UNDERSTANDING ACOUSTICAL PROPERTIES OF CEILINGS

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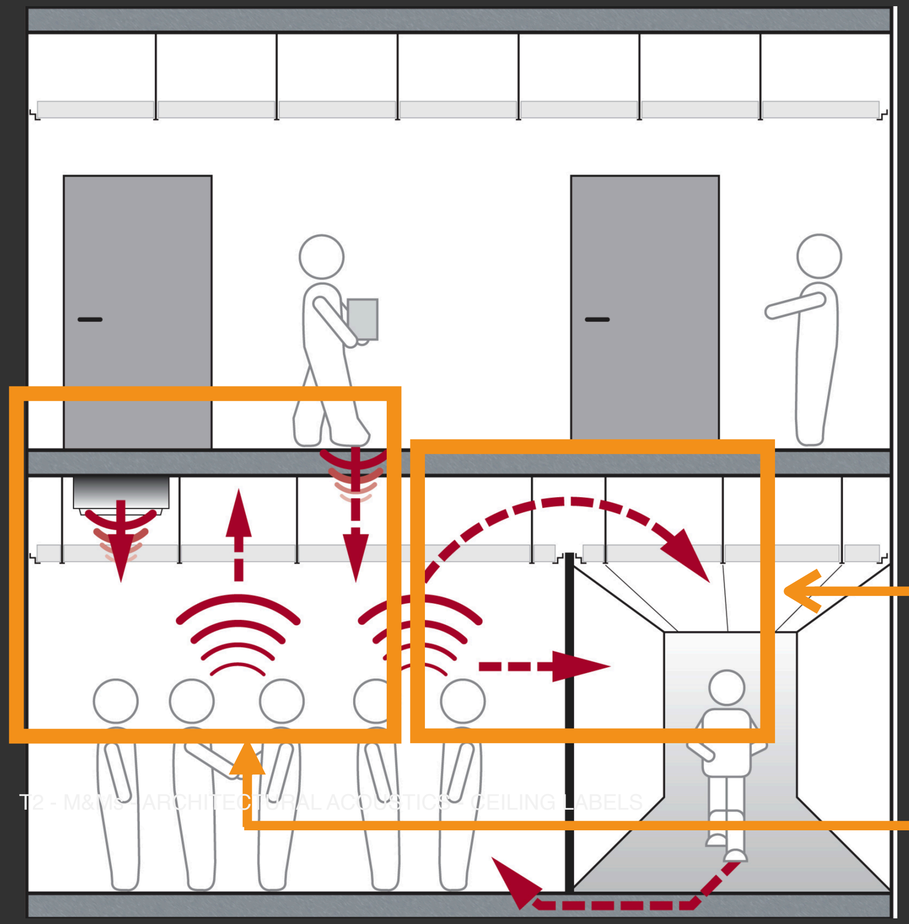
READING PRODUCT LABELS I CEILINGS



Ceilings are typically one of the (if not the) largest surfaces available in interiors for sound control.

- Acoustical performance in ceilings is measured in two ways:
  - CAC - Ceiling Attenuation Class
  - NRC - Noise Reduction Coefficient
- **CAC** measures the capacity of the ceiling to block sound transmission between adjacent closed rooms.
- **NRC** measures the capacity of the ceiling to absorb in the room.

READING LABELS I CEILINGS “CAC”

BLOCKING SPEECH BETWEEN TWO ROOMS

CAC stands for “**Ceiling Attenuation Class**”.

CAC measures the sound passing from one room to an adjacent room across a common plenum.

- CAC values are always tested with two adjacent rooms, both with installed suspended ceilings and closed.
- The more sound the ceiling blocks by absorbing it, the higher the CAC number is.
- For obtaining the CAC value of a ceiling , sound is tested over the **speech frequency range.**
- Speech Privacy is ONLY achieved with a CAC larger than 35 **tested in actual conditions** (in the field). Typical CAC performance recommendations are:
  - Open office: Minimum 25 CAC.
  - Private Offices: Minimum 35 or 40 CAC.

Mineral fiber ceilings have higher CAC values than glass fiber ceilings.

READING LABELS I CEILINGS “NRC”

CONTROLLING SOUND IN A ROOM

NRC stands for “**Noise Reduction Coefficient**”.

NRC measures the capacity of the ceiling (or any material or assembly) to absorb sound. NRC is the percentage of sound which is absorbed, not reflected, by the ceiling. NRC values range from 0 to 1.

