HEALTH AND SAFETY PRODUCT DATA SHEET - BOILERS

The purpose of this document is to inform the end user of the key points and controls that must be in place to ensure that our Boilers and ancillary equipment are safe and without risk to health when properly used.

1.0 PRODUCT

1.1 Packaged Steam and Hot Water Boilers, covering steam raising and hot water boilers for the domestic and overseas markets are as follow:- Steam ST23, ST23E, ST25, ST28, ST32, ST36, ST37, ST49 (Composite), ST65, ST95 (Waste Heat) and the hot water range – HW29, HW33, HW34, HW39, HW96 (Waste heat)

2.0 INTENDED USE

2.1 The boiler is capable of producing steam and/or hot water at the design evaporation and working pressure. Refer to specific contract documents for actual output and pressure. The steam or hot water produced is normally intended for process or plant usage.

3.0 BOILER CONSTRUCTION

3.1 The pressure part of the boiler is of welded construction throughout and is designed to British Standards and/or other National Standards and complies with Health and Safety Executive Guidance notaries or to the requirements of any other authority as specified by the contract entered into.

3.2 The boiler is manufactured from suitable materials as required by the relevant Standards applicable under the contract entered into.

3.3 The required quality of workmanship and construction is as specified in the relevant Standards applicable under the contract entered into by the Company. The shell is insulated with quality material, encased to provide a clean, easily maintained outer surface.

4.0 BOILER MOUNTINGS

4.1 The boiler is complete with the necessary fittings to meet the requirements of the Health and Safety at Work Act 1974 and which require the connection of services at site.

4.1.1 When boilers are supplied incomplete as specified by the contract, final completion of the boiler being the responsibility of the buyer or his agents, the buyer must ensure all components being fitted comply with the relevant codes of practice and the appropriate safety standards.

4.2 All valves and mountings are designed and manufactured to suit the design pressures and temperatures specified in the contract, and to meet the requirements of PUWER Regulations, Insurance requirements and standards applicable under the contract.

4.2.1 The correct setting of the safety valve is of particular importance. The valve is fitted with an internal spring or weight and set to suit the design condition for the contract. This set pressure must not be altered except by a suitably qualified person, who is also able to fully assess the consequences of carrying out such an alteration.

The manufacturer, upon receipt of the client's new requirements will advise on any tests/alterations to be carried out.

4.2.2 The design of the safety valve escape pipe is critical, as bad design can affect safe operation. The safety valve escape pipework and bore must be verified with regard to the valve manufacturers recommendations, the pipe should have a minimum of bends and be taken straight to atmosphere clear of the boiler house roof.

5.0 FEED PUMP

5.1 Where feed pumps are fitted to the boilers, it is essential that an inlet strainer is fitted in feed line prior to the feed pump suction connection.

6.0 COMBUSTION EQUIPMENT

6.1 The combustion equipment when supplied with the boiler is mounted at the front of the boiler to burn the specific fuel. Certain safety features are designed into each combustion system, related to the fuel being used.

7.0 CONTROL PANEL

7.1 When the boiler is supplied with external electrical components pre-wired to a control panel, the panel will contain the required safety feature such as starters, fuses, relays and switches for control functions with indicator lights and alarms for normal and fault conditions.

7.2 Before opening the control panel the incoming mains supply must always be isolated.

8.0 PRINCIPLES OF OPERATION

8.1 The boiler is a pressure vessel capable of converting the heat provided by the combustion of the fuel within the furnace, into steam or hot water.

8.2 The boiler, when fitted with a furnace, receives radiant heat from the combustion of the fuel within the furnace. The hot gases leaving the furnace will continue to give up heat to the cooled surfaces and tubes. Gases generally leave the boiler by means of a chimney. The products of combustion must be adequately dispersed to meet local regulations.

8.3 The temperature of the gases leaving the boiler may be of the order of 260°C.

8.4 Ventilation is required to provide adequate air for combustion and to keep the boiler house cool.

9.0 HEALTH AND SAFETY REQUIREMENTS

9.1 Current safety legislation lays down specific rules to be observed by manufacturers, the owners of the plant and the boiler operator. Clients shall be aware of their legal obligations relating to boilers operation as well as Guidance Note BG01 from the Health and Safety Executive entitled “Boilers Operation Guidance”.

