SMALL SCALE UL 263
FIRE RESISTANCE TESTING
FOR TPR^2 CORPORATION ON
18 MILS OF FLEXIBLE FIRE SHELL
INTUMESCENT COATING
TESTED: FEBRUARY 16, 2007
VTEC #100-2606

VTEC Laboratories Inc.

June 14, 2007

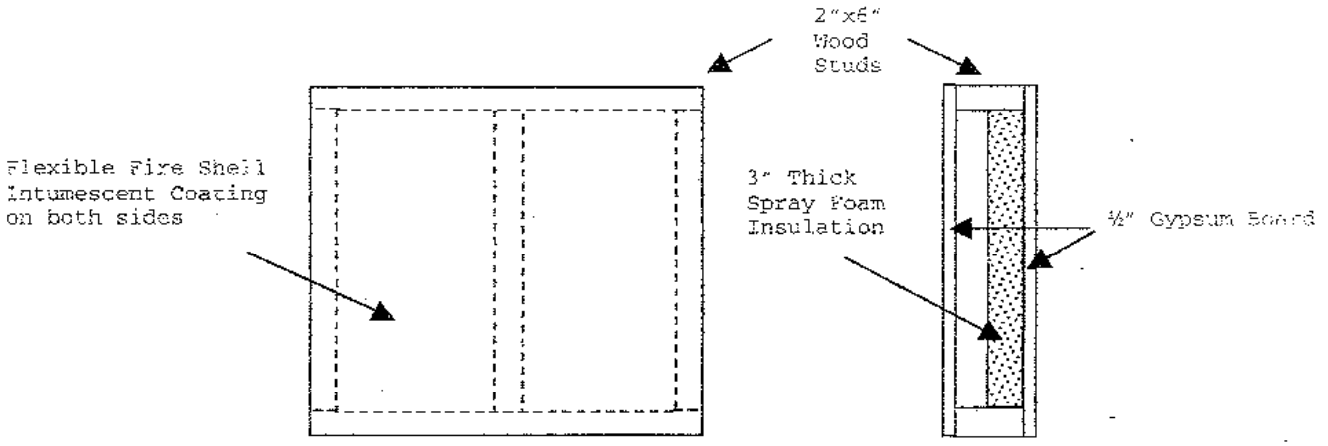
Client: TPR^2 Corporation
161 Interstate Lane
Waterbury, CT 06705

Attn: Mr. Richard J. Barone Jr.

Subject: Fire Resistance Testing According to UL 263

SAMPLE DESCRIPTION: Wall Panel with 18 mils Flexible Fire Shell Intumescent Coating.

The 36"x36"x6.5" thick Gypsum wall panel was fabricated and coated by TPR^2 for UL 263 fire endurance testing. The wall was made up of 5 pieces of 2"x6" 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 3" thick spray foam insulation. The Flexible Fire Shell Intumescent Coating was applied to both surfaces of the gypsum wall at an average thickness of 18 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 UL 263 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 60°F.

At 16 minutes smoke began to emit from the sample.

At 142 minutes the average for all six thermocouples on the unexposed side exceeded 310 ºF thus indicating failure.

