

COMPACT™ STRUCTURAL LAMINATES BY FORMICA GROUP

TECHNICAL DATA



PRODUCT DESCRIPTION

Compact grades are decorative laminates with a thickness of at least 1/8in and generally have a decorative surface on both sides. Being of homogeneous construction, they offer excellent dimensional stability and mechanical strength. Since Compact 1/4in thick or below usually requires some measure of support (e.g. a metal frame), thicker laminates can be regarded as self-supporting. Compact over 1/4in thick are suitable for horizontal applications with the minimum of support. Not only do they meet all the requirements of EN 438:2005, ISO 4586, NEMA LD3 they also possess high impact and moisture resistant properties. Compact laminates are available in both standard and flame-retardant grades.

STORAGE

Compact sheets should be stored in enclosed warehouses where normal interior conditions (65-75°C and 50-60% relative humidity) are maintained. Compact laminates will remain flat if stored horizontally in packs on a flat base board, with their edges flush with one another. The base board must be dry and ideally it should be covered with a material impervious to water, to act as a moisture barrier.

The top sheet of each stack should also be covered with a moisture barrier/cover board, with sufficient weight to remain flat and in contact with the whole surface area of the top sheet of Compact. This procedure should be maintained throughout their storage (whether in a warehouse or on the fabrication shop floor) and reinstated whenever a sheet is removed from the stack.

If Compact sheets are not stored flat for any length of time, deformation can result which will be almost impossible to rectify, particularly with thicker boards. Protective films must be removed from both sides simultaneously.

RECOMMENDED APPLICATION

Compact™ by Formica Group is suitable for interior horizontal or vertical surfaces where high strength, impact, water, and humidity resistance are required. Because of its inherent high strength, Compact sheets may be used as a structural material. Compact sheets can be drilled, routed, tapped, sanded, shaped and cut with standard carbide-tipped tooling. Compact sheets are available in two-sided decorative face; thicknesses ranging from 1/8" (3.18mm) to 1" (25.4mm) with black core. Fire retardant, Class I (A) grades are also available.

FABRICATION AND ASSEMBLY

All the general recommendations for the fabrication of thin laminates also apply to Compact laminate and they should be treated in the same manner as double sided composite boards. The following additional recommendations should also be observed.

GENERAL

The increased thickness of Compact laminates imposes greater

demands on cutting tools and causes greater wear. Slower feed-speeds than those generally used for cutting HPL-faced composite boards are required. The degree of feed speed reduction will depend on the thickness of the laminate and the quality of finish required. Tool manufacturers should be consulted as to the type and quality of tungsten carbide tipping to provide the best performance. Where long production runs are contemplated and where a high quality finish is required, it is worth considering PCD (Polycrystalline Diamond) tooling. In all machine processes, localized heating caused by poorly maintained saws and cutters must be avoided. For optimum flatness the longest dimension of the panel should always be cut to coincide with the longest dimension of the Compact sheet.

SAWING

Saw blades normally used for cutting double sided composites are generally suitable for cutting Compact grades. Saws of less than 2 mm in thickness are not recommended. Breakout on the underside and poor cutting of Compact sheets can be reduced by various methods.

1. By the use of a pre-scoring blade on the underside.
2. Using a base-board of plywood or hardboard beneath the Compact sheet.
3. Altering the exit angle of the saw blade by adjusting the height setting.
4. Triple chip designs have shown to provide good cut quality. Hook - +15°.
5. Rate of advance of the cutter ("chip load") should be .001"-.002".

Note: The higher the saw blade the better the top cut and the worse the bottom cut and vice versa. The feed speed essentially governs the quality of the saw cut when sawing Compact laminates having two decorative faces

PROFILE CUTTING AND EDGE FINISHING

It is not necessary to apply edging strips or edge sealants to Compact panels and for many applications clean sawn edges are sufficient.

A hand router may be used to achieve a superior finish or a profiled edge. Rough cut panels to approximately 1/16in before finish routing. Two-flute carbide straight cutting bits work well for trimming double-sided panels. Although it is not possible to achieve complete freedom from cutter marks, they can be minimized by feeding the work at a constant controlled speed. Care should be taken to avoid pausing during cutting and profiling, as burn marks may result which are difficult to remove.

