

Recertification Instructions

(for 14", 17", & 26" Rigging Sheaves)

Receiving and Initial Inspection

- Upon receiving the sheave discuss updates with the customer.
- Fill out the customer information section of **doc. # WTI-43**.
- Note and record any apparent damages or problems.
- Find the serial number of the sheave e.g. (AA-01), located on the manufacturing tag affixed to the wheel and stamped into the plastic cover on the inside of the gate.

Clevis Removal & Disassembly

(For easy identification the numbers in brackets refer to the item number in the corresponding assembly drawing.)

- Remove the spiral pin or cotter pin[1] from the clevis shaft[12].
- Remove the clevis nut[2] by holding it with a 1 ¼" open end wrench and turning the clevis shaft[12] clockwise with a 5/8" socket.
- Remove the clevis assembly from the rigging sheave.
- Insert an 1/8" allen wrench into the set screws[8] and attempt to remove them. If they do not turn easily, insert an expendable allen wrench and heat the wrench with a torch. Do not heat the clevis housing[9]. After the wrench is glowing orange, enough heat should be transferred to the set screw to destroy the thread sealant. After cooling, remove the set screws with a good allen wrench.
- Remove the clevis[14] by clamping the clevis housing[9] securely in a vise with protected jaws, and turning the clevis with the help of a bar passing through the holes.
- Remove the clevis shaft[12] through the top of the clevis housing[9].
- Discard the thrust bearing[11] and thrust washers[10] these must be replaced.
- Press the clevis roller bearing[7] and seal[6] out of the clevis housing and discard.

Sheave Wheel Disassembly

- With a ¼" punch drive the spring pins[34] into the center of the axle shaft[32] and remove them. Use spanner wrenches to remove the axle nuts[33].
- Lay the sheave on a workbench, loading gate[6 or 9] side up.
- Remove the ball-lock pin, or locking safety clip[19] and loading gate pin[20], and open the gate.
- If working on a 26" sheave, remove the side plates[26] and front plate[7].
- Lift the front of the cover[27] over the axle[32] and remove the gate assembly.
- Being careful not to drop the axle[32] or bearings[11], lift the front of the cover[27] far enough for clearance and remove the sheave wheel[15], axle[32], bearings[11], and seals[10].
- Note the condition of the grease on the recertification form.
- Remove the rear plate[25], and the frame[23] from the cover[27].
- Thoroughly clean all parts with parts washer solvent.
- Be sure to keep the parts from this sheave separate from any other parts. Use a crate or box large enough to hold all of the parts during the rest of the recertification. This will ensure the parts are not mixed with parts from another sheave.

Proof Testing

- Determine the required proof test load. This load will be listed in **doc. # WTI-63** Load Rating Chart.
- Proof test the sheave with the approved apparatus, part # TF-203 or similar equipment, If the line load is indicated on the readout stop at ½ of the proof test load the load on the sheave will be double.
- Document the proof test on the recertification traveler.
- Remember to keep the parts from this sheave separate from any other parts as they have now been proof tested.

