



Designation: C1244-05a<sup>ε1</sup> Designation: C1244 – 11

## Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill<sup>1</sup>

This standard is issued under the fixed designation C1244; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

<sup>ε1</sup>Note—Table 1 was reformatted editorially in February 2006.

### 1. Scope

1.1 This test method covers procedures for testing precast concrete manhole sections when using the vacuum test method to demonstrate the integrity of the installed materials and the construction procedures. This test method is used for testing concrete manhole sections utilizing mortar, mastic, or gasketed joints.

1.2 This test method is intended to be used as a preliminary test to enable the installer to demonstrate the condition of the concrete manholes prior to backfill.

1.3 This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

1.4 This test method is the companion to metric Test Method C1244M; therefore, no SI equivalents are shown in this test method.

1.2 This test method is intended to be used as a preliminary test to enable the installer to demonstrate the condition of the concrete manholes prior to backfill. Users are hereby cautioned that misuse or misapplication of the test criteria contained herein can cause permanent damage to the system being tested.

NOTE 1—Vacuum test criteria presented in this test method are similar to those in general use. The test and criteria have been widely and successfully used in testing manholes.

NOTE 2—The user of this test method is advised that no correlation has been found between vacuum (air) and hydrostatic tests.

1.3 This test method is the companion to metric Test Method C1244M; therefore, no SI equivalents are shown in this test method.

1.4 This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

### 2. Referenced Documents

2.1 ASTM Standards:<sup>2</sup>

C822 Terminology Relating to Concrete Pipe and Related Products

C924 Practice for Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method

C969 Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines

C1244M Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill (Metric)

### 3. Terminology

3.1 For definitions of terms relating to manholes, see Terminology C822.

### 4. Summary of Practice

4.1 All lift holes and any pipes entering the manhole are to be plugged. A vacuum will be drawn and the vacuum drop over a specified time period is used to determine the acceptability of the manhole.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee C13 on Concrete Pipe and is the direct responsibility of Subcommittee C13.06 on Manholes and Specials. Current edition approved Oct. 1, 2005-2011. Published November 2005-2011. Originally approved in 1993. Last previous edition approved in 2005 as C1244-05a<sup>ε1</sup>. DOI: 10.1520/C1244-05AEOH-10.1520/C1244-11.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

**TABLE 1 Minimum Test Times for Various Manhole Diameters  
(30 – 120 in.) in Seconds**

| Depth (ft) | Diameter, in.    |    |    |    |    |    |    |     |     |
|------------|------------------|----|----|----|----|----|----|-----|-----|
|            | 30               | 33 | 36 | 42 | 48 | 54 | 60 | 66  | 72  |
|            | Time, in seconds |    |    |    |    |    |    |     |     |
| <4         | 6                | 7  | 7  | 9  | 10 | 12 | 13 | 15  | 16  |
| 6          | 9                | 10 | 11 | 13 | 15 | 18 | 20 | 22  | 25  |
| 8          | 11               | 12 | 14 | 17 | 20 | 23 | 26 | 29  | 33  |
| 10         | 14               | 15 | 18 | 21 | 25 | 29 | 33 | 36  | 41  |
| 12         | 17               | 18 | 21 | 25 | 30 | 35 | 39 | 43  | 49  |
| 14         | 20               | 21 | 25 | 30 | 35 | 41 | 46 | 51  | 57  |
| 16         | 22               | 24 | 29 | 34 | 40 | 46 | 52 | 58  | 67  |
| 18         | 25               | 27 | 32 | 38 | 45 | 52 | 59 | 65  | 73  |
| 20         | 28               | 30 | 35 | 42 | 50 | 53 | 65 | 72  | 81  |
| 22         | 31               | 33 | 39 | 46 | 55 | 64 | 72 | 79  | 89  |
| 24         | 33               | 36 | 42 | 51 | 59 | 64 | 78 | 87  | 97  |
| 26         | 36               | 39 | 46 | 55 | 64 | 75 | 85 | 94  | 105 |
| 28         | 39               | 42 | 49 | 59 | 69 | 81 | 91 | 101 | 113 |
| 30         | 42               | 45 | 53 | 63 | 74 | 87 | 98 | 108 | 121 |

## 5. Significance and Use

5.1 This is not a routine test. The values recorded are applicable only to the manhole being tested and at the time of testing.

## 6. Preparation of the Manhole

6.1 All lift holes shall be plugged.

6.2 All pipes entering the manhole shall be temporarily plugged, taking care to securely brace the pipes and plugs to prevent them from being drawn into the manhole.

## 7. Procedure

7.1 The test head shall be placed at the top of the manhole in accordance with the manufacturer's recommendations.

7.2 A vacuum of 10 in. Hg shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop to 9 in. Hg.

7.3 The manhole is acceptable if the time for the vacuum reading to drop from 10 in. Hg to 9 in. Hg meets or exceeds the values indicated in Table 1.

**TABLE 1 Minimum Test Times for Various Manhole Diameters  
(30 – 120 in.) in Seconds (continued)**

| Depth (ft) | Diameter, in.    |     |     |     |     |     |     |     |  |
|------------|------------------|-----|-----|-----|-----|-----|-----|-----|--|
|            | 78               | 84  | 90  | 96  | 102 | 108 | 114 | 120 |  |
|            | Time, in seconds |     |     |     |     |     |     |     |  |
| <4         | 18               | 19  | 21  | 23  | 24  | 25  | 27  | 29  |  |
| 6          | 26               | 29  | 31  | 34  | 36  | 38  | 41  | 43  |  |
| 8          | 35               | 38  | 41  | 45  | 48  | 51  | 54  | 57  |  |
| 10         | 44               | 48  | 52  | 56  | 60  | 63  | 67  | 71  |  |
| 12         | 53               | 57  | 62  | 67  | 71  | 76  | 81  | 85  |  |
| 14         | 62               | 67  | 72  | 78  | 83  | 89  | 94  | 100 |  |
| 16         | 70               | 76  | 83  | 89  | 95  | 101 | 108 | 114 |  |
| 18         | 79               | 86  | 93  | 100 | 107 | 114 | 121 | 128 |  |
| 20         | 88               | 95  | 103 | 111 | 119 | 126 | 135 | 142 |  |
| 22         | 97               | 105 | 114 | 122 | 131 | 139 | 148 | 156 |  |
| 24         | 106              | 114 | 124 | 133 | 143 | 152 | 161 | 170 |  |
| 26         | 114              | 124 | 134 | 144 | 155 | 164 | 175 | 185 |  |
| 28         | 123              | 133 | 145 | 155 | 167 | 177 | 188 | 199 |  |
| 30         | 132              | 143 | 155 | 166 | 178 | 189 | 202 | 213 |  |

7.4 If the manhole fails the initial test, the manhole shall be repaired by an approved method until a satisfactory test is obtained.

7.5 Use or failure of this vacuum test shall not preclude acceptance by appropriate water infiltration or exfiltration testing, (see Practice C969), or other means.

## 8. Precision and Bias

8.1 No justifiable statement is presently capable of being made either on the precision or bias of this procedure, since the test result merely states whether there is conformance to the criteria for the success specified.