

hydratight

Hydratight Limited
Bentley Road South
Darlaston
West Midlands
WS10 8LQ
United Kingdom

Tel: +44 121 50 50 600

Fax: +44 121 50 50 800

E-mail: enquiry@hydratightsweeney.com

Website: www.hydratightsweeney.com

**DOUBLE ACTING
HYDRAULIC NUT
HNDA6157000B OM Rev 1**

**Operation and Maintenance
Instructions**



www.boltup.com

HYDRATIGHT and BOLTUP are registered trademarks of Hydratight Limited

Contents

SAFETY NOTES	3
OPERATION OF THE HYDRAULIC NUT	5
Tightening Procedure for Double Acting Hydraulic Nut	5
Trouble Shooting Guide	6
MAINTENANCE INSTRUCTIONS	7
Precautions to Replace Hydraulic Seals.....	7
Inner Seal.....	7
Outer Seal	8
Hydraulic Fittings	8
STORAGE OF EQUIPMENT	10
Hydraulic Nut.....	10
Hydraulic Harness and Hoses	10
Air/Hand Driven Pump	10
General Arrangement Drawing	11
Technical Data Sheet	13
Pressure Load Graphs	14

Safety Notes

High pressure hydraulics should be treated with respect. Please ensure that the following basic rules are followed:

1. ALWAYS WEAR SAFETY GLASSES when working near a pressurised hydraulic system. Your eyesight is important – **PROTECT IT**.
2. Suitable footwear and gloves should be worn when operating this equipment.
3. ALWAYS check the following points before pressurising a hydraulic system:
 - a) Check that the hydraulic harness is fully connected. There should be no loose ends and every male nipple should be connected to its corresponding female coupling.
 - b) Check that each female coupling is securely locked in position on the corresponding nipple by physically pulling the connection.

IT IS DANGEROUS TO PRESSURISE THE BACK OF AN UNCOUPLED QUICK DISCONNECT NIPPLE OR COUPLING. ALL CONNECTIONS MUST BE CONNECTED OR BLANKED OFF BEFORE PRESSURISING.

- c) Check that the bolt material is capable of taking the initial load to be applied. The tools are powerful and are capable of yielding or breaking bolts if tensile/yield properties are not sufficient to support the load applied.
 - d) Check that there is sufficient bolt protrusion above the joint face and ensure that when screwed onto the bolt the hydraulic nut mates with the joint face.

Note

Thread engagement should be a minimum of that stated on the attached data sheet.

4. NEVER exceed the maximum working pressure specified for the equipment (see data sheet).

Note

The maximum safe working pressure specified for the tool does not necessarily represent the maximum safe load that may be induced in the bolt.

5. NEVER exceed the maximum extension quoted for the equipment (see data sheet).

Note

An indicator will appear when the tool is close to maximum extension.

6. ALWAYS take care when pressurising a system. Always observe the gauge and be ready. Pressure can rise faster than you think.
7. NEVER leave a pressurised system unattended. If you must leave the area release the pressure and ensure that the return to tank valve on the pump unit is fully open.
8. NEVER bend the hydraulic hoses less than six times their own diameter. Do not use kinked hoses.

9. NEVER stand in line with the bolt axis whilst tensioning is in progress.

Note

Personnel must be aware of this point at all times.

10. When working on site the work area should be roped off and all personnel not connected with the site operation should be kept clear of the working area.
11. High pressure hydraulic equipment can be very dangerous if misused. Keep away from oil leakages at high pressure. Liquid escaping from highly pressurised equipment has sufficient power to penetrate the skin, which can cause blood poisoning. In the case of such an accident IMMEDIATE medical attention must be sought.

REMEMBER:

TAKE CARE! HIGH PRESSURE HYDRAULICS ARE PERFECTLY SAFE IF THE BASIC SAFETY RULES ARE FOLLOWED.

PLEASE NOTE:

MODIFICATION TO ANY EQUIPMENT COVERED BY THIS MANUAL SHOULD NOT BE ATTEMPTED BY THE CUSTOMER.

IF MODIFICATIONS ARE REQUIRED TO SUIT A SPECIFIC APPLICATION, CONSULT HYDRATIGHT LTD BEFORE MAKING THEM.

INAPPROPRIATE MODIFICATIONS MADE RENDER THE EQUIPMENT DANGEROUS.

