

CUSTOM WATER, WASTE AND DIESEL FUEL TANK DESIGN GUIDE

This guide has been designed to help you decide which type of fittings and accessories you require on your custom built tank. There are five points you need to address:

- HOSE AND PIPE FITTING CONNECTIONS
- AVOIDING INTERNAL BAFFLES
- INSPECTION HATCHES
- LEVEL INDICATORS
- THE TANK DRAWING

Check off each heading as you cover them. You may decide that sender is not necessary as you will be able to see the contents through a tank wall, so just ignore that section.

HOSE AND PIPE FITTING CONNECTIONS

First decide where the fittings need to go. Once you have established the position, the size has to be decided. Once the size has been decided, please refer to the **Tek-Tank Fittings Guide** for the overall height and length of the fitting. This height or length can then be checked against the tank design, to see if there any problems with clearance. For example, you may have a clearance above you tank design of 75mm and want to fit an 1 ½” elbow inlet. This would not be possible as an 1 ½” elbow actually stands up 108 mm and would foul whatever is above the tank. The tank height would then have to be reduced by 25mm to allow for the fitting.

WATER, GREY WATER AND WASTE HOLDING TANKS

All fittings on **water, grey water and waste holding tanks**, whether straight or elbows are screwed onto a BSP threaded male adaptor, which is permanently welded to the tank. All adaptors will stand 24mm off the tank face when the fitting is removed as shown on the drawing below.



Each fitting needs to be checked against the tank design and the boat structure to avoid any problems later when the tank is fitted . Time spent now checking the size and position of each fitting will pay off, as it is not normally possible to modify the tank.

All elbows are multidirectional, hence the direction they need to point does not need to be shown. Once the tank is installed they can be swivelled in the right direction and then the locknut can be tightened.

Hosetail fittings for water, grey water and waste tanks are supplied in plastic. Please refer to the **TekTanks Fittings Guide** for the full list of available sizes.

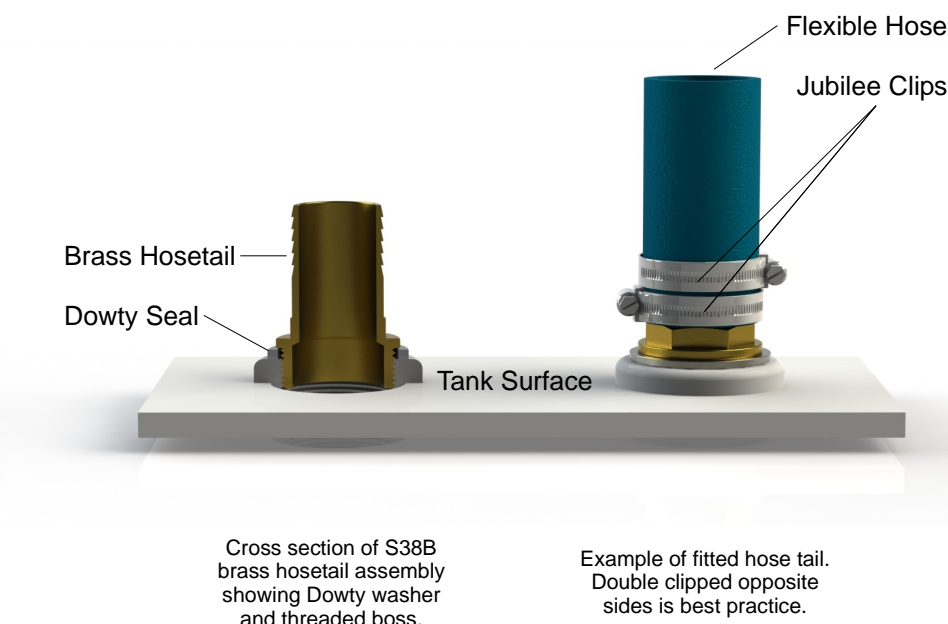
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DIESEL TANKS

All **straight hosetail fittings** are screwed into a female BSP boss, which is permanently welded to the tank. All female bosses will stand 10mm off the tank face when the fitting is removed. Female bosses are available in the following thread sizes: ½” BSP, ¾” BSP, 1” BSP, 1¼ ” BSP, 1 ½” BSP. Smaller sizes are available and are achieved by using a reducing bush screwed into the ½” BSP boss, i.e. a ¼ ” BSP is attained using a ½”-¼ ” BSP reducing bush.

