Date Distributed: October 15, 2020

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

NATIONAL BOARD SUBCOMMITTEE INSTALLATION

AGENDA

Meeting of October 19th, 2020
Webex Online Meeting

These minutes are subject to approval and are for the committee use only.
They are not to be duplicated or quoted for other than committee use.

The National Board of Boiler & Pressure Vessel Inspectors
1055 Crupper Avenue
Columbus, Ohio 43229-1183
Phone: (614)888-8320
FAX: (614)847-1828

1. **Call to Order (11 a.m. Eastern Time)**
2. **Introduction of Members and Visitors**
3. **Adoption of the Agenda**
4. **Public Review Comments**

Item Number: PR20-0101	**NBIC Location: Part 1, S1.1 c)**	**Attachment Page 2**
Submitted by: Alexander Garbolevsky, Hartford Steam Boiler **Related NBIC Action Item:** Item 19-45 (Revisions to Yankee Dryer supplement in Part 1) **Comment:** The correct spelling for the "SI" ton (1,000 kg) is "tonne" to distinguish it from the US Customary unit of "ton" (2,000 lbs.).		

Item Number: PR20-0102	**NBIC Location: Part 1, S5.7.6 i)**	**Attachment Page 4**
Submitted by: Alexander Garbolevsky, Hartford Steam Boiler **Related NBIC Action Item:** Item 18-73 (Update installation requirements for Thermal Fluid Heaters) **Comment:** "Mpa" should be "MPa" in Part 1, S5.7.6 i) and Part 4, 2.3.6 i).		

5. **Future Meetings**

January 11-14, 2021 – TBD
July 12-15, 2021 – TBD

6. **Adjournment**

Respectfully submitted,

Jonathan Ellis

Jonathan Ellis
NBIC Secretary

Contents

Public Review Comment Resolutions

1. **Accepted, changes are incorporated** – Accept/agree with the comment. Required non substantive changes are made to the draft addendum to address the comment and no substantive changes have been made.

2. **Accept in principle, new business item opened** - Accept/agree with the comment and will require additional work for future changes. (However current proposal is not technically wrong and provides guidance.)Requires a new action item for tracking for substantive changes.

3. **Accepted in principle and the item is being returned to the committee for action.** (Proposal may contain technical or other incorrect information.)

4. **Rejected for the following reason** – Complete comment is rejected. Reason must be given.

Substantive Change; A substantive change in a proposed American National Standard is one that directly and materially affects the use of the standard. Examples of substantive changes are below:

- "shall" to "should" or "should" to "shall";
- Additional, deletion or revision of requirements, regardless of the number of changes;
- Addition of mandatory compliance with reference standards.

Unresolved; Either (a) a negative vote submitted by a consensus body member or (b) written comments, submitted by a person during public review expressing disagreement with some or all of the proposed standard, that have not been satisfied and/or withdrawn after having been addressed according to the developer's approved procedures.

National Board of Boiler and Pressure Vessel Inspectors
National Board Inspection Code
Submission of Public Review Comment
2021 Draft Edition

PLEASE SUBMIT ONLY ONE COMMENT/RECOMMENDATION PER PAGE
Make additional copies as needed

Comments Must be Received No Later Than: October 12, 2020

Instructions: If unable to submit electronically, please print this form and fax or mail. Print or type clearly.

Date: September 18, 2020

Commenter Name: Alexander Garbolevsky

Commenter Address: HSB, One State Street, 7th Floor
Hartford, CT 06103

Commenter Phone: (774) 249-2803

Commenter Fax: _____

Commenter Email: alex_garbolevsky@hsb.com

Section/Subsection Referenced: Part 1, S1.1(c)

Comment/Recommendation: *Proposed Solution:* □ New Text ■ Revise Text □ Delete Text

Item 19-45 Part 1, S1.1 (c) – the correct spelling for the " SI" ton (1 000kg) is " tonne" to distinguish it from the US Customary unit of " ton" (2,000 lbs.).

