



United States Testing Company, Inc.

Tulsa Division

1341 No. 108th EAST AVENUE TULSA, OKLAHOMA 74116
TELEPHONE: AREA CODE 918-437-8333

REPORT OF TEST

CLIENT: Environmentally Safe Products
313 West Golden Lane
New Oxford, PA 17350
Attn: Cory Groft

NUMBER

EN91-0089.1
8/8/91

SUBJECT: Full Scale Room Burn Test of Reflective Insulation.

MATERIALEVALUATED:

A sample of 1/4 inch reflective insulation was selected by a United States Testing Company, Inc., representative at the manufacturing plant. The insulation comprises a 1/4 inch thick core of polyethylene foam with aluminum foil bonded to both sides.

PROCEDURE:

The material was tested in accordance with the full scale corner room burn test of ASTM Guide E 603-77(83), UL Standard 1715, and Uniform Building Standard 17-5. The 4 foot wide material was stapled to 1" x 2" furring strips, 2 feet on center, to form two adjacent 8-foot wide wall sections. All joints were sealed with pressure sensitive aluminum foil tape and wood laths were nailed over the insulation at each furring strip. The test was recorded on video tape, color slides, and photographs.

SUMMARY OF RESULTS:

1. Charring of the insulation, lathing, and furring strips to a depth greater than 1/4" did not extend to the outer extremities of the panels within 15 minutes after ignition.
2. Neither excessive smoke nor violent flaming occurred.
3. While some of the insulation at the corner melted completely away, the furring strips and lathing remained in place.

CONCLUSION:

The material is acceptable in accordance with ASTM Guide E 603-77 (83), UL Standard 1715, and Uniform Building Code Standard 17-5.

SIGNED FOR THE COMPANY

Robert C. Smith, M.S., P.E.
Assistant Vice-President

Laboratories In: New York · Chicago · Los Angeles · Houston · Tulsa · Memphis · Reading · Richland

THIS REPORT APPLIES ONLY TO THE STANDARDS OR PROCEDURES IDENTIFIED AND TO THE SAMPLE(S) TESTED. THE TEST RESULTS ARE NOT NECESSARILY INDICATIVE OR REPRESENTATIVE OF THE QUALITIES OF THE LOT FROM WHICH THE SAMPLE WAS TAKEN OR OF APPARENTLY IDENTICAL OR SIMILAR PRODUCTS. NOTHING CONTAINED IN THIS REPORT SHALL MEAN THAT UNITED STATES TESTING COMPANY, INC. CONDUCTS ANY QUALITY CONTROL PROGRAM FOR THE CLIENT TO WHOM THIS TEST REPORT IS ISSUED. UNLESS SPECIFICALLY SPECIFIED. OUR REPORTS AND LETTERS ARE FOR THE EXCLUSIVE USE OF THE CLIENT TO WHOM THEY ARE ADDRESSED. AND THEY AND THE NAME OF THE UNITED STATES TESTING COMPANY, INC. OR ITS SEAL OR INSIGNIA ARE NOT TO BE USED UNDER ANY CIRCUMSTANCES IN ADVERTISING TO THE GENERAL PUBLIC AND MAY NOT BE USED IN ANY OTHER MANNER WITHOUT OUR PRIOR WRITTEN APPROVAL. SAMPLES NOT DESTROYED IN TESTING ARE RETAINED A MAXIMUM OF THIRTY DAYS

TEST PROCEDURE:Test Facility:

The test facility is a masonry block room 8 feet by 12 feet by 8 feet high with a doorway 30 inches wide by 84 inches high in the front end wall. The test room is lined with 5/8-inch Type X gypsum board. The ignition source is placed in the right hand, rear corner of the room.

The ignition source, shown in Figure 3, is a 30-pound wood crib comprising tiers of 15-inch long spruce, pine, or fir strips 1-1/2 inches by 1-1/2 inches, actual. The crib is conditioned to constant weight at 120° F, 20% R.H. The crib is placed on four half bricks so as to be 4 inches above the floor and 1 inch from both test specimen walls. One pound of fluffed wood excelsior is placed under the crib, between the bricks. Immediately before the start of the test, 4 ounces of ethyl alcohol is poured onto the excelsior.

