VTEC Laboratories Inc.

Commercial Testing & Research Facility

SMALL SCALE
ASTM E 119 FIRE TESTING

FOR
CONTEGO INTERNATIONAL, INC.

ON
¼" COATED STEEL PLATE WITH ½" FLANGE
(VTEC #100-1737)

TESTED: APRIL 7, 2003

April 9, 2003

Client: Contego International, Inc.
334 Greyhound Pass West
Carmel, IN 46032-7007

Attn: Mr. Tony Scott

Subject: ASTM E119 Fire Endurance Screening Testing of one 14" x 14" coated ¼" steel plate with ½" flange.

SAMPLE DESCRIPTION:

The sample was identified as follows:

At the request of Contego International, Inc., VTEC prepared a steel plate with a steel flange welded to the plate at a 90^0 angle down the centerline. The steel plate measured 8"x 6" x ¼" thick. The plate and flange were cleaned and primed with a suitable primer. It was then coated with a coating provided by Contego International, Inc. The coating was applied over a seven-day period with about 15 mils wet applied each day. The final dry coating thickness was 73 mils average. The coating was allowed to cure for three days before fire testing according to ASTM E 119.

The specimen was covered on the unexposed side with two layers of 1" thick ceramic refractory insulation and one layer of 1" thick mineral wool to simulate total immersion in a furnace.

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. A transition piece was placed on the front of the furnace that had an opening of 12" x 12" where the sample was to be placed.

The sample was oriented vertically in the front opening of the furnace. The unexposed surface temperature of the sample was monitored by two 20-gauge type K, fiberglass sheathed thermocouples.

The fire test was run following the ASTM E119 time-temperature curve.

The endpoint for the ASTM E119 test on steel beams occurs when either all of the thermocouples on the sample reach an average of 1000^0F or any individual thermocouples on the sample exceed 1200^0F.

RESULTS:

At 85 minutes the average temperature of the exposed side under the coating exceeded 1000^0F. (Although CH 1 exceeded 1200^0F at 79 minutes, it should be noted that CH 1 and CH 2 were drilled completely through the steel plate. In an actual ASTM E119, they would have been placed at the mid point of the wall thickness. The other exposed thermocouple, CH 2, exceeded 1200^0F at 82 minutes.) The average temperature of the unexposed side of the specimen exceeded 1000^0F at 126 minutes, which was the endpoint for the test.