Source: ■ Own Experience/Idea □ Other Source/Article/Code/Standard

Submit Form To: Jonathan Ellis, NBIC Secretary, The National Board of Boiler & Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, OH 43229, email: NBICSecretary@nationalboard.org

NB Use Only

Commenter No. Issued: _____

Comment No. Issued: PR20-0101

Project Committee Referred To:
NBIC Subcommittee Installation

Item 19-XX1
Submitted by Jerry Jessick Date: 7/9/2019
(920) 819-8570, jerry.jessick@gapac.com

PURPOSE: Revision of present (2017) NB-23 Code

BACKGROUND INFORMATION: Suggested revisions are supported by the contributor's 30yr industry experience within large corporate owner/user environments including purchase and design, manufacturing, installation, inspection and repair.

Part 1 - Supplement 1/Part 2 - Supplement 5

OBSERVATION: The wording of Part 1, S1.1, SCOPE and the wording of Part 2, S5.1, SCOPE serve identical purpose within the Code, but are not identically written.

RECOMMENDATION: Ensure that wording in Part 2, S5.1, is identical to that found in Part 1, S1.1.

Part 1

INSTALLATION OF YANKEE DRYERS (ROTATING ~~CAST IRON~~ PRESSURE VESSELS) WITH FINISHED SHELL OUTER SURFACES

S1.1 SCOPE

This supplement provides guidelines for the installation of a ~~Yankee~~ yankee dryer. A ~~Yankee~~ yankee dryer ~~is a pressure vessel with~~ has the following characteristics:

a) ~~This supplement describes guidelines for the installation of a Yankee dryer. A Yankee dryer~~ It is a rotating steam-pressurized cylindrical vessel commonly used in the paper industry, and ~~is typically made of cast iron,~~ finished to a high surface quality, and characterized by a center shaft connecting the heads. While traditionally made of cast iron, bolted or welded steel vessels are in use.

b) Yankee dryers are primarily used in the production of tissue-type paper products. When used to produce machine-glazed (MG) paper, the dryer is termed an MG cylinder. A wet paper web is pressed onto the finished dryer surface using one or two pressure (pressing) rolls. Paper is dried through a combination of mechanical dewatering by the pressure roll(s), thermal drying by the pressurized Yankee dryer, and a steam-heated or fuel-fired hood. After drying, the paper web is removed from the dryer.

c) A ~~Y~~yankee dryer is typically manufactured in a range of outside diameters from 8 to 23 ft. (2.4 to 7 m), widths from 8 to 28 ft. (2.4 to 8.5 m), pressurized and heated with steam up to 160 psi (1,100 kPa), and rotated at speeds up to 7,000 ft/min (2,135 m/min). Typical pressure roll loads against the Yankee dryer are up to 600 pounds per linear inch (105 kN/m). A thermal load results from the drying process due to difference in temperature between internal and external shell surfaces. The dryer has an internal system to remove steam and condensate. These vessels can weigh up to 220 tons (200 ~~tonnes~~tons).

d) The typical ~~Y~~yankee dryer is an assembly of several large ~~castings~~components. The cylindrical shell is ~~normally a gray iron casting, in accordance with~~ commonly ASME ~~designation~~ SA-278 gray cast iron, or SA-516 steel. Shells internally may be smooth bore or ribbed. Heads, center shafts, and journals may be gray cast iron, ductile cast iron, or steel.

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Hartford, CT 06103

Commenter Phone: (774) 249-2803

Commenter Fax: _____

Commenter Email: alex_garbolevsky@hsb.com

Section/Subsection Referenced: Part 1, S5.7.6(i) and Part 4, 2.36(i)

Comment/Recommendation: *Proposed Solution:* □ New Text ■ Revise Text □ Delete Text

Item 18-73, Part 1, S5.7.6(i) and Part 4, 2.3.6(i) - "Mpa" should be "MPa".

Source: ■ Own Experience/Idea □ Other Source/Article/Code/Standard

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Commenter No. Issued: _____

Comment No. Issued: PR20-0102

Project Committee Referred To:
NBIC Subcommittee Installation

ITEM 18-73 Proposal Rev. 3/25/20

PART 4

2.3 OVERPRESSURE PROTECTION FOR THERMAL FLUID HEATERS

2.3.1 GENERAL REQUIREMENTS

Thermal fluid heaters shall be provided with overpressure protection in accordance with the code of construction.

