



Three Pass Wet Back Reverse Flame
COCHRAN BORDERER
Package Steam Boiler

Technical Specification

COCHRAN BORDERER PACKAGE STEAM BOILER SPECIFICATION

The **COCHRAN BORDERER PACKAGE STEAM BOILER** is of horizontal three pass wet back reverse flame design and constructed in accordance with BS EN 12953. It complies with the requirements of the Factories Act (1961) and Arrangement 1 of Guidance on Safe Operation of Boilers Ref: BG01 developed by the Safety Assessment Federation (SAFED) and the Combustion Engineering Association (CEA), the latter being the acceptance criteria for compliance with HSE and UK Inspection Authority requirements. Additionally, the Boiler is CE Marked to meet the requirements of:

- Pressure Equipment Directive
- Low Voltage Directive
- Electro-Magnetic Compliance Directive
- Machinery Safety Directive

Throughout the manufacturing process, the **BOILER** is subject to inspection by a leading Independent Insurance Company. In addition, **COCHRAN** apply their own quality procedures that comply with the requirements of ISO 9001:2008.

The attached schedules detail the specification of the Boiler proposed in the tender enclosed.

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We reserve the right to amend or alter this Specification during the tender validity period or the manufacturing stage of any subsequent order to comply with any alteration or amendment to applicable Standards, Safety Codes, Guidance Notes or Revisions in Manufacturing Techniques.

Schedule 1: Boiler Pressure Part

GENERAL

All plate used in the construction of the boiler is cut and profiled by computer controlled equipment. The shell and furnace plates are then rolled, assembled, machine welded and subjected to NDT (either radiographic or ultrasonic) to ensure compliance with the latest construction standard requirements.

Tube plates are drilled by computer controlled equipment to ensure the correct ligament is maintained and a satisfactory tube hole finish is achieved.

Design

The boiler shell, depending upon size is constructed in suitable sections. Following the rolling process, longitudinal and circumferential seams are machine welded and subjected to inspection to comply with the latest construction code requirements.

Furnace

The furnace is constructed in suitable sections dependent on furnace size. Following the rolling process, longitudinal and circumferential seams are machine welded and subjected to X-Ray and NDT Inspection to comply with the latest construction code requirements.

Convection Tubes

The boiler incorporates one pass of convection tubes fitted with purpose made turbulators. The required number of stay tubes and stay bars are fitted in all boilers. All stay tubes are lightly expanded before being welded in the main boiler tube plates

Access and Inspection

Access to the front tubeplate and furnace are by means of a large hinged door. Access to the rear tubeplate is by means of removable lift off doors. Waterside access is provided by a manhole or headhole as appropriate at the top of the boiler and a muddoor on the rear tubeplate. For inspection purposes, openings are provided to gain access to the steam/water side of the boiler. One 420 x 320mm elliptical manway opening is provided on the top of the boiler. One 125 x 90mm elliptical handhole opening is provided on the rear boiler tubeplate.

To permit observation of the burner flame, a flame viewing sight port is provided.

Seatings

Mountings and controls are fitted to pads, standpipes and bosses welded to boiler shell.

Materials Specification Shell and Shell Attachments

Shell, Furnace, Reversal Chamber and Tube Plates:	BS EN 10025-2 P265 GH
Furnace Access Tube:	ASTM A106 GR B
Stay Bars:	BS EN 10273 P235 GH
Plain and Stay Tubes:	BS EN 10216-1-TR2 BS EN 10216-2 BS EN 10217-1-TR2 BS EN 10217-2
Mandoor Head Holes Muddoor Lifting Lug:	BS EN 10025-2 P265 GH
Pads (Valves):	BS EN 10025-2 P265 GH
Standpipes:	ASTM A106 GR B

Schedule 2: Boiler Mounted fabrications – Casings; Insulation & Supports

Front and Rear Casings

The front casing incorporates a hinged, insulation lined door, which carries the combustion equipment and provides access to the boiler furnace and convection tubes.

The rear casing is fabricated from mild steel plate and incorporates a horizontal flue gas outlet, welded to the rear of the boiler shell. Lift-off doors for access to the convection tubes are provided.

The front and rear casings are provided with screen plates to further minimise heat losses.

Insulation and Sheeting

The boiler shell is insulated with 50mm thick high density insulation to reduce radiation loss then clad in 20G (0.812mm thick) "Stucco" aluminium sheeting to BS1470 SICH.H. Tubeplates, pads and standpipe penetrations are finished with aluminium collars.

To aid access for inspection purposes inspection doors and valves are not provided with insulation, this is available on request as an added option. Pipework is provided uninsulated as the client may find it easier to insulate on site with other connecting pipework between the package and the system.

Supports

The boiler supports are an integral part of the front and rear casings and are provided with outriggers for feed pump and also incorporate jacking points. The front and rear supports are connected together using tie sections to provide rigidity and assist in installation.

Jacking points are provided on the support structure to assist in offloading, positioning and manoeuvring the boiler.