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

ELECTRONICALLY TRANSMITTED SIGNATURE ON FILE

Neil Schultz
Executive Director

ELECTRONICALLY TRANSMITTED SIGNATURE ON FILE

Amirudin Rahim
Technical Director

Time (min)	CH 1 Specimen (Exposed) Temp. (oF)	CH 2 Specimen (Exposed) Temp. (oF)	CH 3 Specimen (Unexposed) Temp. (oF)	CH 4 Specimen (Unexposed) Temp. (oF)	CH 5 Furnace Temp. (oF)	CH 6 Furnace Temp. (oF)	CH 7 Furnace Temp. (oF)	Average (Unexposed) Temp. (oF)	Average (Furnace) Temp. (oF)
0	58	59	56	57	86	82	85	56	84
1	69	68	61	62	267	241	250	62	253
2	84	81	70	72	658	655	656	71	656
3	108	92	80	84	990	896	932	82	939
4	172	140	130	119	1018	962	991	125	990
5	210	178	159	143	1029	986	1012	151	1009
6	259	222	197	174	1059	1009	1028	186	1032
7	299	248	203	191	1122	1065	1100	197	1096
8	307	276	215	207	1214	1192	1177	211	1194
9	322	306	237	222	1296	1237	1261	229	1265
10	360	336	271	239	1339	1271	1298	255	1303
11	377	361	277	258	1353	1332	1344	267	1343
12	389	379	280	275	1372	1354	1363	277	1363
13	394	393	283	292	1389	1366	1372	288	1376
14	424	404	309	306	1401	1375	1386	307	1387
15	447	414	327	320	1408	1383	1396	323	1396
16	467	420	348	332	1420	1393	1403	340	1405
17	483	428	356	341	1428	1408	1416	349	1417
18	489	435	365	352	1439	1421	1427	358	1429
19	497	443	383	360	1458	1430	1435	371	1441
20	525	451	392	365	1476	1447	1459	379	1461
21	574	463	401	370	1481	1468	1476	386	1475
22	582	469	403	380	1486	1483	1487	392	1485
23	603	475	405	389	1492	1487	1497	397	1492
24	610	478	417	399	1499	1501	1505	408	1502
25	629	483	439	403	1503	1508	1514	421	1508
26	641	494	447	405	1506	1511	1523	426	1513
27	674	502	453	407	1511	1518	1534	430	1521
28	693	510	459	411	1524	1527	1547	435	1533
29	713	519	464	415	1535	1531	1555	439	1540
30	741	528	471	420	1544	1543	1560	445	1549
31	768	537	477	421	1550	1550	1567	449	1556
32	799	548	482	426	1553	1558	1574	454	1562
33	815	559	488	430	1561	1566	1579	459	1569
34	830	570	493	433	1566	1574	1583	463	1574
35	837	583	497	436	1571	1585	1591	467	1582
36	842	596	500	440	1579	1597	1597	470	1591
37	848	610	503	444	1585	1608	1601	474	1598
38	871	625	507	448	1596	1617	1606	477	1606
39	885	641	512	452	1599	1619	1611	482	1610
40	918	658	519	456	1605	1621	1617	488	1614
41	926	675	528	462	1607	1625	1622	495	1618
42	931	694	536	465	1611	1628	1626	501	1622
43	940	710	541	470	1617	1630	1629	506	1625
44	962	727	550	475	1622	1639	1632	513	1631
45	969	744	552	479	1628	1647	1636	516	1637
46	973	762	558	483	1633	1653	1638	521	1641
47	988	778	563	488	1635	1655	1641	526	1644
48	1002	793	566	492	1640	1658	1646	529	1648
49	1009	807	570	497	1643	1668	1655	533	1655
50	1013	822	575	502	1648	1671	1662	538	1660

51	1016	838	579	506	1650	1675	1670	542	1665
52	1022	852	584	512	1651	1678	1675	548	1668
53	1033	867	586	516	1656	1687	1678	551	1674
54	1040	881	588	520	1659	1689	1680	554	1676
55	1043	896	594	524	1666	1693	1681	559	1680
56	1059	910	600	531	1671	1700	1687	565	1686
57	1066	923	604	536	1672	1705	1692	570	1690
58	1071	937	609	539	1675	1707	1695	574	1692
59	1080	949	612	547	1681	1710	1697	580	1696
60	1083	961	617	552	1683	1712	1701	584	1699
61	1094	974	623	557	1684	1714	1706	590	1701
62	1106	985	631	562	1688	1716	1709	596	1704
63	1117	997	635	567	1690	1721	1714	601	1708
64	1121	1010	643	572	1695	1729	1718	607	1714
65	1126	1021	647	578	1704	1732	1720	612	1719
66	1133	1032	655	583	1705	1735	1722	619	1721
67	1138	1045	659	587	1709	1737	1728	623	1725
68	1145	1054	664	595	1711	1738	1730	629	1726
69	1151	1065	669	601	1714	1741	1731	635	1729
70	1154	1077	676	604	1721	1745	1735	640	1734
71	1159	1088	686	611	1724	1748	1737	649	1736
72	1161	1100	693	615	1727	1750	1739	654	1739
73	1167	1109	700	622	1729	1751	1743	661	1741
74	1170	1120	705	627	1732	1759	1748	666	1746
75	1174	1132	708	631	1734	1766	1752	670	1751
76	1184	1142	713	638	1735	1770	1754	676	1753
77	1187	1151	715	644	1738	1773	1760	680	1757
78	1196	1162	726	649	1743	1776	1761	688	1760
79	1215	1173	740	655	1745	1778	1764	697	1762
80	1223	1181	753	661	1749	1781	1766	707	1765
81	1236	1192	765	666	1750	1783	1768	715	1767
82	1241	1201	772	671	1751	1786	1769	722	1769
83	1252	1210	790	676	1753	1787	1774	733	1771
84	1259	1219	800	683	1758	1788	1777	741	1774
85	1264	1226	806	688	1761	1792	1779	747	1777
86	1269	1233	812	694	1763	1798	1780	753	1780
87	1276	1241	818	701	1769	1804	1786	759	1786
88	1296	1249	826	706	1770	1805	1788	766	1788
89	1294	1256	838	712	1775	1809	1790	775	1791
90	1301	1262	842	720	1777	1810	1791	781	1793
91	1308	1269	844	726	1779	1811	1795	785	1795
92	1314	1276	849	731	1780	1813	1797	790	1797
93	1319	1281	853	739	1784	1814	1800	796	1799
94	1321	1287	858	744	1788	1815	1804	801	1802
95	1326	1292	861	750	1790	1816	1806	805	1804
96	1329	1297	866	753	1791	1818	1807	810	1805
97	1331	1303	872	761	1792	1819	1809	817	1807
98	1335	1307	880	769	1796	1819	1813	824	1809
99	1340	1312	885	775	1799	1821	1815	830	1812
100	1347	1318	891	780	1801	1825	1817	835	1814
101	1355	1322	895	786	1805	1828	1818	841	1817
102	1363	1329	903	792	1806	1830	1819	847	1818
103	1373	1333	908	799	1811	1832	1821	853	1821
104	1378	1336	914	806	1817	1837	1822	860	1825
105	1385	1341	921	811	1819	1839	1824	866	1827
106	1388	1347	926	818	1821	1840	1826	872	1829
107	1394	1353	935	824	1822	1841	1827	879	1830

