

TYPICAL PHYSICAL PROPERTIES - E34 (E17434) BLACK EPDM

SPECIFICATIONS: SAE J200/ASTM D2000 M3DA7I0A26B36C32EA14F19

	Requirement	E34 (E17434)
ORIGINAL PROPERTIES		
Shore A Durometer	70±5	68
Tensile, MPa, min.	10	17.5
Elongation, %, min.	200 %	296
Color	NR	Black
A26:HEAT AGE, 70 HRS. @ 150°C:		
Change in Durometer, pts., max.	+ 10	+4
Change in Tensile, %, max.	- 20	-2.6
Change in Elongation, %, max.	- 20	+13.2
COMPRESSION SET, 22 HRS. @ 150°C:		
% Set, max.	25	12.4
Fluid Resistance, Water, 70 hrs. @ 100°C		
Change in Durometer, pts.	NR	0
Change in Volume, %	±5	0
OZONE RESISTANCE, 70 HRS. @ 40°C & 50 MPa OZONE		
Quality Retention, %	100%	100%
LOW TEMPERATURE BRITTLENESS, 3 MINS. @ -55°C:		
No Cracks	Pass/Fail	Pass

Note: NR = "Not Required for this Specification"

TYPICAL PHYSICAL PROPERTIES - E61 (E17331) BLACK EPDM

SPECIFICATIONS: SAE J200/ASTM D2000 M2DA7I0A26B36EA14FI9ZI

	Requirement	E61 (E17331)
ORIGINAL PROPERTIES		
Shore A Durometer	70±5	68
Tensile, MPa, min.	10	14.5
Elongation, %, min.	200%	255
Color	NR	Black
HEAT AGE, 70 HRS. @ 150°C		
Change in Durometer, pts., max.	+10	+3
Change in Tensile, %, max.	-20	-7.8
Change in Elongation, %, max.	-20	-13.7
COMPRESSION SET, 22 HRS. @ 150°C		
% Set, max.	40	24
FLUID RESISTANCE, WATER, 70 HRS. @ 100°C		
Change in Durometer, pts.	NR	+2
Change in Volume, %	±5	+2.2
Z1: FLUID RESISTANCE, WATER, 168 HRS. @ 100°C		
Change in Durometer, pts.	NR	+3
Change in Volume, %	NR	+4.4
LOW TEMPERATURE BRITTLENESS, 3 MINS. @ -55°C		
No Cracks	Pass/Fail	Pass

Note: NR = "Not Required for this Specification"

TYPICAL PHYSICAL PROPERTIES - F18 (F13768) BROWN FLUOROCARBON

SPECIFICATIONS: SAE J200/ASTM D2000 M2HK6 I0 AI-I0B37F15

	Requirement	F18 (F13768)
Original Properties:		
Shore A Durometer:	60±5	62
Tensile, Mpa, min.	10	12
Elongation, %, min.	200 %	256
Color	NR	Brown
Heat Age, 70 hrs. @ 250°C:		
Change in Durometer, pts., max	+10	+1
Change in Tensile, %, max.	-25	-12.5
Change in Elongation, %, max.	-25	-3.5
Compression Set, 22 hrs. @ 175°C:		
% Set, max	50	9.3
Low Temperature Resistance:		
Non-brittle after 3 min @ -25°C	Pass	Pass

Note: NR = "Not Required for this Specification"

**TYPICAL PHYSICAL PROPERTIES - F35 (F13755)
BLACK FLUOROCARBON GF® TYPE**

SPECIFICATIONS: SAE J200/ASTM D2000 M2HK8I0 A1-I0B37B48EF3 IZIZ2

	Requirement	F35 (F13755)
ORIGINAL PROPERTIES		
Shore A Durometer:	80±5	82
Tensile, MPa, min.	10	10.5
Elongation, %, min.	150%	192
Color	NR	Black
A110: HEAT AGE, 70 HRS. @ 250°C		
Change in Durometer, pts., max.	+10	+1
Change in Tensile, %, max.	-25	-4.6
Change in Elongation, %, max.	-25	+32
COMPRESSION SET, 22 HRS. @ 150°C		
% Set, max.	50	27
COMPRESSION SET, 70 HRS. @ 175°C		
% Set	NR	30
FLUID RESISTANCE, FUEL C, 70 HRS. @ 23°C		
Change in Durometer, pts.	±5	-3
Change in Tensile, %, max.	-25	-1.2
Change in Elongation, %, max.	-20	+14
Change in Volume, %	0 / +10	+3
Z1: FLUID RESISTANCE, METHANOL, 70 HRS. @ 23°C , % Volume Change	0 / +10	+4
Z2: LOW TEMPERATURE PROPERTIES TR-10, °C	NR	-7