Schedule 3: Steam & Water Mountings

General

As standard, the valves and gauges we offer comply with BS EN 12953 and are fitted to the boiler standpipes with suitable joints and flanges drilled to BS EN 1092. Flange fixing is by metric studs and nuts or bolts. Standard valves and fitting are tabulated below:

Quantity	Description	Manufacturer	Material
1	Steam Stop Valve, Angle pattern type	Ari Armaturen	Cast steel
1	Single Spring High Lift Safety Valve sized to provide 100% discharge capacity	Spirax Sarco	SG Iron
1	Feed water isolation, Angle pattern type	Ari Armaturen	Cast steel
1	Feed water, wafer pattern non-return	Gestra Flowserve	Stainless steel
1	Multi stage, fixed speed, centrifugal feed pump	Grundfos	Stainless steel
1	Manual Blowdown Valve, ball type	RTK Control	Carbon steel
2	Reflex type water gauge assembly with steam & water cocks fitted to a plate type column	Klinger	Carbon steel
1	Standard integrity Probe type controls.	Flowserve	-
1	Flush mounted, rear entry Pressure Gauge	Stewart Buchanan	Aluminium
1	DN25 Blanked connection for TDS Control or Chemical injection	-	-

Drain pipework from the water gauge drain cocks and safety valve drain are extended in suitably sized pipework terminating individually at boiler centre line.

NOTES

- Valve materials are provided for the rating, pressure and temperature requirements.
- For multi-boiler installations an additional steam non-return valve will be required to comply with the requirements of Guidance Notes BG01. Cochran can provide this additional valve on request if not being supplied by your Installation Contractor.
- Please refer to quotation for any additional valves or mountings offered.

Schedule 4: Feed Pumps & Water Level Controls

WATER LEVEL CONTROLS - DIRECT MOUNTED PROBE TYPE

Two top mounted probe type water level elements are fitted, one to operate the on/off feed pump, first low water alarm and system lockout, the other to provide a second low water alarm and system lockout as follows:-

One Water Level Control will provide the following operational signals:

- Pump On
- Pump Off
- First Low Water Alarm and System Lockout

One Water Level Control will provide the following operational signals:

- Second Low Water Alarm and System Lockout
- High Water Alarm

NOTE

As standard, the water level control probes do not have self-monitoring capability but this facility can be offered if required.

FEED WATER PUMP

The feed water pump is of the multistage type sized to suit the boiler working pressure and rating.

The pump is fitted to the boiler support brackets and connected to the boiler feed valve in suitably sized mild steel pipework.

A feed water inlet strainer is supplied loose.

Schedule 5: Combustion Equipment/Control Panel/Wiring & Testing

COMBUSTION EQUIPMENT

The Boiler is fitted with a pressure jet burner matched to the Boiler and suitable for the fuel(s) specified in our tender. The burner is a complete unit pre-wired and includes fuel atomiser, ignition equipment, windbox and control linkage, etc. In the case of gas fired units a matched gas train is supplied.

All burners are fully automatic pressure jet type and have been designed specifically for gas and/or oil applications. Primarily designed for use when firing natural gas, our burners can be adapted to suit gases such as Towns gas and liquefied petroleum gas. They have also been designed to operate with distillate and residual oils as defined by British Standards Specification BS2869 as Classes 'D', 'E', 'F' or 'G'.

CONTROL PANEL

A Boiler control panel is fitted to the Boiler supports and includes the necessary control equipment, starters, water level alarms, controls for feed pump and mains isolation.

ELECTRICAL WIRING

Heat resistant cabling is used for wiring between water level controls and the control panel, all other wiring is in PVC covered wiring carried in flexible conduit. Colour Coding to BS EN 60204-1:2006.

FUNCTIONAL TESTING

An electrical functional test of the boiler safety and control system is carried out and witnessed by the Cochran Q.A. Department Inspectors.

Schedule 6: Painting

Surfaces are degreased prior to painting and one coat of primer, one coat of undercoat and one finishing coat is applied.

Standard Colours are as follows:-

Baseframe, all Valves, Platform and Ladder (<i>when fitted</i>)	Black
Front and Rear Casings	Black
Screen Plates	Blue
Sheeting	Unpainted Stucco Aluminium
Burner	Manufacturer's Standard
Control Panel	Manufacturer's Standard
Feed Pump	Manufacturer's Standard

Schedule 7: Terminal Points

Flanges to BS EN 1092 except where otherwise stated.

Screwed connections BSP except where otherwise stated.

DESCRIPTION

Stop Valve (Outlet)	Flanged
Safety Valve (Outlet)	Flanged
Blowdown Valve (Outlet)	Flanged
Feed Water (Inlet)	Flanged
Drain Pipework (Outlets)	Screwed
Flue Gas (Outlet)	Horizontal
Oil Flow (Connection)	Screwed
Oil Return (Connection)	Screwed
Gas (Inlet) <i>when applicable</i>	Flanged
Pilot Gas (Inlet) <i>when applicable</i>	Screwed

Schedule 8: Tools/Documents

TOOLS

Tube cleaning brushes and rod handle are provided.

DOCUMENTS

General Arrangement Drawing and Electrical Wiring Diagrams are provided.

Certificate of Compliance is provided, certified by independent Inspection Authority.

Operation and Maintenance Manual is provided.

NOTE:

In order to take advantage of all Technical Developments, we reserve the right to amend details given in this Specification.