TECHNICAL BULLETIN

AWWA C900 PRESSURE CLASS EXPLANATION

PRESSURE CLASS CALCULATION

The pressure class of AWWA C900 PVC pipe is calculated at 73°F per the following equation:

$$PC = \left[\frac{2}{DR - 1}\right]\frac{HDB}{SF}$$

Where

- PC = pressure class, psi
- DR = dimension ratio of pipe = nominal outside diameter/ minimum wall thickness
- HDB = hydrostatic design basis of PVC pipe, 4000 psi
- SF = safety factor, current piping industry standards use 2.0

AWWA C900 SAFETY FACTOR CHANGE IN 2007

AWWA C900 is the product standard that mandates the requirements for manufacturers to use when producing C900 PVC pipe. Prior to the 2007 revision of AWWA C900, the pressure class for pipe sizes 12" and smaller was based on a safety factor of 2.5 and a built-in overhead for surge allowance. The revised AWWA C900 standard changed the safety factor to 2.0 with separate methods to calculate occasional and recurring surge pressure ratings.

Per the Foreword of AWWA C900-07, Section IV.3:
"The pressure classes were revised from 100, 150, and 200 psi ... to 165, 235, and 305 psi ... respectively."

FM 1612 PRESSURE CLASSES CHANGE IN 2016

Separate from AWWA, FM Approvals created the FM 1612 standard to detail the manufacturing requirements of PVC pipe used for underground fire service water mains. Prior to 2016, FM 1612 had not been revised since 1999, and the pressure class for pipe sizes 12" and smaller was based on a safety factor of 2.5 and a built-in overhead for surge allowance.

In 2016, FM 1612 was partially harmonized with AWWA C900. For sizes 14" and above, FM maintained the industry-standard safety factor of 2.0 to keep pressure classes in line with AWWA C900. However, for pipe sizes 4" through 12", FM removed the built-in overhead for surge allowance while maintaining the safety factor of 2.5, which resulted in the new values shown in the table below.

WHAT DOES THIS MEAN FOR YOU?

Perhaps most critical to this discussion, the fundamental long-term strength property of PVC pipe—the hydrostatic design basis—has not changed from 4000 psi.

It is important for project engineers, pipe distributors, and contractors to be aware of these changes to safety factors and to understand the discrepancy between AWWA and FM Approvals' pressure classes for C900 PVC pipe. Many engineering firms, utility owners, and municipalities have not updated their internal specifications to account for these changes. We recommend clarification between all entities during design and bidding phases of projects.

Westlake Pipe & Fittings proudly stamps both the AWWA and FM Approvals pressure classes on our C900 PVC pipe.

REFERENCES

- AWWA C900. *Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 60 In. (100 mm Through 1,500 mm), for Water Transmission and Distribution.* August 2016.
- AWWA C900. *Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Transmission and Distribution.* September 2007.
- FM 1612. *Approval Standard for Polyvinyl Chloride (PVC) Pipe and Fittings for Underground Fire Protection Service.* November 2016.
- FM 1612. *Approval Standard for Polyvinyl Chloride (PVC) Pipe and Fittings for Underground Fire Protection Service.* April 1999.

This Technical Bulletin is published for general informational purposes only and is not intended to imply that these materials, procedures, or methods, are suitable for any particular job or should be relied on by the user. Materials, procedures, or methods may vary according to the particular circumstances, local building code requirements, design conditions, or statutory and regulatory requirements. While the information in this Technical Bulletin is believed to be accurate and reliable, it is presented without guarantee or responsibility on the part of Westlake Pipe & Fittings. User is solely responsible for usage of any material, procedure, or method contained herein.

	AWWA C900		FM 1612	
DR	Pre-2007 Pressure Class (psi)	Current Pressure Class (psi)	Pre-2016 Pressure Class (psi)	Current Pressure Class (psi)
25	4" - 12": 100 ≥14": 165	All Sizes: 165	4" - 12": Not in FM 1612 ≥14": 165	4" - 12": Not in FM 1612 ≥14": 165
18	4" - 12": 150 ≥14": 235	All Sizes: 235	4" - 12": 150 ≥14": 235	4" - 12": 185 ≥14": 235
14	4" - 12": 200 ≥14": 305	All Sizes: 305	4" - 12": 200 ≥14": 305	4" - 12": 250 ≥14": 305

©2022 Westlake Pipe & Fittings All rights reserved PI-TB-001-US-EN-0522.1

Westlake Pipe & Fittings