Temperatures were measured using chromel-alumel thermocouples at 9 locations as shown in Figure 1 and Table 1. Temperatures were recorded every 15 seconds.

Table 1. Thermocouple Locations.

Thermocouple	Location
1	48 in. from either test wall, 1 inch below the ceiling.
2	Above crib, 3 in. from either wall, 1 in down from ceiling.
3	Above crib, 3 in. from either wall, 36 in. above floor.
4	Above crib, 3 in. from either wall, 60 in. above floor.
5	Above crib, 3 in. from either wall, 12 in. down from ceiling.
6	48 in. along side wall from back, 36 in. down from ceiling, 3 in. from wall.
7	48 in. along side wall from back, 1 in. down from ceiling, 3 in. from wall.
8	96 in. along side wall from back, 1 in. down from ceiling, 3 in. from wall.
9	1 in. down from the center of the doorway at the inside plane.



Test Specimen

The reflective insulation comprised 1/4 inch thick polyethylene foam with aluminum foil bonded to both faces. The 8-foot by 12-foot test room was lined with 5/8" Type X gypsum board. The test specimen was installed to form two intersecting 8-foot wall section -- the back wall and 8 feet of the right hand side wall. Pine 1-inch by 2-inch furring strips were installed vertically 24 inches apart and horizontally along the ceiling and floor, as shown in Figure 2. The 4-foot wide strips of the reflective insulation was stapled to the furring strips, with the seams vertical, and all joints were taped with pressure-sensitive aluminum foil tape. Strips of wood lath were nailed over the insulation at each furring strip. The resulting installation appeared as shown in Figure 4.

Conduct of the Test:

The excelsior was saturated with 4 ounces of ethyl alcohol, the wood crib replaced, and the excelsior was ignited at time zero. Color slides and a video tape with voice observations recorded the entire test and the resulting condition of the test specimen. These form a separate part of this report. The test continued for 15 minutes after which the fire was extinguished.

RESULTS

Table 2 lists the slides taken during the test along with the times and verbal observations. Selected slides and photographs are included as figures in this document. Table 3 lists the temperatures recorded during the test.



UNITED STATES TESTING COMPANY, INC.

EN91-0089.1

Environmentally Safe Products

8/8/91

Page 4

Table 2. Observations, Slides, and Figures.

<u>Time</u> <u>min:sec</u>	<u>Slide</u>	<u>Figure</u>	<u>Observation or Caption</u>
-	1	2	Furring strips before insulation.
-	2	3	Ignition source.
-	3	4	Crib and test specimen before test.
0:00	4	5	Ignition at 2:20 CDT.
1:00	5	-	Crib flames halfway up wall to ceiling.
1:30	-	-	Crib flames reach ceiling.
2:00	6	-	Foam core involved. Some foil flakes falling.
3:00	7	6	Flames spreading out over upper walls, Maximum flaming.
3:30	8	-	Foam flaming on upper walls.
4:00	9	7	Wood lathing burning.
5:00	10	8	Crib flames reduced to 6 feet height.
6:00	11	8	Some burning on side wall.
7:00	12	-	Most of foam and lath burning ended.
8-12:00	13-16	-	Crib burning continues.
13:00	17	-	Foam no longer burning.
14-15:00	18-19	-	Crib burning continues.
15:00	20	-	End of test.
-	21	10	Side wall after test.
-	--	11	Side wall with surface foil removed.
-	23	--	Upper side wall at corner after test.
-	23	12	Upper corner above crib after test.
-	24	--	Back wall after test.
-	-	13	Back wall after test with surface foil removed.
-	-	14	Lower corner behind crib after test.



UNITED STATES TESTING COMPANY, INC.

EN91-0089.1

Environmentally Safe Products

8/8/91

Page 5

Table 3. Thermocouple Temperatures.

