

BERMAD

SEPARATION VALVES

SEPARATION VALVES TYPE T00

- Installation
- Operation
- Maintenance



SEPARATION VALVES – TOO, **Installation, Operation, Maintenance**

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Safety First

BERMAD believes that the safety of personnel working with and around our equipment is the most important consideration. Please read all safety information below, as well as from any other relevant source, before attempting to perform any maintenance function. Be sure to comply with all approved and established precautions for working with your type of equipment and/or environment.

All maintenance tasks should be performed by authorized personnel.

Before attempting to perform any maintenance or operational procedures, carefully read all instructions to the end and make sure they are understood. If there is anything that is not clear, ask the appropriate authority.

When performing any procedure, be sure to follow all the steps as indicated in the instructions, in the proper sequence and without omission.

Important:

1. In areas where freezing temperatures may occur a heating device for the separation valve and exposed piping is essential.
2. If the stored product has a high viscosity (heavy oil, crude oil etc.) it should be heated, the contents of the TOO separation valve should also be heated using a heating jacket or similar (not provided by BERMAD).

SEPARATION VALVES – TOO, **Installation, Operation, Maintenance**

1. Type TOO

1.1 Installation

1.1.1 Description

The BERMAD TOO Separation valve is a specific gravity sensitive valve, which closes upon sensing the lighter of two fluids. Commonly used for the draining of accumulated water from petroleum product storage tanks and similar.

1.1.2 Basic Installation

For all installations, be sure to install the Separation Valve:

- In the vertical position (to be performed using a level measuring device to ensure accuracy)
- At the lowest available point of the tank
- Firmly positioned and held securely
- As close to the storage tank as possible

Ensure that the size of the Drain Valve (1) between the storage tank and the Separation Valve is at least as large as the inlet of the Separation Valve.

If a pipe is to be connected to the outlet of the Separation Valve, make sure it is as short, straight and horizontal as possible. This will allow undisturbed drainage and will prevent the development of undesirable suction. In cases where a downward slope is unavoidable, allow for an air gap (suction breaker) in the drainage pipeline, as in Figure 2. Make sure that the TOO valve and ancillary parts are thoroughly secured.

1.1.3 Typical Installations

There are several kinds of storage tanks, differing in basic design. Two design features that influence the positioning of the Separation Valve are:

- Position of the storage tank floor
- Location of the storage tank drainage relative to ground level

Customer preferences may also influence the positioning of the Separation Valve.

1.1.3.1 Installing BELOW Tank Bottom Level

In BELOW Tank Bottom installations as shown in figures 1 and 2, the Separation Valve is placed BELOW the level of the storage tank bottom. The inlet to the Separation Valve is on the same level as the storage tank's draining outlet.

In BELOW Tank Bottom installations, there is a naturally occurring exchange of fluids between the Separation Valve and the storage tank. The water coming from the storage tank fills up the Separation Valve. The trapped product from the previous draining cycle, since it is lighter than water, returns to the storage tank by floating back up through the open Drain Valve (1).

Figure 1: Below bottom - cone floor tank

- ① Drain valve
- ② Vent / Sampling valve
- ③ Equalizing valve
- ④ Outlet valve
- ⑤ Storage tank
- Ⓒ Plug

