

AUTOMOTIVE



Ensolite® SF0

- Super soft PVC / NBR crushed (semi-closed cell) foam
- UL listed to UL 94 (flame)
- Manufactured in continuous rolls
- On approved source list for Chrysler MSAY 522 Type 1



Ensolite®

General Information

Armacell Ensolite® SF0: Armacell LLC (Mebane, NC Plant) manufactures a black, very soft, semi-open cell, PVC/NBR, 3.5 - 5.5 lb./ft³ (56 - 88 kg/m³) density, crushed foam product SF0, that has typical 25% compression deflection values of 1 psi (6.89 kPa) max. SF0 can be graded as an ASTM D 1056-07 1A0 & SAE J-18 APR2002 1A0 cellular product with one exception to the basic requirements (Compression set at elevated temperature). **SF0 is listed as an approved source for Chrysler MSAY 522 Type 1.** SF0 meets the flame resistance requirements of FMVSS-302 at most thicknesses. SF0 is UL listed to UL94 HF-1 @ 3.68 mm - 3.99 mm (UL File #: QMFZ2.E55798).

Automotive and Industrial Specifications

The following is a list of automotive and industrial specifications that Armacell Ensolite® SF0 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 Ensolite® SF0	Comments
ASTM	ASTM D1056-07	1A0	Additional (optional) suffixes can be added. Exception to elevated temp compression set
Chrysler	Chrysler MSZ-75 J18	1A0	Additional (optional) suffixes can be added. Exception to elevated temp compression set
Chrysler	Chrysler MS JP9-4	Meets at most thicknesses	Flame resistance (horizontal burn rate)
Chrysler	Chrysler MSAY 500	Type 1 / Type 2	No exceptions
Chrysler	Chrysler MSAY 522	Type 1	SF0 is on the approved source list for Chrysler MSAY 522 Type 1 (2010)
Federal	FMVSS-302	Meets at most thicknesses	Flame resistance (horizontal burn rate). See note 1
FORD	FORD ESB M3G102A	Meets most requirements	Request additional information
FORD	FORD WSB-M3G102-B2	Meets with exceptions	Exception: Armacell's published density specification for SF0 is 3.5 - 5.5 pcf
GM	GM 6086-M	Type IB / Type IA / Type IAA	Exception: SF0 is a semi-open cell soft foam and will typically test below 0.7 psi CD at 50% deflection. See note 2. Tested with added skin as per ASTM D1056 open cell requirement

Automotive and Industrial Specifications (continued)

Source	Specification	Armacell Ensolite® SFO	Comments
GM	GM 6090-M	(B4A) Meets at most thicknesses	Flame resistance tested per GM 9070-P (horizontal burn rate)
GM	GMN11101	Ultra Soft	CD tested at 50% deflection. See note 2. Tested with added skin as per ASTM D1056 open cell requirement
GM	GMN11106	Type IA	CD tested at 50% deflection. See note 2. Tested with added skin as per ASTM D1056 open cell requirement
GM	GMW15473	Class I Type I	CD tested at 50% deflection. See note 2. Exception: fogging. Request more information for additional exceptions. Water absorption tested with added skin as per ASTM D1056 open cell requirement
SAE	SAE J18 APR2002	1A0	Additional (optional) suffixes can be added. Exception to elevated temp compression set
SAE	SAE J369	Meets at most thicknesses	Flame resistance (horizontal burn rate)
SAE	SAE J 1351	Pass, rating 2	Odor specification
Toyota	TSM 0500G	Meets at most thicknesses	Flame resistance (horizontal burn rate)
Toyota	TSK 6505G	2A1 / 2A2	Polymer = PVC/NBR Request additional information regarding exceptions
UL	UL 94 HF-1	HF-1 UL Listed at 3.68mm-3.99mm	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 GM 6086-M, GMN11101, GMN11106 and 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
0.125	1/8	3.18	0.112 - 0.137	2.84 - 3.48	54	250	1.37	76.20	S1S
0.188		4.76	0.165 - 0.212	4.19 - 5.38	54	185	1.37	56.39	S1S, L
0.197		5.00	0.171 - 0.223	4.34 - 5.66	54	185	1.37	56.39	S1S
0.250	1/4	6.35	0.218 - 0.282	5.53 - 7.16	54	125	1.37	38.10	S2S, L
0.315		8.00	0.274 - 0.356	6.96 - 9.04	54	175	1.37	53.34	S1S, L
0.375	3/8	9.53	0.326 - 0.424	8.28 - 10.77	54	104	1.37	31.70	S2S, L
0.394		10.00	0.343 - 0.445	8.71 - 11.30	54	135	1.37	41.15	S2S
0.472		12.00	0.411 - 0.533	10.44 - 13.54	54	110	1.37	33.53	S2S, L
0.500	1/2	12.70	0.450 - 0.550	11.43 - 13.97	54	100	1.37	30.48	S2S, L
0.551		14.00	0.496 - 0.606	12.60 - 15.39	54	60	1.37	18.29	S2S, L
0.591		15.00	0.531 - 0.649	13.49 - 16.48	54	90	1.37	27.43	S2S
0.626		15.90	0.563 - 0.689	14.30 - 17.50	54	85	1.37	25.91	S2S
0.709		18.00	0.637 - 0.779	16.18 - 19.79	54	75	1.37	22.86	S2S
0.750	3/4	19.05	0.675 - 0.825	17.15 - 20.96	54	75	1.37	22.86	S2S, L
0.787		20.00	0.708 - 0.866	17.98 - 22.00	54	70	1.37	21.34	S2S
0.875	7/8	22.23	0.788 - 0.963	20.01 - 24.46	54	50	1.37	15.24	S2S
0.900	9/10	22.86	0.810 - 0.990	20.57 - 25.14	54	50	1.37	15.24	S2S
1.000	1	25.40	0.675 - 0.825	17.15 - 20.96	54	50	1.37	15.24	S2S
1.000	1	25.40	0.900 - 1.100	22.86 - 27.94	54	30	1.37	9.14	S2S
1.188	1-3/16	30.16	1.180 - 1.380	29.97 - 35.05	54	40	1.37	12.19	S2S
1.250	1-1/4	31.75	1.125 - 1.375	28.58 - 34.93	54	45	1.37	13.72	S2S
1.378		35.00	1.237 - 1.513	31.42 - 38.43	54	30	1.37	9.14	S2S
1.445		36.70	1.305 - 1.583	33.15 - 40.21	54	30	1.37	9.14	S1S, S2S

