

# Post Installation Inspection

It's in the owner's best interest to know that their pipeline system has been properly installed and that units of pipe have not been damaged in a way that threatens the structure of the system or shorten the service life. Post Installation Inspection provides proof of proper installation and structural integrity prior to final acceptance.



0.01-Inch Crack Measured in a 36-Inch, Class IV Pipe.  
Pictures 1, 2, and 3 shown as if viewing the crack standing, kneeling, or through a video inspection, respectively.

**Post Installation  
Evaluation and Repair  
of Installed Reinforced Concrete Pipe**

---



---

American Concrete Pipe Association  
www.concrete-pipe.org  
www.concrete-pipe.org

**cpinfo** American Concrete Pipe Association

**Cracks in Installed Reinforced Concrete Pipe**

"Some engineers insist that a crack in a concrete pipe in excess of 0.01-inch represents a failure or partial failure situation. Such a conclusion is utterly ridiculous and represents a disservice, not only to the concrete pipe industry, but taxpayers as well."

This quote from Professor M.G. Spangler, a well respected authority and early pioneer in the design of concrete pipe, should be taken into consideration when designing, installing, inspecting, or funding a project using reinforced concrete pipe (RCP). All parties involved should be aware of the insignificance of a 0.01-inch crack.

Reinforced concrete pipe, like other reinforced concrete structures, is designed to crack. It is well known that while concrete is very strong in compression, its tensile strength is so low that it is considered negligible in design. Therefore, RCP design accommodates the high compressive strength of concrete and the high tensile strength of steel. As load on the pipe increases, and the tensile strength of the concrete is exceeded, cracks will form as the tensile load is transferred to the steel. Typically, the cracks form a V-shape with the largest part of the crack at the surface. The presence of a 0.01-inch crack does not represent failure, but rather an indication that the concrete and reinforcement are working together, as intended.

The 0.01-inch crack criteria has been used as a service load design criteria for RCP for nearly 70 years. This criterion has served the industry well through the clear designation of a plant test protocol. It has also served the public well by conservatively ensuring that a strong and durable product is used in their based infrastructure.

The 0.01-inch crack was never intended to determine the failure of installed RCP. This crack width was established by Professor W.J. Strick of Iowa State University to establish the comparative strength of RCP in a three-edge-bearing test by using a simple 0.01-inch thick leaf gauge to determine a measurable and definitive size crack. The three-edge-bearing test is a plant test that applies a bearing strip along the top of the pipe, and two closely spaced bearing strips along the bottom. Specifications for RCP require an ultimate load resistance that exceeds the required 0.01-inch crack strength, giving the designed pipe a significant factor of safety above the required service load. This 0.01-inch crack width has absolutely no relation to the size of a crack that

Cracks may appear larger in video inspection

0.01-Inch Crack Measured in a 36-Inch, Class IV Pipe.  
Pictures 1, 2, and 3 shown as if viewing the crack standing, kneeling, or through a video inspection, respectively.

American Concrete Pipe Association | www.concrete-pipe.org

This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

**ASTM INTERNATIONAL** Designation: C1840/C1840M - 17

**Standard Practice for  
Inspection and Acceptance of Installed Reinforced Concrete  
Culvert, Storm Drain, and Storm Sewer Pipe<sup>1</sup>**

This standard is issued under the fixed designation C1840/C1840M; 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 (ε) indicates an editorial change since the last revision or reapproval.

**1. Scope**

1.1 This practice covers the requirements for inspection and acceptance of installed reinforced concrete pipe by either person-entry, or remote inspection as shown in Figs. 1 and 2, respectively.

1.2 The scope of this specification is intended for installation related observations and assumes that pre-installation inspection has been completed.

1.3 The reinforced concrete culvert, storm drain and storm sewer pipe shall be manufactured in accordance with Specification C76, C506, C507, C655, or C1417 and accepted in accordance with AASHTO R073. This specification shall only be used for gravity, non-pressure storm drainage applications.

1.4 Person Entry shall be used unless extenuating circumstances preclude this type inspection. Remote inspection is acceptable for use for pipe diameters of 30 in. (750 mm) and smaller unless otherwise specified by owner or engineer.

1.5 Access of installed pipe for manual inspection shall follow OSHA 29 CFR PART 1926 SUBPART AA regulations for confined space entry. However, this standard does not purport to address all of the safety concerns, 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.

1.6 This practice does not cover deformation or deflection assessment. Concrete pipe is classified as a rigid structure because they do not bend or deflect appreciably under load before cracking. Due to these facts shape evaluation are of little or no value when evaluating concrete pipe.

1.7 The values stated in either Imperial/US or [SI] units are to be regarded separately as standard. The SI units are shown in brackets. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other.

<sup>1</sup>This test method is under the jurisdiction of ASTM Committee C13 on Concrete Pipe and is the direct responsibility of Subcommittee C13.05 on Special Projects.  
Current edition approved April 15, 2017. Published April 2017. DOI: 10.1520/C1840-C1840M-17

Copyright © ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States

Provided by BHS under license with ASTM  
No reproduction or networking permitted without license from BHS

<sup>1</sup>License: Florida Department of Transportation/5603622001  
Not for Resale, 09/22/2017 10:05:01 MET

