

Xplus

Combustion Systems



LOW EMISSIONS ♦ ENERGY EFFICIENT ♦ FUEL EFFICIENT

Accomplished by
Continuously Measured, Controlled, and Monitored Combustion

W.N. BEST COMBUSTION EQUIPMENT COMPANY

A division of Preferred Utilities Manufacturing Corporation



Xplus

The **Xplus** Combustion System is a high-quality burner, monitoring, and control system that achieves and maintains firing equipment efficiency and low emissions.

The **Xplus Combustion System** is a new standard for boiler equipment upgrades. It fully integrates the burner with “state-of-the-art” monitoring and controls. Throughout the entire development process, the burner design has included the requirement for repeatable, balanced and optimum fuel and air flow control. The result is a high quality

burner that **achieves and maintains** overall fired equipment energy efficiency and low emissions. Most importantly, boiler owners are offered a single source for engineering, manufacturing, and field commissioning responsibilities that is unrivaled in the industry.

Firing Equipment

- **Low Emissions Design** - Gas tube injectors and atomizer sprayer plate produce stable, staged, low temperature fuel and air combustion.
- **Stable Combustion** - Center-fired gas, or very fine fuel oil droplets are ignited in the Stabilizing Combustion Zone. This feature produces outstanding flame stability during load changes and at very high excess air levels.
- **Energy Efficient** - Low electrical consumption is obtained by variable speed fan control with a Variable Frequency Drive (VFD). When required, “pinpoint” injection of Flue Gas Recirculation (FGR), via the FGR Injection Plenum achieves the required NOx emissions with reduced FGR flow. Variable speed FGR Fan control is used for additional energy reduction.
- **Exceptional Turndown** - The combustion air plenum with “inline” characterized damper are dynamically modeled to assure exceptional turndown and balanced cross-sectional air flow.
- **No Refractory Maintenance** - The burner throat is a high temperature metal. Custom refractory brick installation or maintenance are not required.
- **Free-Floating Design** - Minimizes differential expansion imposed stresses.
- **“Locked” Design** - No moving parts or adjustments necessary.
- **Recessed Plenum** - Minimizes atomizer length and withdrawal clearance requirements.
- **Atomizer Coupling Block With Disengagement Safeties** - Protects operating personnel from hot oil or steam discharges.

