

AUTOMOTIVE



## Monarch® #5013

- UL94 HF-1 and HBF listed for flame
- UL50E (periodic and continuous compression), UL508 and UL48 listed for gaskets and seals (recent upgrade)
- Widely used general purpose blend
- ASTM D 1056-07 2A3 grade closed cell material
- Fine cell – manufactured in blocks (buns)

**Monarch®**

### General Info

**Armacell Monarch® #5013:** Armacell LLC (Spencer, WV Plant) manufactures a black, closed cell,  $9 \pm 2$  lb./ft<sup>3</sup> ( $144 \pm 32$  kg/m<sup>3</sup>) density, EPDM / Neoprene / SBR blended rubber product #5013, that meets the requirements of SAE J-18 APR2002 2A3 and ASTM D 1056-07 2A3. #5013 is manufactured with non-staining oils and anti-oxidants. #5013 is self extinguishing and meets FMVSS-302 at 2.5 mm (0.098”) and higher. #5013 is listed with UL to UL 94 HBF and HF-1 (UL 94 HF-1 for thicknesses between 1.4 - 1.8 mm and UL 94 HBF for thicknesses above 1.80 mm) (UL file# QMFZ2.E55798). #5013 is also listed with UL to UL 50E (periodic and continuous compression), and UL48 & UL508 (UL file# JMLU2.MH25062). This product is also available in gray (#5913 - UL 50E / 48 / 508 listed but not UL 94 listed).

### Bun Size Information

Product	Bun Size (Inches)			Bun Size (mm)			Color
	W	L	T	W	L	T	
5013	40	54	2	1016	1372	50.8	Black
5013	42	72	2	1067	1829	50.8	Black



# Automotive and Industrial Specifications - Information Sheet

The following is a list of automotive and industrial specifications that Armacell Monarch® #5013 has been tested to or can meet. Additional specifications are listed that have a few exceptions. Feel free to suggest other automotive, military or industrial specifications, and a full review will be made.

Source	Specification	Armacell Monarch® #5013	Comments
ASTM	ASTM D 1056-07	2A3	Additional (optional) suffixes can be added
ASTM	ASTM D 1149	Pass, no cracking, rating 0	Ozone resistance
ASTM	ASTM D 1171	Pass, no cracking, rating 0	Ozone resistance
ASTM	ASTM D 6576-07	Type II, grades A & B condition medium	Formerly MILR6130-C
ASTM	ASTM G 21-09	Pass, rating 0	Fungus resistance test method
Chrysler	Chrysler MSZ-75 J18	2A3	Additional (optional) suffixes can be added
Chrysler	Chrysler MS JP9-4	Meets at thicknesses of 2.5mm (.098") and higher	Flame resistance (horizontal burn rate)
Federal	FMVSS-302	Meets at thicknesses of 2.5mm (.098") and higher	Flame resistance (horizontal burn rate). See note 3
FORD	FORD WSK M2D 419-A	Type 4	See note 2
GM	GM 6086-M	Type IIIA	CD tested at 50% deflection. See note 1
GM	GM 6090-M	(B4A) Meets at thicknesses of 3/16" (0.1875") (4.76 mm) and higher	Flame resistance tested per GM 9070-P (horizontal burn rate)
GM	GMN11106	Type II	CD tested at 50% deflection. See note 1
GM	GMW15473	Class I Type V	CD tested at 50% deflection. See note 1
ISO	ISO 6916	2A3	Some lot numbers of 5013 meet the compression set requirement. Typical values are 20% - 30%
Military	ASTM D 6576-07	Type II, grades A & B condition medium	Formerly MILR6130-C
SAE	SAE J18 APR2002	2A3	Additional (optional) suffixes can be added
SAE	SAE J369	Meets at thicknesses of 2.5mm (.098") and higher	Flame resistance (horizontal burn rate)
SAE	SAE J 1351	Rating 2	Odor specification
Toyota	TSM 1501G	2A3	Some lot numbers of 5013 meet the compression set requirement. Typical values are 20% - 30%
Toyota	TSM 0500G	Meets at thicknesses of 2.5mm (.098") and higher	Flame resistance (horizontal burn rate)
UL	UL 94 HF-1	HF-1 listed at 1.4mm-1.8mm (0.055" - 0.071")	Flame resistance specification. (UL file# QMFZ2.E55798)
UL	UL 94 HBF	HBF listed at 1.8mm (0.071") and higher	Flame resistance specification. (UL file# QMFZ2.E55798)
UL	UL48 / UL 50E / UL 508	Suitable for UL48, UL 50E (periodic and continuous compression), UL 508 in all colors	Gasket and seals / UL listed. (UL file# JMLU2.MH25062)
Visteon	VEF 4VH-80A100-AA	Pass	Biocide performance specification

Note 1: For all GM 6086-M, GMN11106 & GMW15473 callouts, Armacell (Monarch®) certifies to the "basic" requirements only. Request additional information for each product. Providing application (interior, exterior or under-hood) and part thickness is helpful.

Note 2: For all FORD WSK M2D 419-A callouts, request full information for each product due to some exceptions with non-tested staining requirements.

Note 3: A number of horizontal burn tests can also be listed (GM 6090, BMW, Volvo, etc.). Request additional information.





