



FEEL
THE FUTURE

stepheat.com

Radiant Showcase
**Commercial &
Industrial
Applications**



The Electro Plastics facility is a 35,000 sqft LEED registered building designed and built to optimize energy efficiency and performance.

LOCATION

The property is located in St. Louis, is on top of a hill, and is surrounded by open space. It is in an industrial area, near hotels, restaurants and shops, adjacent to main interstates and the Lambert International Airport. The planning process began with the property purchase in 2004. The building was completed in July 2009.

BUILDING MATERIALS

The building's design and materials used were chosen for their sustainability, efficiency and environmental friendly properties. The building is a showcase of energy efficiency, personnel productivity and well being. PV solar panels are installed on the roof.

HEATING SOLUTION

The facility is exclusively heated with STEP Warmfloor Commercial — a unique, energy efficient, low-voltage (24V), AC/DC, semi-conductive polymer, the radiant heating system uses environmentally friendly, non hazardous and recyclable materials.



The STEP HEAT facility has a total of 34,725 square feet distributed as follows:

- 15,000 sq.-ft., on the lower level with dock and overhead access, which is used for manufacturing.
- 15,000 sq.-ft., on the upper level also with dock and overhead access for assembly, handling and shipping.
- 4,725 sq.-ft., attached to the upper level with main entrance to the offices, conference room, kitchen and showroom.



The Butler building insulation systems chosen provide a high performance building envelope.

Butler Manufacturing is the world's leading producer of steel building systems. Butler is the only metal building company to provide tested assembly values for its building envelope insulation systems.

THERMALINER™ SYSTEM

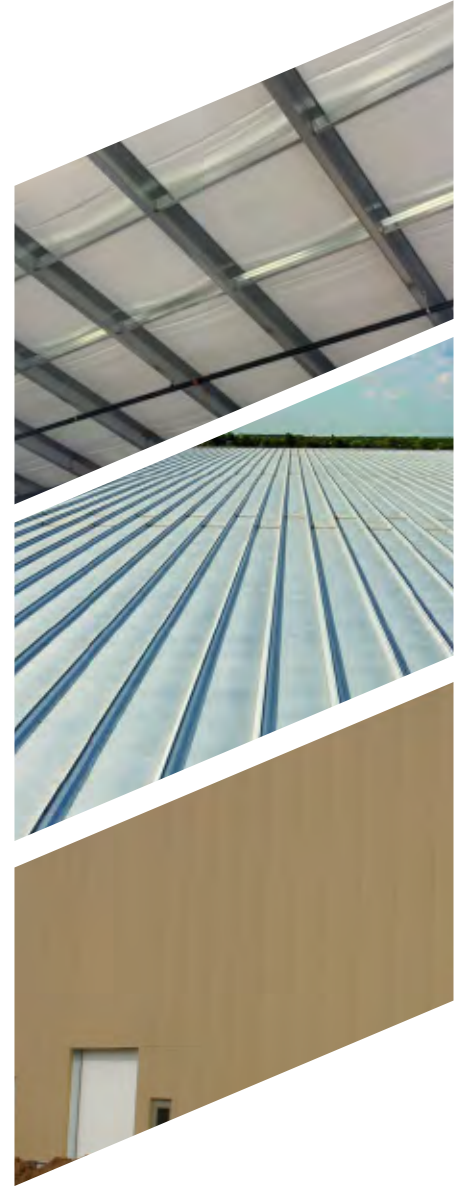
The ThermoLiner™ Insulation System is a state-of-the-art insulated liner system that can be used with most Butler roof systems (MR-24®, VSR™, and Butlerib®). It provides superior thermal efficiency, condensation control, and noise reduction. ThermoLiner™ is a very efficient system, producing R-values from R-20 to R-40.

MR-24® ROOF SYSTEM

The MR-24® roof system is specifically designed for consistent weather tight performance under demanding conditions and to accommodate roof movement. Because the MR-24® roof system is metal and moves freely under the forces of expansion and contraction, additional insulation thickness will not cause roof deterioration, as commonly happens with conventional built-up roofs.

TEXTUREWALL™ PANEL SYSTEM

The TextureWall™ system's factory-installed foam-core insulation and thermal break joint design deliver excellent energy efficiency, with a tested U value of .067. The factory-applied joint sealant provides a complete wall-system weather barrier. Panels are offered in 2- to 4-inch thicknesses.



INSULATION PROPERTIES

	Office (4,725 ft ²)		Warehouse (15,000 ft ²)		Factory (15,000 ft ²)	
	R-Values	Area	R-Values	Area	R-Values	Area
Floor		Perim. 201 ft	Below Heat	15000 ft ²		15000 ft ²
Ceiling	30	4725 ft ²	30	15000 ft ²	Above Heat	15000 ft ²
Wall	32.3	2060 ft ²	32.3	7032 ft ²	32.3	4472 ft ²
Wall B.G					2.9	2800 ft ²
Window	3.3	256 ft ²	3.3	728 ft ²	3.3	416 ft ²
Door	2	96 ft ²	2	240 ft ²	2	312 ft ²



The STEP Warmfloor radiant heating system is the only heat source installed in the facility.

APPLICATIONS

A total of 15,890 feet of heating element was installed in the building: 2,680 feet in the offices, 6,699 feet in the warehouse on the upper level, and 6,511 feet in the factory on the lower level.

