TECHNICAL DATA SHEET

ENDURA XE (EXE) SERIES:

EXE-399, EXE-500, EXE-650, EXE-750

399,000 to 750,000 BTU/HR:

Stainless Steel Firetube Condensing Boilers

FEATURING PURE CONTROL

Fulton's Endura XE (EXE) line of condensing boilers are a durable inline one-pass stainless steel firetube. The packaged boiler features an ultra-compact footprint that fits through a standard doorway, reliable quiet operation, and simplified service & maintenance. The highly-engineered robust construction is built to last with low heat exchanger stress, higher-strength materials, and a premium fit and finish reflecting Fulton's paramount quality. High-turndown Flame-by-Wire™ technology utilizes the surgical precision of independent air and gas motors and continuously tunes the air/fuel ratio for ideal excess O_2 levels to automatically adjust for seasonality. This maximizes condensing potential, and outperforms all conventional platforms in durability, reliability and repeatability.

STANDARD FEATURES:

- Factory Packaged and Test Fired Boiler Assembly
- Stainless Steel Firetube Heat Exchanger
- Fully Condensing Ultra-High Efficiency Operation
- Designed for Variable Primary Flow Arrangements
- Fully Modulating Burner; Up to 15:1 Turndown
- Low NOx Emissions <20 ppm
- Flame-by-Wire™ Electronic Combustion Control
- Real-Time O_2 Compensation™; Feed Forward
- Variable Speed Combustion Blower
- Direct Spark Ignition System
- 160 PSIG Maximum Allowable Working Pressure
- 210°F Maximum Allowable Working Temperature
- Maximum Setpoint Temperature of 185°F
- UL-353 Certified Operating and High Limit
- Low Water Cut Off Probe with Manual Reset
- Air and Blocked Intake Switches
- Ventless Gas Train Utilizing Vent Limiters
- Low and High Gas Pressure Switches (Excludes 399)
- Emergency Stop (E-Stop) Contact

PURE CONTROL™ CAPABILITIES:

- Color Touchscreen Display
- Integrated Lead-Lag of 2 to 10 Boilers
- Universal Data over Ethernet/IP; No Master Boiler Req.
- BAS Integration; Modbus Communication Protocol
- Flue Gas Exhaust Temperature Monitoring
- Inlet and Outlet Water Temperature Sensors
- Combustion Air Temperature Sensor
- Outdoor Air Temperature Reset with Plant Cutoff
- Setback Modes via Internal Clock
- Accept 4-20mA Remote Setpoint Signal
- Safety Interlock Contact for External Device(s)
- General Alarm Contact
- Remote Boiler Enable/Disable Contact
- Pump or Motorized Isolation Valve Start/Stop Contact
- Variable Speed Boiler (Primary) Pump Control
- System (Secondary) Pump Start/Stop Contact
- Domestic Hot Water Pump Start/Stop Contact
- Domestic Hot Water Priority
- Two-Stage Freeze Protection

PROJECT DETAILS:

Project Name		City, State (Province)	
Date Submitted		Engineer of Record	
Fulton Representative		Contractor	

LISTINGS & COMPLIANCE:

- cETLus Listed and Labeled to ANSI Z21.13/CSA 4.9
- ASME Section IV Pressure Vessel, "H" Stamp
- CSD-1 and CSA Compliant Controls and Fuel Train
- AXA XL Compliant; Supersedes IRI
- AHRI Certified to AHRI-1500; Supersedes BTS-2000
- Energy Star Certified Commercial Boiler
- SCAQMD Certified; TCEQ Compliant
- Federal Energy Management Program (FEMP) Compliant
- Advanced Buildings New Construction Guide Tier Two (LEED v4 ACP)

TRIM KIT ITEMS:

- ASME Safety Relief Valve (60 PSIG)
- Condensate Drain Trap
- Pressure & Temperature Gauge
- Installation, Operation and Maintenance Manual

