

**Case: BC23-01**  
**Stop Valves Used In Pressure Relief**  
**Systems Of Thermal Fluid Heaters**  
**0800-3-3-.10(6)(d)**

**Statement of Need:** ECS Consulting, LLC is requesting, on behalf of its clients, a ruling by the Tennessee Board of Boiler Rules (Board) to allow stop (isolation) valves to be installed on the piping within the inlet and outlet of the relief path of the pressure relief valve(s) of a liquid phase thermal fluid heater utilizing hot oil.

**Background:** This request applies to closed-loop liquid phase thermal fluid heaters (flooded pressure vessel) in which a heat transfer medium (thermal fluid) is heated, but no vaporization occurs within the vessel.

These types of heaters (high-temperature power boilers), utilized in Tennessee, are built to Part PTFH of ASME BPVC Section I (or VIII, division 1 "Direct Fired").

Because of the potential degradation of the thermal fluid when exposed to the atmosphere, as well as the excessive heat of the thermal fluid, it is much safer to perform maintenance and replacement of the pressure relief valve(s) without draining the heater of its thermal fluid.

For this practice to occur, the relief path leading to and discharging from the pressure relief valve must be isolated so hot thermal fluid will not escape from the closed-loop thermal fluid system.

Since users want to ensure that the heater operates in a safe condition at all times, a redundant set of pressure relief valve(s) is also installed. The heater would not operate without an inline and operational pressure relief valve(s).

During the construction of thermal fluid heaters, the applicable ASME code does not allow for isolating stop valves on either side of the pressure relief valve(s). The same restriction applies to existing power boilers within Rule 0800-3-3-.10(6)(d),

However, the ASME BPVC allows for exemptions for consideration. Within

ASME Section XIII, Appendix B, there are extensive guidelines providing instructions to the user and jurisdictional authority on how to enable the process to be handled.

Therefore, the request is presented to the Board for the following inquiry and reply.

**Inquiry:** May stop valves be installed within the relief path of a liquid phase thermal fluid heater's pressure relief valve(s)?

**Reply:** It is in the opinion of the Board that stop (isolation) valves may be installed within the relief path of a pressure relief valve of a liquid phase thermal fluid heater provided the following requirements are met:

- 1) Before installation and/or implementation, the owner/user must apply by permit application requesting acceptance by the Boiler Inspection Unit.
  - i) A copy of each heater manufacturer's data report and specification datasheet shall accompany the permit application.
  - ii) The manufacturer's data report must indicate the thermal fluid medium, as required by the original code of construction.
- 2) At the time of application, the owner/user must provide a written administrative control outlining procedures to ensure the heater is continuously protected against overpressure.
  - i) The administrative control must contain an outline for training operators in procedures.
- 3) The Chief Inspector or their designee shall present the written administrative control procedures to the Board for tentative approval at the next Board meeting before the Boiler Inspection Unit accepts the application.

- 4) The heater must be provided with redundant pressure relief valve(s) to ensure at all times that the heater is protected against over pressurization while in operation. At no time may a heater be operated with both sets of pressure relief valves having the inlet and discharge valves in the closed position.
- 5) The inlet connection/piping to and discharge piping from the pressure relief valve(s) must be of the cross-sectional area required by the original code of construction.
- 6) Each stop valve utilized in the relief path of the pressure relief valve(s) inlet and discharge shall:
  - i) Be of the gate valve type construction,
  - ii) Designed for thermal hot oil service.
  - iii) The open/close position of the valve must be readily recognizable with a rising stem.
  - iv) The stop valve's flow resistance (pressure drop) in the full open position does not reduce the relieving capacity below that required by the heater code of construction. The cross-sectional area of the inlet or outlet of the stop valve(s) shall not be larger than the inlet seat diameter opening of the pressure relief valve(s). Information on the stop valve's flow characteristics shall be provided with the installation permit application.
  - v) A mechanical locking element that provides a physical barrier to the operation of the stop valve and contains a means to lock the valve(s) from unauthorized operation.