A CNC router cutting sequence is determined by the type of machining required. A good starting point for machining is:

- Spindle Speed – 16,000 – 18,000 rpms
- Feed Rate – 200-900 in/min

Where it is desirable for edges to be completely free from cutter marks, a further sanding and scraping operation is necessary. Edges may be further enhanced by buffing with steel wool and applying silicone-free oil. A use of an orbital sander in multi-step

COMPACT™ STRUCTURAL LAMINATES BY FORMICA GROUP

TECHNICAL DATA CONTINUED



finishing sequence like Solid Surface can be achieved

Matte Finish	Satin Finish	Semi-gloss Finish
100μ	100μ	100μ
80μ	80μ	80μ
60μ	60μ	60
		1000 Abralon
1000 Abralon	1000 Abralon	2000 Abralon

Chamfering or profiling the edges of Compact panels will reduce the risk of edge impact damage.

DRILLING

The most suitable drills for use on Compact laminates are those designed for plastic sheet materials. These drills have a point angle of 60° - 80° instead of the normal 120° for drilling metal.

To avoid breakout on the reverse side, the feed speed of the drilling head and the pressure applied should be gradually reduced approaching the point of breakthrough. Working on a firm underlay, such as plywood or chipboard, will also reduce the risk of breakout.

For blind boring into the face, the depth of the hole should be such that at least 1/16 mm of material remains between the bottom of the hole and the other side of the sheet. TCT lip and spur drills will produce clean flat bottomed blind holes, with less risk of point penetration on the reverse side. This will allow maximum depth of material to be used for fixings. Compact sheets less than 3/8in thick are not considered suitable for blind fixing. When drilling parallel to the surface (edge drilling) at least 1/8in of material must remain on either side of the hole. Threaded holes can be produced using engineers screw cutting taps. Self-tapping screws or threaded brass inserts may also be used.

INSTALLATION

In the planning of any installation, it is essential to take into account the dimensional movement that can occur with Compact laminates and allowances must be made in the design, fabrication and installation processes. Movement in the length direction of the sheet is about half of that in the width direction.

Typical dimensional movement values resulting from extreme change in relative humidity are as follows:

Transverse direction of the sheet: 0.3in per 10ft

Longitudinal direction of the sheet: 0.1in per 10ft

Compact panels used for wall cladding may be fixed by screwing directly through the face, or by hanging on a rigid supporting timber or metal framework with 'Z' clips. Thinner grades, 1/4in or less, may be bonded to a wood-based framework with heavy duty building adhesives. Scuffing the back of the Compact panel with 220 grit sand paper is advised. The chosen method of attachment will depend on the installation, board thickness

and visual design criteria. In all applications the panels must be fixed to a rigid, secure system of horizontal supports at not more than 2ft centers, with vertical support members at the joints appropriate to the detailing. Fixing clips should also be at maximum 2ft centers. It is recommended that panels of less than full board width are used, both for ease of handling and reducing dimensional movement.

Compact panels should not be fixed to freshly constructed block work (CMU) or brickwork until adequate drying has taken place, nor should they be fixed to damp external walls without the protection of a damp-proof membrane.

NOTE: When cladding outside walls Formica recommends metal furring strips or channel. Do not use particleboard or MDF as lacks structural integrity.

Adequate ventilation/air circulation must be provided behind the panels either by notching the support members or packing them off the wall. Typical minimum ventilation access at the top and bottom of the panels should be 3in²/10ft² of panel area.

DIRECT FACEFIXING

Thru fixing holes should be at least 1.5 times the outside diameter of the screw being used and should be a minimum of 3/4in from the edge of the panel. Soft plastic bushes should be used to ensure correct centering of the screw in the hole, thus still allowing for movement. Countersunk screws should not be used.

ATTACHING FIXING DEVICES

'Z' clips and other secret fixing devices may be attached to the back of panels with 'Taptite' self-tapping screws or threaded brass expansion inserts. Screws and bolts with slow threads provide better resistance to working loose than those with fast threads. In all cases a blind pilot hole of the correct size must first be bored in the back of the panel. The depth of the hole should be at least 1/32in greater than the penetrating depth of the screw, and should leave at least 1/4in of material between the bottom of the hole and the face of the panel.

Rigid items, such as 'Z' clips and fixing angles, fixed to Compact panels, should have oversize holes to accommodate differential movement. A slip foil between the two components is also recommended. Expansion fasteners should not be used in edge-drilled holes (i.e. parallel to the surface).

