

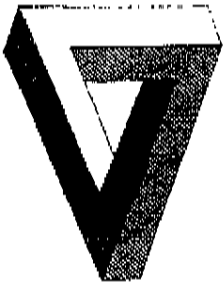
MODIFIED ASTM E119  
FIRE SCREENING TEST  
FOR GRANCRETE INC.  
ON  
NOMINAL 1.5" THICK GRANCRETE B/VR  
VTEC #100-2677-1  
TESTED: JUNE 27, 2007  
REVISION 1.0: JULY 18, 2007

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# VTEC Laboratories Inc.

July 18, 2007

Client: Grancrete Inc.  
P.O. Box 14587  
Durham, NC 27709

Attn: Mr. Jeff Selph

Subject: Modified ASTM E119 Fire Endurance Screening Testing of  
one 14" x 14" Coated Steel Plate.

**SAMPLE DESCRIPTION:**

The sample was identified as follows:

*Nominal 1.5" Thick Grancrete B/VR*

The Grancrete B/VR coating was applied to a 14" x 14' x ¼" thick steel plate at an average dry thickness of 1.5".

**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.

VTEC #100-2677-1 REV 1.0

GRANCRETE INC.

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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. 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 three, 20-gauge type K, fiberglass sheathed thermocouples. There were three layers of Kaowool over the thermocouples on the unexposed side of the sample.

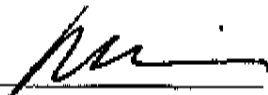
The fire test was run following the ASTM E119 time-temperature curve.


The endpoint for the ASTM E119 Steel Plate Test occurs when all the thermocouples on the sample reach an average of 1,000°F, or when any individual thermocouple on the sample reaches 1,200°F.

**RESULTS:**

At 190 minutes, the furnace was voluntarily shut off with none of the failure criteria met.

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

  
Neil Schultz  
Executive Director

  
Amirudin Rahim  
Technical Director

REVISION 1.0: Changed product name and corrected sample thickness.

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| Time (min) | Unexposed Side    |                 | Unexposed Side        |           | Unexposed Side |           | Furnace Temp. |           | Furnace Temp. |           | Avg. of Unexposed Side (Deg. F) |           | Avg. of Furnace (Deg. F) |           |
|------------|-------------------|-----------------|-----------------------|-----------|----------------|-----------|---------------|-----------|---------------|-----------|---------------------------------|-----------|--------------------------|-----------|
|            | Top Left (Deg. F) | Middle (Deg. F) | Bottom Right (Deg. F) | Channel 1 | Channel 2      | Channel 3 | Channel 4     | Channel 5 | Channel 6     | Channel 7 | Channel 8                       | Channel 7 | Channel 8                | Channel 8 |
| 0          | 76                | 76              | 76                    | 79        | 79             | 79        | 78            | 78        | 76            | 79        | 76                              | 76        | 79                       |           |
| 1          | 76                | 76              | 76                    | 367       | 598            | 76        | 367           | 136       | 136           | 367       | 76                              | 76        | 367                      |           |
| 2          | 76                | 76              | 76                    | 526       | 768            | 76        | 526           | 290       | 290           | 526       | 76                              | 76        | 526                      |           |
| 3          | 76                | 76              | 76                    | 652       | 845            | 76        | 652           | 465       | 465           | 652       | 76                              | 76        | 652                      |           |
| 4          | 76                | 76              | 76                    | 755       | 902            | 76        | 755           | 603       | 603           | 755       | 76                              | 76        | 755                      |           |
| 5          | 76                | 76              | 76                    | 835       | 949            | 76        | 835           | 713       | 713           | 832       | 76                              | 76        | 832                      |           |
| 6          | 77                | 76              | 76                    | 902       | 997            | 76        | 902           | 806       | 806           | 902       | 76                              | 76        | 902                      |           |
| 7          | 76                | 76              | 77                    | 947       | 1034           | 77        | 947           | 876       | 876           | 952       | 76                              | 76        | 952                      |           |
| 8          | 77                | 76              | 76                    | 1006      | 1077           | 76        | 1006          | 935       | 935           | 1006      | 77                              | 77        | 1006                     |           |
| 9          | 77                | 77              | 76                    | 1059      | 1127           | 76        | 1059          | 987       | 987           | 1058      | 76                              | 76        | 1058                     |           |
| 10         | 77                | 77              | 77                    | 1117      | 1173           | 77        | 1117          | 1042      | 1042          | 1111      | 77                              | 77        | 1111                     |           |
| 11         | 77                | 77              | 77                    | 1152      | 1211           | 77        | 1152          | 1095      | 1095          | 1153      | 77                              | 77        | 1153                     |           |
| 12         | 78                | 78              | 77                    | 1253      | 1330           | 77        | 1253          | 1168      | 1168          | 1250      | 77                              | 77        | 1250                     |           |
| 13         | 79                | 78              | 78                    | 1353      | 1427           | 78        | 1353          | 1285      | 1285          | 1355      | 78                              | 78        | 1355                     |           |
| 14         | 80                | 79              | 79                    | 1414      | 1484           | 79        | 1414          | 1363      | 1363          | 1420      | 79                              | 79        | 1420                     |           |
| 15         | 81                | 81              | 80                    | 1467      | 1518           | 80        | 1467          | 1416      | 1416          | 1467      | 81                              | 81        | 1467                     |           |
| 16         | 84                | 83              | 82                    | 1465      | 1497           | 82        | 1465          | 1434      | 1434          | 1465      | 83                              | 83        | 1465                     |           |
| 17         | 87                | 86              | 84                    | 1454      | 1495           | 84        | 1454          | 1411      | 1411          | 1453      | 85                              | 85        | 1453                     |           |
| 18         | 90                | 89              | 87                    | 1427      | 1485           | 87        | 1427          | 1408      | 1408          | 1440      | 89                              | 89        | 1440                     |           |
| 19         | 95                | 94              | 90                    | 1444      | 1494           | 90        | 1444          | 1411      | 1411          | 1450      | 93                              | 93        | 1450                     |           |
| 20         | 100               | 99              | 94                    | 1451      | 1498           | 94        | 1451          | 1415      | 1415          | 1454      | 98                              | 98        | 1454                     |           |
| 21         | 106               | 106             | 100                   | 1460      | 1497           | 100       | 1460          | 1423      | 1423          | 1460      | 104                             | 104       | 1460                     |           |
| 22         | 112               | 112             | 105                   | 1481      | 1509           | 105       | 1481          | 1439      | 1439          | 1477      | 110                             | 110       | 1477                     |           |
| 23         | 119               | 119             | 111                   | 1486      | 1516           | 111       | 1486          | 1458      | 1458          | 1487      | 116                             | 116       | 1487                     |           |
| 24         | 125               | 126             | 117                   | 1504      | 1549           | 117       | 1504          | 1469      | 1469          | 1507      | 123                             | 123       | 1507                     |           |
| 25         | 132               | 133             | 124                   | 1509      | 1552           | 124       | 1509          | 1478      | 1478          | 1513      | 129                             | 129       | 1513                     |           |
| 26         | 138               | 140             | 130                   | 1524      | 1556           | 130       | 1524          | 1493      | 1493          | 1524      | 136                             | 136       | 1524                     |           |
| 27         | 145               | 147             | 137                   | 1536      | 1581           | 137       | 1536          | 1502      | 1502          | 1539      | 143                             | 143       | 1539                     |           |
| 28         | 151               | 153             | 143                   | 1542      | 1580           | 143       | 1542          | 1509      | 1509          | 1543      | 149                             | 149       | 1543                     |           |
| 29         | 157               | 159             | 149                   | 1555      | 1594           | 149       | 1555          | 1520      | 1520          | 1556      | 155                             | 155       | 1556                     |           |
| 30         | 163               | 165             | 155                   | 1561      | 1592           | 155       | 1561          | 1526      | 1526          | 1559      | 161                             | 161       | 1559                     |           |
| 31         | 168               | 171             | 161                   | 1577      | 1607           | 161       | 1577          | 1532      | 1532          | 1572      | 166                             | 166       | 1572                     |           |
| 32         | 174               | 177             | 166                   | 1578      | 1610           | 166       | 1578          | 1546      | 1546          | 1578      | 172                             | 172       | 1578                     |           |
| 33         | 179               | 182             | 172                   | 1586      | 1622           | 172       | 1586          | 1550      | 1550          | 1586      | 178                             | 178       | 1586                     |           |
| 34         | 184               | 188             | 177                   | 1593      | 1625           | 177       | 1593          | 1561      | 1561          | 1593      | 183                             | 183       | 1593                     |           |
| 35         | 189               | 192             | 183                   | 1592      | 1625           | 183       | 1592          | 1563      | 1563          | 1593      | 188                             | 188       | 1593                     |           |
| 36         | 194               | 196             | 188                   | 1615      | 1634           | 188       | 1615          | 1571      | 1571          | 1606      | 193                             | 193       | 1606                     |           |