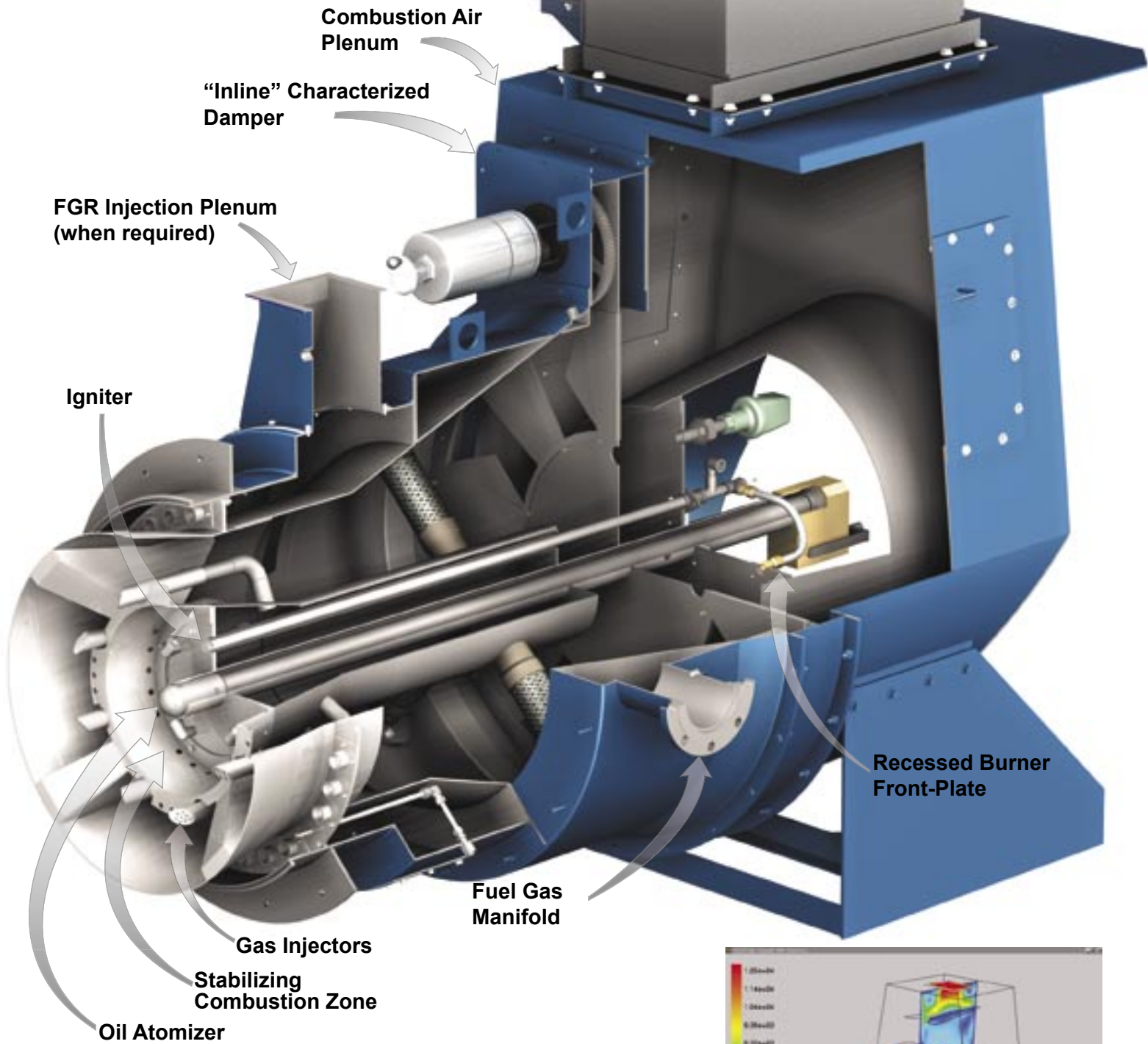
Controls

Optimum Combustion Control and enhanced performance are the design basis:

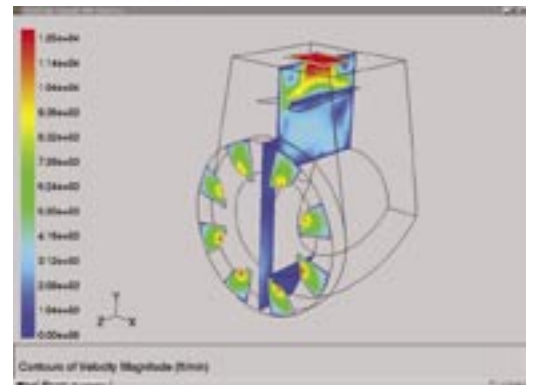
- **Integrated Primary Flow Elements** - Integral combustion air, fuel gas and FGR measurements are used as the basis for combustion control. The integral FGR injection plenum allows independent measurement of Combustion Air and FGR flows.
- **Minimized “Hysteresis” Induced Control Errors** - A direct-coupled damper/actuator is used. Damper linkage is not required.
- **Optimum Combustion Air Flow** VFD control of the FD Fan allows “trimming” of fan speed to exactly meet field conditions. Thereby eliminating the need for fan oversizing, damper “short-stroking” or linkage adjustments.
- **Fuel-Efficient Design** - A “BurnerMate” fully metered combustion control strategy with oxygen trim and variable speed fan-based combustion air flow control is used. Any deviation from the required oxygen set point resulting from changes in fuel stoichiometry, atmospheric conditions or boiler resistance, is automatically acknowledged and corrected, maintaining the highest fuel economy possible.
- **“Low-fire” Fuel Changeover** - Permits fuel transfer without requiring a burner shutdown and purge.
- **Enhanced Boiler Safety** - Flue gas oxygen and temperature monitoring protects against excessive flue gas temperature and incomplete combustion.



The **Xplus** Combustion System delivers stable, reliable, repeatable, efficient, and low emissions combustion.



