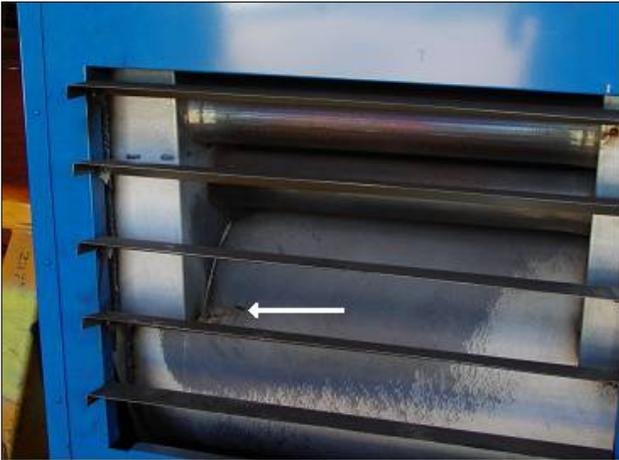


OVER-FIRING COMBUSTION CHAMBER

The INOV8 combustion chamber and heat exchanger have been constructed of aluminized steel. That is cold-rolled steel that has been coated with a thin layer of aluminum on both sides. In heat transfer, common steel is known to be the best conductor of heat, but it is also the most vulnerable to corrosion. Waste oil burning furnaces are more susceptible to corrosion because of the ash that is left behind when burning waste crankcase oil. If the ash is not removed during humid weather or in high humidity conditions, it will draw dampness which will contribute to rusting and corrosion. The aluminized steel is not susceptible to the corrosivity of the ash.

That doesn't mean the ash should be left inside the combustion chamber. When not removed the ash acts as an insulator which prevents good heat transfer from happening. Rather than being sent into your facility, the heat is lost up the chimney. The higher temperature of the flue gases will damage the heat exchanger steel. The aluminized steel has a temperature rating of nearly 1400 °F (800 °C). Temperatures exceeding that will vaporize the aluminum away from the steel as shown in the photo below. If high temperatures continue the steel will twist and crack as can be observed in the lower left corner.

Over-firing can occur several ways:



1. Factory designated oil pressure has been exceeded by adjusting the oil regulator. The oil pressure is what determines the volume of oil that is delivered to the nozzle. For this size furnace it should never exceed 12 psig as measured on the burner oil gauge. The oil pressure "assumes" waste oil to have a BTU value of 144,000 per gallon.
2. Heavy oil may have a higher BTU value than the lighter oil. The best way to determine your waste oil value is to have it analyzed. If your oil tests higher than that, then the oil pressure must be reduced accordingly.
3. If oil is stored at a higher elevation than the burner, the pressure in the oil tank can be additive to the pressure at the nozzle.
4. If there is a boost pump that adds pressure – it should be regulated down to a nominal pressure so it does not cause an over-fire situation.
5. As ash builds it will diminish the temperature felt from the furnace, and users may increase the oil pressure to make up the difference. When the furnace is subsequently cleaned and the oil pressure is left at the high level, it is simply over-firing the furnace and will cause the damage as shown in the photo.

When the aluminized coating is removed the warranty will be voided, as the protective coating will no longer be able to prevent corrosion. After the aluminum is gone, then the requirement for ash removal is very important. If not removed regularly and prior to summer or high humidity, then corrosion will occur as if there was no aluminized protection.