Operation of the Hydraulic Nut

Tightening Procedure for Double Acting Hydraulic Nut

To install the double acting hydraulic nut on to a bolt proceed as follows, refer to drawing HNDA6157000B as necessary.

1. The hydraulic nut is shipped with 9/16"-18UNF blanking plugs fitted in the hydraulic ports. To remove the blanking plugs use a wrench 19mm (3/4") to suit the across flats of the hexagon. Fit appropriate adaptors / connections have a pressure rating of 700 bar (10000 psi).
2. Check that the bolt has been assembled correctly, and that there is sufficient bolt protrusion to engage fully with the hydraulic nut (see data sheet).
3. Screw the fully assembled hydraulic nut onto the bolt.
4. Use the six tightening holes provided in the outside diameter of the hydraulic nut body to screw the hydraulic nut down tightly to the joint face.

Note

Ensure that the ram in contact with the joint face is fully retracted, by checking that there is no gap between the joint face and the hydraulic nut body.

5. Check that the hydraulic nut is seated squarely on the joint face, if it is not then this must be investigated and corrected.

Note

Out of squareness will result in uneven loading.

6. Screw the return ram reaction device on to the stud, ensure the ram is fully retracted. There should be no gap between the top of the ram and the hydraulic nut body.
7. Connect the hydraulic system to the tool(s). Ensure both main pressure port and return pressure port circuits are complete and secure.

Note

If all the hydraulic nuts in the system are not being tightened simultaneously then a sensible tightening sequence should be used. If in doubt consult Hydratight Limited for advice.

Trouble Shooting Guide

Problem/Symptom	Probable Cause	Corrective Action
Oil is leaking from the hydraulic connection.	The connection is not seating properly.	Tighten the connection. Where applicable replace connection components (see general arrangement drawing).
Oil is leaking from the hydraulic valve block or check valve.	Holding screws not tight, or damaged 'o'-rings.	Tighten the screws. Where applicable replace 'o'- rings (see general arrangement drawing).
Oil is leaking from the hydraulic nut body.	Seal failure.	Change the seals.
The hydraulic nut ram will not retract.	<ol style="list-style-type: none">1. Oil return to tank valve is not open.2. One of the connections is not connected properly.	<ol style="list-style-type: none">1. Ensure that the oil return to tank valve is fully open.2. Check that the hydraulic connections are secure.

Maintenance Instructions

The tool is of rugged construction and utilises reliable seals. The only maintenance that may be occasionally required is the replacement of seals or repair of a hydraulic fitting.

It is strongly recommended that in the event of seal failure these hydraulic nuts are returned to Hydratight Limited for seal replacement, if this is not possible then the enclosed procedure should be followed.

Precautions to Replace Hydraulic Seals

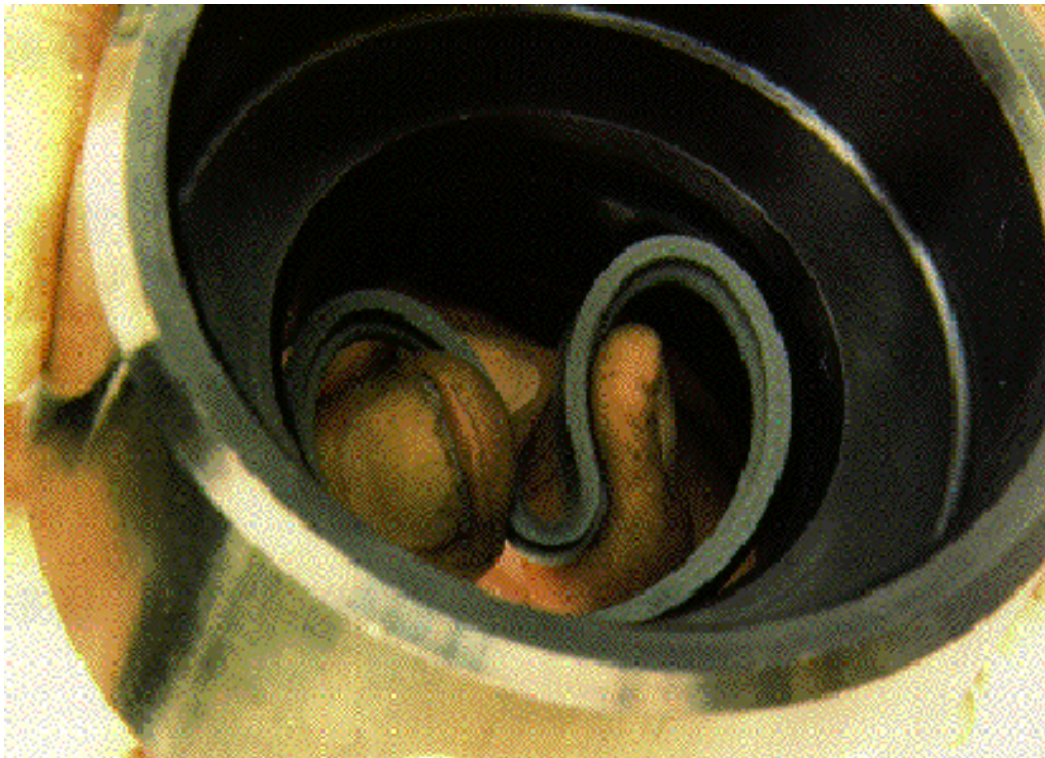
The following precautions must be taken with the assembly of the hydraulic seals:

1. Avoid sharp edges (cover threaded areas).
2. Remove all dust, dirt, swarf and foreign particles.
3. Do not use sharp edged tools.
4. Lubricate all components before assembly.

Inner Seal

1. Insert rubber 'o'-ring into the seal groove.

Insert inner seal as shown in illustration below with the chamfer adjacent to seal groove retaining lip chamfer, i.e. facing pressure. Fold out on top of the 'o'-ring removing any kinks in the seal.



Outer Seal

1. Stretch the rubber 'o'-ring over the seal groove retaining lip of the ram in to the seal groove.
2. The outer seal can be chamfered on one face or both faces. In the case of one chamfer the seal must be inserted with the chamfer adjacent to the ram seal groove retaining lip chamfer, i.e. facing pressure. If the seal is chamfered on both faces then the seal can be inserted either way. Locate part of the outer seal in the seal groove and work around the outside diameter (see illustration below) stretching the seal over the seal groove retaining lip until it finally slips completely in to the seal groove.



Hydraulic Fittings

Hydraulic connections are of the following types:

1. Hydraulic nut body – the main connections in the tool are 9/16"-18 UNF female thread with a spot face for sealing on a bonded seal. If there is a slight leak it can usually be solved by applying the correct torque of 22.6-27.1 Nm or 200-240 lbf.in.
2. Hydraulic nut body – the venting ports in the tool are 1/8" BSP female thread, the seal is effected by tightening the blanking plugs against the link hole shoulder creating a metal to metal seal. A seal is effected by applying a torque of 40-50 Nm or 354-443 lbf.in.
3. Hydraulic nut body – the hydraulic port link hole end plugs are M8 x 1.25 socket set screws. The seal is effected by tightening the grub screw on to a ball bearing that seals

against a shoulder. Applying a torque of 18.0 Nm or 160 lbf.in. should be sufficient to create a seal.

4. Valve Block to body – the seal is effected by compressing three ‘o’-rings. These ‘o’-rings need to be compressed evenly. Gradually tighten the four M6 socket head cap screws, using a male 5mm across flats hexagon key, eventually reaching a torque of 16.0 Nm or 142 lbf.in. on each screw.
5. Check valve to valve block - the seal is effected by compressing three ‘o’-rings. These ‘o’-rings need to be compressed evenly. Gradually tighten the four M4 socket head cap screws, using a male 3mm across flats hexagon key, eventually reaching a torque of 3.5 Nm or 31 lbf.in. on each screw.

Note

If problems persist then the threads should be checked and repaired if possible. If the threads cannot be repaired the component part(s) will need replacing. In the event of any further problems please consult with Hydratight Limited for advice.

Storage of Equipment

Hydraulic Nut

1. Store tools fully retracted.
2. The finish will protect the tools from rust etc but for added protection a light coating of oil or rust inhibitor should be applied to all plated surfaces.
3. Cover the internal threads on the inside of the collar and adjusting collars with a rust inhibitor.
4. Store tools upright.
5. Keep dust caps on the oil inlet nipples.

