SERVICE BULLETIN

Title: V-band/O-ring Joints
Models Affected: All D Series Units

Number: C9107B
Date: 2/4/92
Supersedes: C9107
Date: 7/2/91

Purpose:

To advise the field of the following:

1. New factory practices in the D series compressor v-band/o-ring assembly
2. New procedures for field assembly of v-band/o-ring joints
3. New check out procedure for initial start-up of new machines
4. Field disassembly procedures

File: Compressor–Motor Assembly

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Background:

After looking at the joint design and at returned o-ring/v-band joint survey reports, visiting job-sites, discussing leaks with field technicians, and performing many tests a repair technique for these joints was developed and a new factory process began June 24th, 1991.

Major Design and Assembly Changes:

1. Loctite Gasket Eliminator #515 - A 1/8" bead of 515 is applied at the bottom of the o-ring groove. The o-ring is set in place and another 1/8" bead of Loctite placed on top of the o-ring. A 1/16" bead of Loctite is applied to the flange portion of the joint for additional sealing and moisture penetration prevention. The use of the Loctite product reduces leaks, prevents moisture from entering the joint and causing rust, and also helps hold the o-ring in place during assembly.
2. Radius of the v-band joint - The factory now machines a small radius on the sharp outer corner of the castings (end bell, motor, base, and volute) so that the v-band cannot be hung up by the sharp corner. This is done to improve the seating of the v-band, improve the holding power of the band, and because the band is seating better, reduce the possibility of a loosening v-band during shipment.
3. Changes to the proof and leak test factory procedures - Changes made in this area are designed to reduce the amount of deformation that the v-band might incur during the burst testing of the compressor. Factory leak tests are now performed at 20 psig.

Caution: Field leak tests of all D series machines must be limited to 15 psig leak test pressure (with the rupture disk isolated).

4. Changes to v-band torque and measurement procedures - The factory now torques v-bands to 180 in-lbs (15 ft-lbs) during assembly rather than 125 in-lbs. After the pressure proof and leak tests, the torque is checked and the joint retightened if necessary. Just before the machine is insulated, the torque is checked again and corrected if necessary and recorded along with the depth of the v-band to the joint.

Serial Number Cut-offs:

Machines lower than the following serial numbers were shipped prior to implementation of the new process while those serial numbers listed here and above will have the new factory procedure.

44223, 44224, 44225, 44227, 44229, 44346, 44347, 44348, 44351, 44387, 44388, 44389, 44390, 44391, 44392, 44393, 44394, 44395, 44396, 44400, 44401, 44402, 44420, 44437, 44438, 44439, 44443, 44525, 44526, 44527, 44602, 44603, 44604, 44605, 44622, 44623, 44633, 44637, 44638, 44640, 44647, 44648, 44656, 44657, 44661, 44662, 44664, 44669, 44672, 44678, 44679, 44681, 44692, 44693, 44694, 44699, 44702, 44703, 44709, 44712, 44713, 44715, 44737, 44738, 44739, 44740, 44741, 44744, 44745, 44746, 44750, 44754, 44755, 44756, 44757, 44760, 44767, 44768, 44797, 44798, 44799, 44800, 44802, 44804, 44806, 44807, 44808, 44809, 44810, 44814, 44816, 44817, 44818, 44819, 44820, 44822, 44823, 44828, 44831, 44832, 44833, 44837, 44839, 44840, 44841, 44845, 44846, 44848, 44850, 44856, 44858, 44859, 44862, 44866, 44867, 44868, 44869, 44870, 44874, 44876, 44878, 44880, 44882, 44884, 44887, 44888, 44889, 44891, 44895, 44896, 44898, 44901, 44902, 44903, 44907, 44909, 44911, 44913, 44919, 44912, 44941, 44943, 44945, 44948, 44976, 44977, 44978, 44983, 44995, 45008, 45009, 45010, 45012, 45013, 45014, 45015, 45016, 45022, 45026, 45030, 45032, 45036, 45057, 45058, 45060 & above.....

Field Procedures:

If A Leak Is Suspected - If a leak is picked up using an electronic leak detector on any v-band joint, new or old compressor, the following procedure should be performed:

1. DO NOT TRUST AN ELECTRONIC LEAK DETECTOR! Glue, insulation, paint solvents, etc. can set off a detector. It is prudent to check the joint under vacuum to insure that the detector no longer continues to register the leak. Ultrasonic leak detectors are also suitable for this purpose.
2. MEASURE THE V-BAND TORQUE, JOINT GAP, AND DEPTH READINGS - It is important to understand what the cause of the leak is in order to fix it. Measure the torque on the v-band nuts. It should be 180 in-lbs (15 ft-lbs).

   Examine the gap between the two castings by inserting a small feeler gage in the 1/4" holes that are located around the v-band. Do not remove or loosen the V-band before taking these measurements! It would be best if the joint gap were less than .005", but because the crush on the o-ring in the worst case is at least 0.50", a gap of up to .020" is permissible IF the Loctite 515 is used. The Loctite is able to seal up to 0.030" gaps. If the gap is greater than 0.020", then steps must be taken to re-align the joint.