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

Neil Schultz
Executive Director

Amirudin Rahim
Technical Director

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	60	63	60	59	62	59	48	49	48	60	48
1	60	63	59	58	61	59	749	522	671	60	647
2	60	63	59	58	61	59	795	612	716	60	708
3	60	63	59	58	61	59	841	660	753	60	751
4	60	62	59	58	61	59	970	754	865	60	863
5	60	62	59	58	61	59	1209	1043	1177	60	1143
6	60	62	59	58	61	58	1250	1159	1226	60	1211
7	59	62	59	58	61	58	1313	1234	1284	60	1277
8	60	62	59	58	61	58	1281	1171	1233	60	1228
9	59	62	59	58	61	58	1338	1223	1277	59	1279
10	59	62	58	58	61	58	1295	1296	1296	59	1296
11	59	62	58	58	61	58	1314	1317	1321	59	1317
12	59	62	59	58	61	58	1332	1346	1337	59	1339
13	59	62	58	58	61	58	1367	1369	1361	59	1365
14	59	61	58	57	61	58	1376	1379	1377	59	1377
15	59	62	58	57	61	58	1404	1406	1399	59	1403
16	59	62	58	57	60	58	1474	1388	1405	59	1422
17	59	61	58	57	60	58	1510	1445	1460	59	1471
18	59	61	58	57	54	58	1499	1456	1459	58	1472
19	59	61	58	57	56	58	1509	1450	1457	58	1472
20	59	61	58	57	57	58	1562	1516	1533	58	1537
21	59	61	58	57	57	58	1468	1432	1446	58	1448
22	59	61	57	57	56	58	1507	1447	1470	58	1475
23	59	61	58	57	56	57	1537	1470	1494	58	1500
24	59	61	58	57	57	57	1547	1490	1515	58	1517
25	59	61	58	57	60	57	1523	1468	1493	59	1495
26	59	61	58	57	60	57	1528	1472	1498	59	1499
27	59	60	57	57	60	57	1529	1492	1513	58	1511
28	58	60	57	57	60	57	1548	1509	1528	58	1528
29	58	60	57	57	60	57	1582	1573	1565	58	1573
30	58	60	57	57	60	57	1594	1584	1577	58	1585
31	58	60	57	57	60	57	1586	1590	1578	58	1584
32	58	60	57	57	60	57	1576	1576	1577	58	1576
33	58	60	57	57	60	57	1573	1573	1578	58	1575
34	58	60	57	57	60	57	1583	1581	1582	58	1582
35	58	60	57	57	60	57	1592	1587	1594	58	1591
36	58	60	57	57	60	57	1586	1575	1593	58	1585
37	58	60	57	57	60	57	1590	1583	1596	58	1590
38	58	60	57	57	59	57	1594	1581	1595	58	1590
39	58	60	57	57	59	57	1604	1587	1602	58	1598
40	58	60	57	57	59	57	1608	1597	1605	58	1603
41	58	60	57	57	59	57	1607	1596	1609	58	1604
42	58	59	57	57	59	57	1606	1596	1613	58	1605

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	58	60	57	57	59	57	1604	1602	1609	58	1605
44	58	59	57	57	59	57	1613	1601	1620	58	1611
45	58	59	57	57	59	57	1645	1631	1641	58	1639
46	58	59	57	57	59	57	1653	1639	1647	58	1646
47	58	59	57	56	59	57	1649	1627	1642	58	1639
48	58	59	57	56	59	57	1669	1650	1663	58	1661
49	58	59	57	56	59	57	1687	1660	1677	58	1675
50	57	59	57	56	59	57	1687	1666	1676	58	1676
51	58	59	57	56	59	57	1655	1645	1653	58	1651
52	58	59	57	56	59	57	1661	1651	1663	58	1658
53	58	59	57	56	59	57	1670	1657	1669	58	1665
54	58	59	57	56	59	57	1679	1665	1679	58	1674
55	58	59	57	56	59	57	1681	1670	1675	58	1676
56	57	59	57	56	59	57	1682	1669	1681	58	1677
57	57	59	57	56	59	57	1687	1669	1683	58	1680
58	57	59	57	56	59	57	1689	1677	1689	58	1685
59	57	59	57	56	58	57	1692	1678	1690	58	1686
60	58	59	58	56	58	57	1690	1681	1689	58	1687
61	57	59	58	56	58	57	1713	1696	1711	58	1706
62	57	59	58	57	58	57	1716	1700	1713	58	1710
63	57	59	58	56	58	58	1729	1717	1731	58	1725
64	58	59	58	57	58	58	1710	1703	1710	58	1708
65	58	59	59	57	58	58	1709	1699	1707	58	1705
66	58	59	59	57	58	58	1711	1703	1710	58	1708
67	58	59	59	57	58	59	1741	1725	1735	58	1734
68	58	59	60	57	58	59	1744	1727	1740	59	1737
69	58	59	61	57	58	59	1745	1727	1736	59	1736
70	58	59	61	58	56	60	1748	1725	1737	59	1736
71	58	59	62	57	54	60	1748	1725	1738	58	1737
72	59	59	63	56	53	61	1744	1730	1736	58	1737
73	59	59	64	56	53	62	1746	1731	1743	59	1740
74	60	59	66	53	52	63	1753	1734	1741	59	1743
75	60	60	67	55	56	63	1754	1738	1749	60	1747
76	61	60	69	58	58	65	1755	1733	1747	62	1745
77	62	60	71	60	58	67	1774	1747	1767	63	1763
78	63	60	72	61	59	69	1784	1754	1770	64	1769
79	64	61	75	62	59	71	1773	1744	1762	65	1760
80	66	61	78	63	59	73	1768	1742	1753	67	1754
81	67	62	81	65	60	75	1784	1755	1764	68	1768
82	70	63	84	67	60	79	1786	1757	1774	70	1772
83	72	63	88	69	61	82	1794	1767	1774	73	1778
84	74	64	93	72	62	86	1794	1769	1779	75	1781
85	77	65	97	75	63	90	1797	1765	1787	78	1783

