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**M80 x 6 TOP COLLAR
HYDRAULIC NUT
HNTC6002600C-ISS-B**

**Operation and Maintenance
Instructions**



www.boltup.com

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1. Introduction

In a world of rapidly increasing technological change, HYDRATIGHT LTD is at the forefront of bolt tightening development. It is only through extensive research together with accumulated experience that a more efficient customer service and a reputation for high quality products can be maintained.

HYDRATIGHT LTD has a policy of continual research and development, which enables us to offer innovative precision equipment that meets the rigorous demands of industry world-wide.

HYDRATIGHT series of bolt tensioners offer the following benefits:

ACCURACY	The method of tightening is independent of the frictional conditions of the bolted assembly, thereby giving accurate and consistent bolt loads.
UNIFORMITY	Any number of HYDRATIGHT bolt tensioners can be linked together for simultaneous bolt tightening. This is particularly beneficial on flange applications where uniform loading on the gasket is essential in ensuring leak-free connections.
TIME SAVING	By tightening many bolts simultaneously the time to make up multi-bolted connections is significantly reduced. The length of stroke available reduces the number of times the tensioner needed to be closed.
COMPACT, LIGHT WEIGHT TOOLS	Careful design has enabled the development of an effective yet lightweight and compact tool.
LABOUR SAVING	HYDRATIGHT bolt tensioners can be used easily by one operator with a minimum of effort.
SAFETY	Consistent quality control procedures ensure that HYDRATIGHT tools and equipment are safe in both design and use.
SIMPLICITY	A minimum of moving parts leads to trouble free, simple operation and easy maintenance.
RELIABILITY	All HYDRATIGHT tools and equipment are safety tested including a full pressure test prior to despatch.

2. Safety Notes For Use with Hydraulic Nuts

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. **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 studs/bolts if tensile/yield properties are not sufficient to support the load applied.
 - (d) Check that the threaded portion of the nut tool is screwed on the stud, and that the thread engagement is sufficient. (See Data Sheet)
NOTE: Thread engagement should usually be a minimum of 1 x dia of stud. Check that the tensioner is seated squarely on the bridge piece and that the bridge is seated squarely on the work piece.
3. **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, which may be induced into the bolt/stud.
4. **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.
5. **ALWAYS** take care when pressurising a system. Always observe the gauge and be ready. Pressure can rise faster than you think.
6. **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.
7. **NEVER** bend the hydraulic hoses less than six times their own diameter. Do not use kinked hoses.

8. **NEVER** stand in line with the bolt axis whilst tensioning is in progress.
NOTE: Personnel must be aware of this point at all times.
9. 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.
10. 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.

3. Operation of the Hydraulic Nut

3.1. Tightening Procedure for Top Collar Hydraulic Nuts.

Proceed as follows to install the Top Collar Hydraulic Nut:

1. Check that the stud has been installed correctly and that both nut faces are fully supported. The nut body should locate in a machined recess to keep it concentric with the stud. It is important that the collar is not touching the body or above the top of the insert at this stage.
2. Ensure that the insert is fully retracted. Once this has been done screw down the collar to make contact with the body. This will enable you to observe the extension (see 7).
3. Check that the nut is seated squarely on the mating component. If the nut is not seated squarely this must be investigated and corrected. Out of squareness will result in uneven loading and excessive load losses.
4. Assemble any further nuts in the system in the same manner.
5. Connect the Hydraulic Hoses to the nuts and check that the couplings are securely connected to the nipples. If all of the nuts in a given system are not being tightened simultaneously then a sensible tightening sequence should be used. If in doubt consult Hydratight Ltd for further information.
6. Check that the Hydraulic Harness has been assembled correctly. There should be no loose ends in the system and each female coupling should be connected to a corresponding nipple.
7. Operate the Hydraulic Pump to pressurise the Nuts. Observe the extension constantly during this operation and do not exceed the maximum quoted on the enclosed Data Sheet. The nut will have been designed to accommodate the maximum bolt stretch on the application, and the reasons for the extension being too high must be investigated. If in doubt consult Hydratight Ltd for further advice.
8. When the desired operating pressure is reached stop the pump and whilst holding the pressure constant tighten down the load retaining collar using a Tommy bar, and tap down with a copper hammer. Check that the collar is properly seated. **DO NOT EXCEED THE MAXIMUM WORKING PRESSURE.** The maximum pressure is given on the tool Data Sheet.

