

AUTOMOTIVE



Ensolite® IR42

- UL 94 HF-1 listed for flame
- UL 50E (periodic and continuous compression) listed for gaskets and seals (recent upgrade)
- Manufactured in a variety of thicknesses
- Widely used skin 2 sides closed cell material
- ASTM D 1056-07 2A2 / 2C2 / 2B2 grade product

Ensolite®

General Information

Armacell Ensolite® IR42: Armacell LLC (Conover, NC Plant) manufactures a black, continuous, (rolls / sheets) closed cell, 6.0 - 10 lb./ft³ (96 - 160 kg/m³) density, PVC / NBR / CR rubber product IR42, that meets all the physical property requirements of ASTM D 1056-07 2A2, 2C2 & 2B2 and SAE J-18 APR2002 2A2, 2C2 & 2B2. IR42 has excellent resistance to oil and fuel. IR42 meets the requirements of FMVSS-302 at most thicknesses and is listed to UL 94 HF-1 at 3.4 - 3.7 mm (0.134" - 0.145") (UL File# QMFZ2.E55798). IR42 is UL listed to UL 50E (periodic and continuous compression) (UL File # JMST2.MH30018). Standard roll widths: 48" and 54".

Automotive and Industrial Specifications

The following is a list of automotive and industrial specifications that Armacell Ensolite® IR42 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	IR42	Comments
ASTM	ASTM D 1056-07	2A2/2C2/2B2	Additional (optional) suffixes can be added
ASTM	ASTM D 6576-07	Type II, Grades A & B, Condition Soft-Medium	Formerly MILR6130-C
Chrysler	Chrysler MSZ-75 J18	2A2 / 2C2 / 2B2	Additional (optional) suffixes can be added
Chrysler	Chrysler MS JP9-4	Meets at thicknesses of 0.125" (1/8") (3.1mm) and higher	Flame resistance (horizontal burn rate). Request additional information about thinner thicknesses
Chrysler	Chrysler MSAY 516	Type 2	Exception to 25% compression deflection
Federal	FMVSS-302	Meets at thicknesses of 0.125" (1/8") (3.1mm) and higher	Flame resistance (horizontal burn rate). Request additional information about thinner thicknesses. See note 3
Federal	FAR 25.853 (FAA 25.853)	Pass at 1/8" and 1/4"	12 second vertical burn test. (Test report available upon request)
FORD	FORD WSK M2D 419-A	Type 3	See note 2
GM	GM 6086-M	Type II	CD tested at 50% deflection. See note 1
GM	GM 6090-M	(B4A) Meets at thicknesses of 0.125" (1/8") (3.1mm) and higher	Flame resistance tested per GM 9070-P (horizontal burn rate)
GM	GMN11106	Type II	CD tested at 50% deflection. See note 1

Automotive and Industrial Specifications (continued)

Source	Specification	IR42	Comments
GM	GMW15473	Class I Type IV	CD tested at 50% deflection. See note 1
ISO	ISO 6916	2A2 / 2C2 / 2B2	No exceptions
Military	ASTM D 6576-07	Type II, Grades A & B, Condition Soft-Medium	Formerly MILR6130-C
SAE	SAE J18 APR2002	2A2 / 2C2 / 2B2	Additional (optional) suffixes can be added
SAE	SAE J369	Meets at thicknesses of 0.125" (1/8") (3.1mm) and higher	Flame resistance (horizontal burn rate). Request additional information about thinner thicknesses
SAE	SAE J 1351	Pass, rating 2	Odor specification
Toyota	TSM 0500G	Meets at thicknesses of 0.125" (1/8") (3.1mm) and higher	Flame resistance (horizontal burn rate). Request additional information about thinner thicknesses
Toyota	TSM 1501G	2A2 / 2C2 / 2B2	
UL	UL 94 HF-1	HF-1 listed at 3.4mm-3.7mm (0.134" - 0.145")	Flame resistance specification. (UL file# QMFZ2.E55798)
UL	UL 94 HBF	HBF listed at 3.4mm-3.7mm (0.134" - 0.145")	Flame resistance specification. (UL file# QMFZ2.E55798)
UL	UL 50E / UL 508	Suitable as gasket material for UL 50E (periodic and continuous compression) enclosures	Request additional information about UL enclosure types. (UL file# JMST2.MH30018)

Note 1: For all GM 6086-M, GMN11106 & GMW15473 callouts, Armacell Ensolite® 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.

