

**Board of High Pressure Piping Systems Sub-Committee  
Meeting Minutes – Ammonia Refrigeration & Steam/Bioprocess  
Thursday, June 8, 2017**

Washington Room – Department of Labor and Industry  
443 Lafayette Road North, St. Paul, MN 55155

The HPPS Sub-committees listed below held a public meeting on Thursday, June 8, 2017, at 10:00 a.m. to discuss possible amendments to Rules Relating to High Pressure Piping Systems, Chapter 5230, as follows:

- Sub-Committee No. 1 / IIAR2-2014 and ASME B31.5-2016 (Ammonia Refrigeration)  
Members Present:
  1. Jim Andrie (Chair)
  2. Chris Savage
  3. Marit Brock
  4. Todd Green (Commissioner’s Designee)

**See Attachment A – Chapter 5230, 5230.5001 INCORPORATIONS BY REFERENCE.**

- Sub-Committee No. 2 / ASME B31.1-2016 and ASME BPE-2016 (Steam and Bioprocess)  
Members Present:
  1. Russ Scherber (Chair)
  2. Larry Stevens Jr.
  3. Mark Kincs
  4. Kyle Bain

**See Attachment B – Chapter 5230, 5230.0220 BIOPROCESS PIPING.**

1 **Board of High Pressure Piping Systems**

2 **Possible Amendments to Rules Relating to High Pressure Piping Systems, Chapter 5230**

3 **5230.5001 INCORPORATIONS BY REFERENCE.**

4 Subpart 1. **ANSI/IIAR 2.** For purposes of this chapter, "ANSI/IIAR 2" means the ~~2008~~  
5 2014 revision with addendums A and B of the standard for Equipment, Design, and  
6 Installation of Closed-Circuit Ammonia Mechanical Refrigerating Systems, as approved by  
7 the American National Standards Institute and as published by the International Institute of  
8 Ammonia Refrigeration, 1110 North Glebe Road, Suite 250, Arlington, Virginia 22201.  
9 ANSI/IIAR 2 is incorporated by reference and made part of the code for ammonia refrigeration  
10 systems, except as amended in this chapter. Portions of this chapter reproduce text from  
11 ANSI/IIAR 2. ANSI/IIAR 2 is not subject to frequent change and a copy of ANSI/IIAR 2 is  
12 available in the office of the commissioner of labor and industry and at the State Law Library,  
13 25 Rev. Dr. Martin Luther King Jr. Blvd., Saint Paul, Minnesota 55155. ANSI/IIAR 2 is  
14 copyrighted by the International Institute of Ammonia Refrigeration. All rights reserved.

15 Subp. 2. **ASME B31.5.** For purposes of this chapter, "ASME B31.5" means the ~~2013~~2016  
16 revision of the standard for ammonia refrigeration piping as approved and published by ASME,  
17 Two Park Avenue, New York, New York 10016. ASME B31.5 is incorporated by reference and  
18 made part of the code for ammonia refrigeration piping. ASME B31.5 is not subject to frequent  
19 change and a copy of ASME B31.5 is available in the office of the commissioner of labor and  
20 industry and at the State Law Library, 25 Rev. Dr. Martin Luther King Jr. Blvd., Saint Paul,  
21 Minnesota 55155.

22 **5230.5003. ~~SECTION 3~~ CHAPTER 2, DEFINITIONS.**

23 ANSI/IIAR 2, Section 3, is amended by adding the following definitions:

24 **brine:** Any liquid used for the transmission of heat without a change in its state.

25 **jurisdictional authority:** Administrative authority, as defined in Minnesota Rules, part  
26 5230.0005, subpart 2.

27 **liquid line:** The parts of the ammonia refrigerating system, at any pressure, intended to be  
28 wholly filled with liquid refrigerant.

29 **5230.5005 SECTION ~~10~~ CHAPTER 13, PIPING.**

30 Subpart 1. **Section ~~10.2.1.5~~ Chapter 13.2.1.1.** ANSI/IIAR 2, ~~section 10.2.1.5~~ chapter  
31 13.2.1.1, is amended ~~by adding a subsection to read~~ as follows:

32 **~~10.2.1.5.1.~~ 13.2.1.1. Application of materials.**

33 a. Carbon steel liquid lines must utilize A106 seamless pipe or A333  
34 seamless pipe.

35 b. Piping material used in the discharge line of a pressure relief  
36 device, when discharging to atmosphere, Type F butt weld pipe is  
37 allowed.

38 c. Mill test reports must be provided for the inspector at the  
39 inspector's discretion to verify heat numbers on the pipe and to verify  
40 compliance with this part.

41 Subp. 2. **Section ~~10.2.2.1~~ Chapter 13.2.2.** ANSI/IIAR 2, ~~section 10.2.2.1~~ chapter 13.2.2,  
42 is amended ~~to read~~ by adding a subsection as follows:

43 **~~10.2.2.1.~~ 13.2.2.1. Carbon steel, welded.**

44 a. 1-1/2 inch and smaller - schedule 80.