Time min:sec	Thermocouple Temperatures, Deg F.								
	1	2	3	4	5	6	7	8	9
- 1:00	98.8	90.3	92.2	97.6	98.1	92.6	99.3	99.5	97.2
- 0:30	99.0	89.8	90.9	96.7	98.1	91.5	99.5	99.5	96.3
0:00	123.2	516.3	355.8	255.5	204.2	93.6	163.6	125.5	95.8
0:30	207.4	979.0	624.6	467.0	379.1	115.8	261.4	200.9	168.1
1:00	308.7	1227.7	944.3	644.7	535.8	142.4	396.3	312.2	253.8
1:30	453.3	1372.1	1349.6	957.7	778.6	185.0	566.8	444.2	372.2
2:00	578.5	1422.8	1541.5	1390.3	1141.7	248.3	741.6	601.6	494.6
2:30	1250.9	1796.9	1538.9	1552.4	1583.5	987.1	1690.1	1296.0	968.8
3:00	866.4	1543.3	1525.5	1728.1	1617.1	572.1	1376.0	1150.3	775.8
3:30	689.9	1270.8	1524.0	1538.9	1386.9	370.3	1007.4	803.5	627.2
4:00	629.5	918.4	1677.2	1289.8	1113.2	323.4	816.7	717.9	553.1
4:30	580.5	766.0	1265.4	1181.3	849.8	302.0	681.1	650.7	520.7
5:00	562.1	767.1	698.2	865.0	734.4	304.2	620.2	627.6	500.0
5:30	547.2	857.4	691.8	692.2	710.0	303.6	625.3	697.5	519.6
6:00	544.7	791.1	672.2	731.2	735.7	320.2	636.2	605.5	472.9
6:30	550.8	794.0	678.0	710.6	740.1	313.7	644.6	571.5	460.3
7:00	541.1	762.8	674.4	685.6	714.5	312.6	596.6	529.5	459.1
7:30	530.8	754.3	670.6	681.3	731.9	291.3	599.2	523.3	447.5
8:00	521.8	753.5	664.7	685.4	729.8	287.6	614.1	529.0	454.3
8:30	536.5	777.6	709.9	765.0	804.8	301.7	645.4	547.6	464.9
9:00	542.9	749.2	698.4	712.5	745.2	299.2	612.4	534.3	463.3
9:30	527.8	710.0	684.7	650.9	694.0	294.9	584.3	518.0	458.0
10:00	532.9	678.8	690.1	660.6	732.2	291.1	588.6	515.6	454.1
10:30	523.3	709.1	711.3	681.3	743.6	294.1	610.3	532.7	457.4
11:00	536.4	707.2	687.1	661.6	714.0	292.3	586.3	524.4	455.8
11:30	552.1	731.4	700.9	677.1	739.1	308.7	601.1	533.4	471.5
12:00	541.6	693.9	664.8	662.2	723.1	327.5	600.5	535.7	469.8
12:30	553.1	732.1	665.6	659.1	708.0	321.2	611.7	545.7	479.5
13:00	557.7	792.4	697.5	674.7	717.7	321.2	610.4	542.5	476.9
13:30	545.2	817.4	717.0	688.0	735.7	322.1	614.7	540.8	470.3
14:00	551.3	840.6	737.2	692.7	728.5	323.1	606.8	552.5	475.8
14:30	548.3	886.9	752.3	728.6	728.0	329.6	612.6	546.0	470.5
15:00	541.2	916.1	766.3	739.3	725.0	321.8	610.5	538.5	479.7



UNITED STATES TESTING COMPANY, INC.

EN91-0089.1 Environmentally Safe Products 8/8/91 Page 6

RESULTS:

The foam and foil at the upper wall corner above the crib were burned or melted away. Some of the foam on the upper 1-1/2 feet of the side and back walls ignited during the test but extinguished before the end of the 15-minute test duration. The upper two feet of the foam in the extreme outer furring space of both the side and back wall melted. The foam in the extreme outer furring space of the back wall showed some signs of burning near the ceiling during the test, but this did not extend to the outer edge. The upper portions of the lath strips and of the furring strips in the crib corner became ignited during the test, but all of the burning ceased before the end of the test period. The charring of the lath strips at the extreme outer edges of the back and side wall was less than 1/8 inch in depth. The video tape, Figures 9 through 14 and Slides 20 through 25 show the condition of the test walls after the test.

As shown in the video tape, there was no excessive smoke nor violent flaming during the test.



Figure 1. Burn Room Facility.

