



Designation: C1677 – 11a

# Standard Specification for Joints for Concrete Box, Using Rubber Gaskets<sup>1</sup>

This standard is issued under the fixed designation C1677; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

## 1. Scope

1.1 This specification covers flexible joints for concrete box sections, using rubber gaskets for leak resistant joints. The specification covers the design of joints and the requirements for rubber gaskets to be used therewith, for boxes conforming in all other respects to Specification C1433 or C1577, provided that if there is conflict in permissible variations in dimensions the requirements of this specification for joints shall govern.

1.2 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.

## 2. Referenced Documents

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

C497 Test Methods for Concrete Pipe, Manhole Sections, or Tile

C822 Terminology Relating to Concrete Pipe and Related Products

C1433 Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers

C1577 Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers Designed According to AASHTO LRFD

C1619 Specification for Elastomeric Seals for Joining Concrete Structures

## 3. Terminology

3.1 *Definitions*—For definitions of terms relating to concrete pipe, see Terminology C822.

## 4. Basis of Acceptance

4.1 The acceptability of the box joints and gaskets shall be determined by the results of the physical test prescribed in this

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee C13 on Concrete Pipe and is the direct responsibility of Subcommittee C13.08 on Joints for Precast Concrete Structures.

Current edition approved Sept. 1, 2011. Published September 2011. Originally approved in 2009. Last previous edition approved in 2011 as C1677 – 11. DOI: 10.1520/C1677-11A.

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

specification, if and when required, and by inspection to determine whether the box joints and gaskets conform to this specification as to design and freedom from defects.

## 5. Materials and Manufacture for Gaskets

5.1 The gasket shall be fabricated from a rubber compound. The basic polymer shall be natural rubber, synthetic rubber, or a blend of both meeting the physical requirements prescribed in Specification C1619.

5.1.1 Gaskets for standard use shall meet Class C requirements. Gaskets which require oil resistant properties shall meet Class D requirements.

### 5.2 Circular Cross-Section Gaskets:

5.2.1 Circular cross-section gaskets shall be extruded or molded to the specified size within a tolerance of  $\pm 1/64$  in. ( $\pm 0.4$  mm) or  $\pm 1.5$  % of the cord diameter, whichever is larger.

5.2.2 Circular cross-section gaskets shall have the nominal design cut length tolerance of  $\pm 3$  % for extruded and spliced gaskets.

### 5.3 Non-Circular Cross-Section Gaskets:

5.3.1 Non-circular cross-section gaskets shall be extruded or molded to the design size within a tolerance of  $\pm 1/64$  in. ( $\pm 0.4$  mm) or  $\pm 3.0$  % on any dimension, measured at any cross section, whichever is larger.

5.3.2 Non-circular cross-section gaskets shall have the nominal design cut length tolerance of  $\pm 3$  % for extruded and spliced gaskets.

## 6. Design of Joints

6.1 The manufacturer shall furnish the owner with the detailed design of the joint or joints including design and durometer hardness of the rubber gasket proposed to be furnished under this specification.

6.1.1 The joint design shall consist of a bell or groove on one end of a unit of box, and a spigot or tongue on the adjacent end of the joining box.

6.1.2 All surfaces of the joint upon or against which the gasket is capable of bearing shall be smooth, free of spalls, cracks or fractures, and imperfections that would adversely affect the performance of the joint.

6.1.3 The joints of the box shall be of such design that they will withstand the forces caused by the compression of the