Note: NR = "Not Required for this Specification"

TYPICAL PHYSICAL PROPERTIES - F40 (F13740) BROWN FLUOROCARBON

SPECIFICATIONS: SAE J200/ASTM D2000 M2HK810 A1-I10B38EF3 IEO78Z1

	Requirement	F40 (F13740)
ORIGINAL PROPERTIES		
Shore A Durometer (Z1):	75±5	74
Tensile, MPa, min.	10	11.4
Elongation, %, min.	150%	185
Color	NR	Brown
HEAT AGE, 70 HRS. @ 250°C		
Change in Durometer, pts.	+10	+5
Change in Tensile, %, max.	-25	-5.7
Change in Elongation, %, max.	-25	-9.3
COMPRESSION SET, 22 HRS. @ 200°C		
% Set, max.	50	14
FLUID RESISTANCE, ASTM FUEL C, 70 HRS. @ 23°C		
Change in Durometer, pts.	±5	+1
Change in Tensile, %, max.	-25	-10.6
Change in Volume, %	+10	+8
FLUID RESISTANCE, ASTM SERVICE FLUID 101, 70 HRS. @ 200°C		
Change in Durometer, pts.	-15 / +5	-6
Change in Tensile, %, max.	-40	-19.8
Change in Elongation, %, max.	-20	+4.6
Change in Volume, %	0 / +15	+9.4

TYPICAL PHYSICAL PROPERTIES - F43 (F13742) BLACK FLUOROCARBON

SPECIFICATIONS: SAE J200/ASTM D 2000 M2HK710A1-10B38EF31F15ZI

	Requirement	F43 (F13742)
Original Properties		
Shore A Durometer	70±5	75
Tensile, Mpa, min.	10	13.8
Elongation, %, min.	175 %	278
Color	NR	Black
Heat Age, 70 hrs. @ 250°C		
Change in Durometer, pts., max.	+10	+7
Change in Tensile, %, max.	-25	+37.2
Change in Elongation, %, max.	-25	-7.2
Compression Set, 22 hrs. @ 200°C		
% Set, max.	50	10
Fluid Resistance, Fuel C, 70 hrs. @ 23°C		
Change in Durometer, pts.	±5	-5
Change in Tensile, %, max.	-25	-25
Change in Elongation, %, max.	-20	-18
Change in Volume, %	0 / +10	+5.8
Fluid Resistance, Methanol, 70 hrs. @ 23°C		
% Volume Change	NR	+5

Note: NR = "Not Required for this Specification"

TYPICAL PHYSICAL PROPERTIES F44 (F13744) VS. STANDARD AFLAS™ & FKM COMPOUNDS BLACK FLUOROCARBON

	F44 (F13744)	Typical Aflas™ FA 100S Compound	Typical 66% Fluorine FKM
ORIGINAL PROPERTIES			
Durometer, Shore A	76	74	75
Tensile, MPa	11.7	17.9	13.4
Elongation, %	187	250	181
HEAT RESISTANCE, 70 HRS. @250°C			
Change in Duro., pts.	+2	+2	+2
Change in Tensile, %	-13	-16	-5
Change in Elongation, %	-10	+32	-11
COMPRESSION SET 70 hrs. @ 150°C, % Set			
	16	22	11
LOW TEMPERATURE RETRACTION TR-10, °C			
	-3	+3	-18
ASTM Reference Fuel C, 70 hrs. @ 23°C			
Change in Duro., pts.	-18	-31	0
Change in Volume, %	+44	+71	+3
METHANOL, 70 HRS. @ 23°C			
Change in Duro., pts.	0	+1	-25
Change in Volume, %	+1	0	+128
ISOOCTANE, 70 HRS. @ 23°C			
Change in Duro., pts.	-3	-18	+2
Change in Volume, %	+5	+25	+1
IRM 903, 70 HRS. @ 150°C			
Change in Duro., pts.	-3	-8	0
Change in Tensile, %	-13	-7	-10
Change in Elongation, %	-7	+10	+9
Change in Volume, %	+7	+15	+2
SKYDROL LD4, 70 HRS. @ 100°C			
Change in Duro., pts.	-27	18	-43
Change in Tensile, %	-65	-25	-85
Change in Elongation, %	-46	0	-86
Change in Volume, %	+73	+26	+288
50% NaOH, 70 hrs. @ 100°C			
Change in Duro., pts.	0	-1	+1
Change in Tensile, %	-14	+6	-47
Change in Elongation, %	-9	+2	-18
Change in Volume, %	0	0	-17

