COLBOND

EnkaTech *Note*

Acoustical Benefits of Roof Underlayments

Purposes of Underlayments

Roofing underlayments provide a number of benefits for metal roofing. There are several functions of three dimensional entangled filament underlayments and roof underlayment composites. The main purposes are to provide an open ventilation space to allow incidental moisture to be drained away and also to allow evaporative drying. The 95% open structure of the entangled filaments also facilitates drying of condensed water vapor from the building interior. Colbond underlayments provide each of these primary benefits. A significant secondary benefit of Enkamat 7008/7010 is the reduction of impact noise on metal roof coverings caused by rainfall and hail and a general reduction of airborne noise levels.

Unwanted Sound

Unwanted sound is considered noise. Noise pollution is a disruption of the environment by human created sound. Naturally occurring events when they interact with the built structures can also create noise. The undesirable drumming sound created by the falling of rain and hail, as well as other exterior environmental noise such as airplanes and traffic can be disruptive to building occupants in many types of buildings. Noise that interferes with an activity is an annoyance and especially if building users feel that they have no control over the sound. Exterior noise can inhibit communication, disrupt operations, effect the health and reduce the efficiency of workers. Elevated background noise levels in classrooms has an undeniably negative impact on learning.

Metal Roofing

Strategies to reduce sound levels are important especially in structures with metal roofing. The metal roofing and building industry often make claims that metal roof panels do not elevate the noise level anymore than other types of roofing materials do. However, there have been cases of rain noise in buildings with lightweight metal roof construction which exceed 70 dB - which is equivalent to normal street traffic noise. The roof/ceiling assembly in structures utilizing a metal roof covering can vary considerably and this has an effect on noise transmission levels. The sound transmission from rainfall noise is dependent on several factors. The first factor is the method of construction. A metal roof over open framing will be louder than a roof installed over continuous sheathing board. A metal roof over a concrete substrate will be quieter. The noise of rain striking a metal roof is much greater than that of a slate or tile roof.

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Building Codes & Guidelines

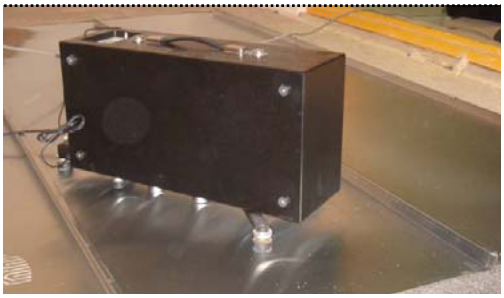
Not many building codes currently require sound control under metal roofs. Design guidelines from some organizations recommend noise isolation for certain building types. One example would be this guideline for churches:

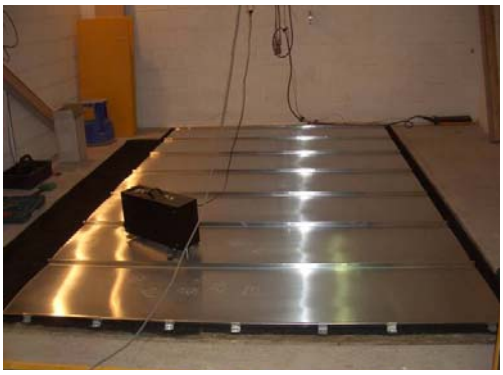
> *"The building envelope should also isolate noise from highways and busy streets, aircraft overflights, emergency services, rainfall on light-weight roofs, barking dogs, etc."*
> Acoustical Guidelines for Orthodox Churches

American National Standards Institute (ANSI) and the Acoustical Society of America (ASA) have worked together to adopt a new voluntary standard for classroom acoustics. This new standard ANSI/ASA S12.60, *Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools*—was approved in 2002. Individual states or school systems can specify compliance with these standards. The maximum sound level inside the classroom is set at 35dB. In order to meet this, care must be taken to design roof assemblies that can reduce sound levels from environmental noise. Selecting materials that work together to reduce both impact and airborne sound levels is necessary to achieve outdoor to indoor noise reduction. Traffic noise from vehicles on roadways, airplanes and railways, as well as roof top mechanical equipment and noise from falling precipitation must all be taken into account.

Colbond Testing

Colbond conducted a series of acoustical tests in Europe on several different types of metal roofs. Roofs tested included zinc, copper, stainless steel, and aluminum. Roofs were also tested with different underlayments. There was not a standardized European rain test for the measurement of sound attenuation so an accepted hammer apparatus was used. This device is commonly used to create impact noise for floor assembly sound testing. The tests were done by WTCB Laboratory in Belgium, part of the Belgian Building Research Institute. The results are that the Enkamat underlayment and composites made with Enkamat reduce sound levels from 9.5 to 13.5 decibels compared to a metal roof directly over a weather barrier fabric. When the entangled filament underlayments were combined with a gypsum ceiling and thermal insulation the sound reduction further increased to 21.5 decibels. When considering that a sound reduction of 10 decibels is perceived by the human ear as cutting noise levels in half, a reduction of over 20 decibels is significant.





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