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
86	81	66	103	77	64	94	1799	1776	1788	81	1787
87	85	67	109	81	64	99	1801	1773	1790	84	1788
88	89	68	115	84	66	104	1799	1781	1798	88	1793
89	95	69	123	89	67	110	1802	1779	1795	92	1792
90	100	71	131	94	68	116	1790	1765	1775	97	1776
91	107	72	140	100	70	122	1795	1778	1788	102	1787
92	115	74	150	105	71	130	1796	1781	1792	107	1790
93	123	76	160	112	73	137	1820	1793	1806	113	1806
94	133	78	170	120	75	145	1821	1797	1811	120	1810
95	143	80	180	128	76	150	1800	1788	1798	126	1796
96	149	83	190	131	77	158	1806	1791	1810	131	1802
97	161	86	199	141	80	168	1798	1781	1792	139	1790
98	172	89	208	152	83	178	1814	1795	1803	147	1804
99	182	92	216	163	86	187	1820	1801	1812	154	1811
100	192	96	224	174	89	195	1817	1802	1812	162	1810
101	196	97	228	179	91	199	1821	1805	1816	165	1814
102	200	99	231	185	93	204	1825	1807	1819	169	1817
103	208	103	239	195	96	211	1824	1811	1820	175	1819
104	217	108	248	204	100	217	1818	1805	1816	182	1813
105	226	112	258	213	104	224	1830	1810	1821	189	1820
106	236	116	268	222	108	230	1828	1814	1830	196	1824
107	247	121	281	229	112	235	1849	1841	1859	204	1850
108	261	125	296	238	116	241	1853	1847	1863	213	1855
109	272	131	303	247	119	246	1839	1837	1853	220	1843
110	299	136	316	256	123	253	1835	1840	1856	230	1843
111	298	141	321	267	127	259	1830	1829	1843	236	1834
112	296	147	329	269	133	264	1828	1833	1850	240	1837
113	298	152	331	285	139	272	1822	1832	1846	246	1833
114	295	158	330	296	147	280	1822	1827	1846	251	1832
115	297	164	327	297	152	288	1822	1828	1840	254	1830
116	291	170	326	299	157	296	1834	1834	1848	256	1839
117	291	176	326	300	161	301	1835	1847	1869	259	1850
118	295	183	326	301	169	305	1831	1846	1871	263	1849
119	294	190	326	302	173	308	1842	1852	1882	265	1859
120	295	197	329	302	176	305	1851	1853	1876	267	1860
121	294	204	331	303	183	303	1847	1861	1886	270	1865
122	296	211	332	302	187	304	1850	1860	1895	272	1868
123	295	218	333	302	191	305	1836	1861	1887	274	1861
124	293	224	334	303	196	306	1838	1853	1877	276	1856
125	296	231	335	304	201	307	1844	1860	1879	279	1861
126	295	237	336	304	205	307	1846	1856	1885	281	1863
127	296	243	338	304	209	309	1847	1859	1889	283	1865
128	296	249	337	305	212	309	1851	1859	1884	285	1865

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
129	296	254	340	305	216	310	1848	1873	1899	287	1873
130	299	258	341	305	221	312	1851	1880	1906	289	1879
131	297	263	343	306	223	312	1854	1871	1900	290	1875
132	299	266	345	306	228	313	1861	1879	1918	293	1886
133	299	269	347	306	232	314	1849	1872	1906	295	1876
134	300	273	349	307	237	315	1840	1874	1901	297	1872
135	301	276	351	307	242	317	1839	1882	1911	299	1877
136	302	279	352	308	246	318	1840	1883	1906	301	1876
137	305	281	354	309	252	319	1836	1872	1894	303	1867
138	303	284	356	309	256	320	1837	1877	1912	304	1876
139	303	285	357	309	257	321	1828	1881	1919	306	1876
140	305	287	359	310	260	323	1837	1878	1906	307	1874
141	304	288	360	311	262	325	1835	1882	1907	308	1875
142	305	289	361	312	265	326	1827	1891	1908	310	1875
143	305	290	362	313	267	327	1827	1892	1913	311	1877