

# AP INJECT-AIRE LOW-NOX BURNER

## Specifications

### Application

Single burner: Firetube, Firebox (cast iron sectional), Watertube Boilers or HTHW Generators

Fuel: No. 2 through No. 6, and/or Natural Gas (consult factory for Biomass or waste fuels)

### NOx Emissions

Natural Gas: as low as 30 ppmc without FGR

No. 2 Fuel Oil: Less than 90 ppmc (maximum 0.01% FBN) without FGR

No. 6 Fuel Oil: Less than 250 ppmc (maximum 0.30% FBN) without FGR

### Burner Efficiency

Any Fuel: 1.0 - 2.0% Excess O<sub>2</sub> 50 - 100% Firing Rate (exclusive of "tramp" air)

VFD Motor Control for maximum electrical efficiency of air and oil

### Operation

Turndown: 9:1 on gas firing, 5:1 on oil firing

### Supply Pressure

Natural Gas: 4 PSIG (at Burner Piping Train Inlet)

Fuel Oils: No Pressure Requirement

Atomizing Media: Not Necessary

**Note:** Consult factory for available pressures outside of the ranges provided.

### Burner Control & Monitoring

Parallel/Full Metering Firing Rate Control: BurnerMate Universal-Variable Speed Combustion Air/Oil Flow Control

Oxygen Sensor: Model "ZP" In-Situ Sensor, reliable zirconia oxide detector

Monitoring: SCADA/Flex Remote Monitoring and Control System

Instruments: Standard and optional equipment available

### Additional Options

- Draft Control
- Drum Level Control
- Low Fire Fuel Changeover
- Dual/Redundant Flame Scanning
- Smoke Opacity Monitoring and Alarm
- Atomizer Pumpback Post Purge Capability
- Flue Gas Temperature Indication Alarm; Emergency Boiler Shutdown

**Note:** NOx performance is furnace geometry and heat release rate dependant.

Lower NOx emissions are attainable by introducing FGR.



### Preferred Utilities

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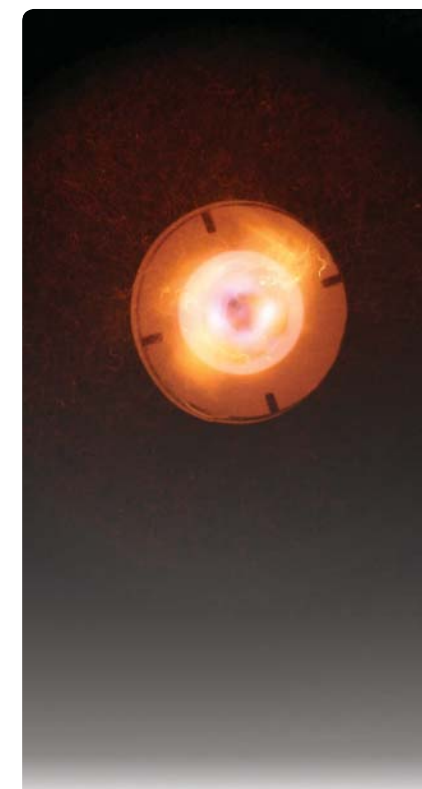


## ADVANCED PERFORMANCE INJECT-AIRE LOW-NOx BURNER

- 4 MMBTUH – 40 MMBTUH
- Exceptionally stable flame at all firing rates
- Low Excess Air Operation: 1.0 - 2.0% Excess O<sub>2</sub> from 50 - 100% Firing Rate
- 30 ppmc on Natural Gas; 90 ppmc on #2 Fuel Oil; 250 ppmc on #6 Fuel Oil without FGR

Preferred Utilities Manufacturing Corporation is proud to offer our new **Advanced Performance**, high efficiency, Inject-Aire Low NOx burner. To continue the tradition of industry leading combustion products, the **AP** Inject-Aire Low NOx Burner is capable of firing natural gas and either light to heavy fuel oils, pulverized coal, biomass solid fuels, digester gas, and ethanol. Other specialty fuels are also possible options that can be explored. The packaging of the burner, flame safeguard/combustion control systems and piping has been designed to eliminate field errors, reduce space requirements, and facilitate maintenance.

Factory demonstrations are always available upon request.



# COMBUSTION CONTROL - FLAME SAFEGUARD PACKAGE



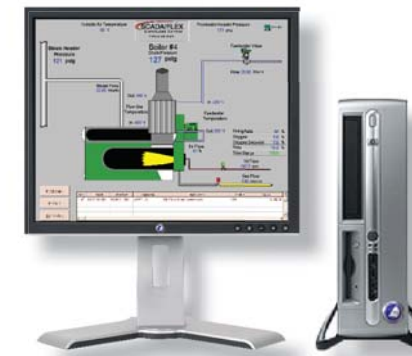
## BurnerMate Universal Control System

The BurnerMate Universal offers complete boiler control in an economical, off-the-shelf, pre-programmed controller. Separate processors are used for flame safeguard and combustion control for NFPA 85 compliance. Configuration is done in the field using the LCD key pad, the optional touch screen, or our exclusive BMU\_Edit software running on your PC. The BMU is available as part of a U.L. listed package with most of the leading gas and oil fired burners. Features include advanced flame safeguard with first out annunciation, parallel positioning combustion control with oxygen trim, draft, and feedwater control.



