

1 Introduction

These instructions apply to the Vetus rigid plastic waste water tanks for grey water and black water.

When installing a waste water tank, the European Recreational Craft Directive (RCD, 2013/53/EU) and any national legislation must be observed. Use the ISO 8099 standard as a guide.

Grey water tank

- A grey water tank should only be used for collecting water from the sink, shower, wash basin, air conditioning, etc..
- The capacity of a waste water tank can never be too large.
- Match the capacity to the amount of fresh water available; the capacity of the water tank(s).
- Fit sink, shower, wash basin, etc. with a drain with sieve, so that coarse waste, such as hair etc., will be less likely to enter the grey water tank.

Black water tank

- A black water tank is used only for temporary collecting toilet waste.
- The capacity of a waste water tank can never be too great.
- The capacity should be calculated using the amount of flushing water (outside water) used by the toilet. Reckon on 7 to 14 litres (1.5 to 3 Imp. Gal., 1.9 to 3.8 US Gal.) of black water per person per day.
- Use only water-soluble toilet paper to prevent unnecessary blockages. Sanitary towels and tampons in the toilet and black water tank will certainly cause blockages.

Clearing a blockage is an unpleasant job, make sure you have a pair of rubber gloves on board.

Smell

Grey water tank

- Unpleasant odours will be produced in every grey water tank. Fit the sink, shower, wash basin, etc., with an S-bend (siphon or stink trap) and a plug.

Black water tank

- Unpleasant smells caused by faeces will be produced in every blackwater tank. The use of sea water for flushing will increase the smell. The algae in sea water also produce unpleasant smells.
- It is possible to add special additives to waste water tanks to reduce the smell, called tank deodorants. A simple way of reducing the smell is by using washing soda, which cleans and sterilizes.
- Leaking hoses, hose fittings, tanks, tank covers, etc., can also cause a smell nuisance. So carry out a regular check of the whole system.

For dimensions, see drawing on page 38. Tolerances of +/- 2% apply to all tank dimensions!

Running dry of the pump is allowed. However, unnecessary running dry will shorten the service life of both the motor and the diaphragm.

Always shut off all sea cocks when leaving the ship.

WARNING

Obstructions in pressure and/or suction hose may be harmful to pump and/or electric motor.

By using a fuse with the recommended amperage (6 A for 12 Volt and 4 A for 24 Volt) in the plus cable, the fuse will blow if there are any blockages or when the outboard shut-off valve is closed.

This will prevent damage to the pump or electric motor.

2 Installation

2.1 General

When choosing a place for the tank and for the deck filler cap, take the following into account:

- The suction hose should be as short as possible, must go directly down to the tank and be as straight as possible.
- The space in which the tank is placed should be properly ventilated.
- There must be sufficient free space available to perform maintenance on the pump.

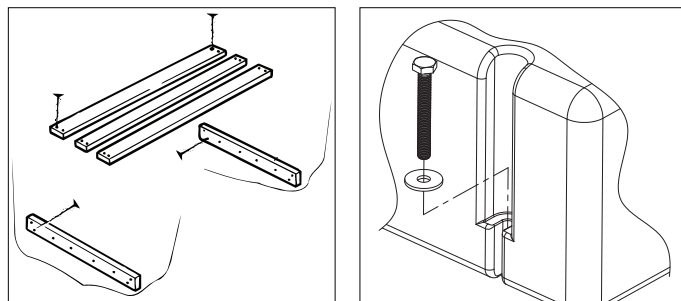
Position

- Several toilets may be connected to a single tank. Extra fittings are also available.
- Position the tank as close as possible to the toilet to avoid dirty water flowing back into the toilet from the tank when the boat heels.

NOTE

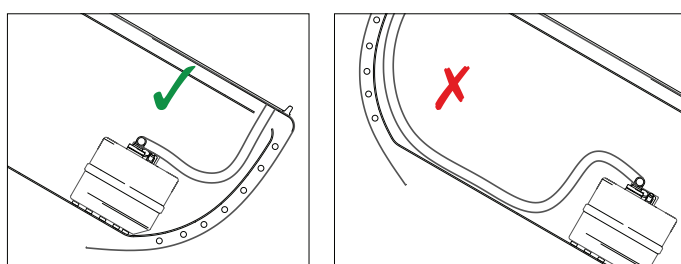
The height difference between the tank and the filler cap may a maximum of 2 metres (6'8") (the maximum excess pressure in the tank is 20 kPa (0.2 bar, 3 psi)!)

