



GENERAL PROCEDURE FOR THE PREPARATION OF BOILERS PRIOR TO ULTRASONIC EXAMINATION

The following procedure describes the preparation instructions for a triple pass multitubular horizontal boiler with combustion chamber and bowling hoop furnace. Not all boilers are alike. Therefore the information contained within these instructions may only apply in part.

PLEASE REFER TO THE TYPICAL BOILER SKETCHES ON SHEETS 8, 9, AND 10 TO DETERMINE YOUR BOILER TYPE AND FOR THE LOCATION OF THE WELDS TO BE INSPECTED.

FRONT AND REAR TUBE PLATE TO SHELL WELDS

In order to test the front and rear tube plate to shell welds, cladding and insulation covering the boiler shell shall be removed. A minimum of 4 areas around the circumference must be opened.

One of these areas shall be at the **12 o'clock position** and for boilers with low slung eccentric furnaces one area at the **6 o'clock position** may be required, at the request of the boiler surveyor.

The 4 areas opened should represent a **minimum of 20%** of the shell circumference both back and front.

The areas exposed should be thoroughly cleaned of scale, flaking paint or other substances which would restrict the examination. A **minimum of 250 mm** from the end of the shell or toe of the main weld should be cleaned. The Front and Rear tube plates should also be exposed at the inspection points to facilitate measurement of the dimension 'F' and to access the tube plate wall thickness. (See Fig. 1)

(It should be noted that if unacceptable defects are located, the front and rear tube plate to shell welds will be subject to 100% inspection. This will necessitate the complete removal of the cladding and insulation around the entire circumference. This requirement may also requested by the competent person)

FURNACE TUBE TO FRONT TUBE PLATE WELD

This weld requires **100% inspection** from the fire side of the furnace. Therefore, it will be necessary to remove any brick work or quarral from the front of the furnace tube in order to facilitate the examination.

Again the test surface should be thoroughly cleaned of any scale, combustion product, cement or any other extraneous material that would affect or restrict the examination for a **width of at least 200 mm.** around the entire circumference.

It may also be necessary to clean the outer face of the tube plate in way of the furnace weld for a **width of 200 mm.** around the entire circumference in order to facilitate ultrasonic inspection. (See Fig. 2)

FURNACE TUBE TO COMBUSTION CHAMBER / REAR TUBE PLATE

This weld requires **100% inspection** from the fire side of the furnace.

Again the test surface should be thoroughly cleaned of any scale, combustion product or any other extraneous material that would affect or restrict the examination for a **width of at least 200 mm.** around the entire circumference.

It will also be necessary to clean the face of the tube plate in way of the furnace weld for a **width of 200 mm.** around the entire circumference in order to facilitate ultrasonic and magnetic particle inspection. (See Fig. 3)

ACCESS TUBE TO WET BACK PLATE AND REAR TUBE PLATE

These welds require **100% inspection** from the fire side of the boiler.

Again the test surface should be thoroughly cleaned of any scale, combustion product or any other extraneous material that would affect or restrict the examination for **a width of at least 200 mm.** around the entire circumference.

It will also be necessary to clean the face of the wet back plate and rear tube plate in way of the access tube welds for **a width of 200 mm.** around the entire circumference in order to facilitate ultrasonic and magnetic particle inspection. (See Fig. 3)

SHELL LONGITUDINAL SEAM

It is a requirement that **100%** of this seam be inspected from the outside of the boiler.

This requires the removal of cladding and lagging for at least **a width of 250 mm.** either side of the seam along its entire length. The seam should be cleaned of any material that would restrict the examination along the entire length. (See Fig. 4)

It should be noted that some boilers may have 2 seams. In this instance both seams require exposure to facilitate testing.

FURNACE TUBE BOWLING HOOPS

Some boilers incorporate bowling hoops within the furnace tube. The competent person may, at his discretion, request magnetic particle inspection of these welds. In this instance it will be necessary to clean and remove combustion product or other material prior to testing. (See Fig. 5)

FURNACE TUBE STIFFENING RING(S)

Some boilers also incorporate stiffening rings around the circumference of the furnace at the water side. The competent person may, at his discretion, request magnetic particle inspection of these weld zones from the fire side in way of these stiffening rings. In this instance it will be necessary to identify the location of these rings, if any, and to clean and remove combustion product or other material prior to testing. (See Fig. 6)

CLEANING INSTRUCTIONS

Cleaning of the above prescribed areas is best achieved by using one of the following methods:

