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**OUTSIDE COLLAR
HYDRAULIC NUT
HNOC-C064-3600**

**Operation and Maintenance
Instructions**



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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 one bolt diameter (see 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 Outside Collar Hydraulic Nut

To install the outside collar hydraulic nut on to a bolt proceed as follows, refer to drawing HNOC-C064-3600 as necessary.

1. Check that the bolt has been assembled correctly, and that there is sufficient bolt protrusion to engage with the hydraulic nut (see data sheet).
2. Screw the fully assembled hydraulic nut onto the bolt.
3. Use the tommy bar holes provided in the flange of the hydraulic nut body to screw the hydraulic nut down tightly to the joint face.

Note

To check that the body is fully screwed onto the bolt back off (rotate anticlockwise) the collar ½ (half) a turn and proceed as above, once completed screw the collar down (rotate clockwise) until it makes contact with the joint face.

4. 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 and higher load losses.

5. Connect the hydraulic harness to the hydraulic nut and check that the coupling is securely connected to the quick disconnect nipple.
6. Operate the hydraulic pump to pressurise the hydraulic nut. Observe the extension and operating pressure constantly during this operation and do not exceed the maximum quoted on the enclosed data sheet.

Note

The extension will appear between the joint face and collar.

7. When the desired operating pressure is reached stop the pump and whilst holding the pressure constant tighten down (rotate clockwise) the load retaining collar using a tommy bar and tap down with a copper hammer. Check that the collar is properly seated.

Note

Do not exceed the maximum working pressure of the hydraulic nut (refer to data sheet).

8. Release the oil pressure slowly.
9. Remove the hydraulic harness and fit protective caps to the hydraulic connections.

10. If desired remove the quick disconnect nipple and adaptor from the hydraulic nut, using suitably sized wrenches 22mm (7/8") and 19mm (3/4") across flats hexagon respectively, and plug the hydraulic port with the blanking plug supplied.

Note

Blanking the hydraulic ports will provide added protection for the quick disconnect nipple. The adaptor and quick disconnect nipple should be kept for future use.

Release Procedure for Outside Collar Hydraulic Nuts.

1. If fitted remove the blanking plug and screw in the adaptor and quick disconnect nipple using suitable torque wrenches.

Note

The across flats of the hexagons of the adaptor and quick disconnect nipple are 19mm (3/4") and 22mm (7/8") respectively. To provide an effective seal the minimum torque requirements for the adaptor (1/4" BSP) and quick disconnect nipple (1/4" BSP) is 15.8 Nm (140 lbf.in).

2. Connect the hydraulic harness and check that each coupling is securely connected to the corresponding quick disconnect nipple.
3. Operate the pump unit to pressurise the hydraulic nut. As the pressure increases fit a tommy bar to the load retaining collar and continually check to see if the collar can be unscrewed (turned anticlockwise). As soon as the collar can be turned stop the pump and turn the collar back sufficiently to allow tension in the bolt to be released.

Note

Do not exceed the maximum operating pressure and extension of the outside collar hydraulic nut.

4. Release the oil pressure slowly.
5. The hydraulic nut assembly should now be free to be unscrewed (turned anticlockwise) from the bolt. If the collar is still screwed down onto the joint face and the hydraulic nut cannot be unscrewed then it is likely that the collar was not screwed back far enough in operation 3, in this case repeat operations 3 to 5.

