# SMALL SCALE UL 263
# FIRE RESISTANCE TESTING
# FOR TPR$^2$ CORPORATION ON
# 12 MILS OF FLEXIBLE FIRE SHELL
# INTUMESCENT COATING
# TESTED: JANUARY 23, 2006
# VTEC #100-2585-3

# VTEC Laboratories Inc.

June 14, 2007

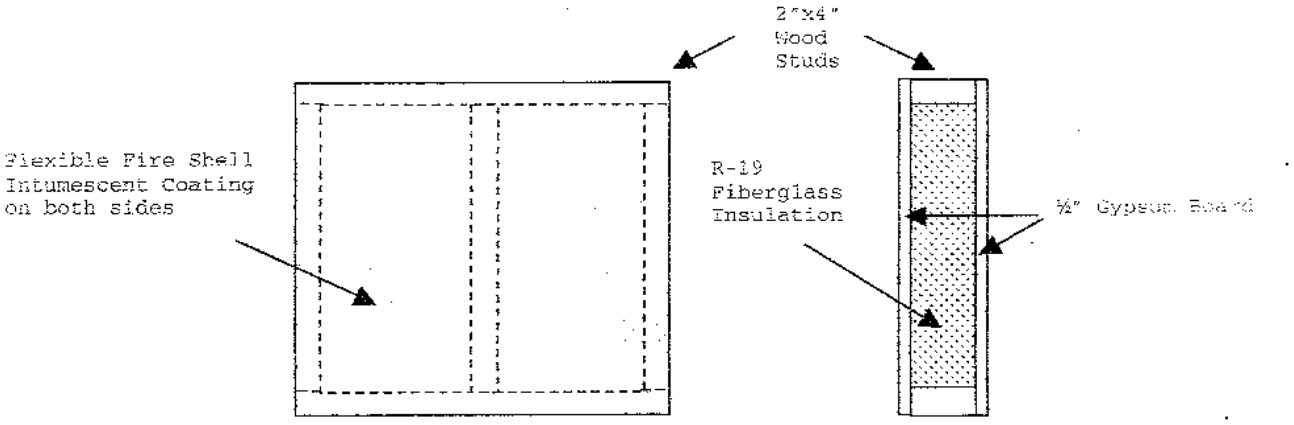
**Client:** TPR$^2$ Corporation
161 Interstate Lane
Waterbury, CT 06705

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

**Subject:** Fire Resistance Testing According to UL 263

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

The 36"x36"x4.5" 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"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.

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**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 UL263 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 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

A. Rahim
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 | 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 | 984 | 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 | 1398 | 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 | 150 | 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 | 154 | 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 | 1545 |
| 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 | 1572 | 1632 | 1638 | 195 | 1614 |
| 39 | 206 | 182 | 216 | 214 | 160 | 206 | 1582 | 1649 | 1644 | 197 | 1625 |
| 40 | 208 | 183 | 221 | 217 | 161 | 210 | 1590 | 1650 | 1647 | 200 | 1629 |
| 41 | 210 | 185 | 226 | 221 | 162 | 215 | 1595 | 1652 | 1650 | 203 | 1632 |
| 42 | 213 | 186 | 231 | 225 | 163 | 221 | 1596 | 1653 | 1651 | 206 | 1633 |