

**Board of High Pressure Piping Systems
Ammonia Committee - Meeting Minutes
July 1, 2008**

**Minnesota Room – Department of Labor and Industry
443 Lafayette Road North, Saint Paul
DLI.CCLDBOARDS@State.MN.US**

Members Present:

Jim Andrie
Margaret Larsen
David Grong
Patrick Galatz

Staff Present:

None

I. Call To Order

The meeting was called to order by David Grong at 8:10 a.m.

II. Approval of Meeting Agenda

The Chair asked if there were any objections or amendments to the Agenda and, hearing none, declared the Agenda approved.

III. Approval of Previous Meeting Minutes

Minutes of the June meeting were approved with no changes.

IV. Regular Business

- A. **Rulemaking.** The Ammonia Committee is tasked with reviewing and recommending revisions to Rule Sections 5230.5000 through 5230.6200, henceforth referred to as the “Ammonia Section”.

The committee continued to review the content of ANSI/IIAR 2-2008, comparing the new 2008 version to the 1992 version, and to the existing Minnesota High Pressure Piping Code. A draft of the ammonia section of the code was written and approved by the Committee as follows:

5230.5000 MINIMUM STANDARDS.

Parts 5230.5000 to [5230.6200](#) form the code for ammonia refrigeration systems and applies to ammonia piping systems used for closed circuit refrigeration systems. Parts 5230.5000 to [5230.6200](#) are minimum standards and are not intended to be used as or considered as a system design manual except as otherwise specified.

5230.5010 BASIS OF THE CODE AND INCORPORATIONS BY REFERENCE.

ANSI/IIAR 2-2008 Equipment, Design, and Installation of Ammonia Mechanical Refrigeration Systems, as published by the International Institute of Ammonia Refrigeration, 1110 North Glebe Road, Suite 250, Arlington, VA 22201, is adopted in its entirety and forms the basis of the code for ammonia refrigeration systems. Specific additions or deletions are listed.

Items A to F are documents incorporated by reference in parts [5230.5000](#) to [5230.6200](#) to the extent of the cited references. The documents are subject to frequent change and are available through the Minitex interlibrary loan system.

A. 2007 American Society of Mechanical Engineers Boiler and Pressure Vessel Code, section VIII, division 1 and section IX; 2007 American Society of Mechanical Engineers, American National Standards Institute, standard B31.5, refrigeration piping; and 1989 American Society of Mechanical Engineers, American National Standards Institute, standard A13.1 scheme for the identification of piping. American Society of Mechanical Engineers, 345 East 47th Street, New York, New York 10017.

B. 1990 American Welding Society, Structural Welding Code-Steel, American National Standards Institute, standard D1.1-90. American Welding Society, 550 Northwest LeJeune Road, Post Office Box 351040, Miami, Florida 33135.

C. 1989 American National Standards Institute, standard Z87.1, Practice for Occupational and Educational Eye and Face Protection, American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018.

D. 1990 Annual Book of American Society for Testing and Materials, Volume 01.01, Steel - Piping, Tubing, Fittings, Publication Number: 01-010190-02, American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

E. The following sections of ANSI/ASHRAE Standard 15-2007, as published by the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 1791 Tullie Circle NE, Atlanta, GA 30329.

- a. Section 4, Occupancy Classifications
- b. Section 5, Refrigeration System Classification
- c. Section 7, Restrictions on Refrigerant Use
- d. Section 8, Installation Restrictions

F. ANSI/IIAR-3-2005, Standard for Ammonia Refrigeration Valves, as published by the International Institute of Ammonia Refrigeration, 1110 North Glebe Road, Suite 250, Arlington, VA 22201

Additions to ANSI/IIAR 2-1999
DEFINITIONS

Subp. 3. Administrative Authority. Administrative Authority means the inspection agency authorized to inspect high pressure piping under Minnesota Statutes, sections 326.46 and 326.47, subdivision 2.

Subp. 11. **Brine.** "Brine" means any liquid used for the transmission of heat without a change in its state.

Subp. 38. **Liquid line.** "Liquid line" means the parts of the system, at any pressure, intended to be wholly filled with liquid refrigerant.

Modifications to ANSI/IIAR 2-2008:

Paragraph 10.2.1.5, add: Subp. E: "Carbon steel Liquid Lines must utilize A106 seamless pipe or A333 seamless pipe.

Paragraph 10.2.1.5, add: Subp. F: Piping material used in the discharge line of a pressure relief device, when discharging to atmosphere, Type F butt weld pipe is allowed.

