

AUTOMOTIVE



Ensolite® IV3

- UL 94 5VA, 5VB, V-0, V-1, HF-1 and HBF listed for flame
- ASTM D 1056-07 2A3 / 2C3 / 2B3 grade product
- ASTM D 6576-07 Type II, Grades A & B, Condition Medium material
- PVC / NBR / CR closed cell material manufactured in continuous rolls

Ensolite®

General Information

Armacell Ensolite® IV3: Armacell LLC (Conover, NC Plant) manufactures a black, continuous, closed cell, medium density (7 - 9.5 lb./ft³) (112 - 152 kg/m³) PVC/NBR/CR rubber product IV3, that meets all the physical property requirements of ASTM D 1056-07 2A3/2C3/2B3 and SAE J-18 APR2002 2A3/2C3/2B3. IV3 has excellent resistance to oil and fuel. IV3 meets the requirements of FMVSS-302 at most thicknesses and is listed to UL 94 HF-1 at 1.58 mm (0.0625") and higher and UL 94 V-0/5VA at 6.35 mm (0.250") and higher (UL File# QMFZ2. E55798). IV3 meets FAR 25.853 12 second vertical burn at 1/8". IV3 is listed on the approved source list of Chrysler MSAY 516 Type 3. Standard roll width: 54".

Automotive and Industrial Specifications

The following is a list of automotive and industrial specifications that Armacell Ensolite® IV2 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	IV3	Comments
ASTM	ASTM D1056-07	2A3 / 2C3 / 2B3	Additional (optional) suffixes can be added
ASTM	ASTM D 1171	Pass	Ozone resistance test method
ASTM	ASTM D 6576-07	Type II, Grades A & B, Condition Medium	Formerly MILR6130-C
Chrysler	Chrysler MSZ-75 J18	2A3 / 2C3 / 2B3	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). Request additional information about thinner thicknesses
Chrysler	Chrysler MSAY 516	Type 3	Approved source list
Federal	FMVSS-302	Meets at thicknesses of 2.5mm (.098") and higher	Flame resistance (horizontal burn rate). Request additional information about thinner thicknesses
Federal	FAR 25.853	Pass at 1/8"	12 Second Vertical Burn Test. (Test report available upon request.) See note 1

Automotive and Industrial Specifications (continued)

FORD	FORD WSK M2D 419-A	Type 4	See note 2
GM	GM 6086-M	Type IIIA	CD tested at 50% deflection. See note 3
GM	GM 6090-M	(B4A) Meets at thicknesses of 2.5mm (.098") and higher	Flame resistance tested per GM 9070-P (horizontal burn rate)
GM	GMN11106	Type IIIA	CD tested at 50% deflection. See note 3
GM	GMW15473	Class I Type V	CD tested at 50% deflection. See note 3
Gulfstream	GAP105K Rev C	Part Numbers GAP105K9-13	Approved source list
ISO	ISO 6916	2A3 / 2C3 / 2B3	Exception to Compression Set
Military	ASTM D 6576-07	Type II, Grades A & B, Condition Medium	Formerly MILR6130-C
SAE	SAE J18 APR2002	2A3 / 2C3 / 2B3	Additional (optional) suffixes can be added
SAE	SAE J369	Meets at thicknesses of 2.5mm (.098") and higher	Flame resistance (horizontal burn rate). Request additional information about thinner thicknesses
SAE	SAE J 1351	Pass, rating 2	Odor specification
Toyota	TSM 1501G	2A3 / 2C3 / 2B3	Exception to compression set
Toyota	TSM 0500G	Meets at thicknesses of 2.5mm (.098") and higher	Flame resistance (horizontal burn rate). Request additional information about thinner thicknesses
UL	UL94 5VA	5VA UL listed at 11.6 mm and higher with skin on one side. UL Listed at 6.2 mm and higher without skin	Flame Resistance specification. (UL file# QMFZ2.E55798)
UL	UL94 5VB	5VB UL listed at 6.12 mm and higher with skin on one side.	Flame Resistance specification. (UL file# QMFZ2.E55798)
UL	UL94 V-0	V-0 UL listed at 6.12 mm and higher with skin on one side. UL listed at 6.2 mm and higher without skin	Flame Resistance specification. (UL file# QMFZ2.E55798)
UL	UL94 HF-1	HF-1 UL listed at 1.5 - 7.0 mm with skin on one side. UL listed at 1.3 mm and higher without skin	Flame Resistance specification. (UL file# QMFZ2.E55798)
UL	UL94 HBF	HBF UL listed at 7.1 mm and higher with skin on one side.	Flame Resistance specification. (UL file# QMFZ2.E55798)

Note 1: A number of horizontal burn tests can also be listed (GM 6090, BMW, Volvo, etc.). Request additional information.

