

Traditional up draft Polar™ outdoor wood burning furnaces employ a drum in drum design that features two stage exhaust smoke reburning technology. This proven design has resulted in one of the least smoky regular efficiency furnaces on the market. In normal operation, burning dry seasoned hardwood, the consumer can expect little more than a heat shimmer from the chimney when the furnace is running under normal load.

The fire burns on a bed of coals on the floor of the firebox. When the fluid in the water jacket falls below 160 degrees Fahrenheit the Aquastat on the water jacket causes the furnace to turn on. The air damper solenoid on the door opens and the fan blows 150 cubic feet per minute of air into the base of the fire. The heat and smoke from the fire are blown to the back of the furnace and hit the rear panel of the firebox maintaining high temperatures against the back wall of the boiler.

In the first smoke reburning stage, the heat and smoke are forced to the ceiling of the firebox and pass over the fire and across the heat tubes towards the front of the firebox. Some fresh air is blown into the ceiling in order to aid in combustion.

In the second stage of smoke reburning, the exhaust gasses are forced through the front exhaust port in the ceiling above the door of the firebox. The catalytic secondary burn chamber on the ceiling is heated to an extremely high temperature by the fire burning below. The unburned gasses ignite as a result of the high temperatures of the steel catalyst and the remaining gasses exhaust out of the chimney at the back of the furnace. This design enhances the efficiency of heat transfer to the fluid in the water jacket as a result of actively forcing the exhaust gasses over the heat exchange areas of the furnace in multiple passes.

When the Aquastat in the firebox senses that the fluid temperature in the furnace is 180 degrees Fahrenheit, it causes the fan to turn off and the air damper solenoid to close. The fire is squelched to a low burn and the heating cycle of the furnace stops. During the idle cycle of the furnace, only a small wisp of smoke is seen at the chimney because very little air is allowed into the unit for combustion.

Attention to detail and operator comfort are important components in the design of the Polar™ outdoor wood burning furnace. The Polar™ furnace employs a courtesy switch on the control panel that disables the fan during loading of the furnace. As a result, the fan on the door will not blow on the person loading the furnace. There is also a courtesy light that illuminates the front of the furnace to illuminate the loading area when the furnace is being stoked at night.

In addition to the fan switch and the courtesy light, in order to prevent the smoke from escaping through the door and into the operator's face when the furnace is being loaded, there is a pull handle located on the front of the furnace that is pulled while loading the furnace. This handle opens the rear exhaust port that allows smoke and gasses from the fire to travel directly up the chimney bypassing the reburning technology of the furnace. Once the furnace is loaded and the door is closed, the handle is returned and the rear exhaust port is closed, restoring the reburning technology.