Viton™ A-100
Fluoroelastomers

Technical Information

Introduction

Viton™ A-100* fluoroelastomer is an ultralow-viscosity, "A-type" gum polymer that demonstrates improved processing and rheology in comparison with existing fluoroelastomers. Viton™ A-100 is especially designed for use with Viton™ Curative No. 50. It may be blended with other Viton™ types to enhance flow and processibility.

Compared with other "A-family" dipolymers, Viton™ A-100 provides:

- Ultralow viscosity
- Improved processing
  - Increased mold flow
  - Can be blended with other Viton™ types to enhance processibility and improve flow
- Excellent mold release
- Good compression set resistance for low-viscosity types of Viton™

Applications

- Transfer and injection molding of complex shapes, such as gaskets
- Extrusions
  - Can be used to modify viscosity of other types of Viton™
- Solution coating
  - Fabric
  - Tanks or chemical containers

Safety and Handling

Before handling or processing Viton™ A-100, read and follow the recommendations as described in the Chemours technical bulletin, "Handling Precautions for Viton™ and Related Chemicals."

Viton™ A-100 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' literature.

Product Description

Chemical Composition	Dipolymer of hexafluoropropylene and vinylidene fluoride
Physical Form	Slab
Color	Silver-gray, translucent
Odor	None
Specific Gravity	1.82
Solubility	Low molecular weight esters and ketones
Storage Stability	Excellent
Mooney Viscosity, ML 1+10 at 121 °C (250 °F)	12

*Viton™ A-100 was formerly named VTR-6698.

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Table 1. General Properties of Viton™ A-100 Compared with Viton™ A-200

		Viton™ A-100	Viton™ A-200
Viton™ A-100		97.5	—
Viton™ A-200		—	97.5
Viton™ C-10		—	—
High-Activity MgO		3	3
Calcium Hydroxide		6	6
MT Black (N990)		30	30
Viton™ Curative No. 50		2.5	2.5
Stock Properties			
Viscosity, ML 1 + 10 at 121 °C (250 °F)			
Units		33	48
Mooney Scorch at 121 °C (250 °F)			
Minimum, in·lb		17	26
2 pt Rise, min		>30	>30
ODR at 177 °C, 3° Arc, 100 Range, 30 min Clock			
M_L, in·lb		2	5
t_s2, min		2.7	2.6
t_c90, min		4.1	4.3
M_c90, in·lb		83	98
M_H, in·lb		92	109
Rosand Capillary Rheometer at 100 °C, 1.5 mm die, L/D = 0/1 and 10/1			
Piston Speed	*Shear Rate*	*Pressure, MPa*	
12.7 mm/min	113 sec^{-1}	4.0	5.0
50.8 mm/min	452 sec^{-1}	6.8	8.6
127 mm/min	1130 sec^{-1}	9.9	11.7
Vulcanizate Properties			
Slabs Cured: 10 min at 177 °C (350 °F); Post-Cured: 24 hr at 232 °C (450 °F)			
Stress/Strain at 23 °C (73 °F)—Original, No post-cure			
100% Modulus, MPa (psi)		3.8 (555)	4.4 (640)
Tensile Strength, MPa (psi)		8.2 (1,195)	8.6 (1,250)
Elongation at Break, %		237	212
Hardness, Durometer A, points		79	79
Stress/Strain at 23 °C (73 °F)—Original, Post-cured			
100% Modulus, MPa (psi)		5.5 (795)	6.3 (920)
Tensile Strength, MPa (psi)		10.7 (1,545)	12.3 (1,780)
Elongation at Break, %		179	179
Hardness, Durometer A, pts		83	82
Stress/Strain at 23 °C (73 °F)—After Aging 70 hr at 200 °C (392 °F)			
100% Modulus, MPa (psi)		7.8 (1,135)	8.6 (1,245)
Tensile Strength, MPa (psi)		11.7 (1,695)	12.2 (1,770)
Elongation at Break, %		152	142
Hardness, Durometer A, pts		80	80

Table 1. General Properties of Viton™ A-100 Compared with Viton™ A-200 (continued)

	Viton™ A-100	Viton™ A-200
Stress/Strain at 23 °C (73 °F)—After Aging 168 hr at 200 °C (392 °F)		
100% Modulus, MPa (psi)	7.7 (1,120)	8.8 (1,270)
Tensile Strength, MPa (psi)	11.9 (1,730)	9.9 (1,440)
Elongation at Break, %	153	113
Hardness, Durometer A, pts	81	80
Stress/Strain at 23 °C (73 °F)—After Aging 70 hr at 232 °C (450 °F)		
100% Modulus, MPa (psi)	7.8 (1,125)	8.8 (1,270)
Tensile Strength, MPa (psi)	11.6 (1,685)	13.4 (1,950)
Elongation at Break, %	150	150
Hardness, Durometer A, pts	83	80
Compression Set, Method B, O-Rings, %		
70 hr at 23 °C (73 °F)	10	9
70 hr at 200 °C (392 °F)	20	17
22 hr at 232 °C (450 °F)	30	22

