Typical acceptable combustion results

Please follow manufacturer's specifications

Oil Fired Power Burners (#2 Fuel Oil)

Oxygen (O_2)	4 à 7 %
Carbon monoxide (CO)	<100 ppm
Carbon dioxide (CO_2)	10.0% - 13.0%
Stack Temp	325 to 600°F / 163°C to 316°C
Stack Draft	+.02 to +.04 inWC* / +4,98 to +19,93 Pa*
Overfire Draft	-.02 inWC / -4,98 Pa
Smoke	0 (or manufacturer's specifications)

Gas Fired Power Burners

Oxygen (O_2)	3 à 6 %
Carbon monoxide (CO)	<100 ppm
Carbon dioxide (CO_2)	8.0% - 11.0%
Stack Temp	275 to 500°F / 135°C to 260°C
Stack Draft	+.02 to +.04 inWC* /+4,98 to +9,96 Pa* (or manufacturer's specifications)
Overfire Draft	-.02 inWC* / -4,98 Pa*

Gas Fired 90+ Power Burners

Oxygen (O_2)	5 à 7 %
Carbon monoxide (CO)	<100 ppm
Carbon dioxide (CO_2)	7.0% - 9.0%
Stack Temp	Less than 125°F / less than 52°C
Stack Draft	+.02 to +.08 inWC* / +4,98 to +19,93 Pa* (or manufacturer's specifications)

Atmospheric Gas Fired Burners

Oxygen (O_2)	7 à 9 %
Carbon monoxide (CO)	<100 ppm
Carbon dioxide (CO_2)	6.0% - 8.0%
Stack Temp	325 to 600°F / 135°C to 260°C
Stack Draft	+.02 to +.08 inWC* / +4,98 to +19,93 Pa* (or manufacturer's specifications)
Overfire Draft	-.02 inWC* / -4,98 Pa*

*inWC: Water Column Inches / Pa: Pascal

Typical combustion troubleshooting

Please follow manufacturer's specifications

Low O_2 and/or High Carbon Monoxide Readings

Insufficient combustion air	Adjust air band Check for proper Combustion Air
Burner Over Firing	Adjust Fuel
Low Stack Draft	Adjust / Install Barometric Control Check Heat Exchanger Improperly sized chimney/vent

High O_2 Readings

Excess Combustion Air	Adjust Air Band
Burner Under Firing	Adjust Fuel
Excess Draft	Adjust / Install Barometric Control
Loose Ports, Doors	Check & Repair
Missing Gasket	Check & Repair

Unstable O_2 and/or CO readings

Changing weather/atmospheric conditions	Check for Draft/Barometric control
Cracked Heat Exchanger	Check and/or Replace
Excess Draft	Adjust / Install Barometric Control
Loose Ports, Doors	Check & Repair
Missing Gasket	Check & Repair

High Stack Temperature

Not enough Air Flow across heat exchanger	Increase Blower speed Increase supply or return ducting as needed Check for dirty blower, filter and AC Coils

Low Stack Temperature

Burner Under firing	Adjust Fuel
Excess Air flows past heat exchanger	Check Temp rise on manufacture's specs
High Fan Speed	Decrease Fan Speed or blower to reduce Air flow

Low Stack Draft (Fuel Oil) less than -.04"WC (-9,96 Pa)

Wrong Sized Venting or Chimney	Inspect & correctly size system
Blocked Vent System/Improper Venting	Inspect & remove blockage/re-vent if necessary
Low combustion air	Add Air
Leak in Chimney and/or Vent	Inspect & fix
Barometric Control	Inspect & Adjust as needed

High Stack Draft (Fuel Oil) greater than -.06"WC (-14,94 Pa)

Barometric Control	Inspect, Adjust or Install as needed
Wrong Sized Venting or Chimney	Inspect & correctly size system

Check for Cracked Heat Exchanger

O2 & Excess Air are the easiest methods to checking for a cracked heat exchanger. Here is the simple test:

Place Probe in stack. Watch the O2 & Excess Air readings as you turn the blower on.

Should the reading change substantially, there could be a cracked heat exchanger. (on Oil systems, possible a gasket missing or clean out port is loose)