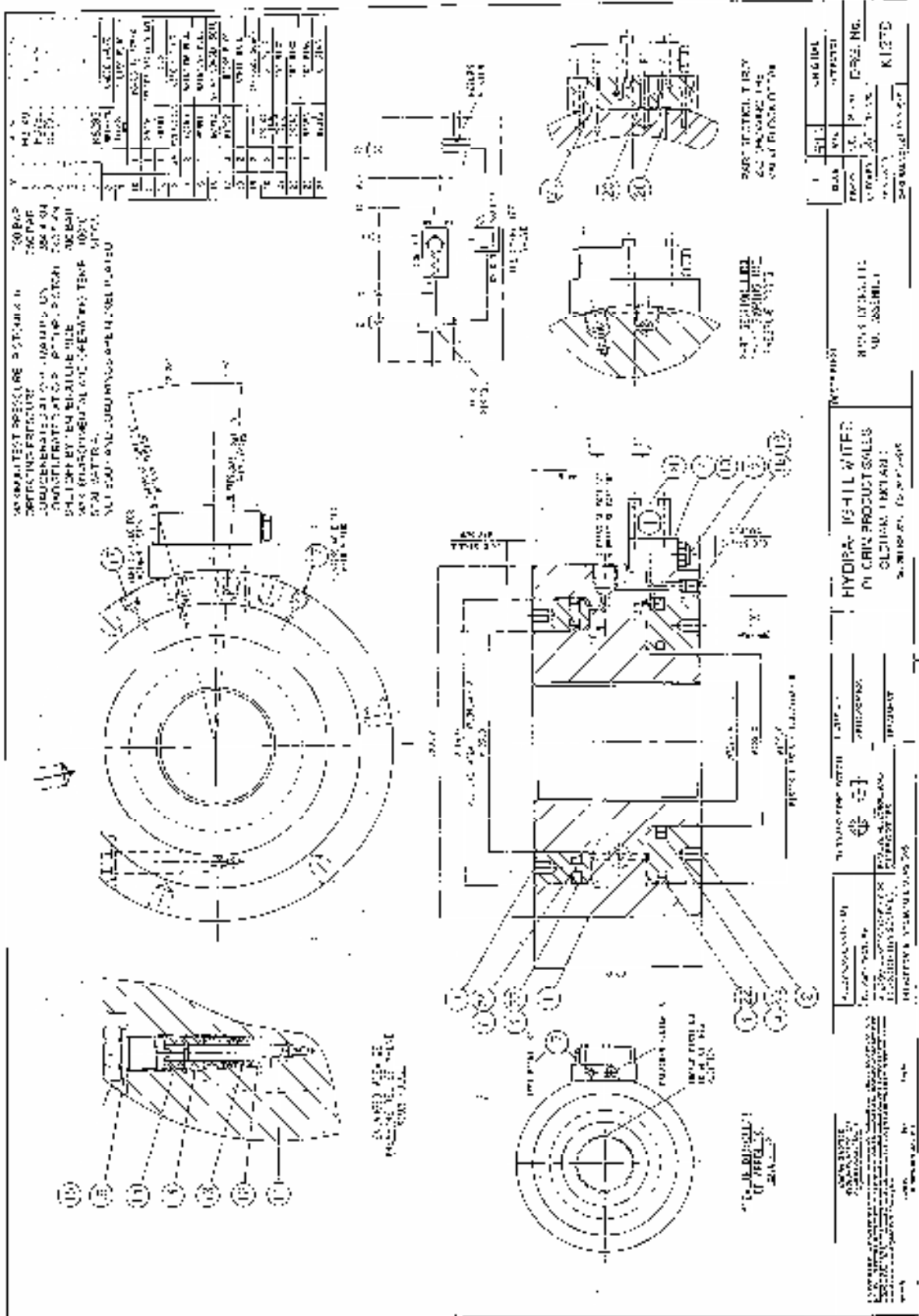
Hydraulic Harness and Hoses

1. Wipe all hoses clean and apply a light coating of oil or suitable rust inhibitor to all nipples, couplings and tee blocks.
2. Always keep dust caps fitted to nipples and couplings.

Air/Hand Driven Pump

1. Always store the pump upright.
2. Apply a light oil coating or suitable rust inhibitor to all exposed unplated metal items.
3. Leave the oil return to tank valve in the open position.
4. Leave the air control valve in the open position (air pump only).
5. Always keep dust caps on inlet and outlet hydraulic fittings.