   If the v-band on the machine does not have at least four holes around the perimeter, then drill 1/4" holes as necessary. There should be one hole at the bottom of the v-band to allow any moisture to drain out.

Next, check the depth of the top of the v-band to the top of the casting joint. This depth should be between 0.200" and 0.270". If this depth is outside the tolerance, get a new v-band. Also, check to be sure the edges of the v-band are not bottoming against the casting.

If these tolerances check out, the cause of the leak could be from moisture penetration and rust, or dry grease on the o-ring, among other things. Do not blame the v-band or the compressor alignment, even if the joint opens when disassembled. Gap measurement is the indicator that re-alignment is necessary.

Field Repair or Assembly Technique:

The following procedure should be followed whenever leaks are repaired, or a compressor is assembled after an overhaul.

Note: Loctite 515 will cure in one to six hours after the joint has been put together. Watch the volute casting alignment and the motor refrigerant drain line alignment to the motor casting! Neither the volute nor the motor will be able to be rotated if the alignment is done after the compressor is together and placed on top of the base. The volute to suction elbow joint should be done first, then put the compressor/motor/end bell joints together, then slide the compressor into the volute and make up this joint last.

1. FILE THE JOINT CORNER - On compressors built before the above mentioned cut off date, check the edge of the casting where the v-band sits for a rounded edge. If the edge is sharp, use a file to just break the edge of the casting so that it is rounded. This will improve the ability

of the v-band to pull and hold the joint together.

2. CLEAN THE CASTING SURFACES - Remove traces of old epoxy, molycoat, or grease on the casting surface. If any trace of old epoxy is left and cannot be removed, use Loctite Primer 'N' to help set up and cure the Loctite 515 to this surface. The primer should be sprayed onto the both faces of the casting surface joint area after the flanges have been cleaned. Primer 'N' should be allowed to dry for at least five minutes before applying the Loctite 515.
3. APPLY LOCTITE 515 - Loctite 515 should be applied in the bottom of the o-ring groove in a 1/8" bead. Wipe the new o-ring clean and install in the groove. The Loctite will help hold it in place. Apply another 1/8" bead of Loctite on top of the o-ring. Now apply a third 1/16" bead of Loctite on the outer flange area of the joint to insure against moisture penetration.
4. PUT THE JOINT TOGETHER, TORQUE AND MEASURE V-BAND: The castings should be brought together and the v-band installed. Apply a light coating of oil to the v-band to help it slide over the castings. Torque the v-band by tightening up both nuts on each side equally. Bring the torque to 90 in-lbs, then use a rubber mallet to tap the v-band around its perimeter. Bring the torque up to 180 in-lbs and tap the v-band again. Measure the torque again and make sure the reading is at 180 in-lbs (15 ft-lbs). Now measure the gap of the joint.

   First, wipe excess Loctite out of the measuring hole then insert a feeler gage. A feeler gage may have to be modified in order to fit into the 1/4" hole. This gap is usually 0.005" or less, but can be up to 0.020" if the Loctite is used. Measure the depth from the top of the v-band to the top of

the castings. The depth should be between 0.200" and 0.270".

Make sure that the edges of the v-band do not bottom out on the casting, or that the v-band nut and bolt are hitting any of the casting surface. Keep track of these readings by writing them on the WAR reports.

5. RE-TORQING THE V-BAND is essential. After some hours the v-band will tend to relax as it settles into the groove. Usually up to two re-torques are required. After the compressor is in place, perform the usual leak test. After the leak test, check the torque on all the v-bands, and bring it back to 180 in-lbs. A dehydration and standing vacuum test of the machine is usually done now. After the dehydration, check the torque again, and retighten if necessary.

Part Numbers:

Loctite 515 Gasket Eliminator

Loctite P/N - 51580 (300 ml Caulking gun tube, enough for 2 compressors)

- 51531 (50 ml tube, enough for 2 joints)

Loctite Primer 'N' P/N - 76456 (small spray can, enough for 1 compressor)

Disassembly Procedures:

CAUTION  **CAUTION**

Do not use a chisel to pry the unopened joints apart, as casting damage may occur.

The castings can be heated and then pried apart using a hydraulic jack. Use the casting rigging holes and bolt holes to add fittings that can be used to pry against with a hydraulic jack. The procedure is to slowly heat the casting joint with a rose-bud tipped torch loosening the Loctite's grip. Then free the casting by using a hydraulic jack to push the joint apart by 1/4 inch. The jack can be placed between the discharge volute pipe and the compressor base to remove the volute, and also between two plates placed on top of the motor casting to pry the end bell off, and the motor casting off. Once the joint is opened up by the jack, a sharp knife or chisel can be used to cut the rest of the joint open. Use a product manufactured by Loctite known as "Liquid Chisel" to remove the old Loctite from the castings.