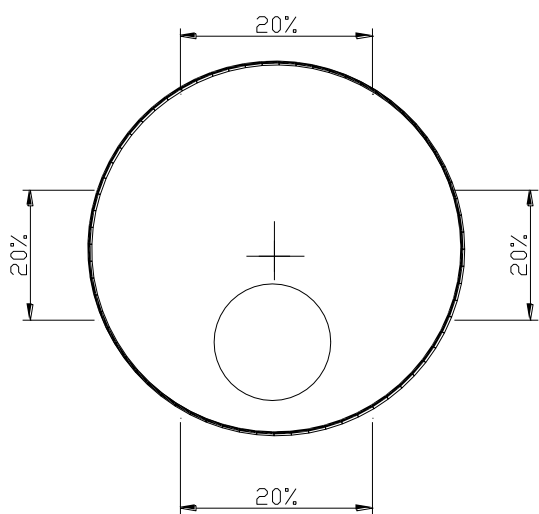
1. 4" Mechanical Disc Grinder with Wire Cup attachment.
2. 4" Mechanical Disc Grinder with a 100 mm. Flexi - Emery Disc.

Where surface conditions are extremely poor, i.e., heavy corrosion or pitting of the outer shell due to leaks from faulty valves ect., a disc grinder may be necessary in order to provide an acceptable test surface. However this procedure should only be carried out under the supervision of the inspector.

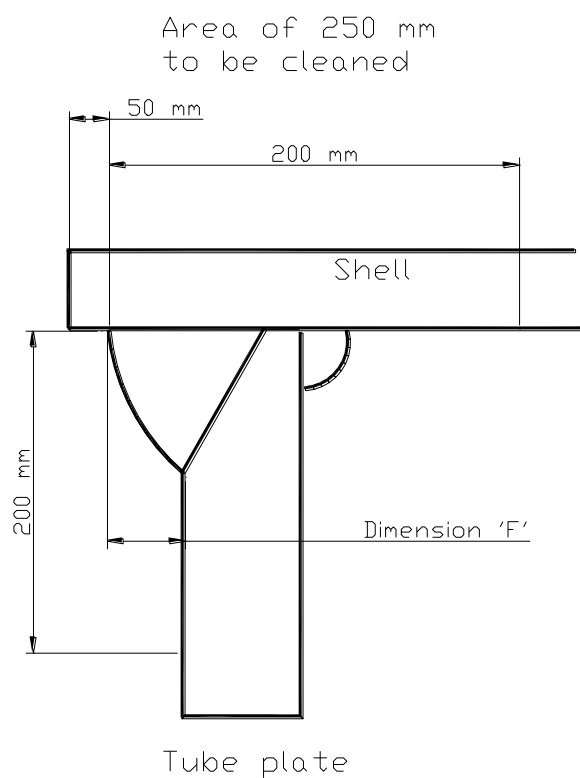
UNDER NO CIRCUMSTANCES SHOULD CHIPPING HAMMERS OR NEEDLE GUNS BE USED ON ANY SCANNING OR TEST SURFACES.



Fig. 1



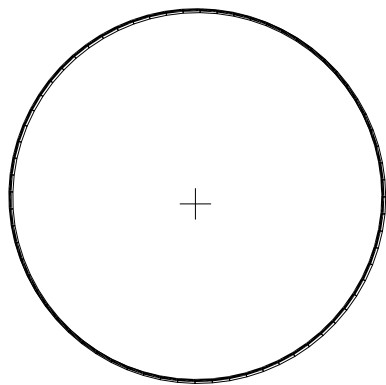
Front and Rear tube plate to shell inspection locations



The Front and Rear tube plates should also be exposed at the inspection points to facilitate measurement of the dimension 'F' and to access the tube plate wall thickness