- Arrange the tanks, and thus the weight, evenly over the ship.
- Install the tank so that it is easily accessible for inspection.
- Also ensure that there is sufficient free space over the top of the tank for the hose connections. These must be easily accessible during installation. The tank should be 1 cm (3/8") free all round from bulkheads or other tanks, to provide ventilation.
- Ensure that there is a sufficiently solid foundation for placing and fixing the tank firmly.
- **The size of the tank increases slightly when it is full.** Take this into account when fixing the tank in place.
- Attach the tank using the stainless steel rings supplied.



Fitting in sailing ships

When fitting remember that the suction waste water hose must always be positioned on the same side of the ship as the tank. This prevents too high a pressure from possibly occurring in the tank when sailing at an angle.



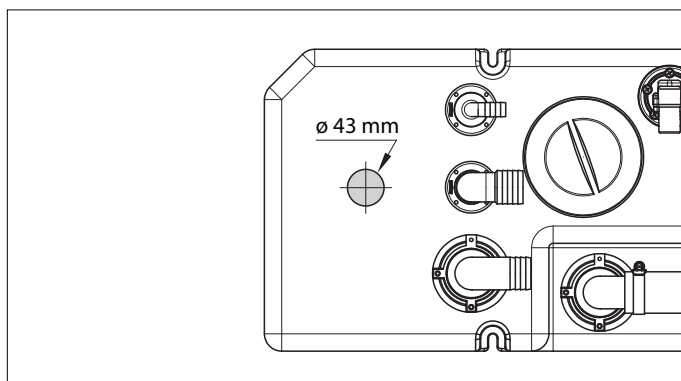
2.2 Tank fittings

The inspection cover and the fittings are pre-assembled in the upper section of the tank.

- Use the tool provided to fit the fittings in the correct direction.
- If required create additional holes on the top of the tank for extra fittings (43 mm (1 11/16") dia.).

Choose the position of the fittings so that when the ship is beached on its side, waste water cannot run back to the toilet, or flow outside via the tank air-relief.

- Clean saw dust and drill shavings from inside the tank.

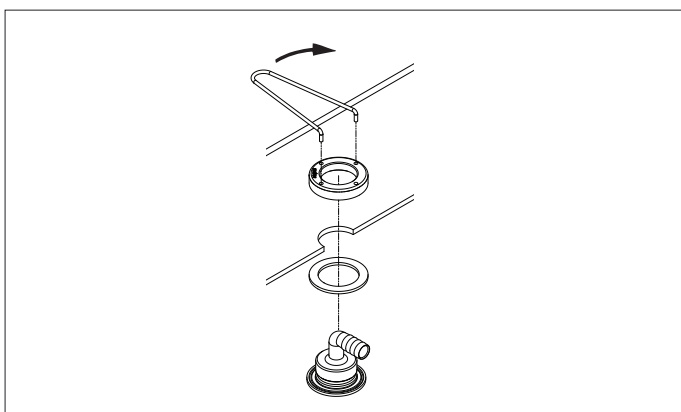


Assemble fittings

- Assemble the fittings with the gasket rings supplied. Tighten the nuts using the wrench, never with water pump pliers. Do not tighten the nuts excessively.
- After 2 days check that the connector nuts are still tight, tighten more securely if required. Repeat this after 4 days.

To prevent blockages caused by hairs and coarse waste in particular, all fittings should have burrs removed internally, local narrowing should be reduced to a minimum and any changes in pipe diameter should be done using conical adapters or large radii.

The sensor for a dirty water level meter is already fitted in the top of the tank. The sensor can be connected only to a Vetus level indicator for waste water.



Option: Vacuum operated vent valve VRF56A
In the top of the tank, drill the hole for the vent valve (ø 57 mm (2 1/4" dia.)).

2.3 Tank connections

Connect the tank with a good quality reinforced hose. Avoid sharp bends and kinks or sagging in the hose.

Bracket the hose at not too far apart, regular points, to prevent the hose sagging. Deposits will collect in these sags, causing a blockage after time.

The reinforced hose should be an odour-proof waste water hose and resistant to a limited under- and over-pressure of 30 kPa (0,3 bar, 4 psi).

Vetus supplies a hose suitable for waste water.

Specially for black water tanks, odour-proof waste water hose:

Article Code: SAHOSE16, 16 mm (5/8") internal diameter
 SAHOSE19, 19 mm (3/4") internal diameter
 SAHOSE25, 25 mm (1") internal diameter
 SAHOSE38, 38 mm (1 1/2") internal diameter

Fit every hose connection with a good stainless steel hose clip.

Attach the discharge connection '5' to waste water pump '9'.