TYPICAL PHYSICAL PROPERTIES - F48 (F13753) BLACK FLUOROCARBON

SPECIFICATIONS: SAE J200/ASTM D 2000 M2HK707A1-I0B37F15Z1

	Requirement	F48 (F13753)
Original Properties		
Shore A Durometer	75±5	77
Tensile, Mpa, min.	7	17
Elongation, %, min.	175%	295
Color	NR	Black
Heat Age, 70 hrs. @ 250°C		
Change in Durometer, pts., max.	+10	+3
Change in Tensile, %, max.	-25	-8
Change in Elongation, %, max.	-25	-3
Compression Set, 22 hrs. @ 175°C		
% Set, max.	50	12.5
Low Temperature Resistance		
Non-brittle after 3 min @ -40°C	Pass	Pass

Note: NR = "Not Required for this Specification"

TYPICAL PHYSICAL PROPERTIES - F52 (F13661) BROWN FLUOROCARBON/FLUOROSILICONE BLEND

SPECIFICATIONS: SAE J200/ASTM D2000 M4HK810F17Z1-Z8

	Requirement	F52 (F13661)
ORIGINAL PROPERTIES		
Durometer, Shore A	75±5	77
Tensile Strength, MPa, min.	7.0	7.9
Modulus @ 50% Elongation, MPa, min.	2.8	3.3
Elongation, %, min.	115	153
Density	Report	1.81
Tension Set, %, max.	6.0	5.1
Tear Strength, Die C, kN/m	11.0	12
HEAT RESISTANCE		
70 hours @ 225°C		
Modulus @ 50% Change, %	0 to 35	21*
Elongation Change, %	0 to -30	-11
COMPRESSION SET		
22 hours @ 100°C		
% of Original Thickness, max.	30%	17
Low Temperature Properties		
Trio, min.	-20°C	-26
IMMERSION: 80% ASTM Fuel C/ 20% Methanol		
70 hours @ 23°C		
Tensile Change, % max.	0 to -70	-55
Elongation Change, %	0 to -50	-31
Tear Strength Change, %	0 to -70	-37
Volume Change, %	0 to +40	+28.3
IMMERSION: 80% ASTM Fuel C/ 20% Methanol		
1008 hours @ 49°C		
Tensile Change, %	0 to -75	-62
Elongation Change, %	+25 to -65	-43
Tear Strength Change, %	0 to -75	42
Volume Change, %	0 to +40	+34.8
IMMERSION: Sour Gasoline		
168 hours @ 60°C		
Tensile Change, %	-45 to 0	-30
Elongation Change, %	-25 to 0	-12
Tear Strength Change, %	-50 to 0	-34
Volume Change, %	0 to +20	+15.1

TYPICAL PHYSICAL PROPERTIES - F56 (F13756) BLACK FLUOROCARBON GF® TYPE

SPECIFICATIONS: SAE J200/ASTM D2000 M2HK7I0A1-I0EF3IZIZ2

	Requirement	F56 (F13756)
ORIGINAL PROPERTIES		
Shore A Durometer	70±5	70
Tensile, MPa, min.	10	11
Elongation, %, min.	175%	264
Color	NR	Black
HEAT AGE, 70 HRS. @ 250°C		
Change in Durometer, pts., max.	+10	+2
Change in Tensile, %, max.	-25	-10.4
Change in Elongation, %, max.	-25	+20
COMPRESSION SET, 22 HRS. @ 150°C: % Set	NR	21
COMPRESSION SET, 70 HRS. @ 175°C % Set	NR	26
FLUID RESISTANCE, FUEL C, 70 HRS. @ 23°C		
Change in Durometer, pts.	±5	-1
Change in Tensile, %, max.	-25	-12
Change in Elongation, %, max.	-20	-1
Change in Volume, %	0 / +10	+2.8
Z1: FLUID RESISTANCE, METHANOL, 70 HRS. @ 23°C % Volume Change	0 / +10	+3.8
Z2: LOW TEMPERATURE PROPERTIES TR-10, °C	NR	-7

Note: NR = "Not Required for this Specification"