2.3.2 PRESSURE RELIEF ~~DEVICES~~VALVES

Thermal fluid heaters shall be equipped with one or more pressure relief ~~devices~~ valves unless the option for overpressure protection by system design is utilized (when permitted by the original code of construction). When pressure relief ~~devices~~ valves are used, the following shall apply:

a) Pressure relief valve(s) shall be of a totally enclosed type. ~~and shall not have a lifting lever. A body drain is not required.~~

b) A lifting lever shall not be used in pressure relief valve(s). A body drain is not required.

~~b) Rupture disks may be installed upstream or downstream of the pressure relief valve(s) in accordance with the original code of construction.~~

c) Pressure relief valves ~~and rupture disks~~ shall be in accordance with the code of construction and designed for liquid, vapor, or combination service as required for the specific installation, service fluids, and overpressure conditions.

d) Cast iron fittings shall not be used.

e) Copper and copper alloys shall not be used.

~~d~~f) The inlet connection to the valve shall be not less than NPS ½ (DN 15).

2.3.3 LOCATION

Pressure relief ~~devices~~ valves shall be connected to the heater in accordance with the original code of construction.

2.3.4 CAPACITY

The pressure relief ~~device(s)~~valve(s) shall have sufficient capacity to prevent the pressure vessel from exceeding the maximum pressure specified in the vessel code of construction.

2.3.5 SET PRESSURE

a) When a single relief ~~device~~ valve is used, the set pressure marked on the device shall not exceed the maximum allowable working pressure.

b) When more than one pressure relief ~~device~~ valve is provided to obtain the required capacity, only one pressure relief ~~device~~ valve set pressure needs to be set at or below the maximum allowable working

pressure. The set pressure of the additional relief ~~devices~~ valves shall be such that the pressure cannot exceed the maximum pressure permitted by the code of construction.

2.3.6 INSTALLATION

Pressure relief valves and the associated discharge piping shall be installed in accordance with the heater Manufacturer's recommendations. The installation of the pressure relief valves required for Thermal Fluid Heaters shall include but not be limited to following requirements:

a) The pressure relief valve shall be provided with discharge piping. ~~When a discharge pipe is used, t~~The cross-sectional area of discharge piping shall not be less than the full area of the valve outlet. The size of the discharge lines shall be such that any pressure that may exist or develop will not reduce the relieving capacity or adversely affect the operation of the attached pressure vessel relief ~~devices~~valves. Discharge piping shall be as short and straight as possible and arranged to avoid undue stress on the pressure relief ~~device~~valve.

b) The pressure relief valve shall be connected to the pressure vessel in accordance with the original code of construction.

~~b~~c) The cross sectional area of the piping between the heater and the relief device shall be sized either to avoid restricting the flow to the pressure relief devices or made at least equal to the inlet area of the pressure relief devices connected to it.

~~c~~d) When two or more required pressure relief devices are placed on one connection, the inlet cross-sectional area of this connection shall be sized either to avoid restricting the flow to the pressure relief devices or made at least equal to the combined inlet areas of the pressure relief devices connected to it.

~~d~~e) Unless permitted by the code of construction, there shall be no intervening stop valve between the vessel and its pressure relief device(s), or between the pressure relief device and the point of discharge.

~~e~~f) Pressure relief device discharges shall be arranged such that they are not a hazard to personnel or other equipment and, when necessary, lead to a safe location, such as a catchment tank, for the disposal of fluids being relieved.

~~f~~g) Discharge lines from pressure relief ~~devices~~ valves shall be designed to facilitate drainage. ~~or be fitted with low point or valve body drains to prevent liquid from collecting in the discharge side of a pressure relief device.~~ Drain piping shall discharge to a safe location for the disposal of the fluids being relieved. The possibility of solidification of fluid leakage into the discharge piping system shall be considered.

~~g~~h) The pressure relief discharge ~~should~~ shall be connected to a closed, vented storage tank ~~or blowdown tank~~ with solid piping (no drip pan elbow~~,~~ or other air gap). The storage tank should be located as close to the system as possible, but away from flammable surfaces. Overflow or high level protection should be considered. The capacity of the storage tank should consider the volume of fluid which may be relieved or sized in accordance with the heater manufacturer's recommendation. Storage tanks located outdoors shall be located such that water cannot collect in the vessel. ~~When outdoor discharge is used,~~

~~t~~The following ~~should~~ shall be considered for discharge piping hazards.