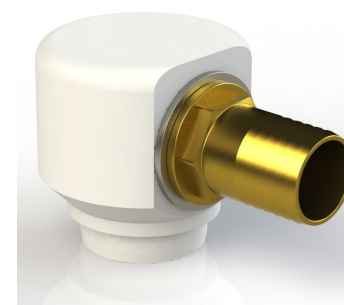
Straight hosetails are required when connecting to a flexible hose. Size of tail should be the same as the bore of the hose you are using. These are normally the inlet/filler hose and vent hose. Feeds and returns can be also flexible. All straight hosetail fittings are supplied with a bonded seal also known as a Dowty washer. These seals comprise of a zinc plated steel ring with a stiff rubber seal bonded to the inside of the ring. The rubber seal is slightly thicker than the steel ring so when the hosetail fitting is tightened up, the rubber compresses and seals the underside of the hose tail flange and the face of the female boss.

The bonded seal does a similar job to a fibre washer, but is far more effective as they are normally found in high pressure applications. Hosetail fittings for fuel tanks are supplied in a marine grade brass. Please refer to the **Tek-Tanks Fittings Guide** for the full list of available sizes.



Elbow hosetails are also used for connecting flexible hose to the tank. These come off a face of the tank and turn through 90°. Tek-Tanks fuel tank elbows are of a fixed type and cannot be rotated once attached to the tank.

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Large **fixed elbow** shown is used for 32, 38 and 50mm hosetails. All other sizes use a smaller body standing 45mm high. It is important that the direction of the elbow is checked thoroughly. If the direction is not correct, the tank will have to be returned to us for repositioning. Please refer to the **Tek-Tanks Fittings Guide** for the full list of sizes available.

ELBOW TYPE FITTINGS FOR FUEL FEEDS AND RETURNS

Elbow fittings are generally specified for fuel feed and return because of their low profile.

A male - female elbow is screwed into a reducing bush with either a hosetail adaptor for flexible hose or a compression fitting for copper pipe. Tek-Tanks will position the elbow in the direction shown on the drawing using a thread sealant / adhesive (Permabond A 131). Should the elbow need to be repositioned then the seal can be easily broken. Repositioning will require a fresh application of either Permabond or a similar sealant / adhesive of which there are many types available.

Feeds should be placed on the top of the tank as with all the other fuel tank fittings if possible. Gravity feed is now really a thing of the past as most modern engines have very good lift pumps. If the tank is a replacement for a gravity fed engine then we will put the feed at the bottom of the tank, but it is not advisable from a “leak potential” point of view. A gravity feed could possibly develop a drip after many years of vibration from the engine whereas a top feed would just show signs of seeping and would probably be easier to see. A total failure of a gravity feed (i.e. a split or worn flexible hose), would almost certainly fill the bilges with diesel.



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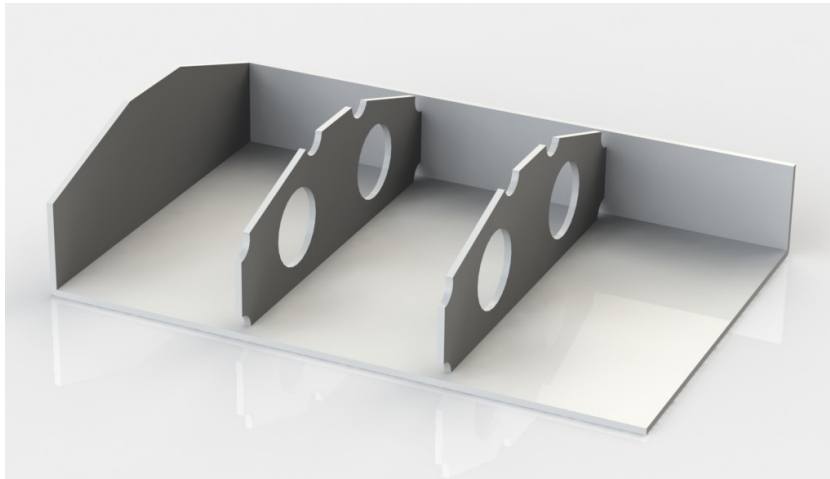
Dip pipes are manufactured from 10mm OD straight copper pipe. The copper pipe is soldered into a brass reducing bush, the banjo fitting is then screwed into the reducing bush and is sealed with a copper or nitrile washer. The whole assembly is then screwed into a ½” BSP boss welded to the tank top or inspection hatch and sealed with a ½” BSP Dowty washer.