EDGE TO EDGE JOINTING

Edge-to-edge joints may be either tongued and grooved, or simply grooved and a loose spline inserted. Whichever method is chosen, the wall thickness of the groove should be greater than the width of the groove. The depth of the groove should be no greater than the thickness of the board and the length of the tongue/spline should be such as to accommodate the maximum

COMPACT™ STRUCTURAL LAMINATES BY FORMICA GROUP

TECHNICAL DATA CONTINUED



anticipated movement. Compact laminates less than 3/8 in thick are not suitable for edge grooving.

EDGE RETAINING PROFILES

Edge retaining profiles of steel or aluminum should be used in situations where some movement of adjoining panels is anticipated, such as in vehicle construction.

ATTACHING LAMINATE TO COMPACT

Solvent-based contact adhesive can be used to bond laminate sheets to Compact sheets. Do not use water-based contacts for this application. Scuff up surface of Compact with 220 grit sandpaper.

THERMOFORMING

Compact S2 at 1/8in thickness can be thermoformed. Product is heated to 325°F using a convection or radiant oven. Depending on oven type, trials needs to be preformed to determine time to heat the sheet thru its core. Temperatures in excess of 375°F may cause blistering. After heating, clamp the mold and let cool to room temperature. Sheets will form to a 6in mold radius but there will be some spring back to a larger radius after cooling depending on sheet size and grain direction.

WET WALL APPLICATIONS

Compact laminates are well suited to wet area applications such as shower cubicles, swimming pool lockers, etc. providing certain safeguards are observed. Formica® Compact Grade Laminate will withstand frequent wetting with hot or cold water and/or prolonged exposure to high humidity, but is not recommended for applications involving long term total immersion. Only standard grade Compact laminates (CGS) should be used in wet areas, as the hygroscopic nature of flame-retardant additives may give rise to surface blisters on Flame Retardant Compact laminates (CGF) if subjected to prolonged exposure to wet conditions.

In common with all high-pressure decorative laminates Compact laminates undergo a certain amount of dimensional movement when subjected to changes in humidity. In order to minimize the risk of bow occurring as a result of this movement, the following points should be observed:

1.) In new buildings, or where excessive moisture conditions are present, it is recommended that, prior to fixing compact laminates, a process of pre-conditioning be carried out to ensure the sheets reach an equilibrium within the site conditions.

This can usually be achieved by laying the compact sheets on a pallet, neatly and flat, face to face and back to back, using carefully aligned spacer sticks (1in by 1in) between the sheets at 12 ft centers across the full area of the wallboards, in the area where they are to be used, (or in another area having identical conditions), for 7 to 10 days prior to installation.

2.) Panels should be cut with the long edge parallel to the length

of the sheet. Dimensional movement across the width of the sheet is twice as great as it is along the length, so cutting panels with the long dimension running across the width of the sheet will greatly increase the risk of bowing.

3.) As far as possible, the ambient conditions should be the same on each side of the panel, as it is important that both sides gain or lose moisture at roughly the same rate. Where panels are mounted on a wall or enclose a vanity unit or Integrated Plumbing System (IPS), adequate ventilation must be provided to ensure that temperature and humidity conditions at the backs of the panels are essentially the same as those at the front.

4.) Fixing centers should be sufficiently close to prevent excessive freedom of movement. Shower cubicle doors greater than 60in high should have three hinges.

LIMITATIONS

Compact sheets are suitable for interior horizontal or vertical surfaces. Compact sheets, 1/4" (6.4mm) or less, are not recommended for adherence directly to plaster, gypsum board, or concrete. They can be attached to particleboard, MDF or hardwood faced particleboard. Compact greater than 1/4in should be attached using mechanical fixing systems (see above). Do not use in areas exposed to temperature exceeding 275°F (135°C). Compact sheets are not recommended for exterior applications.