~~at the point of discharge:~~

1) Both thermal and chemical reactions (personnel hazard);

2) Combustible materials (fire hazard);

3) Surface drains (pollution and fire hazard);

~~4) Loop seal or rain cap on the discharge (keep both air and water out of the system);~~

~~5) Drip leg near device (prevent liquid collection); and~~

~~6~~4) Heat tracing for systems using high freeze point fluids along the discharge line (prevent blockage).

~~h) A condenser that will condense all the vapors discharged from the pressure relief valve may be used in lieu of piping the vapors to the atmosphere.~~

~~i) In order to minimize the loss by leakage of material through the pressure relief valve, a rupture disk may be installed between the pressure relief valve and the vaporizer, provided the following requirements are met:~~

~~1) The cross-sectional area of the connection to a vaporizer shall be not less than the required relief area of the rupture disk.~~

~~2) The maximum pressure of the range for which the disk is designed to rupture shall not exceed the opening pressure for which the pressure relief valve is set or the maximum allowable working pressure of the vessel.~~

~~3) The opening provided through the rupture disk, after breakage, shall be sufficient to permit a flow equal to the capacity of the attached valve, and there is no chance of interference with the proper functioning of the valve, but in no case shall this area be less than the inlet area of the valve.~~

~~4) The space between a rupture disk and the valve shall be provided with a pressure gage, try cock, free vent, or a suitable telltale indicator. This arrangement permits the detection of disk rupture or leakage.~~

~~j~~i) Pressure relief valve discharge capacity for liquid service shall be determined from the following equation:

~~W = CKAP √(M/T)~~
~~Where:~~
~~A = discharge area of pressure relief valve~~
~~C = constant for vapor that is a function of the ratio of specific heats k = cp/cv .~~
~~**Note:** Where k is not known, k = 1.001.~~
~~K = coefficient of discharge for the valve design~~
~~M = molecular weight~~

~~P = (set pressure × 1.03) + Atmosphere Pressure~~
~~T = absolute temperature at inlet, °F + 460 (°C + 273)~~
~~W = flow of vapor~~

~~The required minimum pressure relief valve relieving capacity shall be determined from the following equation:~~

~~W = C x H x 0.75/h~~
~~Where:~~
~~C = maximum total weight or volume of fuel burned per hour, lb (kg) or ft3 (m3)~~
~~H = heat of combustion of fuel, Btu/lb (J/kg) or Btu/ft3 (J/m3)~~
~~h = latent heat of heat transfer fluid at relieving pressure, Btu/lb (J/kg)~~
~~W = weight of organic fluid vapor generated per hour~~
~~The sum of the pressure relief valve capacities marked on the valves shall be equal to or greater than W.~~

For Liquid
U.S. Customary Units
$W = 2{,}407KA\sqrt{(P - Pd)w}$

SI Units
$W = 5.092\ KA\sqrt{(P - Pd)w}$

Where.
W = Liquid Capacity in lb/hr (kg/hr).
A = Discharge Area of Pressure relief Valve, in^2 (mm^2)
K = coefficient of discharge for valve design
P = (Set pressure + OP + Atmosphere pressure, psia (Mpa)
OP = Overpressure required for Pressure Relief
Valve to reach capacity specified in
code of construction
Pd = Pressure at discharge of valve, psia (Mpa)
w = Specific weight of liquid at inlet condition
lb/ft^3 (kg/m^3)

To convert lb/hr of water to gal/min, multiply the capacity in lb/hr by 1/500.

!!!!!!! (SEE PART 1 PROPOSAL BEGINNING ON NEXT PAGE) !!!!!!!

PART 1

S5.7 OVERPRESSURE PROTECTION

S5.7.1 GENERAL REQUIREMENTS

Thermal fluid heaters shall be provided with overpressure protection in accordance with the code of construction.

S5.7.2 PRESSURE RELIEF ~~DEVICES~~VALVES

Thermal fluid heaters shall be equipped with one or more pressure relief ~~devices~~ valves unless the option for overpressure protection by system design is utilized (when permitted by the original code of construction).
When pressure relief devices are used, the following shall apply:

a) Pressure relief valve(s) shall be of a totally enclosed type. ~~and shall not have a lifting lever. A body drain is not required.~~

b) A lifting lever shall not be used in pressure relief valve(s). A body drain is not required.

