

Technical Information

Introduction

Viton™ B-202* fluoroelastomer is a low viscosity, “B-type” gum polymer that demonstrates improved processing and rheology when compared with existing fluoroelastomers.

Viton™ B-202 is designed to be cured with either Viton™ Curative No. 30 or Viton™ Curative No. 50. When using Viton™ Curative No. 30, use Viton™ Curative No. 20 in a ratio of about 1.8 Viton™ Curative No. 30 to Viton™ Curative No. 20. When using Viton™ Curative No. 50, use 0.3-0.5 phr of Viton™ Curative No. 20 to ensure a fast cure rate. Note that Viton™ Curative No. 20 can be difficult to mix into low viscosity stocks, such as those based on Viton™ B-202, and careful attention needs to be paid to mixing procedures.

Compared with other “B-family” terpolymers, Viton™ B-202 provides:

- Low viscosity
- Improved processing
- Increased mold flow
- Excellent mold release

Applications

- Transfer and injection molding of complex shapes
- Extrusions (e.g., fuel hose and tubing)
- Solution coatings of fabrics, tanks, or chemical containers

Viton™ B-202 can be blended with other Viton™ types to modify viscosity, enhance processability, and/or improve flow.

Use of Viton™ B-202

Table 1 compares Viton™ B-202 with Viton™ B-600 and blends of Viton™ B-202 and B-600 in a standard 30MT black formulation. Table 2 compares the effects of carbon black levels in Viton™ B-202.

Safety and Handling

Before handling or processing Viton™ B-202, read and follow the recommendations as described in the Chemours technical bulletin, “Handling Precautions for Viton™ and Related Chemicals”.

Viton™ B-202 should be handled similar to other types of Viton™. Keep off skin and wash well after handling. For safe handling of other compounding ingredients, please refer to the respective manufacturers’ information.

Product Description

Chemical Composition	Terpolymer of hexafluoropropylene, vinylidene fluoride, and tetrafluoroethylene
Physical Form	Slab
Color	Silver-gray, translucent
Odor	None
Specific Gravity	1.84
Solubility	Low molecular weight esters and ketones
Storage Stability	Excellent
Mooney Viscosity, ML 1 + 10 at 121 °C (250 °F)	Nominal 20

*Viton™ B-202 was formerly named VTR-7130.



Table 1. Performance of Viton™ B-202 Alone and in Blends with Viton™ B-600

	Blends of Viton™ B-202 and B-600				
	A	B	C	D	E
Viton™ B-202	100	75	50	25	—
Viton™ B-600	—	25	50	75	100
MT Black (N990)	30	30	30	30	30
Calcium Hydroxide	6	6	6	6	6
High-Activity MgO	3	3	3	3	3
Viton™ Curative No. 50	2.5	2.5	2.5	2.5	2.5
Viton™ Curative No. 20	0.5	0.5	0.5	0.5	0.5
Stock Properties					
Mooney Viscosity, ML 1 + 10 at 121 °C (250°F)					
ML 1 + 10, μm	54	60	67	77	93
Mooney Scorch, MS at 121 °C (250°F)					
Minimum Viscosity, μm	28	31	36	41	47
Rise in 30', μm	0.5	0.4	1.2	3.0	3.3
ODR at 177 °C (351 °F), 3° arch, 15 min motor					
Minimum torque, M_L , dNm	6.8	7.9	9.9	11.6	14.2
Maximum torque, M_H , dNm	104	109	114	116	120
Scorch time, t_{s2} , min	2.4	2.4	2.3	2.1	2.0
Scorch time, t_{c50} , min	3.6	3.7	3.7	3.5	3.5
Optimum cure time, t_{c90} , min	4.1	4.1	4.1	3.9	3.9
MDR2000 at 177 °C (351 °F), 0.5° arc, 12 min					
Minimum torque, M_L , dNm	0.8	1.0	1.2	1.4	1.7
Maximum torque, M_H , dNm	26.3	27.0	27.7	28.5	29.7
Scorch time, t_{s1} , min	1.5	1.5	1.4	1.3	1.2
Scorch time, t_{s2} , min	1.8	1.8	1.7	1.6	1.5
Scorch time, t_{c50} , min	2.3	2.3	2.2	2.1	2.0
Optimum cure time, t_{s2} , min	3.3	3.3	3.1	2.9	2.8
Optimum cure time, t_{c90} , min	3.9	3.8	3.7	3.4	3.3
Rosand Capillary Rheometer at 100 °C (212 °F), 1.5 mm Die, L/D = 0/1					
<i>Shear Rate</i>	<i>Pressure (MPa)</i>				
113 sec^{-1}	4.6	4.9	5.3	5.6	5.3
452 sec^{-1}	6.7	7.1	7.0	7.7	7.2
1,129 sec^{-1}	8.8	9.1	9.0	9.6	9.2
Vulcanizate Properties					
Slabs Cured 10 min at 177 °C (351 °F) and Post-Cured 24 hr at 232 °C (450 °F)					
Stress/Strain at 23 °C (73 °F)—Original, no post-cure					
Hardness, Shore A	77	78	75	74	75
M100, MPa	3.7	3.7	3.9	3.8	3.7
Tb, MPa	8.7	9.3	9.4	9.1	8.8
Eb, %	310	315	305	300	265
Stress/Strain at 23 °C (73 °F)—Original, post-cure					
Hardness, Shore A	78	76	79	79	77
M100, MPa	5.1	4.7	5.0	5.0	5.2
Tb, MPa	13.2	12.4	13.4	11.9	13.4
Eb, %	240	230	240	230	250



