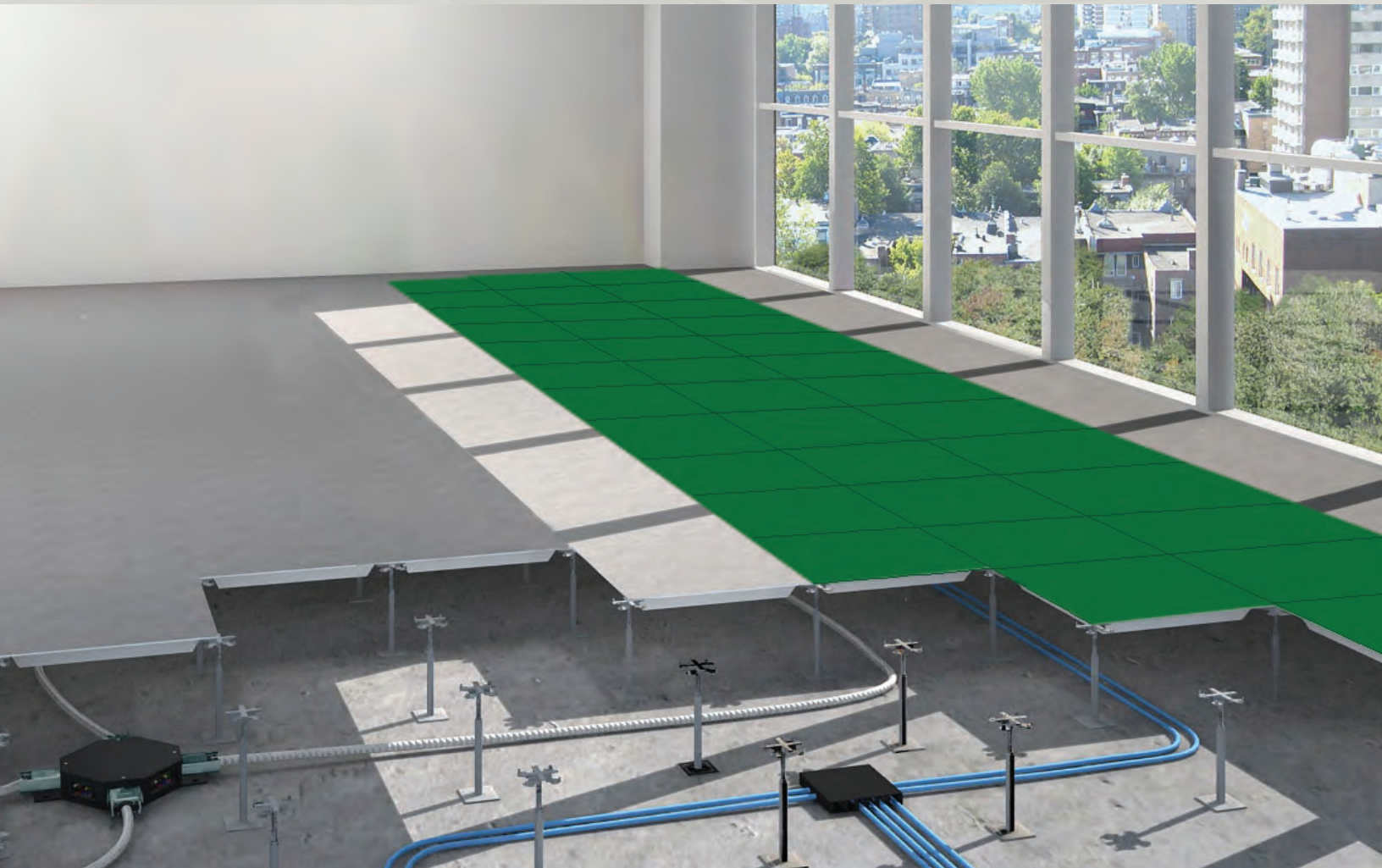




# EcoCore™

Phase Change Technology for Energy Efficiency



**Tate**®



# EcoCore

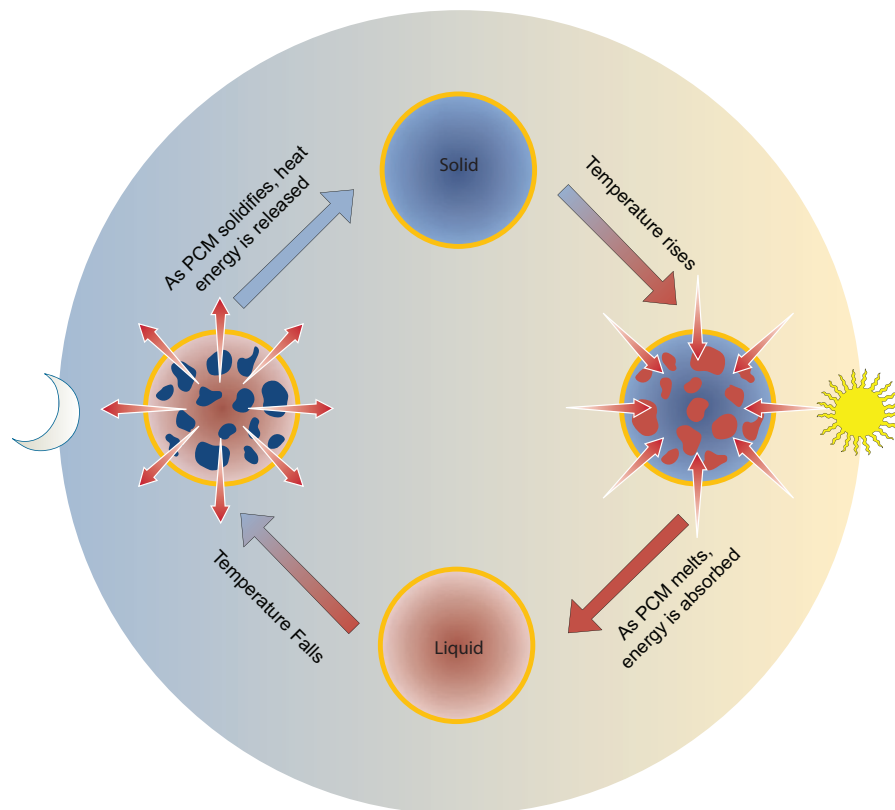
## Phase Change Technology for Energy Efficiency

### What is Phase Change & How it Works

Phase change is a thermodynamic transition of physical matter from one state to another due to a change in energy levels of the material. These transitions are part of our everyday lives such as ice cubes in a cold drink melting. EcoCore uses a special phase change material or PCM designed to melt at 75°F, which is similar to ice melting at 32°F to maintain a cold drink. This allows the PCM to absorb solar and building thermal energy during the normal temperature deviations that occur throughout the day of any office building. As the material changes states it absorbs energy allowing for natural safe passive energy savings to occur.

### What is EcoCore

EcoCore access floor panels are steel welded shells filled with an unique mixture of structural cement and PCM that allows the panel to absorb thermal energy while maintaining the high level of integrity and quality expected from Tate's raised access floors. This is possible due to utilizing a patent pending method of mixing microscopic spheres of encapsulated PCM into the cement. The spheres maintain their size, shape and integrity throughout phase transitions. This allows the panels to seamlessly integrate into a raised floor installation providing a low impact thermal mass to absorb energy during the day that would otherwise affect both the energy efficiency and comfort level of the office. The stored energy is then released again overnight as the temperature drops below the 75° F melting point.