Note

If it is still not possible to remove the hydraulic nut from the bolt contact 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 maintenance section).
Oil is leaking from the hydraulic nut body.	Seal failure.	Change the seals.
When detensioning the bolt the tool becomes locked onto the bolt.	Thread damage or corrosion of the bolt above the hydraulic nut.	Turn the hydraulic nut down and clean up the threads above the hydraulic nut.
When detensioning the bolt the tool becomes locked onto the bolt.	On an application that has been tensioned simultaneously and nuts are being removed individually the last few nuts may lock on.	Refit several hydraulic nuts around the joint and pressurise until the locked hydraulic nut becomes loose.
The pump is not building pressure with oil return to tank valve closed.	<ol style="list-style-type: none">1. Oil return to tank valve may be defective.2. Check valve may be sticking inside the pump head.	<ol style="list-style-type: none">1. Replace the return to tank valve.2. Tap the pump head lightly with a hide hammer. If this fails the pump must be stripped down.
The hydraulic nut collar is not turning when the system is under pressure.	The hydraulic hose is not connected properly to the tool.	Release the pressure and check the hose connection.
The hydraulic nut insert 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, and foreign particles.
3. Do not use sharp edged tools.
4. Lubricate all components before assembly.

Hydraulic Seals Component Parts

The seal kit comprises a flat rubber lip seal held to the piston by 3 pan head screws and a seal retaining plate.

Hydraulic Seals - Disassembly of Hydraulic Nut

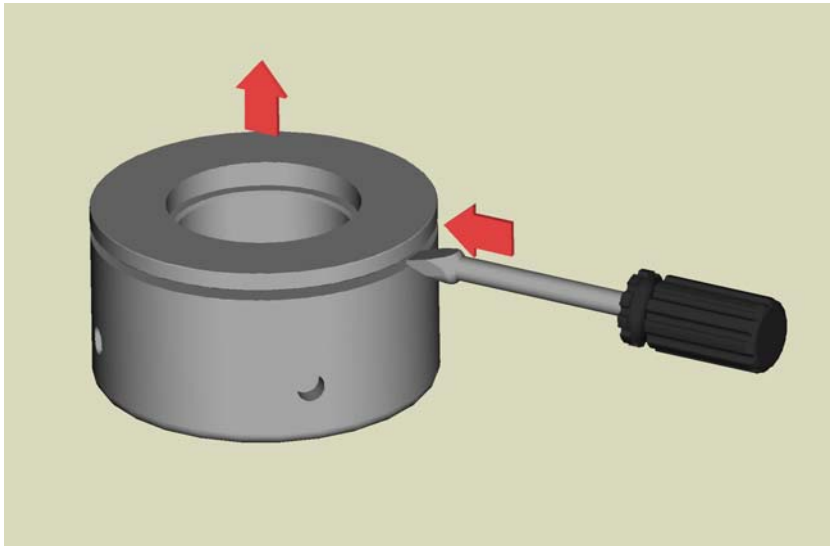
Throughout the following instructions refer to drawing HNOC-C064-3600. The enclosed pictures are for guidance only and may not be of the actual component parts.

1. Remove the quick disconnect nipple and adaptor using appropriate sized wrenches or spanners.

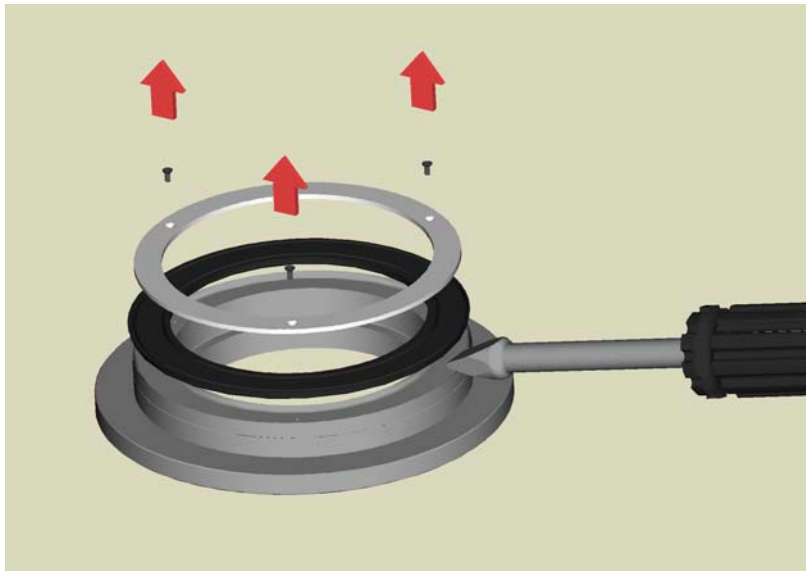
Note

The across flats of the hexagons of the quick disconnect nipple and adaptor are 22mm (7/8") and 19mm (3/4") respectively.

