S0016 Wear Limits for Chain Slings and Lifting Lugs

S0016	Version 2	Structural	August 2012

Refer to document T0001 for details of applicable loads for physical testing of Steelbro chain.

The lifting lugs consist of 4 main components as pictured in figure 1.0.

1. Lifting Chain
2. Lifting Hook pin
3. Lifting Hook.
4. Roll pin (LH or RH)

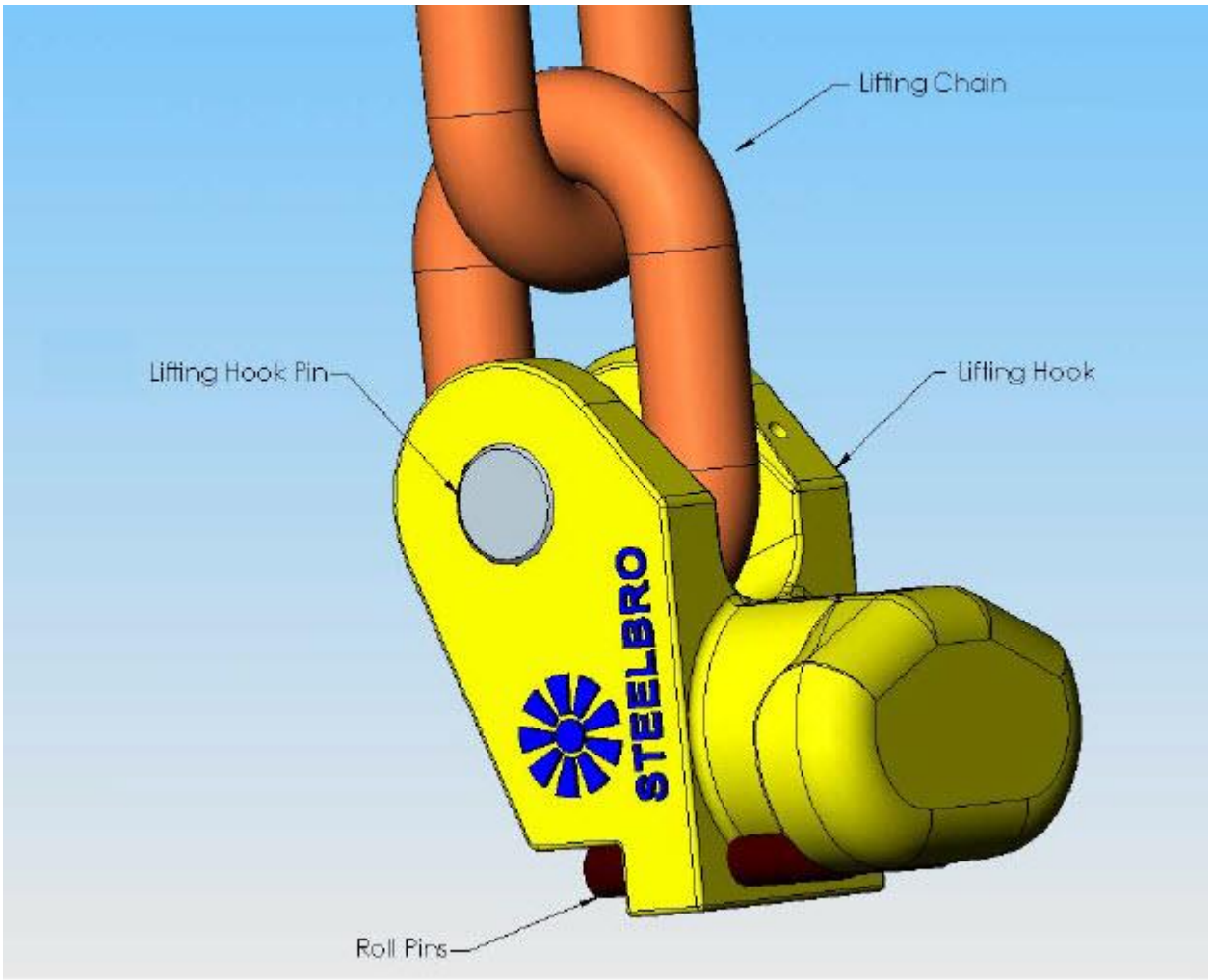


FIGURE 1.0: Lifting lug components.

