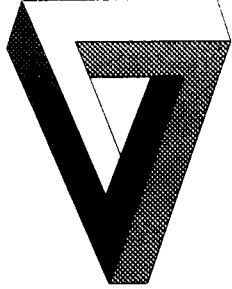


SMALL SCALE ASTM E 119/UL 263  
FIRE TESTING  
FOR  
US ARCHITECTURAL PRODUCTS  
ON TWO-HOUR  
LOAD BEARING CEM-STEEL FLOOR ASSEMBLY  
VTEC #100-1719-3  
TESTED: MAY 8, 2003



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# VTEC Laboratories Inc.

May 9, 2003

**Client:** US Architectural Products  
55 Industrial Circle  
Lincoln, RI 02865

**Attn:** Mr. Robert Cauley

**Subject:** Small Scale ASTM E 119/UL 263 Fire Endurance Screening Testing on Load Bearing Cem-Steel Floor Assembly 78" x 78" x 10½" Thick.

## **SAMPLE DESCRIPTION:**

- 1- CEM-Steel Board 5/8" thick with 26 gauge galvanized steel plate facing down and screw fastened direct to steel framing with #8 x 1-5/8" ITW Buildex S-12 Rock-On Climacoat screws. Fastener spacing 12" o.c. along steel 'C' joists and at perimeter.
- 2- Galvanized steel 'C' joists, 8" depth x 18Ga thickness x 1-5/8" flange width. Joists spaced at 24" o.c. maximum.
- 3- Galvanized steel 'perimeter channel' receiving ends of 'C' joists, 18Ga minimum. Screw fastened to top & bottom flange of 'C' joist with #10 x 1/2" corrosion resistant self-drilling 'Tek' screws.
- 4- Galvanized steel web stiffener, 3-5/8" x 18Ga, placed inside 'C' joist flange and screw attached to web of 'C' joist with three #10 x 1/2" corrosion resistant self-drilling 'Tek' screws.
- 5- Galvanized single leg resilient furring channel, 1/2" deep x 25Ga minimum at 16" o.c. screw fastened to bottom flange of 'C' joist with #10 x 1/2" corrosion resistant self-drilling 'Tek' screws.

- 6- Mineral wool insulation 2.5lbs. pcf density x 3" thick x 24" wide batts in joist cavity.
- 7- Double layer of 5/8" Type 'X' gypsum board, screw fastened to resilient furring channels with #6 x 1" drywall screws at 12" o.c. at first layer, and #6 x 1-5/8" drywall screws at 12" o.c. at second layer.

### **PROCEDURE:**

The furnace measures nominally 5 ft x 5 ft x 7 ft. The outside construction is steel and the furnace is lined with a ceramic refractory insulation.

Four burners, one centered on each wall, provide uniform heat. Each 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 four 1/4" grounded Inconel-sheathed chromel-alumel thermocouples.

The unexposed surface temperature of the sample was monitored by nine, 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 E119/UL263 time-temperature curve.

The endpoint for the E119/UL263 Fire Endurance Testing occurs when either all the thermocouples on the unexposed side of 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.

***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. It 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 that 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.

**RESULTS:**

At 8 minutes 30 seconds smoke began to emit from the edges of the deck.

At 15 minutes the exposed layer of the gypsum board cracked.

24 minutes there were flames from the seam of the gypsum boards on the exposed side of the sample.

At 1 hour the bottom exposed layer of gypsum board started to separate from the second layer of gypsum board.

At 1 hour 2 minutes the bottom exposed layer of gypsum board fell down.

At 1 hour 10 minutes the second layer of gypsum board started to separate from the metal frame.

At 1 hour 15 minutes second layer of gypsum board fell down.

At 1 hour 45 minutes smoke began to emit from the center of unexposed side of the sample.

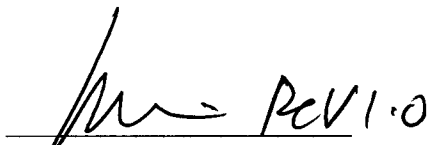
At 2 hours 3 minutes the furnace was voluntarily shut off and the test was ended without reaching any of the failure end points.

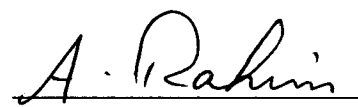
The sample as described above passed the ASTM E 119/ UL 263 test for a two-hour rating.

