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# RUGBY<sup>®</sup> HOIST CYLINDERS SERVICE BULLETIN

This bulletin applies to the following hoist models:

LR-310	LR-26B	HR-550
LR-3510	LR-26C	TH-3512/TB-8
LR-3510A	LR-27B	TH-410/TB-10
LR-416	LR-623	TH-522/TB-12
LR-416B	LR-28A	TH-544/TB-14
LR-165	LR-2066	TH-5550/TB-16
LR-165A	LR-2355	TH-650/TB-18
LR-25	LR-2866A	TH-660/TB-20
LR-25A	HR-520	
LR-525	HR-540	

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# Warnings

**WARNING:** Installing or operating this hoist without first understanding the proper installation and operation procedures can lead to serious injury or death. **Always** read and understand fully all installation and operation manuals before installing or operating this equipment.

**WARNING:** Welding, oxy-fuel cutting, or grinding sparks can cause fuel to ignite which in turn can lead to injury or death. **Always** take adequate steps to avoid ignition of fuel from fuel tanks when welding, grinding, or oxy-fuel cutting during equipment installation.

**WARNING:** Heat from the truck's exhaust system can cause hydraulic component failure and may lead to a fire which could cause injury or death. **Always** install equipment in locations where heat from the exhaust system will not damage any hydraulic component.

**WARNING:** Being under a raised body can result in serious injury or death should the body inadvertently descend. **Never** position yourself or allow others to position themselves under a **loaded** body. **Always** prop the **unloaded** body up using the body prop or body props supplied. **Remember** body props are to be used only on an **unloaded** body.

**WARNING:** Malfunctioning equipment can cause property damage, injury or death. **Always** have faulty equipment repaired before continuing its use. If required, consult the manufacturer.

**WARNING:** Overloading of a truck can cause truck component damage or an accident which may cause injury or death. **Never** exceed the gross vehicle weight (GVW) or the gross axle weight (GAW) rating of your vehicle or trailer.

**WARNING:** The inadvertent shorting of the truck's electrical supply can cause a fire or equipment damage that could lead to injury or death. **Always** disconnect the vehicle battery prior to installing, servicing or repairing the pump.

**WARNING:** Connecting the hoist to a hydraulic system with more pressure (psi) or flow (gpm) than is recommended by the hoist manufacturer can cause the hoist to fail during the dumping of a load. This could lead to damage, serious injury, or death. **Be sure** you have the correct pressure and flow. Consult the manufacturer if you do not know the recommended pressure and flow.

**WARNING:** Adjusting the hydraulic pressure to more than the recommended setting may cause the hoist to fail during the dumping of a load. This could cause damage, serious injury, or death. **Never** adjust the pressure on your own. Consult the manufacturer if the hydraulic pressure is in question. Have only a qualified person set the hydraulic

pressure. **Never** adjust the pressure to more than the recommended amount.

**WARNING:** Fluid under pressure can pierce the skin and enter bloodstream, causing serious injury or death. **Always** wear eye protection and protective clothing when working around hydraulic systems.

**WARNING:** Damage to brake lines during equipment installation, or installing bolts or equipment in such a way that the line will rub and become damaged can lead to brake failure which can cause an accident and can lead to severe injury or death. **Always** take adequate steps to prevent brake line damage during installation and isolate brake lines from installed equipment.

**WARNING:** Never install a cable on a truck while the body is raised without first blocking, bracing, or propping the body up to prevent the body from inadvertently falling when the control valve lever is moved. A falling body will result in serious injury or death if the control valve lever is moved while someone is under the non-supported body.

**WARNING:** Do not raise or drive a raised body against a power line. Bring body in contact with a power line or power source will result in serious injury or death by electrocution.

**WARNING:** Do not raise or drive a raised body against another object. Doing so could result in equipment damage or property damage, bodily injury or death.

**WARNING:** Do not dump while on uneven ground or if vehicle is in an uneven position from side to side. Dumping unevenly can cause vehicle to overturn and cause equipment or property damage, personal injury, or death.