S1S = skin 1 side

S2S = skin 2 sides

L = additional lengths available



Polymer Base: **PVC/NBR**

SFO Continuous Rolls/Sheets (Black)

Semi-Closed Cell / Crushed Foam

Physical Properties	Unit	Test Method	Typical Results
Density	kg/m ³	ASTM D 1056	56 - 88
	lb/ft ³	ASTM D 1056	3.5 - 5.5
Hardness, Durometer Shore 00		ASTM D 2240	5 ± 5
Compression Deflection (25%) (3/8" or 9.53 mm & higher)	kPa	ASTM D 1056	6.9 maximum
	psi	ASTM D 1056	1.0 maximum
Tensile Strength	kPa	ASTM D 412 (Die A)	105 minimum
	psi	ASTM D 412 (Die A)	15 minimum
Tear Strength	kN/m	ASTM D 624 (Die C)	0.7 Typical
	lb/in	ASTM D 624 (Die C)	4.0 Typical
Elongation	%	ASTM D 412 (Die A)	100 minimum
Service Temperature (1)			
Low	°F (°C)	ASTM D 746	-70°F (-56°C)
High Continuous	°F (°C)	ASTM D 746	—
High Intermittent (2)	°F (°C)	ASTM D 746	200°F (93°C)
Water Absorption			
Maximum Weight Change	%	ASTM D 1056	Not Applicable
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" (3.18 mm) & higher	Pass
UL 94			
HF-1		0.145" - 0.157" (3.68 mm - 3.99 mm)	Listed, UL file # QMFZ2.E55798

ASTM D 1056 designation: 1A0 (Exception to elevated temp compression set)
 SAE J 18 APR2002 designation: 1A0 (Exception to elevated temp compression set)
 SFO meets:
 Chrysler MSAY 500 Type 1 / Type 2
 Chrysler MSAY 522 Type 1 Approved Source List
 Ford WSB-M3G212A with deviations
 GM6086M Type IB / Type IA / Type IAA with deviations
 GMN11106 Type IA with deviations
 Toyota TSK 6505G 2A1/2A2 with deviations
 NBR – Acrylonitrile Butadiene Rubber
 PVC – Polyvinyl Chloride

(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.

UL File Number for Armacell Ensolite® SFO

UL File Number: QMFZ2.E55798

Plastics – Component [UL94]

									H	D	
		Min.		H	H	RTI			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 (NBR/PVC), furnished as sheets

SFO	BK	3.68 - 3.99	HF-1	-	-	50	-	50	-	-	-
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UL Yellow Card Listing Verification Online

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1. www.ul.com – THEN
2. Click on “On-Line Certifications Directory” in **gray area at bottom of web page** – THEN
3. Click on “Company Name” in the general search area – THEN
4. Type in “**Armacell**” – & click “SEARCH”
5. 9 (Nine) Armacell file numbers come up (2 for Armacell Germany, 1 for Armacell Middle East)
6. Click on **QMFZ2.E55798** for Armacell (Ensolite®) & (Monarch®) products [Flame / UL94]
7. Click on **JMLU2.MH25062** for Armacell (Monarch®) products listed to JMLU2 [Gaskets & Seals]
8. Click on **JMST2.MH10189** or **JMST2.MH30018** for Armacell (Ensolite®) and or (Monarch®) products listed to JMST2 [Gasket Materials]
9. Click on **OPET2.MQ1977** for Armacell (ArmaSport®) products listed to Lifesaving Equipment, Marine – Component

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