UL 860

STANDARD FOR SAFETY

Pipe Unions for Flammable and Combustible Fluids and Fire-Protection Service

UL Standard for Safety for Pipe Unions for Flammable and Combustible Fluids and Fire-Protection Service, UL 860

Eighth Edition, Dated December 15, 2014

Summary of Topics

This revision of UL 860 is being issued to incorporate the following changes in requirements:

Clarification that a joint may be steel-to-steel construction

The revised requirements are substantially in accordance with Proposal(s) on this subject dated July 22, 2016.

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin.

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1

UL 860

Standard for Pipe Unions for Flammable and Combustible Fluids and Fire-Protection Service

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December 15, 2014

This UL Standard for Safety consists of the Eight Edition including revisions through October 18, 2016.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at https://csds.ul.com.

No Text on This Page

CONTENTS

INTRODUCTION

CONSTRUCTION

PERFORMANCE

MANUFACTURING AND PRODUCTION TESTS

MARKING

INTRODUCTION

1 Scope

1.1 These requirements cover pipe unions to be employed in piping carrying designated flammable or combustible fluids or in piping connections to equipment supplying water for fire-protection service.

1.2 ″Flammable and Combustible Fluids,″ as used herein, means gases and liquids that are investigated and found to be flammable or combustible, such as acetylene, fuel oil, gasoline, kerosene, liquefied petroleum gas, and manufactured and natural fuel gases.

1.3 Requirements for the installation and use of the pipe unions covered by these requirements are included in the Standards of the National Fire Protection Association pertaining to storage and use of flammable and combustible fluids, such as:

ANSI/NFPA 30-1996, Flammable and Combustible Liquids Code;

ANSI/NFPA 31-1997, Standard for the Installation of Oil-Burning Equipment;

ANSI/NFPA 32-1996, Standard for Drycleaning Plants;

ANSI/NFPA 51-1997, Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes;

ANSI/NFPA 54-1999, National Fuel Gas Code AGA Z223.1-1999;

ANSI/NFPA 58-1998, Liquefied Petroleum Gas Code; and

pertaining to the installation of fire-protection systems, such as:

ANSI/NFPA 11-1998, Standard for Low-Expansion Foam;

ANSI/NFPA 12-2000, Standard on Carbon Dioxide Extinguishing Systems;

ANSI/NFPA 13-1999, Installation of Sprinkler Systems;

ANSI/NFPA 14-2000, Standard for the Installation of Standpipe, Private Hydrant, and Hose Systems;

ANSI/NFPA 15-1996, Standard for Water Spray Fixed Systems for Fire Protection;

ANSI/NFPA 16-1999, Standard for the Installation of Deluge Foam-Water Sprinkler and Foam-Water Spray Systems;

ANSI/NFPA 17-1998, Standard for Dry Chemical Extinguishing Systems;

ANSI/NFPA 20-1999, Standard for the Installation of Stationary Pumps for Fire Protection;

ANSI/NFPA 22-1998, Standard for Water Tanks for Private Fire Protection;

ANSI/NFPA 24-1995, Standard for the Installation of Private Fire Service Mains and Their Appurtenances;

2 Components

2.1 Except as indicated in 2.2, a component of a product covered by this standard shall comply with the requirements for that component.

2.2 A component is not required to comply with a specific requirement that:

a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard, or

b) Is superseded by a requirement in this standard.

2.3 A component shall be used in accordance with its rating established for the intended conditions of use.

2.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

3 Units of Measurement

3.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

4 Undated References

4.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

CONSTRUCTION

5 Sizes and Ratings

5.1 Pipe unions covered by these requirements are to be designed for use with standard pipe of 3 inch (iron pipe size) and smaller sizes and for not less than 300 psi (2.07 MPa) cold [100°F (37.8°C)] pressure ratings.

6 Types

6.1 Pipe unions covered by these requirements shall be of the ball-to-full bearing arc, ball-to-cone, metal-to-metal seated type, or conical seat type and shall consist of a head or cone piece, a tail or ball piece, and a connecting nut.

6.2 Head or tail pieces are not prohibited from being formed and threaded or tapped for female or male pipe connection. Head or tail pieces are not prohibited from being an integral part of an elbow, tee, or other standard pipe fitting.

7 Materials

7.1 The various parts of a pipe union are not prohibited from being formed using materials having the characteristics and resistance to corrosion associated with the intended use or as designated in the NFPA Standards listed in 1.3. Such materials include brass, bronze, ductile iron, malleable iron, stainless steel, cast iron or steel, forged steel, or combinations thereof.

7.2 The joint shall be iron-to-iron, brass-to-iron, brass-to-brass, or steel-to-steel. That part of a pipe union incorporating an iron seat shall be zinc, nickel, cadmium or chromium plated over all, including threaded and machined surfaces.