To assemble the valve correctly, consult the waste water pump manual.

Install hull outlet with valve '11'.

Install the suction hose '17' (38 mm. dia. (1 1/2")) such that neither the tank, pump or deck cap are subject to any mechanical loads.

If the suction connector '3' is not being used, close the suction pipe off with a plug.

Fit the air-relief nipple '14' as high up as possible above the level of the top of the tank. Choose a place for the nipple where rain or other outside water cannot enter.

It is very advisable to fit a smell filter '15' type NSF in the pipe. This prevents unpleasant smells from the vent nipple.

Fit the air-relief pipe '18', internal diameter 19 mm (3/4"), between the air-relief nipple and the tank. When viewed from the tank, the air-relief pipe should run straight upwards.

Install a bend ventilator '10' in the discharge pipe between pump and hull outlet when the waste water tank is below the water line and the hull outlet is also below the water line.

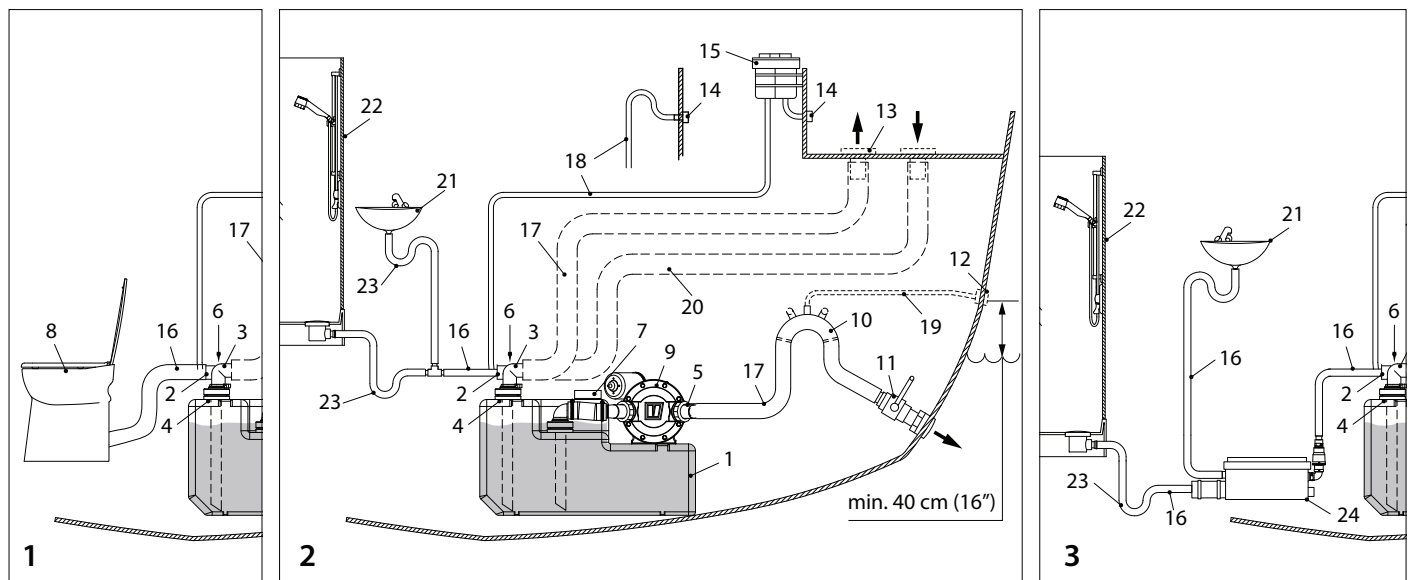
Rinsing pipe '20'

In order to rinse out the tank easily with clean water, and extra fitting can be made in the deck connected to an extra deck cap. Clean water can be poured in through this pipe.

2.4 Check

Check the system for any leaks.

Extraction pressure 20 kPa (0.2 bar, 3 psi).



1. 'Black water' system

2. 'Grey water' system

3. 'Grey water' system, the tank is positioned higher than the shower and washbasin