9. Release the oil pressure slowly.
10. Remove the Hydraulic Harness and fit protective cap to snap nipple. If desired the snap nipple can be unscrewed and removed and the hydraulic connection plugged. This will provide added protection for the snap nipple.
11. Connect the harness to any other nuts in the system and proceed as above.
12. To reduce load transfer factors, repeat the pressure cycle after a minute or two and tap the collar again. The collar may move slightly but the movement may be so small it does not appear to move. Very small amounts of movement at this point will improve the load transfer factor.

3.2. Release Procedure for Top Collar Hydraulic Nuts.

Proceed as follows to remove Top Collar Hydraulic Nuts.

1. Remove plug (if fitted) and screw in hydraulic connector (snap nipple).
2. Connect the hydraulic hoses and check that the coupling is securely connected to the corresponding nipple.
3. Operate the pump unit to pressurise the nut. As pressure increases fit Tommy bar to the load retaining collar and continually check to see if the collar can be unscrewed. As soon as the collar can be released stop the pump and screw the collar back sufficiently to allow the tension in the bolt to be released. **DO NOT EXCEED MAXIMUM OPERATING PRESSURE.** Do not unscrew the collar too far, it must be clear of the top face before releasing the pressure.
4. Release the oil pressure slowly.
5. The nut should now be free to be removed. If the collar is still screwed down onto the body and the nut cannot be removed then it is likely that you have not screwed the collar far enough back in Operation 3. In this case repeat Operation 3, 4 and 5.

3.3. 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 GA.
Oil is leaking from the Nut body.	Seal failure.	Change the seals - See Section 4
When Releasing the nut, the collar becomes locked onto the body.	Insufficient allowance has been made for backing off the collar.	Re-pressurise the tool to the pressure initially applied. And back off the collar further.
The nut will not return to zero stroke.	<ol style="list-style-type: none">1. The 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 open fully.2. Check that the hydraulic connections are secure.

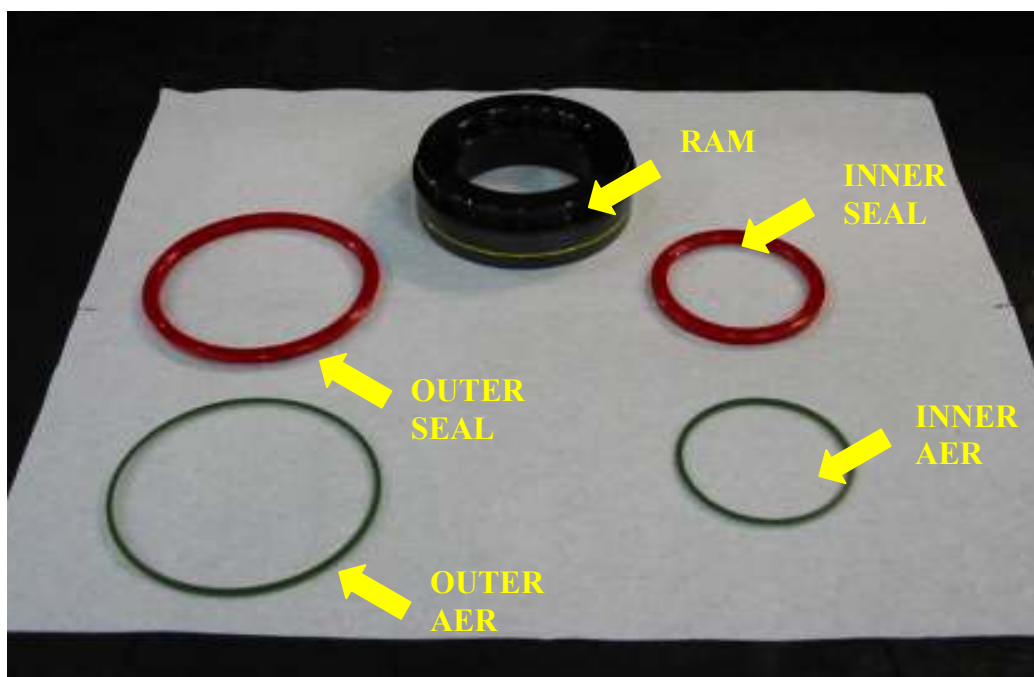
4. Maintenance

4.1. Replacement of Hydraulic Seals

The following precautions must be taken with replacement of 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.