Polymer Base: Neoprene, EPDM, SBR Blend

**F-05013 (Black)**

Physical Properties	Unit	Test Method	Typical Results
Density	kg/m <sup>3</sup>	ASTM D 1056	144 ± 32
	lb/ft <sup>3</sup>	ASTM D 1056	9 ± 2
Hardness, Durometer Shore 00		ASTM D 2240	60 ± 5
Compression Deflection (25%)	kPa	ASTM D 1056	76 ± 14
	psi	ASTM D 1056	11 ± 2
Compression Set (Room temp)	%	ASTM D 1056	≤ 30%
Tensile Strength	kPa	ASTM D 412 (Die A)	690
	psi	ASTM D 412 (Die A)	100
Tear Strength	kN/m	ASTM D 624 (Die C)	2.6
	lb/in	ASTM D 624 (Die C)	15
Elongation	%	ASTM D 412 (Die A)	125%
Resilience	%	ASTM D 2632	20%
<b>Service Temperature</b>			
Low	°F (°C)	ASTM D 746	-40°F (-40°C)
High Continuous	°F (°C)	ASTM D 746	200 °F (93.3°C)
High Intermittent	°F (°C)	ASTM D 746	250°F (121.1°C)
<b>Water Absorption</b>			
Maximum Weight Change	%	ASTM D 1056	< 10%
<b>Fluid Immersion (7 days at 23°C [73.4°F])</b>			
ASTM Ref. Fuel B, Weight Change (%)	%	ASTM D 1056	Not Applicable
<b>Accelerated Aging (7 days at 70°C [158°F])</b>			
Flexibility (180° bend without cracking)		ASTM D 1056	Pass
Appearance change		ASTM D 1056	None
Change in Compression Deflection	%	ASTM D 1056	± 30%
<b>Combustion Characteristics</b>		<b>Thicknesses</b>	<b>Comments</b>
FMVSS-302		.098" (2.5 mm) and higher	Pass
UL94			
HF-1		.055" - .071" (1.4 mm - 1.8 mm)	Listed, UL file # QMFZ2.E55798
HBF		.071" (1.8 mm) and higher	Listed, UL file # QMFZ2.E55798

ASTM D 1056 designation: 2A3  
 SAE J 18 APR2002 designation: 2A3ASTM D 6576: Type 2, Grade A & B, Condition Medium  
 Additionally UL Listed to: UL48, UL50E, and UL508 (UL file # JMLU2.MH25062)  
 EPDM = (ethylene-propylene-diene-methylene)  
 SBR = styrene-butadiene rubber  
 Neoprene = polychloroprene (CR = chloroprene rubber)



## UL File Number for Armacell Monarch® #5013

UL File Number: QMFZ2.E55798  
Plastics – Component (UL 94)

		Min.		H	H	R T I		V	4	C	
		Thk	Flame	W	A	Elec	Mech	T	9	T	
Material Dsg	Color	mm	Class	I	I		Imp	Str	R	5	I

Neoprene/Ethylene Propylene/Styrene Butadiene (CBR/EPR/SB), foamed, furnished as blocks, buns.

F-005013 (g)	BK	1.4-1.8	HF-1	-	-	50	-	50	-	-	-
		1.8	HBF	-	-	50	-	50	-	-	-
		12.0	HBF	-	-	50	-	50	-	-	-

(g) – Density range 0.112 – 0.176 g/cc

## Closed cell EPDM/Neoprene/SBR blend

UL File number for Armacell Monarch® #5031, #5032, #5013, #5055 & #5955

UL File Number: JMLU2.MH25062 Gaskets and Seals - Component

Mtl Dsg	Max Serv Temp	Min Serv Temp	Density pcf	Tnsl Str	Elong	Max Comp Set	Nom Thkns Range In.	Use (1)
F-005X13	60°C	-40°C	11.4	155	140	25.4	—	(2, 3)
F-005X31	60°C	-40°C	6.8	95	135	35.5	—	(2, 3)
F-005X32	60°C	-40°C	6.7	85	105	34.2	—	(2, 3)
F-005055	60°C	-40°C	9.54	160	116	18.6	—	(2)
F-005955	60°C	-40°C	9.54	160	116	18.6	—	(2)

(1) See explanation of end-use environments in guide for this category.

(2) Also suitable for use in UL48, UL50E (continuous and periodic compression), UL508.

(3) X - Represents numbers 0 thru 9 for colors.

UL Spec	Test Method	Requirements
UL48	Tensile strength or elongation characteristics after 70 hours at 100°C for a 60°C maximum service temperature	60% of original (For both tensile and elongation)
UL48	(OR) Heat aging 70 hours in an air oven at a temperature of 100 ± 2°C	No visible evidence of deterioration such as cracking after flexing, softening, or hardening after exposure
UL50E	Tensile strength and elongation after heat aging 168 h (7 d) @ 158°F (70°C)	75% of original for tensile strength 60% of original for elongation
UL50E	Oil immersion / oil aging (IRM # 903), % volume change after 70 h @ room temperature	Shall not swell more than 25% or shrink more than 1% of original volume
UL157	Tensile strength and elongation after heat aging 70 h @ 212°F (100°C)	60% of original (For both tensile and elongation)
UL508	Tensile strength and elongation after heat aging 70 h @ 212°F (100°C)	75% of original (For both tensile and elongation)



## UL Yellow Card Listing Verification Online

### To obtain verification online:

1. [www.ul.com](http://www.ul.com)
2. Click on "Certifications"
3. Click on "Company Name" in the general search area
4. Type in "Armacell" & click "Search"
5. 8 (Eight) Armacell file numbers come up (2 belong to Armacell Germany)
  - For Armacell (Ensolite®) & (Monarch®) products (Flame / UL94)  
**Click on QMFZ2.E55798**
  - For Armacell (Ensolite®) products listed to JMST2 (Gaskets & Seals).  
**Click on JMST2.MH30018 and JMST2.MH10189**
  - For Armacell (Monarch®) products listed to JMLU2 (Gaskets & Seals).  
**Click on JMLU2.MH25062**



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