

DATE: 27 December 2022
 TO: External Distribution
 FROM: Steve Sopher; JSP
 SUBJECT: ASTM C273 Shear Testing to assess welded and glued bonding strength of Extruded PE Foam and ARPAK® EPE Foam.

JSP has conducted a study to evaluate the bond strength of both glued and welded foams. The details of the foams tested are listed below in Table 1:

Table 1

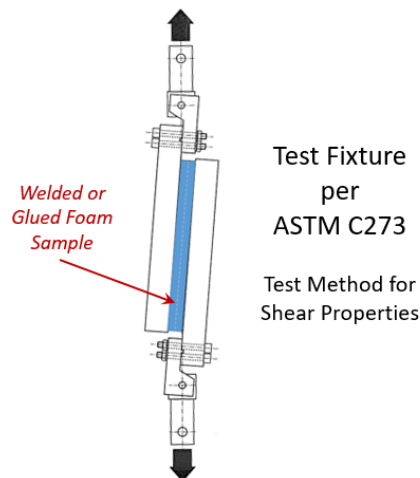
Type	Name	Measured Density (pcf)
Extruded PE Foam	Extruded PE	2.3 to 2.7
Expanded PE Foam	ARPLANK EPE	1.8

All samples subjected to testing were tested as supplied by the customer. Samples provided were glued and welded by the customer. Exact details of the gluing process and welding process are not known. The test results shown below are for these specific bonded samples, and results may be process dependent based factors such as welding plate temperature, welding plate bond time, type of glue, glue application, and of course ambient conditions during that bonding process(es).

Testing of the samples for bond strength was performed using a slightly modified ASTM C273 test method. The test method recommends a length-to-width ratio of at least 12:1. Samples were cut to 2" x 24" (L x W). Thickness was 2", which consisted of 1" thick samples bonded to each other via either glue or hot-weld.

Each of the samples were bonded to the test fixture; shown below in Figure 1.

Figure 1





Both glued and welded samples were bonded to the test fixture (metal plates) using JB Weld 50133 Adhesive. JSP maintains a detailed work instruction for the process used to bond the test samples to the test fixture. This work instruction is used by JSP's internal and external test labs. The test procedure calls out a cross head speed of 0.02 in/min. Testing was conducted at 3 temperatures; 72°F (ambient), 160°F (hot), and -20°F (cold). Table 2 below shows the test results in units of force (lbf) along with the details of the test temperatures, attachment methods and material.

Table 2

Material	Attachment Method	Temperature (°F)	Separation Force (lbf)
ARPLANK EPE	Glued	72	324
		160	425
		-20	339
	Welded	72	542
		160	565
		-20	479
Extruded PE	Glued	72	140
		160	180
		-20	183
	Welded	72	297
		160	267
		-20	326

The results were plotted for comparison. See Figure 3 below for the glued results and Figure 4 for the welded results.

Figure 3

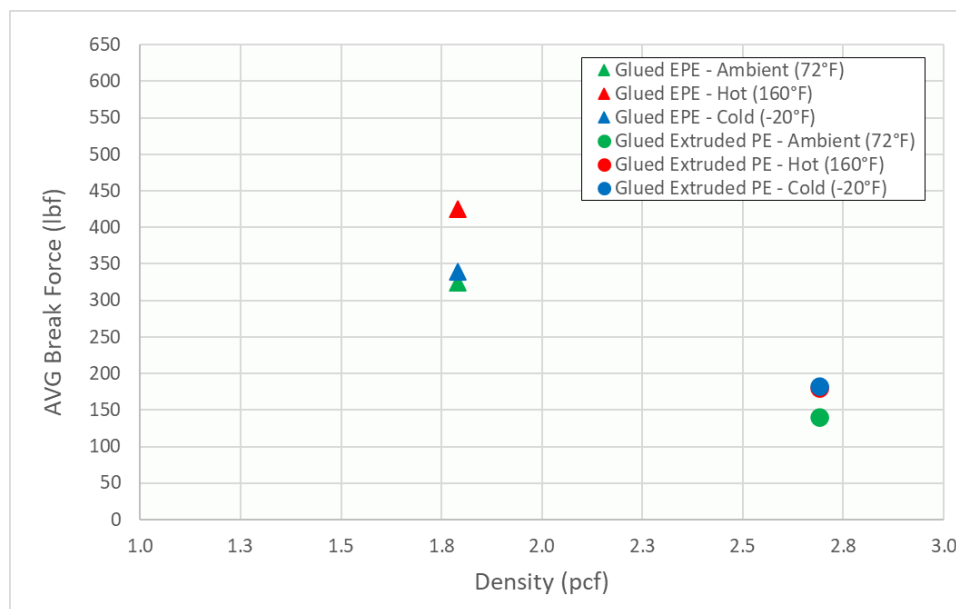
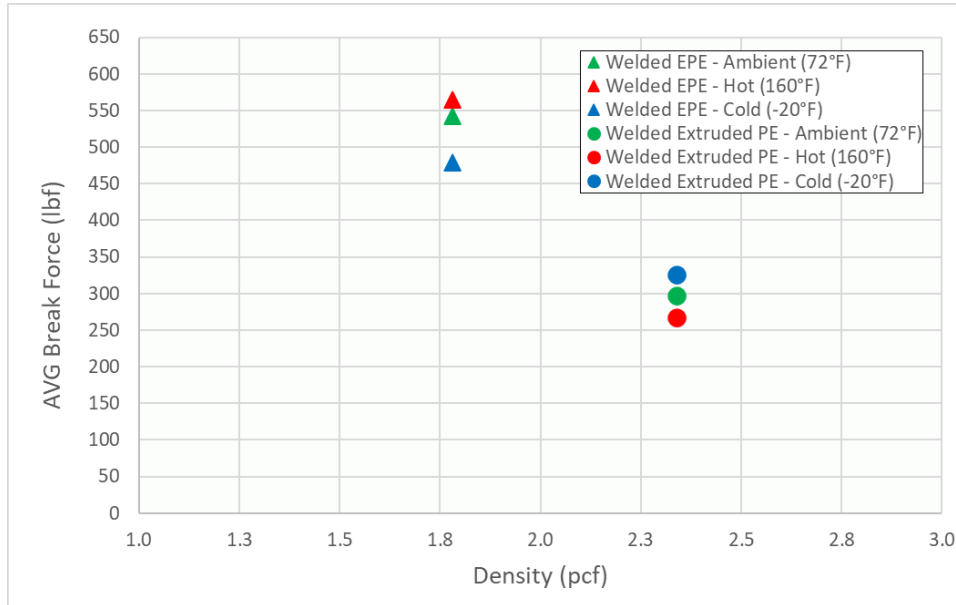


Figure 4



Please direct any questions or comments to the undersigned.



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