Roll Size Information

Gauge (in)	Gauge (fraction of an inch)	Gauge (mm)	Tolerance (inches)	Tolerance (mm)	Roll Size W (in)	Roll Size L (ft)	Roll Size W (m)	Roll Size L (m)	Comments
0.118		3.00	0.078 - 0.158	2.00 - 4.00	39.37	246.06	1	75	
0.125	1/8	3.18	0.105 - 0.145	2.67 - 3.68	48	250	1.22	76.20	skin 2 sides, no splice
0.125	1/8	3.18	0.105 - 0.145	2.67 - 3.68	54	250	1.37	76.20	
0.188	3/16	4.76	0.163 - 0.213	4.14 - 5.41	54	165	1.37	50.29	
0.236		6.00	0.196 - 0.276	5.00 - 7.00	39.37	118.11	1	36	
0.250	1/4	6.35	0.220 - 0.280	5.59 - 7.11	54	125	1.37	38.10	
0.335		8.50	0.295 - 0.375	7.50 - 9.50	39.37	75.46	1	23	
0.375	3/8	9.53	0.335 - 0.415	8.51 - 10.54	54	85	1.37	25.91	
0.500	1/2	12.70	0.450 - 0.550	11.43 - 13.97	54	60	1.37	18.29	
0.625	5/8	15.88	0.563 - 0.687	14.30 - 17.45	48	50	1.22	15.24	
0.625	5/8	15.88	0.563 - 0.687	14.30 - 17.45	54	50	1.37	15.24	
0.750	3/4	19.05	0.675 - 0.825	17.15 - 20.96	54	40	1.37	12.19	
0.500	1/2	12.70	0.450 - 0.550	11.43 - 13.97	54	60	1.37	18.29	
0.750	3/4	19.05	0.675 - 0.825	17.15 - 20.96	54	40	1.37	12.19	
1.000	1	25.40	0.900 - 1.100	22.86 - 27.94	54	30	1.37	9.14	



IR42 Continuous Rolls/Sheets (Black)

Physical Properties	Unit	Test Method	Typical Results
Density (3/8" or 9.53 mm & higher)	kg/m ³	ASTM D 1056	96 - 160
	lb/ft ³	ASTM D 1056	6 - 10
Density (1/4" or 6.35 mm & lower)	kg/m ³	ASTM D 1056	96 - 192
	lb/ft ³	ASTM D 1056	6 - 12
Hardness, Durometer Shore 00		ASTM D 2240	35 - 50
Compression Deflection (25%) (3/8" or 9.53 mm & higher)	kPa	ASTM D 1056	35 - 63
	psi	ASTM D 1056	5 - 9
Compression Deflection (25%) (1/4" or 6.35 mm & lower)	kPa	ASTM D 1056	35 - 76
	psi	ASTM D 1056	5 - 11
50% Compression Set (Room temp)	%	ASTM D 1056	≤ 25%
Tensile Strength	kPa	ASTM D 412 (Die A)	525 minimum
	psi	ASTM D 412 (Die A)	75 minimum
Tear Strength	kN/m	ASTM D 624 (Die C)	2.3 typical
	lb/in	ASTM D 624 (Die C)	13 typical
Elongation	%	ASTM D 412 (Die A)	100% minimum
Service Temperature (1)			
Low	°F (°C)	ASTM D 746	-40°F (-40°C)
High Continuous	°F (°C)	ASTM D 746	---
High Intermittent (2)	°F (°C)	ASTM D 746	200 °F (93.3°C)
Water Absorption			
Maximum Weight Change	%	ASTM D 1056	< 5%
Fluid Immersion (7 days at 23°C [73.4°F])			
ASTM Ref. Fuel B, Weight Change (%)	%	ASTM D 1056	Not Applicable
Accelerated Aging (7 days at 70°C [158°F])			
Flexibility (180° bend without cracking)		ASTM D 1056	Pass
Appearance change		ASTM D 1056	None
Change in Compression Deflection	%	ASTM D 1056	± 30%
Combustion Characteristics (3)		Thicknesses	Comments
FMVSS-302		0.125" (3.1mm) & higher	Pass
UL 94			
HF-1		0.134" - 0.145" (3.4 mm-3.7 mm)	Listed, file # QMFZ2.E55798
HBF		0.134" - 0.145" (3.4 mm-3.7 mm)	Listed, file # QMFZ2.E55798

