Appendix B

EXAMINATION CHART FOR INSPECTION FOR “B” TYPE BUSH PUMP HEAD

The Pump head is inspected by mounting and bolting the pump head on to a pump stand which is set (with a spirit level) in a vertical position.

Tools and equipment required: steel ruler and set square, calipers, measuring tape, pump spanners, set of officially certified templates,

The pump is inspected from the top downwards, starting with the pump mounted on pump stand and the wooden block mounted in a horizontal position.

INSPECTION CHART FOR ‘B’ TYPE “BUSH PUMP” HEAD

<table>
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<th>MANUFACTURER</th>
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1. Angle of pump head.

Test the angle of the pump stand with template (14 degrees) …………Comments………………

Distance between pivot pin centers (240mm)………………Comments …………

2. Dimensions of pump head

   Main steel channel
   Total length 750mm (below bend: 400mm) ………( above bend: 350mm)………………

   Channel dimensions (152mm X 76mm X 750mm)…………………………………….

   Side arms
   Dimensions of side arm (720mm X 12mm X 65mm) ……………………………

   Distance between rear pivot pin centre and upper end of channel (140mm)………………

   Distance between upper end of channel and bend in channel (350mm) …………………

   Distance between bottom of channel and under-side of rising main support plate (300mm)………………………………

   Rising main support plate (apron plate)

   Thickness (10mm)……………………………………………………………………

   Set square with channel ( Y/N) …………………………………………………
3. Checking the alignment

This is very critical. It can be tested by mounting the pump on a pump stand which is exactly vertical. (test with spirit level) and placing the wooden block in a horizontal position (test with spirit level) and the rod (and U bracket) set in the vertical position. Also check that the centers of the bolt holes in the wooden block are exactly 240 mm apart. When the pump head angle is correct the front surface of the descending rod should be 73 +/- 2 mm behind the front edge of the floating washer housing. This is shown on the bush pump technical drawings. The distance between the centers of the two pivot pins should be exactly 240 mm. This can be measured with set square and special template. Set the rod in vertical position and check position in relation to front edge of floating washer housing.

Distance between two pivot pin centers (240 mm) ………………………

Distance between pump rod and front of floating washer housing (73 mm) +/- 2 mm (use set square, steel rule or tape.)

COMMENTS: …………………………………………………………………………………

Alignment of pump head (front to rear)

The head should not be twisted and the pump should stand exactly vertically on the borehole casing. Inspect the pump from front and side to see that the rod enters the floating washer housing centrally and not to one side.

COMMENTS: …………………………………………………………………………………

NOW REMOVE WOODEN BLOCK AND PLACE ON ONE SIDE

4. Examination of pump stand

5a Thickness of pump stand side arms

COMMENTS: Thickness (12 mm) ………………………………………………………

5b Head bolt holes in pump stand

These should be 36 mm (range 35, 5 – 36 mm) and 25 mm (range 24, 5 – 25 mm) respectively. The 25 mm hole should have a double thickness of 12 mm plate increased by a 12 mm thick washer welded to the pump stand to make a total thickness of 24 mm. NOTE: Head bolt securing plate should be below bolt head and horizontal (see drawings).

Large hole (36 mm) = ……………………… Small hole (25 mm) = …………………

12 mm thickness washer added (Y/N) ……………………………………………………

Head bolt securing plate, below and horizontal (Y/N)
…………………………………………………………………………………………
6. **Inspection of Pivot Pins**

Ensure that the bolt is fitted securely and is fastened by a M24 nut and 4.5 mm thick spring washer. There should be no play in the unit. The bolt should be made from a 35 mm diameter bright mild steel shaft and the overall bolt length should be 231 mm. The main working surface of the bolt is to be 165 mm long and should be 35 mm in diameter. One end of the bolt is reduced in thickness to 24 mm over a length of 50 mm. Half of this (25 mm) is threaded for a M24 nut. The remaining 25 mm length of 24 mm diameter shaft is unthreaded and is held within the U bracket or upper pump stand. The other end of the bolt is reduced to 20 mm diameter over a 16 mm length for attachment by welding to the bolt head. The bolt head measures 50 x 50 mm and is 16 mm thick. The 16 mm securing plate is welded below the pivot pin head on the pump stand and above the pivot pin head on the U bracket. The securing plates should make contact with the pivot pin head to stop rotation and not be distant from it. They are designed to hold the bolt in place and stop it rotating. The securing plates should also be 16 mm thick. On the pump stand the securing plate should be horizontal (see pump drawings).

