

## PHP – Technical Bulletin

**Bulletin Number: 210204**

**Subject: Engine Heater - Coolant Leaks**

**Issue Date: Feb. 24, 2021**

**Scope:** All Engine Heaters

**Complaint:**

Heaters are experiencing coolant leaks.

**Resolution:**

Although coolant leaks are not common with fuel fired engine heaters, they do happen. The majority of these however, can be avoided or resolved. This bulletin outlines potential causes and remedies for coolant leaks.

**Hoses, Fittings and Clamps:**

Follow these general good practices while installing your system.

Route hoses so they are protected from pinching, chaffing.

Invest in quality hoses

Use proper hose clamps

Apply proper sealant or tape to fittings

Re-tighten all fittings and clamps after initial installation and usage.

**Overheating:**

This is the most undiagnosed cause for heater leaking. Improperly installed or operated heaters can cause overheat conditions which destroy the heater and result in coolant leaking. When a heater overheats, the coolant boils inside the heater and forms an air pocket. This air pocket further accelerates the intensification of heat since there is no coolant to take the heat away. In any overheat situation, there is significant stress applied to the seals, heat exchanger and water jacket. In extreme cases, the intense heat can even deform metal components. Here are some known causes for overheating;

**Improper Plumbing Design**

The most common cause for overheating of a fuel fired engine heater is due to the restriction of flow due to a closed solenoid valve in the plumbing circuit. Refer to Technical Bulletin “TB210203 – Engine Heater Plumbing Guidelines” for best plumbing practices. Ensure that the finished installation allows for adequate coolant flow.

**Electrical Dumping**

If the heater is in operation and there is a major power spike (ie. Draw from starter motor when starting of the engine), the heater ECU receives a reboot and does not allow the heater to cool down properly. This can simply be avoided by switching off the heater before starting your engine or otherwise dumping power in your electrical system.

## **Air / Lack of Coolant Flow**

Upon installation and during all operation, it is critical that the heater maintains an ample supply of coolant to take the enormous amount of heat away that is generated.

Heater and coolant pump should be located at a proper height to allow air purging.

Air must be purged during installation and any service.

Ensure adequate flow rate through the heater by comparing the incoming and outgoing coolant temperatures at the heater while the heater is running. Use of a digital thermometer would be helpful but not absolutely necessary. Feel the temperature of the two hoses using your bare hands. Temperature difference should be noticeable but not extreme. If the rise in temperature exceeds 10°C (18°F), coolant flow must be increased by modifying the plumbing.

### Engine Coolant:

- Ensure that proper coolant mixture is always used.
- Too high a concentration of antifreeze can promote leaking through the seals.
- Too low of a concentration of antifreeze can cause blockage of coolant flow. The heater should never be used to thaw a frozen system.
- Proper maintenance schedule should be followed to replace coolant when required to avoid deterioration of metal and seal components.

### Faulty O-Rings:

“O” Rings are designed for extreme cold and hot temperatures and should typically last the life of the heater.

Although they are not immune to quality and design failures

Potential Reasons For Failure:

- Overheating
- Coolant contamination
- Improper storage / exceed shelf life (5-15 years)
- Improper installation
- Extreme temperature change in short period
- Extreme pressure
- Corroded housings

Here is a list of the “O” Ring seals found on a heater

Heat exchanger to Water Jacket

Temperature / Overheat Sensors

Inlet and Outlet ports

Coolant Pumps

### Coolant Pumps:

A failed coolant pump can cause coolant leaks in two ways.

#### Poor Flow:

If the pump is not providing enough circulation, this can result in overheat conditions which can damage seals and cause metal fatigue. See notes above.

Poor flow can be caused due to failed coolant pumps but can also be caused by accumulation of metal fragments and other contaminants inside the pump.

#### Leaking:

Depending upon the design of the pump, there is potential for leaks within the pump.

### **Corrective Action:**

While PHP and other heater manufacturers strive to make engineering and manufacturing improvements, educating of installation technicians will continue to be of great benefit.