

Technical Information

Introduction

Viton™ A-200* fluoroelastomer is an “A-family” gum polymer that demonstrates improved processing when compared with existing fluoroelastomers. Viton™ A-200 is designed for use with the clean molding bisphenol curative, Viton™ Curative No. 50.

Compared with other “A-family” dipolymers, Viton™ A-200 provides:

- Lower viscosity
- Improved mold flow
- Excellent extrusion characteristics
- Better mold release
- Less mold fouling
- Improved compression set resistance

Product Description

Chemical Composition	Dipolymer of hexafluoropropylene and vinylidene fluoride
Physical Form	Free-flowing pellets
Appearance	Silver-gray
Odor	None
Mooney Viscosity, ML 1 + 10 at 121 °C (250 °F)	22
Specific Gravity	1.82
Storage Stability	Excellent
Solubility	Low molecular weight esters and ketones

*Viton™ A-200 was formerly named VTR-5995.

Applications

- Transfer and injection molding
 - O-rings
 - Valve stem seals and shaft seals
 - Parts with complicated shapes
- Extrusions
 - Fuel hose and tubing
- Solution coating
 - Fabric
 - Tanks or chemical containers

Safety and Handling

Before handling or processing Viton™ A-200, read and be guided by the recommendations in the Chemours technical bulletin, “Handling Precautions for Viton™ and Related Chemicals.”

Viton™ A-200 should be handled like other types of Viton™. Keep off skin and wash well after handling. For the safe handling of other compounding ingredients, refer to the respective manufacturers’ literature.



Table 1. General Properties of Viton™ A-200 Compared with Viton™ E-45

	Viton™ A-200	Viton™ E-45
Viton™ A-200	100	—
Viton™ E-45	—	100
MT Black (N990)	30	30
High-Activity MgO	3	3
Calcium Hydroxide	6	6
Viton™ Curative No. 50	2.5	2.5
VPA No. 3	1	1
Stock Properties		
Mooney Scorch, MS at 121 °C (250°F)		
Minimum, in-lb	26	34
Time to 1-unit rise, min	30	30
ODR at 177 °C (350 °F), Microdie, 3° Arc, 12 min		
M _L , N·m in-lbf	0.5 (4)	0.7 (6)
t ₉₂ , min	1.9	2.1
t ₉₀ , min	2.8	3.3
M _H , N·m in-lbf	11.4 (96)	12.5 (108)
Vulcanizate Properties		
Press Cured: 10 min at 177 °C (350 °F) Post-Cured: 24 hr at 232 °C (450 °F)		
Stress/Strain—Original		
100% Modulus, MPa (psi)	5.7 (820)	6.4 (930)
Tensile Strength, MPa (psi)	11.1 (1,610)	11.9 (1,730)
Elongation at Break, %	200	190
Hardness, durometer A, pts	76	76
Stress/Strain—After 7 days/225 °C (437 °F)		
100% Modulus, MPa (psi)	4.3 (620)	5.2 (750)
Tensile Strength, MPa (psi)	9.7 (1,400)	10.8 (1,570)
Elongation at Break, %	210	200
Hardness, durometer A, pts	79	79
Compression Set, Method B, O-Rings, %		
22 hr at RT	7	9
22 hr at 200 °C (392 °F)	10	12
336 hr at 200 °C (392 °F)	35	34



