Construction Heaters

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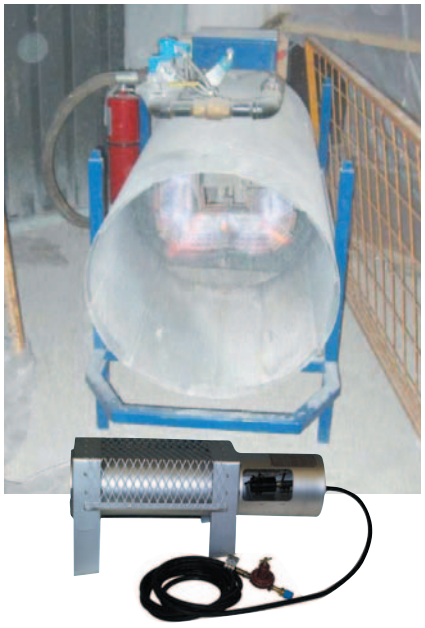
Ontario construction projects require heating in winter to keep workers warm, prevent pipes from freezing, pour and cure concrete, apply dry wall and paint, thaw frozen ground, and do other jobs.

Whatever the reason, you may need a construction heater this winter. So what are your options?

Construction heaters are designed to meet national standards. Units manufactured for Canada must comply with Canadian Standards Association standard CSA 2.14-2000.



Salamander heaters mix fuel with air which burns in an open chamber.

You can choose from numerous sizes and types of heaters. Fuels include natural gas, propane gas, oil, kerosene, and electricity. Some heaters can be operated on one or more fuels.

Other design features include

- thermostats to regulate temperature, leading to lower fuel consumption and emission levels
- safeguards such as an automatic shut-off switch (if the flame should go out) and tip switch (if the heater is accidentally knocked over)
- vaporizers to speed conversion from liquid propane to gas for high demand units and cold temperatures.

Construction heaters are designed for outdoor use and should not be operated indoors unless manufacturer's instructions for ventilating emission gases are followed and the unit is installed in accordance with applicable codes.

Only workers holding a current record of training (ROT) certificate for operating construction heaters are permitted to install and operate the units.

Construction heaters can be divided into two categories based on ventilation requirements: direct-fired and indirect-fired.

Direct-Fired Heaters

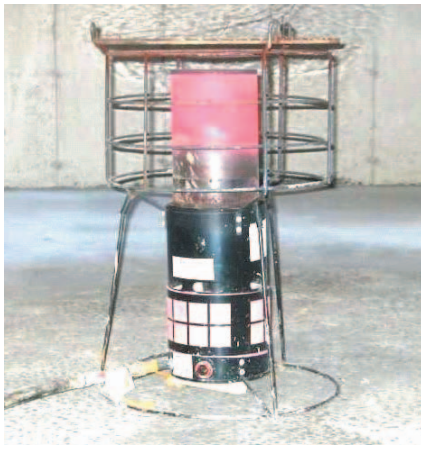
Direct-fired heaters release all of the heat generated by the flame (and the emissions that result) directly into the heated area.

Direct-fired heaters operate like a gas fireplace in your home—but without a chimney to remove combustion products. This type of heater therefore requires openings such as windows and doors to vent emission products outside. The exception to this is the electric heater, which by design is a direct-fired heater, but does not produce combustion emissions.

Direct-fired heaters operate with an open flame (or heated element in the case of infrared heaters). Depending on the fuel burned, the condition of the heater, and the supply of air, the combustion process produces carbon dioxide (CO_2), carbon monoxide (CO), other gases, and suspended particles.

In addition, depending on the fuel, varying amounts of moisture are emitted. With adequate ventilation through windows, doors, and other openings in the building, these emissions can be vented outside.

For more information, refer to "Construction Heater Emissions" in our last issue (Autumn 2004).



Infrared heaters work by burning fuel and heating an element until it glows red hot, thereby giving off radiant heat.

This direct-fired heater can be placed outdoors to combine large amounts of outside air with combustion gases, thereby reducing the concentration of emissions.

