Designation: F3095 – 14

Standard Practice for Laser Technologies for Direct Measurement of Cross Sectional Shape of Pipeline and Conduit by Rotating Laser Diodes and CCTV Camera System[1]

This standard is issued under the fixed designation F3095; 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 procedure for the post installation verification and acceptance of buried pipe deformation using a visible rotating laser light diode(s), a pipeline and conduit inspection analog or digital CCTV camera system and image processing software. The combination CCTV pipe inspection system, with cable distance counter or onboard distance encoder, rotating laser light diode(s) and ovality measurement software shall be used to perform a pipe measurement and ovality confirmation survey, of new or existing pipelines and conduits as directed by the responsible contracting authority.

1.2 This practice applies to all types of material, all types of construction, or shape.

1.3 This practice applies to gravity flow storm sewers, drains, sanitary sewers, and combined sewers with diameters from 6 to 72 in. (150 to 1800 mm). The pipe shall be pre-cleaned and free of debris that would prevent the CCTV camera and laser diode assembly, shown in Fig. 1, from moving through the pipe, or adversely affect the accuracy of the survey. Flow or debris, within the line, shall be less than 10 % of the nominal pipe diameter or 6 in. (150 mm) in depth whichever is the lesser.

1.4 The Laser Light Diode(s) shall be tested, labeled and certified to conform to US requirements for CDRH Class 2 or below (not considered to be hazardous) laser products or certified to conform to EU requirements for Class 2M or below laser products as per IEC 60825-1, or both.

1.5 The profiling process may require physical access to lines, entry manholes and operations along roadways that may include safety hazards.

1.6 This practice includes inspection requirements for determining pipeline and conduit ovality only and does not include all the required components of a complete inspection. The user of this practice should consider additional items outside this practice for inspection such as joint gap measurement, soil/water infiltration, crack and hole measurement, surface damage evaluation, evaluation of any pipeline repairs, and corrosion evaluation.

1.7 This standard practice does not address limitations in accuracy due to improper lighting, dust, humidity, fog, moisture on pipe walls or horizontal/vertical offsets. Care should be taken to limit environmental factors in the pipeline that affect accuracy of the inspection.

1.8 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.9 *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.* There are no safety hazards specifically, however, associated with the use of the laser profiler specified (listed and labeled as specified in 1.3).

2. Referenced Documents

2.1 *ASTM Standards:*[2]

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

F1216 Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube

F2019 Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass Reinforced Plastic (GRP) Cured-in-Place Thermosetting Resin Pipe (CIPP)

[1] This practice is under the jurisdiction of ASTM Committee F36 on Technology and Underground Utilities and is the direct responsibility of Subcommittee F36.20 on Inspection and Renewal of Water and Wastewater Infrastructure.

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[2] 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.

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