Viton™ VTR-9209
Fluoroelastomers

Extrusion and Hose
FKM Precompound

Technical Information

Introduction

Viton™ VTR-9209 is a precompound containing an improved 69% fluorine "B-type" fluoroelastomer. This precompound incorporates a bisphenol cure system that can be optionally compounded with peroxide and coagent for "dual curing." Viton™ VTR-9209 offers a unique combination of processing and cured characteristics including:

- High quality, smooth extrudate surface and appearance at thickness less than 1.0 mm (0.040 in)
- Excellent "green" strength that helps maintain extrudate shape, as well as enabling draw down to very thin veneer thicknesses
- Excellent fuel permeation resistance
- Good tensile strength
- Good adhesion to other elastomers in multilayer hoses

Viton™ VTR-9209 is especially attractive for use in the manufacture of low permeation fuel and filler neck hose for automotive and small engine applications. It also works well for any hose requiring a thin FKM layer. This product is superior in extrusion processability, compared to many other types of Viton™, including Viton™ B-202 and B-600 blends.

When used at a 1–1.5 phr level, Carnauba wax and VPA 2 process aids each create a smooth finish and result in good metal release. Combinations of these process aids with Struktol® WS280 can provide other desirable characteristics to some compounds. Viton™ VTR-9209 is not suggested for use in applications above 250 °C (482 °F).

The heat resistance of VTR-9209 can be maximized by the use of a dual cure system of TAIC and peroxide in conjunction with the incorporated bisphenol cure. See compound three in Table 1 for a dual cure example.

Product Description

Chemical Composition	Copolymer of hexafluoropropylene, vinylidene fluoride, and tetrafluoroethylene plus bisphenol curative
Physical Form	Sheet
Color	Off-white
Odor	None
Specific Gravity	1.86
Storage Stability	Excellent
Mooney Viscosity, ML 1 + 10 at 121 °C (250 °F)	30

Chemours™

Table 1. Properties of Viton™ VTR-9209

	Viton™ VTR-9209	Viton™ VTR-9209 High MgO	Viton™ VTR-9209 Dual Cure
Gum Mooney, ML 1 + 10 at 121 °C (250 °F)	30		
Viton™ VTR-9209	100	100	100
Elastomag® 170 (MgO)	3	6	6
MT Black (N-990)	30	30	30
$Ca(OH)_2$ HP-XL	6	3	3
Diak™ 7	—	—	0.6
Varox® DBPH-50	—	—	0.6
Total phr Lab	139	139	140.2
Mooney Scorch at 121 °C (250 °F)			
Minimum	32	27	26
2 Pt. Rise, min	>30	>30	>30
5 Pt. Rise, min	—	—	—
10 Pt. Rise, min	—	—	—
ODR at 162 °C (324 °F), 3° Arc, 100 Range, 30 Min Clock			
M-L, dNm	13	11	10
ts-2, min	3.2	3.3	3.0
t'50, min	5.5	7.5	6.4
t'90, min	6.3	8.5	13.6
M-H, dNm	63	63	85
MDR2000 at 177 °C (351 °F), 0.5° Arc, 100 Range, 12 Min Clock			
M-L, dNm	1.5	1.3	1.3
ts-2, min	1.3	1.6	1.3
t'50, min	1.7	2.1	1.8
t'90, min	2.3	3.0	2.8
t'95, min	2.7	3.6	3.6
M-H, dNm	17.1	16.7	18.9
Physical Properties at RT—Original (Cured 30 min at 162 °C [324 °F]—No post-cure)			
M-10, MPa	1.2	1.1	0.9
M-25, MPa	1.9	1.7	1.5
M-100, MPa	3.5	3.5	4.2
Tensile, MPa	7.9	8.3	8.8
Elongation, %	359	368	245
Hardness, A, pts	74	70	68
Spec. Gravity	1.875	1.886	1.835

Table 1. Properties of Viton™ VTR-9209 (continued)

	Viton™ VTR-9209	Viton™ VTR-9209 High MgO	Viton™ VTR-9209 Dual Cure
Gum Mooney, ML 1 + 10 at 121 °C (250 °F)	30		
Physical Properties at RT—Original (Cured 30 min at 162 °C [324 °F]—16 hr post-cured at 232 °C [450 °F])			
M-10, MPa	1.5	1.2	1.7
M-100, MPa	4.7	4.4	6.8
Tensile, MPa	11.0	11.8	12.1
Elongation, %	260	255	175
Hardness, A, pts	76	73	79
Adhesion to Tie Gum—180° Peel (1.4 N/mm minimum needed to pass std. hose specs) to NBR722C (40 min at 162 °C [324 °F] cure)			
Initial Peak, Median, N	138	143	96
Median Bond, N/mm	5.4	5.3	3.1
Mean Bond, N/mm	4.9	5.6	3.1
Physical Properties at RT—Aged 168 hr at 23 °C (74 °F) in 90% Fuel C/10% Ethanol (CE-10)			
M-100, MPa	2.5	2.6	2.9
Tensile, MPa	7.3	7.8	7.3
Elongation, %	403	421	296
Hardness, A, pts	66	64	62
Change in Physical Properties After 168 hr at 23 °C (74 °F) in 90% Fuel C/10% Ethanol (CE-10)			
% Change, M100	–28%	–24%	–30%
% Change, T-B	–8%	–6%	–17%
% Change, E-B	12%	14%	21%
Pts Change	–8	–6	–6
Volume Increase, %	6.1	6.7	8.1
Compression Set, Method B, Plied			
No Post-Cure			
70 hr at 70 °C (158 °F)	34	30	17
70 hr at 150 °C (302 °F)	80	70	60
Post-Cured 16 hr at 232 °C (450 °F)			
70 hr at 150 °C (302 °F)	25	17	18
70 hr at 200 °C (392 °F)	33	31	35
Fuel Immersions, % Volume Swell — 168 hr at 23 °C (74 °F) (No post-cure)			
Fuel C	3.0	3.4	3.7
CM-15 Fuel	14	14	14
Fuel Permeation — ASTM E96 Thwing Albert Cup — 672 hr at 40 °C (104 °F) (No post-cure)			
CE-10, g-mm/m²/day	33	33	44

Test Procedures

Property Measured	Test Procedure
Compression Set	ASTM D3955, Method B (25% deflection)
Hardness	ASTM D1414, durometer A
Mooney Scorch	ASTM D1646, small rotor at 121 °C (250 °F)
Mooney Viscosity	ASTM D1646, ten pass at 121 °C (250 °F)
MDR	ASTM D5289
ODR (oscillating disk rheometer)	ASTM D2084
Property Change After Heat-Aging	ASTM D573
Stress/Strain Properties 100% Modulus Tensile Strength (T-B) Elongation (E-B)	ASTM D412, pulled at 8.5 mm/sec (20 in/min)
Volume Change in Fluids	ASTM D471
Permeation	ASTM E96
Adhesion	ASTM D413

Note: Test temperature is 23 °C (73 °F), except where specified otherwise.