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|--|--|--|
| 1 Waste water tank | 5 Discharge connection: 38 mm dia.(1 1/2") | 16 Inlet waste water hose: 38/25/19/16 mm dia.(1 1/2", 1", 3/4", 5/8") |
| 2 Inlet connections:38/25/19/16 mm dia. (1 1/2", 1", 3/4", 5/8") | 6 Air-relief connector: 19 mm dia. (3/4") | 17 Suction waste water hose: 38 mm dia. (1 1/2") |
| 3 Suction connector: 38 mm dia.(1 1/2") | 7 Sensor for water level meter | 18 Air-relief pipe: 19 mm dia. (3/4") |
| 4 Suction tube: 38 mm dia. (1 1/2") | 8 Toilet | 19 Ventilator pipe |
| | 9 Waste water pump | 20 Rinsing pipe |
| | 10 Bend ventilator | 21 Washbasin |
| | 11 Hull outlet with valve | 22 Shower |
| | 12 Hull outlet: 8 mm dia. (5/16") | 23 Siphon (Smell trap) |
| | 13 Deck cap for suction discharge | 24 Shower with pump |
| | 14 Air-relief nipple | |
| | 15 Odour filter | |

2.5 Electrical installation, pump

Make sure that the voltage stamped on the electric motor is identical as the ship's power supply voltage.

The minimum cross-section for the connecting cables is 2.5 mm² (AWG 14). The voltage drop between the battery and the pump should not exceed 10% of the supply voltage. For a 12 Volt installation with a total cable length (positive and negative wiring added together) of more than 19 m use cable with a cross-section of 4 mm². (or more than 50 ft: use AWG 12).

Connect the power supply as shown in the wiring diagram. See drawing at page 34.

A main switch* and a fuse** must be incorporated in the positive cable.

*) The switch must be rated for 10 Amps.

**) Fuse: 6 Amps for 12 Volt system
4 Amps for 24 Volt system



WARNING

The electric motor may become hot when used for a longer period of time! Make sure that electric wiring etc. does not get in contact with the motor housing.

2.6 Electrical installation, level sensor and level gauge

The previously installed ultrasonic tank level sensor (Art. code: SENSORA) measures the liquid level without making any contact. The sensor can be used in combination with a Vetus level meter or with the waste water control panel (WWCP) (Not included in the delivery).

When the power is switched on the LED on top of the sensor will always flash green!

Connect the sensor to the tank level meter as shown in the wiring diagrams, see page 35.

The sensor has been calibrated for the internal height of the tank. Do not connect the yellow wire (Cal), but isolate it.

2.7 Problem solving, level sensor

Problem:

The LED on the top of the sensor does not flash, or only sometimes green.

Cause:	Solution:
The voltage from the power supply is too low.	Charge the battery.
The sensor is dirty on the bottom.	Clean the sensor using a damp cloth or a brush.

3 Use

Emptying

The longer polluted water has been in the tank the greater the risk of nuisance from smell. Therefore, never leave a waste water tank filled unnecessarily long, but pump the tank empty or have it pumped empty once a week, or whenever possible.

Pumping empty can be done in two ways:

1. by connecting a shore pump-out system to the deck cap to pump the tank empty.
2. by using a pump present on the ship to pump out the waste water directly overboard through the deck cap and a hose connected to this. This pump must have internal diameter of minimum \varnothing 38 mm (1 1/2").



NOTE

Pumping waste water directly overboard is in many places absolutely not allowed!

If the tank is pumped empty by a high capacity pump there is a risk of the tank collapsing due to the reduced pressure caused. This problem occurs particularly when using the pump-out systems. The following measures can be taken to prevent collapsing from occurring:

- open the inspection cover on the tank
- open a shut-off valve fitted to the tank for this purpose
- Install a vacuum operated vent valve VRF56A.
- Install a 38 mm dia. ventilation pipe.

After pumping the tank empty:

Rinse the tank with clean water, so that all the discharge hoses are filled with clean water. Pump the flush water away by switching on the pump; remaining contaminants in pump and hoses will also be flushed.

Contaminants left behind in the valves of the pump this may result in a decreased capacity of the pump.

If the installation is not used for a longer period of time, the pump must be operated regularly. By doing so a proper functioning of the valves is ensured.

During your absence

Flush the toilet several times to ensure the hose linking the toilet and the tank is filled with clean water to avoid smells when not in use.

Disinfect the tank and pipes at least once a year preferably at the end of the sailing season.

Cleaning

'Grey water' tank

Clean the inside of the tank with water and a good degreasing household cleaner; use a brush or a sponge for a rigid tank. Rinse the tank with clean tap water.

'Black water' tank

Clean the inside of the tank with water and a good toilet cleaner; add cleaning vinegar if there are lime deposits; use a brush or a sponge for a rigid tank. Rinse the tank with clean tap water. If required, add to reduce odors 'Tank Fresh'.

Disinfecting

Disinfect the tank by filling it with a solution of bleach in water (1:1000). Circulate this disinfecting mixture through the waste water system. Remove the solution and rinse the tank with clean tap water.

4 Making ready for winter

The tank, pipes, pump, etc. must always be drained completely.

