

# TECHNICAL DATA SHEET DS 075

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QCF 56 Issue 3

PAGE

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ISSUE

4

DATE

6 February 2006

APPROVED

A.N.M

TITLE.

Installation Procedure when Replacing Isolators of Type TSC SIZE T3 with New Mountings Beneath a Diesel Propulsion Engine.

Please read in conjunction with leaflet No. PL001 and our installation drawings where applicable.

## **General Notes:**

Isolators comprise of either SG iron or aluminium castings containing four natural rubber elements and a central steel spring.

An adjustable overload and rebound stop unit is fitted and is visible through the "window" in the lower casting. This is adjusted by turning the M24 stud in the centre of the top of the mounting using a flat screwdriver bit, and is secured by the 36mm A/F locknut. But in no circumstances must this be altered, unless instructed by our engineers or as indicated in our arrangement drawings. A 56mm diameter hole should be provided through the machine bedframe at position for access to the stud and locknut.

Each isolator is secured to the machine bedframe with 4 No. M20 screws into tapped holes in the upper casting, and to the deck seating also by 4 No. M20 screws through clearance holes in the base casting. These screws are not supplied by Christie and Grey but must be of sufficient length to accommodate the frame members and shims as required. It is recommended that the fixing bolts be tightened to their correct torque values, but if bolts greater than grade 8.8 grade are used, please consult our Applications Department to discuss the recommended torque values.

The isolators are not designed to accommodate angular misalignment, variations in level, excessive horizontal forces or continuous tensile forces. They are designed for use within ships' engine rooms, but are not usually suitable for prolonged use in corrosive atmospheres without further protection - please consult our applications engineers about problem installation areas or special paint finishes.

We recommend that the vessel is afloat during alignment and installation of the isolators.

## **Procedure:**

- 1) The structure beneath the machine should have been constructed to form a rigid and reasonably level seating for each group of isolators. If the seating is uneven so that a difference of more than 5mm exists between the heights measured at the four corners of a mounting, then rectification should be considered by means of new resin chocks or tapered steel shims.
- 2) The isolators should be examined to ensure they are of the correct variant. If appropriate, the positions for different references should be located in accordance with our drawings.

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- 3). The engine should be first supported on its main jacking screws without the mountings and moved to align the shaft coupling to give the offsets shown on our drawing. Note that the athwartship offset may need to be reversed depending on the direction of rotation of the crankshaft. Place the isolators on the existing prepared seating and insert, but do not tighten, the lower M20 fixing bolts.
- 4). Insert the upper fixing bolts. Ensure a final thread engagement into upper casting fixing holes of 20 to 30 mm. A clearance exists (usually +/- 1.5mm) around both sets of bolts to permit the mounting to be positioned horizontally. If the original fixing holes were not positioned accurately enough to permit easy insertion of the bolts, the holes in the base of the mountings or in the engine foot may be enlarged up to 25 mm diameter, provided that suitable washers are used beneath the bolt heads. When all bolts are in position, tighten the lower bolts to the correct torque but leave the upper bolts loose.
- 5). The engine feet each have two jacking screws which pass through the packing plate that is to be inserted above the mounting (this plate is known as the "proof plate"). Mark the screw heads with a stripe of paint so that their angles can be monitored. Check that the lower ends of the screws are domed so that the engine and mounting will not be forced out of horizontal alignment when turning these screws. The engine weight is now to be transferred from the main jacks to the mountings using these jacking screws in sequence as follows.
- 6). Lower each jacking screws until it is in contact with the mounting upper surface but not applying any load.
- 7). Turn each screw by 180° in sequence around the engine to compress the mountings until one corner main jack becomes free of load but do not allow the coupling alignment to change. **It is essential that all the screws are lowered by the same amount during this process and that screws are only wound downwards. If errors are made, all the screws must be withdrawn so that the full engine weight is taken by the main jacks once more: then start again.**
- 8). Starting at the corner furthest from the unloaded jack, rotate the upper jacking screws by small amounts in proportion to the distance from the unloaded corner, until all the main jacks are just free: the engine alignment should still be unchanged. The clearances above the mountings should then progressively increase away from the first corner.
- 9). Leave the system for 48 hours to allow for primary creep which will cause the engine to settle back onto the main jacks but again without disturbing the coupling alignment. Repeat stages 7 & 8 but with only 60° rotation of the screws to transfer the weight to the mountings again.

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- 10). Measure the average clearance between the engine foot and upper surface of each mounting. To do this take readings at each end of a diagonal across the mounting. For each mounting prepare a proof plate (or pack of shims) with thickness equal to the average clearance at that position. Record the thicknesses for each position.
- 11). At each mounting, turn down the upper jacking screws by just enough to insert the proof plate (or shims). After inserting the plates, release the upper jacking screws to transfer to load onto the plates. Check that the M20 upper fixing bolts may still be turned freely and tighten to their specified torque.
- 12). At this time all the engine weight should be on the mountings, the coupling remaining aligned as our drawing and with the main jacks just in contact. The main jacks may now be withdrawn.
- 13). Adjust the centre bolt in the isolator top so that the clearance above the combined overload and rebound washer is as detailed on the original installation drawings for this application. Tighten the lock nut on the centre bolt to a torque of 200 to 220 Nm.
- 14). The mountings will creep downwards by about 0.8 mm during the first month of service due to an effect called "shakedown" but this is allowed for in the initial coupling alignment setting. At this time the mounting heights should be measured and recorded.
- 15). Thereafter the rate of creep should be much slower. If desired the coupling alignment can be checked after trials and the proof plates (or shims) adjusted to achieve a more accurate setting. However this is not usually required and our engineers should be consulted as to the alignment values to be used at this stage.
- 16). The efficiency of an isolator system can be seriously impaired if the system is connected to rigid pipes, electrical conduits, ducts or shafts. It is essential that such external connections be as flexible as possible, not only to prevent transmission of vibration through the connections and allow the system freedom of movement, but also to avoid possible failure of the connections.

Please contact our Technical Department at the address below if you have any problems relating to installation or selection.



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