NOTE: The following pictures are representative only, actual component parts may differ in appearance.



The seal arrangement is assembled to the ram of the hydraulic nut, the arrangement consists of a main inner and outer seal, where each seal is assembled with an anti-extrusion ring (AER).

The main seal is manufactured from a polyurethane elastomer, red in colour, and is very flexible; the anti-extrusion ring is used to resist extrusion of the main seal and is manufactured from a harder material, care is needed to ensure the anti-extrusion ring is not damaged or kinked during assembly.

The outer seal arrangement necessitates the anti-extrusion ring to be fitted first, followed by the main seal.

The inner seal arrangement necessitates for ease of assembly the main seal to be fitted first, followed by the anti-extrusion ring.

4.1.1. Outer Seal Assembly

Place the anti-extrusion ring into the rearmost position of the seal groove, ensuring it is the correct way round to mate with the seal.

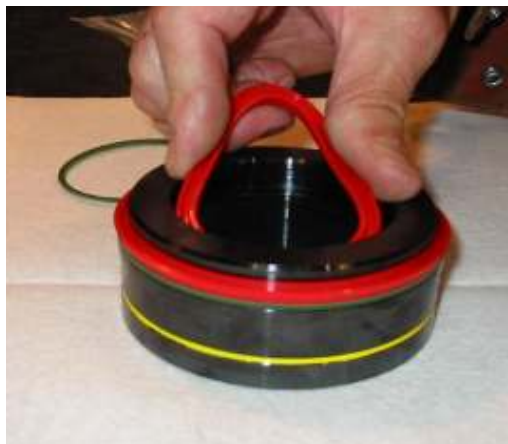


Then gently stretch the main seal over the seal retaining lip of the ram, applying gentle finger pressure to ensure the main seal seats fully and correctly into its groove with the anti-extrusion ring seated neatly in place behind the main seal.



4.1.2. Inner Seal Assembly

Insert the main seal inside the retaining lip of the ram, apply gentle finger pressure to ensure it is seated fully and correctly into its groove.



Insert and direct the anti-extrusion ring at a slight angle to the main seal, starting from one side use gentle finger pressure to push and seat the anti-extrusion ring into position neatly in place behind the main seal.



5. Maintenance Instructions

Hydraulic Bolt Tensioners

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 reaction nuts with Rocol Rustshield or similar rust inhibitor.
4. Store tools upright.
5. Keep dust caps on the oil inlet nipples when not in use.

Hydraulic Harness & Hoses

1. Wipe all hoses clean and apply a light coating of oil or suitable rust inhibitor to all nipples, couplings, tee blocks.
2. Always keep dust caps fitted to nipples and couplings when hoses are not in use.

Air Driven Pump

1. Always store the pump upright.
2. Apply a light oil coating or suitable rust inhibitor to all the exposed un-plated metal items.
3. Leave the oil return to tank valve in the open position.
4. Leave the air control valve in the open position.
5. Always keep dust covers on inlet/outlet hydraulic fittings.

