

Acustadek®

Acustadek provides the extraordinary beauty of exposed steel while providing the same noise reduction performance of common Mineral Fiber, Fiberglass, and Bio Acoustic ceiling tile systems. It is an excellent option for reducing noise inside buildings, increasing the comfort for the occupants. Acustadek is a dual-purpose panel that helps lower costs by providing an interior finish while contributing to the structural performance of the building. This is accomplished by perforating the structural steel decks and adding fiberglass batt acoustic media in the webs or in the cells of cellular deck, turning the profile into Acustadek.

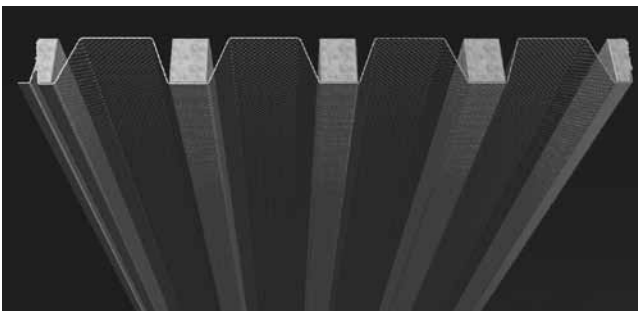
Web-Perforated Acustadek

Web-perforated Acustadek has 0.127" diameter holes spaced 0.375" on center in the webs of the flutes of the deck. Fiberglass batts supplied by ASC Steel Deck are field installed in the low flutes of the deck before the roof system is applied. Web-perforated roof decks are a component of many common roof systems. Ridged insulation boards, engineered wood panels (Plywood and OSB), fiber reinforced gypsum board and glass matt covered gypsum board are all suitable cover boards for web-perforated steel decks.



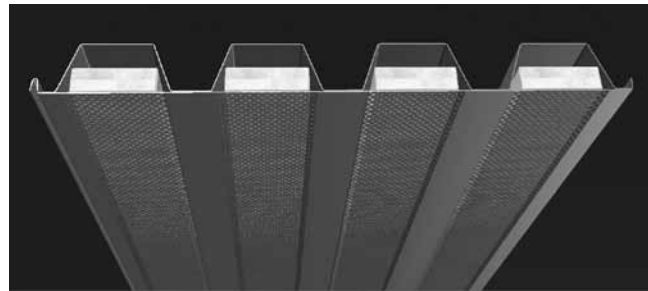
Total Perforation Acustadek

Total perforation Acustadek has 0.127" diameter holes spaced 0.375" on center over the entire width of the profile except the lower interlock flutes. Fiberglass batts supplied by ASC Steel Deck are field installed by the roofing contractor in the low flutes of the deck before the roof system is applied. Total-perforated roof decks are a component of many common roof systems. Ridged insulation boards, engineered wood panels (Plywood and OSB), fiber reinforced gypsum board and glass matt covered gypsum board are all suitable cover boards for total-perforated steel decks.



Cellular Acustadek

Cellular Acustadek has 0.157" diameter holes spaced 0.433" inches on center in the sections of the pan below the top flutes of the steel deck. Fiberglass batts are factory inserted in the cells of the deck before shipping to the project locations. Any roof system utilizing structural or insulating concrete fill, rigid insulation board, or other roof substrate material suitable for installation on a steel roof deck may be applied to the cellular Acustadek.



Fiberglass Batts

Fiberglass batts are used to absorb sound in the Acustadek assemblies. ASC Steel Deck supplies the fiberglass batts that are cut to size for the specified profile. The standard batts are unfaced. Optional batts encapsulated with 0.75 mil clear pvc plastic can be specified.

Acoustical Performance

All Acustadeks have been tested for the sound absorption characteristics of the assemblies. This is commonly presented as a Noise Reduction Coefficient (NRC). The NRC is the average of the 250, 500, 1000, and 2000 hertz sound absorption coefficients. Acustadeks have between a 0.6 and 1.0 NRC.

Acustadek should be a portion of a holistic approach to reducing the noise level in a building. Simply specifying an NRC rating for a single material may not get the level of sound control you require. In general, steel decks tend to have better sound absorption coefficients in the higher audible range. Other materials such as fabric wall treatments and carpet tend to have better sound absorption coefficients in the lower audible frequency ranges. The use of Acustadek in combination with other materials may create the best overall quiet environment. An experienced acoustic designer is key to developing the best overall performance using ASC Steel Deck Acustadek products.