**Time Deflection Data**

<u>TIME (MINS)</u>	<u>DEFLECTION (INCHES)</u>
60	1/8"
64	1/4"
68	3/8"
73	1/2"
90	5/8"
123	5/8"

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

  
 Neil Schultz  
 Executive Director

  
 Amirudin Rahim  
 Technical Director

Time (min)	TC 1 Sample Deg. F	TC 2 Sample Deg. F	TC 3 Sample Deg. F	TC 4 Sample Deg. F	TC 5 Sample Deg. F	TC 6 Sample Deg. F	TC 7 Sample Deg. F	TC 8 Sample Deg. F	TC 9 Sample Deg. F	TC 10 Furnace Deg. F	TC 11 Furnace Deg. F	TC 12 Furnace Deg. F	TC 13 Furnace Deg. F	TC 14 Sample Average Deg. F	TC 15 Furnace Average Deg. F
0	71	70	70	70	69	70	69	68	70	94	89	85	85	70	88
1	71	70	70	70	69	70	69	69	70	258	228	207	200	70	223
2	71	70	70	70	69	70	69	69	69	475	424	406	379	70	421
3	71	70	70	70	69	71	69	68	70	621	571	547	505	70	561
4	71	70	70	70	69	70	69	68	69	827	771	754	706	70	765
5	71	70	70	70	69	70	69	68	69	1048	998	996	951	70	998
6	71	70	70	70	69	70	69	68	69	1101	1064	1055	1010	70	1058
7	71	70	70	70	69	70	69	68	69	1203	1157	1161	1124	70	1161
8	71	70	70	70	69	70	69	68	69	1248	1203	1212	1183	70	1211
9	71	70	70	70	69	70	69	68	69	1283	1241	1248	1229	70	1250
10	71	70	70	70	69	70	69	68	69	1331	1287	1299	1276	70	1298
11	71	70	70	70	69	70	69	68	69	1339	1296	1305	1288	70	1307
12	71	70	70	70	69	70	69	68	69	1361	1319	1328	1312	70	1330
13	71	70	70	70	69	70	69	68	70	1382	1340	1347	1333	70	1350
14	71	70	69	70	69	70	69	68	69	1405	1361	1374	1352	70	1373
15	71	70	70	70	69	70	69	68	69	1431	1388	1396	1380	70	1399
16	71	70	70	70	69	70	69	68	69	1438	1400	1410	1391	70	1409
17	71	70	70	70	69	70	69	68	69	1453	1419	1423	1405	70	1425
18	71	70	70	70	69	70	70	68	69	1466	1430	1438	1419	70	1438
19	71	70	70	71	69	70	70	68	70	1480	1446	1447	1430	70	1451
20	71	70	70	71	70	71	70	68	70	1487	1454	1461	1441	70	1461
21	72	71	70	71	70	71	71	69	70	1489	1463	1468	1455	70	1469
22	72	70	70	72	70	71	72	69	70	1492	1470	1474	1467	71	1476
23	73	71	70	72	71	71	73	70	70	1506	1481	1491	1480	71	1490
24	73	71	71	73	71	72	73	70	71	1513	1495	1498	1490	72	1499
25	74	72	71	74	72	72	74	71	71	1525	1504	1511	1499	72	1510
26	74	72	71	75	73	73	75	71	72	1532	1517	1519	1513	73	1520
27	75	72	72	75	73	74	77	72	73	1538	1527	1528	1521	74	1528
28	76	73	72	76	74	74	78	73	73	1548	1534	1537	1528	74	1537
29	77	73	73	77	75	75	79	74	74	1556	1540	1543	1538	75	1544
30	77	74	73	78	76	76	80	75	75	1560	1546	1546	1542	76	1549
31	78	75	74	79	77	77	82	76	76	1570	1557	1562	1554	77	1560
32	79	75	75	80	78	78	83	77	77	1575	1561	1567	1555	78	1565
33	80	76	76	81	78	79	85	78	78	1580	1566	1570	1564	79	1570
34	81	77	76	83	80	79	86	79	79	1587	1574	1576	1568	80	1576
35	82	78	77	84	81	81	88	81	80	1594	1578	1584	1577	81	1583
36	83	78	78	85	82	82	90	82	81	1599	1588	1589	1581	82	1589

