

# OPERATING INSTRUCTIONS

## 12.13 FOOT VALVE PUMP



### Contents

On these operating instructions .....	2
1. Description .....	2
1.1 Essential equipment .....	2
1.2 Operation principle .....	2
2. Installation .....	3
3. Applications .....	4
3.1 Practical tips .....	4

## On these operating instructions



If the text follows a mark (as shown on the left), this means that an important instruction follows.



If the text follows a mark (as shown on the left), this means that an important warning follows relating to danger to the user or damage to the apparatus.

### 1. Description

#### 1.1 Essential equipment

- Foot valve pump with tube guides (art. no.: 12.13.01).
- Tripod on which the manually operated foot valve pump can be mounted (art. no.: 17.04.01).
- Roll stiff tube (art. no.: 12.20.16).
- Ball valves, diameter 18 mm (art. no.:12.13.02).
- Clamping strap to connect the end of the tube to the tripod.
- Bucket (99.08.10) and/or sample bottles (art. no.: 99.08.07).

#### 1.2 Operation principle

The foot valve pump consists of a tube with a ball valve. Once submerged in the water, the tube should be moved up- and downward relatively fast.

A disadvantage here is that the full weight of the water filled tubes is carried by the arm. This is tiring. If the tubes are connected to a lever (see photo 1) the direction of the force is reversed which results in a ergonomic sound movement.

The tubes can be connected to the lever at the same time. This doubles the output of the pump.

The tube connection is universal; Different sizes of tubes and valves can be applied. The tube should at least have the rigidity of polyethylene.

Photo 1 Manually operated foot valve

Pumpfacilities on the guide block and, and on the lever

Pin + spare pin

Stand



## 2. Installation

1. Place the center of the tripod at around 60 cm from the center point of the well.
2. If the well is fitted with a protective shaft, then the operating height of the tripod can be adjusted.
3. Next the guide base is mounted at the center of the tripod.
4. Place the lever (with the grip pointing downward) between the guide blocks of the guide base and slide a pin through the middle hole of the guide block. The lever now hinges on this pin. The end of the lever (the end with the tube clamp, see photo 2) should be straight over the monitoring well filter. Finally a second pin is slid through the guide block so that the lever is blocked in a horizontal position. This is advantageous during the mounting procedure.
5. Now take (with clean hands) the tube end and, using a stainless steel knife, cut a slanting edge at the inside of the tube.
6. Carefully warm the tube end with a cigarette lighter and press the previously cleaned ball valve inside the end of the tube. After cooling the ball valve is stuck.
7. Slide the tube(s) into the monitoring well until it (they) reach the bottom of the well. Cut the tube in such a way that about 2.5 meter are left outside the monitoring well.
8. Take the plastic guide profile. This tube is open on one side which allows it to be slid tightly over the polyethylene tube. Once mounted this guide profile will prevent uncontrolled thrashing of the tube. Pull the tube upwards between 0.5 and 1 meter. Now press the plastic guide profile tightly to the tube in such a way that the top side of the guide profile ends at 10 cm below the tube clamp (see photo 2). Next the tube is clamped in the tube clamp.



**The tube profile should not be clamped as well. The tube profile should remain 10 cm below the tube clamp. The remaining stretch of "bare" tube operates as a kind of "hinge".**

Photo 2 Foot valve pump with tube and guide profile

*The end of the lever should be straight over the monitoring well*

*Distance between tube clamp and guide profile equals 10 cm*

*Profile*



9. In an identical way a second tube can be fitted, to double the maximum output.



**The diameter of the monitoring well should be no less than 25 mm (for one 18 mm ball valve), and should not exceed apr. 100 mm. Otherwise the tube receives a lot of resistance and will tend to thrash around too much.**

10. The end of the tube should be placed over a bucket, vessel or bottle. To avoid the thrashing, fix the hose to one of the legs of the tripod using the clamping strap supplied.
11. To be able to start pumping, one of the two hinge pins is removed from the guiding block. After the tubes have been completely de-aerated you judge the required force. If the pumping is lighter or heavier than expected you can increase or decrease the stroke (=1/force) without having to move the tripod. This can be done by moving the spare pin to another hole in the guide block while the lever remains in a horizontal position. The first pin is then removed so that the lever can be operated again. After a short while you will have mastered the system and you will know which position you need under which conditions.

12. The foot valve pump is not sensitive to small amounts of sand (self-cleaning). Too much sand, however, will lead to problems. The tube will then produce a beating noise. Remove the tube and empty it by lifting the tube beginning at the end near the valve.  
Special bailers are available to clean sanded-up monitoring wells.

### 3. Applications

The foot valve pump system can be applied for well development and for purging of the monitoring well filters and for sampling these wells. The samples gained are of excellent quality. Research indicated that samples, taken of water with volatile components (as required by NNI draft standard 5745) are of excellent quality. This system allows samples to be taken from monitoring wells with a diameter of 25 mm.

#### 3.1 Practical tips

1. It is possible to leave the pump hose in the monitoring well. This is particularly efficient during longer running projects.
- 2a. Instead of a PE tube a teflon tube can be applied. The system may then be used for pumping (water with high concentrations of) organic solvents.
- 2b. To prevent cracking of the tube make it hand warm when using it in cold weather.
3. Filtration is executed in the most practical way by sticking 2 meter of a much thinner tube in the tube. This tube is connected to a peristaltic pump (art. no.: 12.23 or 12.25) which, in combination with an in-line filter realizes anaerobe filtration.
4. Depending on the water level, pipe diameter, tube material and tube diameter the system operates up to a depth of 50 meter.
5. Preferably do not use PVC as material for tube and/or pipe, as it contains various additives such as 2% lead, zinc or tin and plasticizer.
6. There exist two sizes of ball valves: 18 mm external for tube 12 x 16 mm and 12 mm external for tube 8 x 10 mm. Teflon tubes too are available in these sizes.
7. Decontamination of the valves. This can be executed efficiently in a (glass) bowl with an alkaline detergent. A dishwasher may also be very efficient. Organic as well as anorganic contaminants will then be removed. Always rinse with water.

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