Fig. 2



Furnace tube to front
tube plate
100% inspection

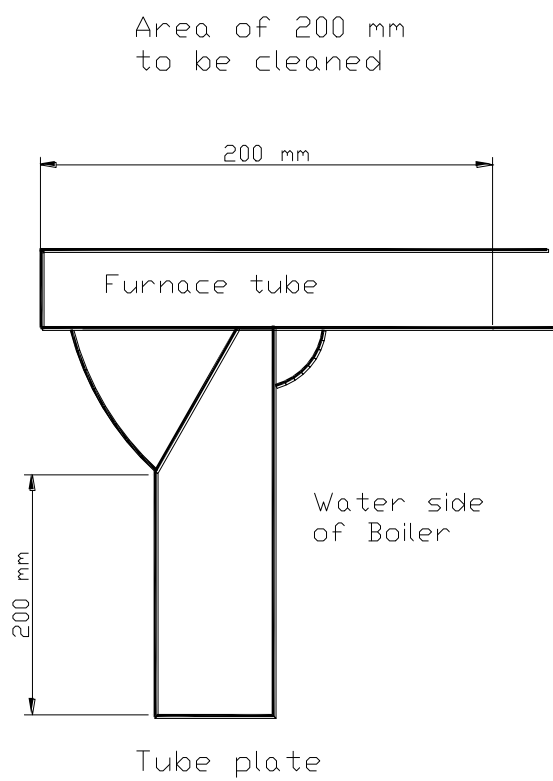
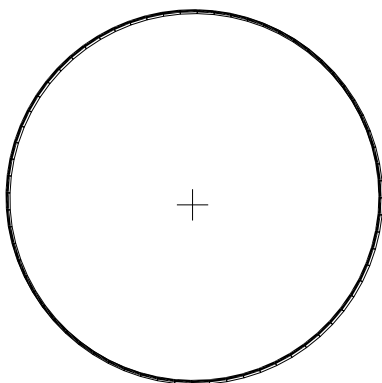


