Viton™ VTR-9217
Fluoroelastomers

Extrusion and Hose
FKM Precompound

Technical Information

Introduction

Viton™ VTR-9217 is a developmental precompound based on a recently developed 69% fluorine "B-type" fluoroelastomer (FKM). This precompound incorporates a bisphenol cure system that can be optionally compounded with peroxide and coagent for "dual curing." Superior thin extrusions for fuel and filler neck hose can be achieved. VTR-9217 has a unique combination of processing and cure characteristics, including:

- High quality, smooth extrudate surface, and appearance at thickness below 0.040 in or 1.0 mm
- Excellent "green" strength that helps maintain extrudate shape, as well as enables drawdown to a thickness of 0.008" or 0.2 mm
- Lower viscosity, lower hardness, and better compression set than VTR-9209, the first generation precompound based on the same gum polymer
- Good fuel permeation resistance for a "B-type" FKM
- Compounds show good adhesion and physical properties

Automotive and small engine applications utilizing low permeation fuel and filler neck hose and tubing are expected to find this product most attractive as an affordable material. Chemours has found this product to be superior in extrusion processability compared to Viton™ B-202 and B-600 blends.

Carnauba wax or VPA No. 2 at a 1–1.5 phr level are the most common process aids used with VTR-9217 to create a smooth finish and good metal release. Combinations of these process aids with Struktol® WS280 can enhance release to some compounds.

Table 1 compares VTR-9217 to higher Mooney VTR-9209.

Product Description

Chemical Composition	Copolymer of hexafluoropropylene, vinylidene fluoride, and tetrafluoro-ethylene plus bisphenol curative chemicals and process aid
Physical Form	Sheet
Color	Off-white
Odor	None
Specific Gravity	1.82
Storage Stability	Excellent
Mooney Viscosity, ML 1 + 10 at 121 °C (250 °F)	20

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Table 1. General Properties of Viton™ VTR-9217 Compared with VTR-9209

	Viton™ VTR-9209/Control	Viton™ VTR-9217
Gum Mooney, ML 1 + 10 at 121 °C (250 °F)	32	19
Viton™ VTR-9209	100	—
Viton™ VTR-9217	—	100
Elastomag® 170	3	3
MT Black (N990)	30	30
Calcium Hydroxide HP-XL	6	6
Total phr	139	139
Mooney Scorch at 121 °C (250 °F)		
Minimum	32	27
2 Pt. Rise, min	>30	23.2
5 Pt. Rise, min	—	>30
10 Pt. Rise, min	—	—
ODR at 162 °C (324 °F), 3° Arc, 100 Range, 30 Min Clock		
M-L, in-lb	13	11
ts-2, min	3.2	2.3
t'50, min	5.5	3.7
t'90, min	6.3	4.3
M-H, in-lb	63	69
MDR2000 at 177 °C (350 °F), 0.5° Arc, 100 Range, 12 Min Clock		
M-L, in-lb	1.5	1.2
ts-2, min	1.3	0.9
t'50, min	1.7	1.2
t'90, min	2.3	1.5
t'95, min	2.7	1.8
M-H, in-lb	17.1	14.7
Physical Properties at RT—Original (Cured 30 min at 162 °C [324 °F]—No post-cure)		
10% Modulus, MPa	1.2	0.8
100% Modulus, MPa	3.5	3.2
Tensile Strength, MPa	7.9	7.9
Elongation, %	359	302
Hardness, A, pts	74	66
Compression Set, Method B, Plied		
70 hr at 70 °C (158 °F)	34	24
70 hr at 150 °C (302 °F)	80	69
Fuel Immersions—168 hr at 23 °C (73 °F) (NPC)		
Fuel C, %VS	3.0	3.0
CM-15 Fuel, %VS	13.7	13.0
Specific Gravity	1.875	1.84
Fuel Permeation—ASTM E91 Thwing Albert Cup—672 hr at 40 °C (104 °F) (NPC)		
CE-10, g-mm/m²/day	33	40

Test Procedures

Property Measured	Test Procedure
Compression Set	ASTM D395, 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 at Break (E-B)	ASTM D412, pulled at 8.5 mm/sec (20 in/min)
Volume Change in Fluids	ASTM D471
Permeation	ASTM E96

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