OPTIONAL ACCESSORIES: PARTS SHIP LOOSE FOR FIELD INSTALLATION

- ☐ BACnet Protonode with Remote Cloud Access *2-45-001058*
- ☐ Lead/Lag IP Switch (16 Port, 120VAC) *2-45-315010*
- ☐ Lead/Lag IP Switch (5 Port, DIN Mount, 24VDC) *2-45-315044*
- ☐ Second (Auxiliary) Low Water Cut Off Kit *Consult Factory*
- ☐ Flue Gas Condensate pH Neutralization *4-50-000021*
- ☐ Supply Header Temperature Sensor *4-30-000405*
- ☐ Outdoor Air Temperature Sensor *4-30-000520*
- ☐ Domestic Hot Water Temperature Sensor *4-30-420500*
- ☐ Return Header Temperature Sensor *4-30-000405*
- ☐ 2-Inch Ball Valve with 120VAC 2-Position Actuator *2-30-001382*
- ☐ Dedicated Boiler Circulator Pump 20°F ΔT *Consult Factory*
- ☐ Dedicated Boiler Circulator Pump 40°F ΔT *Consult Factory*
- ☐ PVC/CPVC Flue Gas Exhaust Kit for EXE-399/500
- ☐ PVC/CPVC Flue Gas Exhaust Kit for EXE-650/750
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

NOTE: Information provided in this document is based on standard boiler configurations only. Alternate configurations may result in deviations.

CAPACITIES: **STANDARD NATURAL GAS; REFER TO PERFORMANCE DATA FOR CAPACITY AT HIGH ELEVATION**

Endura XE Model		EXE-399	EXE-500	EXE-650	EXE-750
Rated Input at High Fire	**BTU/hr**	**399,000**	**500,000**	**650,000**	**750,000**
	kW	*117*	*147*	*190*	*220*
Minimum Input at Low Fire	**BTU/hr**	**50,000**	**50,000**	**50,000**	**50,000**
	kW	*14.7*	*14.7*	*14.7*	*14.7*
Rated Output (at AHRI-1500)	**BTU/hr**	**391,020**	**486,500**	**625,950**	**720,000**
	Boiler HP	11.7	14.5	18.7	21.5
	kW	*115*	*143*	*184*	*211*
Thermal Efficiency (at AHRI-1500)	**%**	**98.0**	**97.3**	**96.3**	**96.0**
Burner Turndown	**-**	**8:1**	**10:1**	**13:1**	**15:1**

NOTES:

- Minimum Input at Low Fire is 125,000 BTU/hr (36.8 kW) when operating on propane.
- The boiler may be factory configured with either a natural gas or propane burner; the burner is not field convertible.

CONNECTION SIZES:

Endura XE Model		EXE-399	EXE-500	EXE-650	EXE-750
Boiler Supply Water Outlet (NPT)	**inches**	**2**	**2**	**2**	**2**
	mm	*51*	*51*	*51*	*51*
Boiler Return Water Inlet (NPT)	**inches**	**2**	**2**	**2**	**2**
	mm	*51*	*51*	*51*	*51*
Flue Gas Condensate Drain	**inches**	**3/4**	**3/4**	**3/4**	**3/4**
	mm	*19*	*19*	*19*	*19*
Natural Gas Train Inlet (NPT)	**inches**	**1**	**1**	**1**	**1**
	mm	*25*	*25*	*25*	*25*
Min. Combustion Air Duct (ID) *(Adapter Required)*	**inches**	**4**	**4**	**6**	**6**
	mm	*102*	*102*	*152*	*152*
Min. Flue Gas Exhaust Vent (ID) *(Adapter Required)*	**inches**	**4**	**4**	**6**	**6**
	mm	*102*	*102*	*152*	*152*
Boiler Exhaust Outlet (ID)	**inches**	**3.87**	**3.87**	**5.87**	**5.87**
	mm	*98*	*98*	*149*	*149*
Boiler Exhaust Outlet (OD)	**inches**	**4**	**4**	**6**	**6**
	mm	*102*	*102*	*152*	*152*

NOTES:

- The combustion air inlet connection on all models shown is 4-inch Sch 10 pipe, appropriately sized field combustion air intake ducting requires an adapter.

