HUNTSMAN
BUILDING SOLUTIONS

ICYNENE® HFO/MAX

Icynene® HFO Max is a two component, closed cell, spray applied, rigid polyurethane foam system. This product uses recycled plastic materials, rapidly renewable soy oils, and the blowing agent has zero ozone depleting potential. Icynene HFO Max complies with the intent of the International Code Council's residential and commercial building codes and is commonly used as a thermal insulation, air barrier, vapor retarder and water resistive barrier in above grade, below grade, interior and exterior applications.

PHYSICAL PROPERTIES		
ASTM D 1622	Core Density	2.0 lb/ft³
ASTM C 518	Aged Thermal Resistance (R-value @ 1 inch)	R-6.3 @ 1", R-26 @ 3.5"
ASTM E 283	Air Leakage @ 75 Pa @ 1"	< 0.02 L/sm²
ASTM E 2178	Air Permeance @ 75 Pa @1"	< 0.02 L/sm²
ASTM E 2357	System Air Leakage Rating Opaque Wall: Air Exfiltration 75 Pa (1.57 pcf) Penetrated Wall: Air Exfiltration 75 Pa (1.75 pcf)	< 0.02 L/sm² < 0.02 L/sm²
ASTM E 96	Water Vapor Permeance (Summer @ 1.625", Winter @ 1.1")	< 1.56 perms
	Qualifies as a Class II vapor retarder per IBC Section 202	1.875"
ASTM D 2842	Water Absorption (volume)	0.87%
ASTM D 1621	Compressive Strength at 10% Deformation	34.8 psi
ASTM D 1623	Tensile Strength	101.3 psi
ASTM D 2126	Dimensional Stabliity @ 158ºF 97% R.H. (168 hours)	-3.7% (% volume change)
VOC Emissions	Low VOC	Meets Criteria
ASTM C 1338	Fungi Resistance	No fungal growth
ASTM C 1029	Standard specification for spray applied rigid cellular polyurethane thermal insulation	Type II Compliant

FIRE TEST RESULTS		
ASTM E 84	Surface Burning Characteristics, 4" thick Summer – Flame Spread Index Summer – Smoke Developed Winter – Flame Spread Index Winter – Smoke Developed	Class I 10 - 15 350 - 400 5 250 - 300
AC 377 Appendix X	Ignition Barrier – Compliant with, 2012, 2015, 2018 & 2021 IBC and IRC, and ICC-ES AC-377 Appendix X, for use in attics and crawl spaces without a prescriptive ignition barrier or intumescent coating.	Pass
NFPA 286	Thermal Barrier - Compliant with the IBC and IRC, as an interior finish with an intumescent coating thickness found at the corresponding table.	Pass
ASTM D 1929	Ignition Properties (spontaneous ignition temperature)	Summer – 1010°F (543°C) Winter – 932°F (500°C)

THERMAL BARRIER THICKNESS REQUIREMENTS		
Coating	Mils wet film thickness	Mils dry film thickness
DC 315	18	12
No Burn Plus ThB	18	12

RECOMMENDED PROCESSING PARAMETERS*	
Initial Primary Heater A-Side (ISO) Setpoint**	92 - 106°F
Initial Hose Heat Setpoint**	102 - 115°F
Initial Primary Heater B-Side (Resin) Setpoint**	98 - 115°F
Initial Processing Setpoint Pressure	1200 - 1400 psi
Drum Temperature During Storage	59 - 77°F
Drum Temperature During Processing	65 - 77°F
Substrate & Ambient Temperature	Summer > 50°F | Winter > 15°F
Moisture Content of Substrate	≤19%
Moisture Content of Concrete	Concrete must be cured, dry, and free of dust and form release agents.

*Foam application temperatures and pressures can vary widely depending on temperature, humidity, elevation, substrate, equipment and other factors. While processing, the applicator must continuously observe the characteristics of the sprayed foam and adjust processing temperatures and pressures to maintain proper cell structure, adhesion, cohesion and general foam quality. It is the sole responsibility of the applicator to process and apply Icynene HFO Max within specification.

