Method Statement

Annual Maintenance of the Oil Fired Boiler

Version	1	2		
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Issue History

Version N°	Date of Adoption	Details of Change Made
1	October 2013	Initial version approved and issued.
2	February 2014	Additional detail added following further use by operators

1. Purpose and Scope

This method statement sets out the instructions that must be followed when preparing the boiler for its annual inspection and maintenance. It includes:

1 Dis-assembly
2 Cleaning and inspection
3 Re-assembly

2. Safety

2.1. Warnings

1 Given the nature of the tasks covered by this method statement it is desirable that none of the work is undertaken unless at least two persons are present in the boiler house.
   a Some of the tasks listed in this method statement are designated as two man tasks. **These tasks must not be attempted by a single person.**
   b At least one of the tasks (see section 5.2) requires 3 people **This task must not be attempted unless the required additional person is present**
2 The back plate is very heavy;
   ◊ **on no account should it be removed without using a hoist**

2.2. PPE

1 The following PPE is required when preparing the boiler for its annual inspection and carrying out the necessary cleaning and maintenance.
   a Dust mask
   b Gloves
   c Eye protection
2 PPE is provided for your protection: Members are strongly urged to wear it.
3 Members supervising others must ensure that Members under training, contractors, other volunteers and visitors wear the required PPE. Persons declining to do so must not be allowed to undertake the operation.

2.3. Equipment and tools required

1 The following equipment and tools are required in order to carry out the work:
   a Vacuum cleaner
   b Hoist (1/2 ton)
   c Some cloth or a pot to catch any oil when disconnecting the oil pipes
   d A plastic bag and some string or a cable tie to protect the oil pipes from contamination after disconnection
   e Heavy duty electric drill, fire tube wire brush and extension rod
   f Wire brushes
   g Oval inspection plate gasket (Supplier: IBHS, Ref BM50-087 - Blue Max joint 320 x 220 x 25 mm)
   h A pair of 17mm A/F spanners
   i 19mm A/F open ended spanner

j 22mm A/F open ended spanner

3. Necessary tasks prior to starting

1 Drain the boiler of water. (How? see section 8.2)

2 Ensure there is nothing on the floor to the right hand side of the boiler by the water softener

- ◊ This will allow the front door of the boiler to be opened fully
  - ⇒ The burner will subsequently rest against the wall

3 Turn off the oil supply to the boiler in the following places

a By the tank

- ◊ The padlock combination on the oil tank door is 0030

b In the boiler house

4 Ensure the power to the boiler is switched off at the main isolator.

4. Dis-assembly

4.1. Order of dis-assembly

1. The order in which the disassembly tasks are carried out is not critical.
   - ◊ The order chosen is left to the operators undertaking the work
   - ◊ In exercising their choice operators must bear in mind that it may be necessary to get to both sides of the boiler to remove the boiler back plate.
     - ⇒ Getting past the front of the boiler when the door is open is difficult,

4.2. Removing the bottom section of the flue

1. This is a two man task; one person is required on each side.
   - ◊ Although not essential a hoist can be used here to take the weight.
2. To remove the bottom section of the flue carry out the following instructions:
   a Remove the four bolts that secure the flue to the boiler back plate at the vertical flange. (17mm A/F)
   b Lower the bottom section, it is a slide fit into the upper section which will remain in position
   c Remove the bottom section from the boiler house.

4.3. Removing the boiler back plate

Note: the back plate is very heavy; on no account should it be removed without using a hoist.

1. To remove the back plate proceed as follows:
   a Suspend the hoist from the beam directly above the back plate

   b Secure the hoist chain to the back plate and take up the slack

The picture left shows the chain looped behind the flue fixing flange

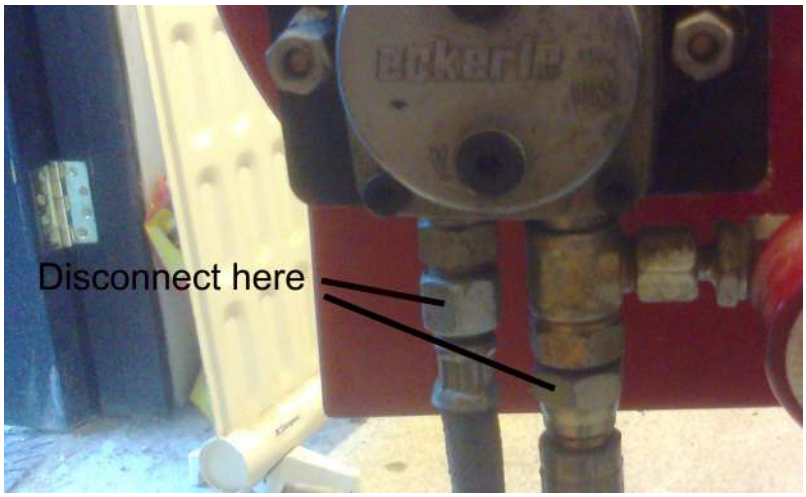
   c Ensure that the chain is securely attached to the back plate
      ⇒ A dropped plate in the confined space behind the boiler could have serious consequences
   d Remove the nuts securing the back plate to the boiler. (19mm A/F)
      ◊ The plate should remain in place on the studs
   e Ensuring the weight will be taken by the hoist, remove the back plate. Lower it to the ground and lean it against the back wall of the boiler house

f Loosely replace the nuts to ensure they are not lost.