Updates

- AXLE NUTS - If the axle nuts have only one hole each replace them with ones that have six each (part# RS-1011A) (one with two and one with six is acceptable.)
- AXLE SHAFT - If the lot number of the axle shaft (part# RS-1109) does not start with the letters PH, replace it with one that does.
- BEARINGS (17")
 - If you are re-certifying a 17" sheave and a cylindrical roller bearing is located in the wheel (between the 2 tapered roller bearings), remove and discard the outer and inner races of this center bearing and the alignment spacers on either side of it (if present).
 - If you are re-certifying a 17" sheave and 2 cylindrical roller bearings are located in the wheel (without any tapered roller bearings), be sure to inspect the seals in the outboard sides of these bearings and the hardened spacers which keep the wheel centered.
- BEARINGS (26") - If you are re-certifying a 26" sheave using bearings identified with the numbers LM501349 and LM501310, replace the hub and bearings using the following procedure.
 - Remove the retaining rings from the wheel hub.
 - Use a hydraulic press to remove the hub from the wheel.
 - Replace the hub with the parts contained in Hub Kit B.
 - Replace the retaining rings.
- COVER HOLES - 1 1/8" holes should be drilled in the covers of the sheave near the axle nuts; one to provide a place to insert a grease gun, and two to observe the grease as it extrudes past the seals and flushes contaminants. Refer to **doc. # WTI-22** for more details.
- COTTER PIN - Retain the clevis nut with a cotter pin instead of a spiral pin. Never reuse old cotter pins. The cotter pin should be 3/16" X 2" S/S, part number RS-1378.
- CLEVIS-AWS - If the clevis does not have four recessed slots in the threads to accept two set screws, replace it, (part #RS-1252). If the clevis does not have an o-ring, add an adapter ring, part #RS-1852 and an o-ring, part #RS-1952.
- CLEVIS-EYE - If the clevis does not have four recessed slots in the threads to accept two set screws or does not have a groove for an o-ring, replace it, (part #RS-14/17-1075). Make sure this clevis type is not used on 26" sheaves!
- CLEVIS-HLS - If the clevis does not have four recessed slots in the threads to accept two set screws, replace it, (part #RS-1552). If the clevis does not have an o-ring, add an adapter ring, part #RS-1852 and an o-ring, part #RS-1952.
- CLEVIS-SJ - If the clevis is a Clevis-SJ, part #RS-1052 (this clevis has ears approx. 1/4" thick) replace it with a Clevis-SJ Thick, part # RS-1652 (this clevis has ears approx. 1/2" thick.) Note: Schlumberger requires this change be made to all of its sheaves. If the clevis does not have four recessed slots in the threads to accept two set screws, replace it.
- CLEVIS HOUSING - If the clevis housing does not have two threaded holes for two set screws replace it (part #RS-1053) and add two set screws, part #RS-1068.
- CLEVIS NUT - If the clevis nut does not have a slot in the end replace it (part #RS-1055), and add a cotter pin, part #RS-1378. If the lot number on the part is G3 or less and does not have an H after the number, send it to WTI to have the slot widened and for re-heat treating. For example, G3, G2, G1, F9, F8 need to be re-heat treated. G3H, G2H, F6H, G4, G5, G6 etc. are OK.
- CLEVIS O-RING - If there is no o-ring between the clevis and the clevis housing add an adapter ring, part #RS-1852 and an o-ring, part #RS-1952.
- CLEVIS SHAFT - If the clevis shaft does not have a hole in the end for a cotter pin, replace it, (part # RS-1154). If the hole is not large enough for a 3/16" cotter pin open it with a #10 size drill bit.
- FRAME AND GATE FRAME – If the frame and gate frames have not been machined on the face that contacts the bearings or the four tabs that contact the axle nut send them out for machining to the current drawing.
- GATE STOP- Ensure the loading gate is equipped with a gate stop to keep the gate from being closed too far. Refer to **doc. # WTI-23** for details and procedures to make this modification.
- GATE PIN - If the sheave is equipped with a ball lock pin to lock the loading gate, replace it with the parts in the Gate Pin Kit, part # RS-1516.
- SAFE WORKING LOAD TAG - Add or if damaged replace the Safe Working Load Tag. See **doc. # WTI-67** for a description and location of this tag. This tag is not used on Baker Atlas sheaves.

- TAGS - Add or replace any missing or damaged tags or labels on the sheave. See **doc. # WTI-22** for a description and location of each. . If the inspection tag or manufacturing label list a different safe working load than the “Safe Working Load Tag” replace it with new ones. No loads listed on any tags should differ from **doc. # WTI-63**.
- WHEEL/HUB - If the wheel does not have a key-way, slot the hub and the wheel and add a woodruff key according to the instructions in **doc. # WTI-64**.

NOTE: All of these updates are to be made available to the customer free of charge. Customers or distributors can exchange parts for updated ones by arrangement with Kenn Dayton at 1-800-743-2831. See **doc. # WTI-44** for details.

Upgrade

- SEALED BEARINGS - If the customer wishes to upgrade to a sealed hub system, which does not require periodic re-greasing, contact WTI for parts and refer to **doc. # WTI-72** for instructions. Make sure the cover is changed to a yellow one and the new hub, sealing plates, and o-rings are handled with care.

Contact the Customer

- At this point document any and all repair or replacement conditions.
- Discuss upgrade and update requirements with the customer.
- Document the changes to be made on the recertification form.

