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EPS vs. XPS - High Density

Amvic is a leading producer of high compressive strength, commercial grade Expanded Polystyrene (EPS) insulation. Understanding the differences between the types of rigid foam insulation, Expanded Polystyrene (EPS) and Extruded Polystyrene (XPS) can save up front material cost and improve performance for the life of the building. Below is a comparison between high compressive strength Type XIV & XV EPS (EN40 and EN60 respectively) and Type VI & Type VII XPS (high load 40 and 60 respectively).

EPS and XPS are both manufactured using Polystyrene resin, EPS resin is expanded using steam then molded to form a closed cell material that uses trapped air as its insulation medium, the foam is cut using a hot wire into specified dimensions. EPS does not contain HFCs, formaldehyde or color dyes (the natural color is white).

XPS resin is melted in an extruder, a blowing agent is added under high pressure where it is dissolved into the polystyrene melt, then extruded through a die to form a closed cell material that uses trapped gas as its insulating medium. XPS may contain color dies such as pink, green or blue, which may contain formaldehyde. Specified dimensions require different size dyes which is not as economical as a hot wire cut potentially creating cost savings.

Due to the high vapor permeability of EPS, the boards are able to dry out much faster allowing them to maintain their thermal resistance characteristics for a longer period of time, see Amvic's EPS vs. XPS - Water Absorption technical bulletin.

Physical Properties Table

	Standard		EN40 (HD)	EN60 (HD)	XPS 400	XPS 600
Specification for Rigid Polystyrene Insulation	CAN/ULC-S701		Type 3	Type 3	Type 4	Type 4
	ASTM C578		Type XIV	Type XV	Type VI	Type VII
Thermal Resistance	ASTM C518	$F.ft^2.hr/Btu$	4.3	4.4	5.0	5.0
	@ 75°F (24°C) per 1" (25mm)	(m^2K/W)	(0.75)	(0.77)	(0.88)	(0.88)
Compressive Strength	ASTM D1621	psi	40	60	40	60
	@ 10% Strain	(kPa)	(276)	(414)	(276)	(414)
Water Absorption	ASTM D2842	%	1.30	0.80	0.30	0.30
Water Vapor Permeance	ASTM E96	US perms	1.75	1.80	1.10	1.10
		($ng/Pa.s.m^2$)	(100)	(103)	(62.9)	(62.9)
Flexural Strength	ASTM C203	psi	63.7	105.0	60	75
		(kPa)	(439)	(726)	(414)	(517)
Density	ASTM D1622	lb/ft^3	2.50	3.50	1.80	2.20
		(kg/m^3)	(40.0)	(56.0)	(28.8)	(35.2)

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