

SKIP

SMALL SCALE ASTM E119  
FIRE RESISTANCE TESTING  
FOR TFR<sup>2</sup> CORPORATION ON  
12 MILS OF FLEXIBLE FIRE SHELL  
INTUMESCENT COATING  
TESTED: JANUARY 23, 2006  
VTEC #100-2585-1



# VTEC Laboratories Inc.

January 24, 2007

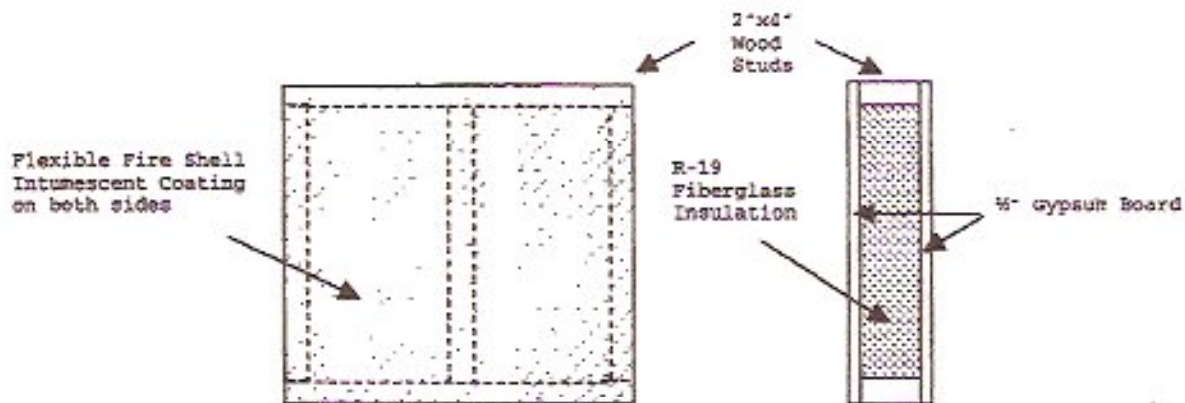
**Client:** TPR<sup>2</sup> Corporation  
161 Interstate Lane  
Waterbury, CT 06705

**Attn:** Mr. Richard J. Barone Jr.

**Subject:** Fire Resistance Testing According to ASTM E119

**SAMPLE DESCRIPTION:** Wall Panel with 12 mils Flexible Fire Shell Intumescent Coating.

The 36"x36"x4.5" thick Gypsum wall panel was fabricated and coated by TPR<sup>2</sup> for ASTM E 119 fire endurance testing. The wall was made up of 5 pieces of 2"x4" wood studs, 4 pieces forming a 36"x36" square frame and the fifth piece placed 18 inches from one side of the frame. One piece of 36"x36"x1/2" gypsum board was attached to each side of the frame using gypsum board screws. The cavity in the frame between the gypsum was filled with R-13 fiberglass wall insulation. The Flexible Fire Shell Intumescent Coating was applied to both surfaces of the gypsum wall at an average thickness of 12 mils dry. The wall panel was oriented so that the center stud was vertical.



**PROCEDURE:**

The furnace used in this test measures 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 fire test was run following the ASTM E119 time-temperature curve.

The endpoint for the ASTM E 119 test occurs when either all the thermocouples on the sample reach an average of 250°F + ambient starting temperature, any individual thermocouple on the sample exceeds 325 °F + ambient starting temperature, or when the sample experiences burn-through.

**RESULTS:**

The ambient temperature was 71°F.

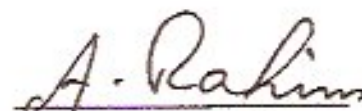
At 52 minutes the coating on the unexposed side started bubbling. At 57 minutes smoke began to emit from the bottom of the sample.

At 62 minutes thermocouples #6 and #3 exceeded 396 °F and the average for all six thermocouples on the unexposed side exceeded 321 °F thus indicating failure.

The time-temperature data are contained on the following pages.



Neil Schultz  
Executive Director



Amirudin Rahim  
Technical Director

**DISCLAIMER:** This test should be used to measure and describe the properties of materials, products or assemblies in response to heat and flame under controlled laboratory conditions and should not be used to describe or appraise the fire hazards or fire risks of materials, products or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire risk assessment, which takes into account all of the factors that are pertinent to an assessment of fire hazard of a particular end use.

**NOTICE:** VTEC Laboratories Inc. will not be liable for any loss or damage resulting from the use of the data in this report, in excess of the invoice. This report pertains to the sample tested only. Such report shall not be interpreted to be a warranty, either expressed or implied as to the suitability or fitness of said sample for such uses or applications, as the party contracting for the report may apply such sample.

