

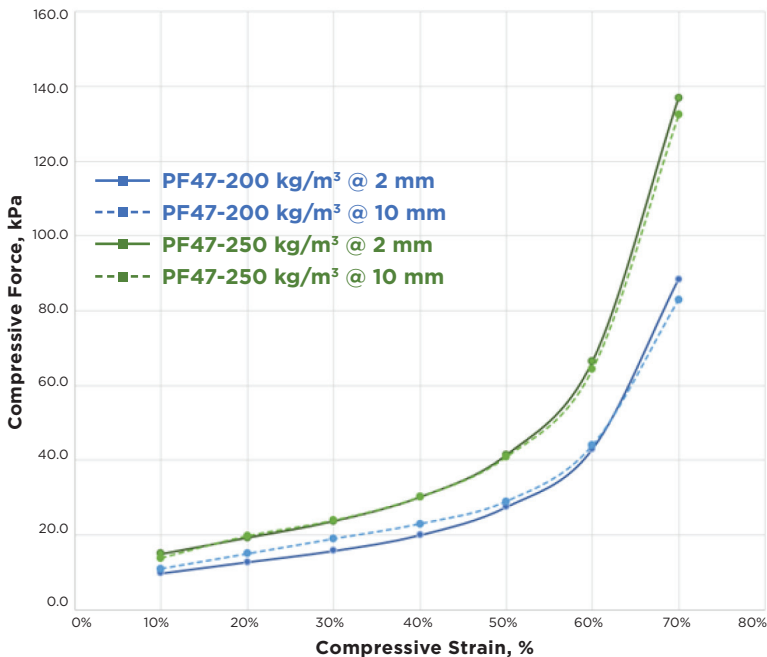
PF47 SERIES

Norseal® PF47 Series, Micro-Cellular Polyurethane Foams

Norseal PF47 Series is manufactured by **Saint-Gobain®** Performance Plastics Corporation, Tape Solutions business, and features enhanced micro-cellular polyurethane foam solutions, specifically developed for efficient functioning of batteries in a pack.

Uniformity of cell temperature and cell pressure is needed for a long battery life. The compressed foam between cells creates uniform pressure over the cell surface. The thermal insulation properties of the foam also help to maintain the cell face temperature. These properties and resulting function of the foam are very consistent over time and over a range of environmental conditions, ensuring a long life for the pack.

The key to performance is seen in the Compression Force Deflection (CFD) curve. **Norseal** PF Cushion Pads provide a flat CFD curve over a wide range of deflection, as shown here.



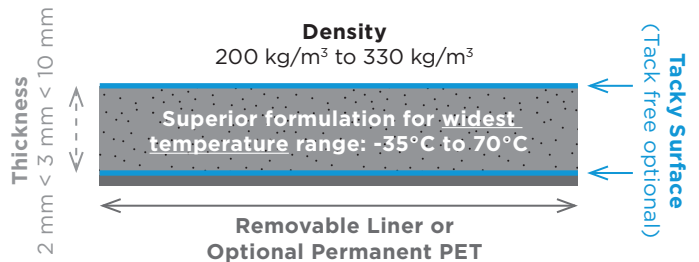
Measurements are based on preliminary trials meant for informative purposes and not specification on design.

APPLICATIONS

- Compression/tolerance pads for lithium-ion pouch and prismatic cell packs
- Cushioning and insulation for thermistors in lithium-ion battery packs



- ✓ Environmental impacts assessed (Life Cycle)
- ✓ Environmental Product Declaration verified



Norseal PF47 Series – Properties

Performance tests are run using standard test procedures. The values presented are typical values and should not be used for specification purposes.

Properties	Test Method	PF47-200	PF47-250	PF47-290
PHYSICAL		Typical Value		
Density, kg/m ³ (lb/ft. ³)	ASTM D3574	200 (12.5)	250 (16)	290 (18.1)
Shrinkage, %		<2		
Thickness, mm (in)		2.0 - 10.0 (0.08 - 0.4)		
Thickness tolerances (%)		+/- 15 (2 to 3) +/- 10 (>3)		
Usable width, mm	-	1360		
Standard color	-	Black		
Standard liner	-	Paper		
Compression set (@ 70%, 7 days), % @ 23°C (73°F) @ 70°C (158°F)	ASTM D1667	<5 <10		<5 <5
Typical compression force deflection, kPa (psi) 50 mm / min @ 30% deflection	ASTM D1667	18 (2.6)	30 (4.3)	42 (6)
THERMAL				
Temperature resistance, °C (°F)	Recommended constant use, max. Recommended intermittent, max.	70 (158) 121 (250)		
Thermal conductivity, W/mK	ISO 8302 (50% compression) ASTM C518 (10% compression)	0.07 —	— 0.03	— 0.04
Low temperature cold flex	-40°C w/25 mm mandrel	Pass		
ELECTRICAL				
Breakdown strength, DC, kV/mm (V/mil)	ASTM D3755 @ 10%	3.2 (81.1)	2.7 (70)	3.0 (76.8)
Surface resistivity, ohm/sq	ASTM D257	1 × 10 ¹⁰		1 × 10 ¹²
Volume resistivity, ohm.cm	ASTM D257	1 × 10 ¹¹		
FLAME				
Resistance	ASTM D4986 (self extinguishing equivalent to UL94-HBF)	Pass		Pending

Options (subject to minimum order requirements)

- Please note that density can be optimized upon customer requirements. Higher density (increased stiffness/CFD) possible up to 330 kg/m³
- Custom thickness (from 2 mm to 10 mm)
- Tack-free surface
- Permanent or removable PET liner
- Acrylic based adhesive

Recommended Storage Conditions

Store at 15°C to 35°C (59°F to 95°F) with 30% to 60% humidity. Protect from sunlight and UV exposure, ensure good ventilation, avoid heavy stacking to prevent deformation. Store packed logs vertically and/or follow specific packaging instructions.

Shelf Life (when stored as indicated above)

Foam without adhesive: 24 months from the date of sales.

Foam with adhesive: 12 months from the date of sales.

IMPORTANT: It is the user's responsibility to ensure the suitability and safety of Saint-Gobain products for all intended uses and that the materials to be used comply with all applicable regulatory requirements. Saint-Gobain assumes no responsibility for any product failures that occur due to your actions or inactions, including your use, design, fabrication or application of the products into which the materials are incorporated.

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