Time (min)	TC 1 Sample Deg. F	TC 2 Sample Deg. F	TC 3 Sample Deg. F	TC 4 Sample Deg. F	TC 5 Sample Deg. F	TC 6 Sample Deg. F	TC 7 Sample Deg. F	TC 8 Sample Deg. F	TC 9 Sample Deg. F	TC 10 Furnace Deg. F	TC 11 Furnace Deg. F	TC 12 Furnace Deg. F	TC 13 Furnace Deg. F	TC 14 Sample Average Deg. F	TC 15 Furnace Average Deg. F
37	84	79	79	86	83	83	91	84	83	1601	1590	1594	1584	84	1592
38	85	80	80	87	84	84	93	86	84	1606	1596	1598	1593	85	1598
39	86	81	81	89	85	85	95	87	85	1613	1601	1605	1596	86	1604
40	87	82	82	90	87	86	96	89	87	1621	1610	1614	1603	87	1612
41	88	83	83	91	88	87	98	90	88	1625	1614	1616	1605	88	1615
42	89	85	84	93	89	88	99	92	89	1628	1618	1621	1612	90	1620
43	90	86	85	94	91	89	101	94	91	1633	1622	1626	1618	91	1625
44	91	87	86	95	93	91	102	96	92	1639	1627	1632	1622	93	1630
45	92	88	87	96	94	92	104	98	93	1645	1635	1635	1629	94	1636
46	93	90	88	98	96	93	105	99	95	1650	1639	1641	1632	95	1641
47	95	92	90	99	98	94	106	101	95	1655	1646	1646	1638	97	1646
48	96	93	91	100	100	95	107	103	97	1659	1650	1651	1641	98	1650
49	98	95	92	101	101	96	109	105	98	1665	1655	1656	1649	99	1656
50	99	97	93	102	103	97	110	106	99	1671	1660	1664	1657	101	1663
51	100	98	94	104	105	98	111	108	100	1673	1662	1666	1658	102	1665
52	102	100	96	105	106	99	112	110	102	1676	1664	1669	1658	103	1667
53	103	101	97	106	108	100	113	111	103	1680	1668	1670	1662	105	1670
54	104	103	98	107	109	101	114	113	104	1686	1675	1678	1670	106	1677
55	105	104	99	108	111	102	115	114	105	1691	1680	1681	1676	107	1682
56	107	106	100	109	113	103	116	115	106	1696	1688	1689	1682	108	1689
57	108	107	101	110	114	104	117	116	106	1699	1689	1691	1686	109	1691
58	109	108	102	111	115	105	118	117	107	1704	1694	1695	1691	110	1696
59	110	110	102	111	116	106	118	119	108	1706	1695	1696	1692	111	1697
60	111	111	103	112	117	107	119	119	109	1709	1700	1700	1696	112	1701
61	112	112	104	113	118	107	120	120	110	1711	1702	1702	1697	113	1703
62	113	113	104	114	118	108	121	121	110	1712	1706	1704	1701	113	1706
63	113	113	105	115	119	108	121	121	111	1734	1710	1713	1697	114	1714
64	114	114	105	115	120	109	122	122	111	1736	1710	1717	1698	115	1715
65	115	115	105	116	120	110	122	122	112	1738	1712	1724	1699	115	1718
66	115	116	106	117	120	109	122	122	112	1746	1720	1733	1704	115	1725
67	116	116	106	117	120	110	123	122	112	1746	1721	1734	1707	116	1727
68	116	116	106	118	121	110	123	123	113	1747	1723	1735	1712	116	1729
69	117	117	106	118	121	111	124	123	113	1749	1724	1736	1714	117	1731
70	117	117	107	119	121	111	124	123	113	1752	1728	1740	1718	117	1735
71	118	117	107	120	121	111	125	123	113	1753	1730	1742	1720	117	1736
72	119	118	107	120	121	111	125	123	113	1754	1734	1746	1723	117	1739
73	120	118	107	121	121	112	126	123	113	1756	1736	1748	1724	118	1741

