

## Important safety Instructions for Installation

1. The installer must ensure that check valves (non-return) are fitted immediately upstream of both the water inlet and steam inlet connections on the heater body.
2. The heater will only function efficiently when there is sufficient pressure differential across the heater, between the steam/water inlet and the hot water outlet. The pressure at the hot water outlet must not exceed one half the lower of either the water or steam inlet pressures.
3. The steam and water supply lines must incorporate tamper-proof pressure relief valves fitted upstream of the heater, in conjunction with the provision of safe return lines. This will ensure that the heater unit cannot experience system pressures in excess of the maximum design pressure of 9.0 barg.
4. With steam temperatures as high as 180 °C, it is essential that any parts of the system that can be touched are adequately guarded or lagged to prevent burns.
5. Steam temperature monitoring and regulation can be achieved by fitting a temperature measuring and display device in the steam line, adjacent to the steam inlet connection.
6. The outlet of the heater must be positioned and directed within the process and protected if necessary, such that any abnormal discharge e.g. steam or dangerous water temperature, would not constitute a hazard.

**Safety aspects** addressed within the design of the unit include:

- a) Clear labelling of steam and water inlet ports, and the hot water outlet port on the heater body, to avoid misidentification during installation
- b) Internal components labelled in a manner which will prevent incorrect assembly
- c) Permanent label attached to the outside of the heater body, quoting maximum working pressure and temperature for the unit.
- d) Coded pressure design for the heater body, branches and end caps.
- e) All aspects of the design have been considered in a HAZOP analysis to identify potential safety and operability problems at the design stage.

## Maintenance and Inspection

Inspection of the exterior of the heater unit and its associated pipe work is fairly straightforward and will serve to identify problems such as steam and/or water leakage.

Inspection and maintenance within the heater body will require some disassembly, but will be necessary in order to check the condition of the internal components such as Raschig rings, nozzle box, retaining grid, spring, and seals.

Any visually observed damage to these components can have serious consequences on the heater operation and safety. The heater should be taken out of service and damaged components replaced.

## Harmonised Standards applicable to the design of the heater unit

Pressure design calculations for the Cox Water Heaters' (PD5500 2000; Category 2) this exceeds the requirements set out in the Pressure Equipment Directive, which prescribes 'Sound Engineering Practice' as adequate design conformity. Heater unit performance and pipe sizing. (The Piping Handbook; 5<sup>th</sup> edition; Crocker and King; McGraw-Hill)