Table 2. Effect of Carbon Black in Viton™ A-100

	A 45 phr	B 30 phr	C 10 phr	D 2 phr	E 2 phr
		2.5 phr VC50			1.5 phr VC50
Viton™ A-100	97.5	97.5	97.5	97.5	97.5
High-Activity MgO	3	3	3	3	3
Calcium Hydroxide	6	6	6	6	6
MT Black (N990)	45	30	10	2	2
Viton™ Curative No. 50	2.5	2.5	2.5	2.5	1.5
Stock Properties					
Viscosity, ML 1 + 10 at 121 °C (250 °F)					
Units	41	32	22	19	18
Mooney Scorch, MS at 121 °C (250 °F)					
Minimum, in·lb	22	17	11	9	10
2-pt Rise, min	>30	>30	>30	>30	>30
ODR at 177 °C (350 °F), Microdie, 3° Arc, 15 min					
M_L, in·lb	3	3	2	2	3
t_s2, min	2.7	2.8	2.9	3.2	2.5
t_c90, min	4.1	4.7	4.4	4.6	4.8
M_c90, in·lb	85	82	68	63	36
M_H, in·lb	94	91	75	70	39

Table 2. Effect of Carbon Black in Viton™ A-100 (continued)

	A 45 phr	B 30 phr	C 10 phr	D 2 phr	E 2 phr
	2.5 phr VC50				1.5 phr VC50
Vulcanizate Properties					
Slabs Cured: A, B, C—10 min at 177 °C (350 °F); D, E—30 min at 166 °C (330 °F); Blisters Appeared at 177 °C (350 °F); Post-Cured: 24 hr at 232 °C (450 °F)					
Stress/Strain at 177 °C (350 °F)—Original, No post-cure					
100% Modulus, MPa (psi)	4.8 (695)	3.9 (565)	1.9 (275)	1.3 (195)	0.9 (135)
Tensile Strength, MPa (psi)	7.3 (1,065)	7.7 (1,120)	7.3 (1,055)	6.0 (870)	5.7 (825)
Elongation at Break, %	192	214	258	252	431
Hardness, Durometer A, pts	86	80	58	53	50
Stress/Strain at 23 °C (73 °F)— Original, Post-cured					
100% Modulus, MPa (psi)	8.4 (1,225)	5.7 (825)	2.2 (320)	1.4 (205)	1.0 (140)
Tensile Strength, MPa (psi)	12.2 (1,770)	10.6 (1,535)	7.9 (1,145)	6.1 (890)	5.6 (815)
Elongation at Break, %	151	176	207	224	363
Hardness, Durometer A, pts	88	82	61	55	52
Stress/Strain at 23 °C (73 °F)— After Aging 70 hr at 200 °C (392 °F)					
100% Modulus, MPa (psi)	11.3 (1,640)	7.8 (1,125)	3.4 (490)	2.3 (330)	1.3 (195)
Tensile Strength, MPa (psi)	12.8 (1,850)	11.1 (1,610)	8.0 (1,160)	7.7 (1,115)	7.2 (1,045)
Elongation at Break, %	117	147	191	243	400
Hardness, Durometer A, pts	88	80	63	56	53
Stress/Strain at 23 °C (73 °F)— After Aging 168 hr at 200 °C (392 °F)					
100% Modulus, MPa (psi)	—	7.8 (1,125)	3.4 (495)	2.2 (320)	1.4 (200)
Tensile Strength, MPa (psi)	11.2 (1,620)	10.2 (1,475)	8.9 (1,285)	7.8 (1,125)	7.2 (1,045)
Elongation at Break, %	96	132	205	244	399
Hardness, Durometer A, pts	85	82	62	56	53
Stress/Strain at 23 °C (73 °F)— After Aging 70 hr at 232 °C (450 °F)					
100% Modulus, MPa (psi)	11.4 (1,655)	8.0 (1,165)	3.5 (510)	2.3 (335)	1.3 (195)
Tensile Strength, MPa (psi)	11.5 (1,670)	11.0 (1,600)	9.8 (1,415)	7.0 (1,105)	6.5 (940)
Elongation at Break, %	101	140	221	225	383
Hardness, Durometer A, pts	88	81	62	55	53
Compression Set, Method B, O-Rings, %					
70 hr at 23 °C (73 °F)	14	10	9	7	19
70 hr at 200 °C (392 °F)	23	18	15	16	29
22 hr at 232 °C (450 °F)	30	25	22	21	32