Combustion Air Plenum and "Inline" Characterized Damper Dynamic Model (Velocity Profile ft/min Air Flow)



Xplus Specifications

Application

Single burner: Firetube / Watertube Boilers or HTHW Generators.
Fuel: No. 2 through No. 6 and/or Natural Gas
(for special or waste fuels, consult factory)

Heat Input Ranges 15 to 100 mmBtu/hr

NOx Emissions

Natural Gas: as low as 30 ppmc without FGR
No. 2 Fuel Oil: 100 ppmc (maximum 0.01% FBN) or less without FGR
No. 6 Fuel Oil: 300 ppmc (maximum 0.30% FBN) or less without FGR

Note: NOx performance is furnace geometry and heat release rate dependant. Lower NOx emissions are attainable with the application of FGR. CO emissions are less than 100ppmc at all firing rates (exclusive of "short-circuiting").

Burner Efficiency

Any Fuel: **1.5 - 2.5% Excess O₂**
50 - 100% Firing Rate (exclusive of "tramp" air)
Electrical: **80% KW Reduction**
@ 40% Firing Rate

Operation

Turndown: 12:1 on gas firing
10:1 on oil firing
Ramp Rate: 200% per minute
Back-up Fuel: Oil or gas may serve as either the backup or supplemental fuel on simultaneous fuel firing applications

Supply Pressure

Natural Gas: 2 - 5 psig (at Gas Manifold Inlet)
Fuel Oils: 75 - 110 psig (No. 2 through No. 6 at Atomizer Coupling Block inlet, No. 6 less than 10 centistokes)
Atomizing Media: Nominally 20 psi higher than fuel oil pressure.

Note: consult factory for available pressures outside of the ranges given.

Burner Control & Monitoring

Firing Rate: **BurnerMate** Fully Metered Combustion Control with Oxygen Trim and Variable Speed Fan Combustion Air Flow Control
Oxygen Sensor: **Model "ZP" In-Situ Sensor**, reliable zirconia oxide detector
Monitoring: **SCADA/Flex** Remote Monitoring and Control System
Controller: **PCC-III** Multiple Loop Controller
Instruments: Standard and optional equipment available

