Compressive Properties Testing:
ASTM D 1621
TRIPOLYMER 105-TM FOAM
VTEC # 100-1198-2
August 14, 2000

Test results

SAMPLE #	WIDTH INCHES	LENGTH INCHES	AREA INCHES	FORCE POUNDS	COMPRESSION STRENGTH (PSI)	COMPRESSION DEFLECTION INCHES	COMPRESSIVE MODULUS (PSI)	SPEED OF TESTING IN/MIN
1	2.044	2.090	4.178	145.2	35	0.2003	257.7	0.15
2	2.107	2.030	4.439	140.6	32	0.2002	247.7	0.15
3	1.972	2.089	3.889	162.3	42	0.2005	316.0	0.15
4	2.097	2.051	4.397	139.5	32	0.1996	208.2	0.15
5	2.103	2.106	4.423	144.2	33	0.2005	252.9	0.15
AVERAGE	2.0646	2.0732	4.265	146.36	34.5	0.20022	256.5	0.15

Compressive strength

Test performed by:
United States Testing Company Inc.
Engineering Services Division
1415 Park Ave. - Hoboken, New Jersey

Subject:
Physical Properties
Test # 80071-1 March 4, 1981

Sample Identification
One (1) sample of material submitted and identified as Tripolymer 105
(Methylene Interconnected Phenolic Base Polymer)

Test Performed
The submitted sample was tested for the following properties in accordance with the procedures outlined in the ASTM Test Method listed:
Compressive Strength
ASTM D-1621 (Proc. A)

Test results

Compressive Strength - in psi: 45.2

Compressive Strength

Determination	dimensions, In.	Load, Lbs.@Yield	Deflection@Yield, In.	Compressive Strength, psi
1.	4.010 x 3.980	688	0.085	43.1
2.	4.865 x 3.845	680	0.105	45.8
3.	3.960 x 3.935	730	0.105	46.8
Average				45.2

Density Testing

Test performed by:
United States Testing Company Inc.
Engineering Services Division
1415 Park Ave. - Hoboken, New Jersey

Subject:
Physical Properties
Test # 80071-1 March 4, 1981

Sample Identification
One (1) sample of material submitted and identified as Tripolymer 105
(Methylene Interconnected Phenolic Base Polymer)

Test Performed
The submitted sample was tested for the following properties in accordance with the procedures outlined in the ASTM Test Method listed:

Density - ASTM D-1622

Test results
Density, lbs/per cu. ft. - 1.233

Density, lbs/per cu. ft. (ASTM D-1622)

1.	2.	3.	4.	5.	Average
1.209	1.223	1.228	1.276	1.228	1.233

Electrical Testing

Electrical Conductivity Test results - Tripolymer® foam

Wet samples - These samples were tested immediately after they were prepared and had a density of 30 kg/m^3.

Test Leads Separation	Resistance (kilo-ohms)	Resistance (kilo-ohms)	Avg. Resistance (kilo-ohms)
100 mm	41	35.1	**38.0**
50 mm	33	28.4	**30.7**
40 mm	27	28.1	**27.6**
30 mm	26.6	27	**26.8**
20 mm	25.8	24.5	**25.1**
10 mm	24.7	21.3	**23.0**
5 mm	24.2	19.8	**22.0**

Dry samples - These samples were tested 14 days after they were prepared. The samples were kept at ambient temperature of 70°F and ambient relative humidity which varied day to day. Density was 19 kg/m^3

Test Leads Separation	Resistance (kilo-ohms)	Resistance (kilo-ohms)	Avg. Resistance (kilo-ohms)
100 mm	>20	>20	**>20**
50 mm	>20	>20	**>20**
40 mm	>20	>20	**>20**
30 mm	>20	>20	**>20**
20 mm	>20	>20	**>20**
10 mm	>20	>20	**>20**
5 mm	>20	>20	**>20**

Fire Testing

ASTM E-119 / Fire Test #100-954-1

Sample description:

The wall sample was made up of 6 pieces of 3 1/2" standard wood studs,4 pieces forming a 36" x 36" square frame. The 5th and 6th pieces were placed on 16" centers forming 2 standard size 141/4" cavities, the last cavity being 11/2" in width. Two pieces of 36" x 36" x 1/2" standard gypsum board was attached to both sides of the frame using gypboard screws. All 3 cavities between the two gypsum boards were filled with Tripolymer #105 foam-in-place insulation. The overall assembly measured 36" x 36" x 4 1/2".The assembly was allowed to cure at ambient temperature and humidity for a period of 14 days before testing was performed.

Procedure:

The furnace used in this test measured 3ft X 3ft X 3ft. The outside construction is steel and the furnace is lined with a ceramic refractory insulation. The furnace dimensions inside the insulation are nominally 27" X 27" X 27". A single burner is centered vertically in the wall opposite the sample. This burner is rated for 1.5 million Btu/hr and is of the flat flame or non impinging flame design. Furnace conditions are monitored by three Inconel-sheathed chromel-alumel thermocouples. These thermocouples are positioned 6" from the face of the sample.