**WARNING:** Stay clear of dump body when dumping. Moving vehicle parts or the moving load could cause injury or death.

**WARNING:** Check load making sure that rocks or any other object will not spill out of vehicle while transporting load. Falling objects can cause equipment damage or property damage, bodily injury or death.

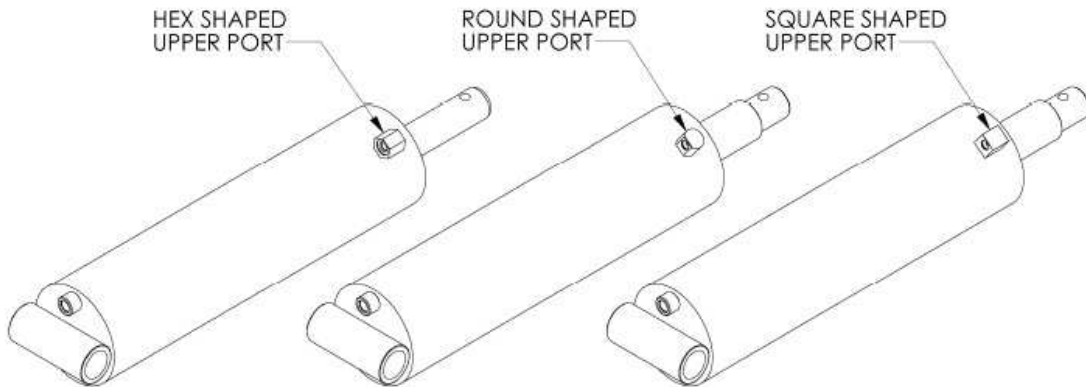
**WARNING:** Make sure all doors are closed and latched before moving vehicle. Swinging doors or falling objects can cause equipment or property damage, bodily injury or death.

# Cylinder Identification

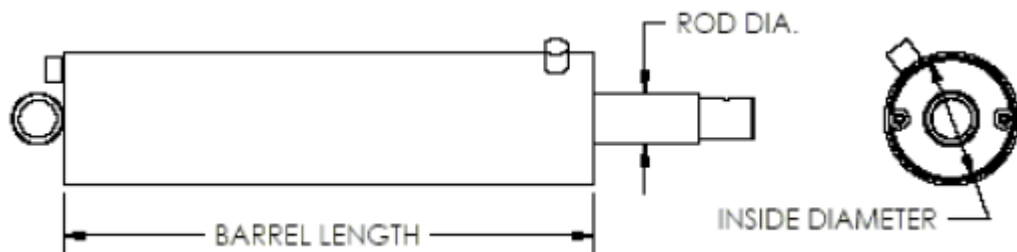
**NOTE:** When ordering replacement parts, it is necessary to determine what cylinder you have. Use the following steps and chart to select the correct Seal Kit #.

1. Determine the model of hoist you are repairing. There should be a decal on the hoist indicating the “Hoist Model”.
2. Determine whether the port at the rod end of the cylinder is hexagonal, round or square shaped. This is the “Upper Port Style” and is needed to determine who manufactured the cylinder.

**NOTE: If port style is round shaped, the barrel length measurement and/or build date of the cylinder will be critical for selecting the correct Seal Kit #.**  
**Cylinders with round upper port styles built after 1/27/2010 will require the same Seal Kit # as square port style cylinders. Refer to charts on pages 7 & 8.**



3. If you have a LR-26B or LR-2066 with a round port, you will need to determine the rod diameter. If the rod is necked down at the end, measure the larger diameter after the necked down feature.



4. Refer to the charts to select the Seal Kit #. The charts contain extra information to help you further verify that you are selecting the correct kit.