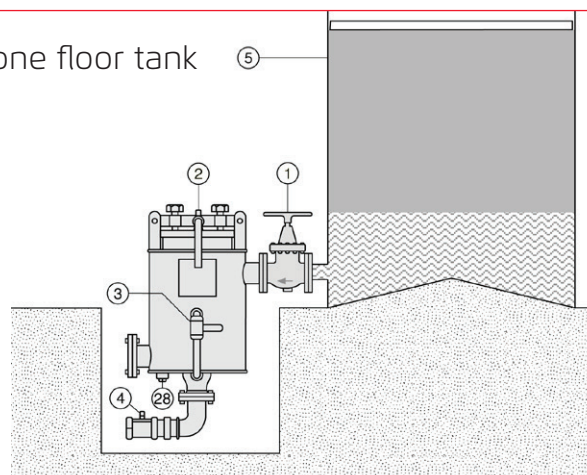
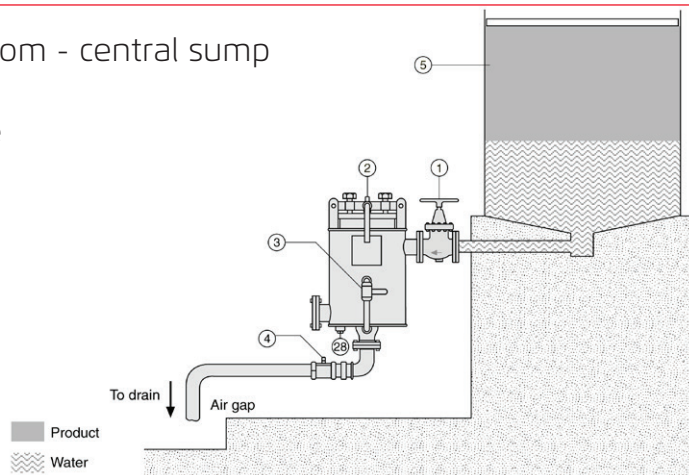


Figure 2: Below bottom - central sump

- ① Drain valve
- ② Vent / Sampling valve
- ③ Equalizing valve
- ④ Outlet valve
- ⑤ Storage tank
- ⊘ Plug



1.1.3.2 Installing ABOVE Tank Bottom Level

In the ABOVE Tank Bottom installations described in illustrations 3 and 4, the Separation Valve is situated ABOVE the level of the storage tank bottom. The Adapter (6) connecting the Separation Valve and the storage tank is always full of liquid and the trapped product cannot return naturally to the storage tank, but must be transferred through operator intervention, by using the factory fitted manual pump. Transfer of the trapped product must be performed at the beginning of the next draining cycle.

Figure 3: Above bottom - cone floor tank

- ① Drain valve
- ② Vent / Sampling valve
- ③ Equalizing valve
- ④ Outlet valve
- ⑤ Storage tank
- ⑥ Adapter
- ⑦ Manual pump
- ⊘ Plug

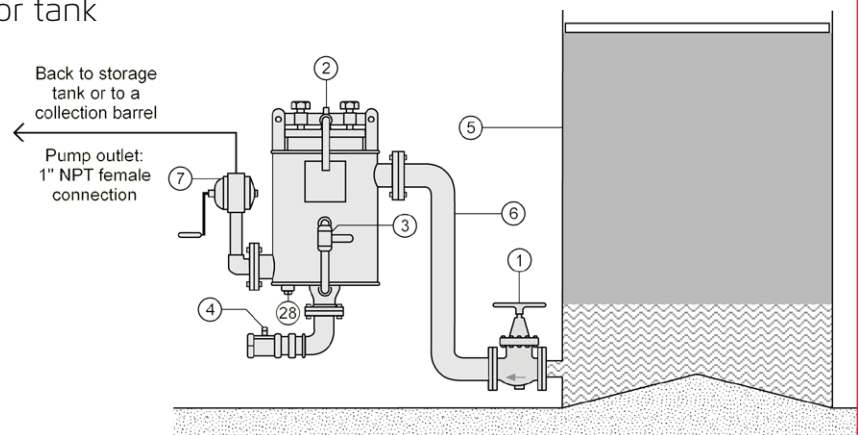
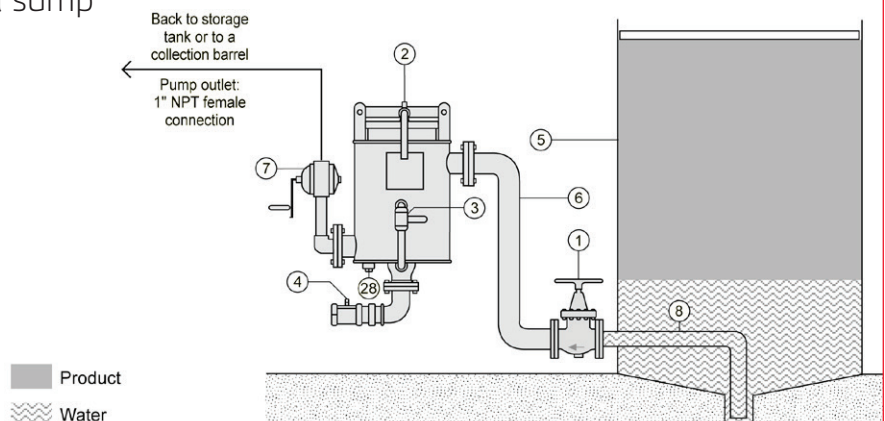


