



Expanded bead foam packaging materials

# Material Properties, Auto/Mil Specs

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## Material Physical Properties

Physical Property	Test Method	Unit	EPE					EPP				xEPE	P-EPP
			1.0	1.3	1.5	1.9	2.8	1.0	1.3	1.9	2.8	1.5	2.8
Average Density	ASTM-D3575	pcf	1.0	1.3	1.5	1.9	2.8	1.0	1.3	1.9	2.8	1.5	2.8
Comp Strength	ASTM-D3575												
@ 25%		psi	8	10	11	13	22	11	14.5	23.5	42	6	23
@ 50%		psi	16	18	19	22	35	19	23.5	33.5	54	15	35
@ 75%		psi	38	44	49	56	75	41	45	64	111	40	79
Tensile Strength	ASTM-D3575	psi	39	40	45	52	70	35	38	55.5	67	22	27
Tensile Elongation	ASTM-D3575	%	38	32	30	29	25	18	16	15	14	50	13
Tear Strength	ASTM-D3575	lbs/in	12	14	16	17	21	9	10	13	16	12	19
Comp Set @ 25%	ASTM-D3575	%	3	3	4	4	4	8	8	7	7	2	5
Comp Set @ 50%	ASTM-D3575	%	12	14	13	12	12	16	14	12	12	6	9
Buoyancy	ASTM-D3575	pcf	61.2	60.6	59.5	59.5	59.1	61	60.5	59.5	59	61	n/a
Thermal Conductivity	ASTM-C177	(K)BTU-in / ft <sup>2</sup> -hr-°F	0.26	0.26	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.25	0.265
Thermal Resistance	ASTM-C177	(R) @ 70° F	3.9	4	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.0	3.8
Service Temp	ASTM-D3575	°F	160	160	160	160	160	212	212	212	212	185	212
Water Absorption	ASTM-D3575	%	~1.0	~1.0	~1.0	~1.0	~1.0	~1.0	~1.0	~1.0	~1.0	~1.0	~1.0
Comp Creep	ASTM-D3575	1000hr@1psi	2.5	2.8	3.0	3.3	3.0	n/a	n/a	n/a	n/a	n/a	n/a
Flammability	FMVSS-302	<4.0 in/min	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Chemical Resist	Various	1 hr exposure	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Fuel Immersion	Coast Guard (CGD-770145) Fuel B	<5% change in volume	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass



ARPLANK® products are manufactured by JSP, one of the world's leading innovators and manufacturers of expanded plastic foam materials.

### The ARPLANK® Materials

#### ARPRO®

Expanded Polypropylene (EPP)

Expanded polypropylene products in the ARPLANK product line are made from ARPRO® EPP. Used extensively in automotive and packaging applications where durability, multiple impact resistance and other demanding performance challenges must be met.

#### ARPEX®

Crosslinked Expanded Polyethylene (xEPE)

ARPEX® is a good alternative to polyurethane foams. It maintains its cushioning properties indefinitely and produces minimal out-gassing.

#### ARPAK®

Expanded Polyethylene (EPE)

ARPAK® EPE is one of the premier packaging foam materials available today. and is ideal for applications requiring resiliences, non-abrasive surface, and outstanding cushioning for multiple impact energy management.

#### POROUS ARPRO®

Expanded Polypropylene (PEPP)

This unique form of EPP is comprised of expanding shaped beads to reduce weight while maintaining a high degree of EPP performance characteristics.

The above data reflects the performance of ARPLANK® panels under controlled test conditions using limited product samples. There can be no assurance that similar results will be achieved in simulated tests or actual commercial use of ARPLANK® panels. JSP makes no representation or warranty, and does not assume any liability, with respect to the accuracy or completeness of such information or the product performance in any particular instance. JSP makes no representation or warranty with respect to ARPLANK® panels, express or implied, including, without limitation, any warranty of merchantability, fitness for a particular purpose, quality or conformity with any description or sample.

