



**Three Pass Wet back  
ST28  
Low NOx  
Packaged Steam Boiler**

# **Technical Specification**

## **COCHRAN ST28 Low Nox PACKAGE STEAM BOILER SPECIFICATION**

Styled on the world renowned and popular Wee Chieftain boiler, the **COCHRAN ST28 Low Nox PACKAGE STEAM BOILER** is of horizontal three pass wet back design and constructed in accordance with BS EN 12953 providing unrivalled efficiency and reliability. The boiler is designed to meet the latest European environmental legislation, the Medium Combustion Plant Directive (**MCPD**) when fitted with Cochran (or equivalent) combustion equipment. It complies with the requirements of the Factories Act (1961) and 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 the Pressure Equipment Directive (**PED**), Low Voltage; Electro-Magnetic Compliance & Machinery Safety Directives.

The Cochran ST28 steam boiler has the following **key features and upgrades available**:

- **Emissions fully compliant with MCPD**
- **Output range of 1000 kg/hr to 6000 kg/hr F&A 100°C**
- **Nett Efficiency upto 95% in accordance with EN12953**
- **Fully matched Cochran combustion equipment**
- **Turndown of upto 6:1**
- **Eclipse Touchscreen HMI with Modbus interface and remote access capability**
- **Variable speed drives for FD Fan and Feed water pump motors**
- **Low noise levels**
- **Enhanced insulation for lower touch temperature**

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 9001:2015.

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

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## Schedule 1: Boiler Pressure Part

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### GENERAL

All plate used in the construction of the boiler is cut and profiled by computer controlled equipment. The shell, furnace and reversal chamber 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

All boilers in the range are of fully wet-back design. The furnace tube is designed to allow adequate expansion and is located between the front tube plate and the totally submerged reversal chamber. The rear reversal chamber plate is stayed to the Boiler rear tube plate with the required number of stay bars.

Tube plates are drilled by computer controlled equipment to ensure the correct ligaments are maintained and a satisfactory tube hole finish is achieved. Weld preparation for welded tubes and bars are also undertaken by computer controlled equipment to strict tolerances.

Two separate passes of convection tubes are fitted. All plain tubes are expanded into position with stay tubes and stay bars fitted to ensure that stressing of tube plates and tube nests are within construction code limits.

All stay tubes are lightly expanded before being welded in the main boiler tube plates and reversal chamber. Stay bars are welded into tube plates.

### Access and Inspection

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 320 x 220mm elliptical headhole opening is provided in the lower quadrants toward the rear of the boiler. Two 125 x 90mm elliptical handhole openings are provided, one in each of the main boiler tubeplates.

To permit observation and access into boiler furnace tube, a rear access door complete with a flame viewing sight port is provided.

## Schedule 1: Boiler Pressure Part (continued)

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### 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**

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### **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.

Rear casing can be insulated externally and provided with a flanged outlet for chimney connection (vertical gas flow), and lift off doors for access to boiler tubeplates and tubes to facilitate tube cleaning and inspection.

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

### **Insulation and Sheeting**

The boiler shell is insulated with 100mm thick insulation to reduce radiation loss then clad in 0.9mm thick self coloured Aluzinc sheeting. Pads and standpipe penetrations are also finished with Aluzinc collars.

To reduce touch temperature, the boiler rear casing can be insulated and clad.

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

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#### 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	Ari Armaturen	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	Water strainer, Y Type (supplied loose)	ISIS Fluid Control	Cast Iron
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 on/off Probe type controls.	Flowserve	-
1	Bourdon type, 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**

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### **WATER LEVEL CONTROLS – DIRECT MOUNTED PROBE TYPE**

Utilising the tried and proven Direct Mounted Probe Type water level controls that are located on the top centreline of the boiler shell.

All boilers within the range are supplied with standard integrity level controls with the following available functions:

- Pump control
- 1st Low Water Level Alarm and System Lockout requiring manual reset
- 2nd Low Water Level Alarm and System Lockout requiring manual reset
- High Water Alarm

### **FEED WATER PUMP**

Manufactured by Grundfos who are recognised as one of the leading pump manufacturers worldwide, the boiler feed pump is a multistage type sized to suit the boiler working pressure and rating.

The pump can incorporate a variable speed drive (VSD) to improve and is fitted to the boiler and connected with suitably sized mild steel pipework.

A feed water inlet strainer is supplied loose.

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

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### **COMBUSTION EQUIPMENT**

Each boiler is fitted with Cochran combustion equipment to achieve Nox levels to meet the MCP Directive.

Our Simplex Burner (Modulating control on gas firing; high/low control on oil firing) is fitted on boilers rated upto and including 3000 kg/hr and our Triplex Burner (Modulating control on gas firing; three stage control on oil firing) is fitted on boilers rated from 4000 kg/hr and 5000 kg/hr. The 6000 kg/hr unit is fitted our Equinox burner (Modulating control on gas / oil firing).

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 Towns gas and liquefied petroleum gas.

The Simplex and Triplex burners are an undershot type configuration comprising of a combustion head assembly, electronically operated air damper, forced draught fan, electric ignition and flame monitoring equipment pre-wired to a junction box. Our Equinox burner has all of the same features but with a side slung windbox arrangement.

The burner is controlled by the Siemens LMV electronic controller that employs a linkageless burner management system. Compliance with BG01 Arrangement 3 is available by upgrading the LMV controller.

### **CONTROL PANEL**

A 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.

Every panel can be fitted our own specially designed Eclipse HMI supplied as an option.

### **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

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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	Self coloured Aluzinc
Burner	Poppy Red
Control Panel	Manufacturer's Standard
Feed Pump	Manufacturer's Standard

## Schedule 7: Terminal Points

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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
Flue Gas (Outlet)	Vertical Flanged
Drain Pipework (Outlets)	Screwed
Oil Flow (Connection)	Screwed
Oil Return (Connection)	Screwed
Gas (Inlet)	Screwed
Pilot Gas (Inlet) <i>when applicable</i>	Screwed

## **Schedule 8: Tools/Documents**

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### **TOOLS**

Tube cleaning brushes and rod handle are provided.

### **DOCUMENTS**

Boiler 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 Technical Developments, 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.