

# Holding Tanks

Presented to FSC Cruising Section by Kim Klaka 22 Nov 02

## 1. Operation

### 1.1 What looks different?

- 2 extra valves
- maybe an extra pump

### 1.2 What do you do differently?

#### a) in harbour:

-set valves to pump waste into tank

- then operate as normal

#### b) at sea

- set valves to pump waste from tank to sea (then pump it out)

- then set valves to pump toilet direct to sea

- operate as normal

#### c) discharge to shore facility

- set valves accordingly (depends on system design)

## 2. Basic Principles

### 2.1 Bacteria breaks down waste

- Anaerobic bacteria likes airless environment and it SMELLS
- Aerobic bacteria likes air - doesn't smell
- Conclusion: tank needs air circulation

### 2.2 Only use highest quality components

a breakage is not fun to repair, especially at sea

## 3. Design

### 3.1 How big?

- size (litres) = no. of people × no. of days × factor (see below)
- factor varies between about 15 and 25 depending on toilet type, use pattern etc.
- my tank is 120litres (2-3 people for 3 days?)

### *3.2 What shape?*

- not critical, but tall and narrow is best  
(drains better and has least effect on sailing performance)
- make sure it fits AND
- make sure it fits through the hatch/locker opening etc.

### *3.3 Connectors and hoses*

- avoid low spots in pipe loops (waste will collect and smell)
- avoid sharp bends: use smooth curves, not nasty cheap sharp plastic elbows
- tank vent pipe has to be big diameter (20mm min, mine is 38mm)), short and horizontal (for air flow)
- hose should be "marine sanitation" grade or it may smell
- hose must be smooth inside, not ribbed or waste will build up

### *3.4 Gauge*

need to know if tank is full before you find out!!

## **4. Manufacture and Installation**

### *4.1 Tank materials options*

- flexible: NO! (no air)
- stainless steel or aluminium: NO. (corrosion)
- wood NO (porous) unless epoxied maybe
- glass fibre: OK with careful resin choice
- BEST OPTION: polyethylene

### *4.2 Strength*

- nice and thick, min 8mm for 100l polyethylene (also reduces chance of smells)
- fit baffles if >80litre
- strongpoints for fastening down (to stronger points!)

### *4.2 Other bits*

- make a mockup in thin plywood
- do it right first time

- don't skimp on materials or tank size

- what did it cost me?

About \$1,000 (tank, valves, hose)

- don't rely on this document, go read the sources given below.....

### **Useful info sources:**

Peggie Hall (*THE* holding tank info source)

<http://www.boatsafe.com/nauticalknowhow/phall.htm>

### ***toilets, valves etc:***

Blakes-Lavac-Taylors

<http://www.chillington-marine.co.uk/>

### ***Whale pumps and valves***

Munster-Simms Engineering , or YotGrot, or other local chandlers

### ***polyethylene tanks***

Fusion Engineering Plastics Pty Ltd

Unit 1, 7 Dobra Rd., Yangebup

Ph: 9494 1004 fax: 9494 1003 email: [fusion@eon.net.au](mailto:fusion@eon.net.au)

### ***hoses and connectors***

Couplers O'Connor

Unit 7, 34 Hines Rd., O'Connor

Ph: 9314 5556 fax: 9314 5557 email: [couplers-oconnor@bigpond.com.au](mailto:couplers-oconnor@bigpond.com.au)

### ***Construction guidelines***

Australian Standard AS3542 - 1996

Not much specific info, but useful general guidelines