# H0028 Overhauling Lyco Cylinders

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## How to identify a Lyco Cylinder

There is an identification groove in the rod and base.

## Lyco Cylinder Part Numbers

| Model | Part Number | Description |
|---|---|---|
| SB300 | HC-25806 | Cylinder Hyd Bottom Lift |
| | HC-25807 | Cylinder Hyd Top Lift L/H |
| | HC-25808 | Cylinder Hyd Top Lift R/H |
| | HC-25805 | Cylinder Hyd Stabiliser Extn |
| | HC-25809 | Cylinder Hyd Stabiliser Tilt |
| | | |
| SB330 | HC-22565 | Cylinder Hyd Traverse |
| | HC-31629 | Cylinder Hyd Bottom Lift |
| | HC-25807 | Cylinder Hyd Top Lift L/H |
| | HC-25808 | Cylinder Hyd Top Lift R/H |
| | HC-25805 | Cylinder Hyd Stabiliser Extn |
| | HC-25809 | Cylinder Hyd Stabiliser Tilt |
| | | |
| SB360 | HC-31628 | Cylinder Hyd Bottom Lift (Type 2) |
| | HC-25801 | Cylinder Hyd Bottom Lift (Metric Type 1) |
| | HC-25802 | Cylinder Hyd Top Lift |
| | HC-25803 | Cylinder Hyd Top Lift Ext Reach |
| | HC-25805 | Cylinder Hyd Stabiliser Extn |
| | HC-25804 | Cylinder Hyd Stabiliser Tilt |

| Model | Part Number | Description |
|---|---|---|
| | | |
| SB361 | HC-32283 | Cylinder Hyd Bottom Lift |
| | HC-32279 | Cylinder Hyd Top Lift |
| | HC-32287 | Cylinder Hyd Stabiliser Extn |
| | HC-32285 | Cylinder Hyd Stabiliser Tilt |
| | | |
| SB401 | HC-32283 | Cylinder Hyd Bottom Lift |
| | HC-32281 | Cylinder Hyd Top Lift |
| | HC-32287 | Cylinder Hyd Stabiliser Extn |
| | HC-32285 | Cylinder Hyd Stabiliser Tilt |

## Follow these instructions to overhaul Lyco cylinders

### Visual Inspection

1. Check the elbow fitting for any signs of leakage or cracks (Figure 1).
2. Check the rod eye and exposed rod for any type of damage (Figure 1).

Figure 1

3. Check the manifold for damage (Figure 2).
4. Check welds for any sign of cracks or leaks around the welded joint (Figure 2).
5. Check the base eye for any sign of damage (Figure 2).

Figure 2

## Test the Cylinder

1. Extend the cylinder rod to inspect for dents, scratches or score marks (Figure 3). Check around the rod and gland seals, elbow and manifold for any sign of leakage.

Figure 3

2. Remove locking grub screw from gland (Figure 4).

Figure 4

3. Locate ‘C’ Spanner on top of gland.
   Locate pin into location hole in side of gland (Figure 5).

Figure 5

4. To disassemble, place a sling through the eye of the cylinder and hang vertical from a crane (Figure 6).
   Unscrew the gland until it is completely free of the tube thread.
   Note: If disassembling horizontally, place a stand under the rod to take the weight of the rod assembly.

Figure 6

## Remove Rod Assembly and Inspect Internally

1. Raise the rod assembly and check the piston seals for any sign of contamination and place rod assembly onto wooden ‘V’ blocks.
2. Clean the tube with clean rags and inspect for any scoring. If scoring is found, either it may be possible to hone out, or replace the tube assembly or cylinder (Figure 7).

Figure 7

## Dissemble Rod Assembly

1. Remove worn piston seals from the piston (Figure 8).

Figure 8

2. Locate the rod assembly into the fixture to remove the piston by machine/torque multiplier (Figure 9).

Figure 9

## Torque Machine

1. Locate the rod eye firmly and neatly so as it will not rotate whilst unscrewing the piston (Figure 10).
   Note: The pin needs to be a neat fit to avoid eye damage when unscrewing.

Figure 10

2. Locate the piston torque jig into existing holes in the base of the piston and unscrew the piston from the rod (Figure 11).

Figure 11

## Remove Gland from Rod and Inspect Gland Seals

1. Remove all seals and thoroughly clean the gland (Figure 12).

Figure 12

## Rod Inspection

1. Thoroughly clean and inspect the rod to ensure there are no dents, scratches or score marks (Figure 13). If dents, scratches or score marks are found, either repair if possible, or replace the rod assembly.

Figure 13

## Gland Assembly

1. Thoroughly clean all seal grooves and blow down using compressed air.
2. Replace all gland seals using the specified seal kits, detailed in Table 1 (Figure 14).

Figure 14

3. Lubricate the internal seals and wear rings using a standard hydraulic oil, AWS Hyspin 46 or equivalent (Figure 15).

Figure 15

Table 1: Piston seals, glad seals, rod wiper and wear rings

| Piston Seals | |
|---|---|
| SB360<br>SB330<br>SE400 | ▪ Hallite 83 Series (5 piece piston set)<br>▪ Nitrile rubber sealing element<br>▪ Split plastic anti-extrusion rings<br>▪ Glass filled nylon wear rings |
| SB361 | ▪ DSA Seal (5 piece piston set)<br>▪ Rubber molded sealing element<br>▪ Split polyester anti-Extrusion rings<br>▪ Polyacetal wear rings. |
|  | |
| | |
| Gland Seals | |
| SB360<br>SB330<br>SE400 | ▪ Hallite 605 Series (Hythane, Twin lipped Seal) |
| SB361 | ▪ Hallite 621 Series (Hythane, twin lipped seal with energiser) |
| | |

| Rod Wiper | |
|---|---|
| SB360<br>SB330<br>SE400<br>SB361 | ▪ Hallite 520 series (Polyurethane snap in wiper)<br>▪ “O” Ring<br>▪ 70Duro Nitrilerubber |
| | |
| Wear Rings | |
| SB360<br>SB330<br>SE400<br>SB361 | ▪ Hallite type 533 series (Glass filled 33%, Nylon 67% wear ring) |

## Rod Assembly

1. Use a tapered sleeve to guide the seals onto the rod (Figure 16).

Figure 16

2. Clean the rod thread and apply Rocol nickel anti-seize, or similar, to eliminate piston/rod seizure during the torque process (Figure 17).