2. Protect the threads of the collar and body at all times. Wind the collar up to the body flange to give space around the piston flange.
3. Turn the tool over to help with removal of the piston.
4. Prise the piston up by inserting a thin bladed screwdriver between the piston flange and the body. Use the screwdriver around the piston to lever it out of the body until it can be pulled out by hand.

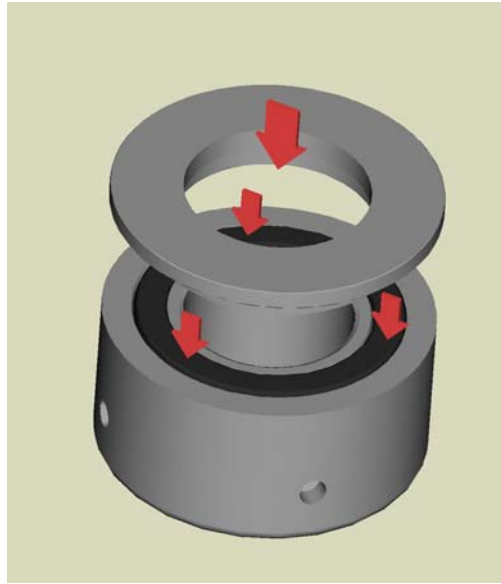


5. Place the piston carefully to one side, taking care that the seal groove 'feather-edges' are protected.
6. Remove the pan head screws and remove then lift off the seal retaining plate.
7. Using a screwdriver, if necessary, carefully lever up the seal from the groove, taking care not to damage any surfaces. Discard the seal, since this cannot be repaired.



Re-assembly of Hydraulic Head

1. Thoroughly clean the body and piston. Check that the 'feather edges' are free from damage. Small marks and bends can be gently knocked out with a copper hammer and smoothed with abrasive cloth/paper. Major damage to this area will require the piston to be replaced.
2. Place the seal in the groove on the piston, ensuring the holes line up. Place the seal retaining plate over the seal, once again ensuring the holes line up. Screw down using the pan head screws. Hand-tight will suffice do not squash the seal.



3. Lubricate all inner faces concentrating on the seals and seal contact faces, preferably using hydraulic oil.
4. Locate the piston in the nut body hydraulic chamber and gently push it down fully until the flange on the piston contacts the body. Take care to push down evenly, otherwise the piston might jam in the chamber. If this happens the piston should be gently tapped out and re-located.
5. Screw the hydraulic connection adaptor and quick disconnect nipple back into the hydraulic port in the body using appropriate torque wrenches (see disassembly for sizes).

Note

To provide an effective seal the minimum torque requirement for the adaptor and quick disconnect nipple (1/4" BSP) is 15.8 Nm (140 lbf.in).

Hydraulic Fittings

Hydraulic connections are of the following types:

1. Hydraulic head assembly – the connection in the tool is 1/4" BSP female thread. If there is a slight leak it can usually be solved by applying a slightly higher torque value than the minimum required (15.8 Nm or 140 lbf.in).
2. Hose – the hose end connection is a 1/4" BSP female swivel with male cone. A seal is effected by screwing down on to the mating adaptor with sufficient pressure. Any problems are usually minimal and normally solved by ensuring that a torque of 40-50 Nm or 355-440 lbf.in is applied.

Note

If the problem persists 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.

