

HUNT WT Series WATERTUBE STEAM BOILER WITH ECONOMISER – 1MW to 20MW

Supply and install steam boiler(s) and economizers suitable for unattended operation, which shall be manufactured in Australia using skilled labour and proven materials, for optimum life and efficiency and will comply with the following Australian Standards:

AS1200-2000	Pressure Equipment
AS1210-2010	Pressure Vessels
AS1228-2006	Pressure Equipment – Boilers
AS1657-1992	Fixed platforms, walkways, stairways and ladders – Design, construction and installation
AS1853-1983	Automatic oil and gas burners – Mechanical draught
AS2593-2004	Boilers Safety Management and Supervision Systems
AS1271-2003	Safety valves, other valves, liquid level gauges and other fittings for boilers and unfired pressure vessels
AS3000-2007	Electrical Installations
AS3814-2009	Industrial and commercial gas-fired appliances
AS3920.1-1993	Assurance of Product Quality – Pressure Equipment Manufacture
AS3992-1998	Pressure equipment – Welding and brazing qualification
AS4037-1999	Pressure equipment – Examination and testing
AS4343-2005	Pressure equipment – Hazard levels
AS4458-1997	Pressure Equipment – Manufacture

BOILER(S)

The boiler(s) shall be of Hunt Boilers manufacture or equal approved and must comply with the following performance and construction criteria:

Construction

The boiler will be manufactured from steel in a “D” type horizontal configuration and have adequate steam space to ensure that there will not be water carry over under normal operating conditions.

The boiler will be of membrane water wall construction, which minimises refractory materials and ensures a gas tight construction.

The boiler will be constructed using adequate sized unheated downcomers to ensure that circulation throughout the tube bank is effective.

The boiler shall be designed for a maximum Working Pressure of 1200 kPa and Operating Pressure of 1000 kPa.

The boiler will be provided with an adequate number of inspection openings to facilitate internal boiler inspection and cleaning.

Steam Drum

The steam drum shall be designed for the evaporation rate and steam pressure and generously sized to provide a buffer for large load variations.

The drum shall also incorporate a water distribution pipe to promote even water distribution, internal baffling to provide effective steam and water separation and a steam dryer from which quality steam is delivered.

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Tubes and Membrane Wall

The boiler will be manufactured such that no welding is performed at fin tips associated with the membrane water wall and all welds associated with membrane seal connection shall be made at the watertube surface only.

Burners and Burner Control

The burner shall be of packaged forced draught type designed.

The following burner control protocol shall apply:

Boiler with capacity of upto 2MW	High/Low Burner Operation
Boiler with capacity greater than 2MW	Fully Modulating Burner Operation

Where the boiler capacity exceeds 2 MW, the burner shall automatically modulate to suit load conditions required of the plant.

Burner modulation will be achieved using a steam pressure transmitter fitted to the steam drum. It shall transmit a 4-20mA analogue signal to the PLC and via a PID loop, the firing rate shall be adjusted to match load conditions.

Boiler Valves and Mountings

The boiler shall be supplied complete with valves and fittings including main steam stop valve, safety valve(s), feed water isolating and check valves, blowdown valve, and water gauges.

Feed Water Pumps

Two feed water pumps shall be supplied that automatically change over after each boiler lockout condition or start up.

The pumps shall be a multistage centrifugal type manufactured from a cast iron casing with all impellers, shafts, bolts, studs and nuts manufactured from stainless steel type 316. Motors shall be totally enclosed fan cooled with an ingress protection of IP54 (minimum) 415 Volt, 3 phase, 50 cycle.

The following pump control protocol shall apply:

Boiler with capacity of upto 3MW	On/Off Pump Operation
Boiler with capacity greater than 3MW	Fully Modulating Pump Operation

Where the boiler capacity exceeds 3 MW, the pumps shall automatically modulate to suit load conditions required of the plant.