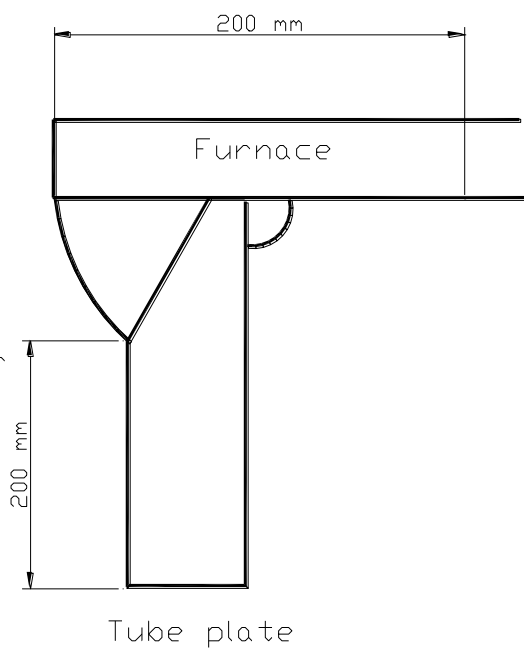


Fig. 3

100% inspection



Area of 200 mm
to be cleaned

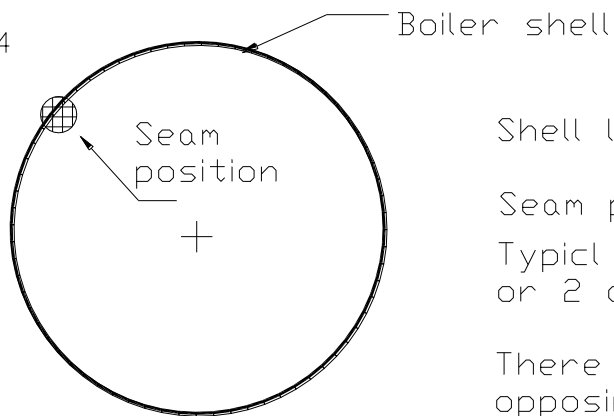


Furnace tube to combustion chamber
or rear tube plate

Access tube welds



Fig. 4



Shell longitudinal seam

Seam position may vary
Typical positions are 10 o'clock
or 2 o'clock

There may be 2 seams
opposing

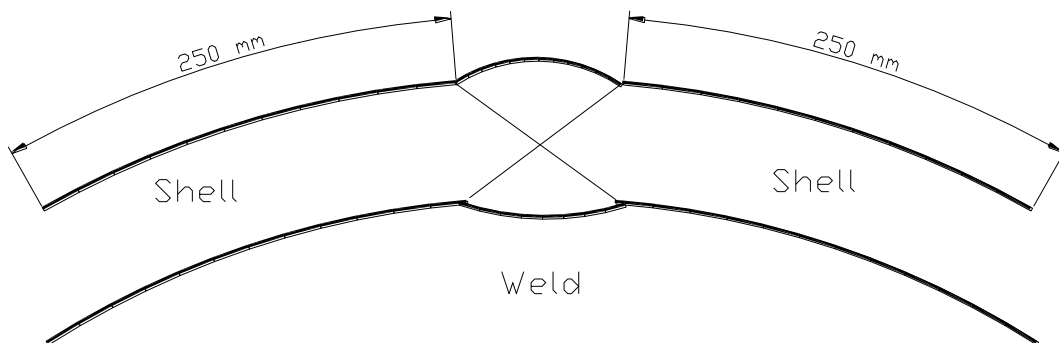
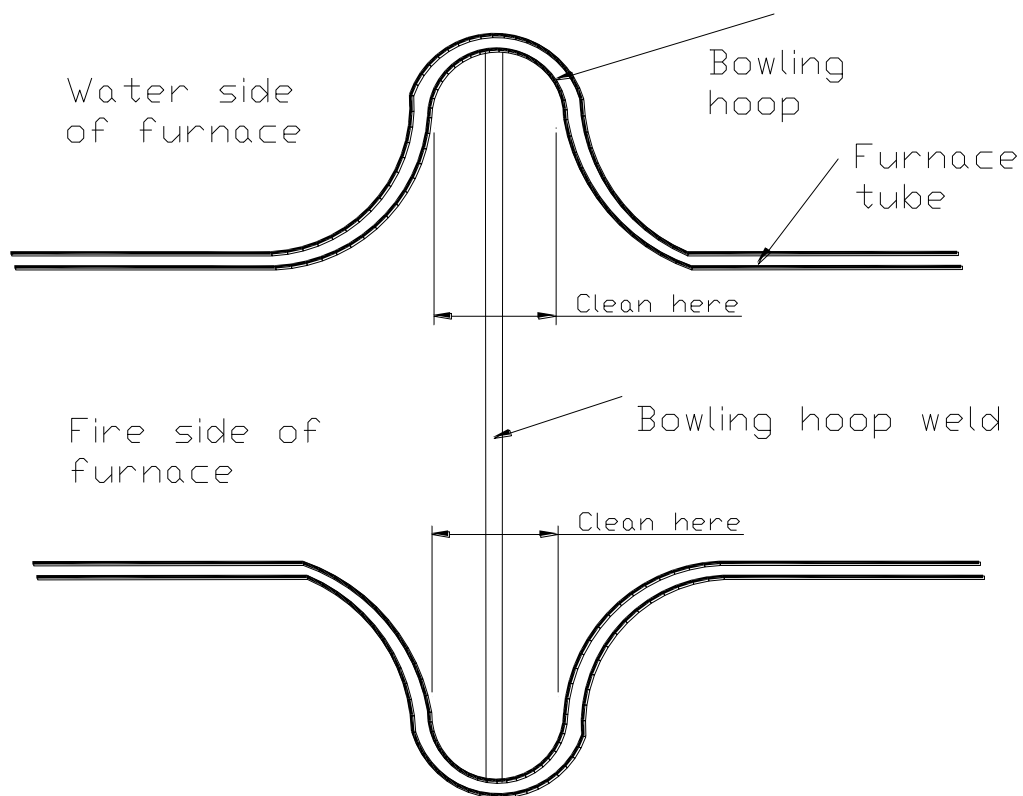




