Viton™ GAL-200S

Fluoroelastomers

Technical Information

Introduction

Viton™ GAL-200S* fluoroelastomer is a low viscosity, 66% fluorine, peroxide-curable fluoroelastomer. Viton™ GAL-200S is manufactured using the latest technology, Advanced Polymer Architecture (APA). Viton™ GAL-200S includes a novel peroxide cure site and has an optimized molecular weight distribution.

Features

- Peroxide-curable polymer similar to Viton™ AL-300
- Improved low temperature resistance compared to bisphenol-cured 66% fluorine copolymer
- Improved water, steam, and coolant resistance compared to bisphenol-cured, 66% fluorine polymer
- Cures exceptionally fast to a high state of cure
- Improved mold release/mold fouling properties compared to previously available technology peroxide-cured polymer
- Good physical properties with high elongation, both original and aged
- Excellent compression set resistance with either low or no post-cure

Processing

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

Safety and Handling

Before handling or processing Viton™ GAL-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 hexafluoropropylene, 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	1.79
Storage Stability	Excellent
Fluorine, %	~ 66

Viton™ GAL-200S was formerly named VTR-8675.

Chemours™

Table 1. Fundamental Properties of Viton™ GAL-200S

	Viton™ GBL-200S	Viton™ GAL-200S
ML-10 at 121 °C (250 °F) (gum)	29	28
Viton™ GBL-200S	100	—
Viton™ GAL-200S	—	100
Zinc Oxide	3	3
N-990	30	30
Viton™ Curative No. 7 (VC-7)	3	3
Varox® DBPH-50	2	2
Total phr Lab	138	138
Mooney Scorch at 121 °C (250 °F)		
Minimum, MU	17	17
2 pt Rise, min	27.4	29.5
5 pt Rise, min	>30	>30
ODR at 162 °C (324 °F), 3° Arc, 100 Range, 30 Min Clock		
M-L, dNm	7	6
ts-2, min	1.4	1.6
t'50, min	3.1	3.2
t'90, min	5.2	6.3
M-H, dNm	146	130
MDR 2000 at 177 °C (351 °F), 0.5° Arc, 100 Range, 6 Min Clock		
M-L, dNm	0.7	0.7
ts-1, min	0.4	0.4
ts-2, min	0.5	0.5
t'50, min	0.7	0.7
t'90, min	1.4	1.2
t'95, min	1.9	1.6
M-H, dNm	30.0	26.2
Spider Mold Flow Test—Sprue 0.8 mm—138 bar (2,000 psi) Inject Pressure (Cured 5 min at 177 °C [351 °F])		
Total Shot Weight, g	39.9	40.1
Weight of Spider, g	26.7	26.0
Fill Factor, %	67	65
Physical Properties at RT—Original (Cured 7 min at 177 °C [351 °F]—No Post-Cure)		
M-10, MPa	0.7	0.7
M-100, MPa	3.1	2.6
Tensile, MPa	11.1	12.2
T-B, psi	1604	1770
Elongation, %	362	447
Hardness, A, pts	67	66
"Hot" Tear Strength at 150 °C (302 °F)—Original (Cured 7 min at 177 °C [351 °F]—No Post-Cure)		
Tear Die B (nicked), N/mm	5.8	6.2

continued

Table 1. Fundamental Properties of Viton™ GAL-200S (continued)

	Viton™ GBL-200S	Viton™ GAL-200S
Physical Properties at RT—Original (Cured 7 min at 177 °C [351 °F]—Post-Cured at 232 °C [450 °F] as noted)		
	Post-Cured: 2 hr	*Post-Cured: 2 hr*
M-10, MPa	0.9	0.8
M-100, MPa	3.9	3.5
M-300, MPa	15.7	15.9
Tensile, MPa	16.7	17.8
T-B, psi	2,416	2,582
Elongation, %	307	393
Hardness, A, pts	72	70
Low Temperature Testing		
Tg by Modulated DSC, °C	–19.4	–24.0
TR-10, °C	–16.4	–19.0
Compression Set, Method B, O-Rings		
22 hr at 200 °C (392 °F)		
– No Post-Cure	22	21
– Post-Cured at 232 °C (450 °F) (as noted)	17	14
70 hr at 200 °C (392 °F)		
– No Post-Cure	29	33
– Post-Cured at 232 °C (450 °F) (as noted)	27	26
Physical Properties at RT—Heat-Aged 70 hr at 250 °C (482 °F) in Oven (Slabs Post-Cured)		
M-100, MPa	4.2	4.0
% Change, M-100	7	16
Tensile, MPa	19.5	20.8
% Change, T-B	17	17
Elongation, %	298	330
% Change, E-B	–3	–16
Hardness, A, pts	74	72
Pts Change	2	2
Physical Properties at RT—Heat-Aged 70 hr at 275 °C (482 °F) in Oven (Slabs Post-Cured)		
M-100, MPa	3.5	3.9
% Change, M-100	–11	14
Tensile, MPa	15.9	15.7
% Change, T-B	–5	–12
Elongation, %	344	287
% Change, E-B	12	–27
Hardness, A, pts	73	73
Pts Change	1	3

continued

Table 1. Fundamental Properties of Viton™ GAL-200S (continued)

	Viton™ GBL-200S	Viton™ GAL-200S
Physical Properties at RT—Aged 168 hr at 150 °C (302 °F) In ASTM #105 Oil (5W/30)		
M-100, MPa	4.4	4.0
% Change, M-100	14	16
Tensile, MPa	8.2	8.4
% Change, T-B	–51	–53
Elongation, %	164	176
% Change, E-B	–47	–55
Hardness, A, pts	75	74
Pts Change	3	4
Volume Swell, %	1.4	1.1
Fuel Resistance—Volume Swell Tested 168 hr at 23 °C (73 °F)		
Fuel C, %VS	5.2	5.6
85/15 Fuel C/Methanol, %VS	21.9	33.6
Water, %VS	4.8	5.2
Specific Gravity	1.856	1.831

Test Procedures

Property Measured	Test Procedure
Compression Set	ASTM D395, Method B (25% deflection)
Hardness	ASTM D1414, durometer A
MDR (moving die rheometer)	ASTM D5289
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)
Tear Die B	ASTM D624
Tg by DSC	DDE Custom (Akron MDSC – Tg)
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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