Table 2. Hard and Soft Black Compounds in Viton™ A-200

Nominal Hardness (Durometer A)	85	75	60	53	50
Viton™ A-200	97.5	97.5	97.5	97.5	98
MT Black (N990)	45	30	10	2	2
Viton™ Curative No. 20	—	—	—	—	0.5
Viton™ Curative No. 50	2.5	2.5	2.5	2.5	1.5
High-Activity MgO	3	3	3	3	3
Calcium Hydroxide	6	6	6	6	6
VPA No. 1	0.5	0.5	0.5	0.5	0.5
VPA No. 3	0.5	0.5	0.5	0.5	0.5
Stock Properties					
Mooney Scorch, MS at 121 °C (250 °F)					
Minimum, in-lb	32	25	17	17	19
5-pt rise, min	30	30	30	30	15
ODR at 177 °C (350 °F), Microdie, 3° Arc, 12 min					
M _L , in-lb	6.5	6.5	5.0	5.0	8.0
t _{g2} , min	2.0	2.2	2.6	2.8	1.5
t _{c90} , min	3.4	3.5	3.8	3.8	2.6
M _H , in-lb	127	122	100	88	56
Vulcanizate Properties					
Press Cured: 10 min at 180 °C (356 °F) Post-Cured: 24 hr at 232 °C (450 °F)					
Stress/Strain at 23 °C (73 °F)—Original					
100% Modulus, MPa (psi)	8.7 (1,240)	6.4 (930)	2.7 (390)	1.7 (250)	1.2 (170)
Tensile Strength, MPa (psi)	12.9 (1,860)	12.4 (1,800)	10.6 (1,530)	7.5 (1,090)	7.7 (1,120)
Elongation at Break, %	165	190	245	240	375
Hardness, durometer A, pts	86	77	61	53	51
Stress/Strain at 23 °C (73 °F)—After aging 70 hr at 275 °C (528 °F)					
100% Modulus, % change	-10	-22	-26	-28	-21
Tensile Strength, % change	-22	-14	-10	0	-8
Elongation at Break, % change	-15	+16	+14	+19	+23
Hardness, points change	+3	+5	+2	+6	+4
Compression Set Resistance, Method B, O-Rings, %					
70 hr at 0 °C (32 °F)	38	21	18	12	29
70 hr at 23 °C (73 °F)	12	9	6	3	18
70 hr at 200 °C (392 °F)	18	12	12	12	21
22 hr at 232 °C (450 °F)	26	21	20	21	24
Volume Swell, %					
ASTM #3 Oil, 70 hr at 200 °C (392 °F)	3.3	4.0	4.4	4.7	4.5
Dexron ATF, 70 hr at 200 °C (392 °F)	1.6	2.2	2.3	2.3	2.3
Methanol, 7 days at 23 °C (73 °F)	77	94	137	160	256



Table 3. Non-Black Fillers in Viton™ A-200 (Hardness—60-70)

	Control MT Black	Multifex MM	Nyad® 400	Celite® 350	Blanc Fixe	Ti-Pure™ R-960
Viton™ A-200	97.8	97.8	97.8	97.8	97.8	97.8
MT Black (N990)	25	—	—	—	—	—
Multifex MM	—	25	—	—	—	—
Nyad® 400	—	—	25	—	—	—
Celite® 350	—	—	—	20	—	—
Blanc Fixe	—	—	—	—	35	—
Ti-Pure™ R-960	—	—	—	—	—	30
Calcium Hydroxide	6	6	6	6	6	6
High-Activity MgO	3	3	3	3	3	3
Viton™ Curative No. 50	2.2	2.2	2.2	2.2	2.2	2.2
VPA No. 1	0.5	0.5	0.5	0.5	0.5	0.5
VPA No. 3	0.5	0.5	0.5	0.5	0.5	0.5
Stock Properties						
Mooney Scorch, MS at 121 °C (250 °F)						
Minimum	22	26	22	30	24	22
Rise in 30 min	0	4	0	0	.5	0
ODR at 177 °C (350 °F), Microdie, 3° Arc, 12 min						
M _L , in-lb	6	9	7	7	8	5
t ₂ , min	1.9	1.7	2.1	2.0	1.9	2.4
t ₉₀ , min	3.9	3.7	3.1	3.3	3.1	4.4
M _H , in-lb	95	78	92	97	88	75
Vulcanizate Properties						
Press Cured: 10 min at 180 °C (356 °F) Post-Cured: 24 hr at 232 °C (450 °F)						
Stress/Strain at 23 °C (73 °F)—Original						
100% Modulus, MPa (psi)	4.7 (680)	3.7 (540)	5.1 (740)	6.8 (990)	2.8 (410)	2.9 (420)
Tensile Strength, MPa (psi)	12.6 (1,830)	10.6 (1,540)	9.0 (1,300)	11.1 (1,610)	8.8 (1,280)	10.7 (1,550)
Elongation at Break, %	240	215	225	195	275	270
Hardness, durometer A, pts	69	62	62	67	59	61
Stress/Strain at 23 °C (73 °F)—After aging 70 hr at 275 °C (528 °F)						
100% Modulus, % change	-32	+11	-6	-26	-25	+55
Tensile Strength, % change	-31	-18	-8	-28	-3	-28
Elongation at Break, % change	+6	-14	-2	+23	+16	-43
Hardness, points change	+4	+6	+5	+8	+4	+13
Compression Set, Method B, O-Rings, %						
70 hr at 23 °C (73 °F)	9	12	6	6	6	12
70 hr at 200 °C (392 °F)	12	18	9	9	12	14
336 hr at 200 °C (392 °F)	28	36	24	36	36	34
22 hr at 232 °C (450 °F)	18	24	21	12	18	18
Volume Swell, %						
ASTM #3 Oil, 168 hr at 200 °C (392 °F)	3.4	3.8	3.8	3.9	3.7	3.7
Methanol, 70 days at RT	109	140	120	111	136	145