Dip pipes are normally left slightly short of the bottom of the tank so as not to pick up any water that may have condensated out or picked up with “bad” fuel. Some engine manufacturers will specify dip pipes on the fuel returns as the more powerful modern engines actually return the fuel back to the tank at quite rate.This high return rate can cause foaming if there is no dip pipe. Return dip pipes are quite rare and can normally be ignored.

AVOIDING BAFFLES

When designing your tank, it is important that the fittings avoid any baffles that we put in. A custom tank can have fittings in almost any position, the only restriction being the baffles. Nearly all custom built tanks will have baffles unless the tank is very small, then it will have none.

The baffle spacing is based upon the length of the tank. All Tek-Tanks custom built tanks have equal baffle spacing where possible. The spacing is normally between 250 and 350mm depending on how the length divides up. For example a tank 1200mm long will have 3 baffles with four compartments 300mm wide. A tank 675mm long will have 1 baffle with two compartments 337.5mm wide. If in doubt about the number of baffles a tank will need, then please phone for advice.



INSPECTION HATCHES

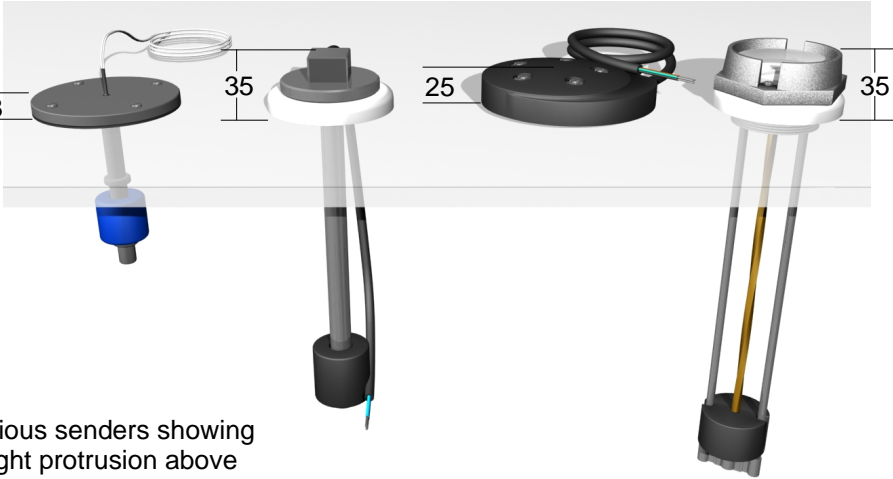
An inspection hatch cannot straddle two compartments. It has to be in one or the other.

For the comprehensive list of hatches, please refer to the **Tek-Tanks Fittings Guide** or phone for advice.

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LEVEL INDICATORS

At Tek-Tanks we use a wide range of level indicators and gauges for remote sensing on tanks.



Various senders showing height protrusion above tanks upper surface

Dimensions in mm

For more details on these units, please visit our webiste or call us.

TANK DRAWING

It is important to provide us with as much information as possible when designing your tank. We will need the overall dimensions and a clear indication of where the fittings are going to go. If the position of the fittings is critical then they will have to be dimensioned from the edges of the tank. If they are not critical then we will put them as near as possible to the position indicated. When positioning the hatch or hatches, just remember to bear in mind where the baffles will be, again give us a call if you are uncertain.

On a very complicated tank with many angles, please indicate any square corners if any. This will help us greatly when we come to draw up the tank on our computer aided design system.

