C).

Second Waterproofing Coat

7. Apply approximately 30 mils of wet resin to entire surface covered by first coat.
8. Optional: If desired, broadcast granules into the second waterproofing coat before it forms a skin.



NOT DRAWN TO SCALE

NOTE: The first waterproofing coat will not be dry enough for foot traffic after 2-3 hours; the second waterproofing coat shall be able to be applied without standing on the flashing area.

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CTL-SF-01 Curb Equipment Flashing, SmartFlash ONE

Anchor, Base Ply and Cap Sheet
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt) to intersection of horizontal roof plane and curb. Proper attachment is defined by specific system, product selection and deck type.

Tape (Recommended)
Tape off desired edges for clean detail aesthetic.

Polyester Reinforcement Preparation (Recommended)
Prepare SmartFlash ONE Reinforcements prior to applying any resin. Cut 6″ width SmartFlash ONE Reinforcement to appropriate lengths. Reinforcement shall be applied wherever a change in angle occurs and across any seams in the substrate. Reinforcement shall overlap 2″ anywhere an overlap occurs. NOTE: To accommodate inside or outside corners, make a 3″ long cut halfway through the width of the strip end.

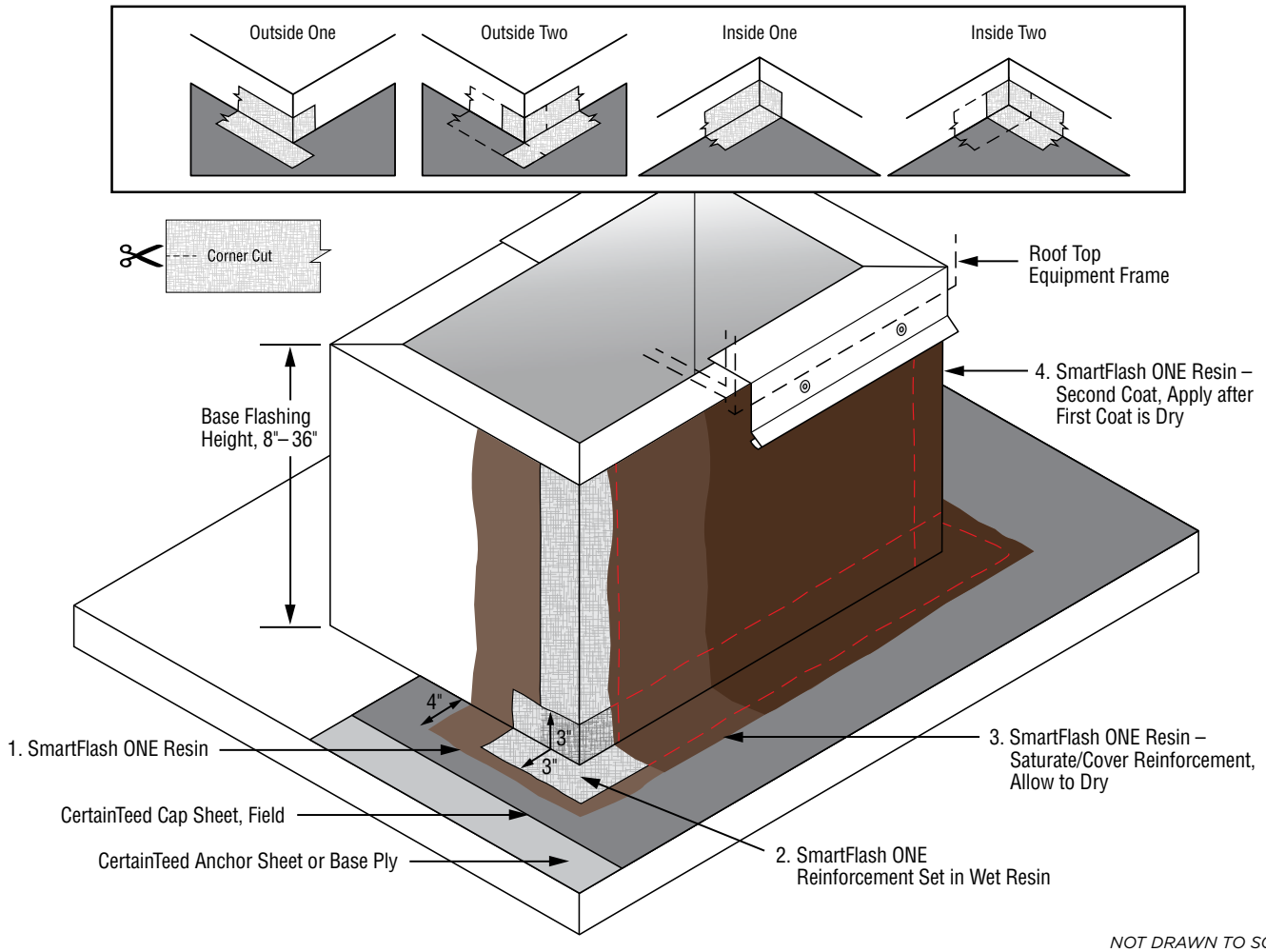
OUTSIDE CORNERS: The cut allows the strip to round the corner and extend onto the field; a second strip cut the same way shall overlap the first strip.

INSIDE CORNERS: The cut allows the strip to round the corner and overlap itself on the vertical surface; a second strip cut the same way shall overlap the first strip.

First Waterproofing Coat
Using a paint brush, roller or trowel for resin application, apply approximately 30 mils of wet resin to the Cap Sheet approximately 4″ (100 mm) horizontally onto the field and vertically to the top edge of the curb. Immediately lightly press SmartFlash ONE Reinforcement into wet resin where field of roof meets base of vertical surface, up/across vertical edges of the curb and across any seams/breaks in material in the curb; saturate and coat Reinforcement with resin such that no Reinforcement is visible. Allow to dry 2-3 hours (assumes 70°F or 20°C).

Second Waterproofing Coat
Apply approximately 30 mils of wet resin to entire surface covered by first coat.

Granules (Optional)
If desired, broadcast granules into the second waterproofing coat before it forms a skin.



NOT DRAWN TO SCALE

Rev 7/20

CTL-SF-02 Wood Area Divider Flashing, SmartFlash ONE

Anchor, Base Ply and Cap Sheet
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt) to intersection of horizontal roof plane and curb. Proper attachment is defined by specific system, product selection and deck type.

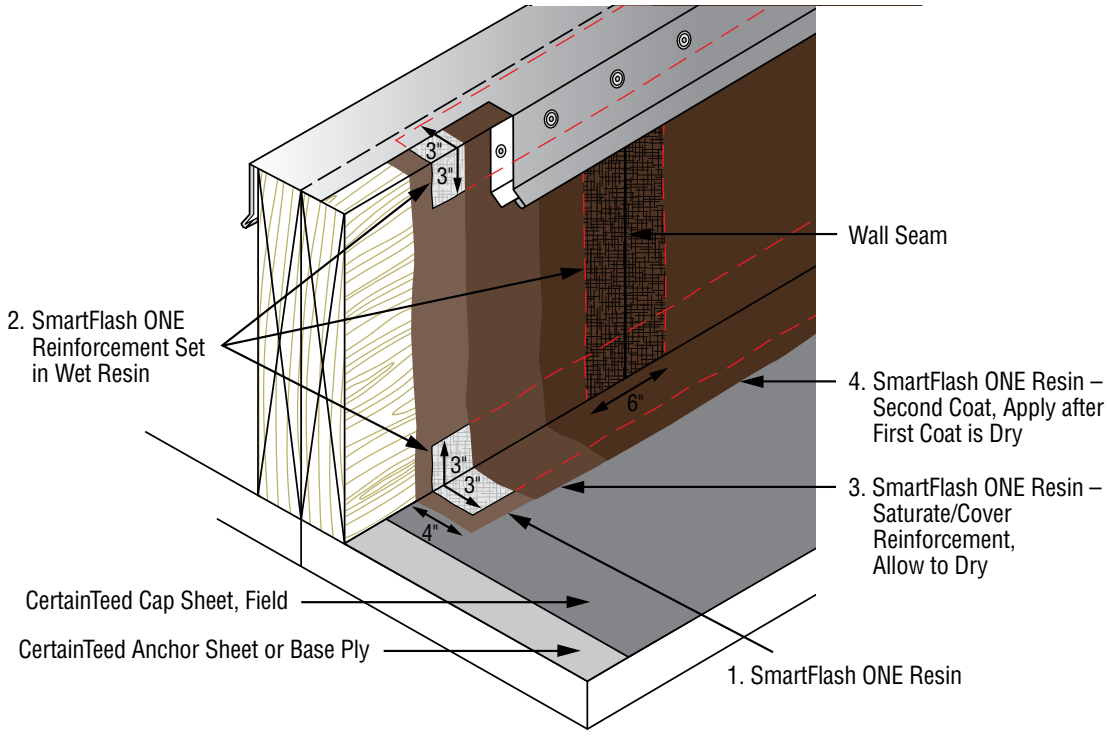
Tape (Recommended)
Tape off desired edges for clean detail aesthetic.

Polyester Reinforcement Preparation (Recommended)
Prepare SmartFlash ONE Reinforcements prior to applying any resin. Cut 6″ width SmartFlash ONE Reinforcement to appropriate lengths. Reinforcement shall be applied wherever a change in angle occurs (i.e. where field of roof meets base of vertical surface) and across any seams in the substrate. Reinforcement shall overlap 2″ anywhere an overlap occurs.

First Waterproofing Coat
Using a paint brush, roller or trowel for resin application, apply approximately 30 mils of wet resin to the Cap Sheet approximately 4″ (100 mm) horizontally onto the field, vertically up the face of the divider, over the top surface of the divider, down the opposing vertical face and approximately 4″ (100 mm horizontally onto the field. Immediately lightly press SmartFlash ONE Reinforcement into wet resin where field of roof meets base of vertical surface, along top edges of the divider and across any seams/breaks in material in the divider; saturate and coat Reinforcement with resin such that no Reinforcement is visible. Allow to dry 2-3 hours (assumes 70°F or 20°C).

Second Waterproofing Coat
Apply approximately 30 mils of wet resin to entire surface covered by first coat.

Granules (Optional)
If desired, broadcast granules into the second waterproofing coat before it forms a skin.



NOT DRAWN TO SCALE

Rev 6/20

CTL-SF-03 Base Flashing and Wallcovering on Parapet Wall, SmartFlash ONE

Anchor, Base Ply and Cap Sheet
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt) to intersection of horizontal roof plane and divider. Proper attachment is defined by specific system, product selection and deck type.

Tape (Recommended)
Tape off desired edges for clean detail aesthetic.

Polyester Reinforcement Preparation (Recommended)
Prepare SmartFlash ONE Reinforcements prior to applying any resin. Cut 6" width SmartFlash ONE Reinforcement to appropriate lengths. Reinforcement shall be applied wherever a change in angle occurs and across any seams in the substrate. Reinforcement shall overlap 2" anywhere an overlap occurs. NOTE: To accommodate inside or outside corners, make a 3" long cut halfway through the width of the strip end.

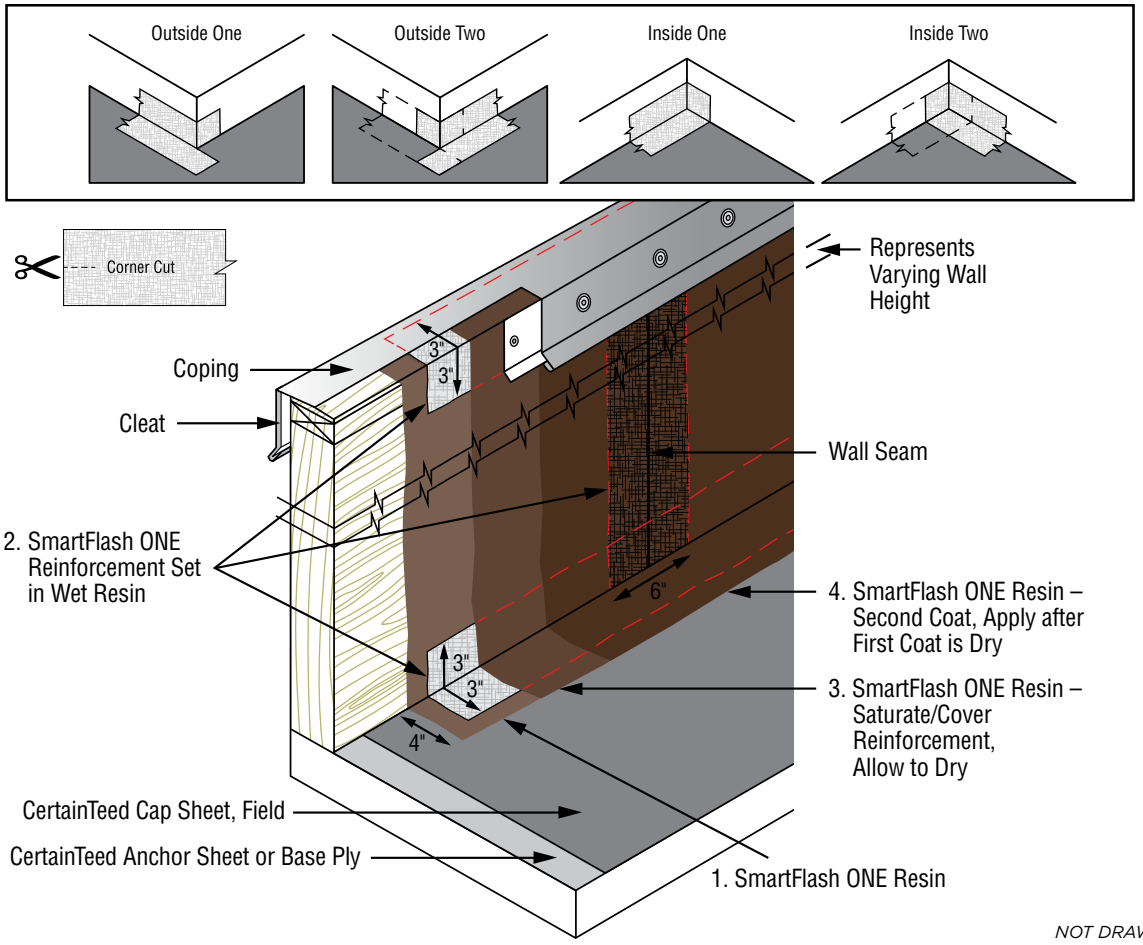
OUTSIDE CORNERS: The cut allows the strip to round the corner and extend onto the field; a second strip cut the same way shall overlap the first strip.

INSIDE CORNERS: The cut allows the strip to round the corner and overlap itself on the vertical surface; a second strip cut the same way shall overlap the first strip.

First Waterproofing Coat
Using a paint brush, roller or trowel for resin application, apply approximately 30 mils of wet resin to the Cap Sheet approximately 4" (100 mm) horizontally onto the field, vertically up the face of the wall, over the top surface of the wall and down the opposing vertical face approximately 2" (50 mm). Immediately lightly press SmartFlash ONE Reinforcement into wet resin where field of roof meets base of vertical surface, along top edges of the wall and across any seams/breaks in material in the wall; saturate and coat Reinforcement with resin such that no Reinforcement is visible. Allow to dry 2-3 hours (assumes 70°F or 20°C).

Second Waterproofing Coat
Apply approximately 30 mils of wet resin to entire surface covered by first coat.

Granules (Optional)
If desired, broadcast granules into the second waterproofing coat before it forms a skin.



NOT DRAWN TO SCALE

Rev 6/20

CTL-SF-04A Through-wall Scupper Flashing, SmartFlash ONE

Anchor, Base Ply and Cap Sheet
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt) to intersection of horizontal roof plane and wall, extending into the scupper on the horizontal plane of the roof. Proper attachment is defined by specific system, product selection and deck type.

Tape (Recommended)
Tape off desired edges for clean detail aesthetic.

Polyester Reinforcement Preparation (Recommended)
Prepare SmartFlash ONE Reinforcements prior to applying any resin. Cut 6″ width SmartFlash ONE Reinforcement to appropriate lengths. Reinforcement shall be applied wherever a change in angle occurs and across any seams in the substrate. Reinforcement shall overlap 2″ anywhere an overlap occurs. NOTE: To accommodate inside or outside corners, make a 3″ long cut halfway through the width of the strip end.

OUTSIDE CORNERS: The cut allows the strip to round the corner and extend onto the field; a second strip cut the same way shall overlap the first strip.

INSIDE CORNERS: The cut allows the strip to round the corner and overlap itself on the vertical surface; a second strip cut the same way shall overlap the first strip.