Figure 4: Above bottom - central sump

- ① Drain valve
- ② Vent / Sampling valve
- ③ Equalizing valve
- ④ Outlet valve
- ⑤ Storage tank
- ⑥ Adapter
- ⑦ Manual pump
- ⑧ Drain pipe
- ⊘ Plug



1.1.4 Manual Pump Operation

Using a safe means of product transfer helps ensure effective and safe drainage and helps prevent environmental pollution and loss of product.

The Manual Pump enables the transfer of trapped product back to the storage tank or collecting vessel. Since the discharge rate of a manual pump is approximately 1 litre (1 quart) per rotation, product trapped in both the Separation Valve and in the adapter is very quickly pumped out.

Note: To calculate the number of rotations required on a manual pump, determine the quantity of petroleum product remaining in the drainpipe (8) and adapter, and add it to the 20 litres (5.3 gal.) of product trapped in the Separation Valve.

Verify by trial and error.

1.2 Operation

1.2.1 General

The ability of the Separation Valve to drain water without draining product is based on the principle of two liquids being separated by their naturally occurring interface. For this reason it is necessary to allow approximately 3 hours (depending on the relative specific gravity of the product) of static conditions inside the storage tank to elapse before draining.

Warning: Do not drain water from the storage tank during high-flow or filling, discharge or circulation, or within approximately 3 hours after such activity. Failure to comply with this warning may cause draining of product mixed with the water.

Flow rate while draining is approximately 13600 l/h (3600 gal/h) with a 13 meter (43 ft) product head (see chart). Prior to beginning the draining procedure, determine which instructions are relevant to you by carefully examining figures 1-4 and choosing the one most similar to your configuration.

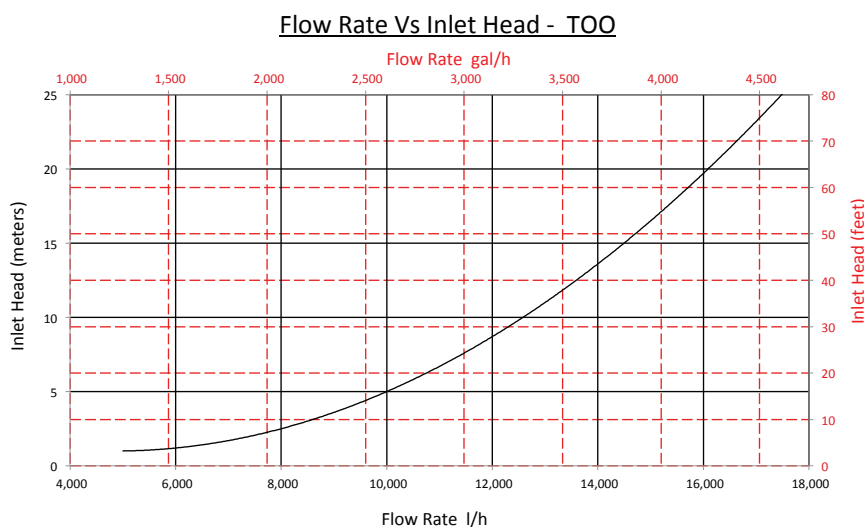
1.2.2 Draining

1. Determine the approximate time required for the current draining cycle:
 - a. Verify with the Control Room the quantity of water to be drained.
 - b. Verify the level of product in the storage tank.
 - c. With the aid of the flow chart, calculate the approximate draining time.
2. Fully open the Drain Valve (1) at the inlet of the Separation Valve.

