

### Roof Insulation Fastening/Attachment

#### OVERVIEW

Effective immediately, the following fastener and plate quantities are required for the various size insulation boards, regardless of thickness, as the minimum for BITEC warranty issuance:

**2' x 4' boards:**

4 fasteners & plates per board

**3' x 4' boards:**

6 fasteners & plates per board

**4' x 4' boards:**

9 fasteners & plates per board

4' x 8' boards:

15 fasteners & plates per board

These minimum quantities are required, regardless of the specification, FM, UL or other requirements. Obviously, additional fasteners may be required for some situations, to meet certain UL or FM requirements.

While the fasteners noted in UL and FM approvals for various insulations may be adequate for wind uplift resistance, the forces created by building movement can be much greater and require more restraint. Adequate but reasonable restraint with more fasteners will provide a more stable substrate for any roofing membrane and therefore allow less chance for movement and stress buildup where insulation joints interface with the roof membrane.

Multiple layers of insulation provide additional stress planes to transfer and/or absorb building movement and can reduce the possibility of membranes being over-stressed. When two layers of insulation are installed with one set of fasteners through both layers, the bottom layer should be pre-secured to insure that joints do not open up before both layers are permanently fastened. Bottom layer boards of maximum size 4' x 4' need only two fasteners for pre-securement, but boards over 4' x 4' such as 4' x 8' need 4 fasteners per board. Top layer boards require the quantity as shown in the chart above.

BITEC does not recommend fastening both the base sheet and insulation together, especially over foamed plastic type insulations, however on the occasion where it is prohibitive to use hot asphalt for installing the base sheet and such mechanical fastening is necessary and receives pre-approval from BITEC's Technical Services Department, fasteners should be installed as follows for minimum warranty requirements:

- When screw and plate type fasteners are used, install fasteners 12" on center at the base sheet laps and 12" on center down the center of the sheet in a staggered pattern, so as not to be in a straight line. This pattern is not acceptable for nails.
- When insulation thickness does not exceed 1/2" and nails with caps are used, install fasteners 9" on center at the base sheet laps with two rows down the center of the sheet, each row 18" on center and each row staggered from the other row. These two center rows should be approximately 11" apart. The nails must be ring shank or spiral shank; smooth shank nails are not acceptable.
- Additional fasteners may be required to insure that no loose corners or edges of boards occur.

When UL, FM or other code requirements exist, it is the responsibility of the design professional, owner, contractor or others to insure that all minimum requirements are met. When possible or feasible, BITEC recommends that a layer of insulation be installed over the mechanically fastened layer with hot asphalt; maximum board size 4' x 4'.

Plastic type plates are not acceptable for use with torch applied systems.

Cap nails are not acceptable for fastening insulation over 1/2" thick.

The maximum board size for hot asphalt application should be 4' x 4'. All 4' x 8' insulation products should be mechanically fastened. Any deviations must be pre-approved by BITEC Technical Service Dept.

For any information on situations not covered by this Technical Bulletin or the General Requirements section of the BITEC Roofing Material Specifications and Details manual, contact the BITEC Technical Services Department.