

# Now Trending in Acoustics

by Gary Madaras, PhD

You've been doing buildings the same way for years with no problems, so why all of sudden are they failing acoustically? The simple answer is that the rules have changed. Acoustic expectations of building occupants have been increasing. As a result, many standards, guidelines and rating systems now have acoustics requirements in them. A broad review of these, both in North America and abroad, results in the following overarching trends.

requirements in the recent past, now have them. For example, LEED® Building Design+Construction version 4 (LEED v4) has sound absorption requirements for reverberation control in building types such as gymnasiums, private offices and courtrooms; while the older version, LEED 2009 New Construction and Major Renovations, did not.

systems are becoming more stringent. Guidelines from the Facility Guidelines Institute (FGI) for the design and construction of health care facilities increased the amount of sound absorption required in corridors in wellness centers, for example, by 33 percent during the 2010 to 2014 revision cycle.

1. More building types – An increasing number of building types that did not have definitive acoustic
2. Greater stringency – Individual acoustic criteria inside the standards, guidelines and rating
3. Room Performance Metrics – It is more common now for acoustic criteria inside standards, guidelines and

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rating systems to be defined in terms of room performance as opposed to product or material performance. For example, the 2013 National Core Criteria for new construction and renovation of Collaborative for High Performance Schools (CHPS) has a prerequisite for maximum reverberation time in core learning spaces as opposed to ceiling or wall noise reduction coefficient (NRC).

Other broad architectural trends have an impact on the acoustic performance, too – perhaps without

you even realizing it. In work environments, for example, larger and larger areas are being designated as collaboration spaces. Private, enclosed offices and even work station dividers in open office areas have essentially disappeared. With them also disappeared the sound absorption benefits provided by any acoustic treatments that might have been mounted on them.

Carpeting has largely disappeared from many spaces as well, partly due to trends in sustainable design and building maintenance/operations. These architectural trends equate to much greater acoustic demands on the ceiling or other overhead absorption systems such as baffles and islands. If the carpeting and acoustic wall panels are removed from a standard size conference room, the NRC of the ceiling must be increased from 0.60 to 0.90 to maintain the same reverberation time.

Along with trends in acoustics and architecture, communication trends also are changing. During your last meeting, how many people were in the room with you versus calling in? A room has to be more acoustically controlled with higher amounts of sound absorption and shorter reverberation times for speech to be intelligible over speaker phones, mobile phones and computers. It's easier to communicate when you're meeting face to face, and therefore the room can be less acoustically controlled. So, as architectural trends are removing floor and wall absorption and communication trends are placing greater demands on the physical environment, it's important to realize that the ceiling that worked fine for most of your career just might not cut it anymore.

Fortunately, most manufacturers of acoustic ceilings, baffles and islands have been adapting with these trends and are able to provide multiple high-performance solutions with NRC 0.90 and above. You won't be restricted to one manufacturer, core material or visual aesthetic.


Before specifying, ordering or installing acoustic ceiling panels,



take a moment to double-check if they are the right ones. Ask yourself how the space will be used. If people will be trying to converse, concentrate, relax or sleep (think health care), and there is not ample carpeting and wall-mounted sound absorption, then a high-performance, sound-absorbing ceiling tile of NRC 0.90 or higher should be used. Contact an appropriate ceiling product manufacturer to discuss the options. We not only can help you meet the occupants' needs, but also can assist you with identifying and understanding the acoustics requirements in the applicable standards, guidelines and rating systems. Together, we can meet the owner's expectations to stay on budget and schedule, while providing an attractive ceiling solution that is easy to maintain for years to come.

#### Key Terms—

**Reverberation time** – The amount of time for a loud sound to decrease 60 dB or become inaudible. Rooms for conversing, concentrating, relaxing and sleeping should have short reverberation times of 0.30 to 0.60 seconds.

**Noise Reduction Coefficient** – An acoustic metric to quantify how much sound is absorbed by an architectural surface like a ceiling. Values range from 0.0 (low absorption) to 1.00 (high absorption). To achieve the short reverberation times in acoustic standards, guidelines and rating systems, use surfaces with high NRC values. 

#### Links to more information—

LEED v4 <http://www.usgbc.org/leed/>

FGI <http://fgiguuidelines.org/>

CHPS <http://www.chps.net>

ROCKFON <http://www.rockfon.com>

#### About the author:

*Gary Madaras, Ph.D., Assoc. AIA, is ROCKFON's acoustics specialist for North America and represents the company as a CISCA member. He also is a full member of the Acoustical Society of America and chairs the society's Healthcare Acoustics Subcommittee; a member of the Institute of Noise Control Engineering; and a member of the Canadian Acoustics Association.*

