

## HEAT EXCHANGERS

*Heat exchangers* used in conjunction with *water* shall be classified as single wall, double wall, double wall with visible leak path/detection or exposed tube wraparound.

Single wall (SW) *heat exchanger* shall mean a *heat exchanger* with one distinct thickness of material separating *potable water* from a heat transfer medium.

Double wall (DW) *heat exchanger* shall mean a *heat exchanger* with two distinct thicknesses of material separating *potable water* from a heat transfer medium.

Double wall with leak path/detection (DWLP) *heat exchanger* shall mean a double wall *heat exchanger* equipped with a space ported to atmosphere between the two walls separating the *potable water* from the heat transfer medium. The space between the double wall of the *heat exchanger* shall allow any leak by either the *potable water* or the heat transfer medium to be detected visually by escaping at the open port to atmosphere. At no point does the wall of the one transfer medium come into contact with the wall of the other transfer medium such that a breach of both walls would allow the passing of heat transfer medium to the *potable water* rather than to atmosphere.

Exposed tube wraparound (ETW) *heat exchanger* shall mean a *heat exchanger* with a vessel comprised of a single wall containing either *potable water* or a heat transfer medium. The vessel's outer wall shall be exposed to atmosphere. A coil of tubing shall be wrapped around the vessel through which either *potable water* or a heat transfer medium flows. Sufficient spacing shall exist between one wrap of the coil and the next to allow either the *potable water* or heat transfer medium to escape to atmosphere.

A *Heat exchanger* shall be utilized for the purpose in which it is designed.

SW and DW *heat exchangers* used in conjunction with *potable water* shall meet or exceed requirements for *heat exchangers* as set out in CAN/CSA-F379.1-88 "Solar Domestic Hot Water Systems (Liquid to Liquid Heat Transfer)".

Manufacturer shop drawings and specifications of *heat exchangers* that come in contact with *potable water* shall be supplied to the Plumbing Inspector prior to the plan check stage of construction.

Double wall with visible leak path/detection type (DWLP) *heat exchangers* shall be:  
(a) approved by the International Association of Plumbing Officials Association under the Material and Property Standard for Heat Exchangers, IAPMO PS 92-2003; or,

- (b) accepted as providing the equivalent or higher visible leak path, liquid separation characteristics and potable and durable materials as required by IAPMO PS 92-2003 as stated in a signed and sealed letter by a professional engineer of the appropriate discipline and *acceptable* upon the review, when required, under Clause 5.3.10.

The *City* may require an independent review by a professional engineer appointed by the *City* for a *heat exchanger* as described in Clause 5.3.9(b). The independent review shall be at the sole expense of the plumbing permit applicant.

The *hazard type* of heat transfer medium fluids and gasses shall be classified in accordance with Table 4. A heat transfer medium other than *potable water*, non-treated steam and gasses other than common combustion gas shall be determined as a class 3 *hazard type*, regardless of the toxicity of the intended materials.

Where the *hazard type* of a heat transfer medium is a Class 3 as determined by Table 4 and is used in conjunction with a *heat exchanger* through which *water* passes and returned to a piping system that supplies one or *potable connections*, the *heat exchanger* shall be one of the following types:

- (a) double wall;
- (b) double wall with visible leak path detection; or
- (c) exposed tube wraparound.

The *water* piping system supplying the cold *water* inlet to a *heat exchanger* shall be protected from backflow from *water* which has passed through the *heat exchanger* as stipulated in Clauses 5.3.14, 5.3.15. Where *isolation* is required, the *backflow preventer* shall be located upstream of the *potable water* inlet of the *heat exchanger* and any connections connected to piping downstream of the *heat exchanger*. The *backflow preventer* shall effectively *isolate water* that passes through the *heat exchanger* (including recirculation and tempering connections) from the cold *potable water* piping.

The minimum *acceptable backflow preventer* to *isolate heat exchangers* and or affected piping systems shall be determined in accordance with Table 5.

Protection from backflow shall be required for a *heat exchanger* in contact with *potable water* and used to increase *water* temperature above 60° C regardless of the *heat exchanger* classification (see Table 3).

Water supplied from a *non-potable water system* shall not be used in conjunction with a *heat exchanger* in contact with:

- (a) a *water* piping system directly connected with, or supplying one or more *potable connections*; and/or,
- (b) a *water* piping system with a physical connection to the *waterworks system*.

The *consumer* shall conduct regular periodic inspections of the atmospheric port of a DWLP *heat exchanger* to determine if a wall of the *heat exchanger* has been breached.

In the event a wall of a *heat exchanger* has been breached, the *consumer* shall make arrangements for the immediate repair or replacement of the *heat exchanger*.

A replacement *heat exchanger* shall comply with this Standard and have *isolation* capabilities equal to, or more effective than, the *heat exchanger* it replaces.

To be certain, a typical electric or gas-fired residential or commercial instantaneous or tank-type water heater or boiler that has only potable materials in contact with *water* and is designed to heat *water* for potable use shall not be identified as a *heat exchanger*.

Table 4

**Transfer Medium Classification**

Transfer Medium Description	Transfer Medium <i>Hazard Type</i>
<i>Water</i> with no chemical additives and in contact with only potable piping system materials Common Flue Gas	<b>Class 1</b>
<i>Water</i> no chemical additives, may be in contact with other than potable piping system materials Non-Treated Steam	<b>Class 2</b>
Refrigerants Treated steam Gasses (other than air) <i>Water</i> containing additives (regardless of toxicity) Fluids other than <i>potable water</i>	<b>Class 3</b>

Table 5

Determining The Minimum *Backflow Preventer* for *Heat Exchanger System*

Transfer Medium <b>HAZARD TYPE</b>	Type of Facility	Type of <i>Heat Exchanger</i>	Minimum <i>Backflow Preventer</i> to Protect Cold Water Supply from <i>Heat Exchanger</i>	Minimum <i>Backflow Preventer</i> as <i>Premise or Area Isolation</i>
Class 1	<i>SFD</i>	SW/DW	DCAP	Not Applicable
Class 1	<i>SFD</i>	ETW/DWLP	None Required	Not Applicable
Class 1	<i>MFR/ICI</i>	SW/DW	DCVA	Not Applicable
Class 1	<i>MFR/ICI</i>	ETW/DWLP	None Required	Not Applicable
Class 2	<i>SFD</i>	SW/DW	DCVA	Not Applicable
Class 2	<i>SFD</i>	ETW/DWLP	None Required	Not Applicable
Class 2	<i>MFR/ICI</i>	DW	RPBA	DCVA
Class 2	<i>MFR/ICI</i>	ETW/DWLP	None Required	Not Applicable
Class 3	<i>SFD</i>	DW	RPBA	DuC
Class 3	<i>SFD</i>	ETW/DWLP	None Required	Not Applicable
Class 3	<i>MFR/ICI</i>	DW	RPBA	DCVA
Class 3	<i>MFR/ICI</i>	ETW/DWLP	None Required	Not Applicable