**HEX PORT STYLE – BUILD DATES PRIOR TO 2/2002**

<b>Hoist Model</b>	<b>Upper Port Style</b>	<b>Seal Kit Part #</b>	<b>Cylinder Part #</b>	<b>Rod Diameter</b>	<b>Inside Diameter</b>	<b>Stroke Length</b>	<b>Barrel Length</b>
LR-310	Hex	<b>1656161</b> (03 2565)	1656155 (03 2555)	1.5	3.0	10.0	14.56
LR-3510	Hex	<b>1656162</b> (03 2568)	1621263 (03 2572)	1.5	3.5	10.0	14.56
LR-416	Hex	<b>1656160</b> (03 2560)	1667217 (10 0540)	2.0	4.0	16.0	21.00
LR-165	Hex	<b>1656152</b> (03 2552)	1656145 (03 2542)	2.0	5.0	16.0	21.25
HR-520	Hex	<b>1656152</b> (03 2552)	1621474 (10 0528)	2.0	5.0	16.0	21.25
LR-25	Hex	<b>1656152</b> (03 2552)	1621258 (03 2536)	2.0	5.0	20.0	25.25
HR-540	Hex	<b>1656152</b> (03 2552)	1312235 (10 0537)	2.0	5.0	20.0	25.25
LR-2355	Hex	<b>1656152</b> (03 2552)	1621262 (03 2571)	2.0	5.0	23.0	28.25
LR-525	Hex	<b>1656152</b> (03 2552)	1655266 (03 1412)	2.0	5.0	25.0	30.33
LR-26B old LR-2066 old	Hex	<b>1656158</b> (03 2558)	1656151 (03 2551)	2.0	6.0	20.0	25.68
LR-28A LR-2866A	Hex	<b>1656156</b> (03 2556)	1656149 (03 2549)	2.5	6.0	28.0	33.33
LR-27B	Hex	<b>1656163</b> (03 2570)	1667266 (10 0709)	2.0	7.0	20.0	25.68

**ROUND PORT STYLE – BUILD DATES 2/2002-1/2010**

<b>Hoist Model</b>	<b>Upper Port Style</b>	<b>Seal Kit Part #</b>	<b>Cylinder Part #</b>	<b>Rod Diameter</b>	<b>Inside Diameter</b>	<b>Stroke Length</b>	<b>Barrel Length</b>
LR-3510 TH-3512/TB-8	Round	<b>1656169</b> (03 2577)	1621276 (03 2572)	1.5	3.5	10.0	14.56
LR-416	Round	<b>1656170</b> (03 2578)	1315035 (10 0547)	2.0	4.0	16.0	21.00
LR-416B TH-410/TB-10	Round	<b>1656170</b> (03 2578)	1621265 (03 2586)	2.0	4.0	16.0	21.00
LR-165	Round	<b>1656171</b> (03 2579)	1656145 (03 2542)	2.0	5.0	16.0	21.25
HR-520 TH-522/TB-12	Round	<b>1656171</b> (03 2579)	1621474 (10 0528)	2.0	5.0	16.0	21.25
LR-25	Round	<b>1656171</b> (03 2579)	1621258 (03 2536)	2.0	5.0	20.0	25.25
HR-540	Round	<b>1656171</b> (03 2579)	1312235 (10 0537)	2.0	5.0	20.0	25.25
LR-2355	Round	<b>1656171</b> (03 2579)	1621262 (03 2571)	2.0	5.0	23.0	28.25
TH-544/TB-14	Round	<b>1657017</b> (03 2832)	1621269 (03 2767)	2.25	5.0	21.0	26.25
HR-550	Round	<b>1657023</b> (03 2838)	1315043 (03 2775)	2.25	5.5	20.0	25.62
LR-26B old LR-2066 old	Round	<b>1656172</b> (03 2580)	1656157 (03 2551)	2.0	6.0	20.0	25.68
LR-26B current LR-2066 current	Round	<b>1656173</b> (03 2581)	1621268 (03 2690)	2.5	6.0	20.0	25.68
TH-5550/TB-16	Round	<b>1656173</b> (03 2581)	1621266 (03 2588)	2.5	6.0	19.0	24.33
LR-623 TH-650/TB-18	Round	<b>1656173</b> (03 2581)	1621264 (03 2576)	2.5	6.0	23.0	28.33
LR-28A LR-2866A	Round	<b>1656173</b> (03 2581)	1656149 (03 2549)	2.5	6.0	28.0	33.33
TH-660/TB-20	Round	<b>1657019</b> (03 2834)	1656788 (03 2589)	2.75	6.0	29.0	34.33
LR-27B	Round	<b>1657020</b> (03 2835)	1667266 (10 0709)	2.0	7.0	20.0	25.68