The sound absorption coefficient varies across the spectrum of audible sound. In buildings with equipment that creates a specific frequency, the sound absorption coefficient for that frequency range should determine the type of deck rather than the overall NRC rating. For example, if a machine emits a sound in the 2000 Hz range, a total perforation deck such as DGB-36AT with an absorption coefficient of 0.95 would be a better choice than a web-perforated Acustadek such

as DGB-36AW which only has a 0.53 coefficient for the 2000 Hz range. Some sound absorption coefficients may be greater than 1.0 because of the measurement methods. When designing for a specific frequency, use 1.0 for any absorption coefficients greater than 1.0.

The type of cover board on non-cellular Acustadek has an impact on the sound absorption coefficients and NRC rating of the assembly. The acoustical testing is based on an assembly comprising the Acustadek profile, the fiberglass batts and the cover board on top of the steel deck that supports the roof system. Historically fiberglass board was used as the cover board on top of the steel deck. These assemblies have higher acoustical performance than modern assemblies using poly-iso insulation board on top of the deck. The Acustadek tables in this section provide information for both fiberglass and poly-iso deck cover board assemblies.

The NRC should not be confused with the Sound Transmission Coefficient (STC). STCs measure the blocking of sound through an assembly as it relates to the decibel drop in the intensity of the sound. Acustadek may not be a good choice if a high STC is required. As an example, consider a room with noisy equipment. The Acustadek may be a good solution to reduce the noise level in the room for the occupants, but may not be a good material to block the noise from escaping the room. The holes in the perforated Acustadek may in fact let more sound escape the room than a conventional deck.

Detailing and Installation of Acustadek

Acustadek provides an exposed finish in the building. Steel deck is a structural element in the building and is subject to incidental dents in the handling and steel erection process. To minimize the potential damage, use 20 gage or heavier deck. 22 gage may be an economical option when minor dents can be tolerated; dark paint finishes or high roof structures can mask these types of minor blemishes.

Acustadek can be specified with a galvanized finish or factory prime painted over galvanized steel. Most Acustadeks will receive finish paint to meet the aesthetic requirements of the building. The galvanized steel can be field painted following the paint manufacturer’s preparation and application recommendations. As an option, factory-applied primer can be specified, which may reduce the surface preparation of the deck.

Attaching the Acustadek to the structure and connection of the side laps of the deck can impact the appearance of the installed product. Side lap top seam welds will leave burn marks in the galvanized finish and an occasional burn through should be expected. This may be unsightly if the galvanized finish is intended to be left exposed. The burns can be easily cleaned up prior to prime painting the deck after installation. A better solution is to use the DeltaGrip® side lap connection. This mechanical interlock connection provides high strength similar to a weld without any

thermal damage to the deck or galvanized coating, and is not visible from the underside of the deck. Arc spot and arc seam welds may also leave visible burn marks on the deck near the support or on the underside of the supporting steel. A good alternative to welding the deck to supports is to attach the deck with self-drilling screws or power-actuated fasteners (PAF), such as the high shear nails manufactured by Hilti, Inc. or fasteners manufactured by Pneutek Inc. that are intended for decking applications.

Structural Performance of Acustadek

The perforation of the webs, top and bottom flutes and pans of the Acustadeks has a small impact on the structural performance of the deck profiles. Section properties are reduced from the non-Acustadek version of the profiles leading reduced vertical load capacity. The reactions at supports are unaffected by the perforation in the Acustadek. The diaphragm shear and flexibility of cellular and web-perforated Acustadek is the same as the non-Acustadek version of the profile. Total perforation Acustadek flexibility is the same as the nonacoustical version of the profile but the diaphragm shear capacity is 85% of the non-Acustadek profile.

Acustadek Structural Properties Summary

Section Properties	Use Acustadek section properties
Reactions at Supports (based on Web Crippling)	Use non Acustadek reactions for the profile
Diaphragm Shear	Web perforated and cellular pan perforated use shear for non-Acustadek profile Total perforated Acustadek use 85% of the diaphragm shear for the profile
Diaphragm Flexibility	Use diaphragm flexibility of the non-perforated profile