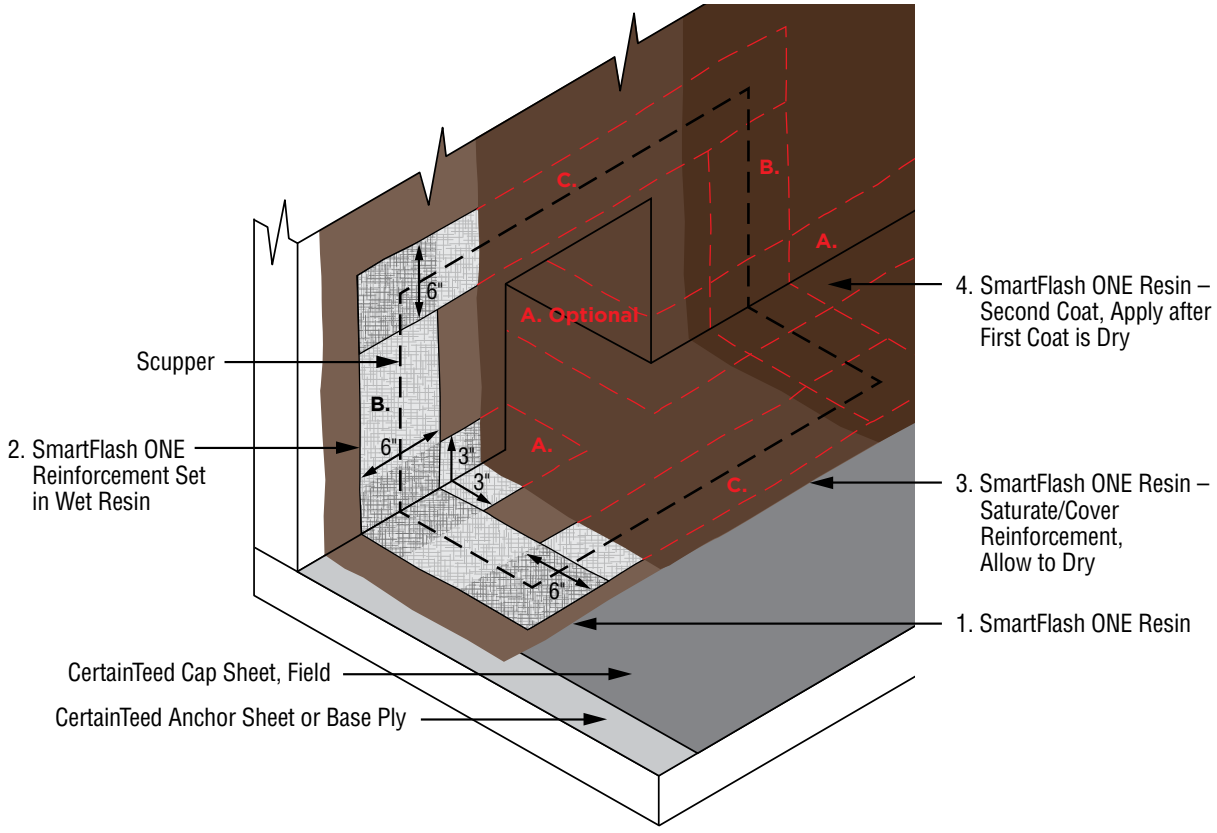
First Waterproofing Coat
Using a paint brush, roller or trowel for resin application, apply approximately 30 mils of wet resin to the Cap Sheet approximately 4″ (100 mm) horizontally onto the field and vertically passed the scupper flange a minimum of 7″.

Immediately lightly press SmartFlash ONE Reinforcement into wet resin:

- **A. Base** – where field of roof meets the base of the vertical surface; scupper floor should be self-sealed (metal) but reinforcement can be added for extra protection
- **B. Scupper Sides** – vertical edges where the scupper meets the parapet wall
- **C. Scupper Flange** – extending 3″ onto the flange and 3″ onto the parapet wall Saturate and coat Reinforcement with resin such that no Reinforcement is visible. Allow to dry 2-3 hours (assumes 70°F or 20°C.

Second Waterproofing Coat
Apply approximately 30 mils of wet resin to entire surface covered by first coat.

Granules (Optional)
If desired, broadcast granules into the second waterproofing coat before it forms a skin.



NOT DRAWN TO SCALE

Rev 6/20

CTL-SF-05 Drain Flashing, SmartFlash ONE

Anchor, Base Ply and Cap Sheet
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt) to edge of drain bowl. Proper attachment is defined by specific system, product selection and deck type.

Tape (Recommended)
Tape off desired edges for clean detail aesthetic.

Polyester Reinforcement Preparation (Recommended)
Prepare SmartFlash ONE Reinforcements prior to applying any resin.

FINGER FLASHING: For drains, it is necessary to cut "fingers" into the sides of the polyester to allow the material to radiate onto the field of the roof and into the drain bowl without creases.

FLASHING STRIPS: Prepare four 6" strips cut to approximately 12" in length with oval centers removed to overlap the "finger" flashing and surround the drain.

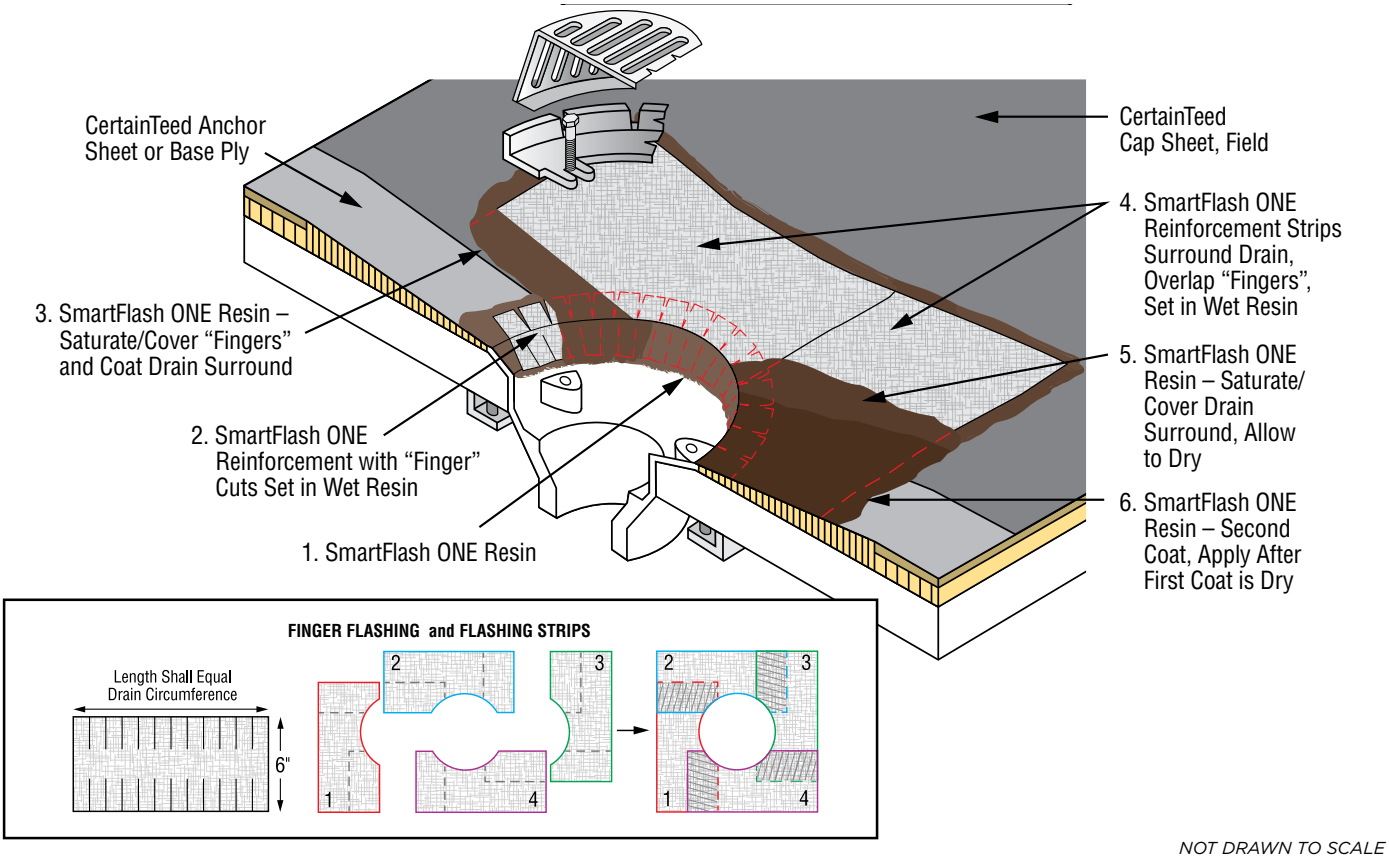
First Waterproofing Coat
Using a paint brush, roller or trowel for resin application, apply approximately 30 mils of wet resin to the Cap Sheet approximately 4" (100 mm) horizontally surrounding the drain and 4" into the bowl.

Immediately lightly press "finger" Reinforcement into wet resin; saturate and coat reinforcement with resin such that not Reinforcement is visible. Extend approximately 30 wet mils of resin out to pre-defined detail edges (tape), approximately 12" x 12".

Immediately lightly press Reinforcement strips into wet resin. Reinforcement strips shall completely cover finger flashing and overlap each other by a minimum of 2" (50 mm); saturate and coat Reinforcement strips, including overlapped surfaces, with resin such that no Reinforcement is visible. Allow to dry 2-3 hours (assumes 70°F or 20°C).

Second Waterproofing Coat
Apply approximately 30 mils of wet resin to entire surface covered by first coat.

Granules (Optional)
If desired, broadcast granules into the second waterproofing coat before it forms a skin.



NOT DRAWN TO SCALE

Rev 6/20

CTL-SF-06 Pipe Flashing, SmartFlash ONE

NOTE: This detail is not intended for use on hot pipes, see CTL-SF-09 Hot Pipe Flashing, SmartFlash ONE.

Anchor, Base Ply and Cap Sheet
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt) to base of penetration. Proper attachment is defined by specific system, product selection and deck type.

Pipe
If pipe is manufactured with PVC, abrade the surface with sand paper prior to resin application. This is also recommended for surfaces with rust or paint. All other surface should be clean and free of moisture, oil or debris.

Tape (Recommended)
Tape off desired edges for clean detail aesthetic.

Polyester Reinforcement Preparation (Recommended)
Prepare SmartFlash ONE Reinforcements prior to applying any resin.

FINGER FLASHING: For pipe or round penetrations, it is necessary to cut "fingers" into one side of the polyester to allow the material to radiate onto the field of the roof without creases.

FLASHING STRIPS: Additionally, prepare two 6" strips cut to 10" in length with half-circles removed to allow for the strips to overlap when placed on opposite sides of the pipe.

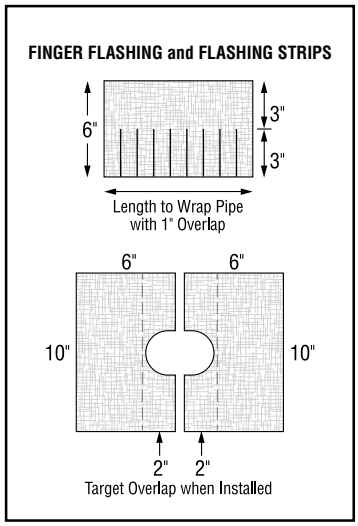
First Waterproofing Coat
Using a paint brush, roller or trowel for resin application, apply approximately 30 mils of wet resin to the Cap Sheet approximately 4" (100 mm) horizontally surrounding the penetration and 4" vertically up the penetration.

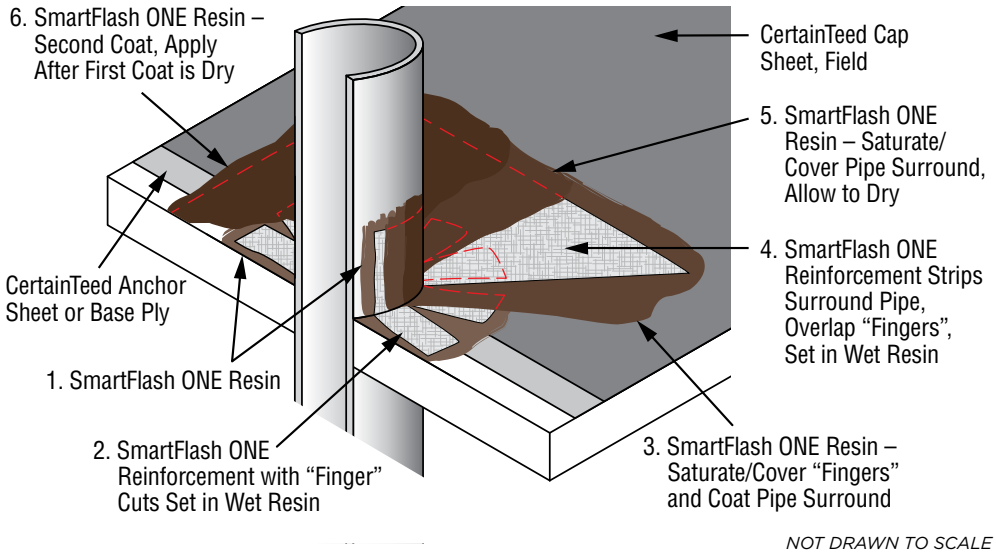
Immediately lightly press "finger" Reinforcement into wet resin onto field and wrapping pipe; saturate and coat field and vertical Reinforcement with resin such that no reinforcement is visible. Extend resin out to pre-defined detail edges (tape), approximately 10" x 10", at approximately 30 wet mils.

Immediately lightly press field Reinforcement strips into wet resin. Reinforcement strips must overlap each other by a minimum of 2" (50 mm); saturate and coat Reinforcement strips, including overlapped surfaces, with resin such that no Reinforcement is visible. Allow to dry 2-3 hours (assumes 70°F or 20°C).

Second Waterproofing Coat
Apply approximately 30 mils of wet resin to entire surface covered by first coat.

Granules (Optional)
If desired, broadcast granules into the second waterproofing coat before it forms a skin.





NOT DRAWN TO SCALE

Rev 6/20

CTL-SF-07 Multi-Piping, SmartFlash ONE

Anchor, Base Ply and Cap Sheet
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt) to intersection of horizontal roof plane and curb. Proper attachment is defined by specific system, product selection and deck type.

Tape (Recommended)
Tape off desired edges for clean detail aesthetic.

Polyester Reinforcement Preparation (Recommended)
Prepare SmartFlash ONE Reinforcements prior to applying any resin. Cut 6″ width SmartFlash ONE Reinforcement to appropriate lengths. Reinforcement shall be applied wherever a change in angle occurs and across any seams in the substrate. Reinforcement shall overlap 2″ anywhere an overlap occurs. NOTE: To accommodate inside or outside corners, make a 3″ long cut halfway through the width of the strip end.

OUTSIDE CORNERS: The cut allows the strip to round the corner and extend onto the field; a second strip cut the same way shall overlap the first strip.

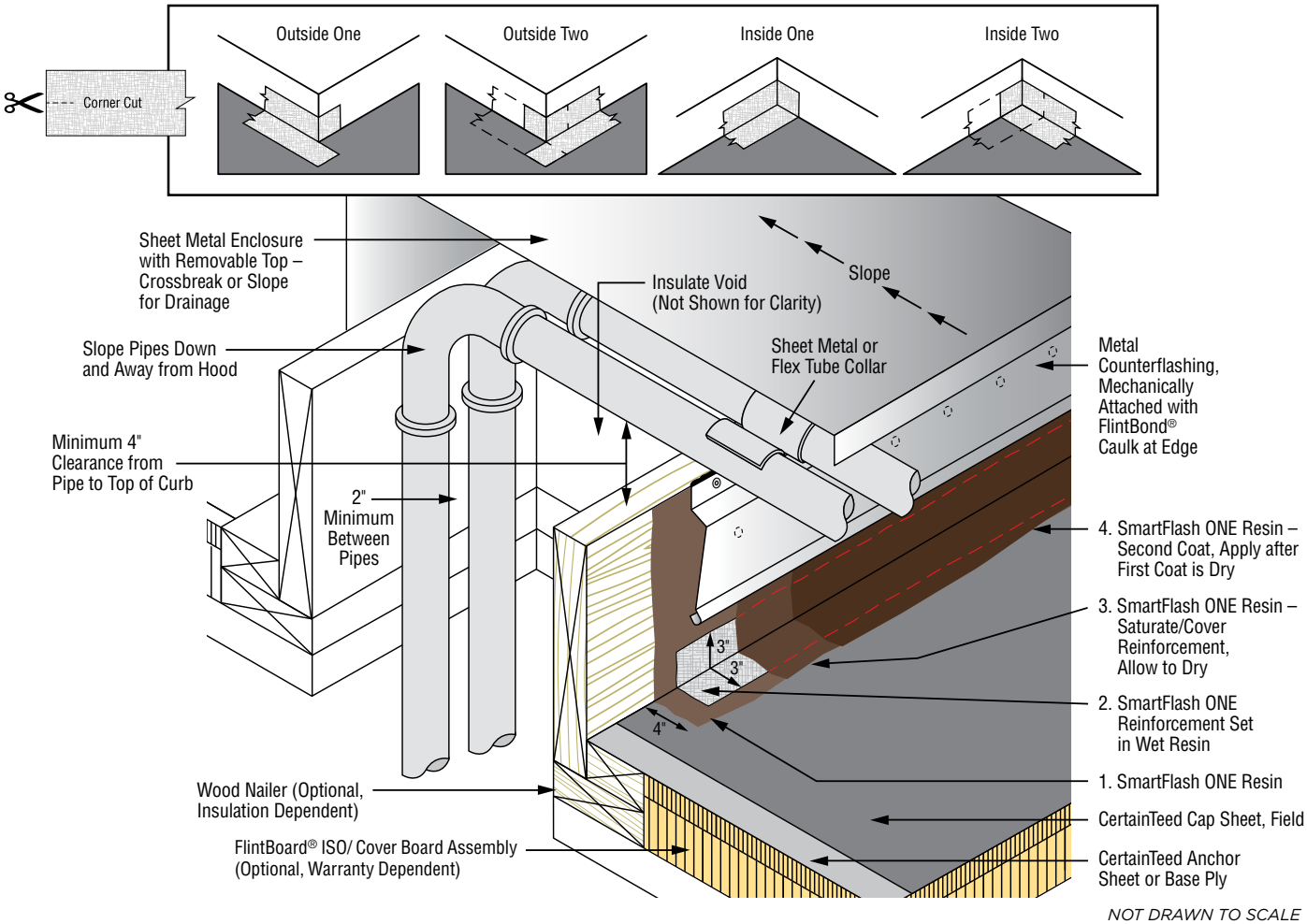
INSIDE CORNERS: The cut allows the strip to round the corner and overlap itself on the vertical surface; a second strip cut the same way shall overlap the first strip.

First Waterproofing Coat
Using a paint brush, roller or trowel for resin application, apply approximately 30 mils of wet resin to the Cap Sheet approximately 4″ (100 mm) horizontally onto the field and vertically to the top edge of the curb.

Immediately lightly press SmartFlash ONE Reinforcement into wet resin where field of roof meets base of vertical surface, up/across vertical corners of the curb and across any seams/breaks in material in the curb; saturate and coat Reinforcement with resin such that no Reinforcement is visible. Allow to dry 2-3 hours (assumes 70°F or 20°C).

Second Waterproofing Coat
Apply approximately 30 mils of wet resin to entire surface covered by first coat.

Granules (Optional)
If desired, broadcast granules into the second waterproofing coat before it forms a skin.



NOT DRAWN TO SCALE

Rev 04/26

CTL-SF-08 Mechanical Equipment Stand, SmartFlash ONE

Anchor, Base Ply and Cap Sheet
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt) to base of penetration. Proper attachment is defined by specific system, product selection and deck type.