Table 3. Curative Level in Viton™ A-100

	2.5 phr VC50	2 phr VC50	1.5 phr VC50	VC50 and VC20	VC50 and VC30
Viton™ A-100	97.5	98	98.5	97.7	97.4
High-Activity MgO	3	3	3	3	3
Calcium Hydroxide	6	6	6	6	6
MT Black (N990)	25	25	25	25	25
Viton™ Curative No. 20	—	—	—	0.3	—
Viton™ Curative No. 30	—	—	—	—	0.6
Viton™ Curative No. 50	2.5	2	1.5	2	2
Stock Properties					
Viscosity, ML 1 + 10 at 121 °C (250 °F)					
Units	21	29	29	27	29
Mooney Scorch, MS at 121 °C (250 °F)					
Minimum, in·lb	11	16	16	14	17
2-pt Rise, min	>30	>30	>30	>30	>30
ODR at 177 °C (350 °F), Microdie, 3° Arc, 15 min					
M_L, in·lb	1	2	3	2	2
t_s2, min	3.3	2.6	2.5	2.0	3.3
t_c90, min	5.6	4.2	5.4	3.5	5.0
M_c90, in·lb	72	60	36	56	73
M_H, in·lb	79	67	39	62	81
Vulcanizate Properties					
Slabs Cured: 10 min at 177 °C (350 °F); Post-Cured: 24 hr at 232 °C (450 °F)					
Stress/Strain at 23 °C (73 °F)—Original, No post-cure					
100% Modulus, MPa (psi)	3.2 (470)	2.7 (390)	2.0 (290)	2.7 (390)	3.1 (450)
Tensile Strength, MPa (psi)	7.7 (1,115)	7.7 (1,110)	8.1 (1,170)	8.0 (1,155)	8.3 (1,200)
Elongation at Break, %	246	277	432	296	252
Hardness, Durometer A, pts	76	72	70	68	70
Stress/Strain at 23 °C (73 °F)— Original, Post-cured					
100% Modulus, MPa (psi)	4.4 (645)	3.4 (490)	2.2 (325)	3.4 (495)	4.2 (615)
Tensile Strength, MPa (psi)	9.2 (1,335)	9.9 (1,440)	8.8 (1,270)	10.2 (1,480)	8.9 (1,295)
Elongation at Break, %	187	235	361	242	179
Hardness, Durometer A, pts	88	82	61	56	52
Stress/Strain at 23 °C (73 °F)— After Aging 70 hr at 200 °C (392 °F)					
100% Modulus, MPa (psi)	6.3 (920)	4.8 (700)	3.5 (505)	5.0 (725)	6.1 (880)
Tensile Strength, MPa (psi)	9.8 (1,425)	10.2 (1,485)	9.7 (1,410)	11.8 (1,710)	11.6 (1,675)
Elongation at Break, %	154	202	316	234	182
Hardness, Durometer A, pts	80	75	70	74	77
Stress/Strain at 23 °C (73 °F)— After Aging 168 hr at 200 °C (392 °F)					
100% Modulus, MPa (psi)	6.4 (935)	4.9 (705)	3.4 (500)	4.8 (695)	6.2 (895)
Tensile Strength, MPa (psi)	9.2 (1,335)	11.0 (1,600)	9.3 (1,355)	8.7 (1,265)	10.7 (1,550)
ation at Break, %	143	213	289	173	165
ness, Durometer A, pts	78	72	71	71	71

Table 3. Curative Level in Viton™ A-100 (continued)

	2.5 phr VC50	2 phr VC50	1.5 phr VC50	VC50 and VC20	VC50 and VC30
Stress/Strain at 23 °C (73 °F)— After aging 70 hr at 232 °C (450 °F)					
100% Modulus, MPa (psi)	6.6 (950)	5.1 (745)	3.6 (515)	4.9 (710)	6.1 (885)
Tensile Strength, MPa (psi)	9.3 (1,345)	11.6 (1,680)	9.3 (1,350)	10.1 (1,460)	11.2 (1,625)
Elongation at Break, %	139	223	296	200	175
Hardness, Durometer A, pts	79	75	73	72	77
Compression Set, Method B, O-Rings, %					
70 hr at 23 °C (73 °F)	9	15	29	16	10
70 hr at 200 °C (392 °F)	19	22	39	26	20
22 hr at 232 °C (450 °F)	21	22	34	23	21

