Tecnoflon® FOR 4391

Cure Incorporated Terpolymer

Tecnoflon® FOR 4391 is a medium viscosity cure incorporated fluoroelastomer terpolymer (FKM) with high fluorine content (70 % wt). Tecnoflon® FOR 4391 is designed for applications requiring outstanding fuel and chemical resistance.

Some of the basic properties of Tecnoflon® FOR 4391 are:

- Good scorch safety
- Reduced mold fouling
- Excellent mold release
- Excellent resistance to fuels
- Very good heat resistance
- Very good compression set

Tecnoflon® FOR 4391 can be used for compression, injection and transfer moulding of shaft seals, valve stem seals, gaskets or any item requiring excellent chemical resistance.

This material can be combined with the cure system and other typical fluoroelastomer compounding ingredients. Mixing can be accomplished with two-roll mills or internal mixers.

Tecnoflon® FOR 4391 can be extruded into hoses or profiles and can be calendered to make sheet stocks or belting. Finished goods can be produced by a variety of rubber processing methods.

Handling and safety

Normal care and precautions should be taken to avoid skin contact, eye contact and inhalation of fumes. Smoking is prohibited in working areas. Wash hands before eating or smoking. For complete health and safety information, please refer to the material safety data sheet.

The basic characteristics of the raw polymer are as follows:

Property	Typical Value
ML (1+10') at 121 °C	49
Fluorine content [%]	70
Specific gravity [g/cc]	1.89
Color	Off white
Packaging/form	Slabs
Solubility	Ketones and esters

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Typical rheological properties

Test Compound	Results	Unit	Test Method
Tecnoflon® FOR 4391	100	phr	
MgO-DE	3	phr	
$Ca(OH)_2$	6	phr	
N-990 MT carbon black	30	phr	

Property	Results	Unit	Test Method
Mooney viscosity ML (1+10') at 121 °C	82	MU	ASTM D1646
Mooney scorch MS 135 °C			ASTM D1646
MV	35	MU	
t_{15}	39	min	
MDR 12 min at 177 °C arc 0.5 °			ASTM D6601
Minimum torque	1.3	lb*in	
Maximum torque	23	lb*in	
t_{s2}	1.8	min	
t'_{50}	2.2	min	
t'_{90}	2.9	min	

Typical physical properties

Mechanical Properties	Results	Unit	Test Method
Press cure: 10 min at 170 °C			
Post cure: (8+16) h at 250 °C			
100 % Modulus	5.9	MPa	ASTM D412C
Tensile strength	16.0	MPa	
Elongation at break	241	%	
Hardness	78	ShoreA	
Compression set 25 % deformation, ASTM D395 method B, 70 h at 200 °C			ASTM D395 method B
#214 O-Ring	32	%	
6 mm Buttons	29		

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Chemical resistance

Test Compound	Results	Unit
Tecnoflon® FOR 4391	100	phr
MgO-DE	3	phr
$Ca(OH)_2$	6	phr
N-990 MT carbon black	30	phr

Fluid	Results	Unit
FAM B, 70 h at 60 °C		
Δ Tensile strength	−48	%
Δ Elongation at break	−4	%
Δ Hardness	−20	Points
Δ Volume	+20	%
Fuel C, 70 h at 60 °C		
Δ Tensile strength	−20	%
Δ Elongation at break	−14	%
Δ Hardness	−14	Points
Δ Volume	+16	%
Fuel H, 70 h at 23 °C		
Δ Tensile strength	−23	%
Δ Elongation at break	−8	%
Δ Hardness	−3	Points
Δ Volume	+7	%
Methanol, 48 h at 23 °C		
Δ Tensile strength	−24	%
Δ Elongation at break	+4	%
Δ Hardness	−3	Points
Δ Volume	+3	%
M15 (Fuel C/Methanol 85/15 %), 48 h at 23 °C		
Δ Tensile strength	−35	%
Δ Elongation at break	−8	%
Δ Hardness	−3	Points
Δ Volume	+8	%
Trichloroethylene, 24 h at 100 °C		
Δ Tensile strength	−35	%
Δ Elongation at break	+7	%
Δ Hardness	−13	Points
Δ Volume	+21	%

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Chemical resistance (cont.)

Fluid	Results	Unit
1,1,1 – Trichloroethane, 24 h at 100 °C		
Δ Tensile strength	−44	%
Δ Elongation at break	+2	%
Δ Hardness	−21	Points
Δ Volume	+41	%
ESSO P60, 72 h at 150 °C		
Δ Tensile strength	−17	%
Δ Elongation at break	+3	%
Δ Hardness	0	Points
Δ Volume	+1.7	%
FAM A/ASTM 2/H_2O 45/45/10, 168 h at 85 °C		
Δ Tensile strength	−37	%
Δ Elongation at break	+27	%
Δ Hardness	−3	Points
Δ Volume	+10	%

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