

P24 Delta Tie

The Dayton Superior P24 Delta Tie is a uniquely designed connector for use in fabricating insulated precast concrete wall panel connectors. It allows the precaster to fabricate a highly energy-efficient, insulated precast concrete wall panel using commercially available rigid foam insulation.

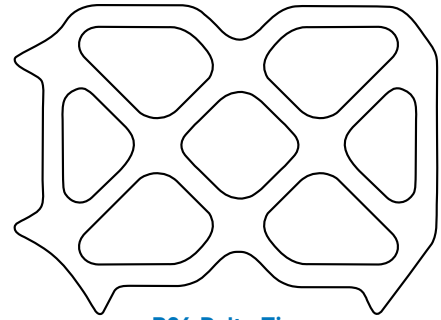
This versatile connector allows the insulation to be placed from panel edge to panel edge, eliminating thermal bridges and costly energy loss. The insulation is sandwiched between two concrete wythes, or layers, to form a long-lasting, energy-efficient insulated precast concrete wall panels. The three wythes are tied together using P24 Delta Ties. Spacing of the Delta Ties varies, based on the analysis of applied loads during erection and end use of the panel.

The Delta Tie is produced using an engineered composite matrix. It consists of a geometrically configured, two-dimensional truss manufactured from continuous wound fiberglass embedded in an alkali resistant resin. The design of the Delta Tie produces a connector of remarkable strength and durability.

The non-metallic, non-corrosive design of the Delta Tie greatly reduces any thermal transfer through the panel, increasing the insulating efficiency of the panel.

Advantages

- Stiffer insulated panels, easier to handle.
- Design flexibility.
- Material, labor and transportation cost reduction.
- Quick and easy installation.
- Applicable to all brands of foam panel insulation.



P24 Delta Tie
U.S. Patent #6761007

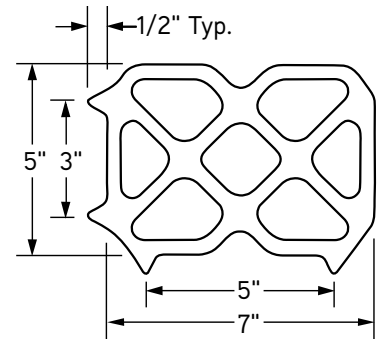


P24 Delta Tie

The standard Delta Tie dimensions are shown in the accompanying detail.

The connector is designed so that it can be oriented in the panel either vertically or horizontally, depending on the thickness of the insulation. For example, the 5" x 7" size can be used on its side in insulation up to 2" thick or on its end for insulation thickness greater than 2" thick up to 4" thick. The Delta Tie can be used with any rigid insulation from 1" to 4" thick. This versatile, dual-use feature adds to the Delta Tie's effective application compatibility and, at the same time, reduces inventory and storage requirements.

In individual connector specimen and full size panel tests the Delta Tie has exhibited excellent loading behavior and load capacities.



Composite Action

Tests have verified the excellent tension and shear strength characteristics of the Delta Tie insulated panel connector.

Stiffer Insulated Concrete Panels

The inherent capabilities of the truss design greatly increase the stiffness of the panel. The added stiffness makes the panel easier to lift, handle, store and/or transport.

Design Flexibility

Due to the composite action gained by using the Delta Tie, panels may be cast in longer lengths or with thinner concrete wythes.

Cost Savings

The Delta Tie design provides a fast and easy installation to save labor. It produces stiffer panels to lessen handling, storage and transportation concerns. The connector's design flexibility allows the cost saving attributes to be designed into the panel. Delta Tie connectors are purchased as a separate item, allowing the precaster to use commercially available rigid foam insulation.

Quick and Easy Installation

The two-dimensional design of the Delta Tie lends itself to easy installation. No drilling or special tools required. Simply use the rigid insulation as a straight-edge template to quickly place the connectors.

Applicable to All Brands of Rigid Foam Insulation

The Delta Tie is not sold as part of a package. It is sold separately and can be used with any commercially available rigid foam insulation purchased by the precaster.

The many Delta Tie advantages open up a wide area of possibilities for the precaster/designer/producer to improve their production, efficiency and costs.

The P24 Delta Tie has the following ultimate capacities:

Delta Tie Type	Insulation Thickness (inches)	Tension Capacity * (lbs)	Shear Capacity * (lbs)	Orientation
P24 (5"x7")	1" - 2"	3407	3612	horizontal
P24 (5"x7")	3"	2546	1787	vertical
P24 (5"x7")	4"	2136	1360	vertical

* Ultimate Strength per tie is defined as resistance derived as the 5% fractile of the mean ultimate resistance, determined from tests. This is based upon a 90% probability (confidence level) that 95% of ties will exceed the characteristic resistance. Please refer to ACI 355.10.3.

What Criteria Determines What Direction the Delta Tie Should be Placed (5" or 7" Vertical) with Different Foam Thicknesses?

Delta Ties are installed to achieve a minimum of 1-1/2" in each concrete wythe. The tie is rotated using either the 5" or 7" dimension to achieve this minimum concrete depth. The chart details the correct direction of the Delta Tie based on insulation thickness:

Insulation Thickness	Horizontal Dimension of Tie to Panel Face
1"	7"
1-1/2"	7"
2"	7"
2-1/2"	5"
3"	5"
3-1/2"	5"
4"	5"

Maximum recommended spacing is 8 square feet of panel per panel connector. For spacing in excess of 8 square feet of panel per connector, contact a Dayton Superior Technical Assistance.

- NFPA 285
- ASTM E-119
- Fire Test Approved

To Order:

Specify: (1) quantity, (2) name.

Example:

500, P24 Delta Ties.

P24 Delta Tie Insulated Panel Installation Sequence



1. Construct form, place reinforcement, lifting inserts, etc. Place and screed the concrete for the bottom wythe.



2. While the bottom wythe concrete is still pliable, lay the first course of insulating foam flush against the form. Typically, the first course of foam will be 12" running the length of the panel. Utilize the edge of the foam as a template and push each Delta Tie down into the bottom wythe.



3. Continue to place the connectors in their proper positions along the first course of insulation.



4. Add the remaining courses of insulation and connectors.*

* Foam-backed tape is available for sealing the insulation joints, if necessary.



5. When all of the foam sections and connectors have been placed, the top reinforced concrete wythe is poured and screeded as necessary.



6. After proper concrete set, the panel may be removed from the form and the process repeated.