COMPACT™ STRUCTURAL LAMINATES BY FORMICA GROUP

TECHNICAL DATA CONTINUED



TECHNICAL DATA

Performance compliance of Compact by Formica Group:

ANSI/NEMA STANDARDS PUBLICATION - LD3-2005

PHYSICAL PROPERTIES	LD3 TEST	COMPACT
Appearance	3.1	No ABC Defects
Light Resistance	3.3	Slight Effect
Cleanability	3.4	20 (maximum)
Stain Resistance	3.4	
Reagents 1 – 10		No Effect
Reagents 11 – 15		Moderate Effect
Boiling Water Resistance	3.5	Slight Effect
High Temperature Resistance	3.6	Slight Effect
Ball Impact Resistance (in.)	3.8	
– in		75 (minimum)
– mm		1905 (minimum)
Radiant Heat Resistance (sec.)	3.10	250 (minimum)
Dimensional Change	3.11	
Machine Direction – %		0.20 (maximum)
Cross Direction – %		0.50 (maximum)
Wear Resistance – cycles	3.13	400 (minimum)

ASTM MECHANICAL PERFORMANCE PROPERTIES

MECHANICAL PROPERTIES*	ASTM TEST	COMPACT
Flexural Strength	D790-84a	
Ultimate		2.12 x 10 ⁴ psi
Modulus		1.91 x 10 ⁶ psi
Tensile Strength	D638-84	
Ultimate		1.97 x 10 ⁴ psi
Modulus		2.07 x 10 ⁶ psi
Bond Strength	D952-8	1.460 x 10 ⁴ psi
Bearing Strength	D953-84a	1.650 x 10 ⁴ psi

STANDARD COMPACT FIRE TEST DATA – ASTM E-84

GRADE/FORMICA® BRAND PRODUCTS (FACED MATERIAL)	ADHESIVE	FLAME	SMOKE	CLASS
S6/Compact (1/2" Thick Phenolic)	Unbonded	30	110	B
S7/Compact (3/4" Thick Phenolic)	Unbonded	30	110	B

FIRE- RATED COMPACT FIRE TEST DATA – ASTM E-84 UL CLASSIFIED BUILDING PRODUCTS – FILE R22111

TESTED IN ACCORDANCE WITH UL723/ASTM E-84

THICKNESS	FLAME	SMOKE	CLASS
1/4" to 1" (6.35mm to 25.4mm)	10	165	A

SIZES

Standard Compact

Sheet Sizes: 48" (121.9cm) x 96" (243.8cm)
60" (152.4cm) x 96" (243.8cm)
60" (152.4cm) x 120" (403.8cm)
60" (152.4cm) x 144" (365.8cm)

Fire-Rated Compact

Sheet Widths: 48" (121.9cm), 60" (152.4cm)
Sheet Lengths: 96" (243.8cm), 120" (403.8 cm),
144" (365.8cm)

TYPICAL THICKNESSES

S2	0.125" (3.18mm)
P7/FM	0.250" (6.4mm)
P9/FL	0.313" (7.9mm)
S8/FK	0.375" (9.5mm)
S6/F1	0.500" (12.7mm)
P8	0.625" (15.9mm)
S7/F5	0.750" (19.0mm)
R3/F8	1.000" (25.4mm)

WEIGHT

Compact sheet weighs approximately 90 lbs/ft³ (1442 kg/m³).

COLORS, PATTERNS, AND FINISH

Compact sheets are available in a broad selection of designs and colors in matte and crystal finish as factory orders.

Compact samples are available from Formica Corporation specification representatives or directly from Formica Corporation. Call 1-800-FORMICA™ for ZIP-CHIP™ service.

HOW TO SPECIFY

Panels shall be Compact™ by Formica Group, Cincinnati, Ohio.

COLOR NUMBER

COLOR NAME

THICKNESS

FINISH

USE AND CARE

Compact sheets may be cleaned with a damp cloth and mild detergent. Use of abrasive cleaners, powders, scouring pads, steel wool, or sandpaper can damage the finish of the decorative surface. Acid- or alkaline-based cleaners and/or compounds will mar, etch, corrode, and permanently discolor the melamine decorative surface of Compact sheets. Do not use these materials on Compact surfaces, nor allow bottles and/or rags contaminated with acid- or alkaline-based cleaners/compounds to contact the surface. Accidental spills or splatters from these harsh materials should be wiped off immediately, and the area cleaned with a damp cloth.

**EXAMPLES OF THESE MATERIALS ARE:**

drain cleaners	rust removers
coffeepot cleaners	metal cleaners
ceramic cooktop cleaners	tub and tile cleaners
chlorine bleach	oven cleaners
some countertop cleaners	bowl cleaners
some disinfectants	

If in doubt about the suitability of a particular cleaner or detergent, check with its manufacturer (refer to Formica® Brand Laminate Use and Care Guide – Form no. YLT 02358W for specifics).