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| Time (min) | Unexposed Side    |                 | Unexposed Side        |           | Unexposed Side |           | Furnace Temp.      |                    | Furnace Temp.      |                    | Avg. of Unexposed       |                            | Avg. of                    |                            |
|------------|-------------------|-----------------|-----------------------|-----------|----------------|-----------|--------------------|--------------------|--------------------|--------------------|-------------------------|----------------------------|----------------------------|----------------------------|
|            | Top Left (Deg. F) | Middle (Deg. F) | Bottom Right (Deg. F) | Channel 1 | Channel 2      | Channel 3 | (Deg. F) Channel 4 | (Deg. F) Channel 5 | (Deg. F) Channel 6 | (Deg. F) Channel 7 | Side (Deg. F) Channel 7 | Furnace (Deg. F) Channel 8 | Furnace (Deg. F) Channel 8 | Furnace (Deg. F) Channel 8 |
| 37         | 198               | 199             | 193                   | 1610      | 1643           | 1590      | 1610               | 1643               | 1590               | 197                | 1611                    | 1611                       | 1611                       |                            |
| 38         | 201               | 201             | 199                   | 1612      | 1636           | 1573      | 1612               | 1636               | 1573               | 200                | 1607                    | 1607                       | 1607                       |                            |
| 39         | 203               | 203             | 204                   | 1575      | 1589           | 1532      | 1575               | 1589               | 1532               | 203                | 1565                    | 1565                       | 1565                       |                            |
| 40         | 205               | 204             | 207                   | 1556      | 1585           | 1516      | 1556               | 1585               | 1516               | 206                | 1552                    | 1552                       | 1552                       |                            |
| 41         | 207               | 205             | 209                   | 1533      | 1561           | 1512      | 1533               | 1561               | 1512               | 207                | 1535                    | 1535                       | 1535                       |                            |
| 42         | 208               | 206             | 210                   | 1540      | 1569           | 1502      | 1540               | 1569               | 1502               | 208                | 1537                    | 1537                       | 1537                       |                            |
| 43         | 208               | 206             | 210                   | 1531      | 1573           | 1496      | 1531               | 1573               | 1496               | 208                | 1534                    | 1534                       | 1534                       |                            |
| 44         | 208               | 207             | 211                   | 1543      | 1585           | 1500      | 1543               | 1585               | 1500               | 209                | 1543                    | 1543                       | 1543                       |                            |
| 45         | 209               | 207             | 211                   | 1638      | 1673           | 1592      | 1638               | 1673               | 1592               | 209                | 1634                    | 1634                       | 1634                       |                            |
| 46         | 209               | 207             | 211                   | 1699      | 1729           | 1654      | 1699               | 1729               | 1654               | 209                | 1694                    | 1694                       | 1694                       |                            |
| 47         | 209               | 207             | 212                   | 1730      | 1756           | 1683      | 1730               | 1756               | 1683               | 209                | 1723                    | 1723                       | 1723                       |                            |
| 48         | 209               | 208             | 212                   | 1744      | 1779           | 1714      | 1744               | 1779               | 1714               | 209                | 1746                    | 1746                       | 1746                       |                            |
| 49         | 209               | 208             | 212                   | 1771      | 1802           | 1731      | 1771               | 1802               | 1731               | 210                | 1768                    | 1768                       | 1768                       |                            |
| 50         | 209               | 208             | 212                   | 1783      | 1815           | 1752      | 1783               | 1815               | 1752               | 210                | 1783                    | 1783                       | 1783                       |                            |
| 51         | 209               | 209             | 213                   | 1807      | 1837           | 1772      | 1807               | 1837               | 1772               | 210                | 1806                    | 1806                       | 1806                       |                            |
| 52         | 209               | 209             | 213                   | 1795      | 1825           | 1768      | 1795               | 1825               | 1768               | 210                | 1796                    | 1796                       | 1796                       |                            |
| 53         | 209               | 209             | 213                   | 1803      | 1831           | 1771      | 1803               | 1831               | 1771               | 210                | 1802                    | 1802                       | 1802                       |                            |
| 54         | 209               | 210             | 213                   | 1806      | 1822           | 1775      | 1806               | 1822               | 1775               | 211                | 1801                    | 1801                       | 1801                       |                            |
| 55         | 210               | 210             | 213                   | 1794      | 1821           | 1768      | 1794               | 1821               | 1768               | 211                | 1794                    | 1794                       | 1794                       |                            |
| 56         | 210               | 210             | 213                   | 1804      | 1819           | 1768      | 1804               | 1819               | 1768               | 211                | 1797                    | 1797                       | 1797                       |                            |
| 57         | 210               | 210             | 213                   | 1794      | 1829           | 1769      | 1794               | 1829               | 1769               | 211                | 1797                    | 1797                       | 1797                       |                            |
| 58         | 209               | 211             | 213                   | 1800      | 1831           | 1773      | 1800               | 1831               | 1773               | 211                | 1801                    | 1801                       | 1801                       |                            |
| 59         | 210               | 211             | 213                   | 1798      | 1824           | 1773      | 1798               | 1824               | 1773               | 211                | 1798                    | 1798                       | 1798                       |                            |
| 60         | 209               | 211             | 213                   | 1810      | 1826           | 1776      | 1810               | 1826               | 1776               | 211                | 1804                    | 1804                       | 1804                       |                            |
| 61         | 209               | 211             | 213                   | 1807      | 1830           | 1761      | 1807               | 1830               | 1761               | 211                | 1806                    | 1806                       | 1806                       |                            |
| 62         | 210               | 211             | 213                   | 1809      | 1823           | 1783      | 1809               | 1823               | 1783               | 211                | 1805                    | 1805                       | 1805                       |                            |
| 63         | 210               | 211             | 213                   | 1804      | 1834           | 1788      | 1804               | 1834               | 1788               | 211                | 1808                    | 1808                       | 1808                       |                            |
| 64         | 210               | 211             | 213                   | 1819      | 1834           | 1786      | 1819               | 1834               | 1786               | 211                | 1813                    | 1813                       | 1813                       |                            |
| 65         | 209               | 211             | 213                   | 1826      | 1846           | 1793      | 1826               | 1846               | 1793               | 211                | 1822                    | 1822                       | 1822                       |                            |
| 66         | 210               | 211             | 213                   | 1792      | 1794           | 1769      | 1792               | 1794               | 1769               | 211                | 1785                    | 1785                       | 1785                       |                            |
| 67         | 210               | 211             | 213                   | 1737      | 1749           | 1720      | 1737               | 1749               | 1720               | 211                | 1735                    | 1735                       | 1735                       |                            |
| 68         | 210               | 211             | 213                   | 1705      | 1731           | 1687      | 1705               | 1731               | 1687               | 211                | 1708                    | 1708                       | 1708                       |                            |
| 69         | 210               | 211             | 213                   | 1689      | 1693           | 1664      | 1689               | 1693               | 1664               | 211                | 1682                    | 1682                       | 1682                       |                            |
| 70         | 208               | 211             | 213                   | 1674      | 1698           | 1649      | 1674               | 1698               | 1649               | 211                | 1674                    | 1674                       | 1674                       |                            |
| 71         | 210               | 211             | 213                   | 1670      | 1689           | 1639      | 1670               | 1689               | 1639               | 211                | 1666                    | 1666                       | 1666                       |                            |
| 72         | 210               | 212             | 213                   | 1668      | 1671           | 1623      | 1668               | 1671               | 1623               | 211                | 1654                    | 1654                       | 1654                       |                            |
| 73         | 210               | 212             | 213                   | 1635      | 1656           | 1612      | 1635               | 1656               | 1612               | 211                | 1634                    | 1634                       | 1634                       |                            |