20mm Lifting Chain:

Chain is manufactured from hardened and tempered steels to meet the critical requirements of this grade and has a high resistance to impact and wear. The useful life of Steelbro chain slings can be extended by the following practices:

1. Store chains on A frames or Wall racks in a clean dry place when not fitted to Steelbro Sidelifters.
2. Lightly oil chains before prolonged storage.
3. Never allow chains to become exposed to extreme heat.
4. Always visually inspect that a chain sling is free from damage or wear before use.
5. Ensure the load is evenly distributed on all sling legs during lifts.
6. Ensure the chain is free from twists and is protected from sharp corners on the load.
7. Commence the lift slowly, taking up the slack gradually.
8. Avoid crushing chain with the load when the load is lifted onto the Sidelifter by other means.

Inspections:

It is important to inspect chain slings regularly. The inspections should include the following:

1. Inspect every individual chain link for signs of wear, twisting, stretching, nicks or gouging.
2. Any worn link should be measured to determine the degree of wear.
3. Oblong links should be inspected for signs of wear at their load bearing points and for any signs of distortion.
4. Hammerlocks should be inspected for:
   a) Any signs of wear at their load bearing points.
   b) Excessive play of the load pin within the body halves.
   c) Impaired rotation of the body halves around the pin.
5. Chain links or fittings having any defects should be clearly marked to indicate rejection and the chain sling withdrawn from service until properly repaired.

Chain Wear allowances Grade 80 (Refer Figure 2.0):

	Minimum Permissible Diameters	
Chain Size (mm)	Crown (mm)	Elsewhere (mm)
10	8.0	8.5
13	10.2	10.8
16	12.8	13.6
20	16.0	17.0

Chain Wear allowances Grade 100, stamped "VIP" (Refer Figure 2.0):

	Minimum Permissible Diameters	
Chain Size (mm)	Crown (mm)	Elsewhere (mm)
10	9.0	9.0
13	11.7	11.7
16	14.4	14.4
20	18.0	18.0

Master/Oblong link Wear allowances Grade 80 and 100:

	Minimum Permissible Diameters	
Chain Size (mm)	Crown (mm)	Elsewhere (mm)
16	14.4	14.4
20	18.0	18.0

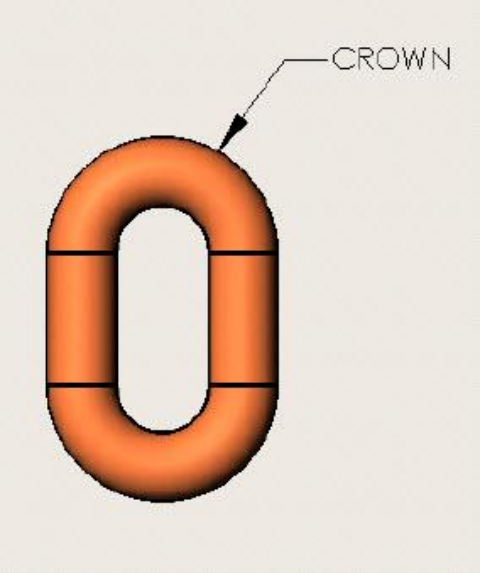


FIGURE 2.0: Chain illustration showing crown

Lifting Hook Pin:

The lifting hook pins are an alloy steel, which is heat treated to produce a high strength material. These pins are strong but not malleable and will not tolerate large amounts of deflection. The pins should not freely rotate due to the roll pin locking mechanism used however the chain should be free to move around the pin.

Safe use of these pins, requires regular inspections of the pins. Inspections that are required are as follows:

1. Inspect the chain is free to move around the pin.
2. Inspect the pin for wear and gouging.
3. Inspect pin for deformation.

Pin Wear Allowance:

Pin diameter (mm)	Minimum permissible diameter (mm)
22	**21**

If pin wear exceeds the specified allowance then pin must be replaced.

Lifting Hook:

The lifting hook is cast from high-grade steel. The lifting hook has 4 main areas, which are; the clevis ears, the shaft, the shaft ears and the body. They are shown in figure 3.0 below. The lifting hook requires regular inspections.