Table 4. Use of Viton™ A-100 as a Viscosity Modifier

		Viton™ E-60	Viton™ LM	Viton™ C-10	Viton™ A-100		
Viton™ E-60		100	90	80	80	50	50
Viton™ LM		—	10	—	—	—	—
Viton™ C-10		—	—	20	—	—	—
Viton™ A-100		—	—	—	20	50	50
High-Activity MgO		3	3	3	3	3	3
Calcium Hydroxide		6	6	6	6	6	6
MT Black (N990)		30	30	30	30	30	45
Viton™ Curative No. 50		2.5	2.5	2.5	2.5	2.5	2.5
Total phr		141	141	141	141	141	156
Stock Properties							
Viscosity, ML 1 + 10 at 121 °C (250 °F)							
Units		60	43	53	52	40	49
Mooney Scorch at 121 °C (250 °F)							
Minimum, MU		32	23	29	28	21	26
2 pt Rise, min		>30	>30	>30	>30	>30	>30
ODR at 162 °C, 3° Arc, 100 Range, 30 Min Clock							
M_L, in·lb		11	9	9	9	6	8
t_s2, min		2.6	2.4	3.0	2.6	2.8	2.7
t_c90, min		4.8	4.1	6.1	4.6	4.8	5.1
M_c90, in·lb		93	79	90	88	76	84
M_H, in·lb		102	87	99	97	84	92
Rosand Capillary Rheometer at 100 °C (212 °F), 1.5 mm die, L/D = 0/1							
Piston Speed	*Shear Rate*			*Pressure, MPa*			
12.7 mm/min	113 sec^{-1}	6.2	4.0	6.1	5.6	5.3	4.9
50.8 mm/min	452 sec^{-1}	9.7	7.4	9.7	9.4	9.1	8.5
127 mm/min	1130 sec^{-1}	13.5	11.6	14.2	14.7	13.2	12.1

Table 4. Use of Viton™ A-100 as a Viscosity Modifier (continued)

	Viton™ E-60	Viton™ LM	Viton™ C-10		Viton™ A-100	
Vulcanizate Properties						
Slabs Cured: 10 min at 177 °C (350 °F); Post-Cured: 24 hr at 232 °C (450 °F)						
Stress/Strain at 23 °C (73 °F)—Original, No post-cure						
100% Modulus, MPa (psi)	3.6 (525)	3.0 (435)	3.5 (505)	3.4 (495)	3.1 (450)	4.5 (655)
Tensile Strength, MPa (psi)	9.1 (1,325)	8.0 (1,165)	8.8 (1,275)	8.5 (1,230)	8.3 (1,210)	8.6 (1,245)
Elongation at Break, %	289	315	288	287	305	269
Hardness, Durometer A, pts	73	72	76	73	73	85
Stress/Strain at 23 °C (73 °F)—Original, Post-cured						
100% Modulus, MPa (psi)	5.0 (730)	4.2 (610)	5.1 (740)	4.5 (650)	4.5 (655)	6.1 (890)
Tensile Strength, MPa (psi)	12.7 (1,845)	10.6 (1,540)	12.2 (1,770)	11.4 (1,655)	12.5 (1,810)	11.6 (1,680)
Elongation at Break, %	215	216	210	217	241	196
Hardness, Durometer A, pts	76	75	77	77	78	86
Stress/Strain at 23 °C (73 °F)—After Aging 70 hr at 200 °C (392 °F)						
100% Modulus, MPa (psi)	5.4 (790)	4.9 (705)	5.4 (790)	5.2 (760)	4.6 (670)	7.3 (1,055)
Tensile Strength, MPa (psi)	13.4 (1,955)	12.2 (1,765)	12.7 (1,845)	13.1 (1,895)	12.0 (1,735)	13.1 (1,895)
Elongation at Break, %	213	214	205	218	222	185
Hardness, Durometer A, pts	77	75	80	78	80	87
Stress/Strain at 23 °C (73 °F)—After Aging 168 hr at 200 °C (392 °F)						
100% Modulus, MPa (psi)	5.6 (810)	4.8 (690)	5.8 (840)	5.4 (785)	4.6 (660)	6.9 (1,000)
Tensile Strength, MPa (psi)	13.8 (2,005)	11.9 (1,725)	14.2 (2,060)	13.7 (1,990)	12.5 (1,810)	11.6 (1,675)
Elongation at Break, %	215	213	219	218	235	173
Hardness, Durometer A, pts	77	75	76	77	79	88
Stress/Strain at 23 °C (73 °F)—After Aging 70 hr at 232 °C (450 °F)						
100% Modulus, MPa (psi)	5.4 (785)	4.9 (710)	6.1 (890)	5.7 (830)	4.9 (705)	6.8 (980)
Tensile Strength, MPa (psi)	13.8 (2,000)	12.3 (1,785)	13.6 (1,965)	13.1 (1,905)	12.3 (1,790)	12.1 (1,755)
Elongation at Break, %	210	214	194	199	216	181
Hardness, Durometer A, pts	78	76	80	79	78	88
Compression Set, Method B, O-Rings, %						
70 hr at 200 °C (392 °F)	21	24	22	21	24	25
168 hr at 232 °C (450 °F)	69	77	76	76	74	79

Test Procedures

Property Measured	Test Procedure
Compression Set	ASTM D395-89, 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-, and 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.