Non-Destructive Testing

- Visually inspect all load bearing components for cracks or damage.
- Inspect bearings for any damage including but not limited to: wear, discoloration from heat, fretting or flaking, brinelling (indentation of the rollers into the races), pitting, or corrosion. Replace any bearings, which have any of these indications.
- Visually inspect the wheel for damage. If there are any cuts or chips larger than 0.25” use dye penetrant to check for any cracking. Replace the wheel if any crack is present.
- Inspect the wheel groove for wear. See figure 1. Insert a radius gauge corresponding to the original groove size listed in **doc. # WTI-16**. If the groove has worn more than 20%” from its original form, recommend wheel re-grooving to the customer. Wheels can be re-grooved up to 0.250” deeper than their original dimension. Minimum diameters at the bottom of the groove are 11.75” for 14” sheave, 14.75 for 17” sheave, and 23.5” for 26” sheave. If the wheel cannot be re-grooved within these parameters, recommend replacement.

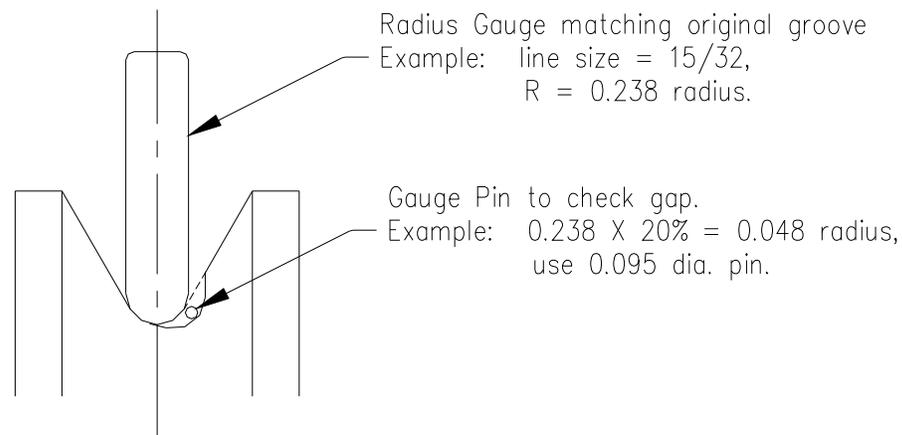


Figure 1. Wheel Groove Inspection

- Perform a magnetic particle inspection on the load bearing components. Follow procedures in ASTM E 1444. For the cast components, (frame, gate frame, and loading gate, cast clevis for Schlumberger) inspect per SAE AMS-STD-2175 and reject parts that do not meet the grade C quality level. For the machined components, (axle shaft, clevis nut, clevis shaft, clevis housing, and clevis) inspect per SAE AMS-STD-1907 and reject parts that do not meet the grade C quality level.
- Inspect the axle shaft to determine that it is still straight and round within 0.015”. If not, replacement is recommended.

- Replace any discrepant parts, identify them as scrap, and segregate them from the assembly area.

Document Changes

- If proof testing or non-destructive testing has revealed any defects, inform the customer of the need to replace the parts.
- Document the changes to be made and record all lot and serial numbers of the components.

Re-Assembly

1. Clevis Re-assembly

- Press a new clevis roller bearing[7] into the clevis housing, recessing it 0.18” below the surface.
- Press a new clevis bearing seal[6] into the clevis housing[9], by hand. Make sure the seal is recessed into the clevis housing far enough so it won't be damaged as the clevis rotates.
- Lubricate both bearings[7,11] by packing with No. 2 EPHT grease.
- Install a new thrust washer[10], then a new thrust bearing[11], then another new thrust washer onto the clevis shaft[12]. Make sure they are fully seated on the head of the shaft.
- Add additional grease to the smooth section of the clevis shaft[12] and install it into the clevis housing[9]. Be sure the thrust bearing[11] and washers[10] remain in their proper place on the shaft.
- Install a new o-ring[13] over the threads of the clevis[14]. If the clevis does not have a groove to accept an o-ring, replace it with one with a groove or add an o-ring with an adapter ring.
- If the end of the clevis[14] is hollowed out, fill this cavity with grease.
- Reinstall the clevis[14] by tightening it completely into the housing[9], then backing it off till the holes in the clevis housing align with the recesses in the clevis threads.
- Coat the threads of the set screws[8] and tapped holes in the clevis housing[9] with Loctite #7471 primer, per the instructions on the bottle, and let dry 30 min.
- Coat the threads of the set screws[8] with Loctite #638 thread locker, per the instructions on the bottle, and install them in the clevis housing[9]. Be sure they align with the slots in the threads of the clevis[14] and recess below the surface of the housing.
- Make sure the clevis shaft[12] still rotates freely.
- Reinstall the clevis assembly into the rigging sheave with the clevis washer[5] and shock cushion[3] in their proper places.
- Thread the clevis nut[2] on the clevis shaft[12] and tighten till the clevis assembly is secure but still free to rotate.
- Turn the clevis shaft[12] till its hole aligns with the slot in the clevis nut[2] and install a new cotter pin[1]. Bend each leg of the pin around the nut as far as possible.