10.0 BOILER SAFETY

10.1 No new steam or hot water boiler shall be put into use unless a certificate specifying its maximum permissible working pressure and stating the nature of the test to which the boiler and fittings have been submitted has been obtained from the manufacturer. The certificate must be kept available for inspection and the boiler so marked as to enable it to be identified as the boiler to which the certification relates.

10.2 <u>It is the operator’s duty</u> to ensure that the boiler is operated safely and efficiently.

10.3 Frequent observations of the gauge glass is one of the most important functions of the boiler attendant’s duties. It is the means by which failure of automatic control systems can be detected and therefore the attendant must ensure that the operating and maintenance instruction manual procedures are adhered to. Gauge glass observation is just as important when boiler plant is unattended. A recognised programme of routine checks should be established by an appointed person, familiar with the boiler and the procedures required.

In the case of hot water boilers, the boiler attendant must ensure that system static head stability is maintained.

10.4 When using the main blowdown valve the operator must not, under any circumstances, leave the valve unattended until the blowdown procedure has been completed. If more than one boiler is connected to a common blowdown system, even if the boilers are not in the same boiler house, the Law requires that only one blowdown key for that system is available on the premises.

If there are two boilers with different sizes of key, it is permissible to weld the keys end to end and make one tool of them. The key must never be left on a closed valve.

10.5 Every boiler loses heat by radiation and convection but this loss is reduced effectively by insulation of the boiler shell. Under normal operating conditions, external boiler surfaces radiate a certain amount of heat, particularly at the rear of the boiler. Boiler attendants and any other personnel are advised to avoid touching these surfaces unless properly protected.

10.5.1 It is recommended that instruments are mounted in the boiler house to constantly display flue gas exit temperatures or if this is not possible, regular weekly checks must be made with a thermometer through the rear instrument plug to monitor gas flue temperatures. If the temperature rises above the normal, by approximately 10°C it indicates a greater heat loss and consequently a less efficient boiler. The boiler should be shut down and cleaned. For optimum efficiency, periods of cleaning should not extend beyond 3 months. This service is available from the Boiler manufacturer.

10.6 When the boiler and plant has been working for some time, it is good operator practice to check for leakage. Regular checks for leakage of steam, water and combustion gases should form part of a boiler house check list.

10.6.1 Live steam or hot water can escape from worn valve joints and connections, this is not only wasteful and expensive it also represents a danger to boiler attendants. Replacement joints should be readily available and all such leaks should be repaired as soon as practicable. The manufacturer will assist in this regard.

10.6.2 Care should be taken when breaking joints on steam and hot water circuits in case isolating valves are not properly tightened.

10.7 Air used in the combustion process must be properly controlled and a CO_2 (carbon dioxide) or 0_2 (Oxygen) indicator be used to determine the correct amount of air. Primary and secondary air needs to be adjusted to keep smoke emission within the local Clean Air requirements whilst, at the same time, maintaining the highest percentage of CO_2 and the smallest percentage of 02. There are various ways of measuring these flue gas characteristics and the Boiler manufacturer will advise upon the most effective means.

10.7.1 It is important to note that CO (carbon monoxide) in the waste gas, not only indicates a serious loss of efficiency but also the presence of a toxic gas. The creation of CO in the waste gases must be avoided at all times.

10.7.2 Adequate ventilation within the boiler house is necessary to prevent asphyxiation. Do not seal up established openings and do not aggravate this problem by allowing the flue gas passages to foul up so that fumes enter the boiler house.

10.8 Enter boiler flues with caution and notify a responsible person that work inside the flues is about to proceed. Put up a notice local to all points of initiation of operation that work is in progress. Wear breathing apparatus unless the area has been declared safe for working. Ensure flues are devoid of personnel before closing up.

Also ensure the combustion system is disconnected from the fuel supply and a bold notice is displayed on the combustion system, identifying work is taking place.