Table 4. Curative Level in Viton™ A-200

	2.5 phr VC50	2 phr VC50	1.5 phr VC50	VC50+ VC20	VC50+ VC30	VC50+ VPA No. 3
Viton™ A-200	97.5	98	98.5	97.7	97.4	98
MT Black (N990)	20	20	20	20	20	20
Calcium Hydroxide	6	6	6	6	6	6
High-Activity MgO	3	3	3	3	3	3
Viton™ Curative No. 20	—	—	—	0.3	—	—
Viton™ Curative No. 30	—	—	—	—	0.6	—
Viton™ Curative No. 50	2.5	2.0	1.5	2.0	2.0	2.0
VPA No. 3	—	—	—	—	—	0.5
Stock Properties						
Mooney Scorch, MS at 121 °C (250 °F)						
Minimum	20	21	20	20	20	20
Rise in 30 min	0.5	0.5	1	1	0	0.5
ODR at 177 °C (350 °F), Microdie, 3° Arc, 12 min						
M _t , in-lb	6	7	8	7	6	7
t ₃ 2, min	2.3	2.1	1.9	1.9	2.8	1.9
t _c 90, min	3.8	3.3	3.4	2.8	4.2	3.0
M _{tt} , in-lb	101	87	64	87	99	87
Vulcanizate Properties						
Press Cured: 10 min at 180 °C (356 °F) Post-Cured: 24 hr at 232 °C (450 °F)						
Stress/Strain at 23 °C (73 °F)—Original						
100% Modulus, MPa (psi)	4.3 (620)	3.6 (520)	2.6 (380)	3.6 (520)	4.4 (640)	3.6 (520)
Tensile Strength, MPa (psi)	11.7 (1,700)	12.1 (1,760)	10.6 (1,540)	11.7 (1,700)	11.9 (1,730)	12.6 (1,830)
Elongation at Break, %	220	250	285	255	220	260
Hardness, durometer A	69	66	64	67	67	66
Stress/Strain at 23 °C (73 °F)—After aging 7 days at 250 °C (482 °F)						
100% Modulus, % change	+5	-3	-4	0	-9	-3
Tensile Strength, % change	+10	+1	+12	+1	-4	-7
Elongation at Break, % change	-5	-4	+18	-8	-5	-10
Hardness, points change	+2	0	+3	+3	+2	+2
Stress/Strain at 23 °C (73 °F)—After aging 70 hr at 275 °C (528 °F)						
100% Modulus, % change	-30	-36	-35	-33	-39	-36
Tensile Strength, % change	-15	-25	-29	-29	-24	-30
Elongation at Break, % change	+23	+30	+60	+22	+25	+33
Hardness, points change	-2	+1	0	+1	0	0
Compression Set, Method B, O-Rings, %						
70 hr at RT	9	12	21	12	9	13
70 hr at 200 °C (392 °F)	10	12	19	12	10	15
336 hr at 200 °C (392 °F)	25	26	32	29	24	29
22 hr at 232 °C (450 °F)	15	15	12	18	12	12



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), 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

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