Technical Data Sheet

CUSTOMER:	Peter Brotherhood Ltd.	
TOOL SIZE:	2.1/2"-6BSF	
TENSIONER ITEM No.	HNOC.C064.3600	
TENSIONER O.D.	155 mm	6.10 in
SEAL O.D.	108 mm	4.25 in
SEAL I.D.	78 mm	3.07 in
HYDRAULIC AREA:	4383 mm²	6.79 in²
MAX OPERATING PRESSURE:	1500 bar	21750 psi
MAX INITIAL LOAD:	657 kN	66.0 tons
MAX STROKE:	6 mm	0.24 in
MINIUM STUD PROTRUSION ABOVE JOINT FACE	90 mm	3.54 in

CALCULATION OF REQUIRED OPERATING PRESSURE

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

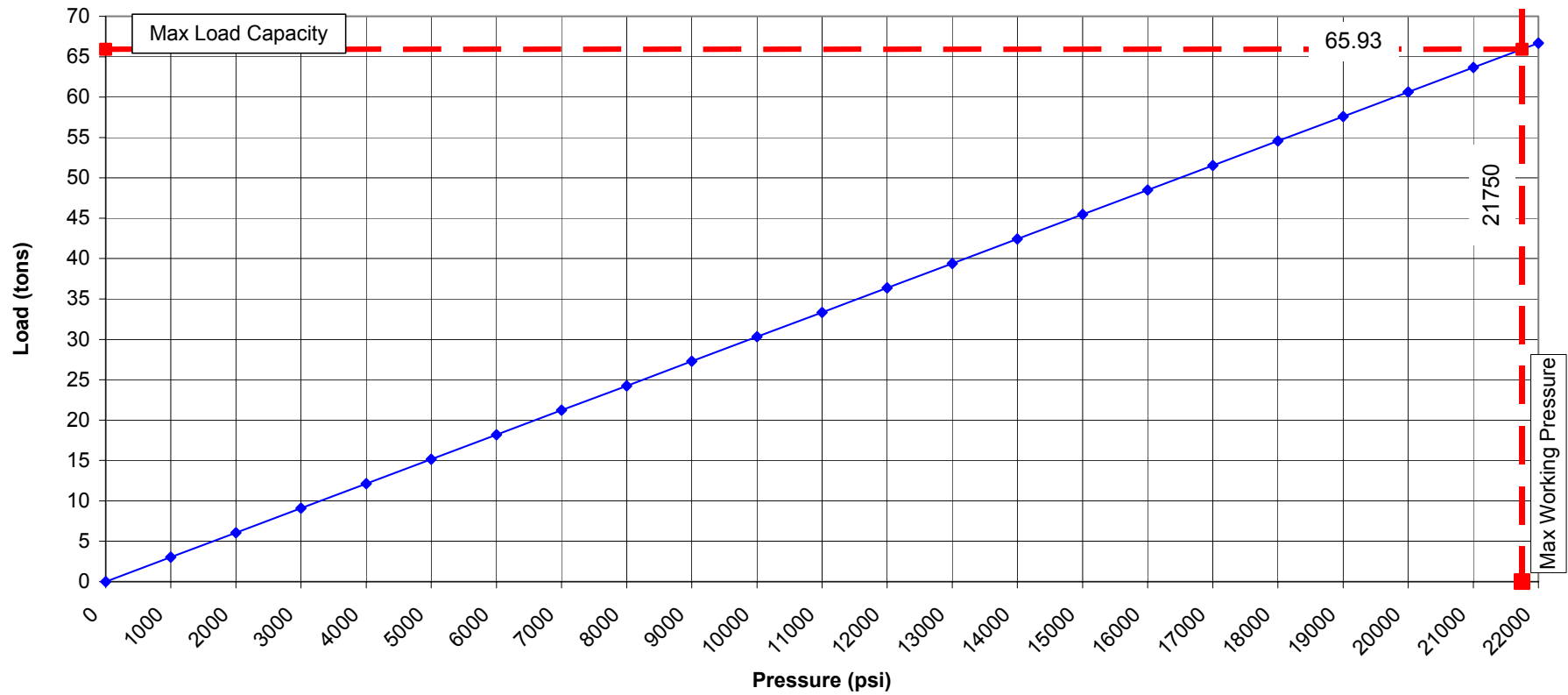
$$\text{Initial load} = \text{Residual Load} \times \text{Load loss Factor}$$

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.