**It may be necessary to go outside of the recommended processing parameters or split temps due to ambient temps and material viscosity.

RECOMMENDED MAXIMUM PASS THICKNESS		
Ambient Temperature	Maximum Pass	Dual Pass (x" + x")
≤ 70°F	6.5"	3.25" + 3.25"
> 70°F; <80°F	4"	3.25" + 3.25"
>80°F	3.25"	3.25" + 3.25"

REACTIVITY PROFILE			
Cream Time 0 – 1 seconds	Gel Time 2 seconds	Tack Free Time 3 – 4 seconds	End of Rise 3 – 4 seconds

LIQUID COMPONENT PROPERTIES		
PROPERTY	A-PMDI ISOCYANATE	ICYNENE HFO MAX RESIN
Color	Brown	Blue
Viscosity @ 77°F (25°C)	180 – 220 cps	Summer – 250 – 350 cps Winter – 200 – 300 cps
Specific Gravity	1.24	Summer – 1.17 – 1.21 Winter – 1.20 – 1.22
Shelf Life of unopened drum properly stored	12 months	6 months
Storage Temperature	50 – 100°F	59 – 77°F
Mixing Ratio (volume)	1:1	1:1

*See SDS for more information.

RECYCLED & RENEWABLE CONTENT	
Finished Foam Renewable and Recycled Content	Summer – 22.7%, Winter – 21.0%
Polyol Renewable Content	Summer – 8%, Winter – 8%
Polyol Recycled Content	Summer – 37.4%, Winter – 34%

LIMITATIONS OF USE: Icynene HFO Max is a combustible material with a maximum continuous service temperature of 180°F (82°C). Icynene HFO Max should not be used in direct contact with chimneys, flues, steam pipes, recessed lighting or heat emitting devices. Consult the listing or label of such materials for clearance to combustibles. A minimum clearance of 3" should be maintained when applying around recessed lighting, and it's important to avoid spraying inside electric outlets or junction boxes. Properly prep and secure any material or surface that should not get insulated. If in doubt about the substrate temperature or surface conditions, a trial application should be conducted to check foam quality and spray performance. Water on the surface from rain, fog, condensation, etc. will react chemically with the isocyanate, adversely affecting the foam and physical properties, particularly adhesion.

GENERAL REQUIREMENTS: Equipment must be capable of delivering the proper ratio (1:1 by volume) of polymeric isocyanate (PMDI) and polyol blend at adequate temperatures and spray pressures. Substrate must be at least 5 degrees above dew point, with best processing results when ambient humidity is below 80%. Substrate must also be free of moisture (dew or frost), grease, oil, solvents and other materials that would adversely affect adhesion of the polyurethane foam. Applicators should limit the application of this product to no more than a thickness of 6.5" per pass (after expansion) to avoid fire hazards (including spontaneous combustion) resulting from excessive heat generation. If subsequent passes are needed, applicators should wait until the core temperature of the foam has dropped below 100°F to allow any reaction heat to dissipate from the prior applications before attempting to reapply the product. Icynene HFO Max must be separated from the interior of the building by an approved thermal barrier or an approved finish material equivalent to a thermal barrier in accordance with applicable codes. Icynene HFO Max must be sprayed at a minimum thickness of 1" per pass. This product must not be used when the continuous service temperature of the substrate or foam is below -60°F (-51°C) or above 180°F (82°C). Icynene HFO Max should not be used to cover flexible ductwork.

DISCLAIMER: The information herein is to assist customers in determining whether our products are suitable for their applications. We request that customers inspect and test our products before use and satisfy themselves as to contents and suitability. Nothing herein shall constitute a warranty, expressed or implied, including any warranty of merchantability or fitness, nor is protection from any law or patent inferred. All patent rights are reserved. The foam product is combustible and must be protected in accordance with applicable codes. Protect from direct flame and spark contact, around hot work for example. The exclusive remedy for all proven claims is replacement of our materials.

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