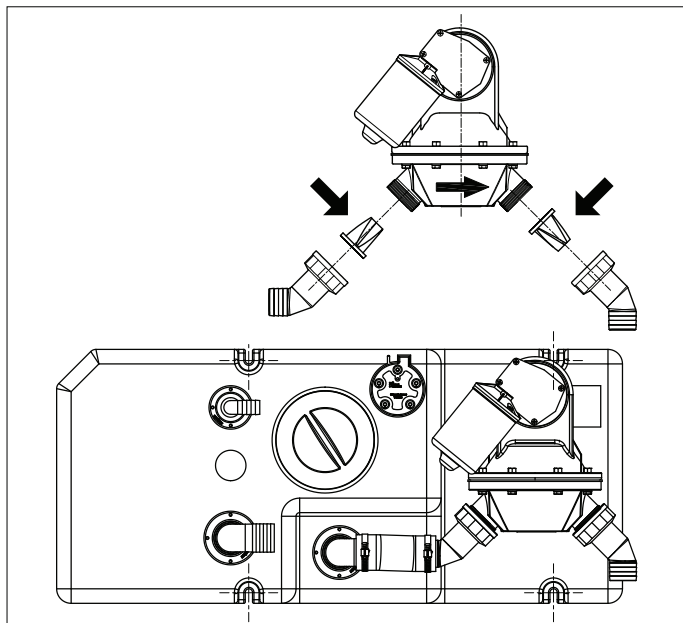


NOTE

Never put anti-freeze in the tank or other parts of the drinking water system to protect it against freezing, anti-freeze is very poisonous!

5 Maintenance

- Check the breather nipple regularly and clean the sieve of the breather nipple if necessary.
- Check the hoses and hose connections for possible leaks annually and fit new hoses and/or hose clamps as necessary.
- Also check the tank for damage as a result of chafing. Replace a damaged tank immediately.
- Carry out the disinfection procedures described under 'Use' at the beginning of the sailing season.
- A tank and installation that is strongly contaminated by algae can be cleaned by rinsing the tank, the pump and pipes with a solution of bleach in water (1:20). Rinse the tank with clean tap water.
- Clean the valves if necessary. Thereto remove the relevant hose pillar, remove the valve and clean it. Re-assemble in reverse order.
- Ensure that the valves are refitted in the correct manner.



6 Technical details

Waste water tank system

Type	WWS42..B	WWS61..B	WWS88..B	WWS120..B
Capacity*	42 litres 9.2 Imp.gal. 11.1 US gal.	6 litres 13.4 Imp.gal. 16.1 US gal.	88 litres 19.4 Imp.gal. 23.2 US gal.	120 litres 26.4 Imp.gal. 31.7 US gal.
Weight*	12.5 kgs 28 lbs	14 kgs 31 lbs	16 kgs 35 lbs	18 kgs 40 lbs
Max. Pressure	30 kPa (0.3 bar, 4 psi)			
Material	mMPE (Metallocene Medium Density Polyethylene), colour: black			

*) Nominal values are given for capacity and weight.
Slight deviations are possible.

Hose fittings

For filling hose	: 38/25/19/16 mm dia. (1 1/2", 1", 3/4", 5/8")
For discharge hose	: 38 mm dia. (1 1/2")
For air relief	: 19 mm dia. (3/4")
For discharge	: 38 mm dia. (1 1/2")

Fittings for hose with suction tube

For Vetus waste water deck cap	: 38 mm dia. (1 1/2" dia.)
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Pump

Type	: Self-priming diaphragm pump
Capacity, at 0 m head	: 27 l/min (5.9 Imp. gal./min, 7.1 US gal./min)
Max. suction height	: 3 metres column of water (10')
Max. head	: 5 metres column of water (16'5")
Max. suction height + head	: 5 metres column of water (16'5")

Material

Pump housing	: Plastic
Hose pillars	: Plastic
Diaphragm	: Neoprene rubber
Valves	: Neoprene rubber
Bell housing	: Aluminium, coated

Electric motor

	WWS..12B	WWS..24B
Type	Permanent magnet DC motor	
Voltage	12 V DC	24 V DC
Current (maximum)	6A	4A

Level sensor

Power supply	: 12 or 24 Volt
Current taken	: 35 mA
Output	: Analogue, suitable for 1 or 2 Vetus level meters or 1x WWCP (control panel for dirty water)
Accuracy	: +/- 5% (temperature compensated)
Storage temperature	: -20° - +70°C (-4° - +158°F)
Useful temperature range	: 0 - +50°C (32° - +122°C)