- An NRC of 1 means it does not absorb any sound (concrete floors)
- An NRC of 0.25 means that the product absorbs 25% of the sound and reflects 75%.

- The higher the NRC value is, the better is the product at absorbing sound. These are typical recommendations for NRC values for ceilings:
  - Open office: Minimum 0.70 NRC.
  - Private Offices: Minimum 0.65 NRC.
- NRC values are always tested IN ONE room, but the effectiveness of acoustic ceilings depends largely on the size of the space and on the installation of the ceiling.

Glass fiber ceilings have higher NRC values than glass fiber ceilings.

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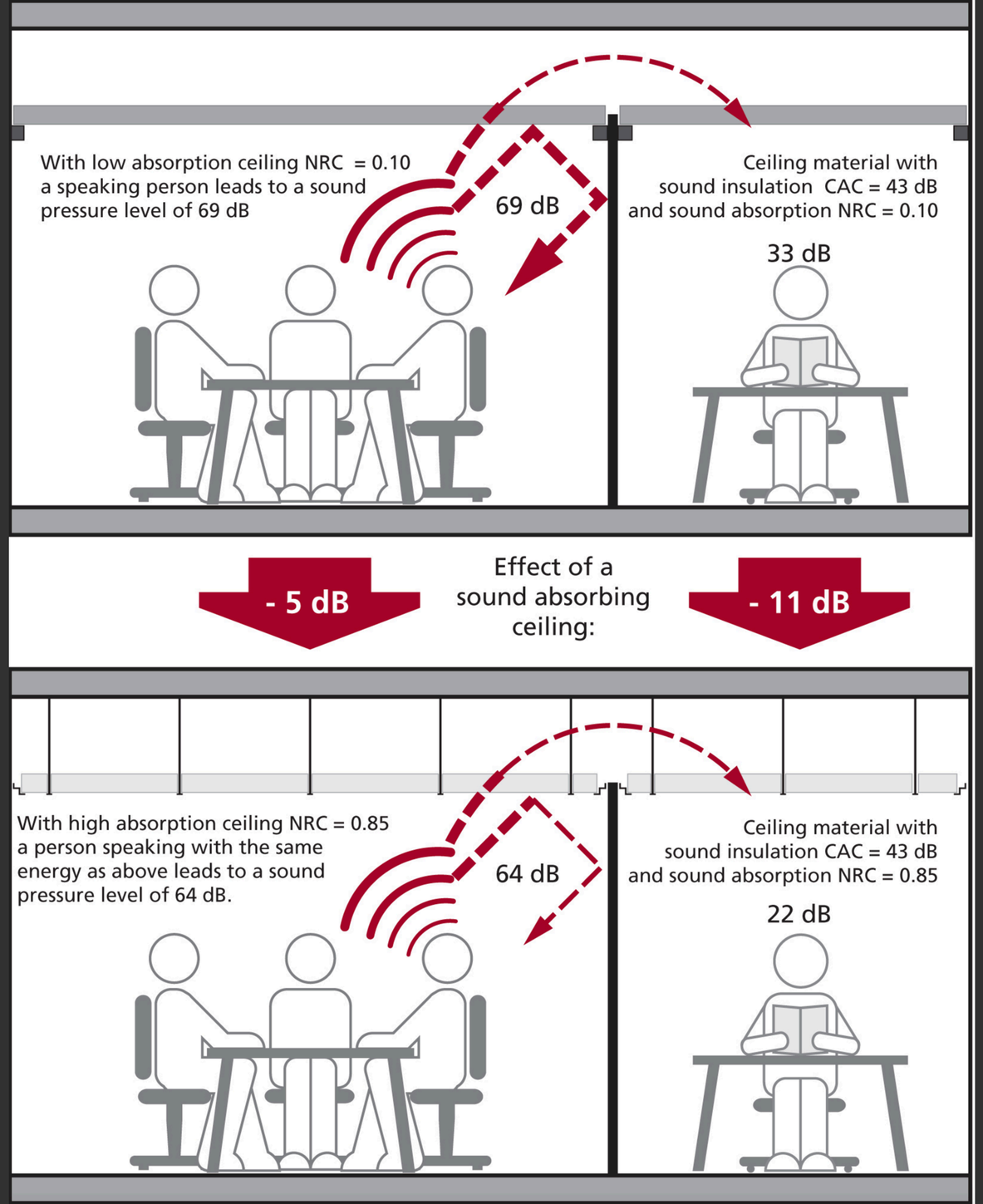
SUMMARY

- CAC is the measure of sound that travels between two rooms.
  - Panels with a high CAC value control better control the sound traveling between rooms.
- NRC is a measure of sound in the room.
  - Panels with a high NRC value control better the sound inside a room.



