

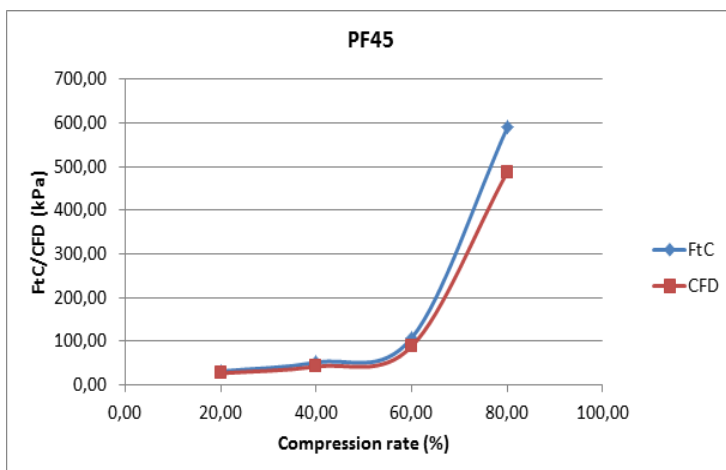
NORSEAL® PF45 Series, Micro-Cellular Polyurethane Foams

The NORSEAL® PF series are enhanced, micro-cellular polyurethane foam solutions for packaging of **pouch and prismatic lithium ion cells**. A range of products are available in this line as a result of working on many **EV projects** of varying designs and functional needs. Importantly, the properties and resulting function of the foam is very consistent over time and consistent over a range of environmental conditions.

Uniformity of cell temperature and cell pressure is needed for a **long battery life**. The compressed foam cushion between cells create uniform pressure over the cell surface. The thermal insulation properties of the foam also helps to keep the cell face temperature.

The **key to performance** is seen in the Compression Force Deflection (CFD) curve. Saint-Gobain NORSEAL® PF cushion pads provide a flat CFD curve over deflection, and this CFD curve remains flat over a range of environmental temperatures and over time.

NORSEAL® PF series is available without acrylic adhesive on one side.



Features & Benefits

- High resiliency performance over complete compression range
- Excellent elastic recovery
- Remains conformable and flexible even at low temperatures
- With or without adhesive
- Easy to die-cut

NORSEAL® PF45 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	PF45
PHYSICAL		
Density, kg/m ³ (lb/cu.ft.)	ASTM D3574	250 (16)
Shrink		<2%
Thickness, mm (in)		2.0 - 2.5 - 3.0 - 3.5 - 4.0 (.08 - .10 - .12 - .14 - .16)
Standard colour	-	Black
Liner	-	Paper
Compression set (@70%), % @23°C (73°F) for 7 days @70°C (158°F) for 7 days	ASTM D3574 Test D	<3 <10
Compression force deflection, kPa (psi) 50 mm/min @20% deflection @60% deflection	ASTM D3574 Test C	25 - 35 (3.6 - 5.1) 85 - 105 (12.47 - 15.23)
Force to compress, kPa (psi) 50 mm / min @20% 50 mm / min @60%	ASTM 3574 Test C	30 - 40 (4.3 - 5.8) 99 - 121 (14.3 - 17.5)
Hardness, durometer, Shore OO	ASTM D2240	40
Water absorption, % wt gain	AMS 3568-b	<4
THERMAL		
Temperature resistance, °C (°F)	Recommended constant use, max. Recommended intermittent, max.	70 (158) 121 (250)
Thermal Conductivity, @50%, W/M-C	ASTM D5470	0.1
Low temperature cold flex	-40°C w/25 mm mandrel	Pass
ELECTRICAL		
Surface resistivity, ohm/sq	ASTM D257	10 x 10 ¹²
Volume resistivity, ohm.cm	ASTM D257	1.0 x 10 ¹⁴
Dielectric strength, AC, volts/mil	ASTM D149, Method B, @10%	49
Dielectric strength DC, volt/mil	ASTM D3755 @50% @10%	321 157
Dielectric breakdown DC, KV	ASTM D3755 @50%	23
Dielectric constant	ASTM D150 @1Khz	2.2
FLAME		
Flame resistance	ASTM D4986 (self extinguishing)	Pass
Glow wire test, GWFI, C	IEC 60695	650

NORSEAL® is a registered trademark of Saint-Gobain Performance Plastics. PF-Series was formerly branded as Protection+.



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