

IAPMO IGC 359-2019^a

PUBLIC REVIEW DRAFT

Flexible Expansion Couplings for DWV Stack Applications



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Flexible Expansion Couplings for DWV Stack Applications

1 Scope

1.1 Scope

This Standard covers flexible expansion couplings intended to be used as an expansion joint in stacked venting applications and specifies requirements for materials, physical characteristics, performance testing, and markings.

1.2 Alternative Materials

The requirements of this Standard are not intended to prevent the use of alternative materials or methods of construction provided such alternatives meet the intent and requirements of this Standard.

1.3 Terminology

In this Standard,

- (a) “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy to comply with the Standard;
- (b) “should” is used to express a recommendation, but not a requirement;
- (c) “may” is used to express an option or something permissible within the scope of the Standard; and
- (d) “can” is used to express a possibility or a capability.

Notes accompanying sections of the Standard do not specify requirements or alternative requirements; their purpose is to separate explanatory or informative material from the text. Notes to tables and figures are considered part of the table or figure and can be written as requirements.

1.4 Units of Measurement

SI units are the primary units of record in global commerce. In this Standard, the inch/pound units are shown in parentheses. The values stated in each measurement system are equivalent in application, but each unit system is to be used independently. All references to gallons are to U.S. gallons.

1.5 Amendments

Proposals for amendments to this Standard will be processed in accordance with the standards-writing procedures of IAPMO.

2 Reference Publications

This Standard refers to the following publications and, where such reference is made, it shall be to the current edition of those publications, including all amendments published thereto.

ASTM D395B	Standard Practice for Rubber Property -Compression Set
ASTM D412	Standard Test Method for Tensile Strength Vulcanized Rubber and Thermoplastic Elastomers-Tension
ASTM D573	Standard Test Method for Change in Durometer Rubber-Deterioration in an Air Oven
ASTM D792	Standard Specification for Density /Specific Gravity and Specific Gravity (Relative Density) of Plastics by Displacement
ASTM D2661	Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe and Fittings
ASTM D2665	Standard Specification for PVC Plastic DWV Fitting
CSA B1800	Thermoplastic nonpressure piping compendium
CSA B181.1	ABS Drain, Waste, and Vent Pipe and Pipe Fittings
CSA B181.2	PVC Drain, Waste, and Vent Pipe and Pipe Fittings
CSA C22.2 No. 0.15	Adhesive Labels
UL 969	Marking and Labeling Systems

3 Definitions and Abbreviations

3.1 Definitions

The following definitions shall apply in this Standard:

Flexible Expansion Couplings - A tapered Coupling that has two hub openings with two bands inside raised openings, and a loose rigid ring installed around its insert built-into the rubber coupling. This coupling is used to provide expansion and contraction for DWV plumbing stack piping in multi-story buildings, see Figure 1.

3.2 Abbreviations

The following abbreviations apply in this Standard:

TPV – A soft non-hydroscopic thermoplastic vulcanizate elastomer.

PVC – Polyvinylchloride.

DWV – Drain, Waste and Vent.

4 General Requirements

4.1 Materials

4.1.1 Flexible Coupling Material

Couplings covered by this Standard shall be made of TPV with the minimum requirements shown in Table 1.

4.1.2 Rigid Components

Flexible expansion couplings complying with this Standard that contain rigid Components are part of the flexible expansion installed around its insert built into the rubber coupling, and shall be made of:

- (a) PVC that complies with the minimum requirements or ASTM D2665.
- (b) ABS that complies with the minimum requirements of ASTM D2661.

4.1.3 Clamps

Clamps for connecting the pipe to the flexible expansion coupling may be conventional snap ring type, a worm driven stainless steel band, or other conventional type of equally corrosion resistant materials.

4.2 Connections

Flexible expansion couplings shall be capable of connecting to pipe and fittings that comply with the minimum requirements of ASTM D2661, ASTM D2665, CSA B181.1 or CSA 181.2 as applicable, ~~sized to fit~~.

4.3 Workmanship

4.3.1 Flexible expansion couplings shall not:

- (a) Restrict the flow capacity of the drainage line.
- (b) Offer abnormal obstruction to the flow.
- (c) Produce excessive turbulence or
- (d) Have excessive body ledges or shoulders.

4.3.2 Inside and outside surfaces of the flex expansion couplings shall be free of cracks, holes blisters, voids foreign inclusions or any other defects that are not visible to the naked eye and that might be affect its functionality.

5 Testing Requirements

5.1 Test Specimen

The test specimen shall consist of a 76.2 mm (3 in) and 101.6 mm (4 in) flex expansion coupling.