ASTM D 1056 designation: 2A2/2C2/2B2
 SAE J 18 APR2002 designation: 2A2/2C2/2B2
 ASTM D 6576: Type II, Grades A & B, Condition Soft-Medium
 Additionally UL Listed to UL 50E (UL file# JMLU2.MH25062)
 Standard Roll Widths: 48" and 54" (1219mm - 1371mm)
 Maximum Gauge: 1" (25.4mm)

(1) This recommendation is based on polymer type only. For specific application requirements please contact technical service.

(2) This temperature is the maximum allowable for intermittent exposure only. For continuous use temperature please contact technical service.

(3) Flammability – This item and any corresponding data refer to typical performance in the specific test indicated and should not be construed to imply this material's behavior in other fire conditions.

NBR – Acrylonitrile Butadiene Rubber

PVC – Polyvinyl Chloride

CR – Chloroprene (Neoprene)

UL File Number for Armacell Ensolite® IR42

UL File Number: QMFZ2.E55798

Plastics – Component (UL94)

									H	D	
		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

Nitrile Rubber/Polyvinylchloride/Neoprene(NBR/PVC/CR), closed-cell foam with skin, “Ensolite”, furnished as tubes or sheets.

IR 41(bd)	BK	3.4 - 3.7	HF-1	-	-	50	50	50	-	-	-
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(bd) - Density range 0.152 - 0.168 g/cc

UL File Number: JMST2.MH30018

Armacell Ensolite® Product Number	Description	Enclosure Types
IR41 & IR42	PVC / Nitrile/ CR	Closed Cellular foam PVC/Nitrile/EPDM. Compound Ensolite IR 41 and Ensolite IR 42. Suitable as a gasket material for UL 50 and UL 50E (continuous and periodic compression) enclosure types 2, 3, 3R, 3S, 4, 4X, 5, 6 and 6P enclosures.

UL Spec	Test Method	Requirements
UL 50E	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
UL 50E	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
UL 157	Tensile strength and elongation after heat aging 70 h @ 212°F (100°C)	60% of original (For both tensile and elongation)

UL Yellow Card Listing Verification Online

To obtain verification online:

1. 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 *Monarch*[®] products listed to JMLU2 [Gaskets & Seals].
Click on JMLU2.MH25062
 - For Armacell *Ensolite*[®] products listed to JMST2 [Gaskets & Seals].
Click on JMST2.MH10189 or JMST2.MH30018

Armacell Ensolite[®] Products / FAR 25.853 (12 Second Burn)

Vertical Flame / 12 Second Burn per FAR 25.853

Armacell Ensolite [®] Product #	Min. Thickness	Pass / Fail	Independent Test Lab Report	Test Report ID #	Polymer	ASTM D 1056 Grade	Density lb./ft ³	25% CD (psi)
IR42	1/4"	Pass	3/4/11	0176	PVC/NBR/CR	2B2	6.0 - 10	5 - 9
IR42	1/2"	Pass	3/4/11	0177	PVC/NBR/CR	2B2	6.0 -10	5 - 9

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