Power Flame Incorporated

SUGGESTED SPECIFICATION
FOR
MODEL HAC COMBINATION
GAS/OIL BURNERS

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HACSP0286
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Suggested Specifications for Model HAC
Combination Gas/Light Oil Burners

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GENERAL BURNER DESCRIPTION (Use for all fuel types - select verbiage as required)

Furnish and install _____ Power Flame Model _____ (Gas/Oil) _____ (Oil) forced draft air atomizing burners. Each burner shall be capable of burning _____ CFH of _____ BTU/CU. FT. (Natural) (Propane) (Other) _____ gas, with a specific gravity of _____. Gas pressure supplied to the burner gas train supply connection shall be a minimum of _____ (In. W.C.) (PSI) at full high fire rate and a maximum of _____ (In. W.C.) (PSI) at static conditions. Each burner shall be capable of burning _____ GPH of No. (2) (4) (5) (6) (Other) _____ fuel oil, with a rating of _____ BTU/GAL. Minimum turndown ratio, while maintaining efficient combustion throughout the range shall be _____ to _____. Fuel changeover shall be accomplished by (fuel selector switch) and/or (other) _____. There shall be no mechanical changes or other adjustments required when switching from one fuel to the other.

Each burner shall be listed by Underwriters Laboratories and shall bear the appropriate U.L. label. (In addition to the U.L. requirements, all equipment and installation procedures will meet the requirements of (IRI) (FM) (NFPA) (Other) _____ codes). Each burner shall be designed and constructed as an integrated combustion system package - and shall be factory fire tested.

Each burner shall be of welded steel construction and have a baked on powder coat finish. The firing head shall incorporate a multiblade, stainless steel, flame retention diffuser. All air required for combustion shall be supplied by a blower, mounted integral to the burner. The blower wheel shall be of a forward curved centrifugal design and shall be directly driven by a _____ H.P., 3450 RPM _____ Volt, 60 Hertz _____ phase motor. A dual blade damper assembly shall meter the combustion air flow.

The burner ignition system shall utilize (Natural) (Propane) gas as the fuel source. At minimum, pilot system components shall include spark ignited pilot assembly, 6000 Volt ignition transformer, pilot solenoid valve, pilot pressure regulator and manual gas shutoff cock. The flame proving system shall incorporate an Ultra-Violet detector which will monitor both the pilot and main flames.

BURNER CONTROL PANEL (Use for all fuel types - select sections as appropriate)

(Standard) All control components shall be mounted and wired within an integral burner mounted console type panel. The panel shall incorporate a hinged and removable front access door and shall be complete with a top indicator section, which will house all indicating lights and operating switches. The indicator section shall be hinged, to allow for full access to all panel mounted components.

The control panel shall include a fused (both primary and secondary) control circuit transformer, flame safeguard control, model number _____, as manufactured by (Fireye) (Honeywell), manual potentiometer, starters for blower, fuel oil pump, compressor (preheater on No. 4, 5 or 6 oil), (fuel selector switch on dual fuel burners) and indicating lights displaying - Power On, Ignition, Main Fuel, Flame Failure. An alarm will sound on flame failure.

(Optional) **CONTROL PANEL WITH GRAPHIC MANAGEMENT SYSTEM** (Use for all fuel types)

All control components shall be mounted and wired within an integral burner mounted console type panel. The panel shall include a hinged and removable front access door which shall incorporate the Power Flame Graphic Burner Annunciation System. The panel shall have a hinged top section, allowing for full access to all panel mounted components. The top section shall contain burner operating and firing rate switches.

(Optional) **LIGHT/ALARM FUNCTIONS** (Use for all fuel types - select sections as appropriate)

Additional indicating lights shall display the following: (Low Water) (High Water) (High Temperature) (High Pressure) (High Gas Pressure) (Low Gas Pressure (Low Oil Pressure) (Low Atomizing Air Pressure) (Pilot Failure) (Main Flame Failure) (Others)_____. (An alarm will additionally sound on the following conditions _____). (An alarm silencing switch will be provided).

FUEL FLOW AND CONTROL (Use for all fuel types - select sections as appropriate).

Oil burner design shall utilize a single nozzle, air atomizing system. The complete nozzle and air diffuser assembly shall be easily removable from the firing head, as one integral unit.

Fuel flow to the nozzle shall be accomplished through a V port metering valve, driven by a modulating motor, which also positions the combustion air dampers. Burner mounted oil train components will, at minimum, include two (2) solenoid safety shutoff valves, low oil pressure switch, combustion air flow switch, low atomizing air pressure switch, nozzle oil and air pressure gauges.

A separate _____ H.P. piston type air compressor set, with pressure indicating gauge shall be provided. Rotary Vane air compressors will not be accepted.

(For firing No. 2 oil in Models HAC3 or HAC4). A blower motor driven fuel oil pump shall be supplied.

(For firing No. 2 or 4 fuel oil in Models HAC5 and HAC6). A separate direct driven 2 HP oil pressure pump shall be supplied.

(For firing No. 5 or 6 fuel oil). A separate belt driven 1/3 HP oil pressure pump set shall be supplied.

Each burner shall be supplied with a removable mesh oil strainer, pressure relief adjustment and all components required for correct oil supply and pressure control.

(For firing No. 4, 5 or 6 fuel oils). The burner shall include an integrally mounted thermostatically controlled _____ K.W. _____ phase electric oil preheater, to provide final fuel temperature control to the nozzle. Unit to contain oil temperature thermometer and cold oil lockout switch.