FUEL REQUIREMENTS: STANDARD NATURAL GAS AT 1,020 BTU/SCF (9,082 KCAL/M³)

Endura XE Model		EXE-399	EXE-500	EXE-650	EXE-750
Fuel Usage at Rated Input	**SCFH**	**391**	**490**	**637**	**735**
	m³/hr	*11.1*	*13.9*	*18.0*	*20.8*
Minimum Gas Pressure *(Req. at High Fire)*	**in W.C.**	**3.5**	**3.5**	**3.5**	**3.5**
	kPa	*0.87*	*0.87*	*0.87*	*0.87*
Maximum Gas Pressure	**in W.C.**	**14**	**14**	**14**	**14**
	kPa	*3.5*	*3.5*	*3.5*	*3.5*

FUEL REQUIREMENTS: STANDARD HD5 PROPANE AT 2,500 BTU/SCF (22,260 KCAL/M3)

Endura XE Model		EXE-399	EXE-500	EXE-650	EXE-750
Fuel Usage at Rated Input	**SCFH**	**160**	**200**	**260**	**300**
	m³/hr	*4.5*	*5.7*	*7.4*	*8.5*
Minimum Gas Pressure *(Req. at High Fire)*	**in W.C.**	**7**	**7**	**7**	**7**
	kPa	*1.7*	*1.7*	*1.7*	*1.7*
Maximum Gas Pressure	**in W.C.**	**14**	**14**	**14**	**14**
	kPa	*3.5*	*3.5*	*3.5*	*3.5*

NOTES:

- Propane operation is suitable for use with HD5 (standard commercial) grade Liquid Petroleum Gases conforming to ASTM D1835-82.

ELECTRICAL REQUIREMENTS: APPLIES TO <20 PPM NOx STANDARD BLOWER AND CONTROL OPTIONS

Endura XE Model		EXE-399	EXE-500	EXE-650	EXE-750
Electrical Supply	**Volts**	**120**	**120**	**120**	**120**
	Ø	1	1	1	1
	Hz	*60*	*60*	*60*	*60*
Full Load Amps (FLA)	**Amps**	**8**	**8**	**8**	**8**
Minimum Current Ampacity (MCA)	**Amps**	**10**	**10**	**10**	**10**
SCCR	**Amps**	**10,000**	**10,000**	**10,000**	**10,000**

NOTES:

- Voltages under specification may result in increased amperage and burner de-rate.
- Provide separate power supplies for external devices. Do not power external devices through the boiler control circuits.

WATER AND FLOW REQUIREMENTS: **SPECIFICATIONS APPLY TO 100% WATER SYSTEMS; SEE IOM FOR GLYCOL SYSTEMS**

Endura XE Model		EXE-399	EXE-500	EXE-650	EXE-750
Typical Flow Rate at Rated Output 20°F ΔT	**GPM**	**38**	**48**	**62**	**72**
	LPM	*144*	*182*	*235*	*273*
Typical Flow Rate at Rated Output 40°F ΔT	**GPM**	**19**	**24**	**31**	**36**
	LPM	*72*	*91*	*118*	*136*
Water Pressure Drop at Rated Output 20°F ΔT	**PSI**	**0.6**	**0.9**	**1.4**	**1.9**
	kPa	*8.3*	*6.2*	*9.7*	*13.1*
Water Pressure Drop at Rated Output 40°F ΔT	**PSI**	**0.2**	**0.2**	**0.3**	**0.5**
	kPa	*1.4*	*1.4*	*2.1*	*3.4*
Low Fire Variable Water Flow Rate	**GPM**	**4 to 105**	**4 to 105**	**4 to 125**	**4 to 125**
	LPM	*16 to 397*	*16 to 397*	*16 to 473*	*16 to 473*
High Fire Variable Water Flow Rate	**GPM**	**16 to 105**	**20 to 105**	**26 to 125**	**30 to 125**
	LPM	*61 to 397*	*76 to 397*	*99 to 473*	*114 to 473*

NOTES:

- Flow rates specified are for water systems, minimum flow parameter will increase for glycol systems. Review Application Guide for details.
- The system will require proper design flow for the given conditions to heat the building and prevent nuisance high limit manual reset lockouts at the boiler.
- Refer to the Installation, Operation, and Maintenance Manual for the water pressure drop at flow rates not listed above.