45 b. 2 inch through 10 inch - schedule 40.

46 c. 12 inch and larger - standard weight.

47 Subp. 3. **Section ~~10.2.2.3~~ Chapter 13.2.2.** ANSI/IIAR 2, chapter 13.2.2, is amended ~~to~~  
48 read by adding a subsection as follows:

49 **~~10.2.2.3.~~ 13.2.2.2. Stainless steel, welded.**

50 a. 3/4 inch through 6 inch - schedule 40.

51 b. 8 inch and larger - schedule 10.

52 Subp. 4. **Section ~~10.3.1.3~~ Chapter 13.3.** ANSI/IIAR 2, section 10.3.1.3, is amended ~~to~~  
53 read by adding a subsection as follows:

54 **~~10.3.1.3.~~ 13.3.8. Operating speed of control valve actuators shall be considered**

55 in the system design. Quarter turn valves (ball valves, butterfly valves, etc.) must  
56 utilize an actuator that restricts the time from fully open to fully closed, both  
57 directions, to at a minimum of 60 seconds.

58 **5230.5007 SECTION 11-CHAPTER 15, OVERPRESSURE PROTECTION DEVICES.**

59 Subpart 1. ~~Section 11.1.5 Chapter 15.2.5.~~ ANSI/IIAR 2, ~~section 11.1.5 chapter 15.2.5,~~ is  
60 amended to read as follows:

61 **11.1.5.** Relief valves shall not be located in refrigerated spaces unless precautions are  
62 taken to prevent moisture migration into the valve body or relief valve vent line. A  
63 drip pocket the size of the discharge pipe and at least 24 inches in length must be  
64 installed below a vertical riser in the discharge pipe and must be fitted with a drain  
65 plug or valve.

66 Subp. 2. ~~Section 11.1.6.2 Chapter 15.2.6.2.~~ ANSI/IIAR 2, ~~section 11.1.6.2 chapter~~  
67 ~~15.2.6.2,~~ is amended by adding the following paragraph at the end:

68 Rupture discs may only be used when installed in series with a pressure relief  
69 valve.

70 Subp. 3. ~~Section 11.2.5.~~ ANSI/IIAR 2, ~~section 11.2.5,~~ is amended to read as follows:

71 ~~11.2.5.~~ Pressure vessels of  $10 \text{ ft}^3$  [ $0.3 \text{ m}^3$ ] or more internal gross volume shall be  
72 protected by one or more dual pressure relief device(s). Dual pressure relief valves  
73 shall be installed with a three way valve to allow testing or repair. When dual relief  
74 valves are used, each valve must meet the requirements of section 11.2.7. When  
75 multiple dual relief valve assemblies are used,

76 a. the sum of the capacities of the pressure relief devices actively protecting  
77 the vessel must equal or exceed the requirements of section 11.2.7, and

78 b. the capacity of any dual relief assembly whose manifold valve is set to a  
79 position other than fully seated (one side open and one side closed) shall be  
80 counted to be zero.

81 Subp. 4. ~~Section 11.3.3.~~ ANSI/IIAR 2, ~~section 11.3.3 of addendum A,~~ is amended to read  
82 as follows:

83 ~~11.3.3. The discharge piping from pressure relieving devices to atmosphere~~  
84 ~~shall be a minimum schedule 40 steel for all pipe sizes.~~

85 **5230.5009 SECTION 15, TESTING AND CHARGING CHAPTER 5, GENERAL**  
86 **SYSTEM DESIGN REQUIREMENTS.**

87 ANSI/IIAR 2, ~~section 15.1.7~~ chapter 5.13, is amended by adding a subsection to read as  
88 follows:

89 **15.1.7.6. 5.13.1.2. Declaration.** A dated declaration of test shall be provided for  
90 all systems. The declaration shall give the name of the refrigerant and the field  
91 test pressure applied to the high side and the low side of the system. The  
92 declaration of test shall be signed by the installer or, if permitted by the  
93 administrative authority, by the owner's representative. If a representative of the  
94 administrative authority is present at the test, that representative shall also sign the  
95 declaration.

96 **5230.5915 PIPING JOINTS.**

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

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

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

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

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

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

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

121 Where the main piping exceeds two inches, branch or lateral connections must be made  
122 by forged steel TEE fitting, be forged steel WELD-O-LET™, or THREAD-O-LET™ ~~of at least~~  
123 ~~2,000 pounds per square inch rating;~~ or in cases where the branch exceeds two inches (further  
124 providing that a branch lateral or saddle is two pipe sizes smaller than the main piping it is  
125 connected to) the connection may be made by the use of a saddle or lateral connection that  
126 complies with the requirements of this part.

127 Branches or run-outs the same size as the main must be connected using forged steel TEE  
128 fittings.

129 Welding of saddles and laterals must comply with the provisions of ASME standard  
130 B31.5.

131 [For text of subparts 3 through 5, see M.R.]