General Arrangement Drawing



Technical Data Sheet

CUSTOMER:	Corus UK	
TOOL SIZE:	M72 x 4	
TENSIONER ITEM No.	HNDA6157000B	
HYDRAULIC NUT O.D.	215 mm	8.46 in
MAIN CHAMBER		
SEAL O.D.	175 mm	6.89 in
SEAL I.D.	105 mm	4.13 in
HYDRAULIC AREA:	15394 mm ²	23.86 in ²
MAX OPERATING PRESSURE:	250 bar	3625 psi
MAX INITIAL LOAD:	385 kN	38.6 tons
RETURN CHAMBER		
SEAL O.D.	175 mm	6.89 in
SEAL I.D.	135 mm	5.31 in
HYDRAULIC AREA:	9739 mm ²	15.10 in ²
MAX OPERATING PRESSURE:	250 bar	3625 psi
MAX INITIAL LOAD:	243 kN	24.4 tons
MAX STROKE:	10 mm	0.39 in
MINIUM STUD PROTRUSION ABOVE JOINT FACE	102 mm	4.02 in

CALCULATION OF REQUIRED OPERATING PRESSURE

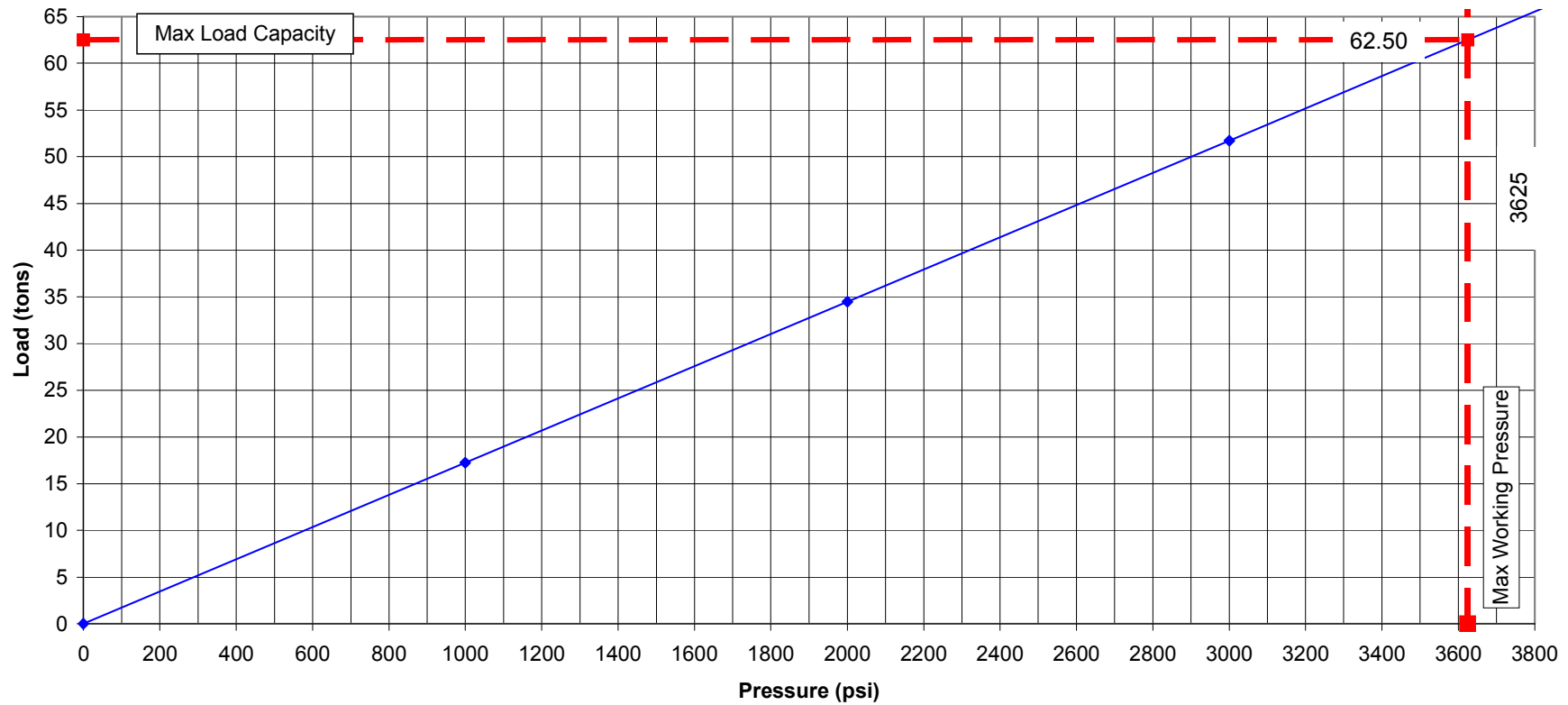
$$\text{Operating Pressure} = \frac{\text{Initial load}}{\text{Hydraulic Area}}$$

