



To help create a panoramic view of the airfield in the centrally located portal area, the metal plank ceiling system at Tulsa International Airport dramatically lifts up as it approaches the glass wall.



»Next time you're in an airport, take a look up. Not necessarily at the sky or planes but at the ceiling above your head. Today, more than ever, chances are it's a metal ceiling.

Long popular in European commercial applications, metal ceilings now are taking off in the United States, as well. Why? Because of their unique combination of aesthetics, acoustics, durability and functionality.

Most metal ceiling systems are manufactured from electrogalvanized steel though aluminum also is available. They usually are white, silver gray or gun metal gray with custom colors offered. Shapes include panels, planks, vaults and curved systems. The curves either can be concave, convex or serpentine.

Metal ceilings also are offered in a wide variety of finishes that coordinate with other interior metal finishes while imparting a very high-tech look to a space. The sophisticated look of metal ceilings make them ideal for use in high-visibility areas, such as transportation terminals, as well as lobbies; entryways; corridors; conference rooms; theaters; and a wide variety of corporate, retail and hospitality environments.

Long service life is another reason for metal's popularity. A metal ceiling panel generally will outlast a traditional mineral fiber panel, especially in areas where access to the plenum is frequent. Metal ceilings often feature a factory-applied powder finish, as well, for added durability.

#### Attributes

Although they are made of steel or aluminum, metal ceilings can provide acoustical control. To achieve the acoustic benefits, however, the panels must be perforated. Perforated panels usually



m-) long concourses that accommodate 16 gates and passenger-holding areas positioned alongside it. The original ceilings were low in height and light levels.

To obtain the desired look and feel of the remodeled terminal, the design team removed the original ceiling and replaced it with a MetalWorks Vector™ ceiling from Armstrong Ceilings, Lancaster, Pa. Made from electrogalvanized steel, the metal ceiling panels chosen for the concourse are 2 by 2 feet (0.6 by 0.6 m) in size and gun metal gray in color. The panels feature a unique, patented edge detail that produces a sleek 1/4-inch (6-mm) reveal and minimizes the visible grid, creating a ceiling that is much more monolithic in appearance than ordinary suspended ceilings. Vector panels also feature downward accessibility, which reduces the risk of damage to the panel caused by hangar wires and other obstructions in the plenum.

“We wanted the grid visual to be as thin as possible,” Denny explains. “Even though Vector panels are installed in a standard 15/16-inch [24-mm] grid system, the portion of the grid that is

visible appears to be as thin as a sheet of paper.”

The architect explains one reason metal was chosen as the ceiling material was because “it fits in so well with the whole aesthetic of an airport. The look of metal is everywhere, from the planes at the gates to the exterior cladding.”

Instead of installing the ceiling as one, long, continuous plane, the design team created a series of 16- by 16-foot (4.8- by 4.8-m) “floating clouds.” At each building column, for example, there is a 2 1/2-foot (0.8-m) gap. According to Denny, the gap not only provides space for lighting fixtures and sprinkler heads but also helps break up the expansive length of the ceiling. There also is a gap between the ceiling and walls.

And because MetalWorks panels require only minimal plenum clearance, the new ceiling could be installed at a height higher than the old ceiling to help impart a bigger, more open “feel” to the area. Denny also notes acoustics was a significant consideration. “With terrazzo on the floor and metal on the interior walls, there were a lot of hard surfaces, so sound was definitely a concern,” he states. To