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| Time<br>(min) | Unexposed Side                 |                              | Unexposed Side                     |                       | Unexposed Side        |                       | Furnace Temp.         |                       | Furnace Temp.         |                        | Furnace Temp.          |                        | Avg. of Unexposed Side |                        | Avg. of Furnace        |                        |
|---------------|--------------------------------|------------------------------|------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|               | Top Left (Deg. F)<br>Channel 1 | Middle (Deg. F)<br>Channel 2 | Bottom Right (Deg. F)<br>Channel 3 | (Deg. F)<br>Channel 4 | (Deg. F)<br>Channel 5 | (Deg. F)<br>Channel 6 | (Deg. F)<br>Channel 7 | (Deg. F)<br>Channel 8 | (Deg. F)<br>Channel 9 | (Deg. F)<br>Channel 10 | (Deg. F)<br>Channel 11 | (Deg. F)<br>Channel 12 | (Deg. F)<br>Channel 13 | (Deg. F)<br>Channel 14 | (Deg. F)<br>Channel 15 | (Deg. F)<br>Channel 16 |
| 74            | 209                            | 211                          | 213                                | 1620                  | 1634                  | 1607                  | 1620                  | 1607                  | 1634                  | 1607                   | 1620                   | 211                    | 211                    | 1620                   | 1620                   | 1620                   |
| 75            | 210                            | 211                          | 213                                | 1621                  | 1655                  | 1600                  | 1621                  | 1600                  | 1655                  | 1600                   | 1621                   | 211                    | 211                    | 1625                   | 1625                   | 1625                   |
| 76            | 210                            | 211                          | 213                                | 1626                  | 1644                  | 1596                  | 1626                  | 1596                  | 1644                  | 1596                   | 1626                   | 211                    | 211                    | 1622                   | 1622                   | 1622                   |
| 77            | 210                            | 211                          | 213                                | 1621                  | 1644                  | 1594                  | 1621                  | 1594                  | 1644                  | 1594                   | 1621                   | 211                    | 211                    | 1619                   | 1619                   | 1619                   |
| 78            | 210                            | 211                          | 213                                | 1620                  | 1662                  | 1597                  | 1620                  | 1597                  | 1662                  | 1597                   | 1620                   | 211                    | 211                    | 1626                   | 1626                   | 1626                   |
| 79            | 210                            | 211                          | 212                                | 1662                  | 1702                  | 1637                  | 1662                  | 1637                  | 1702                  | 1637                   | 1662                   | 211                    | 211                    | 1667                   | 1667                   | 1667                   |
| 80            | 210                            | 211                          | 213                                | 1689                  | 1729                  | 1666                  | 1689                  | 1666                  | 1729                  | 1666                   | 1689                   | 211                    | 211                    | 1695                   | 1695                   | 1695                   |
| 81            | 209                            | 211                          | 213                                | 1706                  | 1740                  | 1687                  | 1706                  | 1687                  | 1740                  | 1687                   | 1706                   | 211                    | 211                    | 1711                   | 1711                   | 1711                   |
| 82            | 209                            | 211                          | 212                                | 1723                  | 1758                  | 1704                  | 1723                  | 1704                  | 1758                  | 1704                   | 1723                   | 211                    | 211                    | 1728                   | 1728                   | 1728                   |
| 83            | 209                            | 211                          | 213                                | 1743                  | 1765                  | 1718                  | 1743                  | 1718                  | 1765                  | 1718                   | 1743                   | 211                    | 211                    | 1741                   | 1741                   | 1741                   |
| 84            | 209                            | 211                          | 212                                | 1747                  | 1778                  | 1726                  | 1747                  | 1726                  | 1778                  | 1726                   | 1747                   | 210                    | 210                    | 1750                   | 1750                   | 1750                   |
| 85            | 208                            | 211                          | 212                                | 1758                  | 1783                  | 1733                  | 1758                  | 1733                  | 1783                  | 1733                   | 1758                   | 211                    | 211                    | 1758                   | 1758                   | 1758                   |
| 86            | 209                            | 210                          | 212                                | 1773                  | 1791                  | 1743                  | 1773                  | 1743                  | 1791                  | 1743                   | 1773                   | 211                    | 211                    | 1769                   | 1769                   | 1769                   |
| 87            | 208                            | 211                          | 212                                | 1769                  | 1798                  | 1751                  | 1769                  | 1751                  | 1798                  | 1751                   | 1769                   | 210                    | 210                    | 1772                   | 1772                   | 1772                   |
| 88            | 208                            | 210                          | 212                                | 1774                  | 1797                  | 1752                  | 1774                  | 1752                  | 1797                  | 1752                   | 1774                   | 210                    | 210                    | 1774                   | 1774                   | 1774                   |
| 89            | 208                            | 211                          | 212                                | 1781                  | 1802                  | 1757                  | 1781                  | 1757                  | 1802                  | 1757                   | 1781                   | 210                    | 210                    | 1780                   | 1780                   | 1780                   |
| 90            | 208                            | 210                          | 212                                | 1771                  | 1808                  | 1763                  | 1771                  | 1763                  | 1808                  | 1763                   | 1771                   | 210                    | 210                    | 1780                   | 1780                   | 1780                   |