Time (mins.)	Sample 1 deg.F	Sample 2 deg.F	Sample 3 deg.F	Sample 4 deg.F	Sample 5 deg.F	Sample 6 deg.F	Furnace deg.F	Furnace deg.F	Furnace deg.F	Sample Average	Furnace Average
0	71	71	70	70	72	70	56	58	58	71	57
1	71	71	70	70	72	70	555	576	620	71	584
2	71	71	70	70	72	70	639	651	662	71	651
3	71	71	70	70	72	70	784	807	833	71	808
4	71	71	70	70	72	70	829	862	887	71	859
5	71	71	70	70	72	70	893	940	964	71	939
6	71	71	70	70	72	70	991	1032	1077	71	1034
7	71	71	70	70	72	70	1076	1117	1156	71	1116
8	71	71	70	70	72	70	1137	1157	1197	71	1164
9	71	71	74	72	72	72	1274	1248	1222	72	1248
10	73	72	82	79	72	79	1311	1300	1265	76	1292
11	79	75	96	90	73	92	1320	1335	1360	84	1338
12	90	81	116	106	76	109	1321	1345	1371	96	1346
13	105	90	136	125	80	127	1328	1357	1396	110	1361
14	123	100	156	144	85	144	1336	1363	1412	125	1370
15	141	110	172	160	92	159	1347	1378	1414	139	1379
16	157	121	183	173	98	171	1349	1414	1421	160	1394
17	171	131	191	184	105	180	1373	1433	1429	160	1412
18	181	139	198	192	111	188	1388	1465	1460	168	1437
19	189	147	204	198	117	194	1437	1496	1505	175	1479
20	197	164	209	204	122	199	1442	1498	1510	181	1483
21	202	160	213	209	127	203	1447	1501	1511	186	1486
22	207	165	216	213	131	206	1459	1502	1512	190	1491
23	211	170	218	215	135	208	1461	1503	1514	193	1493
24	214	173	218	216	138	208	1469	1531	1531	194	1510
25	214	176	216	215	141	207	1472	1532	1533	195	1512
26	214	177	215	213	144	206	1472	1533	1536	195	1514
27	213	179	213	212	146	204	1488	1551	1556	194	1532
28	212	179	212	210	147	202	1506	1560	1558	194	1541
29	211	179	209	207	148	199	1514	1563	1559	192	1546
30	208	179	207	205	149	196	1522	1565	1565	191	1551
31	202	177	199	200	148	195	1527	1574	1580	187	1560
32	203	178	200	200	150	193	1533	1581	1586	187	1567
33	203	178	200	201	152	193	1537	1585	1589	188	1570
34	202	179	201	201	153	194	1541	1588	1596	188	1575
35	202	180	202	203	155	195	1543	1590	1597	190	1577
36	202	180	206	205	156	197	1553	1598	1608	191	1586
37	203	181	209	208	157	199	1565	1628	1634	193	1609
38	204	182	212	211	159	202	1672	1632	1638	195	1614
39	206	182	216	214	160	206	1682	1649	1644	197	1625
40	208	183	221	217	161	210	1690	1660	1647	200	1629
41	210	185	226	221	162	215	1696	1662	1660	203	1632
42	213	186	231	225	163	221	1696	1663	1651	206	1633

Time (mins.)	Sample 1 deg.F	Sample 2 deg.F	Sample 3 deg.F	Sample 4 deg.F	Sample 5 deg.F	Sample 6 deg.F	Furnace deg.F	Furnace deg.F	Furnace deg.F	Sample Average	Furnace Average
43	216	188	237	228	164	227	1597	1660	1654	210	1637
44	219	190	242	231	165	234	1598	1660	1658	214	1639
45	223	194	247	234	166	242	1602	1672	1658	218	1644
46	227	198	251	237	167	255	1608	1677	1668	222	1651
47	231	204	258	239	169	268	1611	1679	1670	228	1653
48	235	213	268	241	177	279	1612	1682	1670	235	1655
49	238	226	277	244	186	283	1622	1685	1673	242	1660
50	240	244	286	250	196	287	1629	1688	1674	250	1663
51	243	263	291	255	203	290	1637	1693	1674	257	1668
52	244	272	294	261	212	292	1640	1695	1675	262	1670
53	246	277	294	265	219	296	1645	1696	1676	266	1672
54	248	281	295	268	225	299	1647	1701	1681	269	1676
55	254	284	298	271	228	306	1660	1706	1688	273	1685
56	260	287	300	274	231	305	1667	1708	1696	276	1690
57	264	289	302	277	232	304	1674	1714	1702	278	1697
58	267	293	308	280	234	305	1680	1722	1704	281	1702
59	270	288	312	285	236	309	1681	1723	1705	283	1703
60	272	273	322	289	241	331	1685	1727	1709	286	1707
61	274	276	356	292	246	369	1687	1731	1711	302	1710
62	276	295	419	293	262	478	1688	1732	1716	336	1712