(For firing No. 5 or 6 fuel oil - optional on No. 4 but then requires a separate driven oil pump). The burner shall include a normally open solenoid operated valve, to provide continuous circulation of heated oil to the inlet of the safety shutoff valve. The burner shall include a compressed air system which will purge oil from the outlet side of the safety shutoff valve through the nozzle, on each burner cycle.

(For Gas firing) The gas firing head shall be of the nozzle mix, multiport design. The gas train, at minimum, shall consist of a manual shutoff cock, main gas pressure regulator, low and high gas pressure switches, main motorized gas valve with proof of closure switch, auxiliary gas valve only used above 5,000 MBH, leak test cock, butterfly type control valve and burner head gas pressure gauge. A modulating motor will automatically position the butterfly control valve and combustion air flow dampers.

EFFICIENCY TESTING

Final burner start up adjustments shall attain CO2 values of 10 to 13% with <#1 smoke on oil firing - 9 to 10% CO2 with <50 ppm Carbon Monoxide on Natural Gas - 10 to 11% CO2 with <50 ppm Carbon Monoxide on Propane Gas. A complete Combustion Test Report will be submitted.

TECHNICAL DATA

The owner shall be supplied with a computer printout listing the specific components used in the manufacture of the burner, wiring diagram, piping diagram, replacement parts data, individual component technical bulletins and a burner start up and instruction manual.

BURNER START UP INFORMATION & TEST DATA

The following information shall be recorded for each burner start up:

Power Flame Model _____ Invoice No. _____ Serial No. _____

Installation Name _____ Start Up Date _____

Start Up Contractors Name _____ Phone _____

Name of Technician doing Start Up _____

Type of Gas: Nat. ☐ LP ☐ Other ☐ Fuel Oil Grad No. _____

Gas Firing

Gas Pressure at Train Inlet
Burner in Off Position _____ "W.C.
Low Fire _____ "W.C.
High Fire _____ "W.C.

Gas Pressure at Firing Head
Low Fire _____ "W.C.
High Fire _____ "W.C.

Gas Pressure at Pilot Test
Tee _____ "W.C.

Flame Signal Readings D.C. Volts ☐ Micro Amps ☐
Pilot _____
Low Fire _____
High Fire _____

CO_2 or O_2 (Specify)
Low Fire _____ %
High Fire _____ %

CO
Low Fire _____ PPM
High Fire _____ PPM

Input Rate
Low Fire _____ BTU/HR
High Fire _____ BTU/HR

Overfire Draft
Low Fire _____ "W.C.
High Fire _____ "W.C.

NOx (Corrected to 3% O_2)
Low Fire _____ PPM
High Fire _____ PPM

Stack Outlet Test Point Draft
Low Fire _____ "W.C.
High Fire _____ "W.C.

Net Stack Temperature
Low Fire _____ ° F
High Fire _____ ° F

Oil Firing

High Fire Vacuum Reading on Oil
Pump Inlet _____ "H.G.

Gas pressure at Pilot Train
Inlet (if applicable) _____ "W.C.

Gas Pressure at Pilot Test
Tee (if applicable) _____ "W.C.

Oil Nozzle Supply Pressure
Low Fire _____ PSIG
High Fire _____ PSIG

Oil Nozzle Atomizing Medium Pressure
Low Fire _____ PSIG
High Fire _____ PSIG

Flame Signal Readings
Pilot (if applicable) _____ D.C. Volts
Low Fire _____
High Fire _____

GPH Firing Rate
Low Fire _____ GPH
High Fire _____ GPH

CO_2 or O_2 (Specify)
Low Fire _____ %
High Fire _____ %

Bachrach Scale Smoke Number
Low Fire _____
High Fire _____

NOx (Corrected to 3% O_2)
Low Fire _____ PPM
High Fire _____ PPM

Over Fire Draft
Low Fire _____ "W.C.
High Fire _____ "W.C.

Stack Outlet Test Point Draft
Low Fire _____ "W.C.
High Fire _____ "W.C.

Gas Firing (Continued)

Combustion Efficiency

Low Fire _____ %
High Fire _____ %

Windbox O_2

Low Fire _____ %
High Fire _____ %

Oil Firing (Continued)

Net Stack Temperature

Low Fire _____
High Fire _____

Combustion Efficiency

Low Fire _____ %
High Fire _____ %

Control Settings

Operating control cut out setting _____
Operating control cut in setting _____

Limit control cut out setting _____
Limit control cut in setting _____

Power supply: Volts _____ Ph _____ Hz _____
Control circuit: Volts _____
Blower motor amps at high fire _____

Other _____

Gas

Low gas pressure switch _____ "W.C.
High gas pressure switch _____ "W.C.

Other _____

Oil

Low oil pressure switch _____ lbs.
High oil pressure switch _____ lbs.
Atomizing low pressure switch _____ lbs.

Oil pump motor amps at high fire _____
Other _____

Operation Checklist

Checked For Proper Operation Of:	Yes	No		Yes	No
Low water cut off			Barometric damper		
High water cut off			Boiler room combustion air &		
Flame safeguard control ignition failure			ventilation provision correct		
Flame safeguard control main flame failure			Oil tank vent system correct		
Burner air flow switch			All oil lines checked for leaks		
Induced draft fan controls			All gas lines checked for leaks		
Over fire draft controls			Gas lines & controls properly vented		
Fresh air damper end switch			Other system components (specify)		

Notified _____ of the following system deficiencies: _____