Stand
If stand legs are rusted or painted, abrade the surface with sand paper prior to resin application. All other surface should be clean and free of moisture, oil or debris.

Tape (Recommended)
Tape off desired edges for clean detail aesthetic.

Polyester Reinforcement Preparation (Recommended)
Prepare SmartFlash ONE Reinforcements prior to applying any resin.

FINGER FLASHINGS: For round stand legs, it is necessary to cut "fingers" into one side of the polyester to allow the material to radiate onto the field of the roof without creases.

FLASHING STRIPS: Additionally, prepare two 6" strips cut to 10" in length with half-circles removed to allow for the strips to overlap when placed on opposite sides of the stand legs.

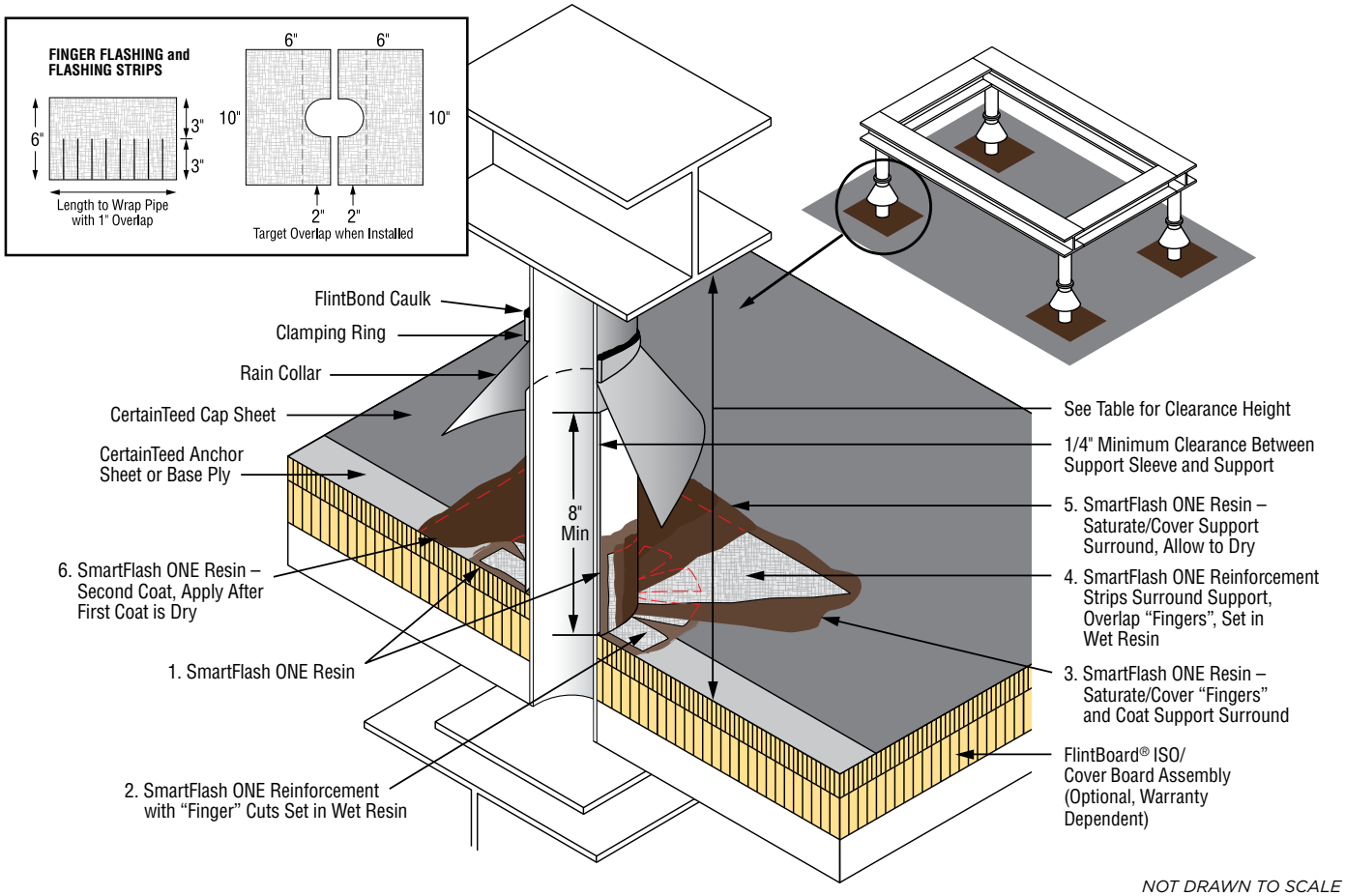
First Waterproofing Coat
Using a paint brush, roller or trowel for resin application, apply approximately 30 mils of wet resin to the Cap Sheet approximately 4" (100 mm) horizontally surrounding the stand legs and 4" vertically up the legs.

Immediately lightly press "finger" Reinforcement into wet resin onto field and wrapping stand legs; saturate and coat field and vertical Reinforcement with resin such that no reinforcement is visible. Extend resin out to pre-defined detail edges (tape), approximately 10" x 10", at approximately 30 wet mils.

Immediately lightly press field Reinforcement strips into wet resin. Reinforcement strips must overlap each other by a minimum of 2" (50 mm); saturate and coat Reinforcement strips, including overlapped surfaces, with resin such that no Reinforcement is visible. Allow to dry 2-3 hours (assumes 70°F or 20°C).

.Second Waterproofing Coat
Apply approximately 30 mils of wet resin to entire surface covered by first coat.

Granules (Optional)
If desired, broadcast granules into the second waterproofing coat before it forms a skin.



NOT DRAWN TO SCALE

Rev 04/26

CTL-SF-09 Hot Pipe Flashing, SmartFlash ONE

Anchor, Base Ply and Cap Sheet
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt) to intersection of horizontal roof plane and curb. Proper attachment is defined by specific system, product selection and deck type.

Tape (Recommended)
Tape off desired edges for clean detail aesthetic.

Polyester Reinforcement Preparation (Recommended)
Prepare SmartFlash ONE Reinforcements prior to applying any resin. Cut 6″ width SmartFlash ONE Reinforcement to appropriate lengths. Reinforcement shall be applied wherever a change in angle occurs and across any seams in the substrate. Reinforcement shall overlap 2″ anywhere an overlap occurs. NOTE: To accommodate inside or outside corners, make a 3″ long cut halfway through the width of the strip end.

OUTSIDE CORNERS: The cut allows the strip to round the corner and extend onto the field; a second strip cut the same way shall overlap the first strip.

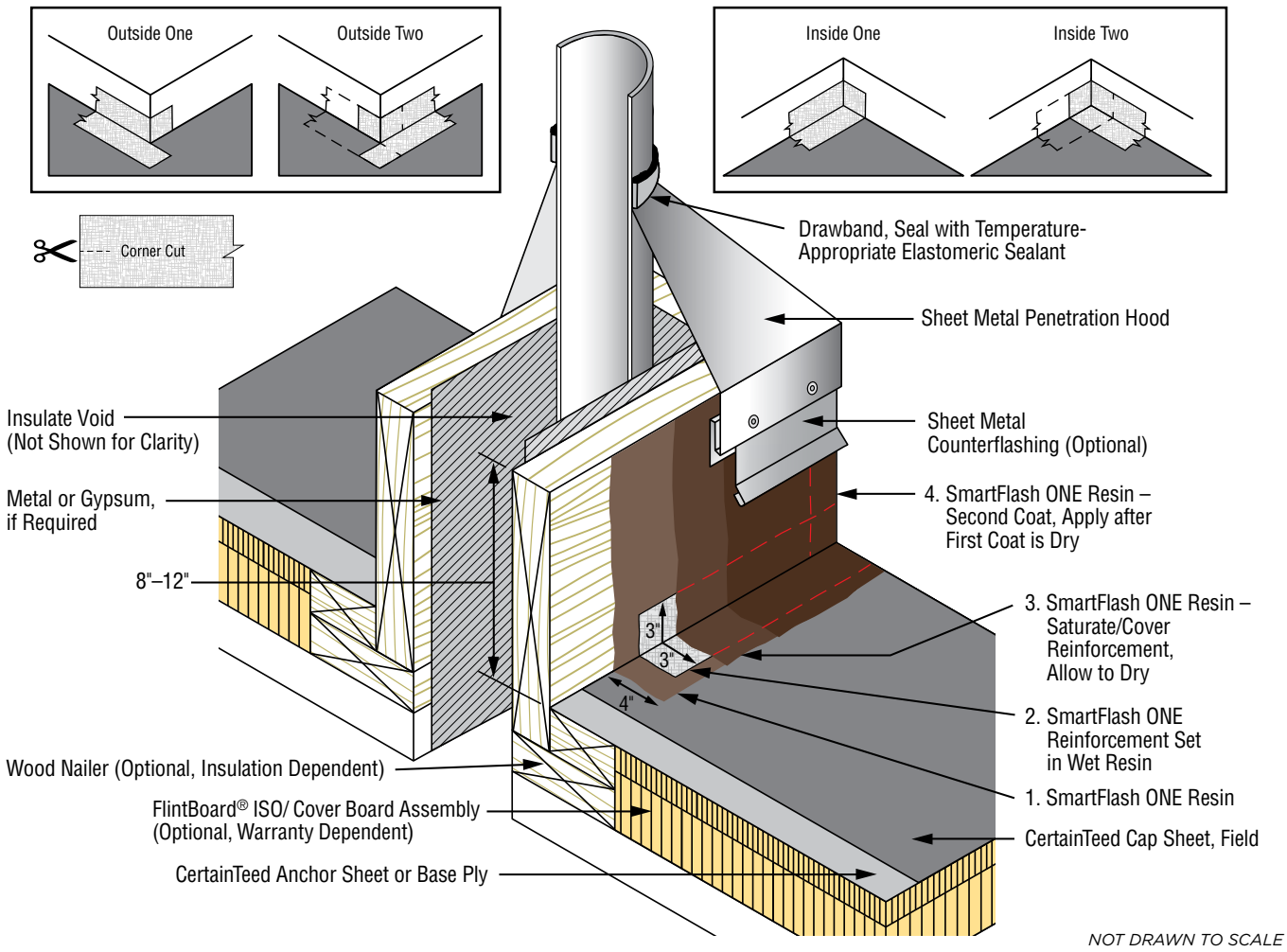
INSIDE CORNERS: The cut allows the strip to round the corner and overlap itself on the vertical surface; a second strip cut the same way shall overlap the first strip.

First Waterproofing Coat
Using a paint brush, roller or trowel for resin application, apply approximately 30 mils of wet resin to the Cap Sheet approximately 4″ (100 mm) horizontally onto the field and vertically to the top edge of the curb.

Immediately lightly press SmartFlash ONE Reinforcement into wet resin where field of roof meets base of vertical surface, up/across vertical corners of the curb and across any seams/breaks in material in the curb; saturate and coat Reinforcement with resin such that no Reinforcement is visible. Allow to dry 2-3 hours (assumes 70°F or 20°C).

Second Waterproofing Coat
Apply approximately 30 mils of wet resin to entire surface covered by first coat.

Granules (Optional)
If desired, broadcast granules into the second waterproofing coat before it forms a skin.



NOT DRAWN TO SCALE

Rev 04/26

CTL-SF-10 Structural Member Thru Roof Deck, SmartFlash ONE

Anchor, Base Ply and Cap Sheet
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt) to base of member. Proper attachment is defined by specific system, product selection and deck type.

Structural Member
If structural member is rusted or painted, abrade the surface with sand paper prior to resin application. All other surface should be clean and free of moisture, oil or debris.

Tape (Recommended)
Tape off desired edges for clean detail aesthetic.

Polyester Reinforcement Preparation (Recommended)
Prepare SmartFlash ONE Reinforcements prior to applying any resin. Cut 6″ width SmartFlash ONE Reinforcement to appropriate lengths. Reinforcement shall be applied wherever a change in angle occurs. Reinforcement shall overlap 2″ anywhere an overlap occurs. NOTE: To accommodate inside or outside corners, make a 3″ long cut halfway through the width of the strip end.

OUTSIDE CORNERS: The cut allows the strip to round the corner and extend onto the field; a second strip cut the same way shall overlap the first strip.

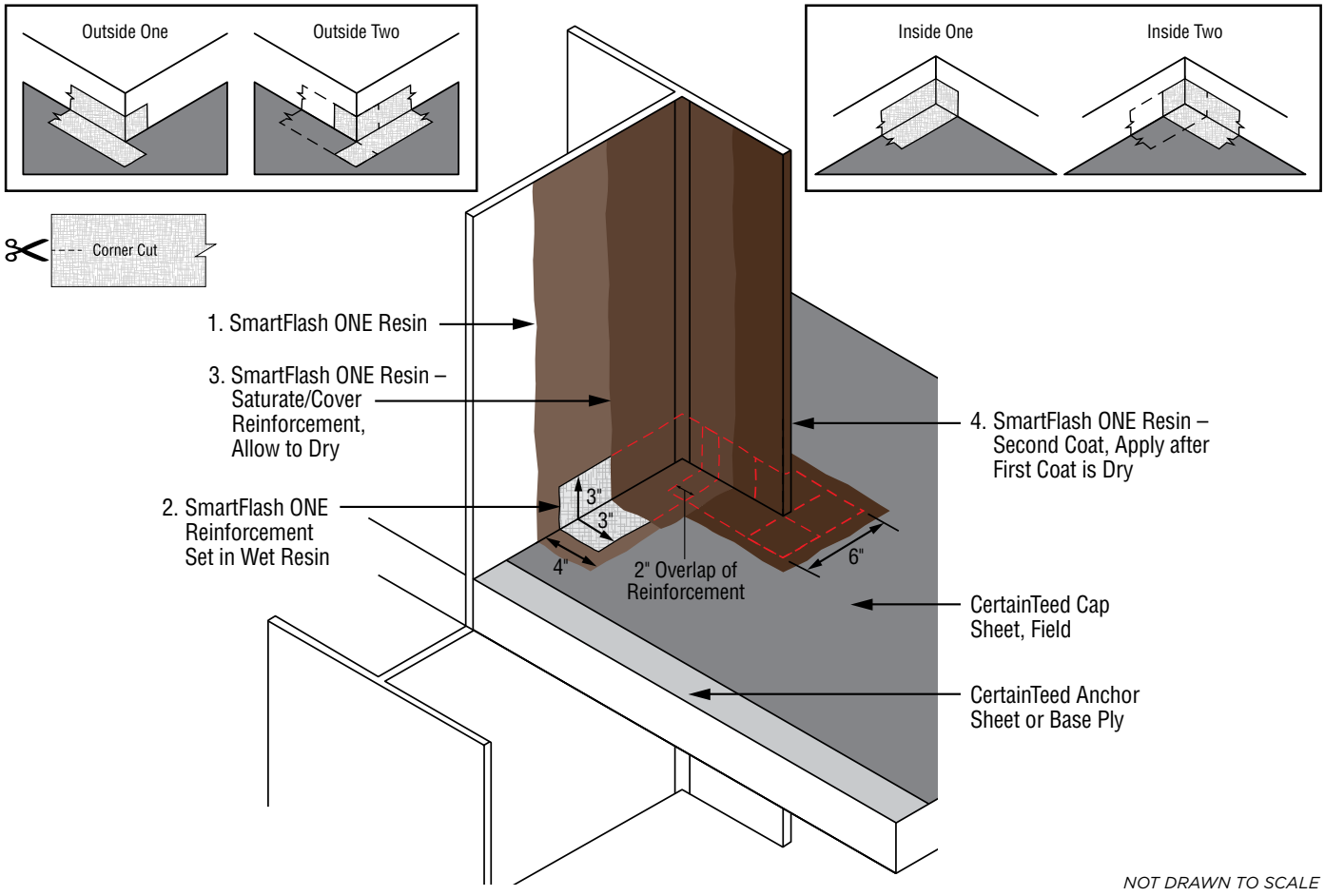
INSIDE CORNERS: The cut allows the strip to round the corner and overlap itself on the vertical surface; a second strip cut the same way shall overlap the first strip.

First Waterproofing Coat
Using a paint brush, roller or trowel for resin application, apply approximately 30 mils of wet resin to the Cap Sheet approximately 4″ (100 mm) horizontally surrounding the member and 4″ vertically up the member.

Immediately lightly press SmartFlash ONE Reinforcement into wet resin where field of roof meets base of member and across/on either side of vertical edges of member; saturate and coat Reinforcement with resin such that no Reinforcement is visible. Allow to dry 2-3 hours (assumes 70°F or 20°C).

Second Waterproofing Coat
Apply approximately 30 mils of wet resin to entire surface covered by first coat.

Granules (Optional)
If desired, broadcast granules into the second waterproofing coat before it forms a skin.



NOT DRAWN TO SCALE

Rev 6/20

CTL-SF-11 Low Profile Expansion Joint Flashing, SmartFlash ONE

Anchor, Base Ply and Cap Sheet
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt) to break in roof plane. Proper attachment is defined by specific system, product selection and deck type.

Tape (Recommended)
Tape off desired edges for clean detail aesthetic.

Polyester Reinforcement Preparation (Recommended)
Prepare SmartFlash ONE Reinforcements prior to applying any resin. Cut 6″ width SmartFlash ONE Reinforcement to appropriate lengths. Reinforcement shall overlap 2″ anywhere an overlap occurs.

Flexible Liner
Mechanically attach with appropriate fasteners, 9″ o.c.

Weatherproofing Strip
Self-adhere WinterGuard® Metal, WinterGuard HT or Flintlastic® SA PlyBase/SA MidPly.