~~b) Rupture disks may be installed upstream or downstream of the pressure relief valve(s) in accordance with the original code of construction.~~

c) Pressure relief valves ~~and rupture disks~~ shall be in accordance with the code of construction and designed for liquid, vapor, or combination service as required for the specific installation, service fluids, and overpressure conditions.

d) Cast iron fittings shall not be used

e) Copper and copper alloys shall not be used

~~d~~f) The inlet connection to the valve shall be not less than NPS ½ (DN 15).

S5.7.3 LOCATION

Pressure relief ~~devices~~ valves shall be connected to the heater in accordance with the original code of construction.

S5.7.4 CAPACITY

The pressure relief ~~device(s)~~valve(s) shall have sufficient capacity to prevent the pressure vessel from exceeding the maximum pressure specified in the vessel code of construction.

S5.7.5 SET PRESSURE

a) When a single relief ~~device~~ valve is used, the set pressure marked on the device shall not exceed the maximum allowable working pressure.

b) When more than one pressure relief ~~device~~ valve is provided to obtain the required capacity, only one pressure relief ~~device~~ valve set pressure needs to be set at or below the maximum allowable working pressure. The set pressure of the additional relief ~~devices~~ valves shall be such that the pressure cannot exceed the maximum pressure permitted by the code of construction.

S5.7.6 INSTALLATION

Pressure relief valves and the associated discharge piping shall be installed in accordance with the heater Manufacturer's recommendations. The installation of the pressure relief valves required for Thermal Fluid Heaters shall include but not be limited to following requirements.

a) The pressure relief valve shall be provided with discharge piping. ~~When a discharge pipe is used, t~~The cross-sectional area of the discharge piping shall not be less than the full area of the valve outlet. The size of the discharge lines shall be such that any pressure that may exist or develop will not reduce the relieving capacity or adversely affect the operation of the attached pressure vessel relief ~~devices~~valves. Discharge piping shall be as short and straight as possible and arranged to avoid undue stress on the pressure relief ~~device~~valve.

b) The pressure relief valve shall be connected to the pressure vessel in accordance with the original code of construction.

~~b~~c) The cross sectional area of the piping between the heater and the relief ~~device~~ valve shall be sized either to avoid restricting the flow to the pressure relief ~~devices~~ valves or made at least equal to the inlet area of the pressure relief ~~devices~~ valves connected to it.

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~~f~~g) Discharge lines from pressure relief ~~devices~~ valves shall be designed to facilitate drainage~~. or be fitted with low point or valve body drains to prevent liquid from collecting in the discharge side of a pressure relief device~~. Drain piping shall discharge to a safe location for the disposal of the fluids being relieved. The possibility of solidification of fluid leakage into the discharge piping system shall be considered.

h) The pressure relief valve discharge shall be connected to a closed, vented storage tank with solid piping (no drip pan elbow or other air gap). The storage tank should be located as close to the system as possible, but away from flammable surfaces. Overflow or high level protection should be considered. The capacity of the storage tank should consider the volume of fluid which may be relieved or sized in accordance with the heater manufacturer's recommendation. Storage tanks located outdoors shall be located such that water cannot collect in the vessel.

The following shall be considered for discharge piping hazards.

1) Both thermal and chemical reactions (personnel hazard).

2) Combustible materials (fire hazard)

3) Surface drains (pollution and fire hazard)

4) Heat tracing for systems using high freeze point fluids (prevent blockage)

i) Pressure relief valve discharge capacity for liquid service shall be determined from the following equation:

For Liquid
U.S. Customary Units
$W = 2{,}407KA\sqrt{(P - Pd)w}$

SI Units
$W = 5.092\ KA\sqrt{(P - Pd)w}$

Where.
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K = coefficient of discharge for valve design
P = (Set pressure + OP + Atmosphere pressure, psia (Mpa)
OP = Overpressure required for Pressure Relief
Valve to reach capacity specified in
code of construction
Pd = Pressure at discharge of valve, psia (Mpa)
w = Specific weight of liquid at inlet condition
lb/ft³ (kg/m³)

To convert lb/hr of water to gal/min, multiply the capacity in lb/hr by 1/500.