**Notes:**

**-For round ports, verify barrel length measurements and/or build dates before selecting Seal Kit.**

**-Round port style cylinders manufactured after 1/2010 require the same Seal Kit # as cylinders with the square port style.**

**SQUARE OR ROUND PORT STYLE – BUILD DATES AFTER 1/2010**

<b>Hoist Model</b>	<b>Upper Port Style</b>	<b>Seal Kit Part #</b>	<b>Cylinder Part #</b>	<b>Rod Diameter</b>	<b>Inside Diameter</b>	<b>Stroke Length</b>	<b>Barrel Length</b>
LR-3510 TH-3512/TB-8	Square OR Round	<b>1694945</b> (03 3055)	1621263 (03 2572)	1.5	3.5	10.0	14.69
LR-416B TH-410/TB-10	Square OR Round	<b>1621272</b> (03 3056)	1621265 (03 2586)	2.0	4.0	16.0	21.03
HR-520 TH-522/TB-12 LR-165A	Square OR Round	<b>1621273</b> (03 3057)	1621474 (10 0528)	2.0	5.0	16.0	21.53
HR-540	Square OR Round	<b>1621273</b> (03 3057)	1312235 (10 0537)	2.0	5.0	20.0	25.53
LR-2355	Square OR Round	<b>1621273</b> (03 3057)	1621262 (03 2571)	2.0	5.0	23.0	28.53
TH-544/TB-14 LR-25A	Square OR Round	<b>1621274</b> (03 3058)	1621269 (03 2767)	2.25	5.0	21.0	26.16
HR-550	Round	<b>1488386</b>	1315043 (03 2775)	2.25	5.5	20.0	25.53
LR-26B LR-26C LR-2066	Square OR Round	<b>1621275</b> (03 3059)	1621268 (03 2690)	2.5	6.0	20.0	25.53
TH-5550/TB-16	Square OR Round	<b>1621275</b> (03 3059)	1621266 (03 2588)	2.5	6.0	19.0	24.53
LR-623 TH-650/TB-18	Square OR Round	<b>1621275</b> (03 3059)	1621264 (03 2576)	2.5	6.0	23.0	28.53
LR-28A LR-2866A	Square OR Round	<b>1621275</b> (03 3059)	1621270 (03 2888)	2.5	6.0	28.0	33.53
TH-660/TB-20	Square OR Round	<b>1621276</b> (03 3060)	1656788 (03 2589)	2.75	6.0	29.0	34.53
LR-27B	Square OR Round	<b>1764332</b>	1667266 (10 0709)	2.0	7.0	20.0	25.94

**Notes:**

**-For round ports, verify barrel length measurements and/or build dates before selecting Seal Kit.**

**-Round port style cylinders manufactured after 1/2010 require the same Seal Kit # as cylinders with the square port style.**



# Cylinder Seal Repair

1. Remove cylinder from hoist frame.

**NOTE:** The cylinder should be disassembled in a clean environment to prevent dirt or other contamination from entering the interior of the cylinder. Clean any accumulated dirt or debris from the port openings and rod guide area. Remove the port plugs and drain any oil from the cylinder. Do not reinstall the port plugs at this time. No special tools are required for disassembly. Items that should be at hand are a vise, flat punch, hammer, emery cloth, clean oil, clean paper towels or shop towels and wrenches for removal of the guide retaining Cap Screws and the piston nut.

