

SCOPE

- I ↗ 1.1 This practice covers the arrangement of various piping around fired process heaters (hereinafter referred to as heaters), and boilers, except where it conflicts with local rules and regulations. The fuel system requirements are also applicable to incinerators, flue gas generators and similar combustion equipment.
- I ↗ 1.2 The contents of this practice are arranged as follows:

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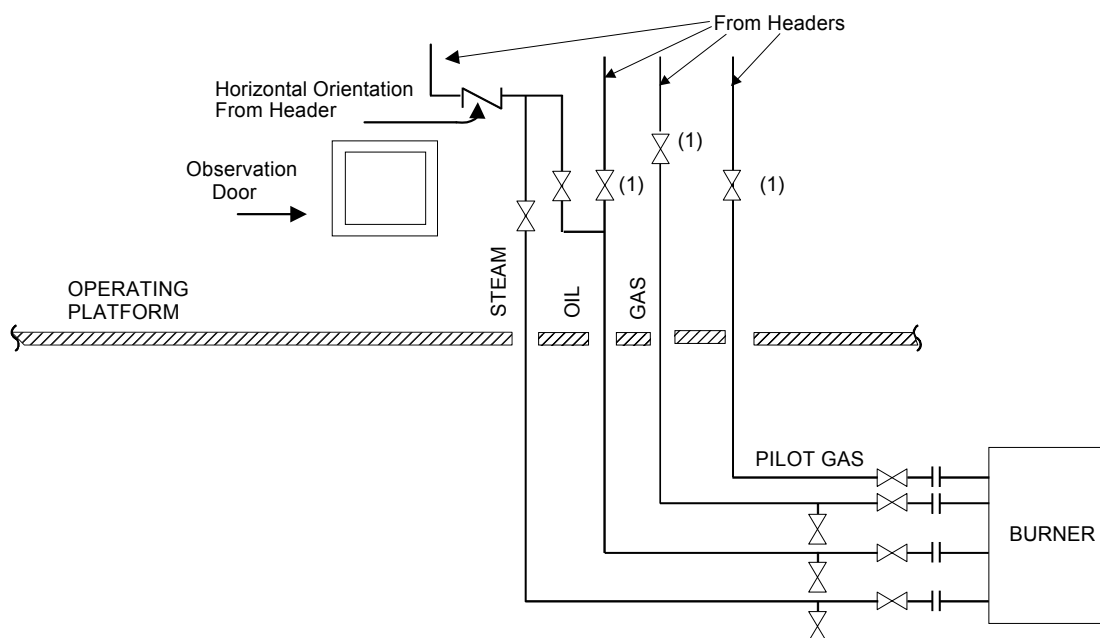
- I ↗ 1.3 **An asterisk (*)** indicates that a decision by the Purchaser is required, or that additional information is furnished by the Purchaser.
- I ↗ 1.4 The following references are synonymous: BP and IP.

FUEL SYSTEM PIPING

- R,M 2.1 **Piping for individual burners** shall be taken from the top of headers.
- M ↗ 2.2 **Piping for individual burners** shall have breakaway connections (flanges or unions) located at the minimum practicable distance from the burner to allow removal of complete burner assembly.
- R,M ↗ 2.3 All fuel headers shall have **connections to facilitate cleaning** before startup or during downtime. All dead ends shall have blind flanges. The length of such dead ends shall be minimized.
- O ↗ *2.4 **Fuel oil system shall be designed** so that during startup and shutdown operations fuel oil can be provided at the burner with a viscosity no less than the maximum permissible value for burner light-off.
- R,M 2.5 **Fuel oil (heavier than 30° API or 0.876 relative density) piping** shall be insulated to the burner and heat traced to the last breakaway connection. Arrangement and insulation system shall be designed for maximum of 5°F (3°C) fuel oil temperature difference between the first and last burners served by a common control valve under the following conditions:
 - a. Design flow rate.
 - * b. Specified winter ambient conditions.
 - c. Assuming non-operation of the heat tracing.
- R ↗ 2.6 **Fuel oil header** shall be located as closely as practicable to the fuel valves for individual burners.
- R,M ↗ *2.7 Unless otherwise specified, **all fuel lines** (including the pilot gas and atomizing steam lines) **shall have filters** to remove scale and other materials larger than 25% of the diameter of the smallest burner orifice or burner tip holes. Filters must be cleanable without interruption of fuel flow.
- R,S ↗ *2.8 **Knockout drums** shall be installed in the main fuel gas supply line and pilot gas line (if separate supply other than natural gas) to prevent condensate entry. A single drum for multiple heater or boiler installations requires Owner's approval.
 - a. The drums shall be fitted with a gauge glass and a high level alarm.
 - b. Dump line to flare system is required.
 - c. Drums shall not be insulated or heat traced, unless specified by the Owner.
 - d. Located no closer than 50 ft (15 m) from the fired equipment.
- S ↗ *2.9 Main fuel gas and pilot gas piping downstream of the knockout drum shall be heat traced and insulated to the breakaway connection nearest the burner except when ambient conditions and fuel sources are such as to ensure no condensation under all operating and weather conditions.

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- O 2.10 **Piping to individual burners** of fired heaters shall be arranged as shown below, unless otherwise specified. Locate burner valves adjacent to observation doors to permit burner adjustments while observing the flame.



Note:

- (1) Valves used for lighting pilot and main burner must be soft seated valves, either ball or V ported plug type. Other isolation valves may be gate or globe valves. Unless otherwise specified, **individual burner valves need not be fire-tested.**

- O * 2.11 Unless otherwise specified, **flexible metal hose is acceptable** in individual burner piping. Fittings shall be selected to avoid twisting hose during installation. Details of hose selection and installation details are subject to Owner's review and approval.

UTILITY PIPING

PURGING AND SMOTHERING STEAM (HEATERS)

- S 3.1 **Purging steam piping**, with an RO sized for three radiant section volume changes in 15 minutes, shall be provided to purge the heater unless alternative means to purge the heater prior to light-off have been specified. Acceptable alternative means of purging include use of FD or ID fans, where provided, and steam or air nozzles in the stack to induce purging airflow.
- S 3.2 **Smothering steam piping** shall be provided to the return header housing of fired heaters using rolled headers, or headers with screw or plug type closures. **Smothering steam piping** shall be taken from main steam headers to prevent inadvertent shut off. **Valves for smothering steam** shall be located at grade and a minimum of 50 ft (15 m) from the heater for accessibility in an emergency and shall be suitably identified.
- S,O 3.3 **Drain holes piped without valves** to a safe discharge point shall be provided in purge steam and smothering steam piping downstream of valves, to preclude the collection of water when not in use.

INSTRUMENT CONNECTIONS (HEATERS)

- R * 3.4 Unless otherwise specified, draft gage piping shall consist of 1/2 in. (13 mm) stainless steel tubing.
- O,R 3.5 There shall be an 18 in. (450 mm) upward loop in the draft gage piping at the connection on the heater to allow condensate to drain into the heater. Remainder of piping must slope continuously toward the gage at grade where a small drain pot with valve shall be provided at each draft gage.