PTFH-11 INSTRUMENTATION

PTFH-11.1 Pressure. Each liquid phase thermal fluid heater shall have a pressure gage(s) so located that it is visible and easily read from the operating floor. The pressure gage(s) or indicator(s) shall be installed so that it shall indicate the pressure in the heater at all times.

PTFH-11.2 Temperature. Each liquid phase thermal fluid heater shall have a temperature gage or other instrumentation indicating the temperature of the fluid in the heater at or near the outlet connection from the heater. The temperature gage or indicator shall be so located that it is visible and easily read from the operating floor at all times during operation.

PTFH-11.3 Fluid Flow. Each liquid phase thermal fluid heater shall have instrumentation that visibly indicates flow of the heat transfer medium through the heater during operation. Instrumentation that monitors or indicates differential pressure across the heater or other device in the associated closed loop circulation system may be used. The instrumentation shall be so located that it is visible and easily read from the operating floor. The fluid flow instrumentation shall have provisions for shutdown of the heat source to the heater in the event of an interruption or cessation of the fluid flow during operation.

PTFH-12 OVERPRESSURE PROTECTION

PTFH-12.1 Intended Service Conditions. The heater Manufacturer shall ascertain and identify all intended service conditions including normal operating and upset conditions and identify any potential overpressure scenarios based on the characteristics of the heat transfer fluid. The heater Manufacturer shall consider methods of overpressure protection that can be used to mitigate each scenario. Intended service conditions shall also include but are not limited to the following conditions:

(a) the heater and the system are open to the atmosphere
(b) the heater and the system are closed to the atmosphere
(c) the system is internally pressurized with an inert gas (blanketed)

PTFH-12.2 Pressure Relief Valves. Each liquid phase thermal fluid heater shall have at least one pressure relief valve. For heaters having more than 500 ft² (47 m²) of liquid heating surface or an electric heating capacity greater than 1,100 kW, two or more pressure relief valves shall be provided. The heater Manufacturer shall ensure that the specified pressure relief valves are suitable for the intended service conditions of thermal fluid heaters as defined in PTFH-12.1. The type and rating of the pressure relief valve(s) shall be determined by the characteristics of the thermal fluid selected for the system.

Systems whose intended service conditions are described in PTFH-12.1 shall be provided with a pressure relief valve(s) designed for liquid service in accordance with PTFH-12.3.

PTFH-12.3 Liquid Service Pressure Relief Valve. The liquid service pressure relief valve as required in PTFH-12.2 shall be designed in accordance with the rules of this Section with the following additional requirements:

(a) Pressure relief valves for liquid phase thermal heaters shall be of a totally enclosed type designed for liquid service.
(b) The pressure relief valves shall have a relieving capacity that shall discharge fluid without allowing the pressure to rise more than 10% or 3 psi (20 kPa) (whichever is greater) above the maximum allowable working pressure (MAWP) stamped on the completed heater.
(c) The pressure relief valve setting shall be no higher than the MAWP stamped on the completed heater.
(d) The inlet connection to the valve shall be not less than NPS 1/2 (DN 15).
(e) The pressure relief valve shall not have a lifting lever.
(f) Valve body drains are not required.
(g) The pressure relief valve shall be provided with suitable discharge piping.

(b) In addition to the marking requirements of PG-110, the letters "PTFH" shall be marked on the pressure relief valve or its nameplate.

PTFH-12.4 Certification. Pressure relief valves for liquid service shall be tested and certified as provided in PG-69 and the applicable requirements in PG-73. The manufacturer’s capacity certification of pressure relief valves for incompressible fluids shall be conducted on water at a temperature between 40°F and 125°F (5°C and 50°C) and at a pressure that does not exceed the set pressure of the valve under test by 10% or 3 psi, whichever is greater. The valve shall be plainly marked by the manufacturer with the required data in accordance with PG-110(e)(3).

PTFH-12.5 Thermal Fluid.

PTFH-12.5.1 The heater Manufacturer shall tag the pressure relief valve with the following:
(a) the manufacturer, trade name, and designator or type of thermal fluid
(b) the relieving capacity of the thermal fluid for which the system was designed

PTFH-12.5.2 The remarks section of the heater Manufacturer’s Data Report shall include the following:
(a) manufacturer, trade name, and designator or type of thermal fluid
(b) the maximum designed flow rate, gal/min (L/min)
(c) the maximum operating temperature of the heater

