Gas Tanks- Maintenance & Repair

Frame

THE TORQUE SETTINGS FOR THE VARIOUS FRAME FASTENERS ARE ILLUSTRATED BELOW:

Under normal conditions bolts are torqued using a toque wrench. In order to evaluate the correct toque setting the friction resistance of the thread to nut interface needs to be accurately known. In the automotive engine area where parts are cleaned and fairly greasy, this resistance is accurately determinable.Where tank containers have been in marine conditions the re-torquing of bolts should be carried out by the turn of nut method. This method induces an extension of the bolt by applying prescribed rotation of the nut on the bolt. To be effective the head and the nut must have a solid base to react against. The bolt and connection piece are pulled into close contact called a snug tight condition.
After suitable marks are made so that the subsequent rotation between the bolt and nut may be observed the nut is subjected to appropriate rotation, depending on the grip length. It is important that the grade of bolt is confirmed to be 10.9 where necessary.

With regard to the end frame, the four topmost bolts labelled A in the accompanying sketch are M18 grade 10.9 with a grip length of 13 mm and should be tightened from a snug tight condition to a fully tight position by, turning the nut 100° or one-third of a turn, or two flats.
With regard to the M20 grade 10.9 at position C this has a joint thickness of 24 mm and the nut should be turned from a snug tight position to a fully tight position by turning it to 180° or half of a turn. or three flats.With regard to the conical mounts these should be tightened from a snug position by pre-tensioning the rubber by 2.5 mm.
The 4 bolts holding the plate to the castellated beam are grade 8.8 and these should be torqued to a nominal 420 Nm with a rotational set of 100°, whichever is the greater.
The top bolt on the top centre mount labelled D in the accompanying sketch is an M36 and is fitted onto a rubber bush. The bolt is in shear alone and should only be tightened so that it fits snugly to the washer without unduly squashing the rubber out from underneath it.

Flanges

All the flanges listed below are manufactured in SA 350 LF2 material.

(a) Manlid and cover
(b) Safety relief valve flange
(c) Liquid phase flange
(d) Gas phase flange
(e) Pressure gauge flange
(f) Temperature gauge flange
(g) Rochester gauge flange.

Manlid

The 500 NB manlid is fastened with 20 x M20 studs and nuts.
These studs and nuts are manufactured to the following specification:

Studs : SA 320 Grade L7
Nuts : SA 194 Grade 4

Replacement of Manlid Gasket

The repair procedure is as follows :

1. First ensure that there is no pressure inside the vessel and that the vessel has been properly cleaned or decontaminated.

2. Carefully remove the TIR bars welded between 2 sets of manlid nuts (note: mark the position of these TIR bars in order to refit them correctly).

3. Loosen manhole nuts.

4. Remove manlid cover.

REPLACEMENT

8. Fit manlid cover.

9. Put Loctite thread lock on all the manlid stud threads protruding through the manlid cover. Also put silicone sealant around the bottom of the stud stems to close of the gap between the stud hole and the stud in order to prevent water penetration.

10. Fit the nuts onto the manlid studs and tighten hand tight in cross order sequence.

11. Remove the excess silicone sealant but make sure the gap between the manlid forging is sealed all round with silicone. Use a torque wrench and finally tighten the

FRAME

The frame is a welded construction of low carbon steel elements BS 4360 Grade 50C and 43C.
The frame is designed by Containeering, Paris.IMPORTANT
Although looking the same, the IMO 5 Containeering frame is no interchangeable with the IMO 1 Containeering frame.
The frame is bolted to the vessel through the patented Containeering "Multidirectional Suspension Units".

This design makes for easy separation of the vessel from the frame, whether for maintenance or repairs.

TANK

This tank is a "U" stamp built vessel designed to ASME Section VIII Division 1 code. Any repairs or welding to the tank must be performed by an approved workshop with an "R" stamp (ASME repair) authorisatio registered and approved by an internationa recognised third party inspection authority.Note: It is imperative that a repair procedure manual is requested from the manufacturer befo commencement of a repair.The vessel shell and

5. Remove all traces of silicone sealer on lid and manlid. Take care not to damage painted surfaces. Also avoid damage to the manlid sealing surface.