### Benefits of Phase Change in a Raised Floor

- Reduce perimeter heating and cooling loads during normal business hours
- Use free or low cost cooling to handle the thermal load stored in the panels during non-business hours
- PCM lasts the life of the building (over 100,000 changes)
- Tate's raised floor panels provide a safe solution for applying phase change material in a building. By embedding the material in cement and then fully encapsulating it in a steel welded shell, the material is protected from the external environment
- Gain advantages of a raised floor system

# Benefits of EcoCore

## Improved Comfort

By utilizing EcoCore Panels, the indoor environment of an office can be noticeably improved. Throughout the normal office day temperatures in a well designed on slab office with overhead HVAC can fluctuate 2-4°F up or down. In a poorly designed or aging office, the fluctuation can be upwards of 10°F on a given day either due to insufficient design capacity or the reduced efficiency of the HVAC system over time. A raised floor solution utilizing the EcoCore Panel effectively evens out those temperature swings, with a low physical mass, high thermal mass solution that offers a wide range of additional benefits.

## Energy Savings

EcoCore panels are specifically designed to store energy in order to shift demand to off-peak time periods when utility rates are lowered in many locations. During the day, the PCM in the EcoCore panel melts under the solar load along the perimeter. By melting during the hot day, the energy is stored until the temperature drops back below the 75°F threshold overnight when off peak electricity rates, or free air economizing can be used to resolidify the material.

Buildings are designed to meet a peak load of a given design hour. By increasing the thermal mass of the building with EcoCore panels, the building is capable of self regulating indoor temperature, reducing the peak load of the building naturally. EcoCore allows buildings to be designed utilizing less air, and smaller HVAC systems.



## Environmental Benefits

There are two energy saving components of using the EcoCore panel. First is the ability to defer or postpone the peak load in the space and release it overnight to allow a larger portion of the load to be cooled with free economized air or cheaper electricity. The second is the ability to then reduce the size of the HVAC system since the building will require less air to handle the new reduced peak load. These benefits will further optimize energy performance to contribute towards LEED credits, in addition to the many LEED contributions already associated with raised floors and underfloor service distribution.



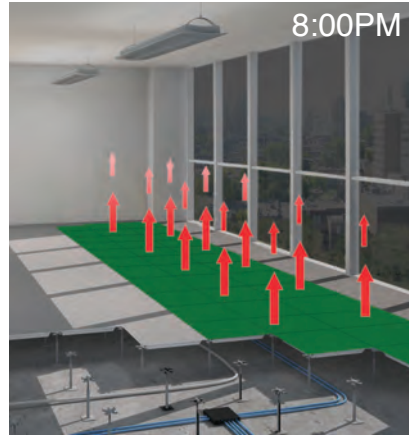
# EcoCore: How it works

## EcoCore Perimeter Solution

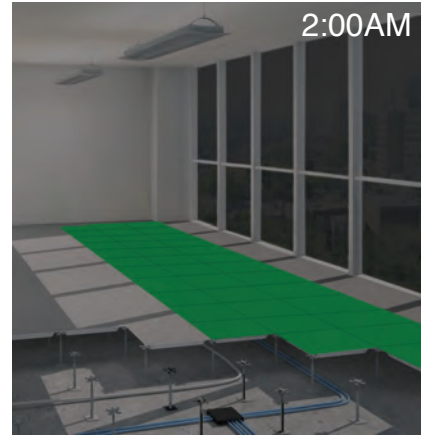
Using EcoCore in the perimeter zone of the office will help to reduce the overall peak load in the space and delay the occurrence of the peak load to later in the day. By reducing the overall peak load the amount of cooling required to keep the space comfortable is reduced. In addition, by delaying the peak to later in the day the load can often be handled with free economizer cooling or with reduced rate electricity.



Solar load warms the panels during the day. As the panels warm the phase change material melts absorbing energy.