PTFH-12.6 Pressure Relief Valve and Discharge Piping. Pressure relief valves and the associated discharge piping shall be installed in accordance with the heater Manufacturer’s recommendations.
PG-73.2.4 To provide a means for verifying whether it is free, each safety valve or safety relief valve shall have a substantial lifting device, which when activated will release the seating force on the disk when the valve is subjected to pressure of at least 75% of the set pressure. The lifting device shall be such that it cannot lock or hold the valve disk in lifted position when the exterior lifting force is released. Disks of pressure relief valves used on high-temperature water boilers shall not be lifted while the temperature of the water exceeds 200°F (93°C). If it is desired to lift the valve disk to assure that it is free, this shall be done when the valve is subjected to a pressure of at least 75% of the set pressure. Pilot-operated pressure relief valves shall be provided with either a lifting device as described above or means for connecting and applying pressure to the pilot adequate to verify that the moving parts critical to proper operations are free to move. For high-temperature water boilers, the lifting mechanism shall be sealed against leakage.

PG-73.2.5 The seat of a pressure relief valve shall be fastened to the body of the valve in such a way that there is no possibility of the seat lifting.

PG-73.2.6 A body drain below seat level shall be provided in the valve and this drain shall not be plugged during or after field installation. For valves exceeding NPS 2 1/2 (DN 65), the drain hole or holes shall be tapped not less than NPS 3/8 (DN 10). For valves of NPS 2 1/2 (DN 65) or smaller, the drain hole shall not be less than 1/4 in. (6 mm) in diameter.

PG-73.2.7 In the design of the body of the valve, consideration shall be given to minimizing the effects of water deposits.

PG-73.2.8 Valves having screwed inlet or outlet connections shall be provided with wrenching surfaces to allow for normal installation without damaging operating parts.

PG-73.2.9 Means shall be provided in the design of all valves for use under this Section, for sealing all external adjustments. Seals shall be installed by the manufacturer, his authorized representative, or an assembler at the time of the initial adjustment. After spring replacement and/or subsequent adjustment, the valve shall be resealed. Seals shall be installed in such a manner as to prevent changing the adjustment without breaking the seal and, in addition, shall serve as a means of identifying the manufacturer, his authorized representative, or the assembler making the adjustment.

PG-73.2.10 Valve capacity may be restricted by restricting the lift of a valve provided the following requirements are met:

(a) The valve size shall be NPS 3/4 (DN 20) or larger.
(b) No changes shall be made in the design of the valve except to change the valve lift by use of a lift restraining device described in (c) below.
(c) The restriction of valve capacity shall be permitted only by the use of a lift restraining device which shall limit valve lift and shall not otherwise interfere with flow through the valve. The design of the lift restraining device shall be subject to review by an ASME designee.
(d) The lift restraining device shall be designed so that, if adjustable, the adjustable feature can be sealed. Seals shall be installed by the valve manufacturer or assembler at the time of initial adjustment.
(e) Valves shall not have their lifts restricted to a value less than 30% of full rated lift, or 0.080 in. (2 mm).
(f) When sizing and selecting valves, the restricted lift nameplate capacity shall be determined by multiplying the capacity at full rated lift by the ratio of the restricted lift to the full rated lift.

PG-73.2.11 A pressure relief valve over NPS 3 (DN 80), used for pressure greater than 15 psig (100 kPa), shall have a flanged inlet connection or a welded inlet connection. Power-actuated pressure-relieving valve inlet connection requirements are provided in PG-68.6. The dimensions of the flanges subjected to boiler pressure shall conform to the applicable ASME standards as given in PG-42. The facing shall be similar to those illustrated in the standard.

PG-73.2.12 The pilot sensing line of pilot-operated pressure relief valves shall be adequately protected from freezing.

PG-73.3 Material Selections.

PG-73.3.1 Cast iron seats and disks are not permitted.

PG-73.3.2 Adjacent sliding surfaces such as guides and disks or disk holders shall both be of corrosion-resistant material. Springs of corrosion-resistant material or having a corrosion-resistant coating are required. The seats and disks of pressure relief valves shall be of suitable material to resist corrosion by the lading fluid. NOTE: The degree of corrosion resistance, appropriate to the intended service, shall be a matter of agreement between the manufacturer and the purchaser.

PG-73.3.3 Materials used in bodies and bonnets or yokes shall be listed in Section II, Parts A and B, and identified in Tables 1A and 1B of Section II Part D, as permitted for Section I construction. Materials used in body to bonnet or body to yoke bolting shall be listed in ASME B16.34. Materials used in all other parts required for the pressure-relieving or pressure-retaining function shall be (a) listed in ASME Section II

(b) listed in ASTM Specifications (see Note below) or
is irremovably attached by welding, provided such welding is postweld heat treated, or on a circular metal band at least 7/8 in. (6 mm) thick. This band around the pipe shall be secured in such a manner as to prevent it from slipping off during handling and installation.