2. Wheel / Bearing Re-assembly

- Slide the frame[23] back into the frame cover[27] and replace the rear plate[25]. Use permanent thread sealant such as Permatex Locks Studs on the threads.
- Lubricate the bearings[11] by pressure packing or hand packing with No. 2 EPHT grease.
- Place the sheave on the workbench, gate[6 or 9] side up.
- Assemble the sheave wheel[15], axle shaft[32], bearings cones[11], and nilos grease rings[10]. If the sheave is being upgraded to sealed use the sealing plates[10] and o-rings[18,30] instead of nilos rings and pack cavity full of grease.
- Pull open the frame cover[27] and install the parts listed in the previous step, with the grease fitting[18] in the wheel[15] facing up, inserting the axle shaft[32] through holes in the frame[23] and the cover. Take care not to damage the nilos grease rings[10].
- Keep the cover[27] open and install the gate assembly under the cover and onto the axle. Then pull the cover over the axle.
- Place an adjustable axle nut[35] (one with 2 holes instead of 6 is acceptable here) on the axle shaft[32], opposite the gate side, and tighten it until it is flush with the end of the axle shaft. Align the holes with the slots in the end of the shaft.
- Install two new spiral pins[34] in this axle nut and drive them flush with the inside of the axle shaft. Always use new spiral pins to ensure secure locking.
- Place the other adjustable axle nut[35] on the other end of the axle shaft[32]. Using a torque wrench attached to an adapter (P/N TF-242) tighten it firmly to seat everything. Loosen the nut then tighten it to 150 in. lbs. for 14” or

17" sheaves, 250 in. lbs. for 26" sheaves. If the hole in the axle nut is lined up with the hole in the axle the spiral pin can be installed. If not tighten until the very next set of holes and slots align.

- Install two new spiral pins[34] into these holes and drive them flush with the inside of the axle shaft.
- Place the sheave back on the workbench, gate side up, and reinstall the rest of the aluminum parts[7, 26] with button head screws[4, 5]. Use permanent thread sealant such as Permatex Locks Studs on the threads.
- Drill holes in the cover[27] as shown in **doc. # WTI-22**.
- Turn the wheel[15] until the grease fitting[18] is accessible through the hole in the cover[27]. Grease the sheave with a grease gun using No. 2 E. P. grease, until grease extrudes past both nilos grease rings. It may be necessary to lift one side of the wheel to allow grease out of both sides.
- Verify smooth wheel[15] rotation and easy gate pin[20] insertion.
- Verify the shroud, if present, is 1/16" or less from the wheel[15]. Bend it closer with a heavy rubber mallet if not, but do not allow it to rub on the wheel when the gate is closed and the gate pin[20] is installed.
- Replace lanyards[22] if damaged.

Final Inspection

- Have someone, other than the person who conducted the recertification or repairs, conduct a final inspection to the sheave, utilizing the Final Inspection Checklist, **doc. # WTI-18**.

Documentation

- Stamp the date into the inspection tag on the cover of the sheave.
- Make sure the Recertification Form (**doc. # WTI-43**) is complete, signed, and dated.
- Send a copy of this Recertification Form (**doc. # WTI-43**), the Proof Test Certification (similar to **doc. # WTI-38**), the Final Inspection Checklist (**doc. # WTI-18**), and the Repair Invoice to WTI to be filed with the sheaves permanent records. Return the sheave to the customer along with a copy of the Proof Test Certification and the Recertification Form and an owner's manual.
- If the sheave is a non-sealed sheave (shielded bearings) remind the customer to re-grease the sheave monthly, as this flushes contaminants and moisture from the bearings, and to return the sheave in one year for its next recertification.