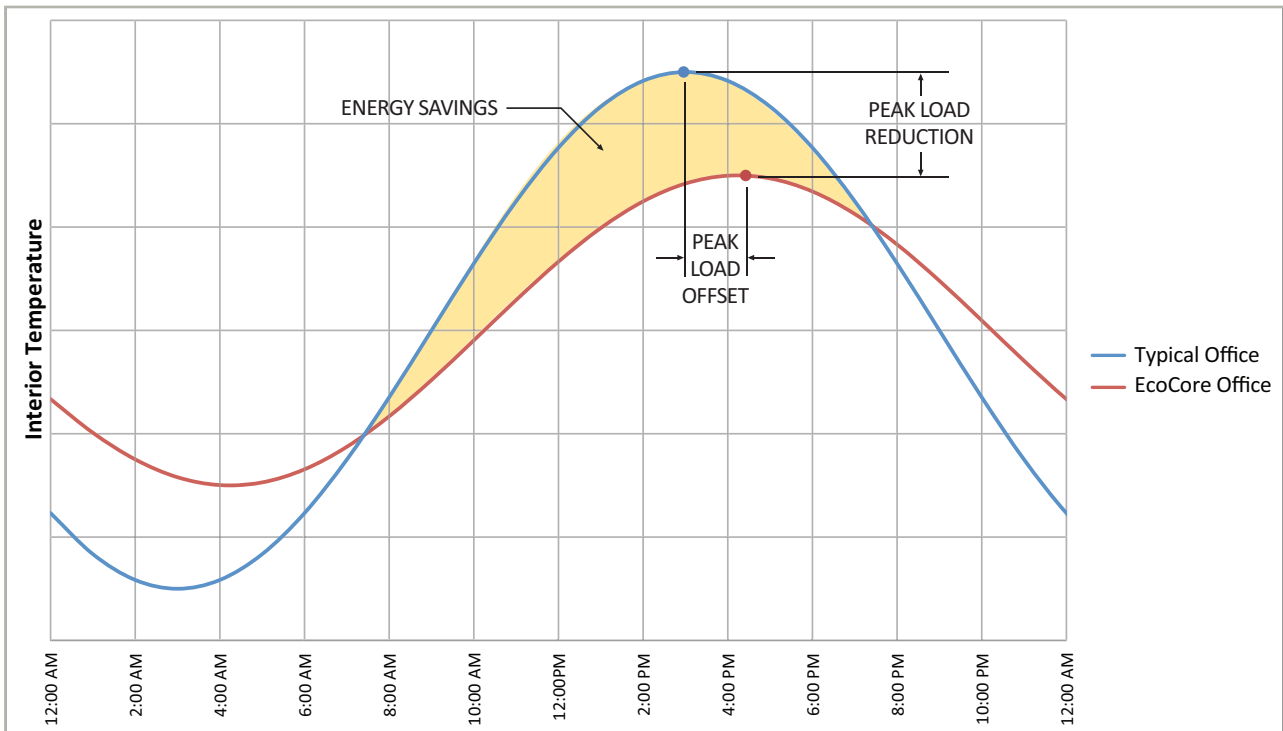


The energy is stored in the panels to be released during non-peak hours.



As the panels cool overnight the phase change material solidifies.

## EcoCore Reduces and Offsets Peak Load to Save Energy



# Applying EcoCore Panels

## Application in Perimeter Zone

Selecting the appropriate number of rows of EcoCore panels to install along the perimeter is something which can be done once the solar loading of the building has been determined. The typical rule of thumb is that for approximately every 70 Btu/lf of solar loading for a given perimeter area a single row of EcoCore panels can be installed to achieve maximum load offsetting.

Other items to consider are building location, solar elevation angles (angle of the sun towards the building adjacent from the horizon), window height, peak vs off-peak energy rates, access to nighttime economizing, and perimeter UFAD solutions.

In the example shown we have determined an average solar loadings of 60 Btu/lf, 120 Btu/lf, 220 Btu/lf, and 130 Btu/lf (North, East, South, and West respectively). It has also been determined that this floor space is located in a region with an exceptionally low solar elevation angle, and is using full height windows. Based on these parameters, we can accurately determine that a significant amount of sunlight will directly impact the raised floor in the east, south and west zones.