A variety of installation methods were used:

- Lower Level Factory – heating elements over thermal insulation and under 6” slab
- Upper level warehouse – heating elements between 2 layers of concrete
- Office – heating elements
 - over thermal insulation in poured concrete
 - under rubber mats on concrete
 - under floating boards, bamboo and wood.
 - on concrete between two layers of cushion and under carpet
 - on concrete and under floor leveling compound and covered with vinyl

INSTALLED WATTAGE

To ensure sufficient heat output during cold peak periods a total of 143,011 watts was installed providing a maximum capacity of 411,840 kWh* (4.1 w/sqft.) :

- 24,119 watts in the office (5.0 w/sqft.)
- 60,291 watts in the warehouse (4.0 w/sqft.)
- 58,599 watts in the factory (3.9 w/sqft.)



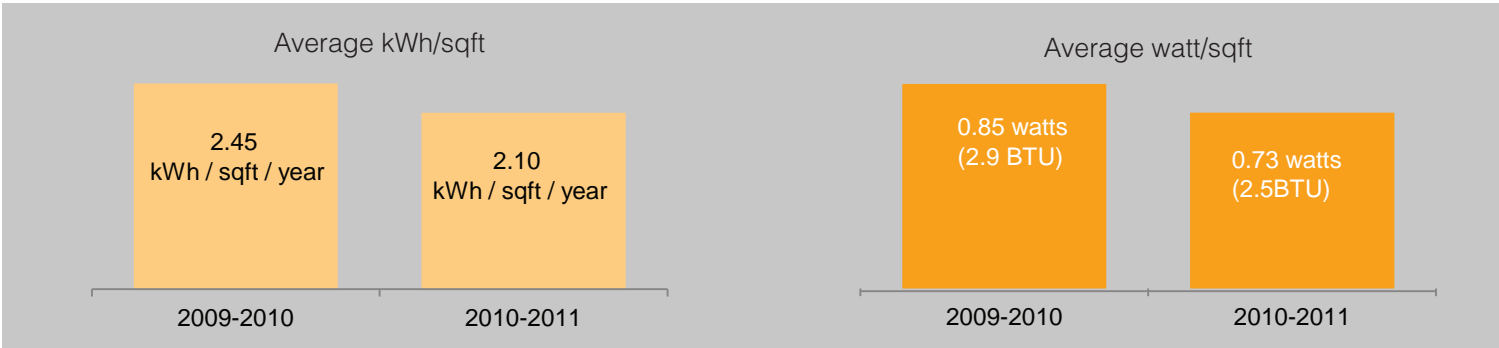
* Maximum capacity calculated based on 120 heating days (2880 hours)

In 2011, the power consumption for the heating season was 0.73 w/sqft (2.5 BTU) or 7.8 W/m²

CONSUMPTION AND COSTS

The building has an isolated electric meter to measure the actual heating consumption. Consumption was measured during the winter months from December 1st to end of March (120 days).

Winter season	Consump . (kWh)	Cost per kWh	Total Cost
2009-2010	85,244	\$0.046	\$3,895.65
2010-2011	72,800	\$0.057	\$4,164.16



OUTDOOR TEMPERATURE

The average outdoor temperature in St. Louis was 35.1°F (1.7°C) during the winter 2009/2010 compared to 35.5°F (2°C) during the winter 2010/2011. The system is designed to a normal min temp of 20F/-7C.

INDOOR TEMPERATURE SETTINGS

To maintain a comfortable indoor working environment the ambient indoor temperature was set to 72°F (22°C) in the office area and 65°F (18°C) in the warehouse and factory.



Commercial Building
34,725 sq. ft.



Office, Warehouse & Factory



Lower Level Factory
5,000 sq.ft.



**Heating Elements over Insulation
and Under 6" Slab**



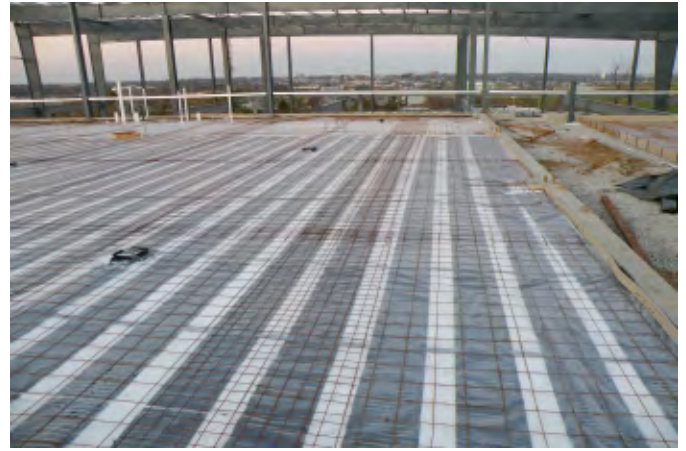
Upper Level Warehouse & Assembly
15,000 sq.ft.



**Heating Elements Between Two Layers
of Concrete**



Open Office - Elements in Concrete and Under Rubber Mats



Heating Elements over Insulation and Under 4" Slab



Show Room - Elements Under Bamboo



Elements on Concrete, Under Sound Barrier and Bamboo



Elements on insulated concrete between two layers of carpet cushion and under carpet



Work Room - finished floor is floating wood boards



Element Covered by Floor Leveler



Break Room - Marmoleum (recycled resilient)



Bathroom Tile



Heating on the floor and the bench



STEP Snowmelt in Vinyl Under Concrete



Solar Panles on Roof



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