
STANDATA bulletin 20-PCB-004

Plumbing

Single wall heat exchangers

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Purpose

This bulletin informs the plumbing industry of the sale and installation requirements for indirect hot water heaters using single wall heat exchangers.

Discussion

Suppliers and installers are reminded that domestic hot water heaters with a remote heat source and heat exchanger must be installed in accordance with good engineering practice that meets the objectives of the National Plumbing Code of Canada (NPC) 2020, as adopted by the Plumbing Code Regulation (119/2007). Hot water heating boilers and steam boilers can be used to indirectly heat a hot water supply using single wall built-in or external heat exchangers installed in accordance with the following:

- a) the pressure of the heat transfer fluid must be less than the minimum operating pressure of the potable water system;
- b) the system must be fitted with a means to automatically maintain the pressure of the heat transfer fluid entering the heat exchanger at a pressure less than the normal minimum operating pressure of the potable water system;
- c) the heat exchanger is equipped with isolation valves on the inlet and outlet piping; and
- d) a prominent and permanent label is attached to the boiler adjacent to the relief valve with instructions to advise the owner of the safe operation and maintenance of the system.

The NPC objective is to provide protection from contamination.

Unless stated otherwise, all Code references in this STANDATA are to the National Plumbing Code of Canada 2020

Issued by the Provincial Plumbing Administrator

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Code Reference

NPC 2.6.2.1 Connection of Systems

2.6.2.1 (1)
 Connections to *potable water systems* shall be designed and installed so that non-*potable* water or substances that may render the water non-*potable* cannot enter the system.

The intent of the applicable standards and the Plumbing Code Regulations is that indirect water heaters with single wall heat exchangers are approved for connection to a potable water system when a heat transfer fluid is non-toxic. A heat transfer fluid would be considered non-toxic when it is not poisonous, mutagenic, teratogenic, nor carcinogenic to humans.

The use of single wall heat exchangers is not acceptable if the heat transfer fluid does not meet the non-toxic standard or classification. Heat transfer fluids that are toxic must be separated from the potable water using atmospherically vented double wall heat exchangers or equivalent protection.

The types of heat exchanger that may be utilized are based on the heat transfer and the specific application such as:

No chemicals added or Non-toxic chemical added	Toxic chemical added
Single wall The system shall be arranged to function automatically so that the pressure of the heat transfer medium entering the heat exchanger is maintained at a pressure below that of the normal operating pressure of the domestic hot water leaving the heat exchanger (see CSA-B214).	Double wall Must have visible means of leak detection. Chemically compatible with the heat transfer fluid. Heat transfer liquids and heat exchangers to comply with CSA-F379.1.
Degree of Hazard – Minor and Moderate	Degree of Hazard - Severe

Marking

The manufacturers of indirect hot water tanks equipped with a single-wall heat exchanger must provide permanent labels for the hot water tank and the boiler with the operating and maintenance instructions for the hot water heater.

A label of an approved design must be affixed by the installer on the side of the boiler in close proximity to the relief valve where it may be observed by the owner/operator of the system. This label must be made of material that is not adversely affected by water with a non-water-soluble adhesive. The physical label specifications must have a 1/8 inch (3.2 mm) border and sized adequately to contain the word “**Caution**” in boldfaced letters having a minimum height of 0.140 inches (3.56 mm) and the operating instructions having a minimum uppercase height of 0.120 inches (3.05 mm) indicating the following:

- a) The heat transfer fluid must be water or other non-toxic fluid.
- b) If there is evidence of discharge from the boiler relief valve, the single wall heat exchanger must be examined for leaks causing the overpressure in the system.
- c) For safe operation the relief valve(s) must not be removed, plugged, or replaced with a relief valve of a higher-pressure rating.
- d) Before installation of any replacement parts in the system, the installer shall ensure the replacement parts are the same or provide operational characteristics at least equivalent to the original part.
- e) Provide a “Warning”. Do not add toxic chemical treatment additives or ethanol antifreeze to the heat transfer fluid. This system is equipped with a single-wall heat exchanger in the indirect hot water heater.

Installer Responsibilities

The installer must ensure:

- a) the "caution" label(s) are affixed in a visible location adjacent to the boiler relief valve;
- b) the manufacturer's instructions supplied with the indirect hot water heater are left on-site for the owner;
- c) no toxic chemicals or antifreeze are added to the system at the time of installation; and
- d) the indirect hot water heater and remote heat source are in safe working order before leaving the installation; and the owner is instructed in the safe and correct operation of the system.