Designation: C828 − 11 (Reapproved 2021)

[redacted]

TABLE 1 Minimum Test Time for Various Pipe Sizes

Nominal Pipe Size, in. (mm)	*T* (time), min/100 ft (min/100 m)
48 (1220)	8.5
4 (100)	0.3 (0.98)
6 (150)	0.7 (2.3)
8 (205)	1.2 (3.9)
10 (255)	1.5 (4.9)
12 (305)	1.8 (5.9)
15 (380)	2.1 (6.9)
18 (455)	2.4 (7.9)
21 (535)	3.0 (9.8)
24 (610)	3.6 (11.8)
27 (685)	4.2 (13.8)
30 (760)	4.8 (15.7)
33 (840)	5.4 (17.7)
36 (915)	6.0 (19.7)
39 (990)	6.6 (21.6)
42 (1065)	7.3 (23.9)

consistent test results. Usually moisture absorbed from the backfill is sufficient to cope with this situation. Where practical, clean the line prior to testing to wet the pipe surface and eliminate debris.

6. Procedure

6.1 Determine the test time for the section of line to be tested using Table 1 or Table X1.1 or the formulas in Appendix X1.

6.2 Plug all openings in the test section.

6.3 Add air until the internal pressure of the line is raised to approximately 4.0 psi (28 kPa). After this pressure is reached, allow the pressure to stabilize. The pressure will normally drop as the air temperature stabilizes. This usually takes 2 to 5 min, depending on the pipe size. The pressure should be reduced to 3.5 psi (24 kPa) before starting the test.

6.4 Start the test when the pressure is at 3.5 psi (24 kPa). If a 1 psi (6.9 kPa) drop does not occur within the test time, the line has passed. If the pressure drop is more than 1 psi (6.9 kPa) during the test time, the line is presumed to have failed the test. If the line fails the test, segmental testing may be utilized solely to determine the location of leaks, if any, but not for the acceptance test as required by this section. (see X2.3.3.2.)

NOTE 1—Ground water above the pipe will reduce air loss. If the section of line under test shows significant infiltration, the agency may require an infiltration test. Refer to Test Method C1091.

7. Test Time

7.1 Table 1 shows the required test time, *T*, in minutes/100 ft of pipe for each nominal pipe size. Test times are for a 1.0-psi (6.9-kPa) pressure drop from 3.5 to 2.5 psi (24 to 17 kPa). Table 1 has been established using the formulas contained in the appendix.

7.2 If the section of line to be tested includes more than one pipe size, calculate the test time for each size and add the test times to arrive at the total test time for the section.

7.3 It is not necessary to hold the test for the whole period when it is clearly evident that the rate of air loss is less than the allowable.

8. Precision and Bias

8.1 No information is presented about either precision or bias of this test since the results are not reported in a quantitative fashion.

9. Keywords

9.1 air test; clay pipe; pipe; pressure test; sewers; testing; test section; vitrified clay pipe

APPENDIXES

(Nonmandatory Information)

X1. FORMULAS AND ALLOWABLE AIR LOSS STANDARDS USED IN TEST METHOD C828

X1.1 Calculate the required test time at a given allowable air loss as follows:

$$T = K \times \frac{D^2 L}{Q}$$

X1.2 Calculate air loss with a timed pressure drop as follows:

$$Q = K \times \frac{D^2 L}{T}$$

X1.3 *Symbols* :

D = nominal size, in. (mm),
K = 0.371×10^{-3} for inch-pound units,
K = 0.534×10^{-7} for S.I. units,
L = length of line of one pipe size, ft (m),
Q = air loss, ft^3/min (m^3/min), and
T = time for pressure to drop 1.0 psi (6.9 kPa), min.

X1.4 An appropriate allowable air loss, Q, in cubic feet per minute, has been established for each nominal pipe size. Based on field experience, the Q's that have been selected will enable detection of any significant leak. Table X1.1 lists the Q established for each pipe size.

TABLE X1.1 Allowable Air Loss for Various Pipe Sizes

Nominal, Pipe Size, in. (mm)	Q, ft^3/min (m^3/min)
48 (1220)	10.0
4 (100)	2.0 (0.06)
6 (150)	2.0 (0.06)
8 (205)	2.0 (0.06)
10 (255)	2.5 (0.07)
12 (305)	3.0 (0.08)
15 (380)	4.0 (0.11)
18 (455)	5.0 (0.14)
21 (535)	5.5 (0.16)
24 (610)	6.0 (0.17)
27 (685)	6.5 (0.18)
30 (760)	7.0 (0.20)
33 (840)	7.5 (0.21)
36 (915)	8.0 (0.23)
39 (990)	8.5 (0.24)
42 (1065)	9.0 (0.26)

X2. APPLICATION OF TEST METHOD C828

X2.1 In order to demonstrate the technique of applying this test method, the example in X2.2 has been prepared. It utilizes various pipe sizes, lengths, and conditions that may be encountered in the field. The example has been designed to illustrate the use of Table 1 and the formulas.

X2.2 *Example* —An installation has been made that consists of line 1: 300 ft (92 m) of 15-in. (380-mm) vitrified clay pipe with no laterals, and line 2: a reach of 350 ft (105 m) of 8-in. (205-mm) of vitrified clay pipe to which are attached 120 ft (37 m) of 4 in. (100-mm) laterals of vitrified clay pipe.

X2.2.1 *Problem*—What are the appropriate test times to use in order to demonstrate the integrity of the installed lines?

X2.3 *Solutions* :

X2.3.1 What is the appropriate test time, *T*, for line 1?

X2.3.1.1 Use Table 1, find time, $T = 2.1$ min/100 ft (31 m), for 15-in. (380-mm) pipe.

$$T_{15} = 300 \times \frac{2.1}{100} = 6.3\text{min}$$

X2.3.2 What is appropriate time for line 2?

X2.3.2.1 *Solution*—Use Table 1.

$$T_8 = 350 \times \frac{1.2}{100} = 4.2\text{min}$$

$$T_4 = 120 \times \frac{0.3}{100} = 0.4\text{min}$$

Total test time 4.6min

X2.3.3 If further analysis is desired, the following example is provided:

X2.3.3.1 If in the test of line 1, the 1.0-psi (6.9-kPa) pressure drop occurs in 3.3 min instead of 6.3 min, what is the rate of air loss?

$$Q = K \times \frac{D^2 L}{T}$$

where:

$$Q = 0.000371 \times \frac{15^2 \times 300}{3.3} = 7.6 \text{ ft}^3/\text{min.}$$

This exceeds the 4 ft^3/min allowed in Table X1.1.

X2.3.3.2 What further courses of action might be considered in resolving this excess rate of air loss?

(1) Segmentally test the line and compare the time-air loss values in each segment.

(2) If the values in each segment are comparable, the air-loss problem may be distributed throughout the line, and further analysis should be made.

(3) If the values in each segment are significantly different, each segment may be evaluated and further analysis be made in order to determine the location of any significant air losses.