Table 1. Performance of Viton™ B-202 Alone and in Blends with Viton™ B-600 (continued)

	Blends of Viton™ B-202 and B-600				
	A	B	C	D	E
Stress/Strain at 23 °C (73 °F)—After aging 168 hr at 200 °C (392 °F)					
Hardness, Shore A	80	78	77	77	77
M100, MPa	5.8	5.4	5.6	5.2	5.7
Tb, MPa	13.5	13.7	12.4	13.0	13.9
Eb, %	230	240	210	230	230
Change M100, %	13	13	12	5	11
Change Tb, %	2	11	-8	9	4
Change Eb, %	-6	3	-11	-1	-6
Change Hardness, pts	2	2	-2	-2	0
Stress/Strain at 23 °C (73 °F)—After aging 168 hr at 250 °C (482 °F)					
Hardness, Shore A	79	79	75	75	76
M100, MPa	4.6	4.2	4.3	4.3	4.5
Tb, MPa	11.2	10.9	11.1	10.9	12.8
Eb, %	230	240	230	230	240
Change M100, %	-10	-11	-13	-13	-13
Change Tb, %	-15	-12	-17	-9	-5
Change Eb, %	-6	3	-3	1	-3
Change Hardness, pts	1	3	-4	-4	-1
Stress/Strain at 23 °C (73 °F)—After aging 168 hr at 150 °C (302 °F) in ASTM 105 Oil					
Hardness, Shore A	82	81	81	81	81
M100, MPa	5.5	6.0	6.0	5.8	5.5
Tb, MPa	6.7	7.0	6.8	6.7	6.4
Eb, %	135	125	115	120	125
Change M100, %	8	26	20	18	6
Change Tb, %	-49	-44	-49	-44	-52
Change Eb, %	-45	-46	-52	-47	-50
Change Hardness, pts	4	5	2	2	4
Stress/Strain at 23 °C (73 °F)—After aging 70 hr at 2000 °C (3632 °F) in Stauffer 7700 Fluid					
Hardness, Shore A	69	71	69	70	70
M100, MPa	4.6	4.2	4.4	4.6	4.2
Tb, MPa	11.3	11.4	11.5	11.4	11.2
Eb, %	250	255	235	265	265
Change M100, %	-10	-12	-11	-7	-18
Change Tb, %	-15	-8	-14	-4	-16
Change Eb, %	4	9	0	16	7
Change Hardness, pts	-9	-5	-10	-9	-7
Fluid Resistance, Volume Swell, %					
Fuel C, 70 hr at 23 °C (73 °F)	3	3	3	3	3
Methanol, 70 hr at 23 °C (73 °F)	17	17	17	17	17
Stauffer 7700 Fluid, 70 hr at 200 °C (392 °F)	9	9	9	9	9
ASTM 105 Oil, 70 hr at 150 °C (302 °F)	-1	-1	-1	-1	-1
Compression Set, %, Method B plied disks					
Aged 70 hr at 150 °C (302 °F)	20	17	16	14	14
Aged 70 hr at 200 °C (392 °F)	34	29	26	24	22
Aged 168 hr at 200 °C (392 °F)	42	37	31	29	26

