

ENDURA+ (EDR+) SERIES:

EDR+8000, EDR+10000, EDR+12000

8,000,000 to 12,000,000 BTU/HR:

Stainless Steel Firetube Condensing Boilers



Fulton's Endura+ (EDR+) line of boilers are the culmination of comprehensive system optimization encompassing superior efficiencies, reduced thermal stresses, novel heat exchangers, enhanced water flow management, and low emissions. The packaged boiler features an ultra-compact footprint that fits through a standard doorway, access panels which detach in seconds, and simplified service & maintenance. High-turn-down Flame-by-Wire™ combustion technology utilizes the surgical precision of independent air and gas servo motors and continuously tunes the air/fuel ratio for ideal excess O₂ 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 Exchangers
- Fully Condensing Ultra-High Efficiency Operation
- External Tube Stress Reliever
- Designed for Variable Primary Flow Arrangements
- Fully Modulating Burners; Up to 30:1 Turn-down
- Low NOx Emissions <20 ppm; <7 ppm Option
- Flame-by-Wire™ Combustion Control; ± 0.2° Precision
- Real-Time O₂ Compensation™
- Variable Speed High-Pressure Combustion Blowers
- Pilot with Spark Electrode Ignition Systems
- 160 PSIG Maximum Allowable Working Pressure
- 210°F Maximum Allowable Working Temperature
- Maximum Setpoint 185°F, 200°F Capable (See IOM)
- Operating and High Limit Aquastats; 200°F Setting
- Low Water Cut Off Probes with Manual Reset
- MERV 8 Combustion Air Intake Filters
- Air, Blocked Filter, and Blocked Flue Switches
- Ventless Gas Trains
- Low and High Gas Pressure Switches
- Emergency Stop (E-Stop) Contact

PURE CONTROL™ CAPABILITIES: v1.0.0.15+

- 7-inch Color Touchscreen Display
- Integrated Lead-Lag of 2 to 10 Boilers
- Universal Data over Ethernet/IP; No Master Boiler Req.
- Modbus Communication Protocol
- Flue Gas Exhaust Temperature Monitoring
- Inlet and Outlet Water Temperature Sensors
- Combustion Air Temperature Sensor
- Wideband Lambda Flue Gas Oxygen Sensor
- Outdoor Air Temperature Reset with Plant Cutoff
- Trending Data Logging
- Setback Modes via Internal Clock
- Accept 4-20mA or 0-10VDC Remote Setpoint Signal
- Two Safety Interlock Contacts for External Device(s)
- Monitoring Contacts (Status, Demand, Alarm)
- Remote Boiler Enable Contact
- Motorized Isolation Valve Control
- Variable Speed Secondary Pump Control (2 Pumps)
- Automatic Rotation of Secondary Pumps
- Variable Speed Primary Pump Control
- Domestic Hot Water Priority with DHW Pump Start/Stop
- Two-Stage Freeze Protection

PROJECT DETAILS:

Project Name	
Date Submitted	
Fulton Representative	

City, State (Province)	
Engineer of Record	
Contractor	

LISTINGS & COMPLIANCE:

- ASME Section IV, "H" Stamp
- ETL Listed to UL-795
- CSD-1 and CSA Controls and Fuel Trains
- AXA XL Compliant; Supersedes IRI
- AHRI Certified to AHRI-1500; Supersedes BTS-2000
- FM Compliant Fuel Train Components
- SCAQMD Compliant (Certain Configurations)

TRIM KIT ITEMS:

- ASME Safety Relief Valve 60, 100, 125, or 160 PSIG
- Pressure & Temperature Gauge
- Installation, Operation and Maintenance Manual
- Condensate Drain Hoses and Fittings

OPTIONAL ACCESSORIES: PARTS SHIP LOOSE FOR FIELD INSTALLATION

BACnet Protonode with Remote Cloud Access 2-45-001058-30
 Lead/Lag IP Switch (8 Port, 120VAC) 2-45-315010
 Lead/Lag IP Switch (5 Port, DIN Mount, 24VDC) 2-45-315044-31
 22-Inch Connection DuraSeal Exhaust Manifold Kit 4-30-315900-31
 Condensate Drain Trap (12MM Max) 4-57-000440
 pH Neutralization Kit (12MM Max) 4-50-000008
 Spare Combustion Air Filter 2-30-001279 (2x)

Supply Header Temperature Sensor 4-30-000510
 Return Header Temperature Sensor 4-30-000510
 Outdoor Air Temperature Sensor Kit 4-30-000500
 Domestic Hot Water Temperature Sensor 4-30-315300
 Second (Auxiliary) Low Water Cut Off Kit 4-30-000330 (2x)