Figure 17

3. Clean the piston threads and fit a new nylon locking ring to bottom of the thread area.
4. Screw the piston onto the rod thread by hand and wind up until the piston contacts the nylon ring (Figure 18).

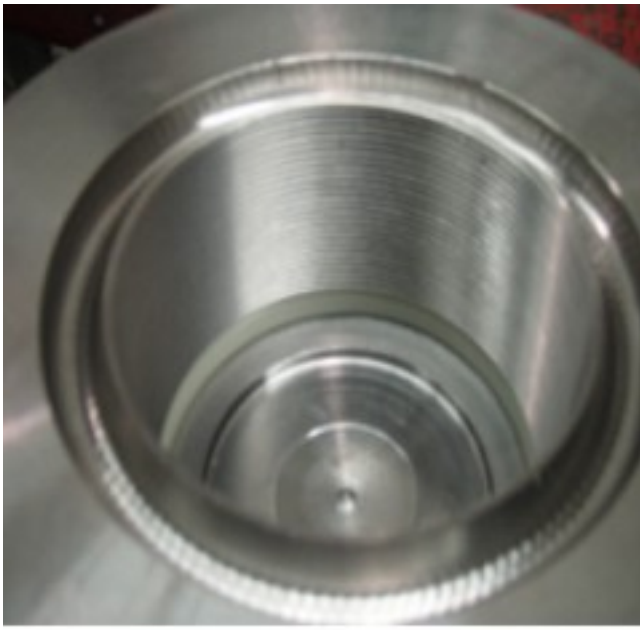

Figure 18

## Piston Assembly

1. Locate the fixture into the locating holes in the bottom of the piston.
2. Torque the piston onto the rod to the required settings using machine or torque multiplier (Figure 19). Refer to Table 2 for the correct torque settings.

Figure 19

Failure to apply the correct torque settings could result in severe damage to the Sidelifter or to personnel.

Table 2: Torque Settings

| Bore size | Rod size | Thread | Torque Nm |
|---|---|---|---|
| 8.0” | 4.0” (101.6) | 3.75”12 TPI UNF | 24,232 Nm |
| 7.0” | 3.5” (88.9) | 2 15/16” 16 TPI UNF | 14,838 Nm |
| 6.0” | 4.0” (101.6) | 2 15/16” 16 TPI UNF | 10,100 Nm |
| 6.0” | 3.5” (88.9) | 2 15/16” 16 TPI UNF | 11,621 Nm |
| 5.0” | 2.5” (63.5) | 1 15/16” 16 TPI UNF | 5,147 Nm |
| 4.0” | 3.0” (76.2) | 1 15/16” 16 TPI UNF | 1,893 Nm |
| 4.0” | 2.5” (63.5) | 1 15/16” 16 TPI UNF | 2,599 Nm |
| 2.5” | 1.5” (38.1) | 1 1/8” 12 TPI UNF | 385 Nm |

## Cylinder Assembly

1. Thoroughly clean the barrel internally and spray the thread area with Rocol Nickel Anti-seize.
2. Lubricate the bore of the cylinder tube with hydraulic oil for ease of rod assembly (Figure 20).

Figure 20

3. Thoroughly lubricate the piston seal and the gland static seals with hydraulic oil (Figure 21).

Figure 21

4. Screw the gland down until it firmly seats on the face of the tube. The nominal torque required is 500 N/m (Figure 22).

Figure 22

5. Fit the grubscrew to the gland. Use Loctite 277 thread locker when fitting (Figure 23).

Figure 23

## Leak Testing for all Steelbro Cylinders

### Objective

To ensure there are no oil leaks from welds, port and seals on all Steelbro cylinders.

### Procedure

All Steelbro cylinders are to be tested for hydraulic oil leaks. Follow this testing procedure:

1. Connect cylinder ports to the hydraulic test bench.
2. Cycle cylinder both ways to fill with oil.
3. Test cylinder in retraction to 500 PSI.
4. Hold pressure for at least two minutes.
   - Visually inspect all welded joins for leaks.
   - Visually inspect rod seal and gland static seal for oil leaks.
5. Test cylinder in extension to 500 PSI, repeat Step 4.
6. Test cylinder in retraction to 5000 PSI.
7. Hold pressure for at least two minutes.
   - Visually inspect all welded joins for leaks.
   - Visually inspect rod seal and gland static seal for oil leaks.
8. Test cylinder in extension to 5000 PSI, repeat Step 7.
9. Repair and make good any leaks found, and then retest the cylinder following this procedure.
10. Purge cylinder of hydraulic oil with air.
    - Remove cylinder from testing bench.
    - Fit steel plates to cylinder ports to prevent oil leaks.

## Relief Bypass System

Note: only on bottom lift cylinder.

**O-ring seal**

**Bypass hole. O-ring sealing face**