Viton™ GF-600S A

Fluoroelastomers

Product Information

Introduction

Viton™ GF-600S A fluoroelastomer is a 70% fluorine, peroxide-cured fluoroelastomer with a gum polymer viscosity of ~65 (ML at 121 °C (250 °F)). Viton™ GF-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

- 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 most common battery electrolytes.
- 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™ GF-200S A to reach intermediate viscosity ranges for injection molding and improve green/tear strength in extrusion and molding.
- Manufactured without fluorinated surfactant.

Compounding and processing

- Viton™ Curative No. 7 (VC-7) is the suggested coagent for all Viton™ GF-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. Based on a DoE (Design of Experiment) study, a good balance of cure speed and properties can be achieved with 1.7 phr VC-7 and 1.3 phr peroxide.
- The suggested process aids for Viton™ GF-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™ GF-600S A compounds.
- Viton™ GF-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™ GF-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™ GF-600S A	
Chemical Composition	Terpolymer of hexafluoropropylene, 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	1.90
Storage Stability	Excellent
Fluorine, %	~70

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

Compound			phr
Viton™ GF-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			60
Mooney Viscosity, ML 1+4 at 100 °C (212 °F)			
Final Mooney, MU			89
MDR Cure Rate - 180 °C (356 °F) / 6 min / arc 0.5°			
ML, dNm			1.88
MH, dNm			25.4
Ts1, min			0.36
Ts2, min			0.4
T10, min			0.41
T50, min			0.63
T90, min			1.08
Mooney Scorch - 135 °C (275 °F) / 45 min			
Initial Mooney, MU			46
Minimum Mooney, MU			26
Ts1, min			5.7
Ts2, min			6.0
T5, min			6.4
T10, min			6.9
T35, min			7.8
Low Temperature Properties			
Tg by DSC - Polymer			
Tg, °C			-6
Temperature Retraction – Press Cure: 10 min / 180°C (356 °F), Post-Cured: 16 hr / 230 °C (446 °F)			
TR10, °C			-4.7
TR30, °C			-2.4
Vulcanizate Properties	**Post-Cured:**	**Post-Cured:**	**Post-Cured:**
Press Cure: 10 min / 180 °C (356 °F)	**None**	**4 hr / 200 °C (392 °F)**	**16 hr / 230 °C (446 °F)**
Hardness Shore A, 1 sec			
Shore A, pts	73	76	79
Tensile Properties, Type 2, at 23 °C (73 °F)			
Tensile Strength, MPa	12.8	14.3	21.3
Elongation at Break, %	345	300	280
Modulus at 100%, MPa	4.0	4.5	6.6
Tear Strength			
Tear Strength Type B – Angle without nick Test Pieces			
Tear Strength, kN/m at 23 °C (73 °F)	22	24	28
Tear Strength, kN/m at 150 °C (302 °F)	4	5	5
Compression Set Properties:	**Post-Cured:**	**Post-Cured:**	**Post-Cured:**
Curing conditions: 10 min / 180 °C (356 °F)	**None**	**4 hr / 200 °C (392 °F)**	**16 hr / 230 °C (446 °F)**
Compression Set, 70 hr at 200 °C (392 °F), Type B			
Compression Set, %	34	30	26
Compression Set, 168 hr at 200 °C (392 °F), Type B			
Compression Set, %	50	44	38
Compression Set, VW, 94 hr at 180 °C (356 °F)			
Compression Set at 5 sec, %	-	-	61
Compression Set at 30 min, %	-	-	51

Table 2. Aging Properties of Viton™ GF-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	79
Delta Hardness, pts	0
Tensile Properties, Type 2, at 23 °C (73 °F)	
Tensile Strength, MPa	16.2
Delta TS, %	-24
Elongation at Break, %	365
Delta Elongation, %	+30
Modulus at 100%, MPa	5.1
Delta 100%, %	-24
Fluid Aging, 168 hr at 150 °C (302 °F) in Motul® ATF VI (Dexron® VI)	
Hardness Shore A, 1 sec	
Shore A, pts	77
Delta Hardness, pts	-2
Tensile Properties, Type 2, at 23 °C (73 °F)	
Tensile Strength, MPa	19.1
Delta TS, %	-10
Elongation at Break, %	225
Delta Elongation, %	-20
Modulus at 100%, MPa	6.5
Delta 100%, %	-2
Weight & Volume Change	
Weight Change, %	0.8
Volume Change, %	1.4

Table 3. Compound Ingredients

Compound Ingredients	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

Table 4. 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

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