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 ENGINEERING DATA FOR CAPACITY AT HIGH ELEVATION

Endura+ Model		EDR+8000	EDR+10000	EDR+12000
Rated Input at High Fire	BTU/hr	8,000,000	10,000,000	12,000,000
	<i>kW</i>	<i>2,344</i>	<i>2,930</i>	<i>3,516</i>
Minimum Input at Low Fire	BTU/hr	400,000	400,000	400,000
	<i>kW</i>	<i>118</i>	<i>118</i>	<i>118</i>
Rated Output (BTS-2000)	BTU/hr	7,568,000	9,450,000	11,508,000
	Boiler HP	226	282	344
	<i>kW</i>	<i>2,218</i>	<i>2,770</i>	<i>3,372</i>
Thermal Efficiency (BTS-2000)	%	94.6	94.5	95.9

CONNECTION SIZES:

Endura+ Model		EDR+8000	EDR+10000	EDR+12000
Boiler Supply Water Outlet (ANSI 150# FLG)	inches	8	8	8
	<i>mm</i>	<i>203</i>	<i>203</i>	<i>203</i>
Boiler Return Water Inlet (ANSI 150# FLG)	inches	8	8	8
	<i>mm</i>	<i>203</i>	<i>203</i>	<i>203</i>
Flue Gas Condensate Drains (Barbed)	inches	1	1	1
	<i>mm</i>	<i>25</i>	<i>25</i>	<i>25</i>
Boiler Pressure Vessel Drains (NPT)	inches	1-1/2	1-1/2	1-1/2
	<i>mm</i>	<i>38</i>	<i>38</i>	<i>38</i>
Natural Gas Train Inlet (ANSI 150# FLG)	inches	3	3	3
	<i>mm</i>	<i>76</i>	<i>76</i>	<i>76</i>
Combustion Air Inlet (ID)	inches	18	18	18
	<i>mm</i>	<i>457</i>	<i>457</i>	<i>457</i>
Minimum Flue Gas Exhaust Vent (ID) (Manifolded)	inches	22	22	22
	<i>mm</i>	<i>559</i>	<i>559</i>	<i>559</i>
Minimum Flue Gas Exhaust Vents (ID) (Discrete)	inches	12	14	14
	<i>mm</i>	<i>305</i>	<i>356</i>	<i>356</i>
Module Exhaust Outlets (ID)	inches	9-3/4	9-3/4	9-3/4
	<i>mm</i>	<i>248</i>	<i>248</i>	<i>248</i>
Module Exhaust Outlets (OD)	inches	10-3/4	10-3/4	10-3/4
	<i>mm</i>	<i>273</i>	<i>273</i>	<i>273</i>

NOTES:

- Packaged boiler includes supply and return water manifolds with 8-inch connections. Minimum 36-inch rear clearance is required for installation.
- Discrete flue gas exhaust vents per module can be run in place of the manifolded flue gas exhaust vent that combines the exhaust of both modules.
- Flue gas condensate drain and boiler pressure vessel drain are qty two (2) each type per packaged boiler.

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

Endura+ Model		EDR+8000	EDR+10000	EDR+12000
Fuel Usage at Rated Input	SCFH	7,844	9,804	11,764
	<i>m³/hr</i>	222	278	334
Minimum Gas Pressure (Req. at High Fire)	in W.C.	8	8	8
	<i>kPa</i>	2	2	2
Maximum Gas Pressure	in W.C.	28	28	28
	<i>kPa</i>	7	7	7

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

Endura+ Model		EDR+8000		EDR+10000		EDR+12000	
Electrical Supply	Volts	460	575	460	575	460	575
	\emptyset	3	3	3	3	3	3
	<i>Hz</i>	60	60	60	60	60	60
Operating Amps at Low Fire (Typical)	Amps	0.9	0.7	0.9	0.7	0.9	0.7
Operating Amps at High Fire (Typical)	Amps	18	15	20	16	24	20
Full Load Amps (FLA)	Amps	22	19	42	34	42	34
Minimum Current Ampacity (MCA)	Amps	28	24	53	43	53	43
SCCR	Amps	10,000		10,000		10,000	

NOTES:

- The boiler may be factory configured for either 460/3/60 or 575/3/60 electrical service; it is not field convertible.
- Operating Amps are typical and will vary based on site specific factors and operating parameters.
- When commissioned for <7 or <9 ppm NO_x operation, the operating amps will increase by up to 25%.
- <7 and <9 ppm NO_x operation is available for 460/3/60 or 575/3/60 electrical configurations only.
- 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+ Model		EDR+8000	EDR+10000	EDR+12000
Typical Flow Rate at Rated Output 20°F ΔT	GPM	766	960	1,160
	<i>LPM</i>	<i>2,900</i>	<i>3,634</i>	<i>4,392</i>
Typical Flow Rate at Rated Output 40°F ΔT	GPM	384	480	580
	<i>LPM</i>	<i>1,450</i>	<i>1,818</i>	<i>2,196</i>
Water Pressure Drop at Rated Output 20°F ΔT	PSI	2.8	4.1	6.0
	<i>kPa</i>	<i>19.3</i>	<i>28.3</i>	<i>41.4</i>
Water Pressure Drop at Rated Output 40°F ΔT	PSI	0.7	1.1	1.5
	<i>kPa</i>	<i>4.8</i>	<i>7.6</i>	<i>10.3</i>
Maximum ΔT Capable (100% Water)	°F	100	100	100
	°C	55.5	55.5	55.5
Minimum Flow Rate	GPM	150	150	150
	<i>LPM</i>	<i>568</i>	<i>568</i>	<i>568</i>
Maximum Flow Rate	GPM	1,400	1,400	1,400
	<i>LPM</i>	<i>5,300</i>	<i>5,300</i>	<i>5,300</i>