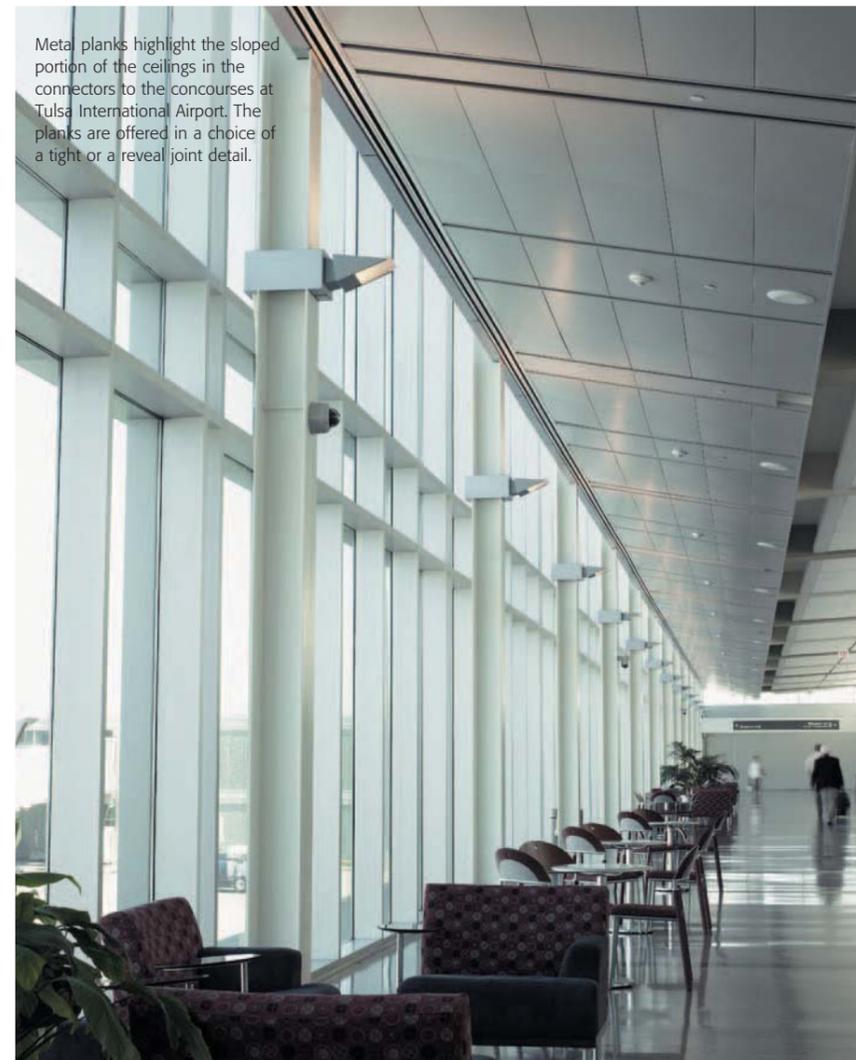
solve this potential problem, the design team selected MetalWorks panels that are perforated with an acoustical fleece behind them.

Perforated metal ceilings in gun metal gray also were chosen for use in the 16 passenger holding areas that line the concourse. In this case, however, rectangular, custom curved RH200 MetalWorks panels from Armstrong were selected instead of the square, flat Metalworks Vector panels used in the concourse ceiling.

Garcia explains there is a difference in height between the exterior wall and soffit on the opposite wall. “We had to create a transition, and the use of curved ceilings that seem to float above the room provided us that opportunity,” he says.

As they did in the concourse, the design team removed the old ceiling and created a series of floating ceilings. To provide the transition between the differing wall heights, the team used a concave ceiling profile at the lower end and convex profile at the higher end. “The new ceiling appears very light and aerodynamic,” Garcia states. “As a result, the visual effect of the curved ceiling is one of a feeling of flight.”

To ensure they had selected the correct radii and sweep of arc, the team worked in conjunction with the Armstrong Architectural Specialties Group, which is comprised of specialists with expertise in architecture and engineering and whose sole mission is to collaborate in the implementation of statement ceilings. “They helped us with many of the details and were very easy to work with,” Denny states.



Meta planks highlight the sloped portion of the ceilings in the connectors to the concourses at Tulsa International Airport. The planks are offered in a choice of a tight or a reveal joint detail.

Denny adds the same curved metal ceiling clouds used in the passenger holding areas also are used above the carousels in the baggage claim areas. “Use of the curved metal ceilings here separates the carousels from other areas and makes it easier for passengers to find them.”

He also points out airport officials are pleased with the new metal ceilings not only from a standpoint of aesthetics and acoustics but also maintenance. “Even though the panels are installed in floating clouds, there still is easy access to the plenum without the use of special tools,” he says.

### Tulsa International Airport

Metal ceilings also can be found in the newly constructed terminal addition that connects Concourse A and Concourse B of Tulsa International Airport. Prior to the construction, each concourse had its own security checkpoint. Now, security is centralized in a recently renovated area located between the two concourses.

Once passengers have cleared the checkpoint, they enter the portal, which opens onto connectors leading to each concourse. The new terminal addition features a 600-foot- (183-m-) long glass wall that offers a panoramic view of the airfield. The terminal expansion project also includes the addition of restaurants and retail stores in the areas connecting the checkpoint with the concourses.