6. Place gasket into manlid groove. Do not use grease to keep the gasket in position. The gasket and sealing surfaces must be absolutely clean.

7. Put silicone sealer all round the outer perimeter of the manhole forging - apply generously.

manlid nuts in cross order sequence to 250 Nm.

12. Repair all paint damage to the manlid and nuts with a zinc rich primer and top coat paint system or an intermediate and top coat paint system. The vessels are painted with an Hempatex paint made by Hempel, Denmark.

13. Weld the TIR bars back in the positions marked earlier.

Gas Phase Valve Replacement

The gas phase manifold assembly consists of the following components (in sequence from vessel to hose coupling):

(a) Fisher C427T-16-10 (2") internal safety excess flow valve screwed into a bolt on flange.

(b) Stainless 304 40 NB schedule 80 threaded pipe connection.

(c) Fisher 310T-16 (2") globe valve.

(d) Threaded pipe connection in stainless 304 pipe 40 NB schedule 80.

(e) ACME 1 3/4" connector bolted to the threaded plate connection. Body in stainless steel 304L and cap in cadmium plated carbon steel.

Safety Relief Valve

This vessel is equipped with a Mecathermic 140370 (3") or Fort Vale 004/ 23995 safety relief valve in stainless steel 304L.
A rupture disc is fitted. This relief valve can accept an Elfab Hughes RK80 or Continental Disc or equivalent rupture disc without any modification. A pressure gauge is provided on the relief valve body flange.
The relief valve is set to start to discharge at pressure of 22 bar.
The relief valve is bolted to the vessel by means of 8 x M24 stainless bolts - each torqued to 185 Nm. Sealing is obtained by means of a PTFE 3 mm gasket.Should the valve be removed, it is essential during replacement that the stainless TIR bar be welded to 2 adjacent safety relief valve bolts in order to satisfy custom's requirements. A new PTFE gasket must be used every time.

Liquid Phase Valve Replacement

The liquid phase manifold assembly consists of the following components (in sequence from vessel to hose coupling):

(a) Fisher C427T-16-25 (2") safety internal excess flow valve screwed into a bolt on flange.

(b) Threaded pipe connection in 304L 40 NB schedule 80 pipe.

(c) Fisher 310T-16 (2") globe valve.

(d) Threaded pipe connection in 304L 40 NB schedule 80 pipe.

(e) ACME 3 1/4" connector bolted to the threaded pipe connection (d). Body in stainless steel 304L and cap in cadmium plated carbon steel.

Paint

Hempel paint systems are used on both vessel and frame.
The specifics of the Hempel system is clearly indicated under technical specification.
All repairs and touch-ups must be done with compatible Hempel paints.
For the best advise regarding repairs and touch-ups, contact Tankspan

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dished end materials are SA 612.

Sun Shield

No insulation is provided on this IMO 5 tank, but only a sun shield. This sun shield must under no circumstances be removed as this will result in a vessel with a lower MAWP (Maximum Allowab Working Pressure). The reason for this is the design reference temperature stipulated by the IMDG Code : ie. 55°C for a vessel with sun shield and 65°C for a vessel without sun shield. The 22 bar design of this vessel for the products as per product has been done taking this sun shield into consideration.The su shield is made of 2 mm thick aluminium sheeting Grade 5251 H6 (Marine Grade). The rivets used are made of 304L stainless steel.

GASKET

All flanged connection sealing are obtained by using 3 mm thick PTFE gaskets .
All threaded connections are sealed by using Loctite 572 PTFE sealer.

TORQUE SETTINGS

All threaded connections must be carefully tightened until the correct alignment of the respective parts are obtained. DO NOT OVER TIGHTEN THREADE CONNECTIONS. This will lead to damaged threads and improper sealing.