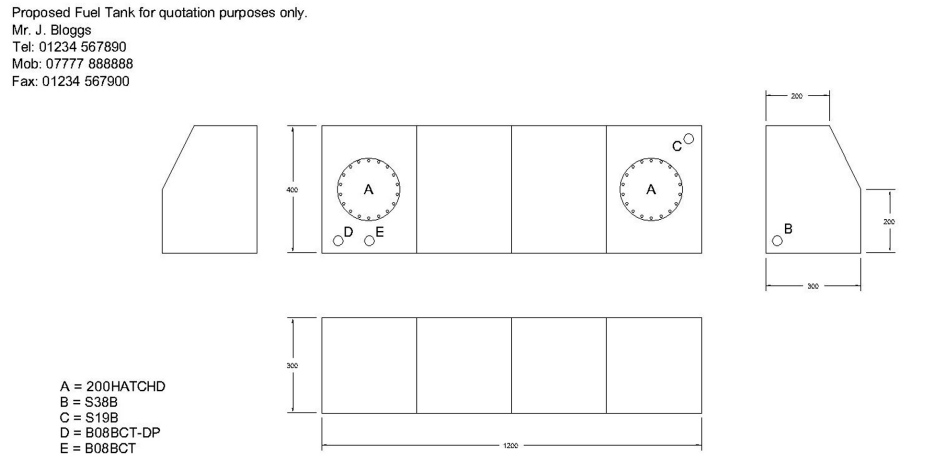
Another method of supplying us with the information we need, is to supply us with a *template* or *mockup* in either plywood or cardboard. By doing this you can satisfy yourself that the tank can be easily installed and that you can actually get it in or out of the boat or vehicle. The template can then be marked up with all the relevant fittings and hatches and either sent to us flat packed or you can bring it along to the factory to discuss in detail.

For quotation purposes a drawing will suffice.

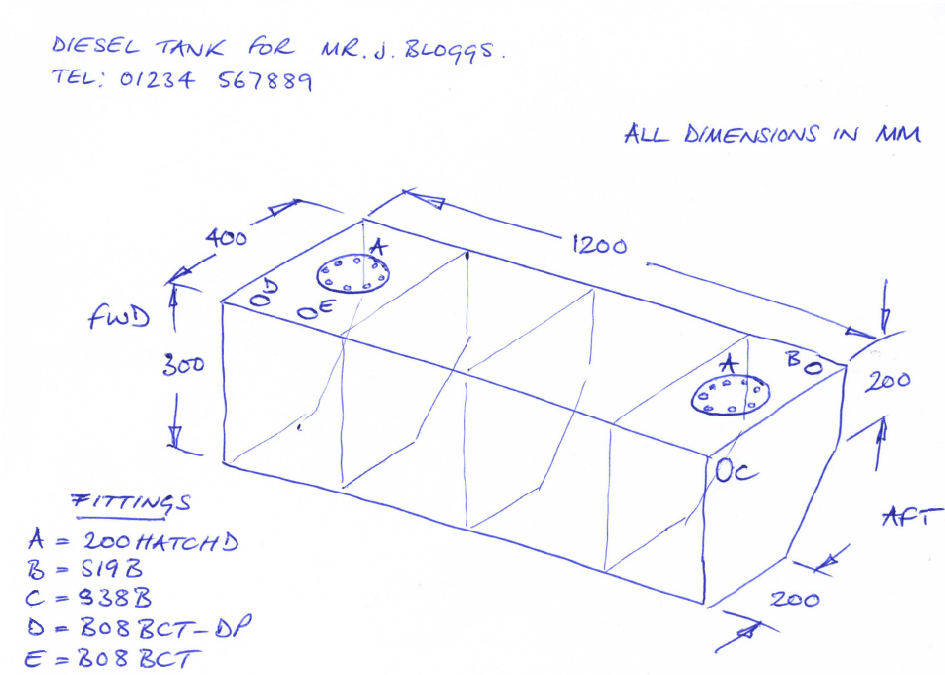
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The following drawing is how we would ideally like the information presented but we do realise that not everyone is a draughtsman and has access to drawing programs. A hand drawn sketch is fine as long as all the information is there.

TANK DESIGN USING COMPUTER



HAND DRAWN TANK DESIGN



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