TYPICAL PHYSICAL PROPERTIES - F65 (F13678) VS. STANDARD FKM & HIGH FLUORINE FKM COMPOUNDS - BLACK FLUOROCARBON

	F65 (F13678)	Typical 66% Fluorine FKM	Typical 70% Fluorine FKM
ORIGINAL PROPERTIES			
Durometer, Shore A	76	77	79
Tensile, MPa	15	17	19
Elongation, %	175	190	215
HEAT RESISTANCE, 70 hrs. @250°C			
Change in Duro., pts.	-3	+1	0
Change in Tensile, %	-32	-16	-4.5
Change in Elongation, %	+38	-12	-2
COMPRESSION SET 22 hrs. @ 200°C, % Set	21	12	18
LOW TEMPERATURE RETRACTION TR-10, °C	-11	-17	-7
FLUID RESISTANCE, 168 hrs. @23°C in <u>Methyl Ethyl Ketone</u>			
Change in Duro., pts.	-11	-42	-38
Change in Tensile, %	-52	-91	-86
Change in Elongation, %	-24	-79	-77
Change in Volume, %	+19	+222	+183
FLUID RESISTANCE, 168 hrs. @100°C in <u>30% Potassium Hydroxide Solution</u>			
Change in Duro., pts.	0	-47	-49
Change in Tensile, %	-7.8	-95	-93
Change in Elongation, %	-2.4	-59	-44
Change in Volume, %	+6	+132	+12
Surface Condition	No Change	Sample Dissolving	Sample Dissolving

TYPICAL PHYSICAL PROPERTIES - F75 (F13664) BLACK FLUOROCARBON

SPECIFICATION: AMS 7276

	AMS 7276 Requirements	F75 (13664)
ORIGINAL PROPERTIES		
Shore A Durometer	75±5	77
Tensile, MPa, min.	9.65	14.7
Elongation, %, min.	125%	125
Color	NR	Black
HEAT AGE, 70 HRS. @ 270°C		
Change in Durometer, pts.	-5 / +10	+3
Change in Tensile, %, max.	35	-8
Change in Elongation, %, max.	-15	-3
Change in Weight, %, max.	-10	-3.5
COMPRESSION SET, 22 HRS. @ 200°C		
% Set, max.	15	10.1
COMPRESSION SET, 336 HRS. @ 200°C		
% Set, max.	40	35.2
FLUID RESISTANCE, ARM 200, 70 HRS. @ 200°C		
Change in Durometer, pts.	-15 / 0	-5
Change in Tensile, %, max.	-35	-12
Change in Elongation, %, max.	-20	+5
Change in Volume, %	+1 / + 25	+17
Compression Set, % Set, max.	10	8.8
FLUID RESISTANCE, ASTM FUEL B, 70 HRS. @ 23°C		
Change in Durometer, pts.	±5	+3
Change in Tensile, %, max.	-20	-7
Change in Elongation, %, max.	-20	-8
Change in Volume, %	0 / +5	+1.3
LOW TEMPERATURE RETRACTION: TR10, -15°C	Pass	Pass

TYPICAL PHYSICAL PROPERTIES - F86 (F13728) GREEN FLUOROCARBON GF® TYPE

SPECIFICATION: FORDWSAM2D401-A8

	Ford WSA-M2D401-A8 Requirements	F86 (F13728)
ORIGINAL PROPERTIES		
Hardness, I.R.H.D.	65-80	66
Hardness, Shore A	75±5	74
Tensile Strength, MPa, min.	9.0	12.3
Elongation at Break, %, min.	160%	220
Modulus at 100% Elong., MPa, min.	40	5.4
Compression Set 70 hours at 200°C, % set, max.	35%	24.2
Tear Strength, Die C, kN/m, min.	14	35
FLTM Ozone Resistance, max. BP 101-01, Procedure A	Rating 0	0
TR-10	-3°C (+23°F)	-11
HEAT AGED, 1000 hours at 200°C		
Hardness Change, max.	±5	-2
Tensile Strength Change, max.	±20%	-12
Elongation at Break Change, max.	±20%	+14
IMMERSION IN FUEL C, 336 hours at 60°C		
Hardness Change, max.	-15	-2
Tensile Strength Change, max.	-60%	-25
Elongation at Break Change, max.	-40%	+15
Volume Change, max.	+15%	+5
IMMERSION IN OXIDIZED FUEL, 336 hours at 60°C (FLTM AZ 105-01, PN 180)		
Hardness Change, max.	-25	-4
Tensile Strength Change, max.	-60%	-30
Elongation at Break Change, max.	-25%	+10
Volume Change, max.	+30%	+8
IMMERSION IN 50% FUEL C AND 50% METHANOL 2000 hours at 60°C		
Hardness Change, max.	-20	-6
Tensile Strength Change, max.	-60%	-30
Elongation at Break Change, max.	-40%	-10
Volume Change, max.	+25%	+10
M50 – DRY OUT, 48 hours at 100°C		
Hardness Change, max.	-5	0
Tensile Strength Change, max.	-15%	-7
Elongation at Break Change, max.	-15%	-3
Volume Change, max.	+5%	-1