| 91            | 208                            | 211                          | 212                                | 1784                  | 1806                  | 1768                  | 1784                  | 1768                  | 1806                  | 1768                   | 1784                   | 210                    | 210                    | 1786                   | 1786                   | 1786                   |
| 92            | 208                            | 211                          | 212                                | 1790                  | 1806                  | 1770                  | 1790                  | 1770                  | 1806                  | 1770                   | 1790                   | 210                    | 210                    | 1789                   | 1789                   | 1789                   |
| 93            | 208                            | 210                          | 212                                | 1803                  | 1815                  | 1773                  | 1803                  | 1773                  | 1815                  | 1773                   | 1803                   | 210                    | 210                    | 1797                   | 1797                   | 1797                   |
| 94            | 208                            | 210                          | 212                                | 1799                  | 1822                  | 1773                  | 1799                  | 1773                  | 1822                  | 1773                   | 1799                   | 210                    | 210                    | 1798                   | 1798                   | 1798                   |
| 95            | 208                            | 211                          | 212                                | 1796                  | 1829                  | 1779                  | 1796                  | 1779                  | 1829                  | 1779                   | 1796                   | 210                    | 210                    | 1801                   | 1801                   | 1801                   |
| 96            | 208                            | 211                          | 212                                | 1808                  | 1827                  | 1776                  | 1808                  | 1776                  | 1827                  | 1776                   | 1808                   | 210                    | 210                    | 1804                   | 1804                   | 1804                   |
| 97            | 208                            | 211                          | 212                                | 1808                  | 1837                  | 1784                  | 1808                  | 1784                  | 1837                  | 1784                   | 1808                   | 210                    | 210                    | 1810                   | 1810                   | 1810                   |
| 98            | 208                            | 211                          | 212                                | 1814                  | 1833                  | 1783                  | 1814                  | 1783                  | 1833                  | 1783                   | 1814                   | 210                    | 210                    | 1810                   | 1810                   | 1810                   |
| 99            | 208                            | 211                          | 212                                | 1815                  | 1830                  | 1790                  | 1815                  | 1790                  | 1830                  | 1790                   | 1815                   | 210                    | 210                    | 1812                   | 1812                   | 1812                   |
| 100           | 208                            | 210                          | 212                                | 1812                  | 1831                  | 1792                  | 1812                  | 1792                  | 1831                  | 1792                   | 1812                   | 210                    | 210                    | 1812                   | 1812                   | 1812                   |
| 101           | 208                            | 211                          | 212                                | 1815                  | 1834                  | 1791                  | 1815                  | 1791                  | 1834                  | 1791                   | 1815                   | 210                    | 210                    | 1813                   | 1813                   | 1813                   |
| 102           | 208                            | 211                          | 212                                | 1822                  | 1830                  | 1792                  | 1822                  | 1792                  | 1830                  | 1792                   | 1822                   | 210                    | 210                    | 1815                   | 1815                   | 1815                   |
| 103           | 208                            | 211                          | 212                                | 1814                  | 1843                  | 1799                  | 1814                  | 1799                  | 1843                  | 1799                   | 1814                   | 210                    | 210                    | 1819                   | 1819                   | 1819                   |
| 104           | 208                            | 210                          | 212                                | 1824                  | 1842                  | 1802                  | 1824                  | 1802                  | 1842                  | 1802                   | 1824                   | 210                    | 210                    | 1823                   | 1823                   | 1823                   |
| 105           | 208                            | 210                          | 212                                | 1824                  | 1855                  | 1813                  | 1824                  | 1813                  | 1855                  | 1813                   | 1824                   | 210                    | 210                    | 1831                   | 1831                   | 1831                   |
| 106           | 208                            | 211                          | 212                                | 1847                  | 1866                  | 1823                  | 1847                  | 1823                  | 1866                  | 1823                   | 1847                   | 210                    | 210                    | 1845                   | 1845                   | 1845                   |
| 107           | 207                            | 211                          | 212                                | 1853                  | 1877                  | 1828                  | 1853                  | 1828                  | 1877                  | 1828                   | 1853                   | 210                    | 210                    | 1853                   | 1853                   | 1853                   |
| 108           | 207                            | 211                          | 212                                | 1863                  | 1878                  | 1834                  | 1863                  | 1834                  | 1878                  | 1834                   | 1863                   | 210                    | 210                    | 1858                   | 1858                   | 1858                   |
| 109           | 207                            | 211                          | 212                                | 1870                  | 1885                  | 1843                  | 1870                  | 1843                  | 1885                  | 1843                   | 1870                   | 210                    | 210                    | 1866                   | 1866                   | 1866                   |
| 110           | 207                            | 211                          | 212                                | 1865                  | 1881                  | 1844                  | 1865                  | 1844                  | 1881                  | 1844                   | 1865                   | 210                    | 210                    | 1866                   | 1866                   | 1866                   |

