



2015
EDITION

THE “GREENBOOK”

**STANDARD
SPECIFICATIONS
FOR PUBLIC WORKS
CONSTRUCTION**

TABLE 208-2.2.2 (A)

| Property | Value | ASTM Test Method No. |
|--------------------------------------------------------------------------------------|-------------|----------------------|
| Tensile strength, at 73.4° ± 3.6°F (23° ± 2°C), psi (kPa), min. | 1000 (6900) | D412 (Die C) |
| Elongation at break, 73.4° ± 3.6°F (23° ± 2°C), %, min. | 200 | D412 (Die C) |
| Shore Durometer, Type A (1 sec. reading, min.) | 60 | D2240 |
| Compression set (after exposure to 158° ± 3.6°F [70° ± 2°C], for 22 hours), % max. | 20 | D395 (Method B) |
| Water absorption (after immersion at 73.4° ± 1.8°F [23° ± 1°C] for 28 days), %, max. | 4 | D570 |

b) Physical Requirements after Accelerated Aging. The physical requirements after accelerated aging shall conform to Table 208-2.2.2 (B).

TABLE 208-2.2.2 (B)

| Property | Value | ASTM Test Method No. |
|--------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------------------|
| Tensile strength (after exposure to 300 psi (2100 kPa) oxygen at 158° ± 1.8°F [70° ± 1°C] for 96 hours), % of initial, min. | 70 | D572 |
| Elongation at break (after exposure to 300 psi (2100 kPa) oxygen at 158° ± 1.8°F [70° ± 1°C] for 96 hours), % of initial, min. | 70 | D572 |
| Ozone resistance (after exposure to 100 ppm ozone for 50 hours at 104° ± 2°F [40° ± 1°C]) | No cracks or crazing | D518 (Procedure C) and D1149 |

c) Chemical Resistance and Physical Testing. After exposure to the chemical solutions specified in Table 211-2 (A), test specimens shall be tested in accordance with 211-2 and meet the physical requirements specified in Table 208-2.2.2 (C).

TABLE 208-2.2.2 (C)

| Property | Value | ASTM Test Method No. |
|----------------------------------------------------------------------------------------|------------|----------------------|
| Tensile strength at 73.4° ± 3.6°F (23° ± 2°C), psi (kPa), min. | 800 (5500) | D412 (Die C) |
| Elongation at break at 73.4° ± 3.6°F (23° ± 2°C), % min. | 150 | |
| Shore Durometer, Type A at 75° ± 5°F (23° ± 2°C) (1 second reading) point change, max. | 15 | D2240 |
| Compression set (after exposure to 158° ± 1.8°F [70° ± 1°C] for 22 hours), % max. | | D395 (Method B) |
| a. Chemical exposures | 25 | |
| b. Bacteriological exposure (unconditioned surface dry) | 30 | |
| Weight change, % max. (approx. specimen size 1.0 x 3.0 x 0.1 inch) (25 x 75 x 2.5 mm) | -1.0, +5.0 | |

208-2.2.3 Circular Plastic Shear Ring Component and Testing Requirements. The plastic shear ring shall be injection molded from an ABS, PE, or PVC resin meeting the requirements specified below. The ABS shear ring material shall conform to 207-15.2. The PE shear ring shall conform to 207-19.2 except that the hydrostatic design and color requirements need not be satisfied and crack resistance failure maximum percentage be zero.

The PVC shear ring shall conform to 207-17.2.2 and 207-17.4.1.

208-4 GASKETS FOR THERMOPLASTIC PIPE. Gaskets shall be manufactured from a synthetic elastomer conforming to the requirements of 208-3. The installation of gaskets shall conform to 208-1.2.

208-5 TYPE "Z" JOINT.

208-5.1 General. Except as modified herein, Type "Z" Joints shall conform to Type "D" Joints per 208-2.2. This joint shall be used as a field closure coupling, repair coupling, or outside diameter transition coupling for identical or dissimilar pipe materials for gravity sewers and drains. The joint shall be applied to 4-inch through 12-inch (100 mm through 300 mm) diameter pipe sizes only.

208-5.2 Components. The joint shall consist of three components as follows:

- a) A circular synthetic rubber sleeve meeting the physical, chemical and bacteriological requirements of the Type "D" Joint per 208-2.2.2. The sleeve shall conform to 208-1.2.
- b) Two stainless steel compression bands (AISI 316) with stainless steel nut and bolt (any AISI Series 300) type tightening devices and meeting the requirements of ASTM A240.
- c) A stainless steel shear band shall wrap around the joint a minimum of 380 degrees. Welded to the shear band shall be two stainless steel nut and bolt tightening devices or worm drive tightening devices fabricated from any 300 Series stainless steel and meeting the requirements of the compression bands above. The minimum shear band thickness shall be 0.012 inches (0.30 mm). Minimum shear band width shall be 2.120 inches (54.0 mm) for 4-inch and 6-inch (100 mm and 150 mm) diameter pipe sizes and 2.437 inches (62.0 mm) for 8-inch through 12-inch (200 mm through 300 mm) diameter pipe sizes.

208-5.3 OD Transitions. Pipe joints where the pipe outside diameters have a differential of 3/8 inch (9 mm) or greater shall require an outside diameter transition coupling. Outside diameter transition coupling shall be comprised of the components per 208-5.2 plus a synthetic rubber bushing meeting the requirements of 208-2.2.2. The bushing shall compensate for the differential in pipe Outside Diameters.

208-5.4 Testing Requirements. The Type "Z" Joint, with or without bushing, shall meet the test requirements for Type "D" Joints per 208-2.2.4.

208-6 PIPE TO MANHOLE FLEXIBLE COUPLINGS.

208-6.1 General. The joint shall consist of a flexible connector designed to produce a positive watertight connection for pipes entering precast manholes and other concrete structures.

208-6.1.1 Seal. The connector shall be in accordance with ASTM C923/C923M so that a positive seal is made between the connector and the manhole wall and between the connector and the pipe. The seal between the connector and the manhole wall may be made by either mechanical means or by casting the connector integrally with the manhole wall. The seal between the connector and the pipe may be made by mechanical means or by compression of the resilient material against the outside of the pipe.

208-6.1.2 Parameters. The connector shall withstand 23 feet (10 psi) (7.1 m (70 kPa)) of hydrostatic pressure and be capable of sustaining an axial deflection of at least 7 degrees in any direction. The test methods and requirements shall be in accordance with ASTM C923/C923M, Section 7.

208-6.2 Materials. The gaskets shall be manufactured from a synthetic elastomer and shall contain not less than 50 percent by volume of first-grade synthetic rubber. All rubber gaskets shall be either molded or extruded and cured in such a manner that any cross-section shall be dense, homogeneous, and free of porosity blisters, pitting, and other imperfections. The gaskets shall comply with the physical requirements prescribed by ASTM C923/C923M Table 1 when tested in accordance with the referenced ASTM. However, the chemical resistance shall be tested in accordance with 211-2 and meet the weight change per Table 210-2.4.1. Metal components shall be fabricated from AISI Type 316 stainless steel