Caruso Acoustics by

FALCON™

ACOUSTIC SOLUTIONS
## TECHNICAL INFORMATION

CLASSROOM: PRACTICAL EXAMPLE

Consider that the room is characterized by the following materials: plastered walls
and ceiling, parquet floor. When the classroom is occupied, the Tr estimated between
250-2000 Hz will be about 1,73 s, too high for teaching. By placing
Silente M sound-absobing panels properly we will get excellent results.
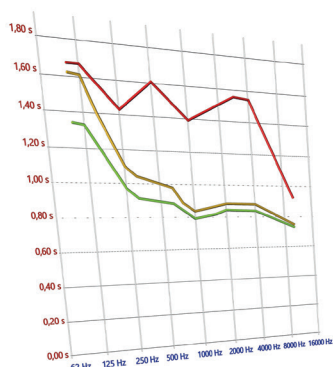
Volume 409 m³ = without absobing panels = Reverberation Time 1,73 s - Average 250-2000 Hz Bad

Unoccupied: Wall Panels + Ceiling Panels = Reverberation Time 0,63 s - Average 250-2000 Hz

Occupied: Wall Panels + Ceiling Panels = Reverberation Time 0,55 s - Average 250-2000 Hz - STI 0,74-0,77 - AlCons 3-4 % > Excellent
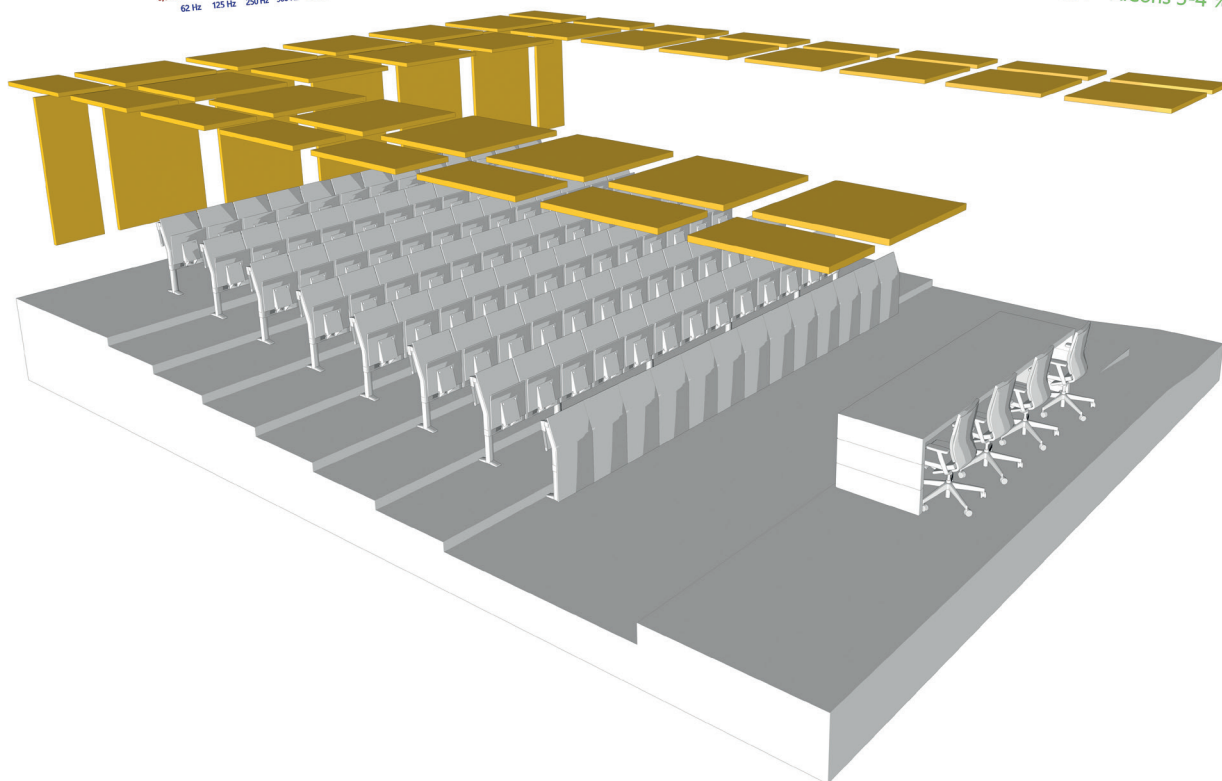
The panels are positioned on the ceiling with U-shaped arrangement and with the base facing to the bottom wall. Other panels are positioned on the bottom wall.

