

Electric Sauna Heaters

— by Daniel B. Langlois, CET, CFEI Fire Investigator, CSA International

CSA International's Corporate Audits and Investigations Group has investigated several fires over the years that were apparently caused by improperly installed electric sauna heaters. Most of the fires investigated were in residences; however, a few incidents occurred that involved commercial saunas.

This article will focus primarily on residential saunas, but the same conditions may present similar fire hazards if applied to a commercial sauna.



Sauna interior

Conditions to Avoid

Following is a summary of improper installations and unsafe practices that investigations have indicated resulted in fires:

- 1. Bench located on top of sauna heater.** The radiant heat produced by the sauna heater ignited the cedar bench. During another investigation, a combustible rack was mounted above the heater. Unfortunately, the heater was accidentally left on all night, and apparently the accumulation of heat ignited the rack and the surrounding combustible materials.
- 2. Heaters located too close to the wall.** A sauna heater installed 1.5 inches from a 0.25-inch asbestos board that was attached to a cedar wall apparently produced enough heat to penetrate the board and ignite the cedar. The installation was contrary to the manufacturer's instructions.
- 3. Heaters mounted on combustible floors.** A heater, initially provided with legs, was mounted directly onto a combustible floor and caught fire. The manufacturer included the legs in the design to provide adequate clearance between the supporting surface and the bottom of the heater. If the legs had been attached correctly, the clearance would have allowed air to circulate through the heater to prevent overheating.
- 4. High temperature limit switch.** Fires have occurred as a result of the improper installation or location of the high limit switch, a capillary tube which protects the heater from being exposed to an uncontrolled temperature condition. These temperature-sensing devices shall be installed in accordance with manufacturer's instructions. When located remotely from the heater, the switch may not be able to control the maximum temperature in the room. Also, there have been cases where the high limits are damaged, or even tampered with (such as if cold water is thrown
- on it, or wrapping it with wet towels), resulting in continuous operation of the heater and probable overheating of the combustibles in the room.
- 5. Shower heads mounted above sauna heaters.** This condition can not only present a fire hazard, but also a potential shock hazard. Water accumulation, over time, may damage the heating elements, corrode the electrical terminal boxes and, in extreme cases, create short circuits and expose live parts.
- 6. Storage of combustible materials within the sauna room.** An investigation was conducted where a sauna room was used for the storage of business materials. A large quantity of paper was piled on the bench to the ceiling, and also on top of the heater. Unfortunately, the switch for the sauna heater was inadvertently turned on and a fire broke out shortly thereafter.



Close-up of sauna heater



Switch plate: From left to right are the heater switch, the on/off light, the interior sauna light and the temperature control.

Conclusions

The above examples show clearly that saunas may present a fire hazard if they are improperly installed, tampered with or used in an unsafe manner.

CSA Standard CAN/CSA-C22.2 No. 164-M91 (R 1997), *Electric Sauna Heating Equipment*, contains a “Marking” clause that requires manufacturers who wish to obtain CSA certification to provide permanent markings on their sauna heater. These markings will clearly indicate the following:

- “TOP” or “BOTTOM,” to indicate how the sauna shall be installed, unless it is otherwise obvious;
- Minimum clearances to any vertical surface, ceiling or floor;
- Minimum size of room in which the sauna heater may be installed;
- “CAUTION: AVOID A FIRE, DO NOT PLACE COMBUSTIBLE MATERIAL ON SAUNA HEATER;”
- Maximum thermal insulation value for the ceilings, walls and floors; and
- “CAUTION: DO NOT INSTALL SHOWER HEADS OR WATER SPRAY DEVICES ABOVE THE SAUNA HEATER.”

Please note that there are several other marking requirements outlined in the standard that are not described here.

To reinforce the safety requirements

outlined in the CSA Standard, the *Canadian Electrical Code*, Part I, 1998, Section 62-500, Appendix B, reads as follows: “Equipment or material of other than an electrical nature should not be installed or placed so close to electrical equipment as to create a dangerous condition. Benches, shelves, guard rails, other structures or ob-

structions should not be placed closer to the heating unit than is permitted for the clearances specified on the nameplate.” ✎

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