V74CF

Precision Polymer Engineering

Fluorosurfactant free ultra-low compression set fluoroelastomer

V74CF is a fluorosurfactant-free alternative to V74C, a PPE grade developed to offer extremely low compression set combined with excellent heat ageing properties.

V74CF uses a fluorosurfactant-free version of the polymer used in V74C. The two materials are otherwise compounded and processed identically.

Testing has been carried out that shows, as detailed below, strong alignment between the original and NFS (non-fluorosurfactant) versions from a thermal and mechanical perspective.

Material Properties	Method	V74C	V74CF
Hardness (Shore A)	ASTM D2240	76	76
Hardness (IRHD)	ASTM D1415	78	80
Density (g/cm^3)	ASTM D792	1.84	1.85
Tensile Strength (MPa)	ASTM D412	12.2	13.4
Elongation at Break (%)		193	191
Modulus @ 50% (MPa)		3.0	3.4
Modulus @ 100% (MPa)		6.1	6.9
Compression Set% (24 h @ 200°C / 392°F)	ASTM D395 Method B	6	7
Compression Set% (24 h @ 200°C / 392°F)	ISO 815 Method B	10	10
Compression Set% (24 h @ 200°C / 392°F)	ISO 815 Method C	7	7
Compression Set% (72h @ 200°C / 392°F)	ASTM D395 Method B	11	14
Compression Set% (72h @ 200°C / 392°F)	ISO 815 Method B	16	16
Compression Set% (72h @ 200°C / 392°F)	ISO 815 Method C	12	14
Compression Set% (168h @ 200°C / 392°F)	ASTM D395 Method B	16	19
Compression Set% (336h @ 200°C / 392°F)	ASTM D395 Method B	25	29
Compression Set% (500h @ 200°C / 392°F)	ASTM D395 Method B	29	32

Table comparing typical properties of original material against new NFS version

V74CF is part of PPE's range of fluorosurfactant-free fluoroelastomer materials. It has been developed to be more environmentally sustainable.

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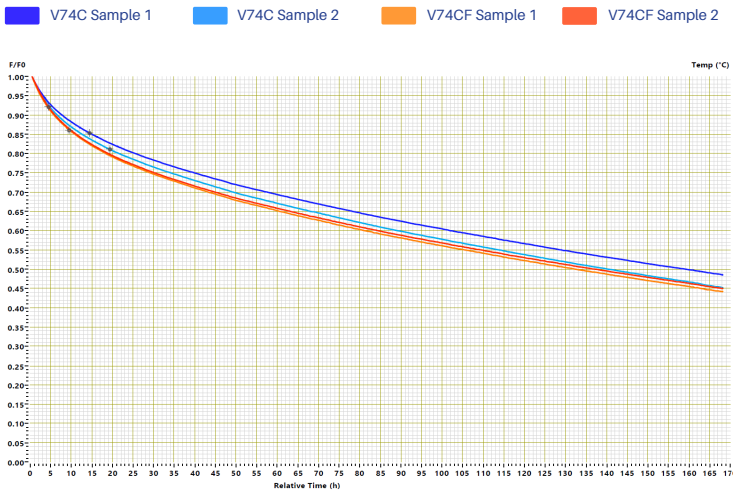
Thermal Performance: (High Temperature)



High temperature performance has been compared using compressive stress relaxation ISO 3384-1 Method B at a constant temperature of 240°C (464°F) for 168 hours with -214 O-Rings under 25% compression.

The results show a high degree of correlation between the original and NFS materials under these conditions.

Stress relaxation is a reduction in the counter-force for maintaining the applied strain; the force is not constant but decreases with time when the material ages.

Thermal Expansion:

The Coefficient of thermal expansion (CTE) has been compared using a thermomechanical analyser (TMA).

The results show a good degree of correlation between the original and NFS materials.

Material Grade	Coefficient of Thermal Expansion µm/(m °C)
V74C	154 µm/(m °C)
V74CF	155 µm/(m °C)

TMA: Comparable Coefficient of Thermal Expansion

Thermal Performance: (Low Temperature)

Low temperature flexibility has been compared using the midpoint Glass Transition Temperature (Tg) obtained through Differential Scanning Calorimetry (DSC) ASTM D3148.

The results show a high degree of correlation between the original and NFS materials.

Material Grade	Glass Transition Temperature (°C)
V74C	-16°C / 3.2°F
V74CF	-16°C / 3.2°F

DSC: Comparable Glass Transition Temperature