Plasti-Fab EPS PRODUCT SOLUTIONS
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Product Information Bulletin

ASTM C578 PlastiSpan Insulation for High Compressive Load Applications

PlastiSpan® insulation is a closed cell expanded polystyrene (EPS) insulation that meets the requirements of ASTM C578**, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation**. The closed cell structure of ***PlastiSpan*** insulation resists water absorption so it will retain its thermal resistance even in applications where severe temperature differentials occur.

Table 1 – PlastiSpan Insulation Material Properties

Material Property	Test Method	Units	PlastiSpan Insulation Types			
			HD	25	40	60
Nominal Density	NA	pcf	1.50	2.0	2.50	3.00
Compressive Resistance *Minimum @ 10% Strain*	ASTM D1621	kPa (psi)	110 (16)	170 (25)	276 (40)	276 (60)
Compressive Resistance[1] *Minimum @ 1% Strain*		kPa (psi)	45 (6.5)	60 (8.7)	103 (15.0)	180 (26.1)
Compressive Modulus *Minimum*		kPa (psi)	4,500 (650)	6,000 (870)	10,345 (1,500)	18,000 (2,610)
Thermal Resistance *Minimum per 25 mm (1 inch)*	ASTM C518	$m^2 \cdot °C/W$ ($ft^2 \cdot h \cdot °F/Btu$)	0.70 (4.04)	0.74 (4.27)	0.75 (4.3)	0.75 (4.3)
Flexural Strength *Minimum*	ASTM C203	kPa (psi)	240 (35)	300 (44)	414 (60)	517 (75)
Water Vapour Permeance[2] *Maximum*	ASTM E96	ng/(Pa·s·m^2) (Perms)	200 (3.5)	130 (2.25)	90 (1.5)	90 (1.5)
Water Absorption[3] *Maximum*	ASTM C272	% By volume	3.0	2.0	2.0	2.0
Dimensional Stability *Maximum*	ASTM D2126	% Linear Change	2.0			
Limiting Oxygen Index *Minimum*	ASTM D2863	%	24			
Flame Spread Index	ASTM E84	Index	<25			
Smoke Developed Index	ASTM E84	Index	<450			
Density *Minimum*	ASTM D1622	pcf	1.35	1.80	2.40	3.00
Product Type	ASTM C578	NA	II	IX	XIV	XV

1. Compressive resistance at 1% strain is within the elastic limit for PlastiSpan insulation and is accepted as the design compressive resistance to limit long-term deformation under structural load.
2. WVP values quoted are maximum values for 1-inch thick samples with natural skins intact. Lower values will result for thicker materials.
3. The water absorption values are applicable to specific end-use design requirements only to the extent that the end-use conditions requires submersion under a head of water for an extended period of time.

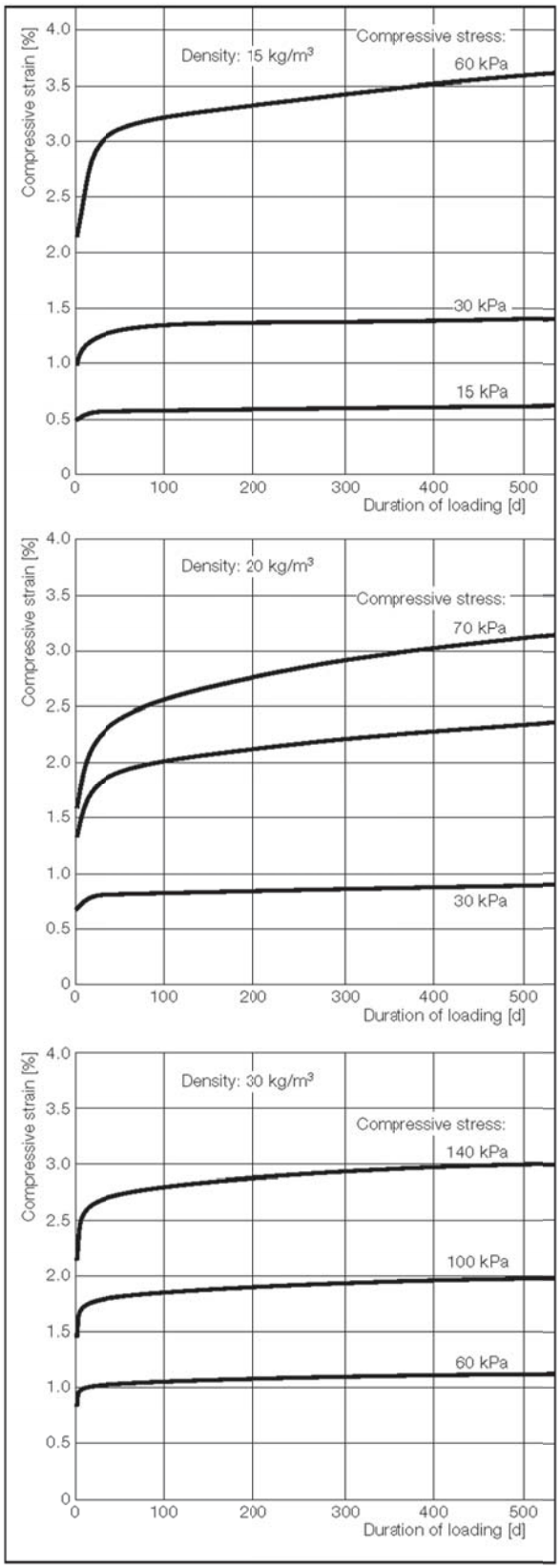

Figure 1 – *Compression as a Function of Time*

PlastiSpan insulation is available with a range of compressive resistance values which makes it ideal to insulating floors, foundations or any application where heavy loads are expected. PlastiSpan insulation material property values for use in load bearing applications are provided below.

Compressive resistance is the most important mechanical property for PlastiSpan insulation used in applications where compressive loads will be applied in the end-use application. The compressive resistance depends primarily on the bulk density with compressive resistance increasing as the bulk density increases.

Figure 1 provides examples of compressive creep curves (change in thickness versus log time) for EPS specimens of three different densities when subjected to various constant loads over a long period. As can be seen, the greatest compressive strain occurs after initial application of load and as the load remains in place for a longer period of time, the strain per unit time decreases. The graphs indicate that if the initial compressive strain is less than 1%, it can be expected that the thickness of the PlastiSpan insulation will not change much more over long loading periods.

This is because compressive resistance at 1% strain is within the elastic limit for the higher strength PlastiSpan insulation types in table 1 and is accepted as the design compressive resistance to limit long-term deformation under structural load.

Compressive resistance at 10% strain is not used for design purposes when an insulation material will be under compressive load. It is typically used for quality control purposes.

Compressive resistance at strain beyond the elastic limit may be applicable for design purposes when the end-use application requires long-term deformation under structural load. One example of this type of application is compressible fill material applications where the EPS is acting as a compressible medium between an expansive soils and a structural element. For additional technical information on GeoVoid® and GeoSpan® compressible fill materials see Plasti-Fab Product Information Bulletin no. 277.