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| Time<br>(min) | VTEC #100-2677-1  |                 |                       |                | GRANCRETE INC.         |                        |                        |               | MOD. ASTM E119    |                  |           |  |
|---------------|-------------------|-----------------|-----------------------|----------------|------------------------|------------------------|------------------------|---------------|-------------------|------------------|-----------|--|
|               | Unexposed Side    |                 | Unexposed Side        |                | Unexposed Side         |                        | Unexposed Side         |               | Avg. of Unexposed |                  | Avg. of   |  |
|               | Top Left (Deg. F) | Middle (Deg. F) | Bottom Right (Deg. F) | Unexposed Side | Furnace Temp. (Deg. F) | Furnace Temp. (Deg. F) | Furnace Temp. (Deg. F) | Side (Deg. F) | Channel 7         | Furnace (Deg. F) | Channel 8 |  |
|               | Channel 1         | Channel 2       | Channel 3             | Channel 3      | Channel 4              | Channel 5              | Channel 5              | Channel 6     | Channel 7         | Channel 8        | Channel 8 |  |
| 111           | 207               | 210             | 211                   | 211            | 1871                   | 1867                   | 1850                   | 1850          | 210               | 1867             | 1869      |  |
| 112           | 207               | 210             | 212                   | 212            | 1867                   | 1867                   | 1849                   | 1849          | 210               | 1867             | 1868      |  |
| 113           | 207               | 211             | 212                   | 212            | 1856                   | 1862                   | 1841                   | 1841          | 210               | 1860             | 1860      |  |
| 114           | 207               | 211             | 212                   | 212            | 1854                   | 1862                   | 1840                   | 1840          | 210               | 1858             | 1858      |  |
| 115           | 207               | 211             | 212                   | 212            | 1867                   | 1874                   | 1839                   | 1839          | 210               | 1860             | 1860      |  |
| 116           | 207               | 211             | 212                   | 212            | 1860                   | 1879                   | 1836                   | 1836          | 210               | 1858             | 1858      |  |
| 117           | 207               | 211             | 212                   | 212            | 1860                   | 1868                   | 1840                   | 1840          | 210               | 1856             | 1856      |  |
| 118           | 207               | 211             | 212                   | 212            | 1858                   | 1873                   | 1835                   | 1835          | 210               | 1856             | 1856      |  |
| 119           | 207               | 211             | 212                   | 212            | 1857                   | 1874                   | 1839                   | 1839          | 210               | 1857             | 1857      |  |
| 120           | 207               | 211             | 211                   | 211            | 1859                   | 1875                   | 1841                   | 1841          | 210               | 1858             | 1858      |  |
| 121           | 207               | 211             | 212                   | 212            | 1861                   | 1873                   | 1837                   | 1837          | 210               | 1857             | 1857      |  |
| 122           | 206               | 211             | 211                   | 211            | 1865                   | 1875                   | 1838                   | 1838          | 210               | 1860             | 1860      |  |
| 123           | 207               | 211             | 212                   | 212            | 1863                   | 1879                   | 1842                   | 1842          | 210               | 1861             | 1861      |  |
| 124           | 206               | 211             | 212                   | 212            | 1860                   | 1877                   | 1843                   | 1843          | 210               | 1860             | 1860      |  |
| 125           | 206               | 211             | 212                   | 212            | 1856                   | 1880                   | 1840                   | 1840          | 209               | 1859             | 1859      |  |
| 126           | 206               | 211             | 212                   | 212            | 1861                   | 1875                   | 1839                   | 1839          | 210               | 1858             | 1858      |  |
| 127           | 206               | 211             | 212                   | 212            | 1857                   | 1879                   | 1840                   | 1840          | 210               | 1858             | 1858      |  |
| 128           | 206               | 211             | 212                   | 212            | 1855                   | 1874                   | 1841                   | 1841          | 209               | 1857             | 1857      |  |
| 129           | 206               | 211             | 212                   | 212            | 1861                   | 1875                   | 1842                   | 1842          | 210               | 1859             | 1859      |  |
| 130           | 206               | 211             | 212                   | 212            | 1860                   | 1887                   | 1844                   | 1844          | 210               | 1864             | 1864      |  |
| 131           | 206               | 211             | 212                   | 212            | 1849                   | 1876                   | 1845                   | 1845          | 210               | 1857             | 1857      |  |
| 132           | 207               | 212             | 212                   | 212            | 1862                   | 1877                   | 1846                   | 1846          | 210               | 1862             | 1862      |  |
| 133           | 207               | 212             | 212                   | 212            | 1856                   | 1875                   | 1847                   | 1847          | 211               | 1859             | 1859      |  |
| 134           | 208               | 213             | 212                   | 212            | 1871                   | 1883                   | 1843                   | 1843          | 211               | 1866             | 1866      |  |
| 135           | 210               | 214             | 212                   | 212            | 1871                   | 1886                   | 1845                   | 1845          | 212               | 1867             | 1867      |  |
| 136           | 212               | 214             | 212                   | 212            | 1867                   | 1883                   | 1846                   | 1846          | 213               | 1865             | 1865      |  |
| 137           | 215               | 216             | 213                   | 213            | 1872                   | 1884                   | 1847                   | 1847          | 214               | 1868             | 1868      |  |
| 138           | 218               | 218             | 213                   | 213            | 1872                   | 1886                   | 1848                   | 1848          | 216               | 1869             | 1869      |  |
| 139           | 222               | 221             | 213                   | 213            | 1873                   | 1893                   | 1850                   | 1850          | 219               | 1872             | 1872      |  |
| 140           | 226               | 225             | 214                   | 214            | 1855                   | 1884                   | 1849                   | 1849          | 221               | 1866             | 1866      |  |
| 141           | 230               | 229             | 215                   | 215            | 1855                   | 1909                   | 1864                   | 1864          | 224               | 1886             | 1886      |  |
| 142           | 234               | 232             | 216                   | 216            | 1901                   | 1912                   | 1868                   | 1868          | 227               | 1894             | 1894      |  |
| 143           | 238               | 236             | 217                   | 217            | 1900                   | 1913                   | 1881                   | 1881          | 230               | 1898             | 1898      |  |
| 144           | 242               | 239             | 217                   | 217            | 1913                   | 1923                   | 1886                   | 1886          | 233               | 1907             | 1907      |  |
| 145           | 247               | 243             | 219                   | 219            | 1904                   | 1930                   | 1889                   | 1889          | 236               | 1907             | 1907      |  |
| 146           | 251               | 248             | 222                   | 222            | 1916                   | 1929                   | 1897                   | 1897          | 240               | 1914             | 1914      |  |
| 147           | 255               | 252             | 224                   | 224            | 1901                   | 1923                   | 1889                   | 1889          | 243               | 1904             | 1904      |  |