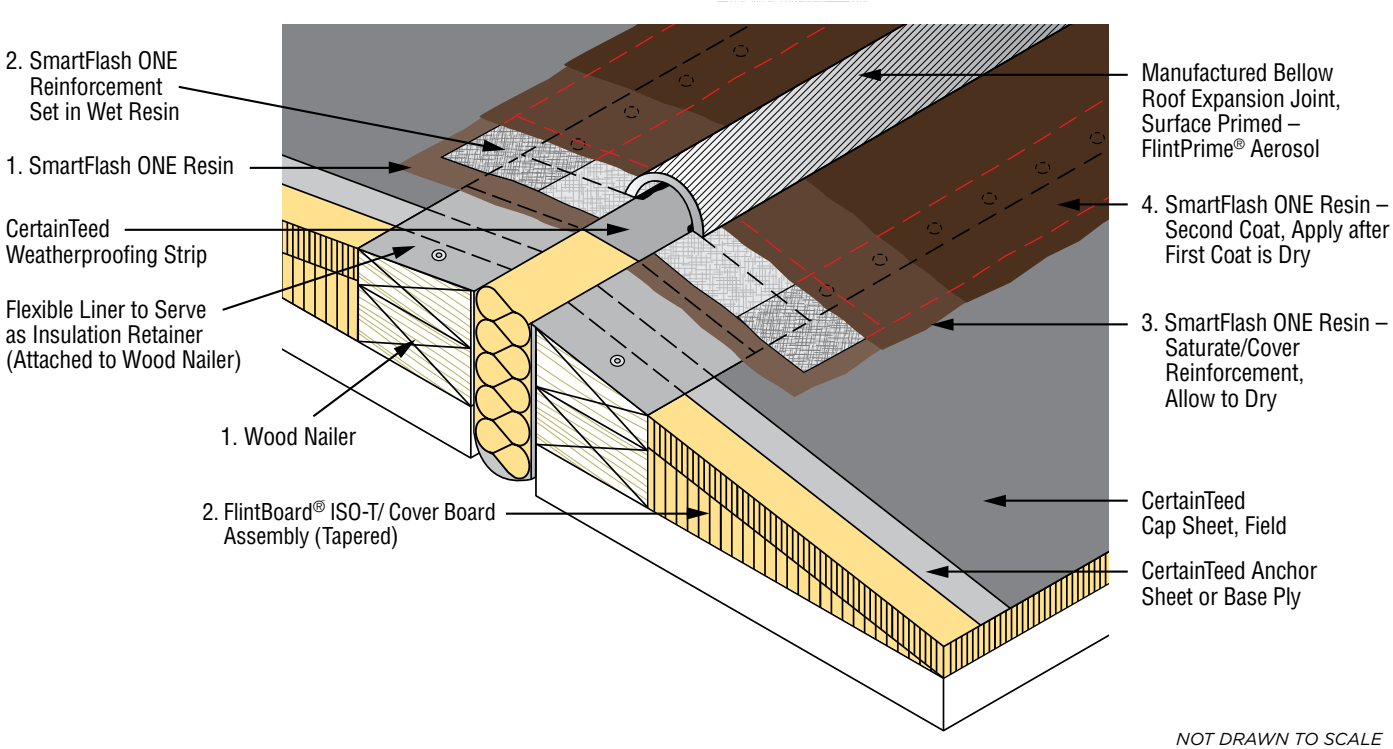
Manufactured Bellow
Set in 1/8″-1/4″ uniform bed of FlintBond® Trowel adhesive and mechanically attach with appropriate fasteners, 4″ o.c.; endlaps shall be set in FlintBond Trowel with two nails.

First Waterproofing Coat
Using a paint brush, roller or trowel for resin application, apply approximately 30 mils of wet resin to the approximately 4″ (100 mm) onto both the Cap sheet and Bellow surfaces.

Immediately lightly press SmartFlash ONE Reinforcement into wet resin across seam of Cap and Bellow, extending equally 3″ onto each surface; saturate and coat Reinforcement with resin such that no Reinforcement is visible. Allow to dry 2-3 hours (assumes 70°F or 20°C).

Second Waterproofing Coat
Apply approximately 30 mils of wet resin to entire surface covered by first coat.

Granules (Optional)
If desired, broadcast granules into the second waterproofing coat before it forms a skin.



NOT DRAWN TO SCALE

Rev 04/26

CTL-SF-12 Raised Door Sill Flashing, SmartFlash ONE

Anchor, Base Ply and Cap Sheet
Mechanically attach or fully adhere (self-adhered, torch, cold process or hot asphalt) to base of penetration. Proper attachment is defined by specific system, product selection and deck type.

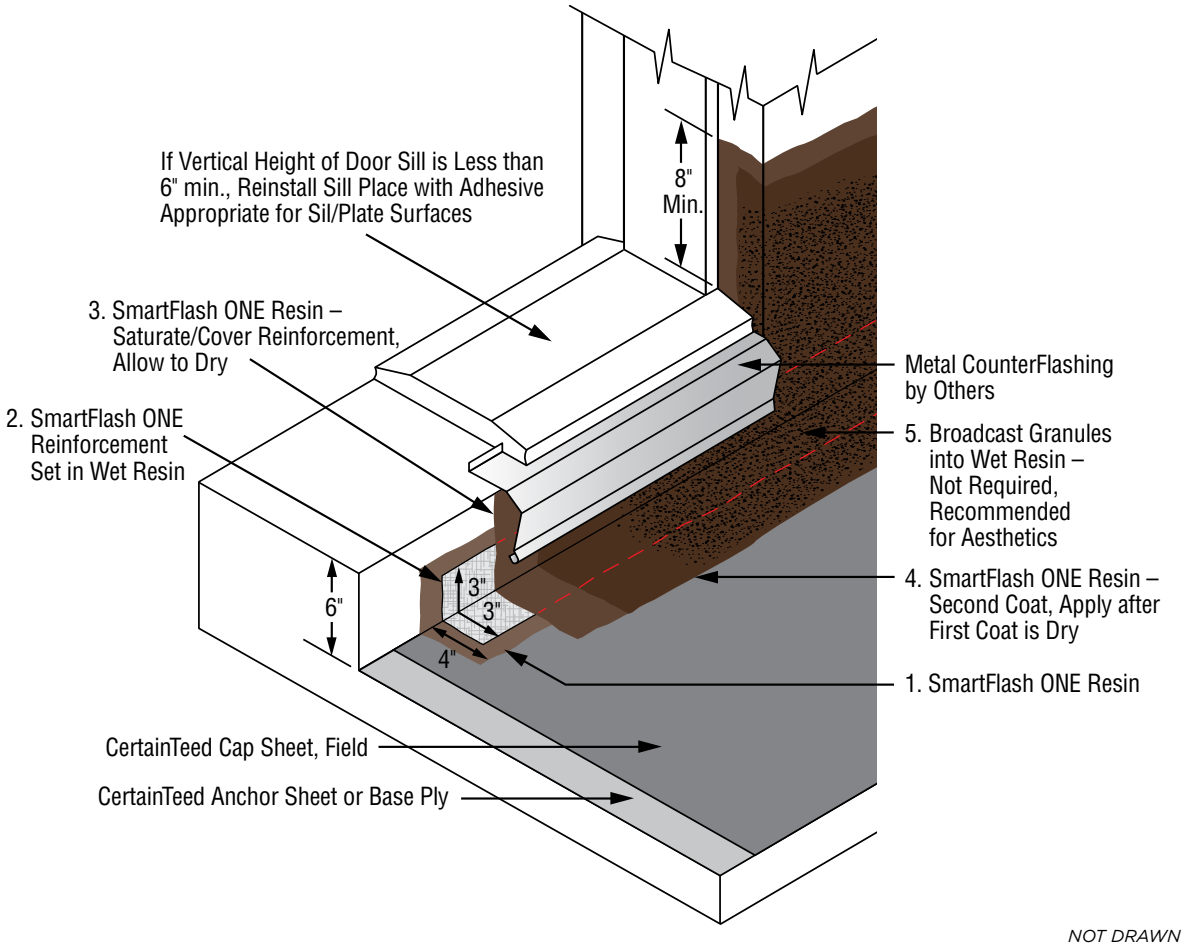
Tape (Recommended)
Tape off desired edges for clean detail aesthetic.

Polyester Reinforcement Preparation (Recommended)
Prepare reinforcements prior to applying any resin. Door sill flashing requires 6″ flashing strips cut to manageable lengths equal to the linear feet of sill length and 8″ minimum vertical flashing on the left and right vertical surfaces of the door frame. Overlap reinforcement by 2″ (50 mm) anywhere an overlap occurs.

First Waterproofing Coat
Using a brush, roller or trowel for resin application. Apply approximately 30 mils of wet resin to the Cap Sheet, approximately 4″ (100 mm) out onto the horizontal surface, and vertical rise to sill, minimum 1″ beyond where subsequent metal counterflashing terminates. Immediately lightly press reinforcement into wet resin; saturate and fully coat field and vertical reinforcement with resin. Allow to dry 2-3 hours (assumes 70°F or 20°C).

Second Waterproofing Coat
Apply approximately 30 mils of wet resin to entire surface covered by first coat.

Granules (Optional)
If desired, broadcast granules into the second waterproofing coat before it forms a skin.



NOT DRAWN TO SCALE

Rev 6/20

CTL-SF-13 Lighting Terminal

This detail depicts the weatherproofing protection and does not represent lightning protection design.

Tape (Recommended)
Tape off desired edges for clean detail aesthetic.

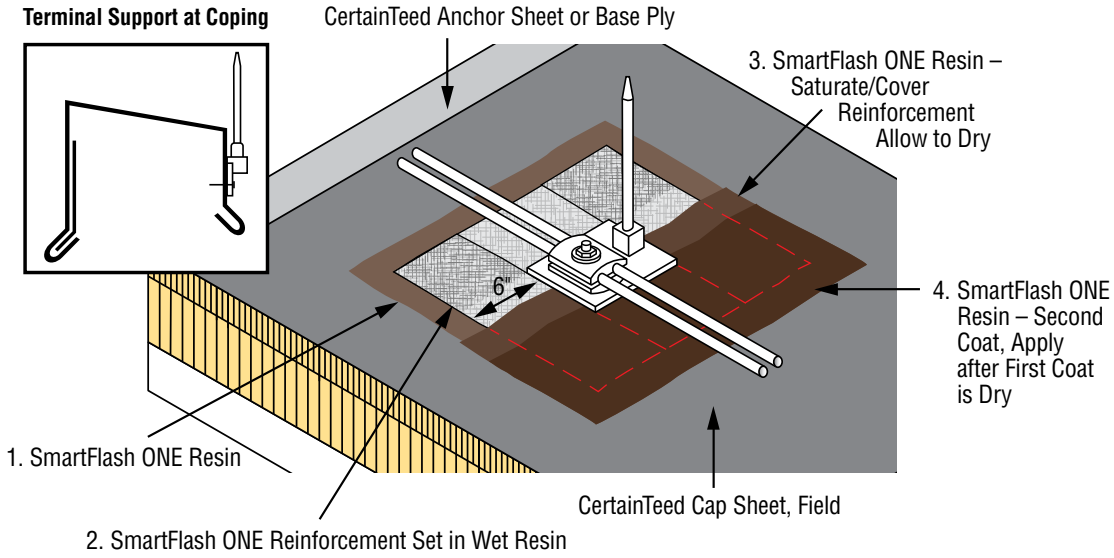
Polyester Reinforcement Preparation (Recommended)
Prepare SmartFlash ONE Reinforcements prior to applying any resin. Cut 6″ width SmartFlash ONE Reinforcement to appropriate lengths. Reinforcement shall extend 6″ beyond edge of Terminal. Reinforcement shall overlap 2″ anywhere an overlap occurs.

First Waterproofing Coat
Using a paint brush, roller or trowel for resin application, apply approximately 30 mils of wet resin to the Cap Sheet.

Immediately lightly press Reinforcement into wet resin; saturate and coat Reinforcement with resin, including overlaps, such that no Reinforcement is visible. Allow to dry 2-3 hours (assumes 70°F or 20°C).

Second Waterproofing Coat
Apply approximately 30 mils of wet resin to entire surface covered by first coat.

Granules (Optional)
If desired, broadcast granules into the second waterproofing coat before it forms a skin.



NOT DRAWN TO SCALE

Rev 4/22

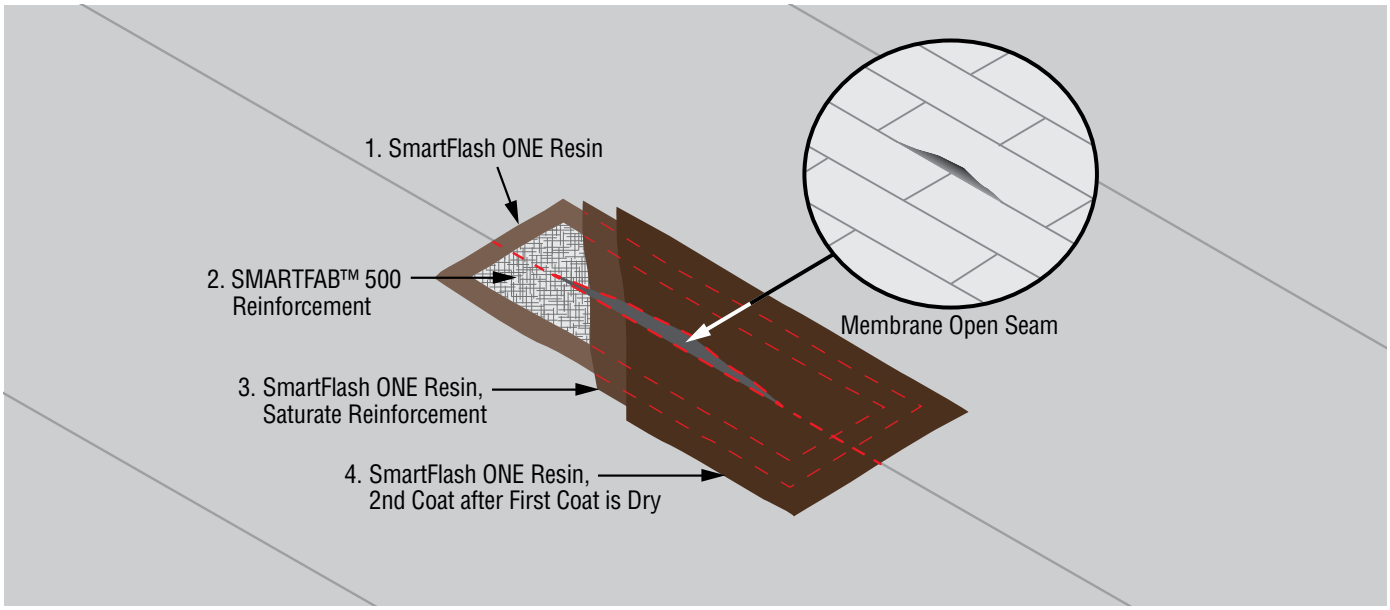
CTL-SF-15 Seam/Surface Split or Puncture, SmartFlash ONE

The substrate shall be clean and free of loose or flaking materials prior to application of SmartFlash ONE.

First Waterproofing Coat
Using a paint brush, roller or trowel for SmartFlash ONE Resin, apply approximately 30 mils of wet resin to the substrate, extending a minimum 4″ (100 mm) beyond deficiency in all directions. Immediately lightly press SMARTFAB™ 500 Reinforcement into wet resin ensuring that the polyester is free of all air pockets and wrinkles; Reinforcement shall be a minimum 6″ width positioned to extend a minimum 3″ beyond deficiency in all directions; saturate and coat Reinforcement with resin such that no Reinforcement is visible.

Second Waterproofing Coat
Apply approximately 30 mils of wet resin to entire surface.

Granules (Optional)
If desired, broadcast granules into the second waterproofing coat before it forms a skin.



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10/21

Appendix 2
Limited Warranty Forms & Samples

Asphaltic Membrane Warranty Overview and Fee Schedule (01-02-745-NA-EN)

Asphaltic Membrane Limited Warranty on Materials (01-02-747-NA-EN)

Integrity Roof System Limited Warranty (01-02-746-NA-EN)

Integrity Roof System NDL Warranty Sample (01-02-752-NA-EN)

Commercial Roof Maintenance Program & Inspection Report (01-02-864-NA-EN)

FlintBoard® Limited Warranty (01-02-753-NA-EN)

SmartFlash® ONE Limited Warranty (01-02-754-NA-EN)

Enhanced Wind Warranty Endorsement Application (01-02-755-NA-EN)

Roof Membrane Enhanced Wind Warranty Endorsement Sample 01-02-748-NA-EN)

OVERVIEW AND FEE SCHEDULE
ASPHALTIC MEMBRANE WARRANTY

WARRANTY OVERVIEW

CertainTeed LLC ("CertainTeed") offers standard asphaltic membrane roof system warranty durations up to 25 years. CertainTeed offers three warranty options: Asphaltic Membrane Limited Warranty on Materials, Integrity Roof System® Limited Warranty and Integrity Roof System® No Dollar Limit (NDL) Limited Warranty.

WARRANTY DURATIONS & SYSTEM SPECIFICATIONS

CertainTeed Integrity Roof System Limited Warranty durations are based on a combination of system specification and product selection. For example, CertainTeed Specification APP-C-2-T lists multiple base sheet and cap sheet options. Per the specification, all base sheets are fully adhered, either in hot asphalt, torch-welded or self-adhered. Per the APP Warranty Duration Matrix, a pairing of All Weather/Empire Base Sheet with Flintlastic GTA carries a 12-year warranty duration. However, a pairing of Black Diamond Base Sheet with Flintlastic GTA carries a 15-year warranty duration. Both of these configurations are options within APP-C-2-T. Further, the addition of two layers of FlintBoard roof insulation or CertainTeed approved cover board (second layer adhered) to a Black Diamond Base Sheet – Flintlastic GTA roof system increases the warranty duration to 20 years and would now be CertainTeed Specification APP-I-2-T. It's important to understand that each CertainTeed Specification allows for various base, ply and cap sheet configurations and, as such, warranty durations associated with an individual specification will vary.