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## Military, Federal and International Material Property Test: JSP Molded Polyolefin Bead Foam Products

Authority	Specification	JSP Materials	Details
Military Standard	CID A-A-59135	EPP Low Density Sheets	Class 2; Grade A, Type I, III, IV & V & Grade C, Type III
		EPE Low Density Sheets	Class 1; Grade A, Type I & III
	CID A-A-59136	EPP Low Density Plank	Class 2; Grade A & C
		EPP Low Density Plank	Class 1; Grade A & C
	PPP-C-1752	EPP & EPE Low Density Plank	Obolete Standard
MIL-STD-2073	EPP & EPE Low Density Plank	Standard Practice for Military Packaging	
Federal Standards	33 CFR §183.114	EPP & EPE Low Density	Coast Guard Standard CGD-77-145
	49 CFR §571.302	All EPP (White)	Federal Motor Vehicle Safety Standard (FMVSS) 302
		EPP ≥1.3 pcf (Black)	Federal Motor Vehicle Safety Standard (FMVSS) 302
CAL-117	FR-EPP	Cigarette Burn Test	
Underwriters Laboratories (UL)	UL-94 (HBF)	EPP Low Density (White)	UL Listed EPP (see UL website for details)
	UL-94 (HF-1/HF-2)	FR-EPP & FR-PEPP	UL Listed EPP (see UL website for details)
	UL-94 (V-0/V-2)	FR-EPP	High FR (Aircraft Grade)
European Union (EU)/European Economic Committee (EEC)	2000/53/EC	All JSP EPP, EPE, xEPE & PEPP Products	European End-Of-Life Vehicle Directive (ELV)
Uniform Building Code (UBC) / International Building Code (IBC) / International Residential Code (IRC)	UBC 2602	FR-PEPP (Plank)	Class A Product per NFPA (per ASTM E-84)
	IBC 2602.1	FR-PEPP (Plank)	Class A Product per NFPA (per ASTM E-84)
	IRC R318	FR-PEPP (Plank)	Class A Product per NFPA (per ASTM E-84)

Note: The above test specifications reference a variety of test methods, including, but not limited to; ASTM, DIN, ISO, DIN, SAE, JIS, FMVSS, UL, as well as a variety of custom test methods specified by the specific customer.

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## Automotive Industry (OEM) Material Property Test: ARPRO EPP

OEM	Specification	JSP Materials
General Motors	GMP-PP-068	EPP; Low and Mid Density
	GMP-PP-092	EPP; High Density
	GM7400M (Various)	EPP; Various Densities
	[GM-Holden] HN 2324	EPP; Various Densities
	GMW3059	EPP; xEPE; Various Densities
	GM9685P	EPP; Various Densities
	GMN 8351	EPP, xEPE; Various Densities
Daimler-Chrysler Daimler-Benz	MS-DB50; Type A, B, C, D, E	EPP; Low and Mid Densities
	DBL 5460	EPP; Various Densities
	DBL 5461	EPP; Various Densities
Ford	WSB-M4D815-A1/A2/A3	EPP; Low and Mid Densities
	WSS-M99P29-A	EPP; Low Densities
Toyota	TSM5725G; Type 2A, 2B, 3, 4 & 5	EPP; Low and Mid Densities
	TSM5743G	EPP, PEPP; Low Densities
	TSM0502G	EPP; Various Densities
	TSM0500G	EPP; Various Densities
Nissan	NES M0086	EPP; Various Densities
	NES M0094	EPP; Various Densities
	NES M0131	EPP; Various Densities
	NES M0132	EPP; Various Densities
	NES M0133	EPP; Various Densities
Mitsubishi	ES-X60317; Type A, B, C & D	EPP; Low and Mid Density
	ES-X60210	EPP; Various Densities
Subaru/Isuzu (Fuji Heavy Industries)	TS346-5-56	EPP; Low and Mid Density
Honda	HES D2500	EPP; Various Densities
	HES-C206	EPP; Various Densities
	7117Z-SDA-P010-M1	EPP; Various Densities
Volkswagen AG	VW 501 80	EPP; Various Densities
	TL-VW 1010	EPP; Various Densities
	VW 440 45	EPP; Various Densities

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