## SCADA/Flex Distributed Control - Optional

Our SCADA/FLEX Distributed Control System is a robust plant optimizing solution providing the ability to monitor and control plant wide processes from a single location. Plant owners around the country have successfully turned to SCADA/Flex from Preferred Instruments. SCADA/FLEX Distributed Control systems are designed to provide remote operation, graphic display of information, alarm message display, report generation, historical trending and remote controller tuning.



## Digital Servo Actuators

Digital servos are available in output torques from 3 ft-lb to 720 ft-lbs. Each includes an actuator positioner board, and integral feedback potentiometer. The feedback potentiometer is used to prove servo position thereby eliminating the need for auxiliary proof of position switches. Servos can be used for the following control functions; Natural gas, fuel oil and/or "other gas" flow control valve(s).



## OIT Touch Screen Options

All of the control functions of the BurnerMate Universal can be accessed through the LCD key pad. 10" and 15" color touch screen display are available for enhanced graphics and communications. Supported communication protocols include; 10/100 Base Ethernet, Modbus TCP/IP, Modbus RTU, SCADA/BAS connection, and BMU connection. One RS-485 port.



## ZP Oxygen Analyzer Probe

Zirconium oxide In-Situ Oxygen Analyzers provide all probe control functions including temperature monitoring, cell temperature maintenance, monitoring, and calibration.



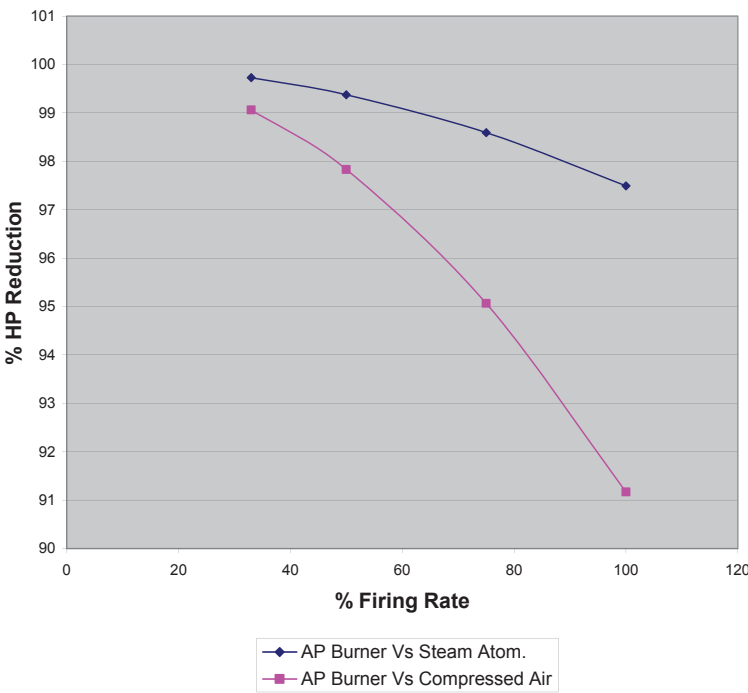
## Flame Scanners

The BurnerMate Universal can accept one or two flame scanners. They are available in ultraviolet, infrared, and ultraviolet self-checking versions.

## Control Valves

Preferred Utilities provides a wide range of control valves and mounting brackets for reliable and efficient installations. Our FGR valves can dependably meter flue gas delivery to a burner which reduces NOx emissions. The valves are manufactured to meter natural gas, biogas, hydrogen, steam, as well as many different grades of oil including waste oils and combustion liquids.

Typical HP Savings When Burning Oil



Because the **AP** burner's design incorporates a VFD for control of FD Fan speed (therefore the fan's volume and static pressure development capabilities) significant electrical energy reductions are achieved regardless of the fuel fired. Additionally, as its design utilizes cutting edge liquid fuel mechanical atomization and coincidental fuel flow control via a VFD controlled metering pump, significantly greater energy savings can be achieved when firing liquid fuels. Why? Because there is no need for an atomizing media source, and the fuel and/or electrical energy consumption associated with their generation (See Typical HP Savings Graph on this page), or the added maintenance attributable to related equipment such as an air compressor. Further liquid fuel firing energy reductions can be realized if the total vacuum at the inlet of the **AP** burner's pump does not exceed 15" mercury (including suction lift and all line friction losses) as all transfer pumping requirements specific to the **AP** burner are eliminated. This results in an additional electrical savings as the liquid fuel transfer pump horsepower is eliminated as well as the mechanical maintenance attributable to the transfer set.

## Coal Conveying Air System



## Gas Piping Train



Case Study Results: Axial Velocity Distribution, O<sub>2</sub> Mass Fraction Distribution, Temperature Distribution. Z = 1.0 ft