Asphaltic Membrane Product and System Warranties

	Asphaltic Membrane Limited Warranty on Materials	**Integrity Roof System Limited Warranty**	**Integrity Roof System NDL Limited Warranty**
Contractor Requirements	--		Liquid-Applied Roofing Master (up to 20 years), Low-Slope Roofing Master (up to 20 years), Liquid-Applied Roofing Master PRO (up to 20 years), Low-Slope Roofing Master PRO (up to 25 years), Liquid-Applied Roofing Master PREMIER (up to 25 years), Low Slope Roofing Master PREMIER (up to 30 years) Credential
Coverage	Warranty covers manufacturing defects in specified CertainTeed asphaltic membranes	Warranty covers leaks caused by manufacturing defects in CertainTeed products	Warranty covers leaks caused by manufacturing defects in CertainTeed products and/or approved partner-brands and/or workmanship
Obtain	www.ctndl.com/sf/warranty.asp		Application submitted through ctndl.com

Complementary and Accessory Stand-alone Warranties

	Enhanced Wind Warranty Endorsement	**FlintBoard® Limited Warranty**	**SmartFlash® ONE Limited Warranty**
Contractor Requirements	Liquid-Applied Roofing Master Contractor, Low-Slope Roofing Master Contractor, Liquid-Applied Roofing Master Pro Contractor, Low-Slope Roofing Master Pro Contractor, Liquid-Applied Roofing Master Premier Contractor, and Low-Slope Roofing Master Premier Contractor	--	--
Coverage	Warranty covers roof system detachment in accordance with primary CertainTeed Warranty	Warranty covers thermal insulation R-value in FlintBoard products	Warranty covers leaks caused by manufacturing defects in CertainTeed products only
Obtain	Apply through Commercial Roofing Tech Services	https://warranties.certainteed.com/	

CertainTeed, 20 Moores Road, Malvern, PA 19355

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OVERVIEW AND FEE SCHEDULE
ASPHALTIC MEMBRANE WARRANTY

LIMITED MATERIAL AND INTEGRITY ROOF SYSTEM WARRANTIES
There are no fees associated with an Asphaltic Membrane Limited Warranty on Materials or an Integrity Roof System Limited Warranty.

INTEGRITY ROOF SYSTEM NDL LIMITED WARRANTY
Subject to CertainTeed published requirements, an Integrity Roof System NDL Limited Warranty is available to CertainTeed approved contractors based on the schedule below. NDL Warranties are fully transferrable and subject to a $500* warranty transfer fee (subject to change at any time) and inspection.

Built-Up Roofing (Non-Modified) Specifications		**Modified Bitumen Roofing Specifications**	
Warranty Duration	**Warranty Fee***	**Warranty Duration**	**Warranty Fee***
10 Years	$6.00 per square ($600 minimum)	10 and 12 Years	$4.00 per square ($400 minimum)
15 Years	$10.00 per square ($1,000 minimum)	15 Years	$7.50 per square ($750 minimum)
20 Years	$15.00 per square ($1,500 minimum)	20 Years	$12.50 per square ($1,250 minimum)
		25 Years**	$15.00 per square ($1,500 minimum)

**Subject to change at any time.*

***Subject to additional requirements. Contact the Warranty Services Department at 1-800-396-8134 ext. 2 or rpg@saint-gobain.com.*

WIND WARRANTY FEE SCHEDULE
Wind endorsement fee schedule for NDL Warranties, minimum 100 sq. If Professional Engineering Stamp is required, there is an additional $1,000 fee. Contact the Warranty Services Department at 1-800-396-8134 ext. 2 or rpg@saint-gobain.com.

55 – 80 mph	$1.00 per square
81 – 90 mph	$2.00 per square
91 – 100 mph	$4.00 per square
101 – 110 mph	$8.00 per square
111 – 120 mph	$10.00 per square
121 – 135 mph	$15.00 per square

ACCESSORY STAND-ALONE WARRANTIES
There are no fees associated with a FlintBoard or SmartFlash ONE stand-alone warranty.

CertainTeed, 20 Moores Road, Malvern, PA 19355

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ASPHALTIC MEMBRANE LIMITED WARRANTY ON MATERIALS

Owner:
Owner Address:
Owner Phone:
Description of Building Use:
Building Address:
CT Product(s) Used:
Applicator:
Applicator's Address:
Applicator's Phone:
Number of Squares:
Product Installation Date:
Warranty Expiration Date:

COVERAGE

CertainTeed LLC ("CT") warrants to the original building owner ("Owner") that the Product described above, will remain free of manufacturing defects until the Warranty Expiration Date.

Should the Product prove to be defective in its manufacture during the Limited Warranty period, CT shall, during the first year and at its sole discretion, provide the appropriate replacement materials or refund the original cost of the Product determined by CT to be defective. After the first year, CT's maximum liability is the original cost of the Product used on the roof reduced by 6.67% for 15-year warranties, 8.3% for 12-year warranties and 10% for 10-year warranties during each subsequent year, less any costs previously incurred by CT for replacement.

NOTE: The Owner is responsible to repair leaks promptly to avoid water damage, including mold growth.

EXCLUSIONS FROM COVERAGE

This Limited Warranty does not cover leaks, damages, or injuries of any type, including, but not limited to, damage to roof insulation/cover boards, roof decks, roof membrane, or other bases over which Product is applied and attributable directly or indirectly to any of the following:

1. Natural disasters, including, but not limited to, cyclones, tornadoes, hurricanes, or other winds exceeding 38 mph, lightning, earthquakes, flood, hail, or fire;
2. Misuse, abuse, falling objects, tools, foot traffic, or equipment or sign installation;
3. Clogged drains or lack of adequate drainage that does not promptly and readily remove water from the roof;
4. Lack of positive slope or inadequate drainage, to completely remove water from the roof system to prevent ponding water conditions on the roof system as defined by the NRCA (48 hours);
5. Settlement, cracking, warping, expansion, contraction, deflection, or other movement of the building structure;
6. Failure to maintain Product as required under the Commercial Roof Maintenance Program;
7. Mold and other damage caused by water entering building;
8. Any other damage not attributable to a manufacturing defect of the Product;
9. Testing/sampling of the membrane by others; and
10. Installation over an improperly prepared or inappropriate substrate, including, but not limited to, wet, dirty, and/or damaged surfaces.

This Limited Warranty does not cover damages caused by leaks. This Limited Warranty applies to material only and does not include installation or labor costs of any kind. The existing roof, roof deck, or any other substrates or materials have not been inspected by CT and is NOT part of this Limited Warranty.

ROOF MAINTENANCE

This Limited Warranty is not a maintenance agreement or an insurance policy. Routine inspections and maintenance of the roof system must be completed by the Owner on a regular basis and are the Owner's responsibility. Inspections by Owner shall take place at least on a semi-annual basis and shall be documented. Periodic inspections are the Owner's responsibility and shall include such things as making minor repairs, cleaning off debris, cleaning filters and gutters, unclogging drains, and removing standing water. Lack of regular maintenance shall void this Limited Warranty. For specific information on roof maintenance requirements please visit our website at www.certainteed.com.

UNAPPROVED REPAIRS, ALTERATIONS, ADDITIONS, OR DELETIONS

All repairs, alterations, additions, or deletions to any aspect of the roof that affects the Product or any material contiguous thereto must have prior written approval of CT's Commercial Building & Infrastructure ("CB&I") Warranty Services Department, 20 Moores Road, Malvern, PA 19355, (800) 396-8134 ext. 2. If Owner, without prior written consent of CT, makes or permits any repairs, alterations, additions, or deletions to the roof that affect the Product, all of CT's obligations, duties, and coverage under this Limited Warranty will terminate and the Limited Warranty will be voided.

NOTE: In the event an emergency condition exists which requires immediate repair to avoid damage to the building or its contents, Owner may make essential temporary repairs performed by a qualified roofer. CT will only reimburse Owner for essential temporary repair expenses that would have been covered under this Limited Warranty.

NOTICE OF CLAIMS

Any claim or request for CT to perform under this Limited Warranty must be made by the Owner to CT in writing to the above listed address, by email to rpg@saint-gobain.com, or by visiting https://www.ctndl.com/resndlsite/Commerical/index.asp within thirty (30) days of discovery of the defect or CT will have no responsibility for repairs. Notification to a roofing contractor is not considered notice to CT. This notice of claim must include a general description of the alleged defect and a copy of your Roof Maintenance Program records. Owner shall grant access to the entire roof system as necessary for CT to investigate a claim, which includes, but is not limited to, the taking of samples that adequately demonstrate the alleged defect for testing by CT as part of the claim investigation. If access is not granted, CT shall have the right to determine, at its sole discretion, that this Limited Warranty is void as to that portion of the roof system to which access is denied. Should the investigation of the alleged defect be determined not to be covered under this Limited Warranty, any costs associated with the investigation shall be the Owner's sole responsibility. This Limited Warranty will become void if costs associated with non-warranty findings are not paid in full within thirty (30) days of receipt of any CT invoicing. If it is determined that CT installation procedures have not been followed, or the required materials have not been installed, CT may void this Limited Warranty at any time.

NOTE: In the event an emergency condition exists which requires immediate repair to avoid damage to the building or its contents, Owner may make essential temporary repairs performed by a qualified roofer. CT will only reimburse Owner for essential temporary repair expenses that would have been covered under this Limited Warranty.

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ASPHALTIC MEMBRANE LIMITED WARRANTY ON MATERIALS

TRANSFERABILITY

This Limited Warranty may be transferred to one subsequent Owner only if CT's CB&I Warranty Services Department is notified at the above listed address within thirty (30) days of real estate title transfer. If it is determined at CT's sole discretion that the roof is in a state of poor maintenance or in disrepair, CT reserves the right to reject the transfer and void this Limited Warranty.

EXCLUSIVE WARRANTY AND LIMITATIONS OF REMEDIES

THIS DOCUMENT CONSTITUTES THE EXCLUSIVE WARRANTY AND SOLE REMEDIES PROVIDED BY CT. THE WARRANTY AND REMEDIES CONTAINED IN THIS DOCUMENT ARE EXPRESSLY IN LIEU OF ANY AND ALL OTHER OBLIGATIONS, GUARANTEES, WARRANTIES, AND REPRESENTATIONS, WHETHER WRITTEN, ORAL, IMPLIED BY STATUTE AT LAW, OR IN EQUITY, INCLUDING WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR USE, AND FITNESS FOR A PARTICULAR PURPOSE. SOME STATES OR JURISDICTIONS MAY NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES OR MAY DETERMINE THE PERIOD OF TIME FOLLOWING THE SALE THAT A PURCHASER MAY SEEK A REMEDY UNDER IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU. CT'S OBLIGATIONS, RESPONSIBILITIES, AND LIABILITY SHALL BE LIMITED TO PROVIDING REPLACEMENT PRODUCT OR REFUNDING THE ORIGINAL COST OF THE DEFECTIVE PRODUCT AS SET FORTH IN THIS LIMITED WARRANTY. IN NO EVENT SHALL CT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND, INCLUDING ANY DAMAGE TO THE PROPERTY, THE BUILDING OR ITS CONTENTS, OR FOR INJURY TO ANY PERSONS THAT MAY OCCUR AS A RESULT OF THE USE OF CT'S PRODUCTS OR AS A RESULT OF A BREACH OF THIS WARRANTY. IF YOUR STATE OR JURISDICTION DOES NOT ALLOW EXCLUSIONS OR LIMITATIONS OF SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU. IN NO EVENT SHALL CT'S TOTAL LIABILITY ARISING OUT OF OR RELATED TO THE PRODUCT COVERED UNDER THIS LIMITED WARRANTY EXCEED THE ORIGINAL PURCHASE PRICE OF THE PRODUCT TO THE OWNER OF THE PRODUCT THAT WAS ORIGINALLY INSTALLED. THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE OR PROVINCE TO PROVINCE.

MODIFICATIONS OF COVERAGE

Except as noted herein, this Limited Warranty may not be modified, altered, or expanded by anyone, including Product distributors, dealers, sellers, installers, contractors, and/or CT field representatives. Only CT's CB&I Warranty Services Department is authorized to modify coverage provided by this Limited Warranty. Issuance of this Limited Warranty or review or inspection of plans, the building, or Product application by a CT representative does not waive any exclusions or conditions of this Limited Warranty.

EXAMINATION OR INSPECTION

CT does not practice engineering or architecture. Roof inspections made by CT or an authorized agent of CT or issuance of this Limited Warranty does not constitute an approval of the roof, roof design plans or specifications, or construction or installation of the roof. Roof designs, construction plans, or installation of the roof system should be approved by the Owner or the Owner's professional. Any roof inspections performed by CT representatives are solely for the benefit of CT and do not constitute approval, representation, or warranty that the roof meets building code requirements.

Warranty Chart	Warranty Period in Years
Flintlastic® STA	10
Flintlastic STA Plus	15
Flintlastic GTA	12
Flintlastic GTA-FR	12
Flintlastic FR-P	12
Flintlastic Premium FR-P	12
Flintlastic GMS	12
Flintlastic GTS-FR	12
Flintlastic SA Cap	12
Flintlastic SA Cap FR	12

This Limited Warranty applies to Product installed in 2026

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LOW-SLOPE ASPHALTIC MEMBRANES
INTEGRITY ROOF SYSTEM™ LIMITED WARRANTY

certainteed SAINT-GOBAIN

Owner:
Owner Address:
Building Address:
Description of Building Use:
Number of Squares:
CT Product Specification No:
Contractor:
Contractor's Address:
Contractor's Phone:
Roof Completion Date:
Warranty Expiration Date:

- O 10-Years
- O 12-Years
- O 15-Years
- O 20-Years
- O 25-Years

COVERAGE

CertainTeed LLC ("CT") hereby warrants the roof membrane ("Product") installed at the above address, subject to the following terms, conditions, limitations and exclusions, for the period checked above from the date of completion of the Product installation. If, during the duration of this Limited Warranty, a manufacturing defect in the Product causes a leak, CT or its designated roofing contractor will, at CT's sole discretion, repair or replace the Product only as necessary to restore it to a watertight condition. Only manufacturing defects in the Product that cause leaks are covered by this Limited Warranty. CT's MAXIMUM LIABILITY during the first year of this warranty is the original cost of the CT Product only. After the first year, CT's maximum liability is the original cost of the Product used on the roof reduced by 4% for 25-year warranties, 5% for 20-year warranties, 6.67% for 15-year warranties, 8.3% for 12-year warranties and 10% for 10-year warranties during each subsequent year, less any costs previously incurred by CT for repair or replacements. In no event, however, will CT be responsible for any costs related to the removal or abatement of any asbestos present in any existing roof system to which the CT Product is applied. Product, as used herein, shall include the following components: applicable base sheet, interplies, cap sheet, hot asphalt and/or FlintBond® between layers if applicable, and Arctic Edge Cold Lap Tape, as required for the above selected warranty duration and applied per CT's Commercial Roof Systems Specifications manual, application instructions, and construction details as published at the time of installation. Approved material utilized to tie-into GCP PERM-A-BARRIER® air barrier products are covered within this Limited Warranty. Roof components which are not part of the Product and hence not covered by this Limited Warranty include, but not limited to, the following: underlying roof deck, insulation, vapor retarders, fasteners, liquid flashing (non-CT brand), metal work, drains, pitch pans, expansion joints, skylights, vents, plastic accessories, decorative or reflective coating (SMARTCOAT Limited Warranty issued separately if applicable, non-CT brand coating excluded from coverage), surfacing and/or any aggregates.

EXCLUSIONS FROM COVERAGE

This Limited Warranty does not cover leaks, damages or injuries of any type, including, but not limited to, damage to roof insulation, roof decks or other bases over which the CT roof membrane specification products are applied, attributable directly or indirectly to any of the following:

1. Natural disasters, including, but not limited to, cyclones, tornadoes, hurricanes, or other winds exceeding 54 mph, lightning, earthquakes, flood, hail, or fire;
2. Falling objects, civil insurrection, war, riot, or vandalism;
3. Settlement, deflection, movement, moisture content, inadequate attachment, or other deficiencies of the roof deck, pre-existing roof system, walls, foundations, or any other part of the building structure, insulation, or other materials underlying the Product;
4. Failure of the roof membrane caused or contributed by:
   a. Maintenance, repair, or work on the roof unrelated to the roof membrane, including, but not limited to, mechanical, electrical, plumbing;
   b. Infiltration or condensation of moisture in, through, or around the walls, parapet walls, copings, and metal components, pitch pans, building structure, or underlying or surrounding materials;
   c. Traffic of any nature or use of the roof surface as a storage area, walking or recreational surface, or for any other similar purpose;
   d. Movement or deterioration of metal work used in conjunction with the Product;
   e. Deposits of solids, liquids, or objects or agents, including plant or animal life, or any organic or inorganic solvents which may cause deterioration of the Product;
   f. Building design or construction;
   g. Lack of positive slope or inadequate drainage, to completely remove water from the roof system to prevent ponding water conditions on the roof system as defined by the NRCA (48 hours) and areas where water is allowed to drain onto the roof from air conditioning units or other rooftop equipment no matter the surface appearance at the completion of installation; or
   h. Installation over an improperly prepared or inappropriate substrate, including, but not limited to, wet, dirty, and/or damaged surfaces;
5. Failure to adhere to all CT application instructions, construction details, and Commercial Roof Maintenance Program as published at the time of installation;
6. Unauthorized application on excluded buildings or structures (see CT's General Recommendations);
7. Any change in the building's basic usage unless approved in advance in writing by CT;
8. Any use of roofing and tie-in materials of any kind or nature not approved in CT/GCP's Commercial Roof Systems Specifications and PERM-A-BARRIER detail manuals or in advance in writing by CT/GCP's Commercial Building & Infrastructure ("CB&I") Warranty Services Department;
9. Placement of any additional structures on the Product, including, but not limited to, equipment or framework used in connection with air conditioning units, transmission and/or reception devices, signs, photovoltaic panels, and/or water towers. This exclusion does not apply to the installation of a CT photovoltaic system when it is installed in accordance with he published installation instructions for the photovoltaic system on a low-slope roof;
10. Failure to maintain the watertight integrity of the roof system. Owner must make repairs to non-warranted items that affect the watertight integrity of the roof system;
11. Testing/sampling of the membrane by others;
12. Design and/or consulting errors or omissions by the Owner or their authorized representative.

In addition, CT will not be responsible, or have any liability, for changes to the appearance of the roof system that do not result in roof leaks. This includes, but is not limited to, fading or other changes in color to the roof membrane, the loss of granules from the cap sheet, and/or surface cracking or blistering due to weathering or normal wear and tear from the elements.

ROOF MAINTENANCE

This Limited Warranty is not a maintenance agreement or an insurance policy. Routine inspections and maintenance of the roof system must be completed by the Owner on a regular basis and are the Owner's responsibility. Inspections by Owner shall take place at least on a semi-annual basis and shall be documented. Periodic inspections are the Owner's responsibility and shall include such things as making minor repairs, cleaning off debris, cleaning filters and gutters, unclogging drains, and removing standing water. Lack of regular maintenance shall void this Limited Warranty. For specific information on roof maintenance requirements please visit our website at www.certainteed.com.

