



AIR & VAPOR BARRIER

ASTM D412 is the wrong test for sheet products

Many manufacturers of sheet flashings, air/vapor barrier and waterproofing products report test results using test method ASTM D412. This is a misleading test, to say the least, for sheet membrane products. ASTM D412 gives test results in PSI (pounds per square inch). ASTM D 412 is a useful test for characterizing solid rubber or elastomeric materials, but with a sheet material, what really matters is PLI (pounds per inch).

Backing up this claim - ICC-ES AC-38 prescribes tensile performance using test methods that measure pounds per inch, not PSI! The tests prescribed therein are ASTM D882, ASTM D828, and ASTM D5034. ICC-ES AC-38 requires a minimum tensile strength of 20 lb/in.

Consider the examples below – three different membrane products made from the same composition facer and adhesive, just different thicknesses

Example	PSI Value	PLI Value
Window Flashing: 20 mil composite membrane; 2 mil poly facer + 18 mil SBS mod asphalt adhesive	5,000 psi for the film 10 psi for the adhesive 509 psi for the membrane	10.2 lb/in
AVB Membrane: 40 mil composite membrane; 4 mil poly facer + 36 mil SBS mod asphalt adhesive	5,000 psi for the film 10 psi for the adhesive 509 psi for the membrane	20.4 lb/in
Waterproofing Membrane: 60 mil composite membrane; 4 mil poly facer + 56 mil SBS mod asphalt adhesive	5,000 psi for the film 10 psi for the adhesive 343 psi for the membrane	20.6 lb/in

For typical sheet composite products, the adhesive adds thickness but contributes very little tensile strength. In reporting PSI, the manufacturer is effectively penalized for adding more adhesive, even though the lb/in width of the membrane is unchanged. Worse, a product that is weaker can appear to have a

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higher psi if it is made thinner, as shown in the 20-mil window flashing versus 60-mil waterproofing example.

Furthermore, PSI is a value independent of the material's thickness. To know the strength of the sheet product, one would have to know the material's thickness, particularly that of the facer. Many manufacturers do not disclose the facer thickness of their sheet products. This makes the PSI value completely useless.

Solution – ***Don't use ASTM D412 for specifying the tensile strength of sheet products!*** For sheet products, specify tensile strength using any of the test methods cited in AC-38. Results must show the tensile strength of the finished composite sheet product in pounds per inch (lb_f/in). As facers often have directional sensitivity, make sure the test results for both machine direction and cross direction are published (or warp and weft for woven facers).

References:

International code Council Evaluation Services "ICC-ES" ACCEPTANCE
CRITERIA FOR WATER-RESISTIVE BARRIERS AC-38

ASTM D412 Standard Test Methods for Vulcanized Rubber and Thermoplastic
Elastomers—Tension

ASTM D882 Standard Test Method for Tensile Properties of Thin Plastic
Sheeting

ASTM D828 Standard Test Method for Tensile Properties of Paper and
Paperboard Using Constant-Rate-of-Elongation Apparatus

ASTM D5034, Standard Test Method for Breaking Strength and Elongation of
Textile Fabrics (Grab Test)