



PIER ONE

RADIANT HEATING AND COOLING SYSTEM

PROJECT PROFILE

Advanced Climate Control System Preserves Personality of Historic Pier One Warehouse

The REHAU radiant floor heating and cooling system installed in a historic warehouse located on Pier One, the northernmost pier on San Francisco's Embarcadero is, according to industry experts, one of the first documented uses of a radiant floor heating system also used to cool a building in North America.

The warehouse wasn't originally designed to be heated or cooled so it lacked insulation and had 4-in. solid concrete walls. Although concrete provides considerable thermal mass (heating up and cooling down slowly), it does not provide an effective means of insulation.

Funding requirements specified that no insulation be installed on the exterior walls and that the system would not obstruct the exposed beams and rafters of the building or the "clear story" at the roof peak. The radiant floor heating system met both of these conditions.

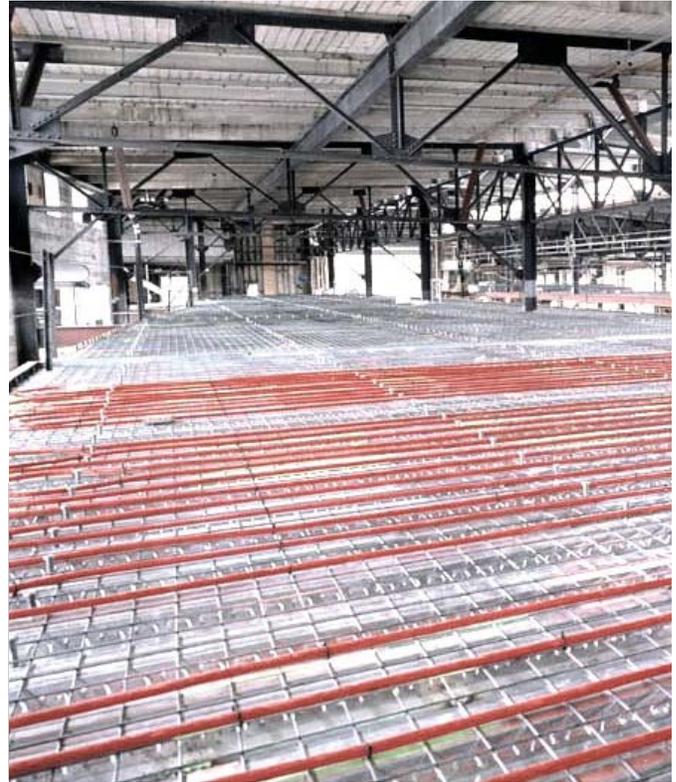
REHAU's RAUPEX O₂ Barrier crosslinked polyethylene (PEXA) pipe was selected for its durability, and for its simplicity of installation. Nearly 132,000 ft of 3/4-in. pipe were installed 10 in. on-center in approximately 230-ft circuit lengths.

The pipe circuits connect to 68 REHAU PRO-BALANCE manifolds with gauges, which optimize flow rates of the system's heat transfer fluid. The gauges allow the operator to easily adjust flow rates for each circuit.

The two floors of the finished warehouse provide about 160,000 sq ft of office space. Perimeter and interior zones are individually controlled to allow adjustments in areas with different heating requirements. A direct digital control system saves energy by tempering the concrete thermal mass in accordance with anticipated heating/cooling demands.

The Pier One system can also be used for cooling. When activated, a dedicated chiller cools the heat transfer fluid, lowering the temperature of the thermal mass, which in turn lowers the mean radiant temperature (MRT) of the building. For the Pier One project, the architects designed an environmentally friendly subsystem that safely cools the hot components of the chiller via a closed-loop circuit of RAUPEX pipe.

A life cycle cost analysis (LCCA) by WSP Flack + Kurtz anticipates energy savings of 15 percent over 10 years for the system compared



Project: Pier One warehouse building, San Francisco, CA

Construction: Warehouse renovation, completed in 2000

Scope of Project: 132,000 feet of RAUPEX O₂ pipe

Owner: AMB Property Corporation and the Port of San Francisco

Engineers: WSP Flack + Kurtz

REHAU Systems Used: Radiant heating and cooling (RAUPEX® pipe, EVERLOC® fittings, PRO-BALANCE® manifolds)

with a standard HVAC system. Although base building construction costs were higher for the radiant system, tenant improvement costs (the costs to fit out the building shell for tenants) were lower because the system does not require the extensive ductwork of an HVAC system. After installation, the LCCA showed lower operating costs and a lower impact on usable building area.

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