The RT (reverberation time) is the first factor to be examined to improve speech intelligibility, but on its own it is not enough to ensure the best results. Different factors which affect perfect speech intelligibility must be taken into account, such as the STI (Speech Transmission Index) and the %ALCONS.

STI measures intelligibility on a scale between 0 (completely incomprehensible) and 1 (perfect intelligibility)

ALCONS expresses the loss of articulation of consonants, with lower values being associated with greater intelligibility. For learning environments the value must be at least 5% or lower.

STI	0 - 0.3	0.3 - 0.45	0.45 - 0.6	0.6 - 0.75	0.75 - 1.0
	unacceptable	poor	fair	good	excellent
ALCONS	100 - 33%	33 - 15%	15 - 7%	7 - 3%	3 - 0%

C50 expresses the clarity of speech (used in particular in Germany) and indicates the sound energy relationship over the first and subsequent 50 ms.

By comparing the data from before and after the acoustic improvements in an empty room, we can see a considerable improvement in the reverberation time. While in an occupied room the average RT will change from 500-1000 Hz at 0.59 s to a value of 0.51 s.

Consequently, we also achieve a considerable improvement in the parameters that define speech intelligibility, such as the STI and the ALCONS.

CLASSROOM: PRACTICAL EXAMPLE

The STI changes from a value of 0.53-0.55, which represents normal conditions, to a value of 0.74-0.77, which can be considered excellent.

We can also see an improvement when we look at the other parameter, the %ALCONS, *with nearly excellent values at 3-4%.

The square area of the graphs represents the listening area and to the right we find the respective key, while the examined frequency is 1000 Hz and the sound source used is a man's voice without amplification. This arrangement is particularly effective and ensures values close to excellent without any amplification.
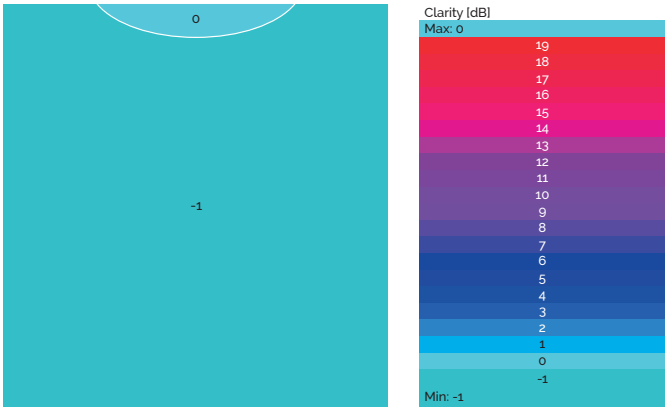
LOSS OF CONSONANTS
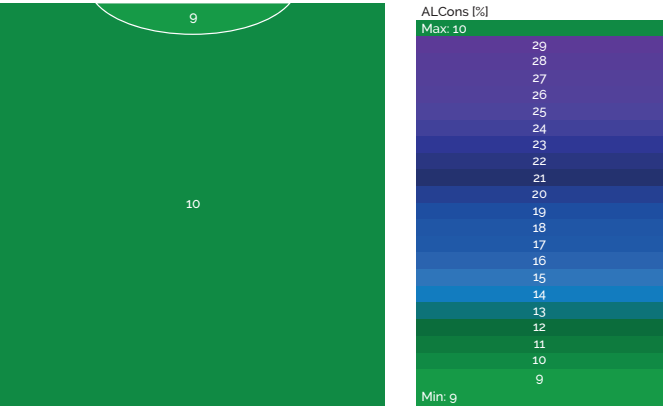
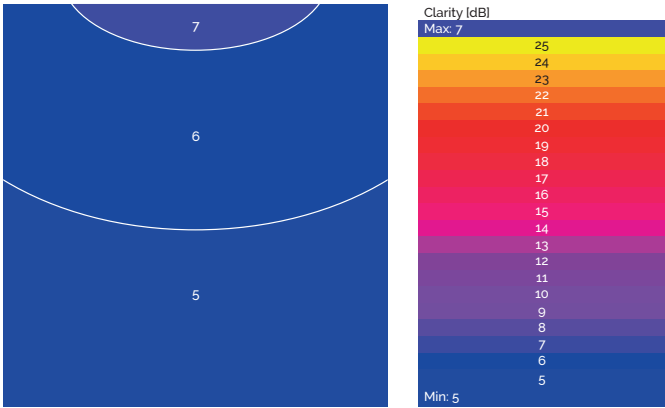ALCONS classroom occupied with people, values without sound-absorbing panels
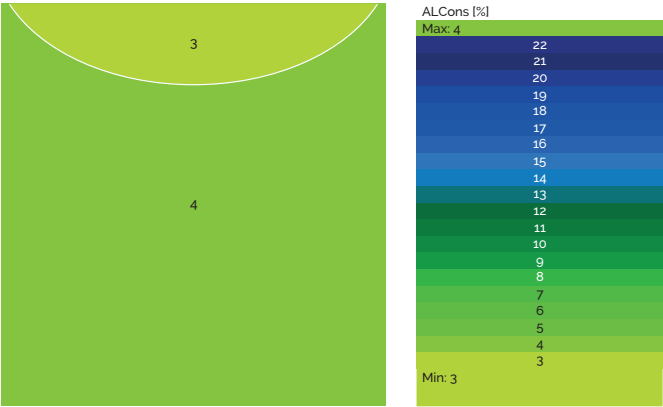
ALCONS classroom occupied with people, values with sound-absorbing panels
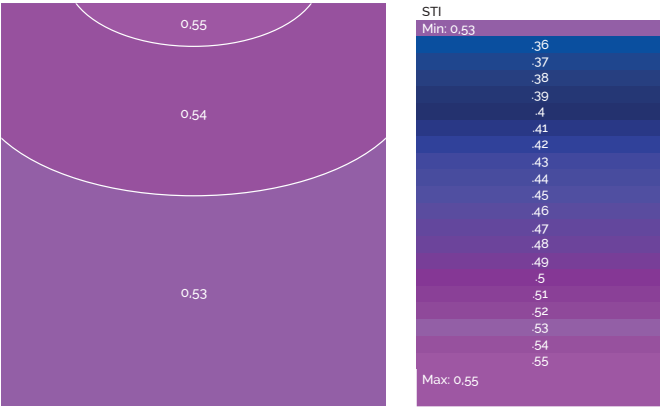
C50 SPEECH INTELLIGIBILITY