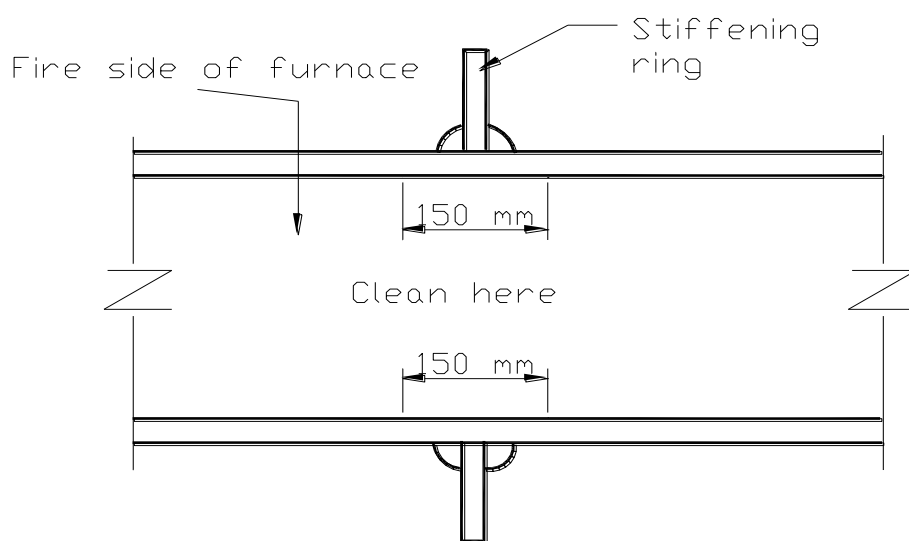
Fig. 5



The full circumference should be cleaned

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Water side of boiler

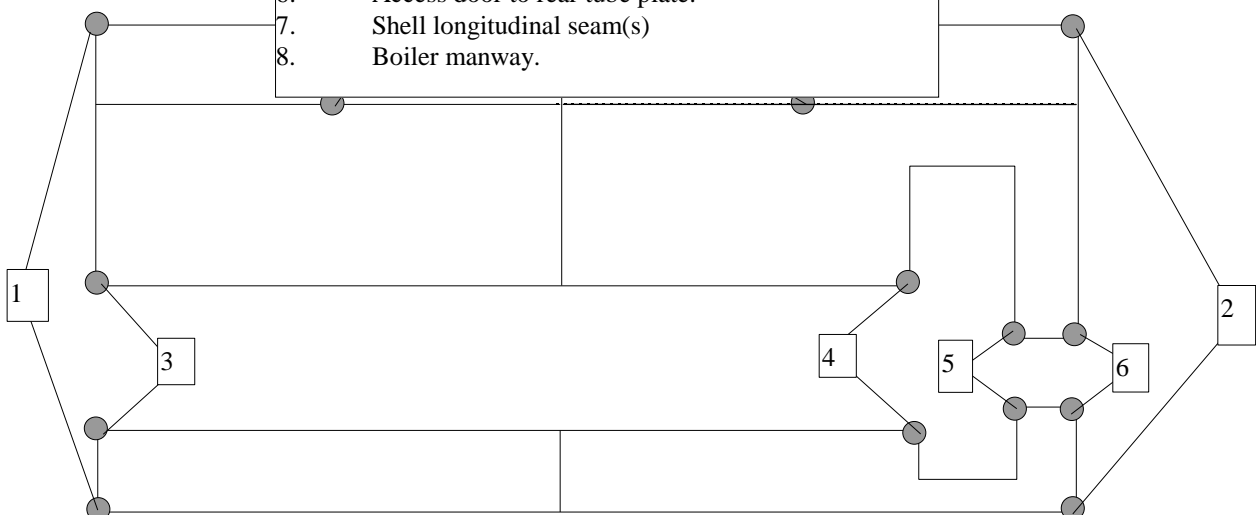


The full circumference of the furnace fire side should be cleaned. There may be more than one ring present

Typical Boiler Type

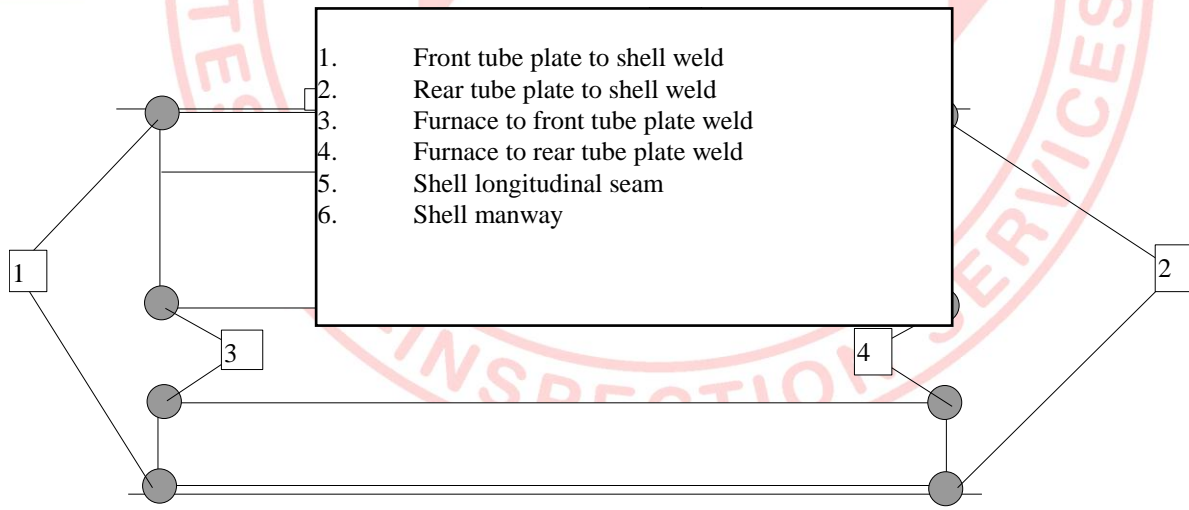
Wet Back Type

1. Front tube plate to shell.
2. Rear tube plate to shell.
3. Furnace tube to front tube plate.
4. Furnace tube to combustion chamber tube plate.
5. Access door to wet back plate.
6. Access door to rear tube plate.
7. Shell longitudinal seam(s)
8. Boiler manway.



Typical Boiler Type

Dry Back Type
Straight Through Furnace



Typical Boiler Type