132 Subp. 6. **Examination of welded pipe joints.** All welds on ammonia piping systems  
133 must comply with the visual examination acceptance standards in section ~~527.3.2-536.4.1~~ of  
134 ASME B31.5. When nondestructive examination other than visual examination is required by  
135 job specification or by the administrative authority, the welds must comply with the acceptance  
136 standards in section ~~536.6.3-536.6.2~~ through 536.6.4 of ASME B31.5 for each type of  
137 nondestructive examination required. All costs of nondestructive testing shall be paid by the  
138 installing contractor. The contractor shall provide a copy of all examination results to the  
139 administrative authority upon request.

1 **Board of High Pressure Piping Systems**

2 **Possible Amendments to Rules Relating to High Pressure Piping Systems, Chapter 5230**

3 **5230.0220 BIOPROCESS PIPING.**

4 Subpart 1. **ASME BPE.** All bioprocess piping must meet the requirements of ASME BPE.  
5 For purposes of this chapter, "ASME BPE" means the ~~2012~~2016 edition of the Bioprocessing  
6 Equipment Standard adopted and published by ASME, Two Park Avenue, New York, New  
7 York 10016. ASME BPE is incorporated by reference and made part of the code for high  
8 pressure piping systems. ASME BPE is not subject to frequent change and a copy of ASME  
9 BPE is available in the office of the commissioner of labor and industry and at the State Law  
10 Library, 25 Rev. Dr. Martin Luther King Jr. Blvd., Saint Paul, Minnesota 55155.

11 Subp. 2. **Examination of welded pipe joints.** All welds on bioprocess piping systems  
12 must comply with the visual examination acceptance standards in sections ~~MJ-6.3-MJ-8.3~~ to ~~MJ-~~  
13 ~~6.4~~MJ-8.4 of ASME BPE. When nondestructive examination other than visual examination is  
14 required by job specification or by the administrative authority, the welds must comply with the  
15 acceptance standards in sections ~~MJ-6.3-MJ-8.3~~ to ~~MJ-6.4~~MJ-8.4 of ASME BPE for each type  
16 of nondestructive examination required. All costs of nondestructive testing shall be paid by the  
17 installing contractor. The contractor shall provide a copy of all examination results to the  
18 administrative authority upon request.

19 **5230.0260 SCOPE.**

20 Valves, fittings, and piping for boilers, as prescribed in the ASME Code for Power Boilers, are  
21 within the scope for this code but provisions of the ASME Code for Power Boilers shall govern  
22 where they exceed corresponding requirements of this code. For purposes of this chapter,  
23 "ASME Code for Power Boilers" means the ~~2013~~2017 edition of the ASME Boiler and Pressure  
24 Vessel Code, section I, as adopted and published by ASME, Two Park Avenue, New York, New  
25 York 10016. The ASME Code for Power Boilers is incorporated by reference in the code for  
26 steam or heating media piping systems. The ASME Code for Power Boilers is not subject to  
27 frequent change and a copy is available in the office of the commissioner of labor and industry  
28 and at the State Law Library, 25 Rev. Dr. Martin Luther King Jr. Blvd., Saint Paul, Minnesota  
29 55155.

30 Economizers, heaters, tanks, and other pressure vessels are outside the scope of this code,  
31 but connecting piping shall conform to the requirements herein specified.

32 **5230.0265 ADOPTION OF ASME B31.1 BY REFERENCE.**

33 For purposes of this chapter, "ASME B31.1" means the ~~2012~~2016 edition of the standard for  
34 power piping, as approved and published by ASME, Two Park Avenue, New York, New York  
35 10016. ASME B31.1 is incorporated by reference and made part of the code for steam or heating  
36 media piping systems, except as amended in this chapter. Portions of this chapter reproduce text  
37 from ASME B31.1. ASME B31.1 is not subject to frequent change and a copy of ASME B31.1  
38 is available in the office of the commissioner of labor and industry and at the State Law Library,  
39 25 Rev. Dr. Martin Luther King Jr. Blvd., Saint Paul, Minnesota 55155. ASME B31.1 is  
40 copyright by ASME. All rights reserved.

41 **5230.0295 CHAPTER III, MATERIALS.**

42 Section 124 is amended by adding a subsection as follows:

43 **~~124.11~~124.13. Furnace Butt Welded Pipe**

44 The use of furnace butt welded pipe is prohibited on steam or heating media piping systems.

45 **5230.0305 CHAPTER VI, INSPECTION, EXAMINATION, AND TESTING.**

46 **Section 136.** ASME B31.1, ~~section 136 and all subsections~~sections 136.1 through 136.3.2 are  
47 deleted.

48 **5230.0325 APPENDICES.**

49 ~~Notwithstanding anything to the contrary in ASME B31.1, the following "Mandatory~~  
50 ~~Appendices" in ASME B31.1 are recommended rather than mandatory: A, D, G, H, and J. The~~  
51 ~~department shall not enforce compliance with "Mandatory Appendices" A, D, G, H, or J of~~  
52 ~~ASME B31.1 to the extent they are referenced within Minn. R., part 5230.0250 through part~~  
53 5230.0335.