Clarity [dB]
Max: 0
19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 -1
Min: -1

C50 classroom occupied with people, values without sound-absorbing panels

Clarity [dB]
Max: 7
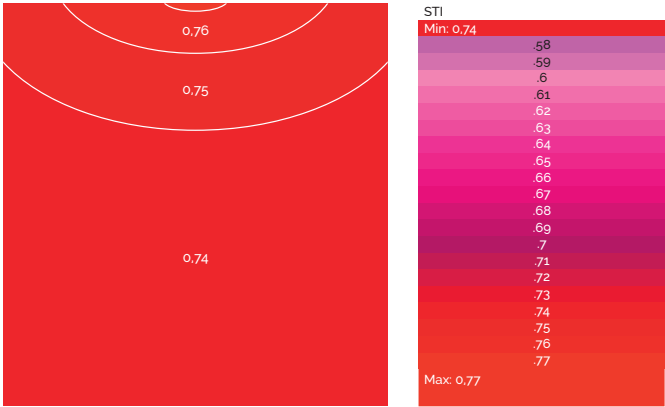25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5
Min: 5

C50 classroom occupied with people, values with sound-absorbing panels

SPEECH TRANSMISSION INDEX: DIFFERENCE BETWEEN DIRECT AND INDIRECT SOUND

STI
Min: 0.53
.36 .37 .38 .39 .4 .41 .42 .43 .44 .45 .46 .47 .48 .49 .5 .51 .52 .53 .54 .55
Max: 0.55

STI classroom occupied with people, values without sound-absorbing panels

STI
Min: 0.74
.58 .59 .6 .61 .62 .63 .64 .65 .66 .67 .68 .69 .7 .71 .72 .73 .74 .75 .76 .77
Max: 0.77

STI classroom occupied with people, values with sound-absorbing panels