**Head bolt main diameter (35 mm) ........ Reduced diameter (24mm) .......**

**Length of main shaft (165 mm) actual = ......................................................**

**Length of reduced diameter shaft (50 mm) actual = ........................................**

**Length of threaded section (25 mm) ..............................................................**

**Size of bolt head (50 x 50 x 16 mm) ..............................................................**

**OTHER COMMENTS:** ..............................................................................

**Spring washer**

Check whether these are in place and are 4.5 mm - 5 mm in thickness ............

**COMMENTS:** ..............................................................................
7. **Inspection of Wooden Head block**

This should be made of teak. Check size with drawings (450 x 150 x 150 mm). With planing this may be reduced to 450mm X 145mmX 145mm which is acceptable. The critical measurement is the distance between the centers of each set of working holes. This should be exactly 240 mm. This is important as it determines the correct entry of the rod into the floating washer housing. The block shall have been boiled in oil for 4 hours and cooled overnight for the oil to penetrate.

The head bolts should rotate easily within the block. Test for this. The bolt hole diameter should lie between 36 and 37 mm but may require drilling to 38 mm if the wood is inclined to swell. The holes for the handle U bolts should also be correctly placed and should be 75 mm apart. The U bolt nuts should be tightened against a plate 125 x 25 mm held tight by spring washers.

**COMMENTS**

Size wooden block (450mm X 150mmX 150mm)……………………………………

Wood type (teak)……………………………………………………………………

Treatment………………………………………………………………………………

Holes drilled square …………………………………………………………………

Distance between forward working holes (240 mm) ………………………

Distance between rear working holes (240 mm) ……………………………

Hole diameter (36 mm – 37 mm) ………………………………………………….

Distance between U bolt holes (75 mm) = ………………………………………

Handle U bolt securing plate (spring washer) ………………………………….

8. **Handle U Bolts**

These should follow the specifications on the drawing (210 mm beyond bend) and not too long otherwise they foul other moving parts of the pump. They should be fitted with spring washers mounted against the securing plate (see above).

**COMMENTS** ………………………………………………………………………
9. Inspection of floating washer housing

The floating washer housing forms part of the water discharge unit.

Floating washer housing

The overall outer diameter of the housing should be 190 mm, the lower plate is 10 mm thick and the central spacer ring is 10 mm thick. The upper plate 6 mm thick. The central hole diameter in the upper plate should be 62 ± 2 mm.

- Thickness of upper plate (6 mm) ………………………………………………………………………
- Thickness of lower plate (10 mm) ………………………………………………………………………
- Thickness of central spacer ring (10 mm) …………………………………………………………………..

Diameter of upper plate (190 mm) ………………………………………………………………………

Diameter of central hole (62 mm ± 2 mm) …………………………………………………………………

Size of Floating Washers (2)

These should have a diameter of 100 mm from a 6 mm thick plate with a central hole 17 mm in diameter. They should move freely within the floating washer housing.

Thickness of plate (6 mm) ………………………………………………………………………

Diameter of washer (100 mm) … Diameter of central hole (17 mm) …

9. Water Discharge Assembly

The height should be 200 mm (65 mm nominal bore GI pipe – outside diameter 76 +/-1 mm. Diameter of dip plug hole should be 24 mm to suit M 24 plug.

