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# TileLetter

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# Unique ceramic tile applications

*Schlüter's Systems' new regional distribution center in Reno, Nevada demonstrates innovative uses of ceramic tile to support energy efficiency, comfort and utility*

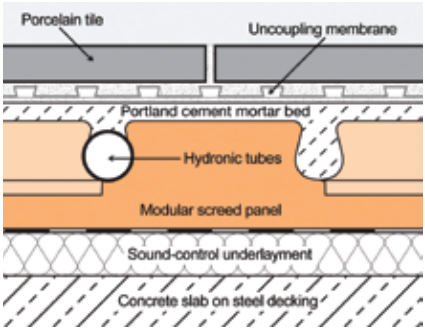
*By Sean Gerolimatos, technical services manager, Schlüter Systems L.P.*

Schlüter Systems' North American subsidiary was founded in 1986, with US and Canadian offices located in Plattsburgh, N.Y. and Montreal, Québec, respectively. To improve service to customers in the western United States and Canada, Schlüter Systems began construction of a regional distribution center (RDC) in Reno, Nevada in February 2011. Like previous construction projects, Schlüter Systems placed a strong emphasis on energy efficiency, comfort and utility, enabled in large part through the extensive use of ceramic tile.

**Radiant-heated floors**

Similar to the U.S. and Canadian headquarters [*TileLetter,* September 2010], a hydronic system of radiant-heated and radiant-cooled floors and geothermal heat pumps both warm and cool the RDC offices and training center.

Geothermal heat pumps transfer energy to and from the earth and the building via the water in the hydronic system, turning the earth into a heat source during winter and a heat sink during summer. Because the temperature of the earth is warmer than the outside air in the winter and cooler than the outside air in the




*Schluter's BEKOTEC modular screed system was used on the floors to maximize the efficiency of the heat pumps.*

summer, this is an ultra-efficient process. RDC office floors incorporate a modular screed system and ceramic tile covering, which combine to reduce the water temperatures necessary to heat the building and in turn maximize efficiency of the heat pumps.

**Radiant-heated walls**

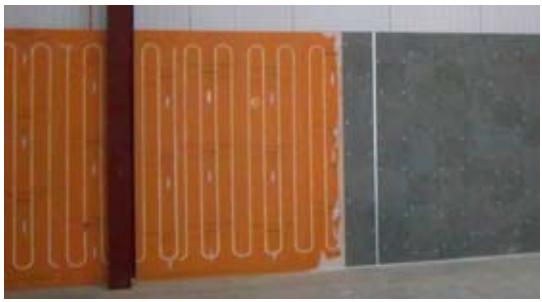
The warehouse plans initially called for combustion heaters, but these plans changed after a conversation between Schlüter Systems North America president Reinhard Plank and company founder Werner Schlüter. The European Union has placed increased focus on public and private building renovations as part of a 2007 initiative to achieve 20% savings in energy use by 2020. Based on its experience with geothermal hydronic radiant-heated floors, Schlüter Systems Germany has been investigating radiant-heated walls. Mr. Schlüter suggested a system in the RDC warehouse to gain practical experience with this process in renovations.

The foundation for this radiant-heated wall is an extruded polystyrene-foam tile backer board/building panel, with an overall 3" foam thickness to provide sufficient insulation (total R-Value of approximately 8.0), achieved by using two layers of the foam board.

First, a layer of 1"-thick board was spot-bonded to the existing masonry walls using dabs of mortar, which allowed the installers to ensure flat, plumb and square surfaces for setting tile. Next, a layer of 2"-thick board, with grooves spaced at 6" on-center to hold the hydronic tubes was installed with the grooves facing out, using thinset mortar in a full-spread application. The grooves were produced using a plywood template and a common router with 3/4" U-shaped bit and vacuum attachment. All 400 of the 24-1/2"x96" boards were prepared in three days with virtually no mess or complications.

Once the two layers of foam boards were installed, the plumber inserted the hydronic tubing and performed a pressure test to check for leaks. After the successful tubing test, the tile setters applied the tile covering using the thinbed method. Tile edges were finished using a rounded profile at the top and ends of the walls, and a cove-shaped profile at the floor-to-wall transition. The result was a lightweight, easy-to-install wall system that offers improved insulation and heating efficiency.

In total, the 8'-high walls span 775', covering an area of 6,200 square feet.



*Radiant heated walls were built by installing hydronic tubing in foam board walls which were then covered with tile.*

*The entire sink and vanity was constructed using the Kerdi-Board building panel system so no wood or metal framing materials were used in these areas.*

The walls are expected to support approximately 50% of the heating load in the warehouse with the other 50% coming from a solar wall and supplemental heaters if required.

In addition, since the overall capacity of the geothermal system (and therefore the number of wells) was determined by the summer cooling load, the radiant walls will use heat that would otherwise have been stored in a water tower to balance the system. Thus, the "excess" energy will be put to practical use and improve the comfort of the warehouse personnel during the winter. For example, incorporating a radiant-heating system will minimize the heat loss caused by opening bay doors to load and unload trucks.

**Lavatory countertops and sinks**

Given their design flexibility and hygienic properties, ceramic tiles represent the ideal covering material for lavatory countertops. As a veneer, tile needs a dimensionally-stable surface for installation – one that is flat, level, plumb and square. Typical building materials often do not fit the bill, even with underlayments and membranes.

In the RDC, lavatory countertops and sinks are constructed entirely from the same foam boards used in the radiant-heated walls described above. Vertical supports were formed by laminating two layers of 2"-thick panels and adhering them to the floor. The decks consist of single 2"-thick panels with additional reinforcement coming from stainless steel U-profiles at front and back. Next, 5"-wide sections of 2"-thick board were adhered to the decks adjacent to the back walls to provide a flat surface above the sink basins for mounting the faucets.

Sink basins were formed in three steps. First, 1-1/2"-tall sections of board were adhered to the perimeters of the decks. Next, the undersides of 1/2"-thick boards were scored with diagonal relief cuts through the facers. The boards were attached to the perim-

*The finished vanity has a single basin that slopes gently to a linear drain for a sleek, modern look.*

eter supports and bent along the relief cuts to slope toward the faucet supports. Finally, linear drains with integrated bonding flanges were set into the basins and connected to the waste lines.

Throughout the process of building the countertops and sink basins, the vertical surfaces were plumbed, the horizontal surfaces were made level, and all corners were made square, providing an ideal surface to set the tile and trim profiles and achieve a successful installation.

**Conclusions**

The unique applications of ceramic tile in Schlüter Systems' regional distribution center in Reno, Nevada serve as examples of how ceramic tiles can function as more than just coverings; they can become integral components of overall building systems to provide improved energy efficiency, comfort and utility.

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*Sean Gerolimatos is the technical director for Schlüter Systems L.P. and has been with the company since 2003. He has served as a member of the TCNA Handbook Membrane Subcommittee, written articles for trade publications, and presented seminars at tile industry events, including Qualicer and Surfaces. His academic background is in civil engineering, earning a Bachelor of Science from Clarkson University and a Master of Science from Cornell University.*

*Schluter's regional distribution center in Reno makes extensive use of tile inside and outside the building to achieve the overriding design goals of comfort and efficiency.*