108	1398	1356	940	831	1824	1844	1830	886	1833
109	1401	1361	948	838	1825	1845	1832	893	1834
110	1407	1365	955	844	1826	1848	1835	899	1836
111	1416	1371	963	850	1829	1850	1836	907	1838
112	1422	1376	971	856	1831	1852	1836	913	1840
113	1433	1380	982	861	1834	1854	1837	921	1842
114	1436	1384	988	867	1835	1855	1838	928	1843
115	1439	1390	996	874	1836	1856	1840	935	1844
116	1447	1393	1001	879	1837	1856	1841	940	1845
117	1452	1398	1004	886	1839	1858	1842	945	1846
118	1453	1403	1009	892	1840	1859	1845	951	1848
119	1455	1406	1011	897	1842	1860	1846	954	1849
120	1459	1410	1019	903	1843	1862	1849	961	1851
121	1466	1414	1023	909	1845	1862	1850	966	1852
122	1473	1419	1030	913	1847	1863	1852	972	1854
123	1475	1423	1039	920	1847	1863	1853	980	1854
124	1481	1427	1048	925	1848	1864	1855	986	1856
125	1484	1432	1055	931	1850	1865	1856	993	1857
126	1486	1438	1061	942	1852	1865	1856	1002	1858
127	1492	1441	1070	948	1853	1866	1857	1009	1859
128	1497	1446	1078	951	1856	1867	1858	1015	1860
129	1502	1450	1081	957	1858	1867	1859	1019	1861
130	1510	1454	1083	962	1860	1868	1861	1023	1863
131	1514	1458	1089	967	1861	1869	1862	1028	1864
132	1522	1462	1098	973	1862	1871	1863	1036	1865
133	1525	1466	1107	978	1862	1873	1865	1042	1867
134	1531	1471	1112	982	1863	1874	1866	1047	1868
135	1536	1473	1118	988	1865	1876	1867	1053	1869
136	1538	1476	1126	993	1866	1877	1869	1059	1871
137	1539	1481	1131	997	1867	1878	1870	1064	1872
138	1544	1484	1135	1003	1869	1879	1871	1069	1873
139	1548	1488	1140	1008	1869	1880	1873	1074	1874

GRAPHICAL REPRESENTATION OF ATTACHED THERMOCOUPLE DATA. ENDPOINT REACHED AT 126 MINUTES.