- Height (200 mm) = ………………………………………………………………………
- Size (65 mm NB) = ………………………………………………………………………
- Exactly vertical mount on base plate (Y/N) ……………………………

Base Plate of Water Discharge Assembly

- Diameter (160 mm) …………………………… Thickness (10 mm) …………………

Diameter of dip plug hole (24 mm to suit M 24 plug) …………………………………………………

Quality of 50 mm socket for attachment to rising main support plate

This should be heavy duty steel pipe: COMMENTS …………………………………………………
10. Inspection of U Bracket

This should be 12 mm thick and follow all the measurements on the drawings. The uprights should rise 250mm above the top of the horizontal section. The uprights and the base section should be square (uprights 154 mm apart). The threaded socket, which secures the rod, should be of the right length (30 mm) and welded square to the U bracket. The rod should descend squarely from the U bracket. The rod should descend in a central line through the floating washer housing. The securing plate holding the pivot pin should be welded above the bolt head. The head bolt holes in the U bracket should be 36 mm and 25 mm in diameter for insertion of the forward pivot pin. The 25 mm hole should have a double thickness of 12 mm in diameter plate increased by a 12 mm thick washer welded to the U bracket to make a total thickness of 24 mm. Forward and rear pivot pins are identical. Distance between hole centers and upper surface of U bracket base should be 165 mm (177 mm to lower surface).

COMMENTS ON U BRACKET

Thickness plate (12 mm) = .........................................................
Height 16 mm rod socket (30 mm) = ..............................................
Position of bolt securing plate (above) ..............................................
Head bolt hole (large 36 mm) = .......................................................
Head bolt hole (small 25 mm) = .......................................................
12 mm thickness washer added (Y/N) ..............................................

Distance between upper surface of U bracket base and hole centers (165 mm) ...........
Distance between upper surface of U bracket base and top of uprights (250mm)...........
Distance between uprights at top of U bracket. (154 mm) .....................................

COMMENTS: ..............................................................................

11. Rubber Buffer

This should be about 50 mm high and 60 mm in diameter with a central 17 mm hole.

Height (50 mm) ................................. Width (60 mm) .........................

Central hole (17mm).................................................................

12. Comparison with templates for rising main support plate and WDU base plate.

The template for the rising main support plate (apron plate) can be matched with the actual plate once the water discharge unit (WDU) has been removed. These reveal the hole positions for retaining bolts and also the location of the dip plug hole as well as the dimensions of the plate. The rising main support plate has a length of 210mm and a width of 190mm. The template for the base plate of the water discharge unit can also be compared with the unit being manufactured. The rising main support plate (apron plate) should be welded at exactly 90 degrees to the channel section of the pump stand.

Comments....................................................................................
13. Pump handle

This should be 50 mm GI pipe, 2.5 m long unless otherwise specified. Wall thickness 3.5mm.

Diameter (50mm) ....................................... Length (2.5m).................................

Wall thickness (3.5mm) ...............................................................

NOTE. For pumps used down to about 20m a 40 mm handle is preferred. Deeper pumps require a 50 mm x 2.5 m handle which is standard. Very deep pumps (60 – 100 m) require a 50 mm x 3 m handle, the deepest filled with concrete. All handles should have a minimum wall thickness of 3.2mm.

14. Water Outlet Pipe

This should follow drawings. Horizontal component about 264 mm. A 50 mm socket should be fitted to allow for cattle trough takeoff.

COMMENT: .............................................................................................................

15. Quality of Welding

COMMENTS ............................................................................................................

16. General Appearance (Painting etc.)

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17. Metal Pump Makers Plate added (Y/N) .........................................................

a) Pump Stand Serial Number........................................................................

b) Discharge Unit Serial Number..................................................................

c) Brass cylinder Serial Number.....................................................................

18. Caretakers Spanners

19mm combination (Y/N)............................................................................... 24/36mm (Y/N)....................................................................................................

19. General Comments ..........................................................................................

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20. Recommendations ..........................................................................................

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Signed ........................................ Date: ......................................................