

NRC and CAC of acoustical ceilings in healthcare facilities

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Ceilings are typically the only surfaces available for sound absorptive finishes for noise control in healthcare facilities. Regular acoustical ceiling panels, without film facing, are allowed in many healthcare spaces. The two important properties to keep in mind for acoustical ceiling panels are Noise Reduction Coefficient (NRC) and Ceiling Attenuation Class (CAC). NRC is a measure of the sound absorption of the panel, the percentage of sound energy not reflected by the panel, which ranges from 0 to 1.0. CAC is a measure of how well the panel blocks sound transmission; the CAC test actually measures how sound is blocked when traveling from one room, into the ceiling plenum with no wall above the ceiling and into another room with the same type of ceiling. CAC ranges from 0 up to 40-45 for ceiling panels. Even though CAC was developed for this double-pass arrangement, it has become a useful ranking metric for how well ceiling panels block noise transmission from the ceiling plenum.

Glass fiber ceiling panels have high NRC ratings (0.90 or greater) for sound absorption, but low CAC ratings for blocking ceiling plenum noise. These panels are very useful in two types of areas:

- where little or no mechanical system noise sources are in the ceiling plenum, or
- where higher background sound levels are acceptable and speech privacy and/or noise control is important (reception/admitting/waiting areas, cafeterias).

Mineral fiber ceiling panels have high CAC ratings (30 or greater) and are good for blocking noise from ceiling equipment noise, but they have a wide range of possible NRC performance that falls below the NRC performance of glass fiber panels. High-performance mineral fiber ceiling panels can achieve a NRC of 0.70 and a CAC of 30 or greater, and provide good sound absorption at speech frequencies, so they are useful in many areas of hospitals.

Composite ceiling panels consist of two layers: the bottom layer facing the occupied space is glass fiber and the upper layer facing the ceiling plenum is mineral fiber or gypsum board. These composite panels can achieve NRC ratings up to 0.95 and CAC ratings up to 40, and will comply with the high NRC and CAC requirements for NICU ceilings included in the 2010 Guidelines for Design and Construction of Health Care Facilities.

Ben Davenny, LEED AP BD+C, EDAC, is a Senior Consultant at Acentech Incorporated. Ben's acoustics consulting focuses on architectural and environmental acoustics, and HVAC noise and vibration control. He is a LEED Accredited Professional with the Building Design + Construction specialty. He has also earned the Evidence-Based Design Accreditation and Certification (EDAC) credential from the Center for Health Design, demonstrating his commitment to using research evidence to inform the design of healthcare facilities. His recent healthcare projects include New 5-story Addition at Woman & Infants Hospital of Rhode Island; Mugar Patient Addition at Cape Cod Hospital; and MRI Suite at the VA Medical Center in Providence, RI.

Contact Ben at 617-499-8083 or bdavenny@acentech.com