Viton™ GFLT-200S

Fluoroelastomers

Technical Information

Introduction

Viton™ GFLT-200S* fluoroelastomer is a low viscosity 67% fluorine, peroxide-cured, low temperature fluoroelastomer. GFLT-200S utilizes the latest technology from Chemours, Advanced Polymer Architecture (APA), which includes a novel peroxide cure site along with an optimized molecular weight distribution.

Features

- Is ideal for blending with Viton™ GFLT-600S to reach intermediate viscosity ranges for injection and transfer molding
- Cures exceptionally fast to a high state of cure
- Improved mold release/mold fouling properties
- Improved mold flow and less shear sensitivity for a 25 Mooney peroxy-cured FKM
- Good physical properties with high elongation, both original and aged
- Improved water resistance/lower volume swell in water
- Excellent compression set resistance with either low or no post-cure

Processing

A load factor of 72%+ for internal mixing of GFLT-200S is preferred. The suggested process aids for GFLT-200S are 0.75 phr of Struktol® HT290, either alone or in combination with 0.5 phr of PAT-777, or combinations of 0.5 phr Armeen® 18D with carnauba wax or Struktol® WS280. The use of TMAIC (trimethallyl isocyanurate) is NOT suggested, as it causes poor mold release and high compression set. Viton™ Curative No. 7 (VC-7) is the suggested coagent for all GFLT-200S compounds and usually used at a 3 phr level or lower, unless high modulus is needed. High levels of VC-7 can bleed out and cause molding flaws. A peroxide level of 1.5–2 phr is suggested for this fast-curing FKM polymer.

Safety and Handling

Before handling or processing Viton™ GFLT-200S, read and be guided by the suggestions in the Chemours technical bulletin, "Handling Precautions for Viton™ and Related Chemicals."

Product Description

Chemical Composition	Copolymer of perfluoromethylvinyl ether, vinylidene fluoride, and tetrafluoroethylene with a cure site monomer
Physical Form	Sheet
Appearance	White to tan
Odor	None
Mooney Viscosity, ML 1 + 10 at 121 °C (250 °F)	25
Specific Gravity	1.86
Storage Stability	Excellent
Fluorine, %	~67

*Viton™ GFLT-200S was formerly named VTR-8555.

Chemours™

Table 1. General Properties of Viton™ GFLT-200S

	Viton™ GFLT-200S
ML-10 at 121 °C (250 °F) (gum)	27
Viton™ GFLT-200S	100
Zinc Oxide	3
N990 (MT Black)	30
Viton™ Curative No. 7 (VC-7)	3
Varox® DBPH-50	2
Total	138
Mooney Scorch at 121 °C (250 °F)	
Minimum	16
2 Pt. Rise, min	28.0
5 Pt. Rise, min	>30
10 Pt. Rise, min	—
ODR at 162 °C (324 °F), 3° Arc, 100 Range, 30 Min Clock	
M-L, dNm	6
ts-2, min	1.3
t'50, min	2.7
t'90, min	4.2
M-H, dNm	163
MDR 2000 at 177 °C (350 °F), 0.5° Arc, 100 Range, 6 Min Clock	
M-L, dNm	0.8
ts-2, min	0.4
t'50, min	0.6
t'90, min	1.1
t'95, min	1.3
M-H, dNm	32.2
Rosand Capillary Rheometer at 100 °C (212 °F), 1.5 mm die—L/D = 0/1 and 10/1	
Shear Rate, sec^{-1}	*Pressure (short die L/D = 0/1), MPa*
113	3.0
452	4.6
1,129	6.0
2,221	7.4
Spider Mold Flow Test—Sprue 0.8 mm (0.031 in)—Transfer Pressure 103 bar—(Cured 7 min at 177 °C [350 °F])	
Total Shot Weight, g	39.9
Weight of Spider, g	27.5
Fill Factor, %	69%
Physical Properties at RT—Original (Cured 7 min at 177 °C [350 °F]—No post-cure)	
M-10, MPa	0.7
M-100, MPa	4.2
Tensile, MPa	9.7
T-B, psi	1,404
Elongation, %	226
Hardness, A, pts	68

continued

Table 1. General Properties of Viton™ GFLT-200S (continued)

	Viton™ GFLT-200S
"Hot" Tear Strength at 150 °C (302 °F)—Original (Cured 7 min at 177 °C [350 °F]—No post-cure)	
Tear Die B (nicked), N/mm	5.5
Physical Properties at RT—Original (Cured 7 min at 177 °C [350 °F]—Post-cured 2 hr at 232 °C [450 °F] as noted)	
M-10, MPa	0.9
M-100, MPa	5.3
Tensile, MPa	15.3
T-B, psi	2,213
Elongation, %	214
Hardness, A, pts	72
Physical Properties at RT—Heat Aged 70 hr at 250 °C (482 °F) in Oven	
M-100, MPa	4.0
% Change, M100	–24
Tensile, MPa	15.6
% Change, T-B	4
Elongation, %	264
% Change, E-B	27
Hardness, A, pts	74
Pts Change	2
Physical Properties at RT—Heat Aged 70 hr at 275 °C (527 °F) in Oven	
M-100, MPa	2.6
% Change, M100	–51
Tensile, MPa	9.4
% Change, T-B	–37
Elongation, %	380
% Change, E-B	83
Hardness, A, pts	71
Pts Change	–1
Physical Properties at RT—Aged 168 hr at 150 °C (302 °F) in ASTM #105 Oil (5W/30)	
M-100, MPa	5.3
% Change, M100	1
Tensile, MPa	9.5
% Change, T-B	–37
Elongation, %	157
% Change, E-B	–25
Hardness, A, pts	74
Pts Change	2
Volume Swell, %	0.4

continued

Table 1. General Properties of Viton™ GFLT-200S (continued)