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| Time<br>(min) | VTEC #100-2677-f                                 |  |  |  | GRANCRETE INC.                         |  |   |  | MOD. ASTM E119                                   |  |  |  |  |  |   |  |
|---------------|--|--|--|--|--|--|---|--|--|--|--|--|--|--|---|--|
|               | Unexposed Side<br>Top Left (Deg. F)<br>Channel 1 | Unexposed Side<br>Middle (Deg. F)<br>Channel 2 | Unexposed Side<br>Bottom Right (Deg. F)<br>Channel 3 | Furnace Temp.<br>(Deg. F)<br>Channel 4 | Furnace Temp.<br>(Deg. F)<br>Channel 5 | Furnace Temp.<br>(Deg. F)<br>Channel 6 | Avg. of Unexposed<br>Side (Deg. F)<br>Channel 7 | Avg. of<br>Furnace (Deg. F)<br>Channel 8 | Unexposed Side<br>Top Left (Deg. F)<br>Channel 1 | Unexposed Side<br>Middle (Deg. F)<br>Channel 2 | Unexposed Side<br>Bottom Right (Deg. F)<br>Channel 3 | Furnace Temp.<br>(Deg. F)<br>Channel 4 | Furnace Temp.<br>(Deg. F)<br>Channel 5 | Furnace Temp.<br>(Deg. F)<br>Channel 6 | Avg. of Unexposed<br>Side (Deg. F)<br>Channel 7 | Avg. of<br>Furnace (Deg. F)<br>Channel 8 |
| 148           | 260  | 256  | 226  | 1897                                   | 1923                                   | 1884                                   | 247   | 1902                                     | 1897   | 1923   | 1884   | 247                                    | 1902                                   | 1884                                   | 247   | 1902                                     |
| 149           | 264  | 260  | 229  | 1899                                   | 1915                                   | 1881                                   | 251   | 1898                                     | 1899   | 1915   | 1881   | 251                                    | 1898                                   | 1881                                   | 251   | 1898                                     |
| 150           | 269  | 265  | 233  | 1904                                   | 1916                                   | 1881                                   | 255   | 1900                                     | 1904   | 1916   | 1881   | 255                                    | 1900                                   | 1881                                   | 255   | 1900                                     |
| 151           | 275  | 269  | 236  | 1889                                   | 1906                                   | 1879                                   | 260   | 1891                                     | 1889   | 1906   | 1879   | 260                                    | 1891                                   | 1879                                   | 260   | 1891                                     |
| 152           | 279  | 273  | 241  | 1898                                   | 1913                                   | 1879                                   | 265   | 1897                                     | 1898   | 1913   | 1879   | 265                                    | 1897                                   | 1879                                   | 265   | 1897                                     |
| 153           | 285  | 278  | 245  | 1903                                   | 1914                                   | 1874                                   | 270   | 1897                                     | 1903   | 1914   | 1874   | 270                                    | 1897                                   | 1874                                   | 270   | 1897                                     |
| 154           | 290  | 283  | 251  | 1895                                   | 1915                                   | 1877                                   | 275   | 1896                                     | 1895   | 1915   | 1877   | 275                                    | 1896                                   | 1877                                   | 275   | 1896                                     |
| 155           | 296  | 288  | 255  | 1902                                   | 1903                                   | 1871                                   | 280   | 1892                                     | 1902   | 1903   | 1871   | 280                                    | 1892                                   | 1871                                   | 280   | 1892                                     |
| 156           | 302  | 293  | 261  | 1893                                   | 1915                                   | 1877                                   | 285   | 1895                                     | 1893   | 1915   | 1877   | 285                                    | 1895                                   | 1877                                   | 285   | 1895                                     |
| 157           | 307  | 297  | 266  | 1898                                   | 1914                                   | 1874                                   | 290   | 1895                                     | 1898   | 1914   | 1874   | 290                                    | 1895                                   | 1874                                   | 290   | 1895                                     |
| 158           | 314  | 302  | 271  | 1890                                   | 1911                                   | 1876                                   | 295   | 1892                                     | 1890   | 1911   | 1876   | 295                                    | 1892                                   | 1876                                   | 295   | 1892                                     |
| 159           | 319  | 307  | 276  | 1902                                   | 1904                                   | 1860                                   | 301   | 1895                                     | 1902   | 1904   | 1860   | 301                                    | 1895                                   | 1860                                   | 301   | 1895                                     |
| 160           | 325  | 312  | 281  | 1896                                   | 1908                                   | 1879                                   | 306   | 1894                                     | 1896   | 1908   | 1879   | 306                                    | 1894                                   | 1879                                   | 306   | 1894                                     |
| 161           | 331  | 317  | 287  | 1893                                   | 1921                                   | 1881                                   | 312   | 1898                                     | 1893   | 1921   | 1881   | 312                                    | 1898                                   | 1881                                   | 312   | 1898                                     |
| 162           | 337  | 322  | 292  | 1900                                   | 1917                                   | 1880                                   | 317   | 1899                                     | 1900   | 1917   | 1880   | 317                                    | 1899                                   | 1880                                   | 317   | 1899                                     |
| 163           | 344  | 328  | 298  | 1894                                   | 1920                                   | 1882                                   | 323   | 1899                                     | 1894   | 1920   | 1882   | 323                                    | 1899                                   | 1882                                   | 323   | 1899                                     |
| 164           | 350  | 333  | 304  | 1893                                   | 1916                                   | 1881                                   | 329   | 1897                                     | 1893   | 1916   | 1881   | 329                                    | 1897                                   | 1881                                   | 329   | 1897                                     |