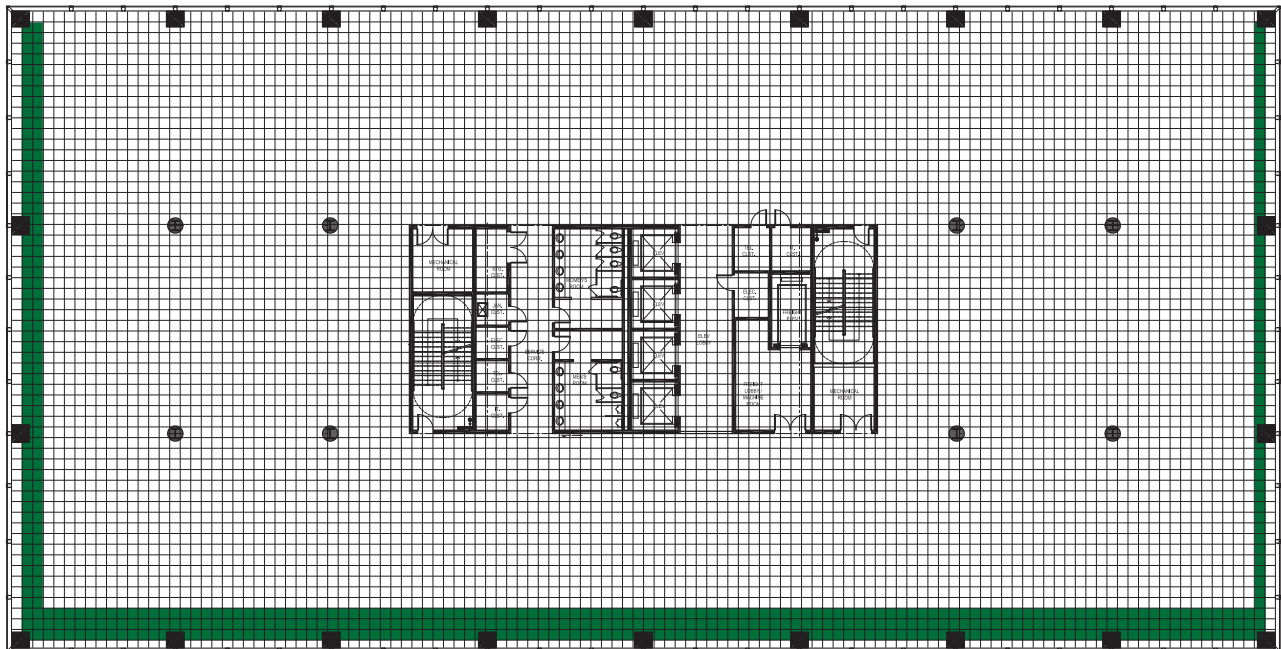
For more information about applying EcoCore to a specific project please contact us at **800-231-7788** or email **technical@tateinc.com**.

## Building Conditions:

North Average Load:	60 Btu/lf
East Average Load:	120 Btu/lf
South Average Load:	200 Btu/lf
West Average Load:	130 Btu/lf
Solar Elevation Angle:	34°

## Number of Panels Deep:

North:	$60/65 = 0.9$ ; 0 Rows of panels
East:	$120/65 = 1.8$ ; 1 Row of panels
South:	$200/65 = 3.1$ ; 3 Rows of panels
West:	$130/65 = 2.0$ ; 2 Rows of panels