Pump modulation will be achieved using a water level transmitter fitted to the steam drum. It shall transmit a 4-20mA analogue signal to the PLC and via a PID loop, the water flow rate shall be adjusted to match load conditions.

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Refractory

Where possible a fibre type refractory shall be used to minimise weight and improve insulation effectiveness.

Equipment Access

Ladders and galleries shall be provided to the steam drum and operating the necessary valves and fittings.

Control Overview

The boiler shall be provided with a 'Failsafe' integrated boiler management system connecting the boiler, burner and water systems and their safety interlocks.

The boiler control panel shall be rated to IP55 and incorporate an Allen Bradley Micrologix 1500 PLC based boiler management system. The PLC must communicate to external protocols including RS-232, DF1 half duplex and DF1 full duplex.

The control panel shall include a touch screen that allows for the control of boiler operation and provides the display of current operating conditions, discrete first up fault identification and detailed fault memory.

Also incorporated into the management system shall be a self-check boiler water level control and self-check flame safeguard.

Safety Interlocks

The boiler management system shall, as a minimum, control and detect the following:

- Loss of pilot flame or main flame;
- Low water and extra low water;
- Low feed water tank level;
- Over pressure in boiler;
- Loss of combustion air;
- Gas pressure;
- Electric phase failure;
- PLC operation.

Boiler Flues (Chimney)

The boiler shall be provided with boiler flues designed such that there will be no positive pressure at connection to the boiler, manufactured from material not less than 1.6 mm, which is hot dipped galvanized or stainless steel, of a spiral welded style of construction.

Documentation

The boiler shall be provided with complete set of documentation as follows:

Design Registration Statement
Design verification Statement
Manufacturer's Data Report

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Copies of all Material Certificates
Copies of all Non-destructive Test Reports
Complete Instruction Manuals (2 sets - electronic)

General Capacity Specification

The boilers shall be provided as follows:

Model	Hunt WT or approved equal
Rated Continuous Capacity	1 MW to 20 MW
Top drum diameter	610 mm, 760 mm, 946 mm or 1067 mm
Bottom drum diameter	610 mm or 762 mm
Transport Mass	8.2 tonne to 38.5 tonne
Flooded Mass	10.4 tonne to 57.6 tonne
Evaporation from and at 100°C	1597 kgs/hr to 31,880 kgs/hr
Minimum Thermal Efficiency	80%
Design Temperature	250°C
Design pressure	1200 kPa
Maximum operating pressure	1000 kPa
Hydrostatic Test Pressure	1800 kPa
Fuel type	Natural Gas
Burner	Riello, Saacke, Nu Way packaged type or approved equal
Principle Design Standards	AS1200, AS1228, AS2593, AS3920.1, AS3992, AS4343 and AS4458

ECONOMISER(S)

The economiser(s) shall be of Hunt Boilers manufacture or equal approved and must comply to the following performance and construction criteria:

Construction

The economiser shall be a vertical tube arrangement manufactured from stainless steel extended fin tube.

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The economiser pressure parts shall be of welded assembly without the use of any bonded or compression fittings.

The economiser enclosure shall be the gas tight, allowing unrestricted flow of hot gas over all internal parts for maximum resistance to corrosion in header boxes and return areas.

The enclosure shall be furnished with a minimum of 50 mm thick, factory installed high temperature insulation covered with a suitable steel jacket.

The economiser shall be completely drainable by gravity after installation and shall be designed to operate at 100 percent load without bypassing any flue gas or feedwater.

Economiser Performance

The economisers, while in clean condition, shall be guaranteed to provide an energy recovery of between 4.5% and 6%.

Model	Hunt WT or approved equal
Rated Continuous Capacity	1 MW to 20 MW
Design Temperature	250°C
Design pressure	1200 kPa
Maximum operating pressure	1000 kPa
Hydrostatic Test Pressure	1800 kPa
Fuel type	Natural Gas
Principle Design Standards	AS1200, AS1228, AS2593, AS3920.1, AS3992, AS4343 and AS4458

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