5.2 Life Cycle Test

5.2.1 Test Apparatus

The test apparatus shall consist of using a Drill Press capable of testing in a down position for expansion or contraction of 12.7 mm (1/2 in) for the 76.2 mm (3 in) specimen or 19.05 mm (3/4 in) for the 101.6 mm (4 in) specimen.

5.2.2 Test Procedure

The life cycle test shall be conducted as follows:

- (a) Install the flex expansion coupling per manufacturer's installation instructions and set up the test apparatus as shown in Section 5.2.1.
- (b) Apply contraction for 1 s
- (c) Apply expansion for 1 s
- (d) Repeat steps (b) and (c) for 100 cycles at a temperature of 37.8°C (100°F)
- ~~(d)~~(e) Repeat steps (b) and (c) for another 100 cycles at a temperature of -1°C (30°F)
- ~~(e)~~(f) Remove the coupling from the apparatus and examine it.

5.2.3 Performance Requirements

The specimen shall not fail or show any signs of deformation.

5.3 Hydrostatic Water Pressure Test

5.3.1 Test Specimen

The test specimen shall be the same one used for the life cycle test in Section 5.2

5.3.2 Test Procedure

The hydrostatic water pressure test shall be conducted as follows:

- (a) Install the flex expansion coupling per manufacturer's installation instructions
- (b) Fill a 3 m (10 ft) length of pipe extended above the ~~Flex~~ Coupling, or;
- ~~(b)~~(c) Fill a 0.9 m (3 ft) length of pipe with water and subject the system to a 34.5 kPa (5 psi) pressure.
- ~~(c)~~(d) Hold the pressure for 10 min
- ~~(d)~~(e) Examine the coupling for leaks

5.3.3 Performance Requirements

There shall be no leakage from the coupling

~~5.4 Low Temperature Hydrostatic Pressure Test~~

~~5.4.1 Test Procedure~~

~~The low pressure hydrostatic test shall be conducted as follows:~~

- ~~(a) Perform the test at a temperature of 0°C (32°F) and atmospheric pressure~~
- ~~(b) Install the flex expansion coupling per manufacturer's installation instructions~~
- ~~(c) Fill a 0.9 m (3 ft) length of pipe extended above the Flex Coupling~~
- ~~(d) Hold the pressure for 10 min~~
- ~~(e) Examine the coupling for leaks~~

~~5.4.2~~ Performance Requirements

~~There shall be no leakage from the coupling~~

6 Markings and Accompanying Literature

6.1 Markings

Flexible expansion couplings complying with this Standard shall be marked with the:

- (a) manufacturer's name or trademark;
- (b) model number;
- (c) IAPMO standard designation (i.e., "IAPMO IGC 359");
- (d) intended service, where applicable (e.g., "DWV");

6.2 Visibility

Markings shall be permanent, legible, and visible after installation.

6.3 Adhesive Labeling

[Adhesive labels complying with the applicable requirements of UL 969 or CSA C22.2 No. 0.15 are considered permanent.](#)

~~6.3~~ 6.4 Installation Instructions

The Flexible Coupling shall be accompanied by general instructions for their installation, care and maintenance, and repair and shall include the following:

- (a) Requirements for where and how to install the flex expansion coupling;
- (b) Locations where anchors should be installed to allow the flex expansion coupling to work properly; and,
- (c) A statement showing that shrinkage in multi-story wood structures should be considered prior to installation of the flexible coupling.

Table 1
TPV Properties Minimum Requirements
 (see Section 4.1.1)

Material Property	Typical Value in SI (U.S.)	Test Based on
Density	0.93 g/cm ³ (0.03 lb/in ³)	ASTM D792
Tensile Stress at 23°C (73°F)	2.1 MPa (305 psi)	ASTM D412
Tensile Strength at Break at 23°C (73°F)	4.6 MPa (667 psi)	ASTM D412
Elongation at Break at 23°C (73°F)	480 %	ASTM D412
Compression Set 70°C (158°F), 22 h, Type 1 125°C (257°F), 70 h, Type 1	19 % 49 %	ASTM D395B
Change in Tensile Strength in air at 150°C (302°F), 168 h	-11 %	ASTM D573
Change in Ultimate Elongation in air at 150°C (302°F), 168 h	-10 %	ASTM D573
Change in Durometer Hardness in air at 150°C (302°F), 168 h	1.0	ASTM D573

Figure 1
Flexible Expansion Coupling
(see Section 3.1)