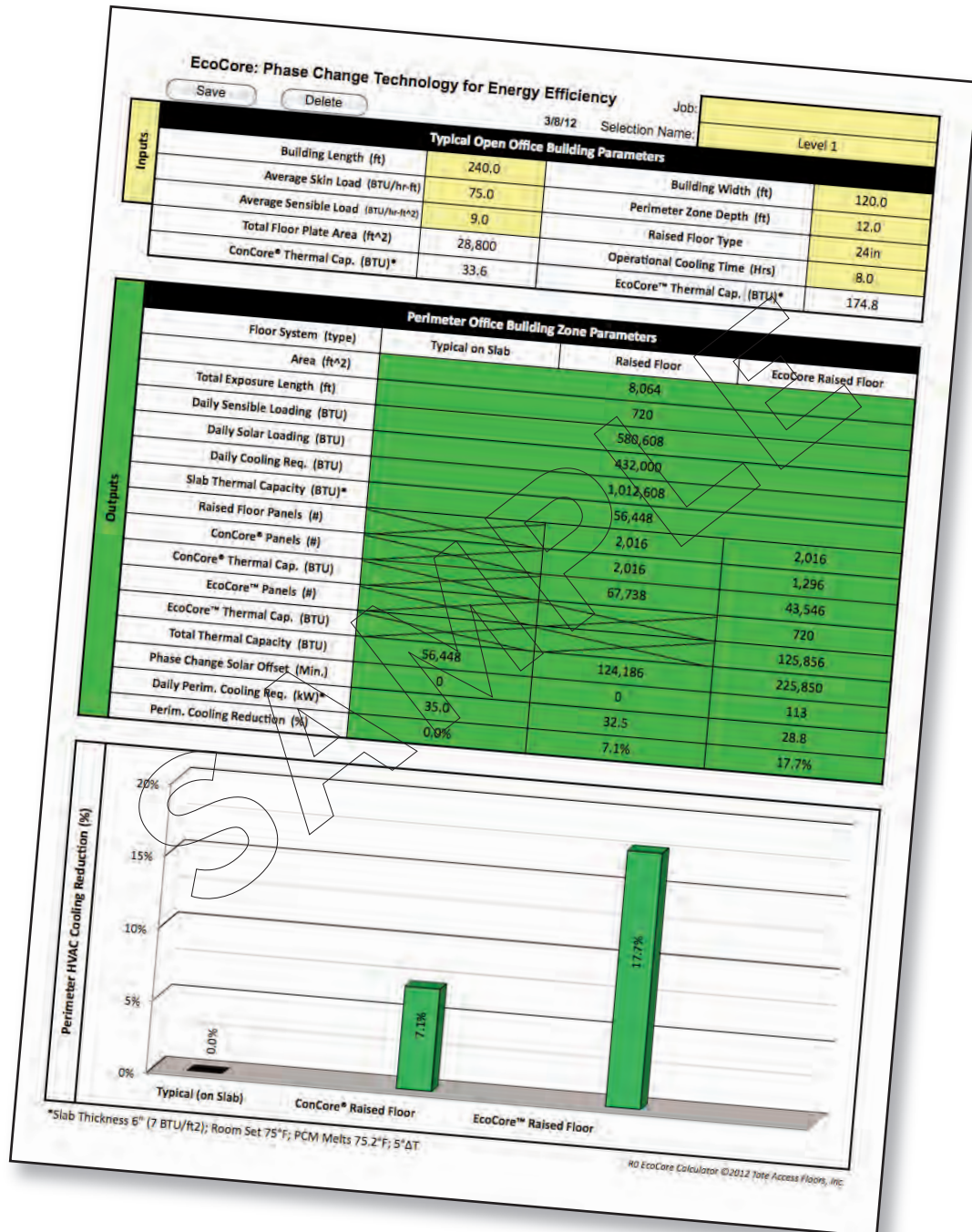


# Improves Energy Performance

Comparing Phase Change Thermal Storage to a building without

Tate provides an interactive energy performance tool designed to help evaluate the skin load reduction between traditional slab construction and utilizing Tate's EcoCore panel in the perimeter zone of a building. Download your copy at [www.tateinc.com](http://www.tateinc.com).

For more information about the energy saving potential of EcoCore call us at **800-231-7788** or email [technical@tateinc.com](mailto:technical@tateinc.com).



# Additional Products

Visit [www.tateinc.com](http://www.tateinc.com) for more information



## In-floor Active Chilled Beam

Energy efficient perimeter heating & cooling for underfloor air distribution systems

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