| 165           | 357  | 339  | 310  | 1894                                   | 1914                                   | 1883                                   | 335   | 1897                                     | 1894   | 1914   | 1883   | 335                                    | 1897                                   | 1883                                   | 335   | 1897                                     |
| 166           | 363  | 344  | 316  | 1897                                   | 1918                                   | 1885                                   | 341   | 1900                                     | 1897   | 1918   | 1885   | 341                                    | 1900                                   | 1885                                   | 341   | 1900                                     |
| 167           | 369  | 350  | 321  | 1905                                   | 1920                                   | 1884                                   | 347   | 1903                                     | 1905   | 1920   | 1884   | 347                                    | 1903                                   | 1884                                   | 347   | 1903                                     |
| 168           | 375  | 356  | 328  | 1906                                   | 1924                                   | 1884                                   | 353   | 1905                                     | 1906   | 1924   | 1884   | 353                                    | 1905                                   | 1884                                   | 353   | 1905                                     |
| 169           | 382  | 362  | 334  | 1909                                   | 1921                                   | 1887                                   | 359   | 1905                                     | 1909   | 1921   | 1887   | 359                                    | 1905                                   | 1887                                   | 359   | 1905                                     |
| 170           | 387  | 368  | 339  | 1913                                   | 1928                                   | 1891                                   | 365   | 1911                                     | 1913   | 1928   | 1891   | 365                                    | 1911                                   | 1891                                   | 365   | 1911                                     |
| 171           | 393  | 373  | 345  | 1927                                   | 1926                                   | 1893                                   | 370   | 1915                                     | 1927   | 1926   | 1893   | 370                                    | 1915                                   | 1893                                   | 370   | 1915                                     |
| 172           | 399  | 379  | 351  | 1916                                   | 1936                                   | 1897                                   | 376   | 1916                                     | 1916   | 1936   | 1897   | 376                                    | 1916                                   | 1897                                   | 376   | 1916                                     |
| 173           | 404  | 384  | 356  | 1916                                   | 1936                                   | 1901                                   | 381   | 1918                                     | 1916   | 1936   | 1901   | 381                                    | 1918                                   | 1901                                   | 381   | 1918                                     |
| 174           | 410  | 389  | 361  | 1921                                   | 1936                                   | 1902                                   | 387   | 1920                                     | 1921   | 1936   | 1902   | 387                                    | 1920                                   | 1902                                   | 387   | 1920                                     |
| 175           | 415  | 395  | 367  | 1919                                   | 1941                                   | 1905                                   | 392   | 1922                                     | 1919   | 1941   | 1905   | 392                                    | 1922                                   | 1905                                   | 392   | 1922                                     |
| 176           | 421  | 401  | 373  | 1918                                   | 1947                                   | 1909                                   | 398   | 1924                                     | 1918   | 1947   | 1909   | 398                                    | 1924                                   | 1909                                   | 398   | 1924                                     |
| 177           | 426  | 406  | 378  | 1927                                   | 1939                                   | 1908                                   | 404   | 1925                                     | 1927   | 1939   | 1908   | 404                                    | 1925                                   | 1908                                   | 404   | 1925                                     |
| 178           | 432  | 412  | 384  | 1929                                   | 1947                                   | 1908                                   | 409   | 1928                                     | 1929   | 1947   | 1908   | 409                                    | 1928                                   | 1908                                   | 409   | 1928                                     |
| 179           | 437  | 417  | 390  | 1926                                   | 1942                                   | 1909                                   | 415   | 1926                                     | 1926   | 1942   | 1909   | 415                                    | 1926                                   | 1909                                   | 415   | 1926                                     |
| 180           | 442  | 422  | 396  | 1925                                   | 1920                                   | 1902                                   | 420   | 1916                                     | 1925   | 1920   | 1902   | 420                                    | 1916                                   | 1902                                   | 420   | 1916                                     |
| 181           | 448  | 428  | 402  | 1900                                   | 1899                                   | 1883                                   | 426   | 1894                                     | 1900   | 1899   | 1883   | 426                                    | 1894                                   | 1883                                   | 426   | 1894                                     |
| 182           | 453  | 434  | 407  | 1888                                   | 1894                                   | 1881                                   | 431   | 1887                                     | 1888   | 1894   | 1881   | 431                                    | 1887                                   | 1881                                   | 431   | 1887                                     |
| 183           | 458  | 439  | 413  | 1888                                   | 1889                                   | 1881                                   | 437   | 1886                                     | 1888   | 1889   | 1881   | 437                                    | 1886                                   | 1881                                   | 437   | 1886                                     |
| 184           | 463  | 444  | 419  | 1882                                   | 1887                                   | 1879                                   | 442   | 1883                                     | 1882   | 1887   | 1879   | 442                                    | 1883                                   | 1879                                   | 442   | 1883                                     |

