Viton™ GFLT-600S A

Fluoroelastomers

Product Information

Introduction

Viton™ GFLT-600S A fluoroelastomer is a 67% fluorine, peroxide-cured, low temperature fluoroelastomer with a gum polymer viscosity of ~65 (ML at 121 °C (250 °F)). Viton™ GFLT-600S A utilizes the latest Advanced Polymer Architecture (APA) and FWRD technologies from Chemours, enabling high performance in the most critical applications, without the use of a fluorinated surfactant during production.

Features

- Ideal for low temperature applications with a Tg of -25°C (-13 °F).
- Excellent fluid resistance to aromatic hydrocarbons and alcohols, including methanol and ethanol, biodiesel, oils, hot water and steam, as well acids.
- Compatible with latest EV fluids, (oils and coolants, transmission, and thermal fluids) as well as cooling systems used in hydrogen applications.
- Excellent physical properties with high elongation, both original and aged in standard compounds and in formulations with no or low filler, even after aging.
- Outstanding compression set resistance with either low or no post-cure.
- Ideal for blending with Viton™ GFLT-200S A to reach intermediate viscosity ranges for injection molding as well as with other FWRD APA grades (e.g., GBL-S A, GLT-S A).
- Manufactured without fluorinated surfactant.

Compounding and processing

- Viton™ Curative No. 7 (VC-7) is the suggested coagent for all Viton™ GFLT-600S A compounds and is usually used at a 2.5 phr level or lower, unless high modulus is needed. High levels of VC-7 can bleed out and cause molding flaws.
- The use of TMAIC (trimethallyl isocyanurate) is not suggested, as it causes poor mold release and high compression set.
- 2,5-Bis(*tert*-butylbutoxy)-2,5-dimethylhexane is used commonly as crosslinking peroxide, often as 45% active free flowing powder on a silica/calcium carbonate carrier. Typical levels are 1.5 phr or lower.
- The suggested process aids for Viton™ GFLT-600S A are Struktol® HT-290, either alone or in combination with Struktol® WS-280 (recommended level 0.75 to 1.0phr). Armeen® 18D or PAT®-44/04 are also suitable for use with Viton™ GFLT-600S A compounds.
- Viton™ GFLT-600S A can be easily compounded on hot roll mills as well as in internal mixers (recommended >72% load factor for the latter).

Safety and Handling

Before handling or processing Viton™ GFLT-600S A, be sure to read and be guided by the suggestions in the Chemours technical bulletin, “Handling Precautions for Viton™ and Related Chemicals”.

Product Description

Viton™ GFLT-600S A	
Chemical Composition	Terpolymer of perfluoromethylvinyl ether, vinylidene fluoride, tetrafluoroethylene, and a proprietary cure site monomer
Physical Form	Sheet
Appearance	Off-white to tan
Odor	None
Mooney Viscosity, ML 1 + 10 at 121 °C (250 °F)	65
Specific Gravity	1.86
Storage Stability	Excellent
Fluorine, %	~67

Table 1. General properties of Viton™ GFLT-600S A

Compound	phr
Viton™ GFLT-600S A	100
Thermax® Floform N990	30
Zinc Oxide	3
Viton™ Curative No. 7 (VC-7)	2.2
Luperox® 101 XL 45	1.5
Struktol® HT 290	1
Rheological Properties	
Mooney Viscosity, ML 1+10 at 121 °C (250 °F)	
Final Mooney, MU	63
Mooney Viscosity, ML 1+4 at 100 °C (212 °F)	
Final Mooney, MU	85
MDR Cure Rate - 180 °C (356 °F) / 6 min / arc 0.5°	
ML, dNm	2.0
MH, dNm	26.7
Ts1, min	0.34
Ts2, min	0.38
T10, min	0.40
T50, min	0.61
T90, min	1.05
Mooney Scorch - 135 °C (275 °F) / 45 min	
Initial Mooney, MU	50
Minimum Mooney, MU	30
Ts1, min	5.8
Ts2, min	6.0
T5, min	6.5
T10, min	6.9
T35, min	8.0
Low Temperature Properties	
Tg by DSC - Polymer	
Tg, °C	-25
Temperature Retraction – Press Cure: 10 min / 180°C (356 °F), Post-Cured: 16 hr / 230 °C (446 °F)	
TR10, °C	-24
TR30, °C	-22