2. Remove the two rod guide retaining Cap Screws and washer that are installed in the face of the rod guide.
3. After removing the guide retaining Cap Screws, secure the cylinder in a vise at about the midpoint of the wall. Do not excessively tighten vise on wall or it will be difficult to pull piston past deflected area of wall. Place the punch on the face of the rod guide and gently tap on the punch with the hammer to drive the rod guide into the cylinder bore. Drive the rod guide inside the bore until the front face of the rod guide is just past the retaining ring. Use fingers to remove retaining ring from groove in wall. A screwdriver can be used to lift the retaining ring out of the groove also. Be very careful not to scratch any part of the cylinder bore as a scratch may damage the piston seal upon assembly.
4. Use the emery cloth to remove any burrs that are present along the retaining ring groove in the cylinder bore. This will make it easier to remove the rod guide and piston, and help prevent damage to the seals when re-installing.
5. Pull the rod vigorously outward and allow the piston to bump the rod guide. If there is high resistance to piston movement in the area of the vise jaws, the vise is probably too tight. The momentum of the rod should be sufficient to pull the rod guide and piston from the cylinder barrel. Be careful not to mar the chromed surface of the rod.

**NOTE:** The piston seal and the rod guide static seal will likely be cut by the edge of the retaining ring groove on removal from the barrel. This is normal and cannot be avoided on disassembly.

**NOTE:** The nut does not need to be removed unless there are indications that the seals between the rod and piston are leaking. These do not normally wear out.

6. To loosen and remove the 1" piston nut from a 3" or 3-1/2" bore cylinder, a 1-1/2" socket is required.
7. Remove the piston nut and piston.
8. Remove the rod guide from the rod.

**NOTE:** DO NOT remove seals from the head gland and piston at this time.

9. Check the cylinder tube for scoring. If small nicks are present the tube can be repaired by honing. If serious scoring is present, the tube must be replaced.
10. Check all parts for wear and replace if necessary.

**NOTE:** Clean all parts before assembly. Change oil in the hydraulic system.

11. Note the position and orientation of the seals on the piston and rod guide before replacing them. Be careful to not scratch the seal grooves when removing the old seals. The seals can be removed with a sharp tool like an awl by carefully pushing the point partially into the seal and prying the seal from the groove. Hard seals can be removed by carefully cutting the seal apart with a utility knife or an x-acto knife.

**NOTE:** The seal kit you receive will have the necessary seals for your cylinder, but may have extra seals depending on the exact cylinder you have. The best way to insure that the proper seals are used and installed correctly is by removing one old seal and immediately replacing it with a new seal of the same size. This procedure is then repeated until all seals are replaced.

12. Inspect the seal grooves and clean away any contamination. Apply a light coating of clean oil to the new seals and into the seal grooves to ease installation and prevent scuffing of the sealing surfaces.
13. Assemble the rod guide onto rod.
14. Assemble the rod guide and piston onto the rod. Install and tighten the piston nut to the required torque.
  - a. Tighten 1" piston nut to 400ft-lbs.
16. Apply a light coating of clean oil to the piston and guide OD and to the mouth of the cylinder barrel. Carefully position the piston so that it is centered and square with the cylinder wall mouth. Once started, push firmly until the piston is about half way down the length of the cylinder bore. Carefully push the rod guide into the cylinder bore until the front face of it clears the retaining ring groove. Be careful to not mar the chromed rod surface. Install the rod-guide retaining ring into the groove and be certain that it is completely nested into the bottom of the groove. Pull the rod outward until the piston contacts the rod guide. Continue to pull on the rod until the

rod guide is firmly in position against the retaining ring. Install rod guide retaining Cap Screws and washers.

- a. Tighten 5/16" Cap Screws to 33ft-lbs.
- b. Tighten 3/8" Cap Screws to 37ft-lbs.

17. Check cylinder for external leaks using rated hydraulic pressure. Any leaks should be evident after the cylinder has been pressurized for one minute. Remove pressure from cylinder. If the seals are oil tight, the cylinder is ready for service.

**WARNING:** Keep away from jets of high-pressure oil. High-pressure oil jets can penetrate skin and cause severe injury or death.

18. Re-install cylinder in hoist frame.