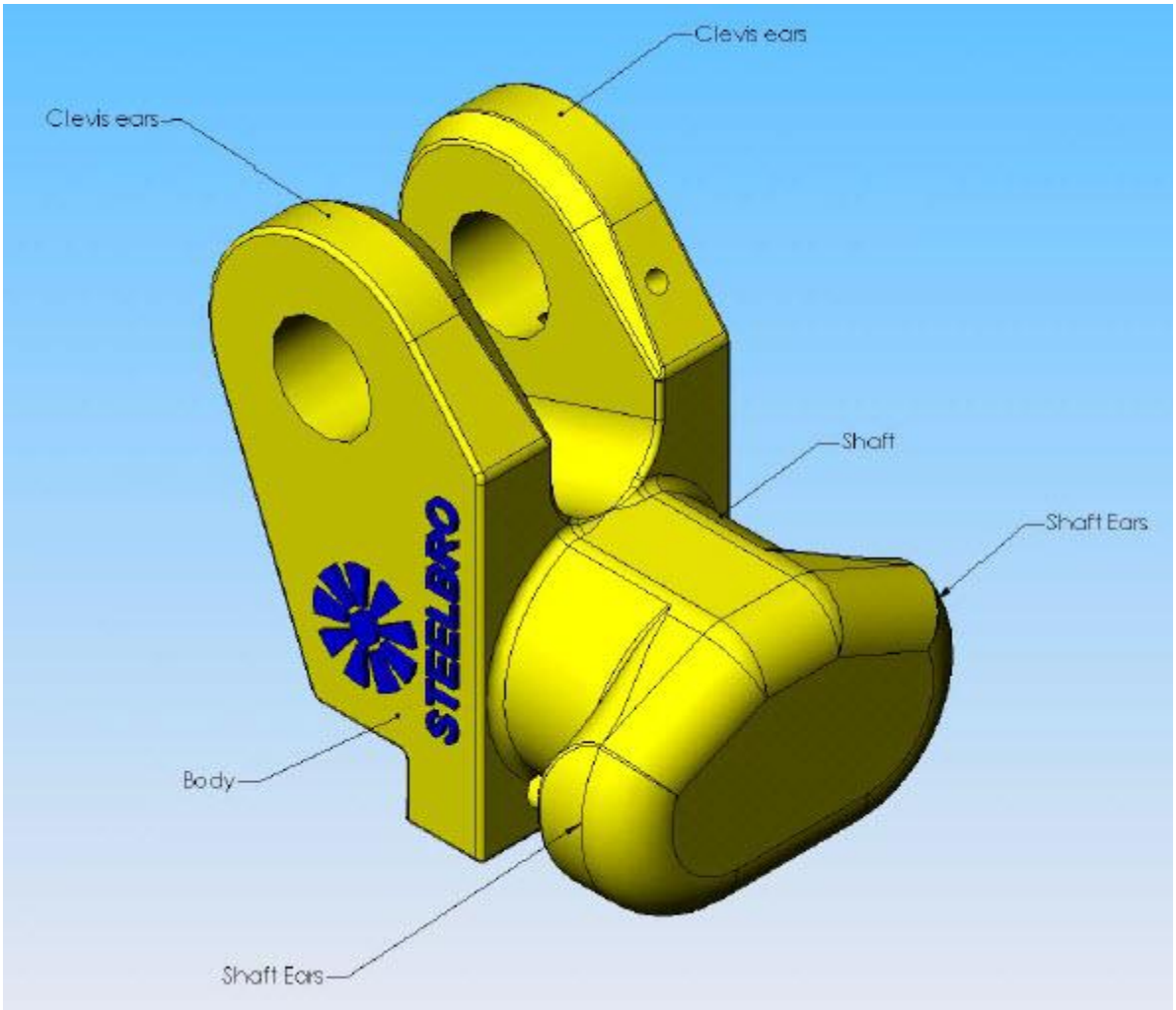


FIGURE 3.0: LIFTING HOOK

The Clevis Ears Inspections:

The clevis ears require the following inspections to be carried out daily:

1. Inspect for cracking around the pin holes in the clevis ears.
2. Pin holes should be inspected for flogging out.
3. Clevis ears need to be inspected for widening.
4. Binding should not exist between the lifting chain and the clevis ears, or the lifting hook body.

Wear allowances for Clevis ears:

	Chain Size	Maximum Permissible size	Minimum Permissible Size
Gap between Clevis ears (mm)	16	19	16
Gap between Clevis ears (mm)	20	23	20
Pin Hole flogging mm)		Ø 23.5	

Lifting hooks exceeding the above stated allowances must be discarded and replaced.