Vulcanizate Properties Press Cure: 10 min / 180 °C (356 °F)	Post-Cured: None	Post-Cured: 4 hr / 200 °C (392 °F)	Post-Cured: 16 hr / 230 °C (446 °F)
Hardness Shore A, 1 sec			
Shore A, pts	71	72	75
Tensile Properties, Type 2, at 23 °C (73 °F)			
Tensile Strength, MPa	10.5	12.4	18.0
Elongation at Break, %	260	255	260
Modulus at 100%, MPa	3.2	3.6	4.5
Tear Strength			
Tear Strength Type B - Angle without nick Test Pieces			
Tear Strength, kN/m at 23 °C (73 °F)	17	16	19
Tear Strength, kN/m at 150 °C (302 °F)	5	5	6

Compression Set Properties: Curing conditions: 10 min / 180 °C (356 °F)	Post-Cured: None	Post-Cured: 4 hr / 200 °C (392 °F)	Post-Cured: 16 hr / 230 °C (446 °F)
Compression Set, 70 hr at 200 °C (392 °F), Type B			
Compression Set, %	28	26	21
Compression Set, 168 hr at 200 °C (392 °F), Type B			
Compression Set, %	43	37	31
Compression Set, VW, 94 hr at 180 °C (356 °F)			
Compression Set at 5 sec, %	-	-	41
Compression Set at 30 min, %	-	-	35

Table 2. Aging Properties of Viton™ GFLT-600S A

Aging Properties	
Post-Cured: 16 hr / 230 °C (446 °F)	
Heat Aging, 168 hr at 250 °C (482 °F)	
Hardness Shore A, 1 sec	
Shore A, pts	74
Delta Hardness, pts	-1
Tensile Properties, Type 2, at 23 °C (73 °F)	
Tensile Strength, MPa	12.9
Delta TS, %	-28
Elongation at Break, %	450
Delta Elongation, %	+76
Modulus at 100%, MPa	3.1
Delta 100%, %	-31
Fluid Aging, 168 hr at 150 °C (302 °F) in Motul® ATF VI (Dexron® VI)	
Hardness Shore A, 1 sec	
Shore A, pts	73
Delta Hardness, pts	-2
Tensile Properties, Type 2, at 23 °C (73 °F)	
Tensile Strength, MPa	17.3
Delta TS, %	-4
Elongation at Break, %	250
Delta Elongation, %	-4
Modulus at 100%, MPa	4.8
Delta 100%, %	+7
Weight & Volume Change	
Weight Change, %	+1
Volume Change, %	+1

Table 3. General Properties of Viton™ GFLT-600S A in Mineral Formulation

Compound	phr
Viton™ GFLT-600S A	100
Tremin® 283 600 EST	50
Thermax® Floform N990	2
Zinc Oxide	3
Ti-Pure™ R-960	1
Viton™ Curative No. 7 (VC-7)	2.4
Luperox® 101 XL 45	1.5
Struktol® HT 290	1
Rheological Properties	
Mooney Viscosity, ML 1+10 at 121 °C (250 °F)	
Final Mooney, MU	68
MDR Cure Rate - 180 °C (356 °F) / 6 min / arc 0.5°	
ML, dNm	2.5
MH, dNm	34.2
Ts1, min	0.33
Ts2, min	0.37
T10, min	0.39
T50, min	0.57
T90, min	0.91
Mooney Scorch - 135 °C (275 °F) / 45 min	
Initial Mooney, MU	54
Minimum Mooney, MU	33
Ts1, min	6.2
Ts2, min	6.5
T5, min	6.9
T10, min	7.3
T35, min	8.0
Vulcanizate Properties	
Press Cure: 10 min / 180 °C (356 °F)	
Post-Cured: 16 hr / 230 °C (446 °F)	
Hardness	
Shore A, 1sec, pts	76
IRHD, pts	74
Tensile Properties, Type 2, at 23 °C (73 °F)	
Tensile Strength, MPa	10.1
Elongation at Break, %	230
Modulus at 100%, MPa	6.7
Tear Strength	
Tear Strength Type B - Angle without nick Test Pieces	
Tear Strength, kN/m at 23 °C (73 °F)	22
Compression Set Properties:	
Compression Set, 70 hr at 200 °C (392 °F), O-ring AS-214	
Compression Set, %	20
Compression Set, 70 hr at 200 °C (392 °F), Plied	
Compression Set, %	22
Compression Set, VW, 94 hr at 180 °C (356 °F)	
Compression Set at 5 sec, %	38
Compression Set at 30 min, %	31