WEIGHTS AND VOLUMES:

Endura XE Model		EXE-399	EXE-500	EXE-650	EXE-750
Dry Weight	**lbs**	**525**	**525**	**525**	**525**
	kg	*238*	*238*	*238*	*238*
Operating Weight	**lbs**	**674**	**674**	**674**	**674**
	kg	*305*	*305*	*305*	*305*
Pressure Vessel Water Volume	**Gallons**	**17.9**	**17.9**	**17.9**	**17.9**
	Liters	*67.8*	*67.8*	*67.8*	*67.8*

Endura XE Model		EXE-399	EXE-500	EXE-650	EXE-750
Combustion Air Intake Flow Rate	**SCFM**	**82**	**102**	**133**	**153**
Flue Gas Exhaust Flow Rate	**SCFM**	**88**	**110**	**143**	**165**
	ACFM	*109*	*136*	*177*	*204*
Minimum Allowable Draft Pressure	**in W.C.**	**-0.10**	**-0.10**	**-0.10**	**-0.10**
	kPa	*-0.025*	*-0.025*	*-0.025*	*-0.025*
Maximum Allowable Draft Pressure	**in W.C.**	**+1.25**	**+1.25**	**+1.25**	**+1.25**
	kPa	*+0.311*	*+0.311*	*+0.311*	*+0.311*

VENTING REQUIREMENTS:

NOTES:

- Maximum draft pressure is the total sum of the venting system and is inclusive of both the flue gas vent and combustion air intake frictional pressure losses.
- Refer to the Installation, Operation, and Maintenance Manual for complete venting guidelines including certifications, materials, common venting requirements.

Endura XE Model		EXE-399	EXE-500	EXE-650	EXE-750
NOx	**ppm**	**< 20**	**< 20**	**< 20**	**< 20**
CO	**ppm**	**< 100**	**< 100**	**< 100**	**< 100**
	lbs/hr	0.0288	0.0361	0.0470	0.0542
	g/hr	*13.1*	*16.4*	*21.3*	*24.6*
SOx	**lbs/hr**	**0.0002**	**0.0003**	**0.0004**	**0.0005**
	g/hr	*0.12*	*0.15*	*0.20*	*0.23*
Total Particulates (PM)	**lbs/hr**	**0.0030**	**0.0038**	**0.0050**	**0.0057**
	g/hr	*1.4*	*1.7*	*2.2*	*2.6*
Total Organics (TOC)	**lbs/hr**	**0.0043**	**0.0054**	**0.0070**	**0.0081**
	g/hr	*1.96*	*2.45*	*3.19*	*3.68*
Lead	**lbs/hr**	**2×10^{-7}**	**2.5×10^{-7}**	**3.3×10^{-7}**	**3.8×10^{-7}**
	g/hr	*0.8×10^{-4}*	*1×10^{-4}*	*1.3×10^{-4}*	*1.5×10^{-4}*
Volatile Organic Compounds (VOC)	**lbs/hr**	**0.0022**	**0.0027**	**0.0035**	**0.0041**
	g/hr	*1.0*	*1.2*	*1.6*	*1.8*

EMISSIONS: STANDARD NATURAL GAS AT 1,020 BTU/SCF (9,082 KCAL/M³)

NOTES:

- NOx and CO are stated at a 3% O_2 correction.
- Emissions data is typical for standard natural gas operation at maximum rated burner input.
- Emissions will vary based on site specific factors and operating parameters.
- Site specific conditions and emissions requirements will determine the appropriate CO_2 settings for each application.
- VOC, SOx, PM, TOC and Lead are achieved through calculation using the AP 42 method as published by the US EPA, and are stated at rated input.
- AP 42, Fifth Edition, Vol 1, Ch 1, Table 1.4-2 determines the emissions components that cannot be measured with a combustion analyzer.
- Jacket losses: 0.2% of output at maximum capacity, IAW ASHRAE Standard 103-2007.

Endura XE Model		EXE-399	EXE-500	EXE-650	EXE-750
Front	**inches**	**24**	**24**	**24**	**24**
	mm	*610*	*610*	*610*	*610*
Rear	**inches**	**12**	**12**	**12**	**12**
	mm	*305*	*305*	*305*	*305*
Top	**inches**	**16**	**16**	**16**	**16**
	mm	*406*	*406*	*406*	*406*
Sides	**inches**	**0**	**0**	**0**	**0**
	mm	*0*	*0*	*0*	*0*

MINIMUM CLEARANCES:

NOTES:

- Although 12-inch (305 mm) rear clearance is permitted, some installations may require or benefit from 24-inch (610 mm) rear clearance.
- Boilers exceeding 400 MBTU/hr rating are not for installation in an alcove or closet. Boilers less than 400 MBTU/hr rating may be installed in an alcove.
- Local codes may supersede Fulton requirements, the more stringent of the two shall prevail.

DIMENSIONS:

Refer to the 7-91 type Product Data Submittal End Assembly Drawing for dimensions.