NOTES:

- Flow rates will vary for glycol systems. Review Engineering Guide for details.
- Maximum delta-T for glycol systems is 40°F.
- 100°F delta-T requires water heating system (0% glycol) and minimum 35 psi at the boiler outlet flange. The maximum setpoint is 185°F.
- Pressure drop values are representative of both modules enabled.
- Refer to the Installation, Operation, and Maintenance Manual for the water pressure drop at flow rates not listed above.

WEIGHTS AND VOLUMES:

Endura+ Model		EDR+8000	EDR+10000	EDR+12000
Dry Weight	lbs	11,480	11,480	11,500
	<i>kg</i>	<i>5,207</i>	<i>5,207</i>	<i>5,216</i>
Operating Weight	lbs	14,482	14,482	14,502
	<i>kg</i>	<i>6,569</i>	<i>6,569</i>	<i>6,578</i>
Approximate Shipping Weight	lbs	11,980	11,980	12,000
	<i>kg</i>	<i>5,434</i>	<i>5,434</i>	<i>5,443</i>
Pressure Vessel Water Volume	Gallons	360	360	360
	<i>Liters</i>	<i>1,362</i>	<i>1,362</i>	<i>1,362</i>

VENTING REQUIREMENTS:

Endura+ Model		EDR+8000		EDR+10000		EDR+12000	
Combustion Air Intake Flow Rate	SCFM	1,734		2,160		2,600	
Flue Gas Exhaust Flow Rate	SCFM	1,858		2,324		2,788	
	<i>ACFM</i>	2,294		2,870		3,440	
Minimum Allowable Draft Pressure	in W.C.	-0.10		-0.10		-0.10	
	<i>kPa</i>	-0.025		-0.025		-0.025	
Maximum Allowable Draft Pressure	in W.C.	+0.25		+0.25		+0.25	
	<i>kPa</i>	+0.06		+0.06		+0.06	

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 pressure losses.
- Refer to the Installation, Operation, and Maintenance Manual for complete venting guidelines including certifications, materials, common venting requirements.

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

Endura+ Model		EDR+8000		EDR+10000		EDR+12000	
NOx	ppm	< 20	< 7	< 20	< 7	< 20	< 7
CO ₂	%	8.6	7.5	8.6	7.5	8.6	7.5
CO	ppm	< 45	< 45	< 50	< 45	< 60	< 50
	<i>lbs/hr</i>	0.2628	0.2628	0.3576	0.3212	0.5168	0.4292
	<i>g/hr</i>	119.2	119.2	162.2	145.7	234.4	194.7
SOx	lbs/hr	0.0048		0.0058		0.0070	
	<i>g/hr</i>	2.18		2.63		3.18	
Total Particulates (PM)	lbs/hr	0.060		0.075		0.0447	
	<i>g/hr</i>	27.0		33.8		20.28	
Total Organics (TOC)	lbs/hr	0.086		0.108		0.129	
	<i>g/hr</i>	39.1		48.9		58.7	
Lead	lbs/hr	4.0 × 10⁻⁶		5.0 × 10⁻⁶		5.8 × 10⁻⁶	
	<i>g/hr</i>	1.8 × 10 ⁻³		0.0022		0.0026	
Volatile Organic Compounds (VOC)	lbs/hr	0.043		0.054		0.065	
	<i>g/hr</i>	19.6		24.5		29.4	

NOTES:

- <7 ppm NOx operation is available for 460/3/60 or 575/3/60 electrical configurations only.
- NOx and CO are stated at a 3% O₂ correction.
- Emissions data is typical for standard natural gas operation.
- Emissions will vary based on site specific factors and operating parameters.
- Site specific conditions and emissions requirements will determine the appropriate CO₂ 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.

MINIMUM CLEARANCES:

Endura+ Model		EDR+8000	EDR+10000	EDR+12000
Front	inches	36	36	36
	<i>mm</i>	<i>914</i>	<i>914</i>	<i>914</i>
Rear	inches	36	36	36
	<i>mm</i>	<i>914</i>	<i>914</i>	<i>914</i>
Top	inches	18	18	18
	<i>mm</i>	<i>457</i>	<i>457</i>	<i>457</i>
Sides	inches	24	24	24
	<i>mm</i>	<i>610</i>	<i>610</i>	<i>610</i>

NOTES:

- 24-inch (610 mm) minimum clearance is required on both sides of each boiler to facilitate maintenance.
- Local codes may supersede Fulton requirements, the more stringent of the two shall prevail.
- Greater top clearance will be required for applications where combustion air is ducted directly to the boiler from the outdoors.

DIMENSIONS:

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