$$\text{Initial load} = \text{Residual Load} \times \text{Load loss Factor}$$

Note: The Load Loss Factor is based on a theoretical approximation of the amount of load lost when the pressure in the hydraulic head is released, and the load is transferred to the permanent nut. The main variable which affects the load loss factor is the grip length of the application.

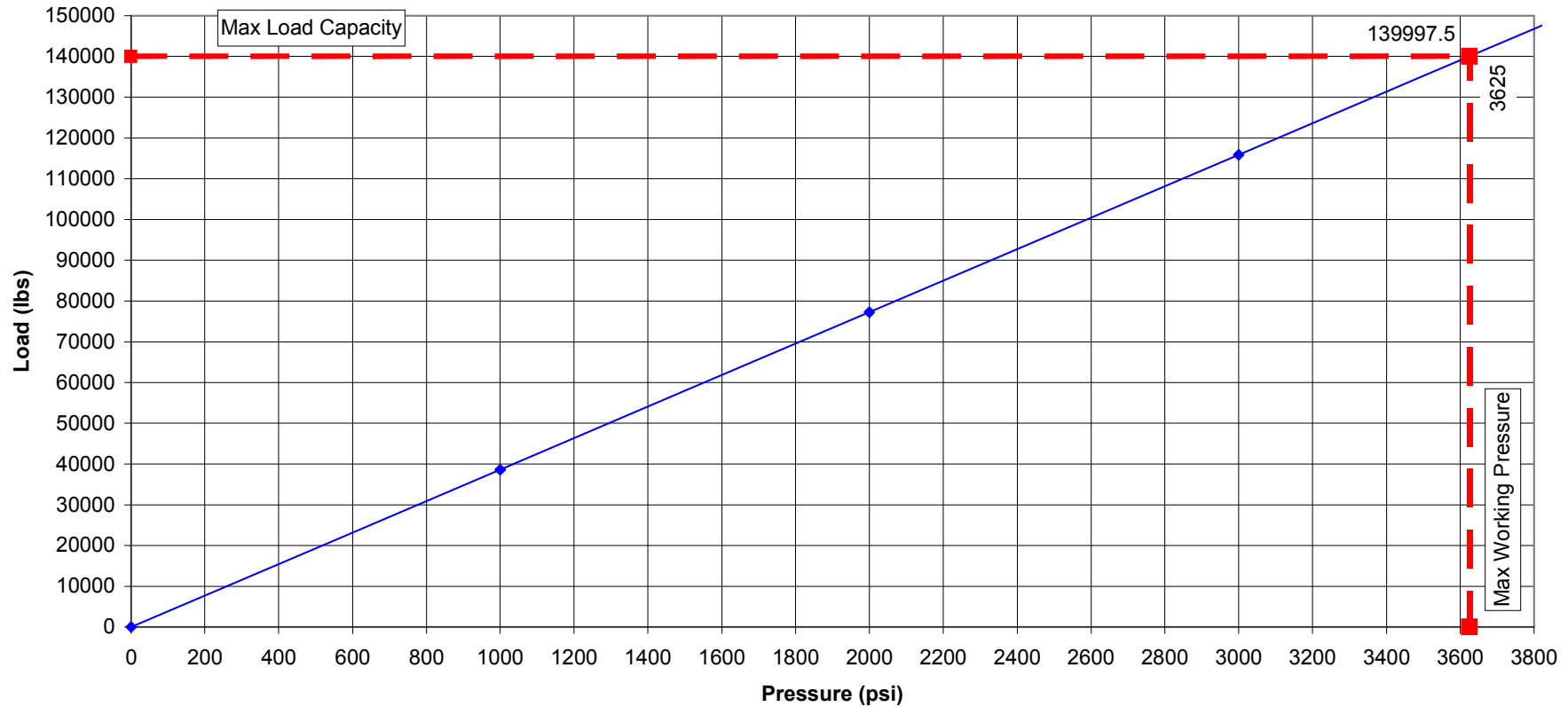
IF IN DOUBT CONSULT HYDRATIGHT SWEENEY LTD FOR FURTHER INFORMATION

PRESSURE LOAD GRAPH
HNDA6157000B M72 x 4

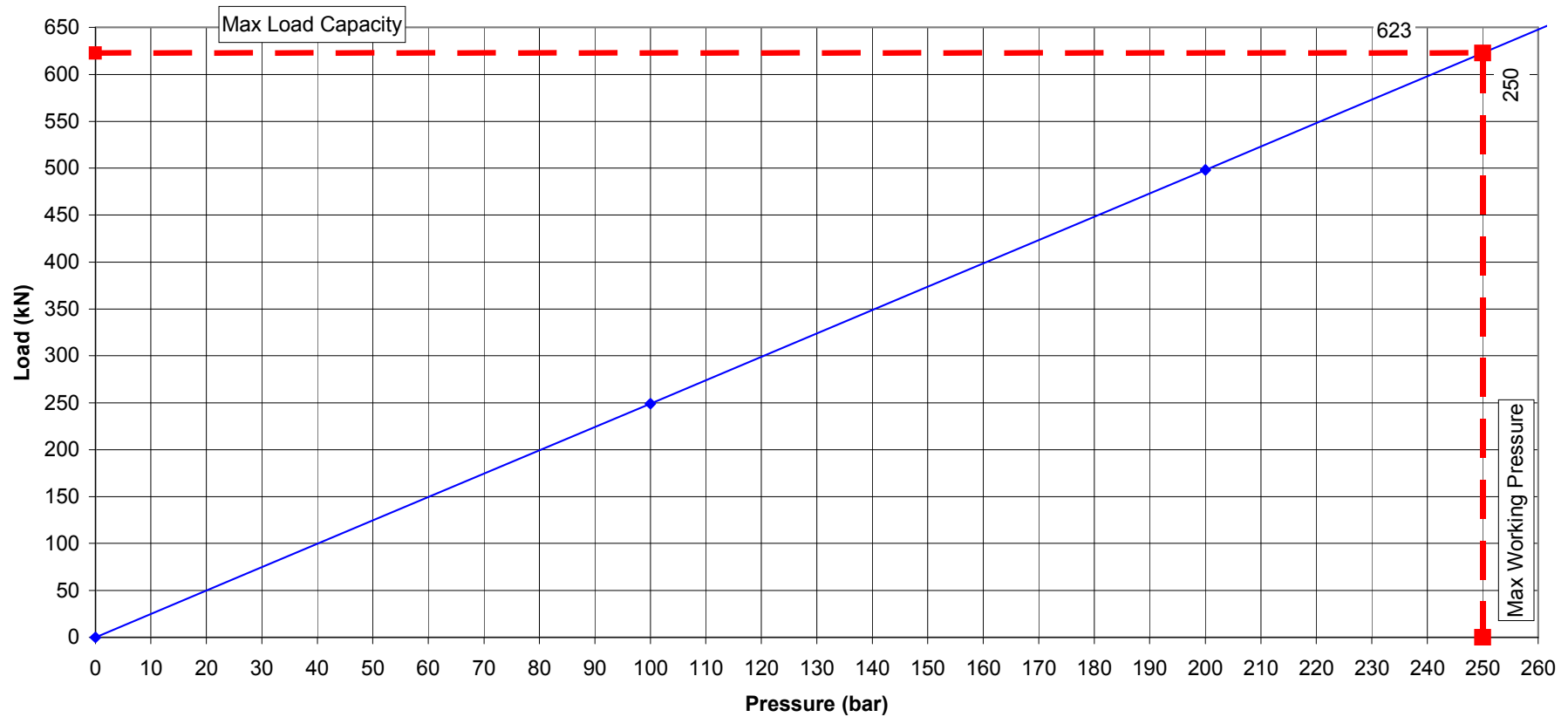


Pressure Load Graphs

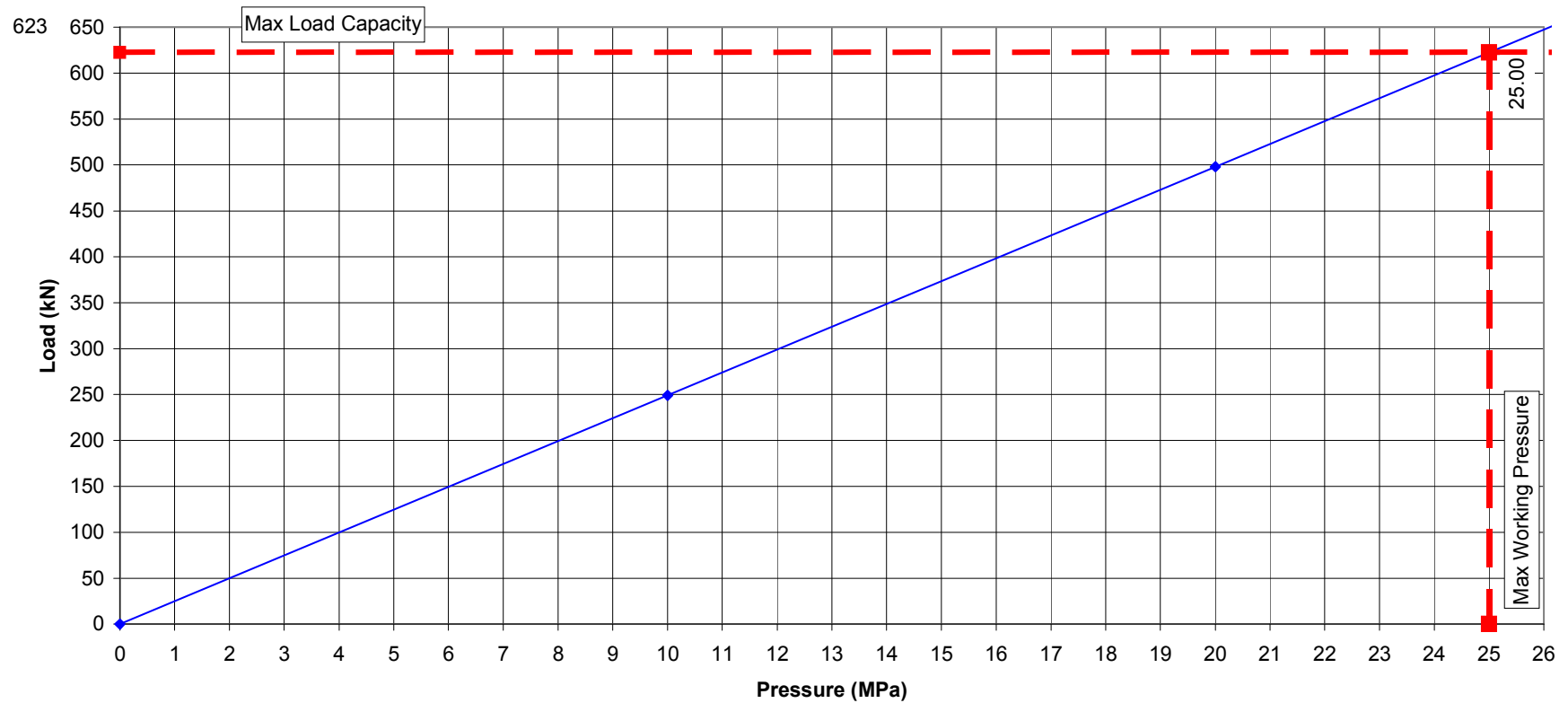
PRESSURE LOAD GRAPH HND A6157000B M72 x 4



PRESSURE LOAD GRAPH HND A6157000B M72 x 4



PRESSURE LOAD GRAPH HND A6157000B M72 x 4



AMENDMENT RECORD FOR THIS DOCUMENT IS SHOWN BELOW:

Rev	Comments	ECN No.	Date	By
1	Original Issue	-	07-Jul-2005	MH
2	References to Hydratight Sweeney now read Hydratight. Amendment record added.	-	08-Aug-07	MH