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SUBJECT: Single Wall Heat Exchangers

This bulletin has been jointly developed by Safety Services and the Plumbing Technical Council to inform the plumbing industry of the requirements associated with the sale and installation of **Indirect Hot Water Tanks** using "**SINGLE WALL HEAT EXCHANGERS**".

Suppliers and **Installers** are reminded that Domestic Hot Water Tanks with a Remote Heat Source and Heat Exchanger shall be installed in accordance with good engineering practice and meet the objectives of the **National Plumbing Code of Canada (NPC) 2010**. 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 and **Sentence 2.6.2.1 (1)** states:

"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".



Issue of this STANDATA is authorized by
the Administrator

[Original Signed]
Sidney Manning



SAFETY CODES COUNCIL

The intent of the applicable standards and the Plumbing Code Regulations is that Indirect Water Heaters with **single wall** heat exchanger 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 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

<p align="center">No chemicals added or Non-toxic chemical added</p>	<p align="center">Toxic chemical added</p>
<p align="center">Single wall</p> <p>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).</p>	<p align="center">Double wall</p> <ul style="list-style-type: none"> • have visible means of leak detection • chemically compatible with the heat transfer fluid <p>Heat transfer liquids and heat exchangers to comply with CSA-F379.1.</p>
<p>Degree of Hazard – Minor and Moderate</p>	<p>Degree of Hazard - Severe</p>

MARKING

The manufacturers of **Indirect Hot Water Tanks** equipped with a single-wall heat exchanger shall 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 shall 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 shall be made of material that is not adversely affected by water with a nonwater-soluble adhesive. The physical label specifications shall 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) That the heat transfer fluid must be water or other non-toxic fluid.

- b) That 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) That for safe operation the relief valve(s) must not be removed, plugged, or replaced with a relief valve of a higher-pressure rating.
- d) That before installation of any replacement parts in the system, the installer shall ensure that 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 shall ensure that

- 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;
 - d) the indirect hot water heater and the remote heat source are in safe working order before leaving the installation; and
 - e) the owner is instructed in the safe and correct operation of the system
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Note: This Standata does not apply to solar hot water systems.

Solar Domestic Hot Water Systems (SDHW) that utilizes liquid-to-liquid heat transfer shall comply with CAN/CSA-F379.1-88 (R2004) and the installation Code CAN/CSA-F383-87 (R2003).

The heat transfer fluid shall be **potable water** or **non-toxic** liquid for a **SDHW** system that utilize single-wall heat exchangers and the heat exchanger shall be a 300- or 400-series stainless steel of all-welded construction with a minimum thickness of 1.4 mm.

When the heat transfer fluids are **toxic** the heat exchanger shall be double wall construction with a visible means of leak detection and the wall material shall be chemically compatible with the heat transfer fluid.