

# VINNAPAS® EP 8178

## A Novel Solution for Weather-Resistant Air Barriers with Excellent Water Resistance, Desirable Mechanical Properties and High Extender Loading Capability

### Liquid Applied Advantage

Weather-resistant air barriers are multi-functional, seamlessly protecting the sheathing from the elements prior to exterior cladding application. They then contribute to the integrity of the building envelope throughout the lifespan of the structure. Air barriers are the ideal choice for a high-performance, environmentally conscious home, decreasing drafts and energy costs and controlling moisture for a healthy indoor environment.

### Breathability

In the prevailing climate regions in the US and Canada, air barriers must be vapor permeable to allow moisture trapped in the wall to escape. Insufficient permeability can lead to moisture damage, causing costly callbacks and putting the health of the building's inhabitants at risk. VINNAPAS® EP 8178 is designed to be vapor permeable in low- and high-humidity environments but remains resistant to bulk water, such as from wind-driven rain.

### Vapor Permeability: ASTM E96

	Target	VINNAPAS® EP 8178 Formula
Wet cup	> 10	33.6
Dry cup	> 1	1.04



### Properties of VINNAPAS® EP 8178

Solids [wt. %]	69.5–71.5
T <sub>g</sub> [°C]	-3
Viscosity [mPa.s]	1,200–2,700
pH	4.5 – 5.5

### Air Penetration Resistance

VINNAPAS® EP 8178 has been shown to help make structures more airtight. A 14 mil free film of the VINNAPAS® EP 8178 model formula was able to pass the ASTM E2178 Air Penetration test at 0.0033 L/(s·m<sup>2</sup>) at 75 Pa, substantially below the maximum set forth by the ABAA and the IECC.

### Ease of Application

The liquid barriers can be spray- or roller-applied to the structure to form a continuous protective film. The VINNAPAS® EP 8178 model formula gives application latitude with a sag of >60 mils and film formation at 4 °C with no additional plasticizers or coalescing agents. The latter can be added to optimize performance in terms of flexibility, film formation, etc. in very cold regions. Windows and cracks will need to be caulked, but the air barrier alone is a sufficient seal over nail holes.

### Mechanical Properties

Formulas with insufficient elongation at break can be subject to tearing. The flexibility of the VINNAPAS® EP 8178 formula is excellent and is not diminished by exposure to water. A minimum of 200% elongation is recommended to prevent the coating from tearing in the field\*. The WACKER formula with VINNAPAS® EP 8178 not only meets this threshold but, with an elongation at break of nearly 400%, accommodates the natural increase in rigidity due to UV exposure.

### Water Resistance

VINNAPAS® EP 8178 imparts water resistance to the barrier coating, which is critical to protecting the OSB or plywood sheathing before the exterior cladding is installed. Analyses of commercial barrier coatings have indicated that uptake should be no more than 10%. Those exceeding this value are prone to increased field failures, including blistering and lack of long-term durability\*. The WACKER polymer was able to meet this threshold, demonstrating an advantage over commercial controls of varying chemistries.

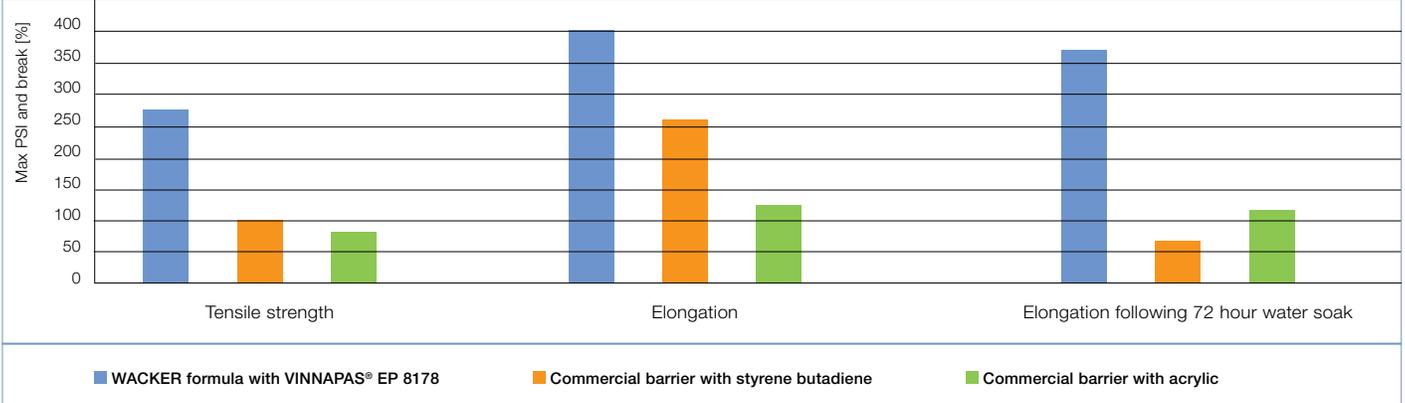
The barrier coating also needs to dry rapidly so that rain will not wash it off walls. The solids content of VINNAPAS® EP 8178 is high, allowing formulations to cure more quickly by minimizing the water content. We found that a 30 mil wet coat of the VINNAPAS® EP 8178 formulation over OSB was dry enough for exposure to rain after 90 minutes.

### Early Rain Resistance Test



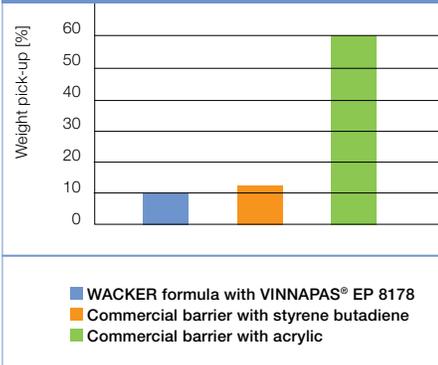
**WACKER** formula containing VINNAPAS® EP 8178 vs. a commercial barrier containing an acrylic in a test to simulate early rain resistance. The WACKER formula remains intact after a 30 minute cure while the other has washed away.

### Mechanical Properties: ASTM D412



Comparison between the mechanical properties of VINNAPAS® EP 8178 and those of competitive, commercially available materials based on differing chemistries. Note the WACKER product excels in both tensile strength and elongation at break. The superior elongation, which is not diminished by immersion in water, indicates a better resistance to tearing failures following exposure to weathering. Free films with a dry thickness of 15 mils (after drying for two weeks) were pulled at a rate of 1 inch per minute.

### Water Swell: 24 Hour Free Film Water Absorption



WACKER VINNAPAS® EP 8178 meets the critical maximum 10% water absorption threshold, retaining its original shape. Products with high absorption, such as the barrier based on an acrylic polymer, spread and blister upon exposure to water.

### At a Glance: Benefits of VINNAPAS® EP 8178

- Contributes to increased airtightness
- Good water vapor permeability
- Low water absorption
- High tensile strength and elongation
- Quick drying
- High extender loading possible
- Low VOC capable formulations possible (<10 g/L)
- APEO free

\* Wissink, Katherine S., Bashaw, Laura K., and Ruggiero, Stephen S., "Comparative Analysis of Fluid-Applied Air Barrier Products," Building Walls Subject to Water Intrusion and Accumulation: Lessons from the Past and Recommendations for the Future, STP 1549, Jeff Erdly and Paul Johnson, Eds., pp. 187–201, doi:10.1520/STP154920130054, ASTM International, West Conshohocken, PA 2014.



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