PART PVG
REQUIREMENTS FOR ORGANIC FLUID VAPORIZERS

GENERAL

PVG-1 GENERAL

The rules in Part PVG are applicable to organic fluid vaporizers and parts thereof and shall be used in conjunction with the general requirements in Part PG as well as with the special requirements in the applicable Parts of this Section that apply to the method of fabrication used.

MATERIALS

PVG-5 GENERAL

PVG-5.1 Materials used in the construction of pressure parts for organic fluid vaporizers shall conform to one of the specifications in Section II and shall be limited to those for which allowable stress values are given in Section II, Part D, Subpart 1, Tables 1A and 1B. Pressure relief valve materials shall conform to PG-73.3.3.

PVG-5.2 The requirements for materials given in Part PG shall apply in all respects to organic fluid vaporizers.

DESIGN

PVG-8 GENERAL

The rules in the following paragraphs apply specifically to the design of organic fluid vaporizers and parts thereof and shall be used in conjunction with the general requirements for design in Part PG as well as with the specific requirements for design in the applicable Parts of this Section that apply to the method of fabrication used.

PVG-9 GENERAL REQUIREMENTS

The Manufacturer shall be responsible for providing in the design the limited heat absorption rates, proper furnace proportions, etc., which will permit satisfactory and safe operation of the vaporizers under all conditions of operation.

PVG-10 GAGE GLASSES

Gage glasses shall be of the flat glass type with forged steel frames. Gage cocks shall not be used.

PVG-11 DRAIN VALVES

Suitable drain valves of the globe or angle type may be used in lieu of the blowoff valve required in ASME B31.1.

PVG-12 PRESSURE RELIEF VALVES

PVG-12.1 Pressure relief valves shall be of a totally enclosed type so designed that vapors escaping beyond the valve seat shall not discharge into the atmosphere, except through an escape pipe that will carry such vapors to a safe point of discharge outside of the building. A suitable 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. The pressure relief valve shall not have a lifting lever. In addition to the marking requirements of PG-110, the letters "PVG" shall be marked on the pressure relief valve or its nameplate. The vaporizer shall be designed in accordance with the rules in this Code for a working pressure of at least 40 psi (280 kPa) above the operating pressure at which it will be used. Valve body drains are not mandatory.

PVG-12.2 Pressure relief valves should be disconnected from the vaporizer at least once yearly (or as recommended by the vaporizer Manufacturer or valve manufacturer). If disconnected, the pressure relief valve should be inspected, repaired if necessary, tested and then replaced on the vaporizer.

PVG-12.3 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 requirements of PGV-12.3.1 through PGV-12.3.4.3 are met.

PVG-12.3.1 The cross-sectional area of the connection to a vaporizer shall be not less than the required relief area of the rupture disk.

PVG-12.3.2 Every rupture disk shall have a specified bursting pressure at a specified temperature, shall be marked with a lot number, and shall be guaranteed by its manufacturer to burst within 5% (plus or minus) of its specified bursting pressure.

PVG-12.3.3 The specified bursting pressure at the coincident specified temperature shall be determined by bursting two or more specimens from a lot of the same material and of the same size as those to be used. The tests shall be made in a holder of the same form and pressure area dimensions as that with which the disk is to be used.

PVG-12.3.4 A rupture disk may be installed between a pressure relief valve and the vaporizer provided the requirements in PVG-12.3.4.1 through PVG-12.3.4.3 are met.
compressed solid three additional times after presetting at room temperature) shall not exceed 0.5% of the free height.

**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\(\frac{1}{2}\) (DN 65), the drain hole or holes shall be tapped not less than NPS \(\frac{3}{8}\) (DN 10). For valves of NPS 2\(\frac{1}{2}\) (DN 65) or smaller, the drain hole shall not be less than \(\frac{1}{4}\) 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 \(\frac{3}{4}\) (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 \( \frac{3}{4} \) 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.

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.

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 “PP” 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) (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) or
   (3) capacity _____ gal/min (l/min) at 70°F (20°C) at an overpressure of 10% or 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)
(f) 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.