UNAPPROVED REPAIRS, ALTERATIONS, ADDITIONS, OR DELETIONS

All repairs, alterations, additions, or deletions to any aspect of the roof, or any material contiguous thereto, must have prior written approval of CT's Warranty Services Department (CertainTeed Commercial Building & Infrastructure, Warranty Services Department, 20 Moores Road, Malvern, PA 19355, (800) 396-8134 ext. 2). If Owner, without prior written consent of CT, makes or permits any repairs, alterations, additions, or deletions to the roof, all of CT's obligations, duties, and coverage under this Limited Warranty will terminate and the Limited Warranty will be voided. Application of a roof membrane that deviates from CT's published specifications and application instructions voids coverage unless prior written approval is provided by CT's Warranty Services Department.

NOTE: In the event an emergency condition exists which requires immediate repair to avoid damage to the building or its contents, Owner may make essential temporary repairs performed by a CT credentialed roofer. CT will only reimburse Owner for essential temporary repair expenses that would have been covered under this Limited Warranty.

NOTICE OF CLAIMS

Any claim or request for CT to perform under this Limited Warranty must be made by the Owner to CT in writing to the above listed address, by email to rpg@saint-gobain.com, or by visiting www.ctroof.com within thirty (30) days of discovery of the defect or CT will have no responsibility for repairs. Notification to a roofing contractor is not considered notice to CT. This notice of claim must include a general description of the alleged defect and a copy of your Roof Maintenance Program records. Owner shall grant access to the entire roof system as necessary for CT to investigate a claim, which includes, but is not limited to, the taking of samples that adequately demonstrate the alleged defect for testing by CT as part of the claim investigation. If access is not granted, CT shall have the right to determine, at its sole discretion, that this Limited Warranty is void as to that portion of the roof system to which access is denied. Should the investigation of the leak be determined not to be covered under this Limited Warranty, any costs associated with the leak investigation shall be the Owner's sole responsibility. This Limited Warranty will become void if costs associated with non-warranty findings are not paid in full within thirty (30) days of receipt of any CT invoicing. If it is determined that CT installation procedures have not been followed, or the required materials have not been installed, CT may cancel this Limited Warranty at any time.

NOTE: In the event an emergency condition exists which requires immediate repair to avoid damage to the building or its contents, Owner may make essential temporary repairs performed by a CT credentialed roofer. CT will only reimburse Owner for essential temporary repair expenses that would have been covered under this Limited Warranty.

MODIFICATION OF COVERAGE

Only CT's Warranty Services Department is authorized to modify coverage provided by this Limited Warranty. Issuance of this Limited Warranty or review or inspection of plans, the building, or roof system application by a CT representative does not waive any exclusions or conditions of this Limited Warranty.

TRANSFERABILITY OF WARRANTY

This Limited Warranty may be transferred to a subsequent Owner only if CT's Warranty Services Department is notified at the above listed Malvern address within thirty (30) days of real estate title transfer and upon payment of the applicable transfer fee. Failure of the Owner and subsequent Owner to transfer this Limited Warranty pursuant to these stated conditions terminates CT's warranty obligations and the Limited Warranty will be voided. This Limited Warranty is NOT otherwise transferable or assignable by contract or operation of law, either directly or indirectly.

CONDITION PERTAINING TO WARRANTY EFFECTIVENESS

This Limited Warranty applies to roof membranes installed during the calendar year of 2026 and shall become effective following complete installation of the roof membrane and payment in full to the roofing contractor. The warranty in effect at the time the material is originally installed is the applicable warranty. The warranty duration listed above is solely based upon information provided within the Product Registration/Warranty Request Form. Information presented and determined as incomplete or inaccurate, shall result in this warranty being null and void. Should a dispute arise between any of the parties (contractor, Owner, CT) as to whether or not the contractor was paid in full, CT will hold the Limited Warranty in abeyance until such time as the parties agree that this condition has been satisfied. If and when this Limited Warranty becomes effective, the original Roof Completion Date shall apply for all purposes of this Limited Warranty.

EXCLUSIVE WARRANTY AND LIMITATION OF REMEDIES

THIS DOCUMENT CONSTITUTES THE EXCLUSIVE WARRANTY AND SOLE REMEDIES PROVIDED BY CT. THE WARRANTY AND REMEDIES CONTAINED IN THIS DOCUMENT ARE EXPRESSLY IN LIEU OF ANY AND ALL OTHER OBLIGATIONS, GUARANTEES, WARRANTIES, AND REPRESENTATIONS, WHETHER WRITTEN, ORAL, IMPLIED BY STATUTE AT LAW, OR IN EQUITY, INCLUDING WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR USE, AND FITNESS FOR A PARTICULAR PURPOSE. SOME STATES OR JURISDICTIONS MAY NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU. CT'S OBLIGATIONS, RESPONSIBILITIES, AND LIABILITY SHALL BE LIMITED TO REPAIRING OR REPLACING THE DEFECTIVE PRODUCT AS SET FORTH IN THIS LIMITED WARRANTY. IN NO EVENT SHALL CT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND, INCLUDING ANY DAMAGE TO THE PROPERTY, THE BUILDING OR ITS CONTENTS, OR FOR INJURY TO ANY PERSONS THAT MAY OCCUR AS A RESULT OF THE USE OF CT'S PRODUCTS OR AS A RESULT OF A BREACH OF THIS WARRANTY. IF YOUR STATE OR JURISDICTION DOES NOT ALLOW EXCLUSIONS OR LIMITATIONS OF SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU. IN NO EVENT SHALL CT'S TOTAL LIABILITY ARISING OUT OF OR RELATED TO THE ROOF MEMBRANE PRODUCT OR THIS WARRANTY EXCEED THE COST TO THE OWNER OF THE ROOF MEMBRANE PRODUCT OF THE ORIGINAL INSTALLATION. THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY HAVE OTHER RIGHTS THAT MAY VARY BY STATE OR JURISDICTION. THIS LIMITED WARRANTY MAY NOT BE MODIFIED, ALTERED, OR EXPANDED BY ANYONE, INCLUDING PRODUCT DISTRIBUTORS, DEALERS, SELLERS, INSTALLERS, CONTRACTORS, AND/OR CT REPRESENTATIVES.

AGREEMENT TO BINDING ARBITRATION

Any and all claims, disputes, and other matters in question that may occur between the Owner, the contractor, and/or CT, arising out of, in connection with, or relating to this Limited Warranty or breach thereof, shall be submitted to BINDING ARBITRATION for resolution. The arbitration shall be conducted by the American Arbitration Association under its Construction Industry Arbitration Rules then in effect, unless the parties mutually agree otherwise. This agreement to arbitrate shall be specifically enforceable under the Federal Arbitration Act, 9 U.S.C. § 2 or the applicable state arbitration laws. The award rendered by the arbitrator shall be final, and judgment may be entered upon such award in accordance with applicable law in any court having jurisdiction thereof.

EXAMINATION OR INSPECTION

CT does not practice engineering or architecture. Roof inspections made by CT or an authorized agent of CT or issuance of this Limited Warranty does not constitute an approval of the roof, roof design plans or specifications, or construction or installation of the roof. Roof designs, construction plans, or installation of the roof system should be approved by the Owner or the Owner's professional. Any roof inspections performed by CT representatives are solely for the benefit of CT and do not constitute approval, representation, or warranty that the roof meets building code requirements.

NOTE: All referenced documents/forms are available at www.certainteed.com.

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LOW-SLOPE ASPHALTIC MEMBRANES

_____ YEAR INTEGRITY ROOF SYSTEM® NDL LIMITED WARRANTY

certainteed SAINT-GOBAIN

COVERAGE

CertainTeed LLC ("CT") hereby warrants the roof system installed at the above address, subject to the following terms, conditions, limitations and exclusions, for a period of _____ years from the date of completion of the roof system installation. If, during the duration of this Limited Warranty, a leak is caused by a deficiency in the workmanship of the roof system installation or by a manufacturing defect in the roof system, CT or its designated roofing contractor will, at CT's expense, repair or replace the roof system only as necessary to restore it to a watertight condition. Only deficiencies in the roof system that cause leaks are covered by this Limited Warranty. In no event will CT be responsible for any costs related to the removal or abatement of any asbestos present in any existing roof system to which the CT roof system is applied. Roof system, as used herein, shall include the following components: FlintBoard® insulation, approved fasteners, Millennium insulation adhesive, FlintPrime® QD and Aerosol primers, FlintBond® adhesives, FlintEdge® metals, SmartFlash® ONE liquid applied flashing, Arctic Edge Cold Lap Tape™, applicable base sheet, interplies, cap sheet, and hot asphalt between layers when applicable, as required for the warranty duration and applied per CT's Commercial Roof Systems Specifications manual, application instructions, and construction details as published at the time of installation. Approved material utilized to tie-into GCP PERM-A-BARRIER® air barrier products are covered within this Limited Warranty. Roof components which are not part of the roof system and hence not covered by this Limited Warranty include the following: underlying roof deck, insulation (non-CT brand), vapor retarders (non-CT brand), fasteners (non-CT brand), liquid flashing (non-CT brand), metal work (non-CT brand), drains, pitch pans, expansion joints (non-CT brand), skylights, vents, plastic accessories, decorative or reflective coating (SMARTCOAT Limited Warranty issued separately if applicable, non-CT brand coating excluded from coverage), surfacing, and/or any aggregates.

EXCLUSIONS FROM COVERAGE

This Limited Warranty does not cover leaks, damages, or injuries of any type, including, but not limited to, damage to roof insulation, roof decks, or other bases over which the CT products are applied, attributable directly or indirectly to any of the following:

1. Natural disasters, including, but not limited to, cyclones, tornadoes, hurricanes or other winds exceeding 54 mph, lightning, earthquakes, flood, hail, or fire;
2. Falling objects, civil insurrection, war, riot, or vandalism;
3. Settlement, deflection, movement, moisture content, inadequate attachment or other deficiencies of the roof deck, pre-existing roof system, walls, foundations or any other part of the building structure, insulation, or other materials underlying the roof system;
4. Failure of the roof system caused or contributed by:
    a. Maintenance, repair, or work on the roof unrelated to the roof system, including, but not limited to, mechanical, electrical, or plumbing;
    b. Infiltration or condensation of moisture in, through, or around the walls, copings, and metal components, pitch pans, building structure, or underlying or surrounding materials;
    c. Traffic of any nature or use of the roof surface as a storage area, walking or recreational surface, or for any other similar purpose;
    d. Movement or deterioration of metal work used in conjunction with the roof system;
    e. Deposits of solids or liquids which may cause deterioration of the roof system;
    f. Building design or construction;
    g. Lack of positive slope or inadequate drainage, to completely remove water from the roof system to prevent ponding water conditions on the roof system as defined by the NRCA (48 hours); or
    h. Installation over an improperly prepared or inappropriate substrate, including, but not limited to, wet, dirty, and/or damaged surfaces;
5. Failure to adhere to all CT application instructions, construction details, and Commercial Roof Maintenance Program as published at the time of installation;
6. Unauthorized application on excluded buildings or structures (see CT's General Recommendations);
7. Any change in the building's basic usage unless approved in advance in writing by CT;
8. Any use of roofing and tie-in materials of any kind or nature not approved in CT/GCP's Commercial Roof Systems Specifications and PERM-A-BARRIER detail manuals or in advance in writing by CT/GCP's Commercial Building & Infrastructure ("CB&I") Warranty Services Department;
9. Placement of any additional structures on the roof system, including, but not limited to, equipment or framework used in connection with air conditioning units, transmission and/or reception devices, signs, and/or water towers. This exclusion does not apply to the installation of a CT photovoltaic system when it is installed in accordance with the published installation instructions for the photovoltaic system on a low-slope roof;
10. Failure to maintain the watertight integrity of the roof system. Owner must make repairs within thirty (30) days of notification from CT of non-warranted items that affect the watertight integrity of the roof system;
11. Testing/sampling of the membrane by others;
12. Design and/or consulting errors or omissions by the Owner or their authorized representative.

In addition, CT will not be responsible, or have any liability, for changes to the appearance of the roof system that do not result in roof leaks. This includes, but is not limited to fading or other changes in color to the roof membrane, the loss of granules from the cap sheet, and/or surface cracking or blistering due to weathering or normal wear and tear from the elements.

NON-WARRANTED REPAIRS

Repairs must be made by a CT Master, Master PRO, Master PREMIER roofing contractor or roofing contractor approved in advance by CT. Should a non-warranted repair be made by any roofing contractor, payment must be remitted to the roofing contractor within thirty (30) days from completion of the work or the Limited Warranty will be void. Should non-warranted repairs not be made within thirty (30) days of notification from CT, the Limited Warranty will be void.

TWO-YEAR INSPECTION

A mandatory inspection will be made of the roofing system within approximatively 18 to 24 months (~2-years) from the date of completion. If for any reason CT or its authorized representative is not granted access to perform the inspection this Limited Warranty shall be void.

SAMPLE

UNAPPROVED REPAIRS, ALTERATIONS, ADDITIONS, OR DELETIONS

All repairs, alterations, additions, or deletions to any aspect of the roof, or any material contiguous thereto, must have prior written approval of CT's CB&I Warranty Services Department (CertainTeed Commercial Building & Infrastructure, Warranty Services Department, 20 Moores Road, Malvern, PA 19355, (800) 396-8134 ext. 2). If Owner, without prior written consent of CT, makes or permits any repairs, alterations, additions, or deletions to the roof, all of CT's obligations, duties, and coverage under this Limited Warranty will terminate and the Limited Warranty will be voided. Application of a roof system that deviates from CT's Commercial Roof Systems Specifications manual and application instructions voids coverage unless prior written approval is provided by CT's CB&I Warranty Services Services Department.

NOTE: In the event an emergency condition exists which requires immediate repair to avoid damage to the building or its contents, Owner may make essential temporary repairs performed by a CT credentialed roofer. CT will only reimburse Owner for essential temporary repair expenses that would have been covered under this Limited Warranty.

NOTICE OF CLAIMS

Any claim or request for CT to perform under this Limited Warranty must be made by the Owner to CT in writing to the above listed address, by email to rpg@saint-gobain.com, or by visiting https://www.ctndl.com/resndlsite/Commerical/index.asp within thirty (30) days of discovery of the leak or CT will have no responsibility for repairs. Notification to a roofing contractor is not considered notice to CT. This notice of claim must include a general description of the alleged defect and a copy of your Roof Maintenance Program records. Owner shall grant access to the entire roof system as necessary for CT to investigate a claim, which includes, but is not limited to, the taking of samples that adequately demonstrate the alleged defect for testing by CT as part of the claim investigation. If access is not granted, CT shall have the right to determine, at its sole discretion, that this Limited Warranty is void as to that portion of the roof system to which access is denied. Should the investigation of the leak be determined not to be covered under this Limited Warranty, any costs associated with the leak investigation shall be the Owner's sole responsibility. This Limited Warranty will become void if costs associated with non-warranty findings are not paid in full within thirty (30) days of receipt of any CT invoicing. If it is determined that CT installation procedures have not been followed, or the required materials have not been installed, CT may cancel this Limited Warranty at any time.

NOTE: In the event an emergency condition exists which requires immediate repair to avoid damage to the building or its contents, Owner may make essential temporary repairs performed by a CT credentialed roofer. CT will only reimburse Owner for essential temporary repair expenses that would have been covered under this Limited Warranty.

MODIFICATION OF COVERAGE

Only CT's CB&I Warranty Services Department is authorized to modify coverage provided by this Limited Warranty. Issuance of this Limited Warranty or review or inspection of plans, the building, or roof system application by a CT representative does not waive any exclusions or conditions of this Limited Warranty.

TRANSFERABILITY OF LIMITED WARRANTY

This Limited Warranty may be transferred to a subsequent Owner only if CT's CB&I Warranty Services Department is notified at the above listed Malvern address within thirty (30) days of real estate title transfer, upon payment of the applicable transfer fee to CT, and inspection of the roof membrane by authorized CT personnel. Failure to transfer this Limited Warranty pursuant to these stated conditions terminates CT's warranty obligations and the Limited Warranty will be voided. If it is determined, at CT's sole discretion, that the roof is in a state of poor maintenance or in disrepair, CT reserves the right to reject the transfer and void this Limited Warranty. Transfer fees are non-refundable as they are applied to inspection and administrative costs. This Limited Warranty is NOT otherwise transferable or assignable by contract or operation of law, either directly or indirectly.

CONDITIONS PERTAINING TO WARRANTY EFFECTIVENESS

This Limited Warranty shall become effective only upon the occurrence of all the following events:

1. Receipt of roofing contractor's notice of completion;
2. CT final inspection and completion of all punchlist items;
3. Payment of CT's warranty fee to CT; and
4. Owner's payment to roofing contractor for installation and supplies.

Should a dispute arise between any of the parties (contractor, Owner, CT) as to whether or not any of these Conditions Pertaining to Warranty Effectiveness have been satisfied, CT will hold the Limited Warranty in abeyance until such time as the parties agree that all Conditions have been satisfied. If and when this Limited Warranty becomes effective, the original date of installation shall apply for all purposes of this Limited Warranty.

EXCLUSIVE WARRANTY AND LIMITATIONS OF REMEDIES

THIS DOCUMENT CONSTITUTES THE EXCLUSIVE WARRANTY AND SOLE REMEDIES PROVIDED BY CT. THE WARRANTY AND REMEDIES CONTAINED IN THIS DOCUMENT ARE EXPRESSLY IN LIEU OF ANY AND ALL OTHER OBLIGATIONS, GUARANTEES, WARRANTIES, AND REPRESENTATIONS, WHETHER WRITTEN, ORAL, IMPLIED BY STATUTE AT LAW, OR IN EQUITY, INCLUDING WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR USE, AND FITNESS FOR A PARTICULAR PURPOSE. SOME STATES OR JURISDICTIONS MAY NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU. CT'S OBLIGATIONS, RESPONSIBILITIES, AND LIABILITY SHALL BE LIMITED TO REPAIRING OR REPLACING THE DEFECTIVE ROOF SYSTEM AS SET FORTH IN THIS LIMITED WARRANTY. IN NO EVENT SHALL CT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND, INCLUDING ANY DAMAGE TO THE PROPERTY, THE BUILDING OR ITS CONTENTS, OR FOR INJURY TO ANY PERSONS THAT MAY OCCUR AS A RESULT OF THE USE OF CT'S ROOF SYSTEMS OR AS A RESULT OF A BREACH OF THIS WARRANTY. IF YOUR STATE OR JURISDICTION DOES NOT ALLOW EXCLUSIONS OR LIMITATIONS OF SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU. THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY HAVE OTHER RIGHTS THAT MAY VARY BY STATE OR JURISDICTION. THIS LIMITED WARRANTY MAY NOT BE MODIFIED, ALTERED, OR EXPANDED BY ANYONE, INCLUDING PRODUCT DISTRIBUTORS, DEALERS, SELLERS, INSTALLERS, CONTRACTORS, AND/OR CT FIELD REPRESENTATIVES.