4.4. Opening the boiler front door

The front plate and burner is hinged on the right hand side and swings open

1. To allow it to swing fully open proceed as follows:
   a Ensure the donkey bottle bleed tube is pointing away from the boiler so it will not obstruct the door when swung open
   b Position the pot or cloth under the burner couplings to catch any oil drips.
   c Disconnect the flexible oil pipes from the burner.
      ◊ They have different connectors so cannot be mixed up
      ◊ The manifold block has two small arrows, one 'In' and one 'Out'.
         ⇒ The 'In' pipe comes from the bottom of the donkey bottle (19mm A/F)
         ⇒ The 'return' goes to the top of the donkey bottle (22mm A/F)

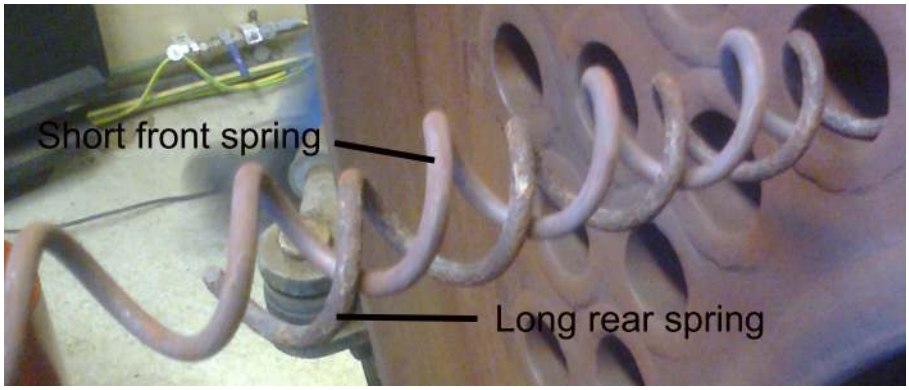


   d Put the plastic bag over the ends of the two pipes to prevent any muck from getting into the oil. Fasten the bag and then fasten the pipes to the top of the donkey bottle
   e Ensure the electrical cable is not wrapped around anything.
      ◊ It is long enough to leave connected
   f Loosen the two large nuts on the left hand side of the front door and swing the eye bolts clear.
      ◊ The spanner is hung on the front of the boiler
   g Swing the front door and burner open ensuring:
         ◊ It will clear the donkey bottle
         ◊ The electrical cable does not get caught on anything.
   h Re-position the pot or cloth under the burner couplings to catch any oil that drips out

4.5. Fire tube springs

Each fire tube contains two springs that are wound together. The first spring out is stainless steel and is shorter than the second. **They must be replaced in the same order**.

1 Remove by:
   a Pulling **without** turning until the end of the front short spring has come out of the tube



b Separate the two springs.

c Removing the long spring from the tube.

2 Store the different springs in separate places to aid re-assembly.

4.6. Removing the water jacket inspection cover

This is only necessary when the inspection is due

The cover is oval in shape and sits inside the jacket. It is oval in shape so it can be turned whilst still inside the jacket and then lifted out through the hole.

1. To remove the cover proceed as follows:
   a Tie a rope to the eye on the inspection cover and secure to the pulley system secured to the ceiling above
      ◊ This prevents the cover being dropped into the water jacket
   b Remove the nuts and clamps
   c Tap the cover to break the seal being careful not to drop the cover inside
   d Rotate the cover to allow it to be removed
   e Remove the gasket
      ◊ The old gasket is not required a new one will be fitted later
   f Dress the sealing face of the plate to remove any corrosion
   g The inaccessible face inside the boiler should be checked by feel
      ◊ To date this has not required any work
         ⇒ If work should be required a separate method statement must be prepared before it is undertaken

5. Cleaning

5.1. General

1 The major cleaning involves removing rust with wire brushes so will create a lot of dust in a confined space so:
   a Goggles / safety glasses and dust masks are required
   b A vacuum cleaner should be used where possible to prevent the rust from becoming airborne
   c Gloves should also be worn if appropriate

2 Any loose rust should be removed from:
   a Inside the main tube

b The inside surface of the back plate
c Around the inside of the front door
d The water jacket front and back plates
e Inside the fire tubes

5.2. Fire tubes

4 This operation is carried out with a special wire brush that is fitted to a long rod (see picture) and an extension rod