Paragraph 10.2.1.5, add: Subp. G: Mill test reports must be provided for the inspector at the inspector's discretion to verify heat numbers on the pipe and to verify compliance with this part.

Paragraph 10.2.2.1 Carbon Steel, welded. is changed:

- a. 1-1/2 inch and smaller - schedule 80
- b. 2" and larger - Standard Weight pipe

Paragraph 10.2.2.3 Stainless Steel, welded: is changed:

- a. 3/4 inch through 6 inch, schedule 40.
- b. 8 inch and larger, schedule 10.

Paragraph 10.3.1.3 is modified: Operating speed of control valve actuators shall be considered in the system design. Quarter turn valves (ball valves, butterfly valves, etc.) must utilize an actuator that restricts the time from fully open to fully closed, both directions, to at a minimum of 60 seconds.

5230.5915 PIPING JOINTS.

Subpart 1. **Design standards.** Piping joints must be designed for ammonia service. Joints must be designed for the pressure temperature and mechanical strength requirements of ammonia service and items A to E.

A. One and one-quarter inch and smaller joints may be threaded or welded. Threaded pipe must be American Society for Testing and Materials schedule 80 seamless. Threaded fittings must be 2,000 pounds per square inch rating. Threaded fittings must be forged steel.

B. Joints one and one-half inch and larger must be welded. Fittings must match pipe schedule and material. Welded pipe one and one-half inch and smaller must be jointed with the use of socket weld fittings of at least 2,000 pounds per square inch ratings or butt weld fittings of the same wall thickness and material as the pipe. Socket weld fittings must be forged

steel.

C. Flanges must be a tongue and groove type, or raced face type, rated and designed for ammonia service and system pressure.

D. Gaskets must be designed for ammonia service and system pressure.

E. Unions must be at least 2,000 pounds per square inch forged steel ground joint unions, be used only for three quarters inch and smaller pipe.

Subp. 2. **Branch, run-outs, laterals, and saddles.** When joining carbon steel to carbon steel material, if the main piping is two inches and smaller, or the branch or run-out is two inches and smaller, branch or lateral connections must be forged steel TEE fitting, forged steel WELD-O-LET™ or THREAD-O-LET™, or engineering equivalent of at least 3,000 pounds per square inch rating. Engineering equivalency must be based on proper documentation signed by a registered professional engineer. Follow ASME B31.5 when using other materials.

Where the main piping exceeds two inches, branch or lateral connections must be made by forged steel TEE fitting, be forged steel WELD-O-LET™, or THREAD-O-LET™ of at least 2,000 pounds per square inch rating; or in cases where the branch exceeds two inches (further providing that a branch lateral or saddle is two pipe sizes smaller than the main piping it is connected to) the connection may be made by the use of a saddle or lateral connection that complies with the requirements of this part.

Branches or runouts the same size as the main must be connected using forged steel TEE fittings.

Welding of saddles and laterals must comply with the provisions of standard B31.5 and result in proper fusion through the weld and must be subjected to nondestructive testing including radiography at the discretion of the administrative authority.

The costs of nondestructive testing for labor and materials and all testing media must be at the expense of the installing contractor.

Subp. 5. **Components.** The assembly of the various components, whether done in a shop or as a field erection, must be done so that the completely erected piping and equipment conform with the requirements of this chapter.

Paragraph 11.1.5 is modified: Relief valves shall not be located in refrigerated spaces unless precautions are taken to prevent moisture migration into the valve body or relief valve vent line. A drip pocket the size of the discharge pipe and at least 24 inches in length must be installed below a vertical riser in the discharge pipe and must be fitted with a drain plug or valve.

Paragraph 11.1.6.2, add: Rupture discs may only be used when installed in series with a pressure relief valve.

Paragraph 11.2.5 is modified: Omit Subp. B "Pressure vessels of 10 ft³ or more internal gross volume shall be protected by dual relief valves.

Paragraph 15.1.7, add: Declaration. A dated declaration of test shall be provided for all systems. The declaration shall give the name of the refrigerant and the field test pressure applied to the highside and the lowside of the system. The declaration of test shall be signed by the installer and, if an inspector is present at the test, the inspector shall also sign the declaration, or the owner's representative when approved by the inspector.

V. Special Business – None

VI. Committee Reports - None

VII. Complaints - None

VIII. Open Forum - None

IX. Board Discussion – None

X. Announcements - None

A. Next Regularly Scheduled Meeting:

- i. August 7, 2008, 11:50 a.m. – Minnesota Room, DOLI

XI. Adjournment

The meeting adjourned at 10:00 AM.

Respectfully Submitted,

David H. Grong

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