	Viton™ GFLT-200S
Compression Set, Method B, O-Rings	
22 hr at 200 °C (392 °F)	
– No Post-cure	19
– Post-cured at 232 °C (450 °F)	13
70 hr at 200 °C (392 °F)	
– No Post-cure	22
– Post-cured at 232 °C (450 °F)	21
Low Temperature Testing	
TR-10, °C	–24.4
Tg by DSC, °C	–25.5
Volume Swell After Immersion—168 hr at temperature as noted	
Fuel C at 23 °C (73 °F)	6.3
CM15 (85/15 Fuel C/Methanol) at 23 °C (73 °F)	12.4
Methanol, 23 °C (73 °F)	8.8
Water at 100 °C (212 °F)	3.3

Table 2. Blend of Viton™ GFLT-200S and Viton™ GFLT-600S

	Viton™ GFLT-200S	Blend	Viton™ GFLT-600S
ML-10 at 121 °C (250 °F) (gum)	24	41	61
Viton™ GFLT-200S	100	50	—
Viton™ GFLT-600S	—	50	100
Zinc Oxide	3	3	3
MT Black (N-990)	30	30	30
Viton™ Curative No. 7 (VC-7)	3	3	3
Varox® DBPH-50	2	2	2
Total	138	138	138
Mooney Scorch at 121 °C (250 °F)			
Minimum	16	25	36
2 Pt. Rise, min	26.7	22.2	20.0
5 Pt. Rise, min	27.6	23.7	21.2
10 Pt. Rise, min	>30	24.9	22.3
ODR at 162 °C (324 °F), 3° Arc, 100 Range, 30 Min Clock			
M-L, dNm	6	11	18
ts-2, min	1.5	1.2	1.2
t'50, min	2.9	2.6	2.5
t'90, min	4.2	4.1	4.2
M-H, dNm	169	167	161

continued

Table 2. Blend of Viton™ GFLT-200S and Viton™ GFLT-600S (continued)

	Viton™ GFLT-200S	Blend	Viton™ GFLT-600S
MDR 2000 at 177 °C (350 °F), 0.5° Arc, 100 Range, 6 Min Clock			
M-L, dNm	0.6	1.2	2.0
ts-2, min	0.4	0.4	0.4
t'50, min	0.6	0.6	0.6
t'90, min	1.0	1.0	1.0
t'95, min	1.3	1.2	1.2
M-H, dNm	35.2	33.6	32.4
Rosand Capillary Rheometer at 100 °C (212 °F), 1.5 mm die—L/D = 0/1 and 10/1			
Shear Rate, sec^{-1}		*Pressure (short die L/D = 0/1), MPa*	
113	3.5	4.0	5.2
452	5.5	5.5	6.3
1,129	6.6	6.7	7.3
2,221	7.8	7.9	8.4
Physical Properties at RT—Original (Cured 7 min at 177 °C [350 °F]—No post-cure)			
M-100, MPa	5.0	5.1	4.7
Tensile, MPa	12.1	13.3	12.8
T-B, psi	1,759	1,929	1,862
Elongation, %	188	203	214
Hardness, A, pts	67	67	65
"Hot" Tear Strength at 150 °C (302 °F)—Original (Cured 7 min at 177 °C [350 °F]—No post-cure)			
Tear Die B (nicked), N/mm	8.1	7.5	8.5
Physical Properties at RT—Original (Cured 7 min at 177 °C [350 °F]—Post-cured 2 hr at 232 °C [450 °F])			
M-100, MPa	6.0	6.1	5.6
Tensile, MPa	16.8	16.9	16.6
T-B, psi	2,437	2,451	2,408
Elongation, %	198	199	206
Hardness, A, pts	70	68	67
Compression Set, Method B, O-Rings (2 hr post-cure)			
22 hr at 200 °C (392 °F)			
– No Post-cure	13	11	14
– Post-cured at 232 °C (450 °F)	9	9	11
70 hr at 200 °C (392 °F)			
– No Post-cure	20	20	20
– Post-cured at 232 °C (450 °F)	17	14	17
Low Temperature Testing			
TR-10, °C	–24.0	–24.8	–24.8
Tg by DSC, °C	–26.0	–26.1	–25.3

Test Procedures

Property Measured	Test Procedure
Compression Set	ASTM D395, Method B (25% deflection)
Compression Set, O-Rings	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)
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)
Temperature Retraction (TR-10)	ASTM D1329
Volume Change In Fluids	ASTM D471

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

For more information, visit Viton.com

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