10.9 Attendants are to use a protective blue or green tinted viewing glass screen or goggles when looking at the flame through the inspection port. Ear protectors must be worn in a noisy environment.

10.10 Spilt fuel must not be allowed to accumulate since it can cause serious accidents to personnel and presents a significant potential fire hazard.

Obey No Smoking Regulations in the vicinity of areas designated hazardous and do not smoke local to fuel supply systems.

10.11 A record must be kept of all periodic tests, servicing and maintenance of controls. Advice on a suitable record for the daily and weekly tests of water gauges and controls can be obtained from the Boiler manufacturer.

11.0 INSPECTION AND MAINTENANCE

11.1 After properly isolating the boiler (steam, water and fuel connections) it must be allowed to cool slowly to a safe condition for inspection and maintenance.

11.2 Rapid cooling hardens scale in the boiler and can cause joints to open. When atmospheric pressure shows on the gauge, test or air cocks must be opened and the water run out. Manhole or access cover should not be removed or opened, whilst there is the slightest possibility of any pressure or vacuum condition existing in the boiler. Do not rely entirely upon the pressure gauge and sufficient margin of time must be allowed after the pressure has fallen to atmospheric and after test and/or air release cocks have been opened.

11.3 Before entering a boiler a check must be made to verify that all steam, water and blowdown valves have been tightly closed and blowdown valve key removed. Where the boiler is connected to a range, both boiler crown valve and range isolating valves and feed check valve should be locked with padlock and chain prior to entry. Alternatively, connections must be blanked or spaded off.

11.4 Notices must be placed at accessible and clearly visible locations to warn that men are working inside the boiler and the responsible person acting on behalf of the boiler operator must be aware that men are inside the boiler.

11.5 Where ceramic fibre blanket is used. The user must be aware of the following precautions, if removal of the fibre is undertaken by his own personnel. When handling used refractory blanket, take reasonable steps to minimise airborne dust and wear an approved mask. Avoid contact with skin and eyes by wearing gloves and eye protection. After handling, rinse exposed skin areas with water. Work clothing should be washed separately. After removal the old blanket material must be put into plastic bags, sealed end safely disposed of in accord with the statutory regulations.

12.0 EMERGENCY PROCEDURES

12.1 All members of the boiler plant staff must be aware of the operation and maintenance procedures as well as those defined by their own Company Policy documents to be adopted in the case of an emergency incident and particularly one which requires the emergency services.

12.2 Fire fighting equipment including equipment particularly suitable for combating the relevant fuel and electrical fires must be available in the area.

13.0 WATER TREATMENT EQUIPMENT

13.1 Water Treatment is an essential part of the process for any boiler plant. Other than the general caution note below, it is impracticable for the boiler manufacturer to deal with specific hazards occasionally associated with water treatment, because of the varying water qualities encountered and the subsequent different treatment required. Practical guidance is provided in the Water Treatment Contractors instruction manuals but the client must consult the Contractor when unspecified circumstances are encountered.

The chemicals in use will form part of the clients COSHH assessment in accordance with the Regulations.

13.2 CAUTION ON THE USE OF CHEMICALS

The storage of dangerous or hazardous chemicals and particularly those associated with the water treatment, should be fully protected in a fully enclosed well ventilated building. Provision for different bays should be made to avoid mixing of chemicals and in the case of spillage, adequate washing down facilities and effluent disposal facilities ***MUST BE PROVIDED***. Protective clothing, gloves and eye protection for the handling of the chemicals, must also be available.

14.0 TRAINING OF BOILER ATTENDANTS

14.1 It is important that customers boiler attendants and maintenance personnel understand the procedures for safe and efficient working of the plant and that maintenance personnel can carry out regular checks, make adjustments and repairs.

The importance of training is also emphasised in Health and Safety Executive Guidance Note BG01.

14.2 Cochran Ltd organise throughout the year, a series of courses designed to cover the correct operation and maintenance of Packaged Boilers and their combustion and control equipment. On site Training Courses are also available. Details on request.

14.3 Additionally, we provide the full range of Customer Services covering plant operation, servicing, maintenance, repair, conversion/retro fit and spares supplies as well as energy saving, energy conservation and emissions control consultancy.