LIMITED WARRANTY

Formica Corporation expressly warrants that, for a period of one (1) year from the date of first sale, these products will be reasonably free of defects in materials and workmanship, and that when properly handled and fabricated, will conform, within accepted tolerance, to applicable manufacturing specifications. Colors subject to dye lot variations. This limited warranty only applies to Formica® Brand Laminate which is stored, handled, fabricated and installed in the manner recommended by Formica Corporation. Due to the variety of uses and applications to which Formica Brand Laminate may be put, FORMICA CORPORATION CAN MAKE NO WARRANTY THAT THIS PRODUCT IS SUITABLE FOR ANY PARTICULAR PURPOSE AND CAN MAKE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, OTHER THAN THOSE SET FORTH ABOVE.

DISCLAIMER OF WARRANTIES

THE WARRANTIES SET FORTH HEREIN OR IN FORMICA CORPORATION'S WARRANTY DOCUMENTS WITH RESPECT TO A PRODUCT ARE THE ONLY WARRANTIES MADE BY FORMICA CORPORATION IN CONNECTION WITH THESE PRODUCTS, AND ARE EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. PRODUCTS SOLD BY FORMICA CORPORATION ARE SOLD ONLY TO THE SPECIFICATIONS SPECIFICALLY SET FORTH BY FORMICA CORPORATION IN WRITING. FORMICA CORPORATION'S SOLE OBLIGATION FOR A REMEDY TO BUYER SHALL BE REPAIR OR REPLACEMENT OF NON-CONFORMING PRODUCTS, OR AT THE OPTION OF FORMICA CORPORATION, RETURN OF THE PRODUCT AND REFUND OF THE PURCHASE PRICE. BUYER ASSUMES ALL RISK WHATSOEVER AS TO THE RESULT OF THE USE OF THE PRODUCTS PURCHASED, WHETHER USED SINGLY OR IN COMBINATION WITH OTHER SUBSTANCES.

LIMITATION OF LIABILITY

No claim by buyer of any kind, including claims for indemnification, whether as to quality or amount of products delivered or for non-delivery of products, shall be greater in amount than the purchase price of the products in respect of which damages are claimed.

IN NO EVENT SHALL FORMICA CORPORATION BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL, RELIANCE, EXEMPLARY, OR CONSEQUENTIAL DAMAGES OR COVER, OR LOSS OF PROFIT, REVENUE OR USE, IN CONNECTION WITH, ARISING OUT OF, OR AS

A RESULT OF, THE SALE, DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS SOLD HEREUNDER, OR FOR ANY LIABILITY OF BUYER TO ANY THIRD PARTY WITH RESPECT THERETO. BUYER SHALL INSPECT FOR NONCONFORMITY PROMPTLY UPON RECEIPT.

Failure by buyer to give Formica Corporation written notice of claim within 30 days from date of delivery or, in the case of non-delivery from the date fixed for delivery, shall constitute a waiver by buyer of all claims in respect of such products.

MANUFACTURER

Formica Corporation 10155 Reading Road
Cincinnati, Ohio 45241-5279

TECHNICAL SERVICES

Technical assistance may be obtained through your local Formica® Brand Products Distributor or from Formica Corporation trained representatives in sales offices throughout the country. To assist these representatives, Formica Corporation maintains a sales technical services staff in Cincinnati, Ohio. For technical assistance, contact your distributor or sales representative; write the company directly at Formica Corporation Technical Services Department, 10155 Reading Road, Cincinnati, OH, 45241; call (513) 786-3578 or 1-800-FORMICA™ (option 2); or fax (513) 786-3195. In Canada, call 1-800-363-9280. In Mexico, call (525) 530-3135.

Formica is a sublicensed trademark to Formica Corporation. Formica and the Formica Anvil logo are registered trademarks of The Diller Corporation. 1-800-FORMICA, Zip-Chip and Compact are trademarks of The Diller Corporation, a subsidiary of Formica Corporation. The products and manufacturing processes of Formica Corporation are protected under U.S. and foreign patents.

All ® brands are registered trademarks of the respective owners. All ™ brands are trademarks of the respective owners.

For warranty information, please visit www.formica.com or call 1-800-FORMICA™.

GreenGuard Environmental Institute
Formica® high-pressure laminate (HPL) is GreenGuard Indoor Air Quality Certified under the GreenGuard Standard for Low-Emitting Products

©2015 Formica Corporation Cincinnati, Ohio 45241

Printed in the USA