Note: The next step – Step 3 – applies only to ABOVE Tank Bottom installations as illustrated in figures 3 or 4, and if your installation is BELOW Tank Bottom as illustrated in Figures 1 or 2, skip to Step 4.

3. For ABOVE Tank Bottom installations only: Transfer the trapped product back to the storage tank or to a collecting vessel.
4. Release air through the vent/sampling valve (2).
5. Momentarily open the Equalizing Valve (3), allowing the pressure surrounding the Separation Valve Float (Figure 6, Item 6) to equalize. The Float will then come to rest on top of the heavier liquid.
6. Open the Outlet Valve (4). The water will begin to drain.
7. When the approximated required time for draining has elapsed, inspect the Separation Valve. If draining has been completed, close the Outlet Valve (4). The Separation Valve is now ready for the next draining cycle.

Figure 5



1.3 Maintenance

1.3.1 General

The Separation Valve should be periodically inspected and cleaned. The frequency of internal inspection and cleaning depends on the condition of the storage tank and the purity of the product that is stored. In cases where the Separation Valve is installed onto an older storage tank (with more corrosion), or in cases where sludge and sediment are present, it is recommended to inspect and clean more frequently. In new petroleum tanks, it is recommended to conduct an internal check every 6 months. In older petroleum tanks, it is recommended to conduct an internal check every 3 months. Precise intervals for internal checks will be determined by the condition of the tank and quantity of sedimentation found in the Separation Valve. It is recommended to conduct the first inspection after three months of use.

Important: The float (Figure 6 Item 6 or 6A) can be calibrated by adding or subtracting water from the float. The float should float on water up to the beam and sink into the product intended for use (Gasoline, Diesel etc.). At the end of calibration, seal and tighten the plug of the float using the elastomeric seal and fuel resistant locking adhesive.

1.3.2 Preparing for Disassembly

See figures 6 and 7.

Warning: Be sure to depressurize the Separation Valve before opening Cover (8). Failure to do so may cause personal injury and product loss.

1. Close the Drain Valve (22).
2. Open Vent/Sampling Valve (21/27), remove Drain Plug (28) and drain the contents of the Separation Valve.

1.3.3 Disassembling

See figures 6 and 7.