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SUMMARY

SELECT YOUR CEILING ACCORDING TO THE FUNCTION OF THE ROOM:

- Ceilings for a space where for **privacy** reasons you want to control the sound leaving the room, should have a high CAC value.
- Ceilings for a space where you want to control the sound within the room, should have a high NRC value.
- A room where you want to control both the noise leaving the room or and the noise within the room should have high CA and NRC values.

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Best, Better, Or Good desired acoustical performance by space IS determined by the PROGRAM

BEST TOTAL ACOUSTICS:

NRC 0.80 minimum

CAC 0.35 minimum

BETTER TOTAL ACOUSTICS:

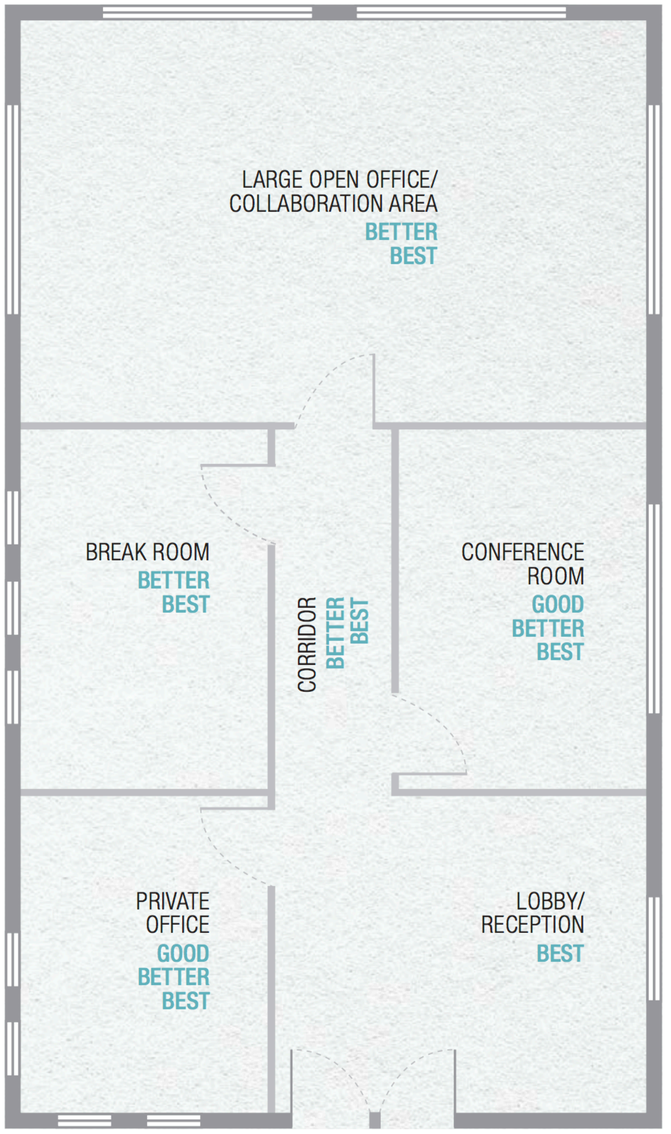
NRC 0.70 to 0.75

CAC 0.35 minimum

GOOD TOTAL ACOUSTICS:

NRC 0.60 to 0.65

CAC 0.35 minimum



BEST
NRC 0.80+ and CAC 35+
High traffic spaces or multipurpose spaces where maximum sound absorption and sound blocking are needed to help keep noise levels down and prevent disruption to adjacent spaces.

BETTER
NRC 0.70-0.75 and CAC 35+
Spaces where strong sound absorption and sound blocking are needed for all-around acoustical performance.

GOOD
NRC 0.60-0.65 and CAC 35+
Spaces where less sound absorption is required but sound blocking is needed to maintain privacy between adjacent areas.

NRC
+CAC
=Total Acoustics™

READING THE LABELS

CEILINGS - Selection by Acoustics

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The RIGHT product can be selected knowing how to read the Manufacturer's Literature

For WoodWorks® and MetalWorks™ Solutions:

Acoustics performance for WoodWorks® and MetalWorks™ ceilings is determined by the product, perforation, and infill panel.

See product data pages for detailed information.