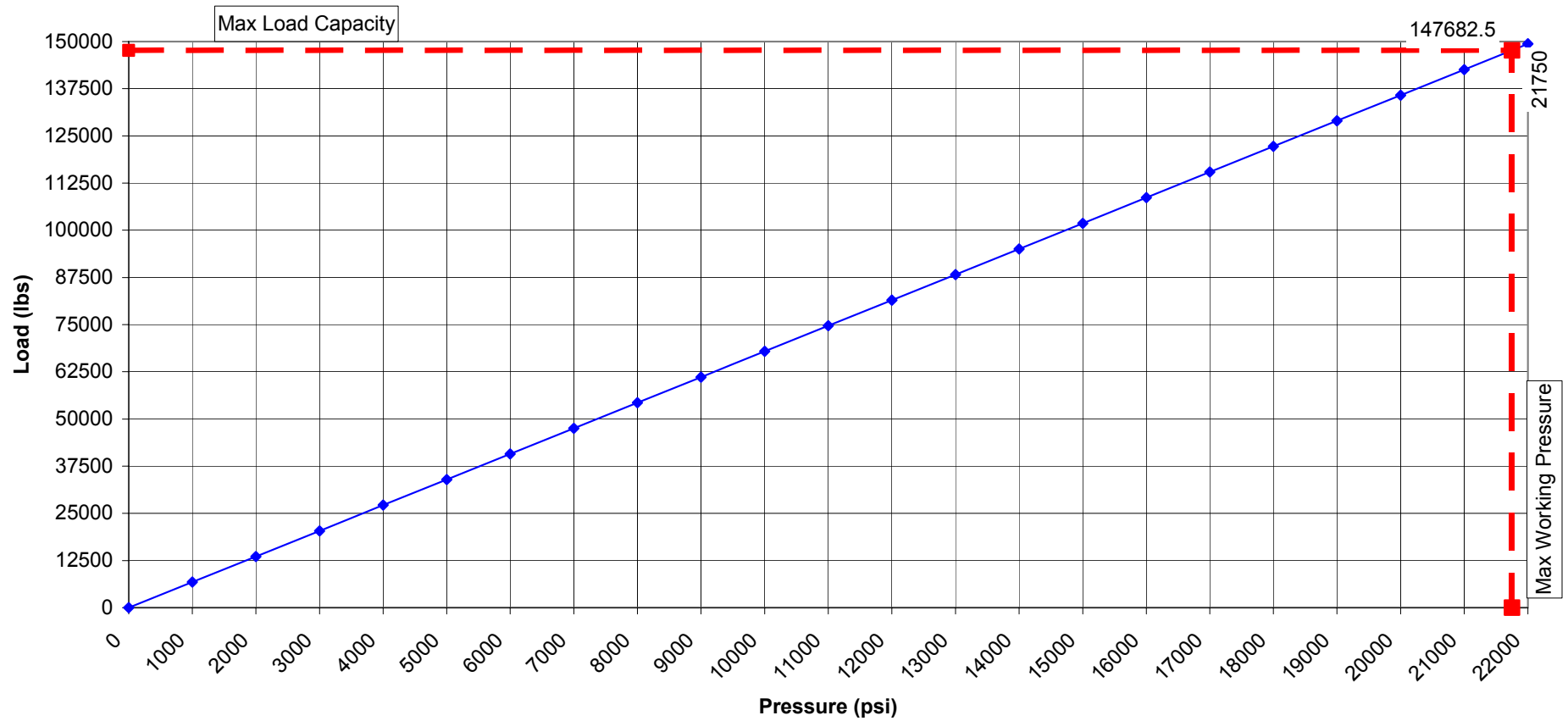
IF IN DOUBT CONSULT HYDRATIGHT SWEENEY LTD FOR FURTHER INFORMATION

Pressure Load Graph