5 The operation requires three people:
   a One at the rear of the boiler with a vacuum cleaner to catch the dislodged rust
   b One on the drill to turn the wire brush
   c One at the front of the boiler to aid with guiding the wire brush into each tube
6 Insert the brush into the tube
   a Once the brush is into the tube switch on the electric drill to turn the brush
   b Push until it reaches the far end of the tube.
   c Once it has reached the end of the tube, it should be withdrawn to the front face
      ◊ The brush should continue to be turned whilst as it is withdrawn from the tube
      ◊ **Warning**: If the electric drill has a reverse this **must not** be used as the extension will become disconnected from the brush
         ⇒ A disconnected brush is very difficult to remove from the tube.
7 When the brush reaches the front end of the tube:
   a Turn off the drill
   b If appropriate, disconnect the brush from the extension piece
      ◊ If another tube is to be cleaned this step may not be necessary.
8 Repeat the cleaning process until all the fire tubes have been cleaned.

6. Inspection

The boiler has both an annual ‘Hot’ and ‘Cold’ inspection by an independent inspector. Sometimes it may be possible for the inspector to carry out both inspections on one visit.

6.1. Cold inspection

Prior to this inspection, the boiler must have been cleaned, emptied of water and the back cover and oval inspection cover removed. The door will be fully open.

The inspector has charge of the inspection and will have his list of actions covering corrosion, scaling, etc., plus the checking of the correct functioning of all valves etc. Expect this work to take about an hour.

6.2. Hot inspection

Prior to this inspection, the boiler will have been re-assembled (see Section 7) and filled with water.

The inspector will expect that immediately prior to the inspection the boiler will have been fired up and the pressure to be rising.

The inspector checks the correct functioning of valves etc. and, by over-riding the high pressure safety limit, will check the correct operation of the safety valves. Typically these lift at about 130 psi.

The inspector issues a report to Combe Mill following both inspections.

7. Re-assembly

7.1. General

1 Reassembly must be complete before the 'Hot' inspection can take place.

2 Re-assembly is generally the reverse of the dis-assembly but the following should be observed.

7.2. Fire tube springs

1 Each tube has a long and a short spring and they must be re-assembled as follows:
   a Insert the long spring until there is 6 inches or so still protruding
   b Wind the short spring into the long spring for several turns
   c Push the pair of springs until the end is flush with the back of the tube
   d Wind the front spring in until it is flush with the front of the tube.
      ◊ Do not let the front spring disappear into the fire tube

7.3. Back plate and flue

1 The glass tape seal may need to be renewed if it is in poor condition
      ◊ A long roll of this tape is normally kept at Combe Mill.
2 Ensure the hoist is securely attached to the back plate and is used to take the weight.
3 Using the hoist to take the weight re-attach the back plate to the boiler (19mm A/F nuts)
      ◊ On completion of the attachment remove the hoist.
4 Reattach the bottom section of the flue (17mm A/F nuts and bolts)
      ◊ This is a two man task.
      ◊ Although not essential the hoist can be used to facilitate the work.

7.4. Oval inspection plate

1 Ensure the inspection cover is secured to the pulley system in the ceiling above.
      ◊ This prevents the cover being dropped into the water jacket
2 Fit a new gasket following the instructions on the package
3 The seal always seems to leak at first use:
   a As it is soft it will conform to the surfaces when warm.
   b Tighten the nuts by maybe a full turn as the pressure rises
      ◊ In use, there does not seem to be any leakage.
      ◊ **Warning**: The gaskets are soft and have to be kept flat.

⇒ They **MUST NOT** be hung on pegs!

7.5. Front door

1 Normally the square rope gasket on the door can be reused.
   ◊ If it is replaced, the door hinges and fastening bolts will need to be re-set to suit the new gasket thickness.
   ◊ Close the front door and secure.

7.6. Oil pipes

1 Reconnect and check the oil pipes for leaks.
   a Inlet (bottom of the donkey bottle to connector with the 'IN' arrow (19mm A/F)
   b Return (connector with the 'OUT' arrow to the top of the donkey bottle (22mm A/F)
   c Turn on the oil supply
      ◊ By the oil tank
      ◊ In the boiler house
   d Ensure the catch bottle is under the bleed valve on the top of the donkey bottle and open the valve to ensure there is no trapped air in the bottle
   e Check for oil leaks at the donkey bottle and the boiler unions.
   f Turn off the oil and lock the oil store

8. Miscellaneous

8.1. Pressure gauge re-calibration

1 The main pressure gauge above the boiler must be tested and recalibrated every 10 years
   ◊ This work must be carried out by a specialist supplier.

8.2. Draining the boiler

1 If the inspection cover is still in place open the green vent valve to allow air into the boiler
2 Open the valve on the blow down tank (under the oil tank)
   ◊ In this operation, as the water in the boiler is cold, it is not important if the blow down tank is emptied
3 Open the boiler blow down valve to release water from the boiler.
   ◊ It will flow under gravity into the blow down tank
   ◊ **Do not open the valve fully** as the flow from the boiler will be greater than that from the blow down tank
      ⇒ Causing the blow down tank to overflow.