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: 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.

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
0.75	3/4	19.05	0.75 - 0.95	19.10 - 24.10	60	100	1.52	30.48	S2S
1.00	1	25.40	1.00 - 1.20	25.40 - 30.48	54	100	1.37	30.48	S2S
1.25	1-1/4	31.75	1.25 - 1.45	31.75 - 36.83	54	50	1.37	15.24	S2S, L
1.50	1-1/2	38.10	1.50 - 1.70	38.10 - 43.18	54	50	1.37	15.24	S2S

S2S = skin 2 sides

L = additional lengths available

IV3 Continuous Rolls/Sheets (Black)

Physical Properties	Unit	Test Method	Typical Results
Density	kg/m ³	ASTM D 1056	112 ± 152
	lb/ft ³	ASTM D 1056	7.0 - 9.5
Hardness, Durometer Shore 00		ASTM D 2240	60 - 70
Compression Deflection (25%)	kPa	ASTM D 1056	76 ± 14
	psi	ASTM D 1056	11 ± 2
50% Compression Set (Room temp)	%	ASTM D 1056	≤ 35%
Tensile Strength	kPa	ASTM D 412 (Die A)	690 minimum
	psi	ASTM D 412 (Die A)	100 minimum
Tear Strength	kN/m	ASTM D 624 (Die C)	3.5
	lb/in	ASTM D 624 (Die C)	20
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	< 10%
Fluid Immersion (7 days at 23°C [73.4°F])			
ASTM Ref. Fuel B, Weight Change (%)	%	ASTM D 1056	< 100%
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		0.098" (2.5 mm) & higher	Pass
FAR 25.853		1/8" (12.70 mm)	Pass
UL 94			
V-0	w/o skin	0.244" (6.2 mm) & higher	Listed, UL file# QMFZ2.E55798
	w/ skin on one side	0.241" (6.12 mm) & higher	Listed, UL file# QMFZ2.E55798
HF-1	w/o skin	0.051" (1.3 mm) & higher	Listed, UL file# QMFZ2.E55798
	w/ skin on one side	0.059" - 0.276" (1.5 - 7.0 mm)	Listed, UL file# QMFZ2.E55798
5VA	w/o skin	0.244" (6.2 mm) & higher	Listed, UL file# QMFZ2.E55798
	w/ skin on one side	0.457" (11.6 mm) & higher	Listed, UL file# QMFZ2.E55798
HBF	w/ skin on one side	0.280" (7.1 mm) & higher	Listed, UL file# QMFZ2.E55798
5VB	w/ skin on one side	0.241" (6.12 mm) & higher	Listed, UL file# QMFZ2.E55798

ASTM D 1056 designation: 2A3 / 2C3 / 2B3
 SAE J 18 APR2002 designation: 2A3 / 2C3 / 2B3
 ASTM D 6576: Type II, Grades A & B, Condition Medium
 IV3 is on the approved source list for Chrysler MSAY 516 (Type 3)
 Standard Roll Widths: 54 " (1.37 m)
 Maximum Gauge: 1.5" (38.1 mm)

(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® IV3

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, “Ensolite”, furnished as profiles, tubes or sheets.

IV3 (p)(q)	BK	1.3	HF-1	-	-	50	-	50	-	-	-
		6.2	V-0, 5VA	-	-	50	-	50			
		13.7	HF-1	-	-	50	-	50			
IV3 (p)(r)	BK	1.5-7.0	HF-1	-	-	50	-	50	-	-	-
		7.1	HBF	-	-	50	-	50			
		6.12	V-0, 5VB	-	-	50	-	50			
		11.6	V-0, 5VA	-	-	50	-	50			
		13.1	HBF	-	-	50	-	50			

(p) - Density range 0.122 - 0.141 g/cc w/o skin and 0.134 - 0.225 g/cc w/ skin

(q) - without skin

(r) - with skin on one side

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 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

Vertical Flame / 12 Second Burn per FAR 25.853 Appendix F — Part I Test Criteria and Procedures for Showing Compliance with Sec. 25.853 or Sec. 25.855

Armacell Ensolite® Product #	Min. Thickness	Pass / Fail	Independent Test Lab Report	Test Report ID #	Polymer	ASTM D 1056 Grade	Density lb./ft³	25% CD (psi)
IV3	1/8"	Pass	2/18/10	0149	PVC/NBR/CR	2B3	7 - 9.5	9 - 13

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