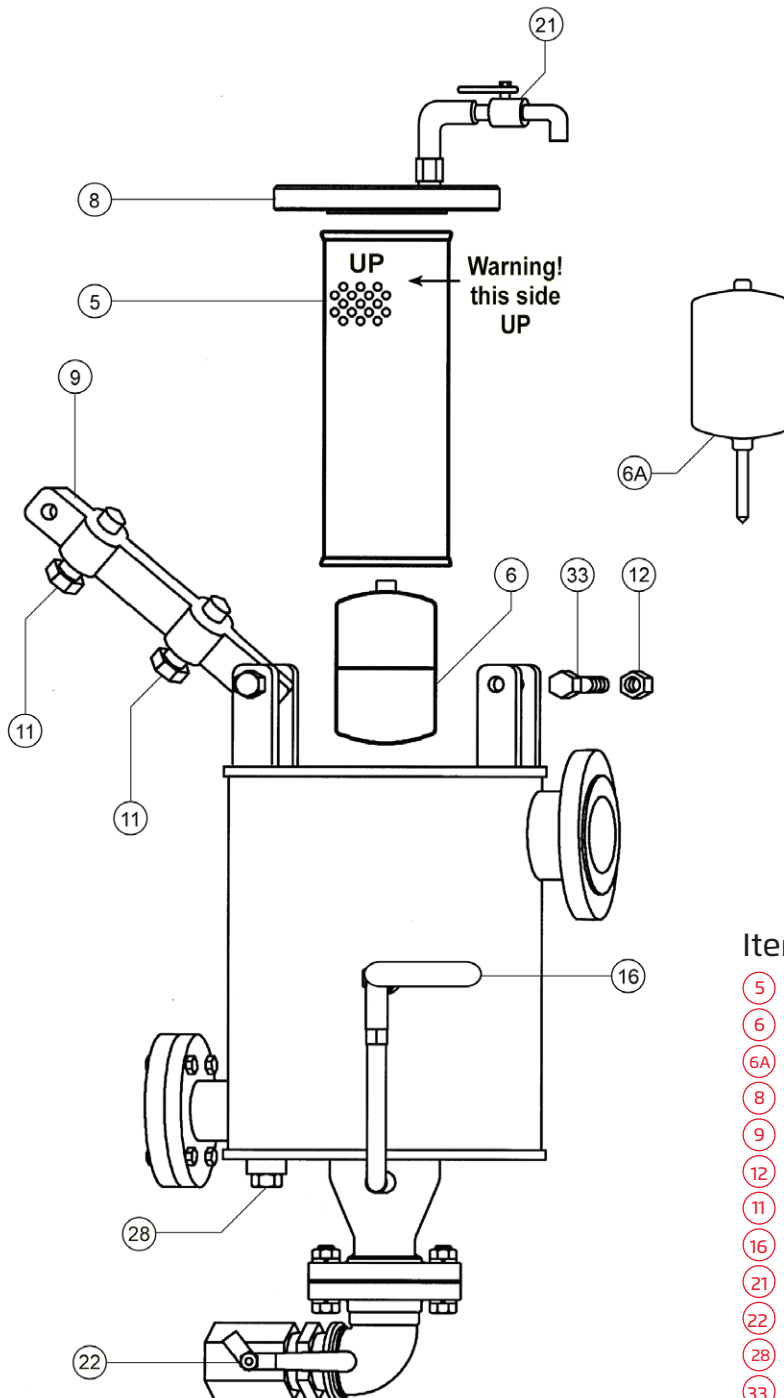
1. Release Bolts (11).
2. Release and remove Bolt (33) and Nut (12).
3. Lift Beam (9) and remove Cover (8).
4. Remove Guide (5) and Float (6).
5. Clean sediment and sludge from bottom of the Separation Valve.
6. Check integrity of the Seals (Figure 7, Items 2 and 7). Replace if necessary.

1.3.4 Reassembling

See Figures 6 and 7.

1. Place the Float (6 or 6A) on the Seat.
2. Place the Guide (5) around the Float and centre it on the Seat.
3. Replace the Cover (8), centered on the Guide (5). Ensure that the Cover O-ring (7) is positioned against the Separation Valve neck (Figure 7, Detail C).
4. Replace the Beam (9), Bolt (33) and Nut (12).
5. Tighten the Bolts (11) to ensure a good seal between the Cover (8) and the Separation Valve neck.
6. Open the storage tank Drain Valve (Figures 1-4, Item 1) according to regulatory policy.

