The following is applicable to our electronic water descalers HM-100 and ES-150 which are powered by a Class 2 transformer.

The Electrical Code Section 16, Class 1 and Class 2 Circuits, para. 16-222 applies.

Questions raised regarding this rule in the code were clarified in Bulletin 16-2-4, dated December, 2005.

The wording of the Bulletin is clear.

Decmber 2005
Approval of Devices on Class 2 Circuits
Rule 16-222

“In response to questions, electrical equipment connected to the load side of a Class 2 circuit operating under 42.4 volts peak or 42.4 volts DC is not required to be approved unless the equipment is …..” (lists 4 exceptions, none of which applies to our units)

The transformers powering the units have the required CSA approvals and this is marked on the transformers.

Use this information as you need to assure clients of code compliance.

Regards, Gord Skinner P.Eng.(Ontario)

(c) Nonmetallic sheathed cable for the electric lighting, power, and Class 1 circuits operating at 300 V or less; or

(d) Nonmetallic conduit, electrical nonmetallic tubing, insulated tubing, or equivalent, in addition to the insulation on the Class 2 circuit conductors or the electric lighting, power, and Class 1 circuit conductors.

(2) Where the electric lighting or power conductors are bare, all Class 2 circuit conductors in the same room or space shall be enclosed in a metal raceway that is bonded to ground and no opening, such as an outlet box, shall be permitted to be located within 2 m of the bare conductors if up to and including 15 kV or within 3 m of bare conductors above 15 kV.

(3) Unless the conductors of the Class 2 circuits are separated from the conductors of electric lighting, power, and Class 1 circuits by an acceptable barrier, the conductors in Class 2 circuits shall not be placed in any raceway, compartment, outlet box, junction box, or similar fitting with the conductors of electric lighting, power, or Class 1 circuits.

(4) Subrule (3) shall not apply where the conductors of a power circuit are in the raceway, compartment, outlet box, junction box, or similar fitting for the sole purpose of supplying power to the Class 2 circuits, and all conductors are insulated for the maximum voltage of any conductor in the enclosure, cable, or raceway, except that no Class 2 conductor installed in a raceway, compartment, outlet box, junction box, or similar fitting with such conductors of a power circuit shall show a green-coloured insulation, unless such Class 2 conductor is completely contained within a sheathed or jacketed cable assembly throughout the length that is present in such raceway or enclosure.

16-214 Conductors of Different Class 2 Circuits in the Same Cable, Enclosure, or Raceway

Conductors of two or more Class 2 circuits shall be permitted within the same cable, enclosure, or raceway provided all conductors in the cable, enclosure, or raceway are insulated for the maximum voltage of any conductor.

16-216 Penetration of a Fire Separation

Conductors of a Class 2 circuit extending through a fire separation shall be so installed as to limit fire spread in accordance with Rule 2-124.

16-218 Conductors in Vertical Shafts and Hoistways

Class 2 conductors and cables installed in a vertical shaft or hoistway shall meet the requirements of Rules 2-124 and 2-126.

16-220 Class 2 Conductors and Equipment in Ducts and Plenum Chambers

Class 2 conductors and equipment shall not be placed in ducts or plenum chambers except as permitted by Rules 12-010 and 2-126.

16-222 Equipment Located on the Load Side of Overcurrent Protection, Transformers, or Current-Limiting Devices for Class 2 Circuits (see Appendix B)

(1) Equipment located on the load side of overcurrent protection, transformers, or current-limiting devices for Class 2 circuits shall:

(a) For Class 2 circuits operating at not more than 42.4 V peak or dc be acceptable for the particular application; and

(b) For Class 2 circuits operating at more than 42.4 V peak or dc be arranged so that no live parts are accessible to unauthorized persons.

(2) Notwithstanding Subrule (1), lighting fixtures, electromedical equipment, equipment for hazardous locations, and thermostats incorporating heat anticipators shall be approved.

16-224 Class 2 Circuits Extending Beyond a Building

Where Class 2 circuits extend beyond a building and are run in such a manner as to be subject to accidental contact with lighting or power conductors operating at a voltage exceeding 300 V between conductors, the conductors of the Class 2 circuits shall also meet the requirements of Section 60.

16-226 Underground Installations

(1) Underground installations of Class 2 circuits shall be installed in accordance with Rule 12-012.

(2) Direct buried Class 2 circuits shall maintain a minimum horizontal separation of 300 mm from other underground systems except when installed in accordance with Subrule (3).

(3) Direct buried Class 2 circuits shall be permitted to be placed at random separation in a common trench with power circuits which are for the sole purpose of supplying power to the Class 2 circuits provided that the Class 2 circuit is in a metal sheathed cable, with sheath bonded to ground, the power circuit operates at 750 V or less, and all conductors are insulated for the maximum voltage of any conductor in the trench.

Approval of Devices on Class 2 Circuits

Rule 16-222

In response to questions, electrical equipment connected to the load side of a Class 2 circuit operating under 42.4 volts peak or 42.4 volts DC is not required to be approved unless the equipment is:

(1) lighting fixtures

(2) electromedical

(3) equipment for hazardous locations

(4) thermostats incorporating heat anticipators

If you do not want to use an approved product, then the Class 2 circuit needs to meet the requirements of Rule 16-200 and have the output less than 42.4 volts peak or 42.4 volts DC, even though a class 2 circuit can be higher than these values.

Note that all equipment for Class 2 circuits in hazardous locations must be approved and the circuits wired in accordance with the requirements of Section 18 of the Ontario Electrical Safety Code (Rule 16-008, page 88).

Please note that although Rule 16-222 allows some limited equipment to not require approval, the equipment still needs to be "acceptable for the particular application". If the equipment presents an undue hazard under the circumstances, an inspector can deem it to be "unacceptable".

Decorative units with LED (light emitting Diodes) only require the class 2 power supply to be approved not the LED's.

Decorative units with Halogen or incandescent lights require approval on the whole decorative unit including the power supply. The issue is that heat produced by the halogen or incandescent bulb has to be in an enclosure that can withstand that level of heat and flammability requirements.

Use of Communication Cable for Wiring Extra Low Voltage Class 2 Circuits

In response to a request, communication cables types MPP, CMP, MPR, CMR, MPG, CMG, MP, CM, CMX, CMH may be used for wiring extra low voltage Class 2 circuits provided:

- Only types MPP and CMP are used in locations where a FT6 flame spread rated cable is required by the Ontario Building Code (ie air handling plenums - Bulletin 2-8-*), and
- Only types MPP, CMP, MPR, CMR, MPG and CMG are used in locations where a FT4 flame spread rated cable is required by the Ontario Building Code.

Rationale

The subject cables are tested for 300 volt insulation but do not carry a voltage rating.

Cable types MPP, CMP, MPR, CMR, MPG, CMG, MP, CM, CMX AND CMH have been found to have a flame spread rating equal or greater than FT1 (Appendix B of the Ontario Electrical Safety Code, page 429).

Cable types MPP, CMP, MPR, CMR, MPG and CMG have been found to have a flame spread rating equal or greater than FT4.