Oklahoma City-based The Benham Companies LLC, an architectural, engineering, design-build, environmental and performance contracting firm with 11 offices around the country, partnered with San Francisco-based Gensler, a global design, planning and strategic consulting firm with 28 offices, on the design of the terminal renovation and expansion.

Molly A. Jones, AIA, project architect for Benham, explains the Benham design team was able to create a ceiling that features a lower horizontal portion as it proceeds away from the checkpoint area and then dramatically slopes up as it approaches the glass wall. “We wanted to create a panoramic view of the airfield,” Jones states. “By lifting the ceiling plane up as it approaches the glass wall, we were able to capitalize on that view for the passengers.”

A combination of MetalWorks custom RH200 plank and custom Fastrack ceiling systems from Armstrong was chosen for the portal area and northernmost sloped portion of the ceiling in the connectors to the concourses. “The Armstrong metal ceiling systems were chosen because they offered the largest color selection,” Jones states.

The gun metal gray planks are made of electrogalvanized steel and provide full downward accessibility to the plenum above. The “hook-on” feature of the planks offers an extensive range of ceiling options for increased design and installation flexibility. The system also accommodates a wide variety of lighting system types and sizes and offers a choice of a tight or reveal joint detail.

According to Jones, a metal ceiling was chosen for a number of reasons. “The exterior of the terminal expansion is clad in metal, so this allowed us to marry the interior with the exterior. Metal also

metalmag will begin an “Interiors” section in 2006, highlighting projects like these that show how metal enhances a building’s interior.

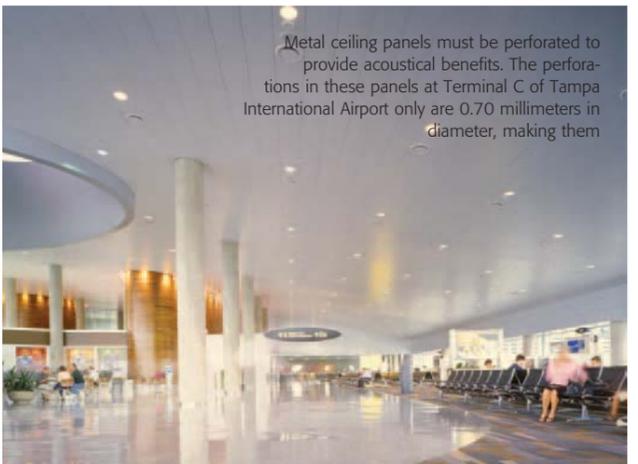
imparts a clean, contemporary look and offers itself as an aesthetic complement to the international design of the existing building.”

Dimensions of custom MetalWorks planks typically range from 9 to 24 inches (229 to 610 mm) in width and up to 96 inches (2.4 m) in length. The planks in the Tulsa airport vary in size, measuring up to 20 by 65 inches (0.5 by 1.7 m). Both perforated and unperforated planks are used in the airport with perforated planks located between the linear light fixtures in the portal ceiling. “The use of the perforated planks in that particular area was more of an aesthetic decision than an acoustic one,” Jones points out. “We simply liked the look.”

A total of 5,364 square feet (498 m<sup>2</sup>) of metal ceilings were used in the central portal area while 2,884 square feet (268 m<sup>2</sup>) were installed in the Concourse B connector and about 4,000 square feet (372 m<sup>2</sup>) in the Concourse A connector.

Looking back on the ceiling project, Jones notes it was a challenging one because of all the coordination and meticulous detailing involved. In this regard, she says the Armstrong Architectural Specialties Group was extremely helpful.

“We worked with them during the design phase,” she says. “They also came out to the job site during the ceiling installation to help with any site modifications that had to be done to achieve the design goals. The end result certainly speaks for itself.”



Metal ceiling panels must be perforated to provide acoustical benefits. The perforations in these panels at Terminal C of Tampa International Airport only are 0.70 millimeters in diameter, making them

### Other Examples

More examples exist of how metal ceilings are changing the look and feel of airports across the United States. Included among them are the Armstrong MetalWorks custom grated ceiling that was recently installed in Terminal 3 of Chicago’s O’Hare International Airport and the new Armstrong MetalWorks Extra-Microperforated Vector ceiling in Terminal C of Tampa International Airport in Florida.

And there is no sign of turbulence ahead slowing this trend. Metal ceilings’ aesthetics, acoustics, durability and functionality will ensure that. ■

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