Figure 6



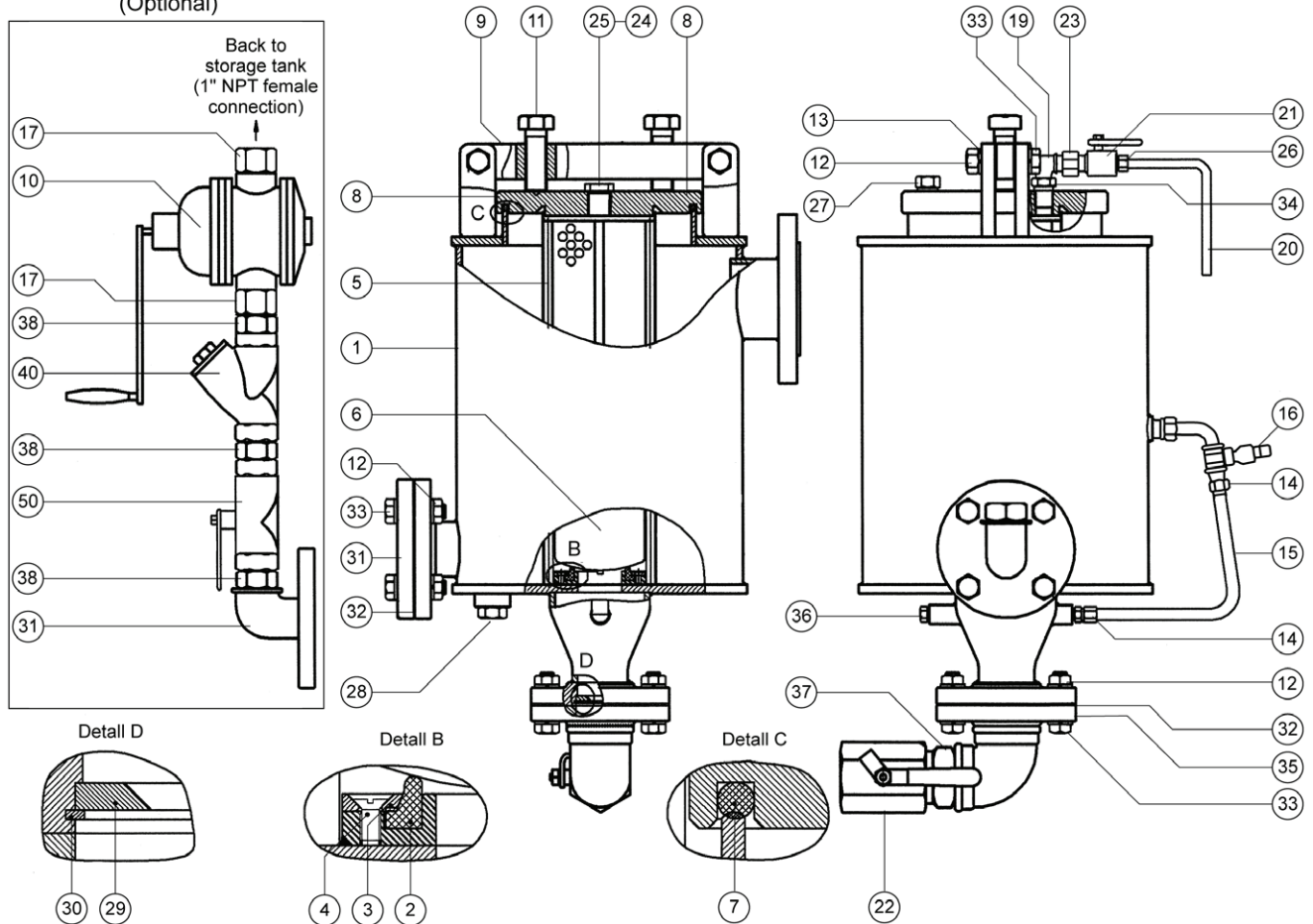
Item List for Figure 6

- 5 Guide
- 6 Float
- 6A Float (limit switch compatible)
- 8 Cover
- 9 Beam
- 12 Nut
- 11 Bolt
- 16 Equalizing Valve
- 21 Ball Valve
- 22 Ball Valve
- 28 Plug
- 33 Bolt

Model T00

Figure 7

Manual Pump Assembly
(Optional)



Item List for Model T00

- | | | |
|---------------|--------------------|-----------------|
| ① Body | ⑭ Fitting | ⑳ Plug |
| ② Seal | ⑮ Tube | ㉑ Orifice |
| ③ Ring | ⑯ Equalizing Valve | ⑳ Retainer Ring |
| ④ Screw | ⑰ Bushing | ㉑ Flange Assy. |
| ⑤ Guide | ⑱ Street | ㉒ Gasket |
| ⑥ Float | ⑲ Tube | ㉓ Bolt |
| ⑦ O-Ring | ㉑ Ball Valve | ㉔ Bushing |
| ⑧ Cover | ㉒ Ball Valve | ㉕ Flange Assy. |
| ⑨ Beam | ㉓ Nipple | ㉖ Plug |
| ⑩ Manual Pump | ㉔ Plug | ㉗ Nipple |
| ⑪ Bolt | ㉕ O-Ring | ㉘ Nipple |
| ⑫ Nut | ㉖ Fitting | ㉙ Strainer |
| ⑬ Washer | ㉗ Plug | ㉚ Ball Valve |



Notes

Series of horizontal dotted lines for taking notes.





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