



Tech Hotline

No. 0409E

October 2014

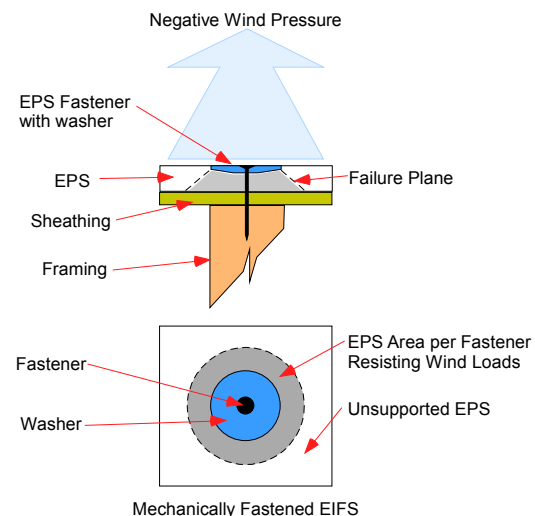
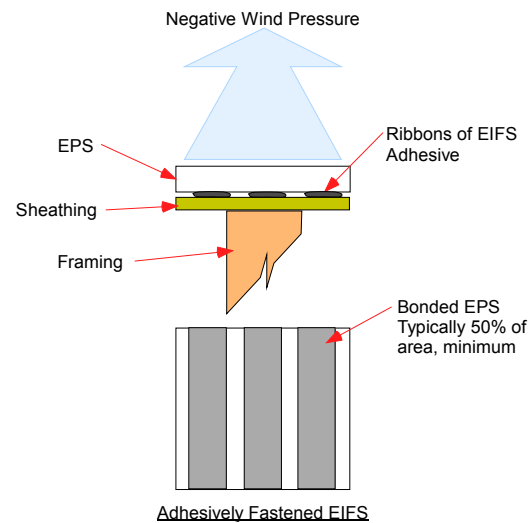
Adhesive v. Mechanical Fastening of StoTherm® ci

Whenever possible Sto Corp. recommends adhesive fastening of insulation in StoTherm ci systems for several reasons:

Better Wind-load Resistance: The adhesive provides a more uniform attachment and maximizes the wind-load resistance of the wall cladding. Adhesives applied using a notched trowel, as recommended by Sto, will result in a bonded area of at least 50% of the EPS surface giving the system a pull-off resistance of at least 15 psi (the internal or cohesive strength of the EPS board). This is more than adequate to resist wind loads, considering that a 200 mph wind exerts less than 1 psi pressure.

Mechanical attachment relies on the strength of the insulation only in the area of the fasteners, which makes the system much less efficient at resisting negative wind pressure. Testing has shown that the typical mode of failure for adhesively fastened EIF systems is either buckling of the studs or pull-out (or pull-through) of the sheathing fasteners. And when studs and sheathing attachment are adequate to resist loading, adhesively attached systems have exceeded the capacity of the test apparatus. Under the same set of circumstances the mode of failure for mechanically fastened EIF systems is typically rupture of the EPS around the

fastener disk. Mechanical fasteners that are over-driven during installation can break the EPS and further reduce the wind-load resistance.



Long term durability of the bond of the adhesives is best demonstrated by cyclic load testing performed as part of our Miami-Dade County Missile Impact approvals. Systems are impacted by either large or small missiles (as defined by the Florida Building Code test method TAS 201). The impacted specimens are then tested by applying 50% of the design pressure for 600 cycles (1 second per cycle) followed by 60% of the design pressure for 70 cycles; followed by one cycle at 130% of design pressure. This demonstrates the ability of the system to maintain performance after large and small missile impact and repeated loading. StoTherm ci have been successfully tested in this manner for all Miami-Dade County NOA approved systems, which use our standard EIFS adhesives.

Construction and Economic

Considerations: The process of laying-out and installing fasteners is not as efficient as adhesive installation. Mechanical fasteners must be attached to the framing for gypsum substrates. This adds labor costs to the EPS installation process, in addition to the cost of the fasteners themselves.

Mechanical fasteners must be driven slightly into the EPS (without breaking the surface) to provide an acceptably flat plane for installation of the base coat. The fastener locations are typically "spotted" to level them with the surrounding wall and prevent any sagging of excess base coat at the fastener locations. This is an additional labor step compared to adhesive attachment. In addition rasping of the EPS is less efficient since free movement of the rasp is impeded by the fasteners and washers.

Aesthetic Considerations: Mechanical fasteners may be visible on the finished wall surface. Because of the design and installation of the fastener disks, additional base coat will be required to fill the fastener head locations. This results in different drying characteristics during construction, which can cause color variations in the finish coat.

The insulation value of the system is not continuous at the fasteners due to thermal bridging. Thus, the fastener locations are often visible as distinct spots during periods when dew or frost is on the wall. Over an extended period of time, with many cycles of wetting and drying, the fastener locations may become permanently visible unless the finish is cleaned and recoated.