Welded piping NPS 2 (DN 50) or less included within the scope of this Code shall be marked with an identification acceptable to the Inspector and traceable to the required Data Report. Such marking shall be of a type that will remain visible until the piping has been installed.

(19) PG-109.3 A manufacturer in possession of the pressure piping Certification Mark may

(a) design and fabricate welded piping. Such fabrications shall be stamped and reported on a Form P-4A, Manufacturer’s Data Report for Fabricated Piping, as called for in PG-112.2.5.

(b) fabricate other parts of boilers, such as superheater, waterwall, or economizer headers, where complete design requirements are provided by others. Such parts shall be stamped or marked as required by PG-106.8 and reported on a Form P-4, Manufacturer’s Partial Data Report, as called for in PG-112.2.4.

(19) PG-109.4 Mechanically assembled boiler external piping which contains no pressure boundary welds does not require stamping, and as such may be assembled by a nonstamp holder. Note that the responsibility for documentation and hydrostatic testing of a mechanically assembled boiler external piping must be assumed by a holder of a valid Certification Mark with the “S,” “A,” or “PA” Designator (see PG-112.2.5).

PG-110 STAMPING OF BOILER PRESSURE RELIEF VALVES

Each pressure relief valve shall be plainly marked with the required data by the Manufacturer or Assembler (see PG-73.4.4) in such a way that the marking will not be obliterated in service. The marking shall be placed on the valve or on a metal nameplate securely fastened to the valve. The other required data may be stamped, etched, impressed, cast, or applied by other means acceptable to the ASME Designated Organization on the valve or nameplate. For units other than those included below, see PG-4. The marking shall include the following:

(a) the name (or an acceptable abbreviation) of the Manufacturer and Assembler, as applicable

(b) Manufacturer’s design or type number

(c) NPS (DN) (the nominal pipe size of the valve inlet)

(d) set pressure _____ psi (MPa), and if applicable per PG-73.5.2, cold differential test pressure _____ psi (MPa)

(e) Capacity

(1) capacity _____ lb/hr (kg/h) (for saturated steam service in accordance with PG-69.2) or

(2) capacity _____ lb/hr (kg/h) at _____ °F (°C) (for power-actuated pressure-relieving valves in accordance with PG-69.4, or for pressure relief valves for superheated steam service in accordance with PG-68.7 or supercritical steam service in accordance with PG-67.5)

(3) capacity _____ gal/min (l/min) at 70°F (20°C) at an overpressure of 10% or 3 psi (20 kPa), whichever is greater, for valves certified on water or

(4) capacity _____ lb/hr (kg/h) at _____ °F (°C) _____ (fluid identification) (for organic fluid vaporizers in accordance with PVG-12.4)

(h) year built, or alternatively, a coding may be marked on the valve such that the valve Manufacturer or Assembler can identify the year the valve was assembled and tested

(g) Certification Mark as shown in Figure PG-105.1 with a “V” Designator placed under the Certification Mark. A marking method other than the stamp issued by the Society may be used, provided that it is acceptable to the ASME Designated Organization.

(h) The pilot of a pilot-operated pressure relief valve shall be plainly marked by the Manufacturer or Assembler showing the name of the Manufacturer, the Manufacturer’s design or type number, the set pressure in pounds per square inch (MPa), and the year built, or alternatively, a coding that the Manufacturer can use to identify the year built.

PG-111 LOCATION OF STAMPINGS

The location of the required stampings shall be as listed below. These stampings shall be left uncovered or an easily removable marked cover may be provided over the stamping when a boiler is covered with insulation, or jacketed. No piping, boiler appliance, or other obstructions shall interfere with reading of the stamping.

PG-111.1 Horizontal-return tubular boilers — on the front head above the central rows of tubes.

PG-111.2 Horizontal-flue boilers — on the front head above the flues.

PG-111.3 Traction, portable, or stationary boilers of the locomotive type or Star watertube boilers — on the furnace end above the handhole. Or on traction boilers of the locomotive type — on the left wrapper sheet forward of the driving wheel.

PG-111.4 Vertical firetube and vertical submerged tube boilers — on the shell above the firedoor and handhole opening.

PG-111.5 Watertube Boilers.

PG-111.5.1 Drum type — on a head of the steam outlet drum near and above the manhole.

PG-111.5.2 Forced-flow steam generator with no fixed steam and waterline — the master stamping (PG-106.3) shall be located on a major pressure part, located near the main operating floor where readily visible. The Data Report Form shall record the location of the master stamping.