The sample was oriented vertically in the front opening of the furnace. The unexposed surface temperature of the sample was monitored by six, 20 gauge type K, fiberglass sheathed thermocouples. An insulating pad was placed over each thermocouple on the unexposed side of the sample.

The end point for this test is reached when the average of all thermocouples indicate unexposed surface temperature of 250 F plus ambient, or when a single thermocouple on the unexposed surface exceeds 325 F plus ambient. The ambient temperature at the time of the test was 64 F.

The fire test was run following the ASTM E119 time-temperature curve.

Results:

Weight before test 73 lbs

At 25 minutes 5 seconds smoke began emanating from the top of the sample. At 26 minutes 10 seconds smoke began emanating from the bottom and sides of the sample. The test was voluntarily terminated at 1 hour 30 minutes without reaching any end points. Therefore, failure did not occur. The average unexposed temperature was 173 F and the highest single temperature was 218 F. Failure for this test would have been at 314 F average temperature or 389 F on any single temperature.

Fungi Resistance

Test performed by:
United States Testing Company, Inc.
Engineering Services Division
291 Fairfield Avenue - Fairfield, New Jersey

Subject:
Physical Properties
Test No. 099423-2

Sample Identification:
The sample is identified by code and trade name as Tripolymer 105 Foam Insulation.
The sample was submitted as two sealed frames after being prepared by C. P. Chemical Co. for testing.

Test Performed:
The submitted sample was tested for Fungi Resistance in accordance with the procedures outlined in HUD Bulletin #74: Federal Register Vol. 44, No. 54, 3/19/79, section 456.810

Test results
Fungi Resistance
Two frames (1 specimen and 1 control) were used in this test. There was no visible fungal growth. The sample is considered to have passed this test.

Oil Absorption

Test performed by:
VTEC Laboratories
212 Manida Street
Bronx, NY

Subject:
Oil Absorption Testing in #2 Fuel Oil

Sample Description:
Tripolymer 105 TM, an air-expanded, cold setting phenolic base methylene linked copolymer.

Oil Absorption Testing:
TRIPOLYMER 105-TM FOAM
VTEC # 100-1198-1
August 14, 2000

Test Procedure: Three foam specimens were cut to nominally 2" by 2" by 1.5" and submerged in one gallon of #2 fuel oil. A weighted wire mesh was placed over the three specimens to keep them submerged in the fuel oil. The specimens remained in the oil for 72 hours and were then removed. The specimens weighed and measured before and after immersing them in the oil.

After the 72 hours of immersion, the specimens were removed and blotted dry using paper towels before they were weighed and measured.

Observations: Immediately after the specimens were submerged in the #2 fuel oil, small bubble appeared on the surface of the oil. These small bubbles continued for about 25 minutes.

Upon removal of the weighted mesh, the specimens immediately floated to the surface of the oil. The outline of the mesh was seen on the top surfaces of tall three specimens. These outlines were about 1/8" deep.

The three specimens were light blue before the immersion and changed to light brown after they were immersed.

Test Results

SAMPLE #	Weight Before (grams)	Weight After (grams)	Dimensions Before (inches)	Dimensions After (inches)	Weight Gain (grams)	Weight Gain (%)
1	1.838	60.020	1.98x2.12x1.33	2.02x2.15x1.51	58.182	3165.5
2	2.100	65.597	2.00x2.08x1.45	2.00x2.16x161	63.497	3023.7
3	1.983	68.388	2.06x2.07x1.48	2.10x2.12x1.54	66.405	3348.7
AVERAGE	1.974	64.668	4.397	139.5	62.695	3179.3

Accelerated aging

Testing conducted by Mac Millan Research, Ltd.

"We have examined the sample of foam and find that it shows no shrinkage in the accelerated aging test (140 F, 60 C). In addition we find, after 6 days under such conditions, that a loss in weight of only 4.7% is experienced. This is considerably superior to other foams we have tested. No discoloration was apparent. The 6 days in incubation is the approximate equivalent of 2 years in actual use."

(Analysis # 28-21-6 Z)

Combustion testing

Test performed by:
Factory Mutual Research
1151 Boston Providence Turnpike
Norwood, Massachusetts 02062

Subject: Heat of Combustion Serial No. 1C4K4.MH

Sample Identification
The sample is identified by code and trade name as Tripolymer.

Test Performed
The heat of combustion was determined by oxygen bomb calorimetry using the ASTM procedure D-240-73.

Test results
This material has a heat content of 6,435 BTU's per pound.

Compressive Properties

Test performed by:
VTEC Laboratories
212 Manida Street
Bronx, NY

Subject:
Standard Test Method For Compressive Properties of Rigid Cellular Plastics According to ASTM D1621.

Sample Description:
Tripolymer 105 TM Foam, an air-expanded, cold setting phenolic base methylene linked copolymer.