PRESSURE LOAD GRAPH
HNOCC064.3600 **2.1/2"-6BSF**



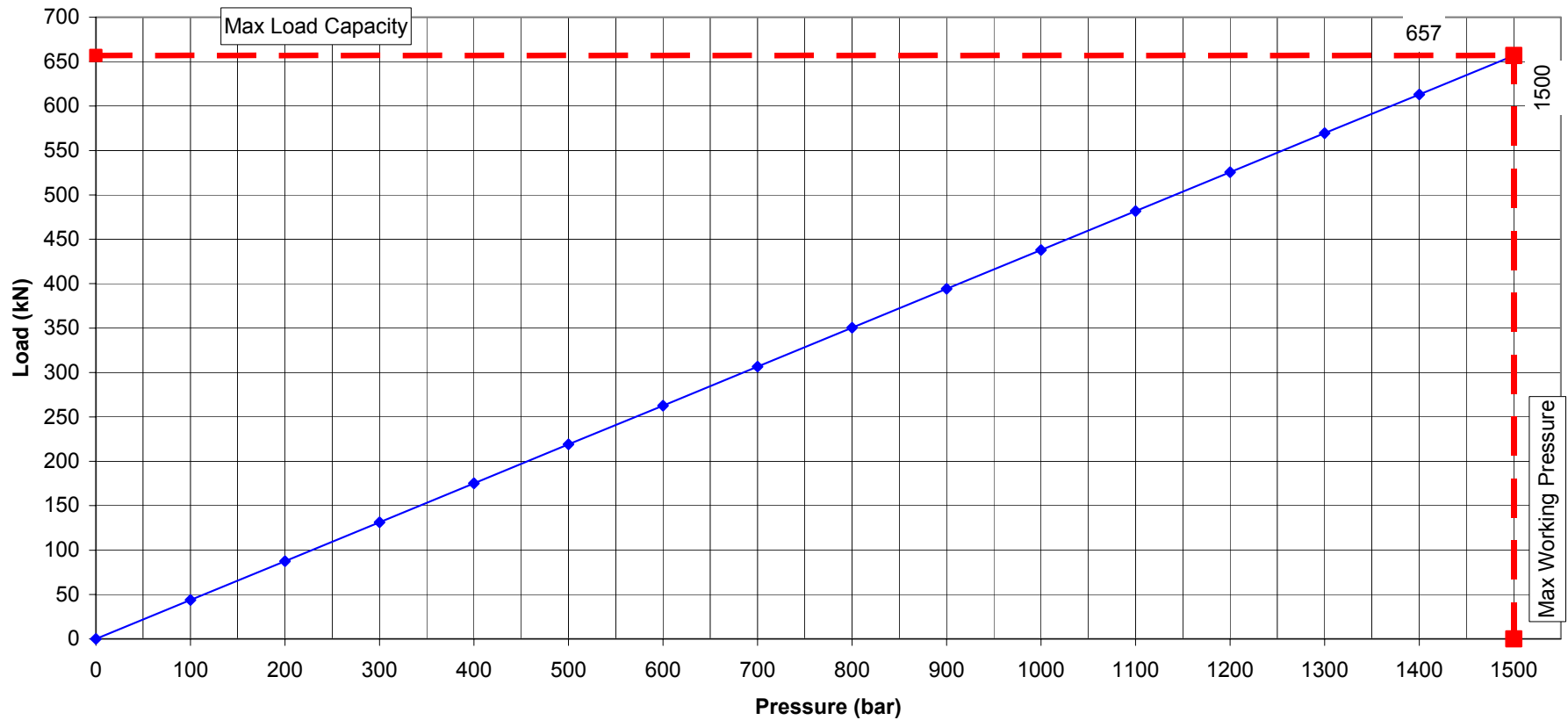
PRESSURE LOAD GRAPH HNOCC064.3600 2.1/2"-6BSF