7.3 A union zinc coated by the hot-dip process shall be coated inside and out before machining and cutting of threads.

7.4 A union employing a brass or bronze insert-type seat shall have the seat securely forced, pressed, welded, soldered, or otherwise secured into the head or tail piece so as to become a permanent part of the union.

8 Pipe Ends

8.1 The external surfaces of threaded or tapped pipe ends shall provide a suitable wrench-gripping surface.

8.2 Pipe ends that are threaded or tapped with taper threads shall conform to the following:

a) Standard for Pipe Threads, General Purpose (Inch), ANSI/ASME B1.20.1 or

b) Where pipe unions are intended for use in installations where piping incorporates pipe threads other than threads compliant with ANSI/ASME B1.20.1, pipe threads complying with a national pipe thread standard shall be permitted.

8.3 Contact surfaces of pipe ends subjected to pressure in tightening the unions shall be finished smooth and true.

8.4 The pipe ends of the unions may also be socket style so that piping can be inserted and welded to the union.

PERFORMANCE

9 General

9.1 Representative samples of each size and type of pipe union are to be selected from stock and are to be subjected to the tests described in these requirements. Test bars of certain metals used in castings are required for physical tests.

10 Metallic Materials

10.1 Specimen bars of brass or bronze, ductile iron, and of malleable iron used in unions are to be prepared from the same heat or run of metal used in making samples submitted for investigation and tests. Tests for flexure and tensile strength are to be conducted and the test methods and results recorded for countercheck of future production.

11 Tensile Strength

11.1 An assembled pipe union shall withstand, without rupture, the ultimate loads designated in Table 11.1 applied axially to the union and its threaded parts.

Table 11.1
Tensile strength

Nominal pipe size, inches	Ultimate load for cold [100°F (37.8°C)] pressure ratings			
	500 PSI (3.45 MPa) or less		600 PSI (4.14 MPa) or greater	
	Pound-force	kN	Pound-force	kN
1/8	2500	11.12	4000	17.79
1/4	3800	16.90	6000	26.69
3/8	5300	23.57	8000	35.58
1/2	7700	34.25	10000	44.48
3/4	10600	47.15	14000	62.27
1	15500	68.94	18000	80.06
1-1/4	21300	94.74	23000	102.30
1-1/2	25800	114.76	28000	124.54
2	30000	133.44	40000	177.92
2-1/2	35000	155.68	55000	244.64
3	40000	177.92	75000	333.60

11.2 This test is to be conducted by threading or welding steel bars or tubing to each end of a union or union fitting, using the pipe threads provided. The bars are to be properly secured in a tensile testing machine, and the load is to be increased at a uniform rate until the ultimate load designated in Table 11.1 is reached or rupture occurs, whichever is first.

12 Hydrostatic Strength

12.1 An assembled pipe union shall withstand, without rupture or leakage at any joint, an internal hydrostatic pressure of five times the cold [100°F (37.8°C)] pressure rating applied for a period of 1 minute.

12.2 Each sample for test is to be properly assembled and connected into a system of piping in a manner providing for the removal of all air in the piping and sample. The hydrostatic pressure is to be increased at a uniform rate until rupture occurs.

MANUFACTURING AND PRODUCTION TESTS

13 General

13.1 To assure compliance with these requirements in production, the manufacturer shall provide the necessary production control, inspection, and tests. The program shall include at least the following:

a) Unless other proven methods are employed to ensure freedom from leakage, each union for services other than LP-Gas shall be subjected to an air pressure test of not less than 75 psi (0.52 MPa) and proved tight before shipment. Each union for LP-Gas service shall be subjected to an air pressure test of not less than 250 psi (1.72 MPa) and proved tight before shipment. Samples that show leakage shall be rejected.

b) To ensure conformance to the Standard for Pipe Threads, General Purpose (Inch), ANSI/ASME B1.20.1, or alternative national recognized pipe thread standard, each manufacturer shall obtain and make use of a set of reference gauges for counterchecking the working gauges.

c) Taper pipe threads shall not vary more than one turn large or one turn small from the standard provided by the gauge.

d) An inspection program which will ensure compliance with the intent of all of the foregoing requirements shall be maintained at each factory.

13.1 revised December 15, 2014

MARKING

14 General

14.1 A pipe union shall be marked with the following:

a) Name, trademark, or other symbol identifying the manufacturer or private labeler; and

b) Design working pressure.

14.2 Pipe unions having design working pressures of 300, 500, and 600 psi (2.07, 3.45, and 4.14 MPa) cold [100°F (37.8°C)] are those also generally recognized in the trade as suitable, respectively, for 150, 250, and 300 psi (1.03, 1.72, and 2.07 MPa) working steam pressure (WSP). The respective temperature limits for the above three pressures are 358, 400, and 417°F (181, 204, and 214°C).