Table 4. Aging Properties of Viton™ GFLT-600S A in Mineral Formulation

Aging Properties	
Press Cure: 10 min / 180 °C (356 °F)	
Post-Cured: 16 hr / 230 °C (446 °F)	
Heat Aging, 168 hr at 250 °C (482 °F)	
Hardness Shore A, 1 sec	
Shore A, pts	75
Delta Hardness, pts	-1
Tensile Properties, Type 2, at 23 °C (73 °F)	
Tensile Strength, MPa	11.7
Delta TS, %	+15
Elongation at Break, %	240
Delta Elongation, %	+3
Modulus at 100%, MPa	7.5
Delta 100%, %	+13
Heat Aging, 1008 hr at 200 °C (392 °F)	
Hardness Shore A, 1 sec	
Shore A, pts	76
Delta Hardness, pts	0
Tensile Properties, Type 2, at 23 °C (73 °F)	
Tensile Strength, MPa	12.1
Delta TS, %	+20
Elongation at Break, %	205
Delta Elongation, %	-12
Modulus at 100%, MPa	8.9
Delta 100%, %	+32
Fluid Aging, 70 hr at 60 °C (140 °F) in FAM-B	
Hardness Shore A, 1 sec	
Shore A, pts	66
Delta Hardness, pts	-10
Tensile Properties, Type 2, at 23 °C (73 °F)	
Tensile Strength, MPa	6.3
Delta TS, %	-38
Elongation at Break, %	230
Delta Elongation, %	-1
Modulus at 100%, MPa	3.6
Delta 100%, %	-47
Weight & Volume Change	
Weight Change, %	+7
Volume Change, %	+20
Fluid Aging, 168 hr at 23 °C (73 °F) in Methanol	
Hardness Shore A, 1 sec	
Shore A, pts	72
Delta Hardness, pts	-4
Tensile Properties, Type 2, at 23 °C (73 °F)	
Tensile Strength, MPa	7.5
Delta TS, %	-26
Elongation at Break, %	240
Delta Elongation, %	+4
Modulus at 100%, MPa	4.5
Delta 100%, %	-33
Weight & Volume Change	
Weight Change, %	+3
Volume Change, %	+8

Table 5. Compound Ingredients

Compound	Supplier
Thermax® Floform N990	Cancarb Limited
Zinc Oxide (99% pure, 5 microns)	Sigma-Aldrich
Viton™ Curative No. 7 (VC-7)	The Chemours Company
Luperox® 101 XL 45	Arkema
Struktol® HT 290	Schill+Seilacher
Ti-Pure™ R-960	The Chemours Company
Tremin® 283 600 EST	Quarzwerke-Gruppe

Table 6. Test Procedures

Property Measured	Test Procedure
Compression Set	ISO 815-1:2019
Compression Set VW	VW PV 3307:2004-08
Hardness	ISO 48-4:2018
MDR (moving die rheometer)	ISO 6502-3:2023
Mooney Viscosity	ISO 289-1:2015
Mooney Scorch	ISO 289-2:2020
DSC (differential scanning calorimetry)	ISO 22768:2020
Temperature Retraction	ISO 2921:2019
Fluid Aging	ISO 1817:2022
Heat Aging	ISO 188:2023
Stress/Strain Properties	ISO 37:2024
Tear Strength	ISO 34-1:2022

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

For more information, visit viton.com