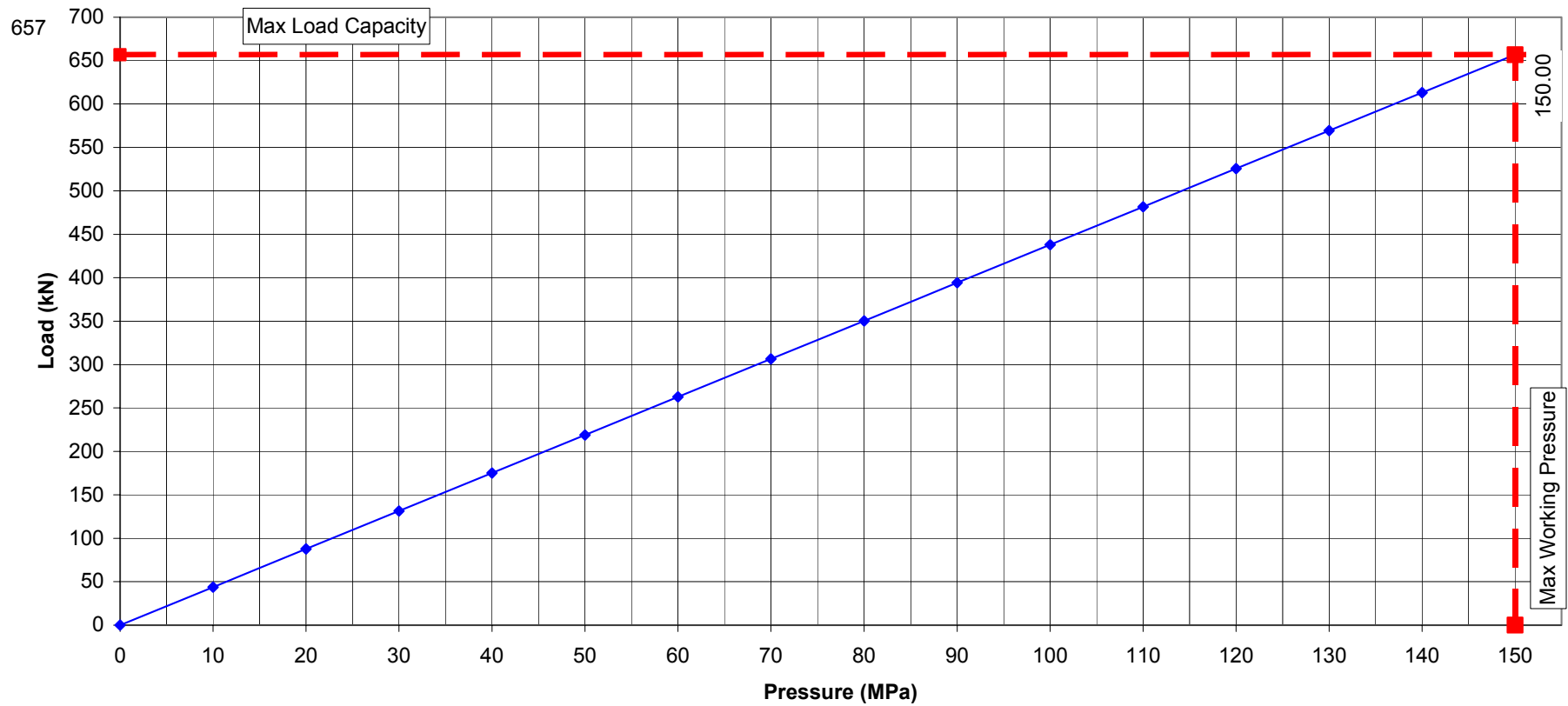
PRESSURE LOAD GRAPH

HNOCC064.3600

2.1/2"-6BSF



PRESSURE LOAD GRAPH
HNOCC064.3600 **2.1/2"-6BSF**



AMENDMENT RECORD**AMENDMENT RECORD FOR THIS DOCUMENT IS SHOWN BELOW:**

Rev 1	Original Issue	14-Oct-2005	MH
Rev 2	References to Hydratight Sweeney now read Hydratight. Amendment record added.	16-Nov-2006	MH