



# Physical Properties of Molded and Modified EPS

## I. ASTM SPECIFICATIONS

Parts molded from Flint Hills Resources modified expandable polystyrene (EPS) will comply with the following standards when produced in accordance with the manufacturer’s recommendations. Flint Hills Resources participated in the development of ASTM-C578 through membership in ASTM, C-578 Committee and Industry Trade Association involvement, and laboratory proficiency testing, including third party verification.

### ASTM C-578 “Standard Specifications for Preformed, Cellular Polystyrene Thermal Insulation”

Table 1.0

ASTM Classification	Type XI	Type I	Type VIII	Type II	Type IX	Type XIV
Compressive resistance at yield or 10% deformation, whichever occurs first (with skins intact), min, psi (kPa) per ASTM D1621	5.0 (35)	10.0 (69)	13.0 (90)	15.0 (104)	25.0 (173)	40.0 (276)
Thermal resistance of 1.00-in. (25.40mm) thickness, min, F-ft <sup>2</sup> -h/Btu (K·m <sup>2</sup> /W) Mean temperature: 75 + 2°F (24 + 1°C) per ASTM C177/C-518	3.10 (0.55)	3.60 (0.63)	3.80 (0.67)	4.00 (0.70)	4.20 (0.74)	4.20 (0.74)
Flexural strength, min, psi (kPa) per ASTM C-203	10.0 (70)	25.0 (173)	30.0 (208)	35.0 (240)	50.0 (345)	60.0 (414)
Water vapor permeance of 1.00-in. (25.40mm) thickness, max, perm (ng/Pa-s-m <sup>2</sup> ) per ASTM E-96	5.0 (287)	5.0 (287)	3.5 (201)	3.5 (201)	2.0 (115)	2.5 (143)
Water absorption by total immersion, max, volume % per ASTM C-272	4.0	4.0	3.0	3.0	2.0	2.0
Dimensional stability (change in dimensions), max, %	2.0	2.0	2.0	2.0	2.0	2.0
Oxygen index, min, volume % per ASTM D-2863	24.0	24.0	24.0	24.0	24.0	24.0
Density, min, lb/ft <sup>3</sup> (kg/m <sup>3</sup> ) per ASTM C-303	0.70 (12)	0.90 (15)	1.15 (18)	1.35 (22)	1.80 (29)	2.40 (38)

**ASTM C-578 - Continued**

**“Standard Specifications for Preformed, Cellular Polystyrene Thermal Insulation”  
Thermal Resistance Values at Additional Mean Temperatures Table 1.1**

Property						
Density, min, lb/ft <sup>3</sup> (kg/m <sup>3</sup> ) per ASTM C-177/C-518	0.70 (12)	0.90 (15)	1.15 (18)	1.35 (22)	180 (29)	2.40 (38)
Thermal resistance of 1.00-in. (25.4-mm) thickness, min, F-ft <sup>2</sup> -h/Btu (K-m <sup>2</sup> /W) Mean temperature:						
25°F (-3.9°C) +2°F (+1°C)	3.45 (0.61)	4.20 (0.74)	4.40 (0.77)	4.60 (0.81)	4.80 (0.84)	4.80 (0.84)
40°F (4.4°C) +2°F (+1°C)	3.30 (0.58)	4.00 (0.70)	4.20 (0.74)	4.40 (0.77)	4.60 (0.81)	4.60 (0.81)
110°F (43.3°C) +2°F (+1°C)	2.90 (0.51)	3.25 (0.57)	3.45 (0.61)	3.65 (0.64)	3.85 (0.69)	3.85 (0.69)
ASTM Classification or Type	XI	I	VIII	II	IX	XIV

**II. OTHER PROPERTIES**

There are a number of other important characteristics not required by the standards that are frequently requested by specifiers and regulatory agencies. These properties are shown in the following table:

**Flint Hills Resources Modified Expanded Polystyrene Typical Physical Properties at 1 - lb/cu. ft.**

	UNITS	ASTM TEST	VALUE
<b>SHEAR PROPERTIES</b>			
		C-273	
Ultimate Load	lbs.		370
Shear Strength	psi		16
Shear Modulus	psi		440
<b>TENSION PROPERTIES</b>			
		C-297	
Ultimate Load	lbs.		490
Tensile Strength	psi		28
Type of Failure			Sudden
Location of Failure			Core
<b>BREAKING LOAD AND FLEXURAL PROPERTIES</b>			
		C-203	
Breaking Load	lbs.		26
Modulus of Elasticity	psi		915

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