Electric heaters are direct-fired but generate heat without the moisture and combustion emissions of direct-fired gas and oil heaters.

Indirect-Fired Heaters

These heaters can be set up in the heated space or outside. The flame is enclosed in a heat exchanger that separates combustion products from the air to be heated.

This system resembles a home furnace where combustion products are directed up a chimney and heat is transferred through a heat exchanger to supply the home with heated air free of emissions.

An indirect-fired heater is commonly located outside where combustion emissions vent directly to the atmosphere. No open flame is introduced to the workspace.

Heated air is ducted (or heated liquid is piped) to areas intended for heating. The heat generated by an indirect-fired heater is not captured 100% as it is with a direct-fired heater. But there is no need to ventilate emissions. This allows the building to stay airtight and retain all the heat produced.

Heat Transfer

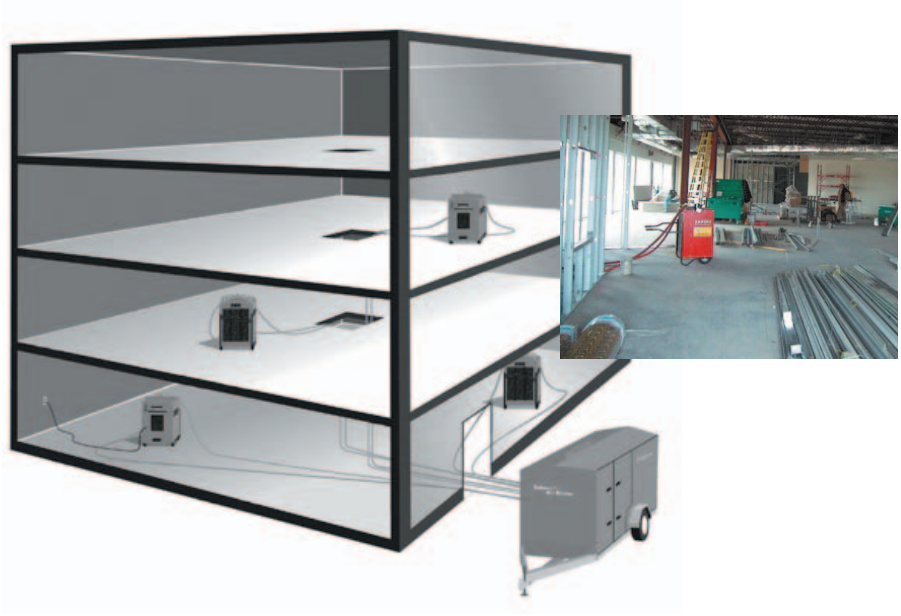
Ducts, hoses, and other methods can be used to transfer heat for various purposes.

A hydronic heater basically consists of a heater, pump, and heat transfer hoses. The unit heats a fluid, then pumps it through hoses to the location requiring heat.

The hose typically runs along the ground under an insulating blanket. Heat is absorbed directly into the surface for ground thawing or concrete curing.

Hydronic Heater

The air in a work space can also be heated using a liquid that is first heated, then pumped through hoses. But instead of lying on a surface to distribute heat, the hoses are connected to liquid-to-air heat exchangers.



This diagram shows a multi-level setup using a system of liquid-to-air heat exchangers on different floors. The main unit sits outside the building and warms the heat transfer fluid. A pump then circulates the heated fluid through a series of hoses to the heat exchangers placed throughout the building. Each heat exchanger's fan draws cooler air from the room and blows it across heated coils to produce warm air. The fluid then returns to the main unit for re-heating.

Flexible ducting is often used for cold weather applications to deliver heated air to various temporary and permanent shelters or work spaces. The ducting can be treated to repel mildew, rot, and water. It can also be treated to provide flame resistance. Ducting may be wire-reinforced to prevent collapse and support bending.

This oil-fueled indirect-fired heater vents emissions outdoors while heated air (free of emissions) is ducted indoors.