AGREEMENT TO BINDING ARBITRATION

Any and all claims, disputes, and other matters in question that may occur between the Owner, the contractor, and/or CT, arising out of, in connection with, or relating to this Limited Warranty or breach thereof, shall be submitted to BINDING ARBITRATION for resolution. The arbitration shall be conducted by the American Arbitration Association under its Construction Industry Arbitration Rules then in effect, unless the parties mutually agree otherwise. This agreement to arbitrate shall be specifically enforceable under the Federal Arbitration Act, 9 U.S.C. § 2 or the applicable state arbitration laws. The award rendered by the arbitrator shall be final, and judgment may be entered upon such award in accordance with applicable law in any court having jurisdiction thereof.

EXAMINATION OR INSPECTION

CT does not practice engineering or architecture. Roof inspections made by CT or an authorized agent of CT or issuance of this Limited Warranty does not constitute an approval of the roof, roof design plans or specifications, or construction or installation of the roof. Roof designs, construction plans, or installation of the roof system should be approved by the Owner or the Owner's professional. Any roof inspections performed by CT representatives are solely for the benefit of CT and do not constitute approval, representation, or warranty that the roof meets building code requirements.

NOTE: All referenced documents/forms available at www.certainteed.com.

SAMPLE

COMMERCIAL ROOF MAINTENANCE PROGRAM

certainteed SAINT-GOBAIN

Roof installed by: _____ Warranty # _____

The following information is designed to assist owners in establishing a regular and beneficial roof inspection and maintenance program. This important area of responsibility for the building owner can provide many long-term benefits, including extended life expectancy of the roofing system, reduced average in-place cost, prevention of major deterioration resulting from minor problems, and eventually, reduced roof system replacement cost. Failure to properly maintain the roof system voids all CertainTeed LLC ("CertainTeed") Commercial Roofing Limited Warranties.

Roof Maintenance Guidelines

All roofs require regular inspections and periodic maintenance to achieve their expected life. Roofs should be inspected at least twice yearly, in the spring and fall. Additionally, all roofs should be inspected after any severe weather or storms. The roofing contractor who installed the roof membrane, in conjunction with the building owner's maintenance personnel, should perform these inspections. Leaks occur most often at flashings, pitch pans, gravel stops, and other penetrations. Wind damage occurs most often at the roof edge termination. Pay special attention to these areas. All components of the roof are the owner's responsibility to maintain and repair as necessary to prevent future leaks or damages.

General – One of the keys to avoiding roof damage is limiting access to the roof. Allow only authorized personnel on the roof who understand good roof access procedures and precautions. Bag and remove all debris from the roof. Keep grease and oil off of the roof. Clean and remove any liquid deposits immediately. Do not allow foot traffic on the roof in very hot or very cold weather. Do not allow the installation of television or radio antennas, satellite dishes, or other mechanical equipment without notifying CertainTeed for approval and for consultation about the methods and details for these installations.

Modified Flashings – Inspect and service flashings on a routine basis.

Roof Drains – CertainTeed requires positive drainage. Owners must keep roof drains and the surrounding areas free of debris to allow for proper drainage. Maintain proper attachment of drain clamping rings.

Metal Flashing – Start with a visual examination looking for areas of damage or rust. Ensure that the flashing has remained properly attached and sealed. Repair or replace areas with damage, poor caulking, and all loose areas including counterflashing, coping, seams, and/or joints.

Pitch Pans – Keep pitch pans full at all times. Examine and repair the metal pan assembly when necessary.

Rooftop Equipment – Qualified roofing personnel should accompany the equipment installation and/or service employees. If this is not practical, have qualified roofing personnel inspect the area after the equipment installation and/or service employees have completed their work. Regularly check and maintain the condition of all rooftop equipment. Ensure that no substances from the equipment are being deposited on the roof, and if deposits are present, clean immediately. Check equipment flashing for proper condition.

Roof Coating – Visually inspect for signs of deterioration. Maintenance or replacement completed by a roofing professional is essential. Coating life is affected by a variety of factors including climate and environment.

Other – The above list reflects only the most common components found on roof systems; it is not all-inclusive. Contact CertainTeed for additional information.

Building Owner Inspection and General Recommendations

A. Utilize roofing professionals or thoroughly trained maintenance personnel for roof-related issues. Use of a Registered Roof Consultant (RRC) or Registered Roof Observer (RRO) is recommended.

B. Building owners must file all job records, drawings, and specifications for future reference. Contract with a roofing contractor authorized by CertainTeed to set up a regular inspection and roof maintenance schedule. Record maintenance procedures as they occur. Log all roof access times and other trades working on the roof, in case damage should occur. Report damage as soon as it occurs so repairs may be scheduled and executed as soon as possible.

C. Make more frequent inspections (six times per year) on buildings that house manufacturing facilities that evacuate or exhaust debris or other contaminants (e.g., grease) onto the roof.

D. Inspect the exterior of the building for settlement or movement. Structural movement may result in splits in the roof membrane.

E. Repairs should be performed as soon as needed, building owners should not allow a nuisance leak to develop into a major problem, degrading insulation and destroying a large portion of the roof assembly. While a roofing contractor authorized by CertainTeed should perform repairs and maintenance work, the owner can help maintain the roof by ensuring that minor clean-up and maintenance procedures are performed (e.g., regular checking and cleaning of debris from roof and around drains).

F. Notify CertainTeed immediately after a roof leak occurs. If possible, note conditions resulting in leakage. Heavy or light rain, wind direction, temperature, and the time of year that the leak occurs are all important clues to tracing roof leaks. Note whether the leak stops shortly after each rain or continues to drip until the roof is dry. If the owner is prepared with the facts, the diagnosis and repair of roof problems can proceed more rapidly.

G. In some emergency situations, owner-applied temporary patches may be made to stop leaks to minimize property loss. Except for certain emergency situations, owners should not attempt roof repairs. The puncturing of a blister or the spreading of a liquid-applied coating or bituminous cement may only cover up evidence needed to ascertain the real problem. For your convenience, we have provided a basic inspection form on the reverse side of this page that addresses several critical areas of the roofing system.

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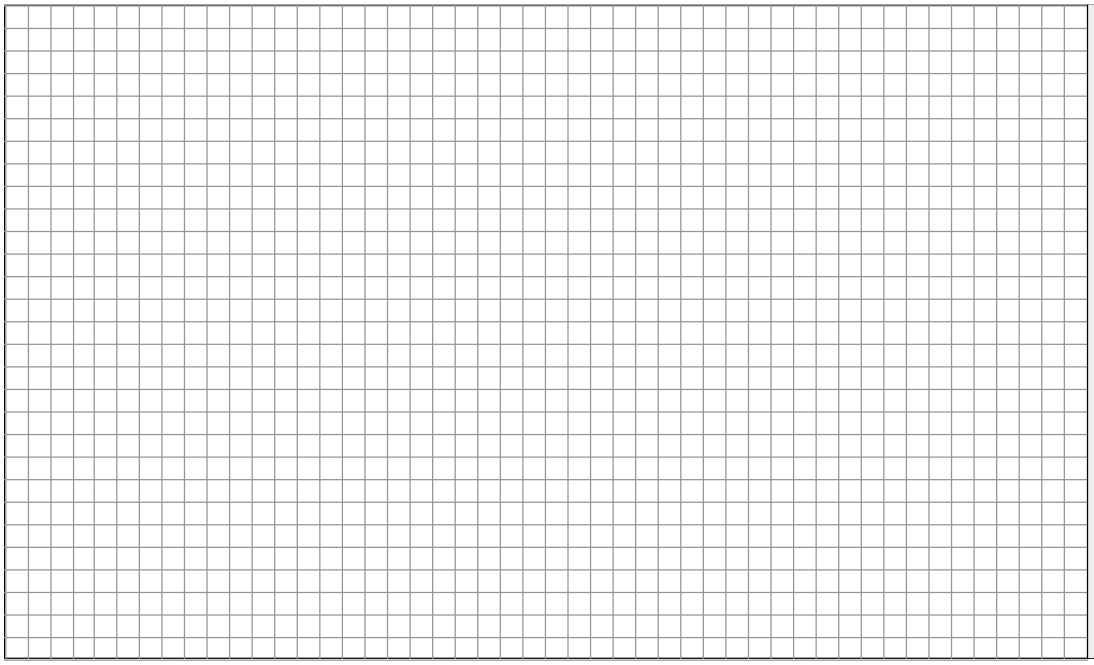
COMMERCIAL ROOF MAINTENANCE PROGRAM

Date: _____ Inspected By: _____



ROOF PLAN LEGEND

- Roof Drain
- Scupper
- Firewall FW
- Chimney
- Skylight
- Scuttle or hatch
- Penthouse 10 PH
- Ventilator/Fan
- Vent Pipe
- Air Conditioner AC
- Cooler C
- Pitch Pocket
- Saddle S S
- Hip H
- Ridge R
- Valley V
- Pipe or Conduit
- Screen Support/Fence XXX
- Expansion Joint E.J.
- Metal Edging – Single-line perimeter
- Parapet Wall – Double-line perimeter
- Other _____

Owner-Based Maintenance Requirements

	No Problems	Maintenance Required	Not Applicable
1. Edge Metal	☐	☐	☐
2. Counter Flashings	☐	☐	☐
3. Expansion Joints	☐	☐	☐
4. Pitch Pans	☐	☐	☐
5. Drains	☐	☐	☐
6. Scuppers	☐	☐	☐
7. Skylights	☐	☐	☐
8. Coping Covers	☐	☐	☐
9. Vents	☐	☐	☐
10. Flues	☐	☐	☐
11. Antennae	☐	☐	☐
12. HVAC Equipment	☐	☐	☐
13. Sign Supports	☐	☐	☐
14. Coatings/Toppings	☐	☐	☐
15. Debris	☐	☐	☐
16. Other	☐	☐	☐

Comments _____

_____

_____

Condition of Roof Membrane

Surface Condition	Yes	No
Any blisters, splits, buckles or punctures?	☐	☐
Any bare spots, displaced gravel, thin coating or severe granule loss?	☐	☐
Reflective coating in good condition?	☐	☐
Any evidence of ponding?	☐	☐
Any evidence of residue deposits or foreign contamination?	☐	☐
Are A/C condensation lines extending into drains?	☐	☐
Any evidence of traffic or physical damage?	☐	☐
Any evidence of wet insulation?	☐	☐

Comments _____

_____

_____

_____

General Conditions

Any building or structural movement?	☐	☐
Any deflection or sagging of deck?	☐	☐
Any alterations, additions or new penetrations?	☐	☐
Any change in building usage?	☐	☐

Comments _____

_____

_____

Copies of this form should be made and used in your semi-annual roof inspections.

CertainTeed Commercial Building & Infrastructure – 20 Moores Road, Malvern, PA 19355
Attn: Warranty Services Department – Phone: 800-396-8134, ext. 2; Fax: 610-254-5458
Email: rpg@saint-gobain.com
Website: www.certainteed.com

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FLINTBOARD®
LIMITED WARRANTY

certainteed SAINT-GOBAIN

Owner: _____ Owner Phone: _____

Owner Address: _____

Description of Building Use: _____

Building Address: _____

CT FlintBoard Product(s) Used: _____

Contractor: _____ Contractor Phone: _____

Contractor Address: _____

No. of Squares: _____ Installation Date: _____ Warranty Expiration Date: _____

COVERAGE

CertainTeed LLC ("CT") hereby warrants to the Owner that the thermal insulation R-Value of its family of FlintBoard® polyisocyanurate foam insulation products ("FlintBoard") will not at any time after the first (1st) year of purchase, but prior to the start of the twentieth (20th) year after purchase, diminish to less than eighty percent (80%) of the published R-Value of the FlintBoard at the time of purchase. This Limited Warranty is expressly made subject to the following terms, conditions, and limitations:

WARRANTY LIMITED TO ONE EVALUATION

Owner agrees that the Limited Warranty is based on an evaluation of FlintBoard as hereinafter set forth, and that the FlintBoard may be evaluated for R-Value only one time during the time period for which this Limited Warranty is made. Owner agrees and understands that the FlintBoard may not be evaluated each year and that the Limited Warranty applies only to the results of the initial test performed on the product.

PROOF OF PURCHASE

As a condition precedent to recovery under this Limited Warranty, Owner agrees to retain the original Proof of Purchase ("Sales Receipt") of FlintBoard product and to submit the same to CT when filing a claim. The original Sales Receipt must clearly establish that it relates to the FlintBoard which is the subject of the claim.

WARRANTY AND LIMITATION OF REMEDIES

THIS DOCUMENT CONSTITUTES THE EXCLUSIVE WARRANTIES AND REMEDIES PROVIDED BY CT. THE WARRANTIES AND REMEDIES CONTAINED IN THIS DOCUMENT ARE EXPRESSLY IN LIEU OF ANY AND ALL OTHER OBLIGATIONS, GUARANTEES, AND WARRANTIES, WHETHER WRITTEN, ORAL, OR IMPLIED BY STATUTE OR AT LAW. STATE OR PROVINCIAL LAW WILL DETERMINE THE PERIOD OF TIME FOLLOWING THE SALE THAT A PROPERTY OWNER MAY SEEK A REMEDY UNDER THE IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. CT'S OBLIGATIONS, RESPONSIBILITIES, AND LIABILITY SHALL BE LIMITED TO REPAIRING OR REPLACING THE DEFECTIVE FLINTBOARD PRODUCT AS SET FORTH IN THIS LIMITED WARRANTY. IN NO EVENT SHALL CT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND, INCLUDING ANY DAMAGE TO THE PROPERTY, THE BUILDING OR ITS CONTENTS, OR FOR INJURY TO ANY PERSONS THAT MAY OCCUR AS A RESULT OF THE USE OF THE FLINTBOARD PRODUCT OR AS A RESULT OF A BREACH OF THIS WARRANTY. IF YOUR STATE OR PROVINCE DOES NOT ALLOW EXCLUSIONS OR LIMITATIONS OF SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU. IN NO EVENT SHALL CT'S TOTAL LIABILITY ARISING OUT OF OR RELATED TO FLINTBOARD PRODUCT OR THIS WARRANTY EXCEED THE COST TO THE OWNER OF THE FLINTBOARD PRODUCT OF THE ORIGINAL INSTALLATION. IN NO EVENT SHALL CT BE LIABLE FOR ANY DAMAGES OR EXPENSES RELATED TO THE REMOVAL OR REPLACEMENT OF THE FLINTBOARD OR ANY COVERINGS OVER THE FLINTBOARD. THIS LIMITED WARRANTY MAY NOT BE MODIFIED, ALTERED, OR EXPANDED BY ANYONE, INCLUDING PRODUCT DISTRIBUTORS, DEALERS, SELLERS, INSTALLERS, CONTRACTORS, AND/OR CT FIELD REPRESENTATIVES. THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE OR PROVINCE TO PROVINCE.

LIMITATIONS OF COVERAGE

CT shall not be liable for, and this Limited Warranty does not apply to: (a) FlintBoard which has been damaged, abused, misused, punctured, crushed, or improperly applied or installed; (b) FlintBoard which has been harmed by use or environmental conditions such that the foam cells have been ruptured by excessive heat, cold, and/or humidity; (c) FlintBoard wherein the moisture content as shown by the moisture content test taken on the sample at the time of evaluation indicates an excess of three percent (3%) moisture by weight; (d) FlintBoard which has not been handled, stored, or used according to the instructions outlined on CT labels or CT product literature in effect at the date of sale; or (e) any other cause not related to manufacturing defects.

EVALUATION OF R-VALUE AND NOTICE OF CLAIM

If at any time after the first (1st) year from the date of purchase of the FlintBoard, but prior to the twentieth (20th) year, Owner decides to evaluate the FlintBoard R-Value, Owner shall notify CT in writing at CT's Commercial Building & Infrastructure ("CB&I") Warranty Services Department, 20 Moores Road, Malvern, PA 19355, (800) 396-8134 at least sixty (60) days prior to the removal of the installed samples. Owner agrees that a CT representative shall monitor and choose the sampling places, the testing facility, and the testing procedures. Owner agrees, at its own expense, to remove samples, replace and repair the sample area, and have tests made on the FlintBoard only in the presence of a CT representative. Owner further agrees that a moisture content test shall also be performed under the above terms and conditions and that Owner shall be responsible for all costs involved in connection therewith. If the Owner removes or damages the FlintBoard prior to the scheduled sampling, this Limited Warranty shall be void. All testing of the insulation samples will be conducted at a NAVLP certified independent testing laboratory approved by CT. Results of the testing will be final and binding on all parties concerned.

CertainTeed, 20 Moores Road, Malvern, PA 19355

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LIMITATION OF LIABILITY

If the test results of the FlintBoard samples as determined by the independent testing laboratory verify that the R-Value has fallen below eighty percent (80%) of CT published specifications in force at the time of the original sale, CT will reimburse Owner a percentage of Owner's original purchase price of FlintBoard product pursuant to the following schedule:

Year(s) After	Percent Reimbursement Of Original Purchase	Year(s) After	Percent Reimbursement Of Original Purchase
1-10	100%	16	40%
11	90%	17	30%
12	80%	18	20%
13	70%	19	10%
14	60%	20	0%
15	50%		

THE AMOUNT ORIGINALLY PAID FOR THE FLINTBOARD BY THE OWNER SHALL BE EVIDENCED BY THE ORIGINAL SALES RECEIPT. IN NO EVENT SHALL THE AMOUNT OF ANY LIABILITY AND/OR REIMBURSEMENT OF CT UNDER THIS LIMITED WARRANTY BE GREATER THAN THE ORIGINAL PURCHASE PRICE OF THE FLINTBOARD.