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MOD. ASTM E119

GRANDCRETE INC.

VTEC #100-2677-1

| Time (min) | Unexposed Side    |           | Unexposed Side  |           | Furnace Temp.         |           | Furnace Temp. |           | Avg. of Unexposed Side (Deg. F) |           | Avg. of Furnace (Deg. F) |           |           |
|------------|-------------------|-----------|-----------------|-----------|-----------------------|-----------|---------------|-----------|---------------------------------|-----------|--------------------------|-----------|-----------|
|            | Top Left (Deg. F) | Channel 1 | Middle (Deg. F) | Channel 2 | Bottom Right (Deg. F) | Channel 3 | (Deg. F)      | Channel 4 | (Deg. F)                        | Channel 5 | Channel 6                | Channel 7 | Channel 8 |
| 185        | 468               | 450       | 456             | 425       | 1875                  | 1889      | 1879          | 1873      | 447                             | 1881      | 1882                     | 1881      | 1881      |
| 186        | 474               | 456       | 431             | 431       | 1882                  | 1892      | 1873          | 1873      | 453                             | 1882      | 1882                     | 1882      | 1882      |
| 187        | 479               | 462       | 437             | 437       | 1881                  | 1894      | 1882          | 1882      | 459                             | 1886      | 1882                     | 1882      | 1886      |
| 188        | 485               | 468       | 444             | 444       | 1888                  | 1902      | 1891          | 1891      | 465                             | 1893      | 1891                     | 1891      | 1893      |
| 189        | 490               | 473       | 450             | 450       | 1902                  | 1928      | 1905          | 1905      | 471                             | 1911      | 1905                     | 1905      | 1911      |
| 190        | 495               | 479       | 455             | 455       | 1952                  | 1954      | 1940          | 1940      | 476                             | 1949      | 1940                     | 1940      | 1949      |