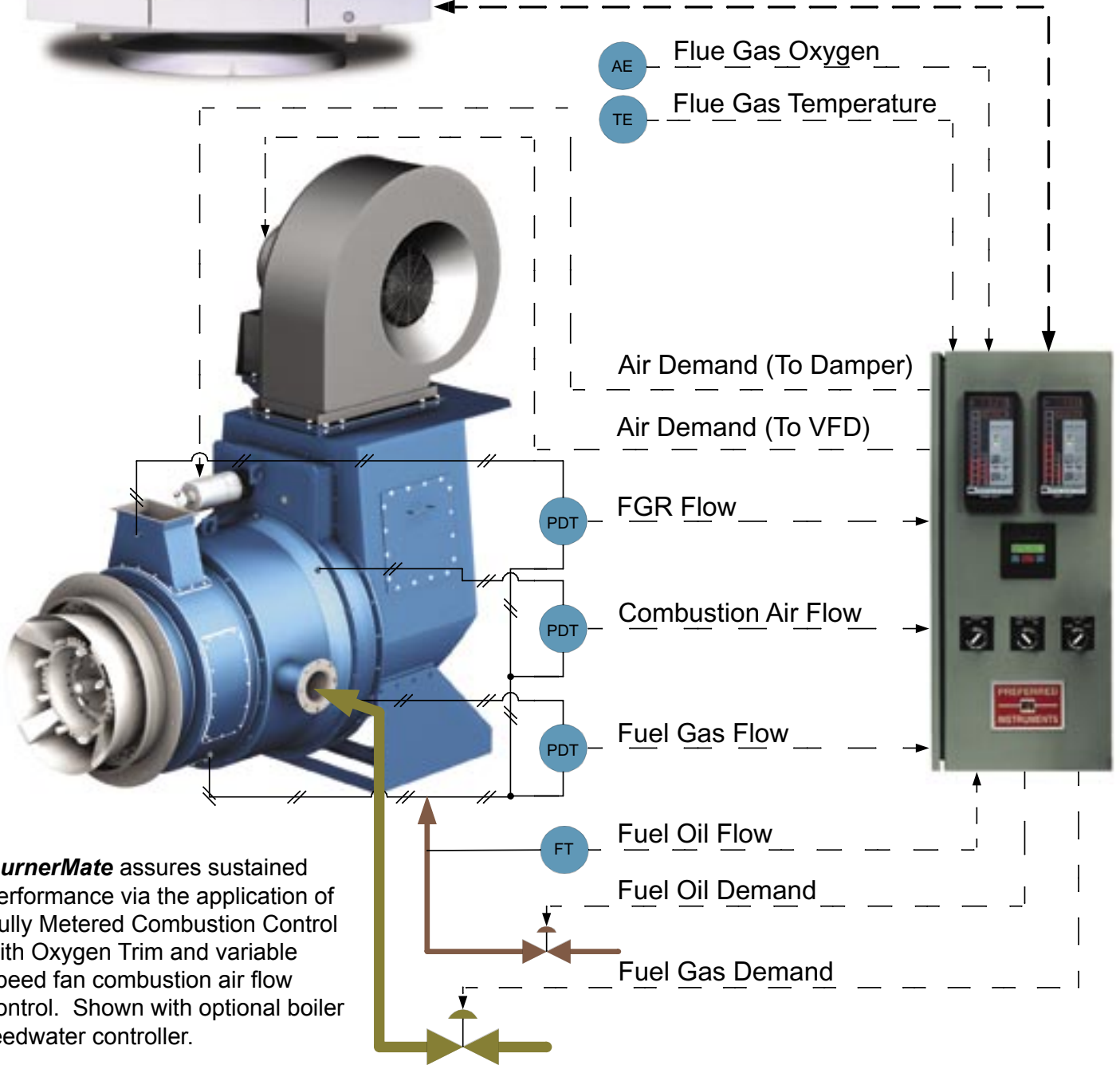
Options

- Dual Scanners - for added security and availability
- Simultaneous Fuel Firing
- Automatic Atomizer Post Purge - to prevent post combustion discharge of fuel oil into the furnace
- FGR Fan VFD control for energy savings, noise reduction and flow control



SCADA/Flex Remote Monitoring and Control System continuously monitors the **XPlus Combustion System** performance:

- Combustion Monitoring and Troubleshooting
- Historical Trending Of Flame Signal Strength, Fuel Flow, Air Flow, FGR Flow, Burner Cycles And Operating Hours.
- Maintenance "Reminder" Messages
- Boiler Efficiency Trends And Alarms



BurnerMate assures sustained performance via the application of Fully Metered Combustion Control with Oxygen Trim and variable speed fan combustion air flow control. Shown with optional boiler feedwater controller.

W.N. Best Combustion Equipment Co.

A division of Preferred Utilities Manufacturing Corporation, W.N. Best has been engaged in the design and manufacture of register type combustion systems for marine, industrial and institutional boiler plants since 1890. W.N. Best continues to manufacture combustion systems for sewage, acid sludge and other waste incineration applications.

Preferred Utilities Manufacturing Corporation with divisions W.N. Best, Preferred Instruments, Preferred Utilities, and Preferred Services has a unique ability to engineer both firing equipment and combustion controls as well as fuel handing equipment. Our customers are offered a single source engineering, manufacturing and commissioning responsibility that is unrivaled in the industry.

Other Combustion Products and Services From Preferred:

Combustion Testing and Energy Audits

Combustion Modeling Available

Electrical and Mechanical Fabrication and Turnkey Installations

Single Source Commissioning and Field Service

Fuel (Gas and Oil) Valve Trains

Waste Fuel Burning Systems
(sewage, acid sludge, digester gas, & other special fuels)

Combustion Control Systems

Plant Monitoring and Control Systems

Combustion Monitoring Instruments and Actuators

Burner Management Systems

Fuel Oil Pumping, Heating and Strainer Systems

Day Tank and Day Tank Level Control Systems

Automated Fuel Maintenance Systems
(filtration, stabilization, & dewatering)

Tank Gauging & Leak Detection

Fuel Oil Specialties

Represented by:



W.N. Best Combustion Equipment

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