Appendix C.

B TYPE BUSH PUMP

INSPECTION CHART for “DOWN THE HOLE” COMPONENTS

MANUFACTURER…………………………………. DATE……………………

Steel components

1. 50mm NB GI Pipe

Origin…………………………………………………………………………………………
Diameter Internal (53mm) ………….External ( +/-61mm )…………………..
Wall Thickness (3.5mm)…………………………………………………………
Length (3.0m)…………………………………………………………………………
End Caps (protection of thread)………………………………………………
Galvanising/Electroplating
Comments…………………………………………………………………………………………
…………………………………………………………………………………………………..

2. 16mm mild steel rods

Origin…………………………………………………………………………………………
Length (3.0m)…………………………………………………………………………
Diameter (M16)……………………………………………………………………
Thread Length (40mm)………………Thread pitch (2mm)………………
Galvanising/Electroplating (Quality)………………………………………..
Sockets (M16) (Length 60mm) …………………
Comments…………………………………………………………………………………………
…………………………………………………………………………………………………..
Brass Components

**Cylinder** – Serial No.………………

Origin…………………………………………………………………………

Length (600mm)……………………………………………………………..

Wall Thickness (3.25mm)…………………………………………………. 

Internal Surface (polished) …………………………………………..

**Upper end cap**

Casting Origin and manufacture…………………………………………………………

Thread Length (25mm)…………………………………….

Thread type (inner) - 2” BSP x 25mm)…………………..

Thread type (outer) (78 x 11Tpi x 23mm)……………………………………

**Lower End Cap and Check Valve**

Casting. Origin and Manufacture …………………………………………………

Thread Length/Type Inner (2”BSP x 20mm)……………………………………

Thread length (outer) Outer (78 x 11 Tpi x 23mm)……………………………………

Poppet valve diameter (46mm )…………………….Thickness (7mm+- 1mm)

Poppet valve (ease of movement)………………………………………

Poppet Valve Seat Diameter ( outer 47mm )……………….(inner 33mm) ........................

Poppet Valve Retaining Pin diameter (6mm) ......................

**Piston**

Casting Origin and Manufacture……………………………………

Poppet Valve diameter (46mm)……………………………………

Poppet valve thickness (7mm +- 1mm) ......................

Poppet valve seat diameter (I/d: 34mm)................. (O/d: 54mm)........................

Free Movement of Valve………………………………………

Upper Cage (Thread Length, 22mm)……………………………………

Spacer Length (22mm)………………………………………

Seal between Poppet and Seat ………………………………………
Leather seals

Leather Seals Origin

Leather Seal (Quality)

Comments

Foot Valve

Poppet valve diameter (70mm)

Poppet valve thickness (9mm)

Poppet valve (wings)

Poppet (free Movement)

Upper Housing inner thread (2”Bsp/84.5 x 11Tpi)

Upper housing height (85mm)

Lower Cage Height (49mm)

Lower Cage (Rubber Seal Slot) Height Upper (6mm)

Lower Cage (Rubber Seal Slot) Depth (5mm)

Seal Slot (I/d 57mm)

Seal Slot (O/d 69mm)

Unit Cleaned

Unit Leakage Test

Testing

Down the hole components should be thoroughly cleaned and tested for leaks before they are placed down the well or borehole. Cleanliness is essential for these components before and after installation, as foreign objects caught in the valve gear can lead to a poor performance of the pump after installation.

General Comments

Recommendations

Signed

Date
NOTES FOR INSPECTION CHART OF ‘B’ TYPE “BUSH PUMP”

“DOWN THE HOLE” COMPONENTS

Tools and equipment required: callipers, measuring tape, wrench spanners.

The “down the hole” components are an essential part of any Bush Pump installation. In the standard design, they consist of both steel (ferrous) and brass (non ferrous) components. The steel components consist of 3m long 50mm NB (nominal bore) galvanized steel (GI) pipes which link the pump head to the cylinder. Running inside these are a series of 16mm galvanized steel pump rods. Both pipes and rods are linked by appropriate sockets or connectors. The series of pipes are known as “the rising main.”

The brass components in the standard Bush Pump consist of a 75mm cylinder, equipped with a piston and a heavy duty foot valve. The cylinder has an internal diameter of 75mm and is 600mm long. It is equipped with brass “end caps” at each end. Both upper and lower end caps are threaded to accept the 50mm pipe above and the heavy duty foot valve below. The brass piston which rises and falls within the cylinder is equipped with two high quality leather seals. It has a circular brass “poppet valve” which rises and falls on to a brass seat. The lower end cap of the cylinder houses a “check valve” which is a backup for the primary foot valve below. This also has a brass poppet valve, rising and falling on a brass seat. The foot valve is a heavy duty reliable unit which threads into the lower end of the cylinder. This is equipped with a lower cage, which prevents larger items entering the valve. The brass poppet valve has “wings” which provides a circular movement to the valve during use. The poppet valve rises and falls on to a rubber seat which is tightly fitted into a slot in the lower part of the foot valve housing. The upper part of the foot valve housing is equipped with a 50mm thread which screws into the lower end cap of the cylinder.

In order that the brass components serve their function properly, it is essential that the 3 poppet valves sit neatly on the respective seats and maintain a good seal. The internal wall of the cylinder should be very smooth and highly polished. The two leather seals should be of the highest quality. All components should be thoroughly cleaned before assembly and after assembly of the foot valve, fitted to the cylinder, should be checked for leakage.

Another important aspect is that the steel pipes are of the correct quality and thickness to the specifications for the pipes (SABS 62 part 1) with a minimum wall thickness of 3.2mm. The wall thickness of GI pipe is normally 3.5mm. Also with the brass tube used for the cylinder this should have a wall thickness of at least 3.25mm. This thickness provides sufficient support for the threads made at each end of the cylinder to hold the end caps.

In the standard Bush Pump, the leather seals are the fastest wearing parts. Where the water quality is good, seals can last up to 3-5 years depending on use. In turbid water a seal life is reduced. Poor quality seals have a very short life and it is important that suppliers provide the highest quality leather possible for this component. The cost of replacing seals is high, as it involves removing the rods and rising main to gain access to the cylinder and piston arrangement. The cost of seals is low, even for the highest quality units.

Pipe life can be extended by applying “plumbers paste” or “plumbers delight” to all threaded components before assembly. This will provide a better seal at the joint and also help the dismantling operation when the pipes are lifted. Joints which are rusted together are difficult to take apart and damage can be caused during this operation.