Total Acoustics = NRC 0.80+ and CAC 35+

Total Acoustics = NRC 0.70-0.75 and CAC 35+

Total Acoustics = NRC 0.60-0.65 and CAC 35+

CEILING | SYSTEMS

Between us, ideas become reality™

UL Classified Acoustical Performance Summary

PRODUCT FAMILY	SOUND ABSORPTION CO-EFFICIENTS[A] – E-400 MOUNTING						PUBLISHED VALUE: SOUND ABSORPTION[B]	PUBLISHED VALUE: TRANS-MISSION[C]
	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	NRC[D]	CAC[D]
SOFT FIBER								
Optima® 1.5" w/CAC Backing	0.51	0.85	0.91	1.13	1.09	1.01	1.00	26
Optima 1.5"	0.73	0.95	0.92	1.06	1.03	0.94	1.00	–
Optima 1"	0.76	0.89	0.84	1.02	1.09	0.99	0.95	–
Optima 3/4"	0.81	0.94	0.76	0.93	1.05	1.01	0.90	–
Optima Vector® 7/8" w/CAC Backing	0.42	0.44	0.78	0.94	1.09	1.05	0.80	26
Optima Vector 7/8"	0.72	0.84	0.79	0.99	1.06	1.00	0.90	–
Optima Health Zone™ 1"	0.72	1.00	0.80	1.01	1.06	0.98	0.95	–
Painted Nubby™ 1"	0.76	0.89	0.84	1.02	1.09	0.99	0.95	–
Painted Nubby 3/4"	0.73	0.94	0.70	0.90	0.99	1.01	0.90	–
Pebble™ High-NRC Perforated	0.74	0.78	0.68	0.88	0.78	0.66	0.80	–
Pebble 5/8" Perforated	0.59	0.70	0.56	0.84	0.89	0.71	0.70	–
Pebble Unperforated	0.50	0.31	0.28	0.77	0.66	0.67	0.50	–
Random Fissured™ 5/8" Perforated	0.59	0.70	0.56	0.84	0.89	0.71	0.70	–
Random Fissured Unperforated	0.44	0.35	0.33	0.83	0.84	0.64	0.55	–
Shasta® 5/8" Perforated	0.59	0.70	0.56	0.84	0.89	0.71	0.70	–
Shasta Unperforated	0.50	0.31	0.28	0.77	0.66	0.67	0.50	–
BIOACOUSTIC™								
Tierra™	0.70	0.93	0.66	0.85	0.96	0.96	0.85	–
MINERAL FIBER								
Armatuff®	0.33	0.32	0.69	0.65	0.52	0.36	0.50	33-35
Ceramaguard® Perforated	0.28	0.27	0.43	0.72	0.90	0.86	0.55	38-40
Ceramaguard Unperforated	–	–	–	–	–	–	–	40
Cirrus® 3/4"	0.31	0.35	0.62	0.86	0.94	0.89	0.70	35
Cirrus 3/4" Fire Guard™	0.27	0.25	0.29	0.36	0.46	0.53	0.35	35
Cirrus 7/8"	0.36	0.40	0.66	0.84	0.88	0.91	0.70	38
Cirrus 7/8" High-CAC	0.27	0.37	0.70	0.91	0.94	0.96	0.70	40
Cirrus 7/8" High-NRC	0.33	0.39	0.85	1.00	0.96	0.96	0.75	35
Cirrus 3/4" 1-Up Profiles	0.26	0.36	0.57	0.82	0.89	0.85	0.65	35
Cirrus 3/4" 4-Up Profiles	0.32	0.29	0.55	0.87	0.96	0.91	0.65	35
Cirrus Second Look®	0.23	0.31	0.59	0.83	0.95	0.95	0.65	35
Cirrus Themes™	–	–	–	–	–	–	0.65	35
Clean Room™ FL (field units)	0.28	0.30	0.69	0.94	0.77	0.54	0.55	35
Clean Room FL (border units)	–	–	–	–	–	–	–	35
Clean Room VL Unperforated	–	–	–	–	–	–	–	40
Clean Room VL Perforated	0.22	0.24	0.53	0.90	0.78	0.47	0.55	35
Cortega® 5/8"	0.21	0.26	0.51	0.78	0.75	0.69	0.55	35
Cortega 5/8" Fire Guard	0.22	0.26	0.46	0.78	0.92	0.82	0.55	35
Cortega Second Look	0.20	0.30	0.48	0.72	0.73	0.73	0.55	30-35
Cortega Second Look Fire Guard	0.23	0.31	0.56	0.87	0.85	0.82	0.55	40

THE END THE CEILINGS HAVE LEFT THE BUILDING

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