**TYPICAL PHYSICAL PROPERTIES - F86 (F13728)
GREEN FLUOROCARBON GF® TYPE (CONT)**

	Ford WSA-M2D401-A8 Requirements	F86 (F13728)
IMMERSION IN 65% FUEL C, 20% METHANOL AND 15% MTBE 2000 hours at 60°C		
Hardness Change, max.	-25	9
Tensile Strength Change, max.	-70%	-45
Elongation at Break Change, max.	-45%	-21
Volume Change, max.	+40%	+12
FUEL BLEND– DRY OUT, 48 hours at 100°C		
Hardness Change, max.	-5	-1
Tensile Strength Change, max.	-15%	-9
Elongation at Break Change, max.	-15%	-5
Volume Change, max.	+5%	-1

TYPICAL PHYSICAL PROPERTIES - M07 (H14327) BLACK NITRILE

SPECIFICATIONS: SAE J200/ASTM D2000 M2BG7|0B|4EF|IEF2|E034

	Requirement	M07 (H14327)
ORIGINAL PROPERTIES		
Shore A Durometer	70±5	70
Tensile, MPa, min.	10	15.8
Elongation, %, min.	250%	462
Color	NR	Black
Heat Age, 70 hrs. @ 100°C:		
Change in Durometer, pts.	±15	+4
Change in Tensile, %, max.	+/- 30	-3.2
Change in Elongation, %, max.	-50	-22
Compression Set 22 hrs. @ 100°C:		
% Set, max.	-50	11
Fluid Resistance IRM 903 Oil, 70 hrs. @ 100°C:		
Change in Durometer, pts.	-10 / +5	-7
Change in Tensile, %, max.	-45	-17
Change in Elongation, %, max.	-45	-25
Change in Volume, %	0 / +25	+8.4
Fluid Resistance, ASTM Fuel A, 70 hrs. @ 23°C:		
Change in Durometer, pts.	±10	-1
Change in Tensile, %, max.	-25	-10.7
Change in Elongation, %, max.	-25	-17.3
Change in Volume, %	-5 / +10	+3.2
Fluid Resistance, ASTM Fuel B, 70 hrs. @ 23°C:		
Change in Durometer, pts.	-30 / 0	-15
Change in Tensile, %, max.	-60	-41.3
Change in Elongation, %, max.	-60	-45.3
Change in Volume, %	0 / +40	+28

Note: NR = "Not Required for this Specification"

TYPICAL PHYSICAL PROPERTIES - N20 (N18538) BLACK NEOPRENE®

SPECIFICATIONS: SAE J200/ASTM D2000 M4BC7I4A14B14EO14EO34

	Requirement	N20 (N18538)
ORIGINAL PROPERTIES		
Shore A Durometer:	70±5	72
Tensile, MPa, min.	14	18.9
Elongation, %, min.	250%	269
Color	NR	Black
HEAT AGE, 70 HRS. @ 100°C		
Change in Durometer, pts., max.	±15	+7
Change in Tensile, %, max.	-15	+15
Change in Elongation, %, max.	-40	-11.6
COMPRESSION SET, 22 HRS. @ 100°C		
% Set, max.	25	17
FLUID RESISTANCE, ASTM OIL#1, 70 HRS. @ 100°C		
Change in Durometer, pts.	±10	-6
Change in Tensile, %, max.	-30	-13.5
Change in Elongation, %, max.	-30	-19
Change in Volume, %	-10 / +15	+8
Fluid Resistance, IRM 903 Oil, 70 hrs. @ 100°C:		
Change in Tensile, %, max.	-45	-25.7
Change in Elongation, %, max.	-30	-21.5
Change in Volume, %, max.	+80	+57.6

Note: NR = "Not Required for this Specification"