NOTE: Not more than one claim may be filed on any one building.

TRANSFERABILITY OF WARRANTY

This Limited Warranty may be transferred to one subsequent Owner only if the CT CB&I Warranty Services Department is notified at the above listed Malvern address within thirty (30) days of real estate title transfer and upon payment of the applicable transfer fee to CT. Failure of the Owner to transfer this Limited Warranty pursuant to these stated conditions terminates CT's warranty obligations and the Limited Warranty will be voided. This Limited Warranty may not be transferred a second time. If a claim was made by the first Owner and settled or rejected, this warranty is no longer in effect and may not be transferred to a second Owner.

CONDITION PERTAINING TO WARRANTY EFFECTIVENESS

This Limited Warranty shall become effective following complete installation of the FlintBoard and payment in full to the roofing contractor. Should a dispute arise between any of the parties (contractor, Owner, CT) as to whether or not the contractor was paid in full, CT will hold the Limited Warranty in abeyance until such time as the parties agree that this condition has been satisfied. If and when this Limited Warranty becomes effective, the original date of installation shall apply for all purposes of this Limited Warranty.

AGREEMENT TO BINDING ARBITRATION

Any and all claims, disputes, and other matters in question that may occur between the Owner, the Contractor, and/or CT, arising out of, in connection with, or relating to this Limited Warranty or breach thereof, shall be submitted to BINDING ARBITRATION for resolution. The arbitration shall be conducted by the American Arbitration Association under its Construction Industry Arbitration Rules then in effect, unless the parties mutually agree otherwise. This agreement to arbitrate shall be specifically enforceable under the Federal Arbitration Act, 9 U.S.C. § 2 or the applicable state arbitration laws. The award rendered by the arbitrator shall be final and judgment may be entered upon such award in accordance with applicable law in any court having jurisdiction thereof.

INSPECTION

CT does not practice engineering or architecture. Roof inspections made by CT or an authorized agent of CT or issuance of this Limited Warranty does not constitute an approval of the roof, roof design plans or specifications, or construction or installation of the roof. Roof designs, construction plans, or installation of the roof system should be approved by Owner or Owner's professional. Any roof inspection performed by CT representatives are solely for the benefit of CT and do not constitute approval, representation, or warranty that the roof meets building code requirements.

CertainTeed, 20 Moores Road, Malvern, PA 19355

©01/26 CertainTeed, Code No. 01-02-753-NA-EN

SMARTFLASH® ONE
LIMITED WARRANTY

Owner:
Owner Address:
Owner Phone:
Description of Building Use:
Building Address:
Contractor:
Contractor's Address:
Contractor's Phone:
Number of Squares:
Installation Date:

COVERAGE

For the Warranty Period defined in the Warranty Chart below, CertainTeed LLC ("CT") warrants to the original building owner ("Owner") that SmartFlash® ONE used on the roof will be free of leaks caused by manufacturing defects.

PRODUCT WARRANTY CHART:

SmartFlash ONE Applied:	Warranty Period
During original installation of a CT asphaltic low or steep-slope roof system	Matches CT roof system warranty as published at the time of the installation, up to, but not more than 20 years. The Warranty Period runs from the date of the original installation of the roof system.
As a repair or after completion of an original installation of a CT asphaltic low or steep-slope roof system where the roof system warranty has already started	10 years from the date of the original application of SmartFlash ONE.
As part of a non-CT asphaltic low or steep-slope roof system, whether an original installation or repair.	10 years from the date of the original application of SmartFlash ONE.

EXCLUSIONS FROM COVERAGE

This Limited Warranty does not cover leaks, damages, or injuries of any type, including, but not limited to, damage to roof insulation, roof decks, roof membrane, or other bases over which SmartFlash ONE is applied and attributable directly or indirectly to any of the following:

1. Natural disasters, such as falling objects, cyclones, hurricanes, tornadoes, or other winds or gusts exceeding 54 mph, earthquakes, lightning, hail, or fire;
2. Misuse, abuse, falling objects, tools, foot traffic, or equipment or sign installation. This exclusion does not apply to the installation of a CT photovoltaic system when it is installed in accordance with the published installation instructions for the photovoltaic system on a low-slope roof;
3. Clogged drains or lack of adequate drainage that does not promptly and readily remove water from the roof;
4. Ponding water (as defined by the National Roofing Contractors Association);
5. Settlement, cracking, warping, expansion, contraction, deflection, or other movement of the building structure;
6. Failure to comply with all CT application instructions, construction details, and Commercial Roof Maintenance Program as published at the time of installation;
7. Mold and other damage caused by water entering building; and
8. Any other damage not attributable to a manufacturing defect of the SmartFlash ONE.

This Limited Warranty is only applicable when SmartFlash ONE is properly installed according to CT published specifications and label instructions. This Limited Warranty does not cover leaks or damage caused by leaks due to installation error. This Limited Warranty provides material only and does not include installation or labor costs. The existing roof deck and/or other substrates have not been inspected by CT and are NOT part of this Limited Warranty.

ROOF MAINTENANCE

This Limited Warranty is not a maintenance agreement or an insurance policy. Routine inspections and maintenance of the roof system must be completed by the Owner on a regular basis and are the Owner's responsibility. Inspections by Owner shall take place at least on a semi-annual basis and shall be documented. Periodic inspections are the Owner's responsibility and shall include such things as making minor repairs, cleaning off debris, cleaning filters and gutters, unclogging drains, and removing standing water. Lack of regular maintenance shall void this Limited Warranty. For specific information on roof maintenance requirements please visit our website at www.certainteed.com.

UNAPPROVED REPAIRS, ALTERATIONS, ADDITIONS, OR DELETIONS

All repairs, alterations, additions, or deletions to any aspect of the roof that affects SmartFlash ONE or any material contiguous thereto must have prior written approval of the CT Commercial Building & Infrastructure's ("CB&I") Warranty Services Department, 20 Moores Road, Malvern, PA 19355, (800) 396-8134 ext. 2. If Owner, without prior written consent of CT, makes or permits any repairs, alterations, additions, or deletions to the roof that affect the SmartFlash ONE, all of CT's obligations, duties, and coverage under this Limited Warranty will terminate and the Limited Warranty will be voided.

SMARTFLASH® ONE
LIMITED WARRANTY

NOTICE OF CLAIMS

Any claim or request for CT to perform under this Limited Warranty must be made by Owner in writing to the above listed address, by email to rpg@saint-gobain.com, or by visiting www.ctroof.com within thirty (30) days of discovery of the defect, and Owner must send proof of purchase and samples that demonstrate the alleged manufacturing defect to CT CB&I's Warranty Services Department. Notification to a roofing contractor is not considered notice to CT. This notice of claim must include a general description of the alleged defect. Owner shall grant access to the entire roofing system as necessary for CT to investigate the claim, which includes, but is not limited to, the taking of samples that adequately demonstrate the alleged defect for testing by CT as part of the claim investigation. If access is not granted, CT shall have the right to determine, at its sole discretion, that this Limited Warranty is void as to that portion of the roof to which access is denied. Contract or invoice from roofer for service, product, or work completed does not constitute Proof of Purchase of CT products. Original Proof of Purchase is required and best obtained from the place of purchase. Copies are not acceptable. Failure to notify CT in a timely manner shall relieve CT of any obligation under this Limited Warranty.

NOTE: In the event an emergency condition exists which requires immediate repair to avoid damage to the building or its contents, Owner may make essential temporary repairs performed by a qualified roofer. CT will only reimburse Owner for essential temporary repair expenses that would have been covered under this Limited Warranty.

TRANSFERABILITY

This Limited Warranty may be transferred to a subsequent owner only if CT CB&I's Warranty Services Department is notified at the above listed address within thirty (30) days of real estate title transfer and upon payment of the applicable transfer fee to CT. Failure to transfer this Limited Warranty pursuant to these stated conditions terminates CT's warranty obligations. If it is determined at CT's sole discretion that the roof is in a state of poor maintenance or in disrepair, CT reserves the right to reject the transfer and void this Limited Warranty. All transfer fees will be refunded minus the cost of any applicable inspection and administrative fees.

LIMITATIONS OF REMEDY AND LIABILITY

THIS DOCUMENT CONSTITUTES THE EXCLUSIVE WARRANTIES AND REMEDIES PROVIDED BY CT. THE WARRANTIES AND REMEDIES CONTAINED IN THIS DOCUMENT ARE EXPRESSLY IN LIEU OF ANY AND ALL OTHER OBLIGATIONS, GUARANTEES, AND WARRANTIES, WHETHER WRITTEN, ORAL, OR IMPLIED BY STATUTE OR AT LAW. STATE OR PROVINCIAL LAW WILL DETERMINE THE PERIOD OF TIME FOLLOWING THE SALE THAT A PROPERTY OWNER MAY SEEK A REMEDY UNDER THE IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. CT'S OBLIGATIONS, RESPONSIBILITIES, AND LIABILITY SHALL BE LIMITED TO PROVIDING REPLACEMENT SMARTFLASH ONE OR REFUNDING THE ORIGINAL COST OF THE SMARTFLASH ONE AS SET FORTH IN THIS LIMITED WARRANTY. IN NO EVENT WILL CT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND, INCLUDING THE LOSS OF SALES, PROFITS, RENT PAYMENTS, INVENTORY, EQUIPMENT, VALUABLES OR OTHER MONETARY LOSSES, OR DAMAGE TO THE BUILDING OR TO THE BUILDING'S CONTENTS, OR FOR INJURY TO ANY PERSONS THAT MAY OCCUR AS A RESULT OF THE USE OF SMARTFLASH ONE OR AS A RESULT OF A BREACH OF THIS WARRANTY. IF YOUR STATE OR PROVINCE DOES NOT ALLOW EXCLUSIONS OR LIMITATIONS OF SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU. IN NO EVENT WILL CT'S TOTAL LIABILITY ARISING OUT OF OR RELATED TO SMARTFLASH ONE OR THIS WARRANTY EXCEED THE COST TO THE OWNER OF THE SMARTFLASH ONE THAT WAS ORIGINALLY INSTALLED. THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATED TO STATE OR PROVINCE TO PROVINCE.

MODIFICATIONS OF COVERAGE

Except as noted herein, this Limited Warranty may not be modified, altered, or expanded by anyone, including product distributors, dealers, sellers, installers, contractors, and/or CT field representatives. Only CT's CB&I Warranty Services Department is authorized to modify coverage provided by this Limited Warranty. Issuance of this Limited Warranty or review or inspection of plans, the building or product application by a CT representative does not waive any exclusions or conditions of this Limited Warranty. Application of the CT SmartFlash ONE materials that deviates from CT's Commercial Roof Systems Specifications manual voids coverage unless prior written approval is provided by CT's CB&I Warranty Services Department.

EXAMINATION OR INSPECTION

CT does not practice engineering or architecture. Roof inspections made by CT or an authorized agent of CT or issuance of this Limited Warranty does not constitute an approval of the roof, roof design plans, or specifications, or construction or installation of the roof. Roof designs, construction plans, or installation of the roof system should be approved by the Owner or the Owner's professional. Any roof inspections performed by CT representatives are solely for the benefit of CT and do not constitute approval, representation, or warranty that the roof meets building code requirements.

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ENHANCED WIND WARRANTY APPLICATION
PROJECT INFORMATION FORM (PIF)

certainteed SAINT-GOBAIN

This worksheet is intended to provide initial project data to commence with wind load analysis of roof cladding systems. **All fields in Section A are required to be completed.** Complete the form, sign the bottom, and return to CertainTeed LLC's ("CT") Commercial Building & Infrastructure Warranty Services Department along with all required supporting documents listed in Section E and the required nonrefundable $100 processing fee. If required, final signed/sealed design documents from a Professional Engineer will not be issued until CT receives all required supporting documentation and $1,000 Professional Engineering fee.

A – BUILDING INFORMATION	
Project Name:	Building Use:
Address:	Building Category*:
Project Contact:	Importance Factor*:
Phone:	Basic Wind Speed*: mph:
*Note: If project is permitting in State of Florida, the items marked * must be listed on the project Roof Plan, as required in Section 1603 of the 2023 Florida Building Code.	Exposure Category*:
	Internal Pressure Coeff.:

B – CODE INFORMATION		
Code Jurisdiction (check one and list year):	❑ **IBC**	**Year:**
	❑ **FBC**	**Year:**
	❑ **Other:**	**Year:**

C – SPECIFICATION INFORMATION			
FM Approval Requirement	❑ YES	❑ NO	FM Class 1 - _____
Special Wind Requirements:	❑ YES	❑ NO	Describe requirement:
P.E. Certification Required:	❑ YES	❑ NO	List state of registration:
Other Spec. Requirements:			

D – ROOF INFORMATION
Complete the following information for each roof level and area of the project. Use multiple pages for multiple roof areas.

Project Type:	❑ **New Construction**	❑ **Re-Roof (tear off)****	❑ **Recover****
****Roof Level # of**			
Height: ft	**Length: ft**	**Min. Width: ft**	**Pitch :12**
Parapet Height: ft		**Deck Type:**	
Roof Insulation Type ❑ **Tapered** ❑ **Flat** ❑ **Composite**		**Coverboard Type**	
Tradename:		**Tradename:**	
Thickness (inches):		**Thickness (inches):**	
Install Method:		**Install Method:**	

New Roof Assembly (BUR or Mod Bit)

Component	**Tradename**	**Install Method**	**Fasteners and Plates**
Base			**Manufacturer:**
Ply(s):			**Fastener Tradename:**
Cap:			**Plate Template**
Coating:			

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ENHANCED WIND WARRANTY APPLICATION
PROJECT INFORMATION FORM (PIF)

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Product Approval Documentation List below the Product Approval or Test Report being submitted as the baseline for the wind load analysis:			
Miami-Dade NOA:		**FBC Statewide Approval:**	
ICC-ES Evaluation Report:		**Test Report:**	
Other:			

** For re-roof or recover projects involving mechanically attached roof components (e.g. insulation or membrane), field withdrawal resistance testing is required. CT recommends sampling and testing in accordance with Miami-Dade TAS 105, or applicable Building Code Requirement.

*** Complete section D for each roof level on the project.

E – REFERENCE ATTACHMENTS

Check those attachments which are included in the transmittal.

❑ **Roof Plan (required)** ❑ **Roof Specification (required if issued for project)**

❑ **Exposure Condition Photographs (Photos taken from the roof top are required showing North, South, East and West exposure conditions if the project exposure condition is not specified on the roof plan or specs.)**

❑ **Field Pull Test Report, in accordance with ANSI/SPRI IA-I 2015 or SPRI FX-1 (required for re-roof and recover projects)**

❑ **Product Approval Documentation**

❑ **Other (list):**_____

NOTICE: Wind load analysis performed is to be based exclusively on the information presented in this form and supplied attachments. An incomplete form will result in a delayed response. If the information presented is inaccurate, then the results of the analysis may be adversely affected, leading to an inappropriate fastening recommendation. CT will not be held accountable for erroneous recommendations resulting from inaccurate information. Responsibility and liability for incomplete or inaccurate information rests exclusively with the preparer of this form. This analysis is for guidance and CT warranty purposes only. The building owner or their authorized representative is responsible for adhering to local building code requirements. By signing this form, you agree to install the roof membrane per CT Enhanced Wind Warranty installation requirements at minimum. CT will not be considered as Quality Assurance for any roofing project. The roofing contractor is responsible for ensuring the roof membrane is installed in a workmanlike manner as required by CT's published installation instructions and all applicable building codes. If it is determined that the roof membrane was not installed per requirements, CT reserves the right to cancel any warranties issued for the specified project. Any warranty and processing fees paid to CT are nonrefundable.

CT does not practice engineering or architecture. Issuance of an Enhanced Wind Warranty Endorsement does not constitute approval of the roof design, plans, or specifications. Roof designs, construction plans, or installation of the roof systems should be approved by the owner or the owner's responsible professional.

ENHANCED WIND WARRANTY ENDORSEMENT FEE SCHEDULE[2]

Wind endorsement fee schedule for NDL Warranties, minimum 100 sq. If Professional Engineering Stamp is required, there is an additional $1,000 fee. Contact CT's Warranty Services Department at 1-800-396-8134 Ext. 2

55 – 80 mph	$1.00 per square
81 – 90 mph	$2.00 per square
91 – 100 mph	$4.00 per square
101 – 110 mph	$8.00 per square
111 – 120 mph	$10.00 per square
121 – 135 mph	$15.00 per square

Professional engineer report & stamp, as required $1,000 fee in addition to above per square fee.

[2] The fee schedule is based on a minimum 100 squares and is in addition to applicable Integrity Roof System NDL Limited Warranty Fees.

Name:	**Date**
Company:	
Signature:	

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WARRANTY ENDORSEMENT
ROOF MEMBRANE ENHANCED WIND

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Endorsement to Warranty_____

CertainTeed LLC ("CT") warrants the roof membrane or system ("Roof") associated with the above warranty number with an Enhanced Wind Warranty Endorsement, extending warranty coverage for leaks caused by wind speeds above the published, maximum warranted speed, 54 mph, up to _____ mph.

CT warrants that the Roof, as applicable, when installed in accordance with CT-provided, Enhanced Wind Warranty Application instructions, will repair the Roof to the original watertight conditions up to the allowable speed of the Endorsement for the first ten (10) years of the warranty duration. After 10 years, the wind speed covered by the Endorsement will decrease by the following percentages during each subsequent year, but the covered wind speed will not go below the original published speed of 54 mph. All reductions are calculated and then rounded up:

a. 4% for 25-year NDL warranties
b. 5% for 20-year NDL warranties
c. 6.67% for 15-year NDL warranties
d. 8.3% for 12-year NDL warranties

A CT 10-Year Integrity Roof System NDL Limited Warranty ("Limited Warranty") is not subject to wind speed proration.

The remainder of the original Limited Warranty shall remain unchanged and subject to the published terms and conditions. See Limited Warranty document for further details.

This Endorsement shall become effective only upon payment by the roofer of the applicable wind endorsement fee fixed by CT.

SAMPLE

CertainTeed, 20 Moores Road, Malvern, PA 19355

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CertainTeed

Ceilings • Gypsum • Insulation • Roofing • Siding • Trim

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