The shaft Inspections:

The shaft requires visual inspection of its surface for cracking (specifically where it joins the body and shaft ears), gouging and deformation. If surface defects (previously stated) exceed 50% of surface then the part must be discarded and replaced.

The shaft ears:

These require inspection for cracking (particularly where they join the shaft) and gouging of the ears. No deformation of the shaft ears is tolerated but a wear allowance of 2mm is allowed. If the shaft ears do not conform to the wear allowance or have deformed then the lifting hook must be replaced.

Roll pins for LH/RH operation:

Roll pins must be inspected for deformation of any type (out of roundness, gouging, bending along shaft, etc). If deformation exists in the roll pins then they should be replaced immediately.

Sidelifter Lifting pin (G pin):

This pin is not specified as lifting gear but must be inspected along with the lifting gear. There are two types of G pin:

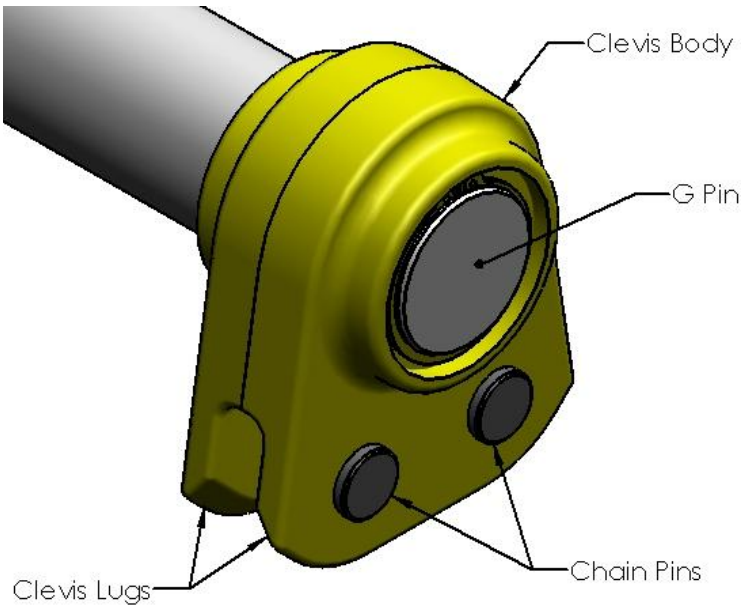
- Master/Oblong link type
- Clevis type

The following inspections are required on both types:

1. Rotating the G pin to insure free rotation occurs and no binding is occurring.
2. Surface inspection for signs of wear on the G pin.
3. Visual inspection of G pin circlip and circlip groove to check for any damage.

If the G pin has bound up and does rotate freely and/or surface wear is seen on the G pin then the specified Steelbro service agent should be contacted. If circlip is damaged then immediate replacement is required.

Further Clevis Type checks



Clevis type G pins require these further inspections:

CHAIN PINS - The chain pins are an alloy steel, which is heat treated to produce a high strength material. These pins are strong but not malleable and will not tolerate large amounts of deflection. The pins should not freely rotate due to the roll pin locking mechanism used however the chain should be free to move around the pin.

Safe use of these pins, requires regular inspections of the pins. Inspections that are required are as follows:

1. Inspect the chain is free to move around the pin.
2. Inspect the pin for wear and gouging.
3. Inspect pin for deformation.

Pin Wear Allowance:

Pin diameter (mm)	Minimum permissible diameter (mm)
22	**21**

If pin wear exceeds the specified allowance then pin must be replaced.

CLEVIS LUGS - The clevis lugs require the following inspections to be carried out weekly:

1. Inspect for cracking around the pin holes in the clevis lugs.
2. Pin holes should be inspected for flogging out.
3. Clevis lugs need to be inspected for widening.
4. Binding should not exist between the lifting chain and the clevis lugs, or the clevis body.

Wear allowances for Clevis Lugs:

	Chain Size	Maximum Permissible size	Minimum Permissible Size
Gap between Clevis lugs(mm)	16	19	16
Gap between Clevis lugs(mm)	20	23	20
Pin Hole flogging mm)		Ø 23.5	

Units exceeding the stated allowances must be discarded and replaced.