Table 2. The Effect of Carbon Black Level in Viton™ B-202

	Blends of Viton™ B-202 and B-600				
	4.5 phr	30 phr	15 phr	5 phr	2.5 phr
Viton™ B-202	97	97	97	97	97
Calcium Hydroxide	6	6	6	6	6
MT Black (N990)	45	30	15	5	2.5
High-Activity MgO	3	3	3	3	3
Viton™ Curative No. 50	2.5	2.5	2.5	2.5	2.5
Viton™ Curative No. 20	0.5	0.5	0.5	0.5	0.5
Stock Properties					
Mooney Viscosity, ML 1 + 10 at 121 °C (250 °F)					
ML 1 + 10, μm	84	65	51	43	41
Mooney Scorch MS at 121 °C (250 °F)					
Minimum Viscosity, μm	44	33	26	23	22
Rise in 30', μm	1	0	0	0	0
ODR at 177 °C (351 °F), 3° arch, 15 min motor					
Minimum torque, M_L , dNm	10.8	8.7	6.6	7.5	6.6
Maximum torque, M_H , dNm	88	89	77	84	74
Scorch time, t_{s2} , min	1.9	2.2	2.8	2.5	2.7
Scorch time, t_{c50} , min	3.1	3.4	4.0	3.7	3.8
Optimum cure time, t_{c90} , min	4.0	4.1	4.6	4.3	4.4
MDR2000 at 177 °C (351 °F), 0.5° arc, 12 min					
Minimum torque, M_L , dNm	1.6	0.9	0.7	0.5	0.5
Maximum torque, M_H , dNm	30.2	22.5	15.5	12.3	11.5
Scorch time, t_{s1} , min	0.9	1.3	1.5	1.8	1.7
Scorch time, t_{s2} , min	1.1	1.5	1.7	1.9	1.8
Optimum cure time, t_{c90} , min	2.8	3.0	3.0	3.1	2.9
Vulcanizate Properties					
Slabs Cured 10 min at 177 °C (351 °F) and Post-Cured 24 hr at 232 °C (450 °F)					
Stress/Strain at 23 °C (73 °F)—Original, no post-cure					
Hardness, Shore A	83	75	66	58	56
M100, MPa	4.4	3.2	2.3	1.6	1.4
Tb, MPa	8.0	8.1	8.0	8.0	7.0
Eb, %	304	384	358	367	337
Stress/Strain at 23 °C (73 °F)—Original, no post-cure					
MP50, MPa	2.2	1.6	1.4	1.1	1.1
M100, MPa	—	2.7	—	—	—
Tb, MPa	3.3	2.8	1.7	1.5	1.4
Eb, %	89	103	70	75	74
Stress/Strain at 23 °C (73 °F)—Original, post-cured					
Hardness, Shore A	85	78	65	56	56
M100, MPa	5.7	4.7	2.8	1.8	1.6
Tb, MPa	10.8	11.4	11.3	9.7	8.4
Eb, %	238	281	329	321	295
Compression Set, %, Method B plied disks					
Aged 70 hr at 150 °C (302 °F)	24	18	15	15	16
Aged 70 hr at 200 °C (392 °F)	38	31	26	25	26
Aged 168 hr at 200 °C (392 °F)	52	45	41	40	42



Test Procedures

Property Measured	Test Procedure
Compression Set	ASTM D3955, Method B (25% deflection)
Compression Set—Low Temperature	ASTM D1299, Method B (25% deflection)
Compression Set, O-Rings	ASTM D1414
Hardness	ASTM D2240, durometer A
Mooney Scorch	ASTM D1646, using the small rotor. Minimum viscosity and time to a 1-, 5-, or 10-unit rise are reported.
Mooney Viscosity	ASTM D1646, ten pass 100 °C (212 °F) and 121 °C (250 °F)
ODR (vulcanization characteristics measured with an oscillating disk cure meter)	ASTM D2084
Property Change After Oven Heat-Aging	ASTM D573
Stress/Strain Properties	
100% Modulus	
Tensile Strength	
Elongation at Break	ASTM D412, pulled at 8.5 mm/sec (20 in/min)
Stiffness, Torsional, Clash-Berg	ASTM D1043
Temperature Retraction	ASTM D1329
Volume Change in Fluids	ASTM D471

Test temperature is 24 °C (75 °F), except where specified otherwise.