Time	TC 1	TC 2	TC 3	TC 4	TC 5	TC 6	TC 7	TC 8	TC 9	TC 10	TC 11	TC 12	TC 13	TC 14 Sample	TC 15 Furnace
(min)	Sample	Sample	Sample	Sample	Sample	Sample	Sample	Sample	Sample	Furnace	Furnace	Furnace	Furnace	Average	Average
	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>
74	121	119	107	122	122	112	127	123	114	1759	1737	1750	1726	118	1743
75	122	119	108	124	122	112	127	124	114	1769	1738	1755	1729	119	1748
76	123	120	108	126	123	113	129	125	115	1772	1740	1762	1734	120	1752
77	125	122	109	128	124	113	130	126	116	1775	1748	1765	1736	121	1756
78	127	123	110	131	126	114	132	127	117	1777	1750	1766	1737	123	1758
79	129	125	111	135	127	116	134	129	118	1780	1756	1769	1739	125	1761
80	131	127	113	139	130	117	137	131	119	1785	1758	1772	1742	127	1764
81	134	130	115	145	133	119	140	133	120	1787	1760	1776	1745	130	1767
82	138	132	117	150	136	121	143	136	122	1791	1764	1779	1752	133	1772
83	142	135	119	157	140	123	147	139	124	1795	1766	1785	1753	136	1775
84	147	138	121	165	146	125	151	144	125	1796	1767	1785	1759	140	1777
85	152	142	123	173	153	128	156	150	127	1799	1769	1788	1760	145	1779
86	158	146	126	182	160	131	161	157	129	1798	1772	1789	1762	150	1780
87	164	151	128	190	169	134	167	164	130	1804	1773	1793	1762	155	1783
88	171	157	131	197	177	138	174	173	132	1807	1774	1796	1763	161	1785
89	178	162	134	203	186	142	180	180	135	1815	1776	1803	1764	167	1790
90	185	169	136	207	193	146	186	187	138	1816	1780	1804	1765	172	1791
91	191	174	139	210	199	150	191	192	140	1818	1781	1806	1768	176	1793
92	196	180	142	212	204	154	196	196	143	1818	1782	1807	1770	180	1794
93	200	186	144	214	207	158	200	200	146	1819	1783	1809	1772	184	1796
94	204	191	147	215	210	162	203	203	149	1820	1788	1813	1776	187	1799
95	208	196	151	216	212	166	205	206	152	1821	1794	1814	1779	190	1802
96	211	200	154	216	213	170	207	208	155	1821	1792	1814	1771	193	1800
97	212	204	157	216	213	174	209	210	158	1830	1800	1817	1783	195	1807
98	213	207	161	215	213	177	210	210	161	1831	1801	1823	1787	196	1811
99	215	210	164	217	214	181	211	211	164	1836	1804	1827	1788	199	1814
100	215	212	168	218	215	185	212	211	167	1838	1806	1826	1795	200	1816
101	216	213	171	219	215	189	213	212	170	1839	1808	1831	1788	202	1817
102	217	214	175	221	216	192	213	212	172	1844	1809	1833	1798	204	1821
103	216	214	178	221	217	196	213	212	174	1845	1810	1835	1801	205	1823
104	218	215	182	223	218	199	214	212	176	1846	1815	1836	1802	206	1825
105	218	215	185	224	219	201	215	213	178	1848	1816	1837	1801	208	1826
106	219	216	188	227	220	204	216	213	180	1850	1822	1841	1803	209	1829
107	220	216	192	229	220	206	218	212	181	1851	1824	1842	1807	210	1831
108	219	212	194	230	219	208	219	212	184	1852	1825	1844	1808	211	1832
109	220	211	197	232	219	209	221	212	185	1854	1825	1847	1809	212	1833
110	222	211	200	236	220	211	223	213	187	1857	1823	1848	1810	214	1835

Time	TC 1	TC 2	TC 3	TC 4	TC 5	TC 6	TC 7	TC 8	TC 9	TC 10	TC 11	TC 12	TC 13	TC 14 Sample	TC 15 Furnace
(min)	Sample	Sample	Sample	Sample	Sample	Sample	Sample	Sample	Sample	Furnace	Furnace	Furnace	Furnace	Average	Average
	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>	<u>Deg. F</u>
111	223	210	202	238	221	211	225	214	189	1857	1832	1849	1809	215	1837
112	226	211	204	238	222	211	226	215	190	1858	1833	1851	1809	216	1838
113	229	212	206	246	224	213	230	218	192	1863	1834	1853	1808	219	1840
114	231	214	207	250	226	214	234	220	192	1865	1834	1856	1807	221	1841
115	234	214	208	253	227	213	234	222	193	1866	1836	1857	1808	222	1842
116	236	215	209	258	228	213	236	224	194	1867	1837	1858	1809	224	1843
117	239	217	210	262	230	213	238	227	195	1869	1839	1859	1809	225	1844
118	240	218	210	266	232	214	241	229	196	1871	1840	1861	1810	227	1846
119	241	218	210	267	233	214	245	230	196	1873	1841	1864	1815	228	1848
120	244	219	211	274	237	215	251	231	197	1874	1843	1865	1814	231	1849
121	246	219	211	276	239	215	255	231	198	1878	1847	1868	1815	232	1852
122	249	221	212	278	241	215	259	232	199	1880	1849	1871	1824	234	1856
123	253	222	212	281	244	215	263	234	200	1883	1850	1873	1827	236	1858