6. Attachments

TECHNICAL DATA SHEET

CUSTOMER:	Danieli	
TOOL SIZE:	M80 x 6	
TENSIONER ITEM No.	HNTC6002600C	
TENSIONER O.D.	190 mm	7.48 in
SEAL O.D.	157 mm	6.18 in
SEAL I.D.	102.5 mm	4.04 in
HYDRAULIC AREA:	11108 mm²	17.22 in²
MAX OPERATING PRESSURE:	1380 bar	20010 psi
MAX INITIAL LOAD:	1532 kN	154 tons
MAX STROKE:	20 mm	0.79 in
MIN STUD PROTRUSION (M48)	126 mm	4.96 in

CALCULATION OF REQUIRED OPERATING PRESSURE

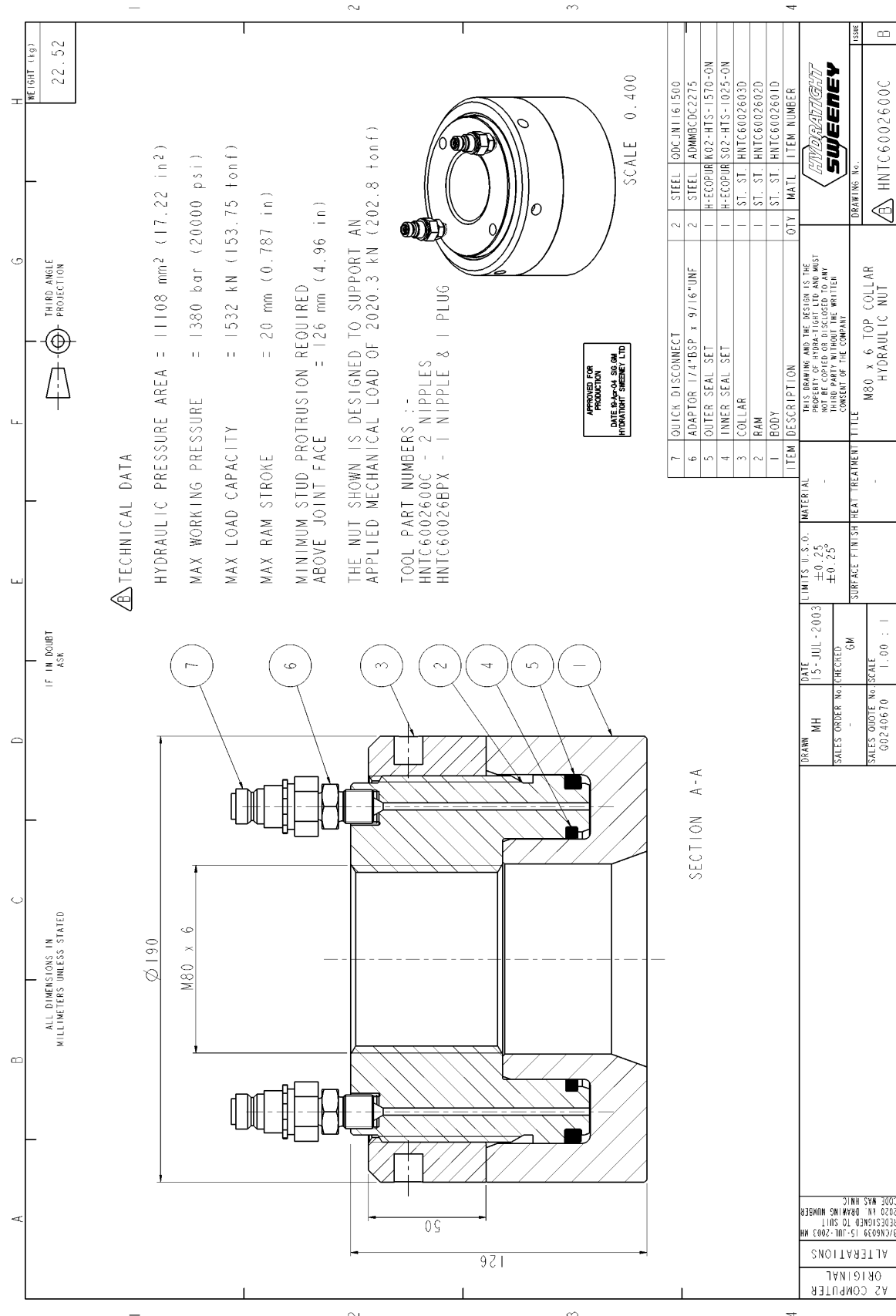
$$\text{Operating Pressure} = \frac{\text{Initial load}}{\text{Hydraulic Area}}$$

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

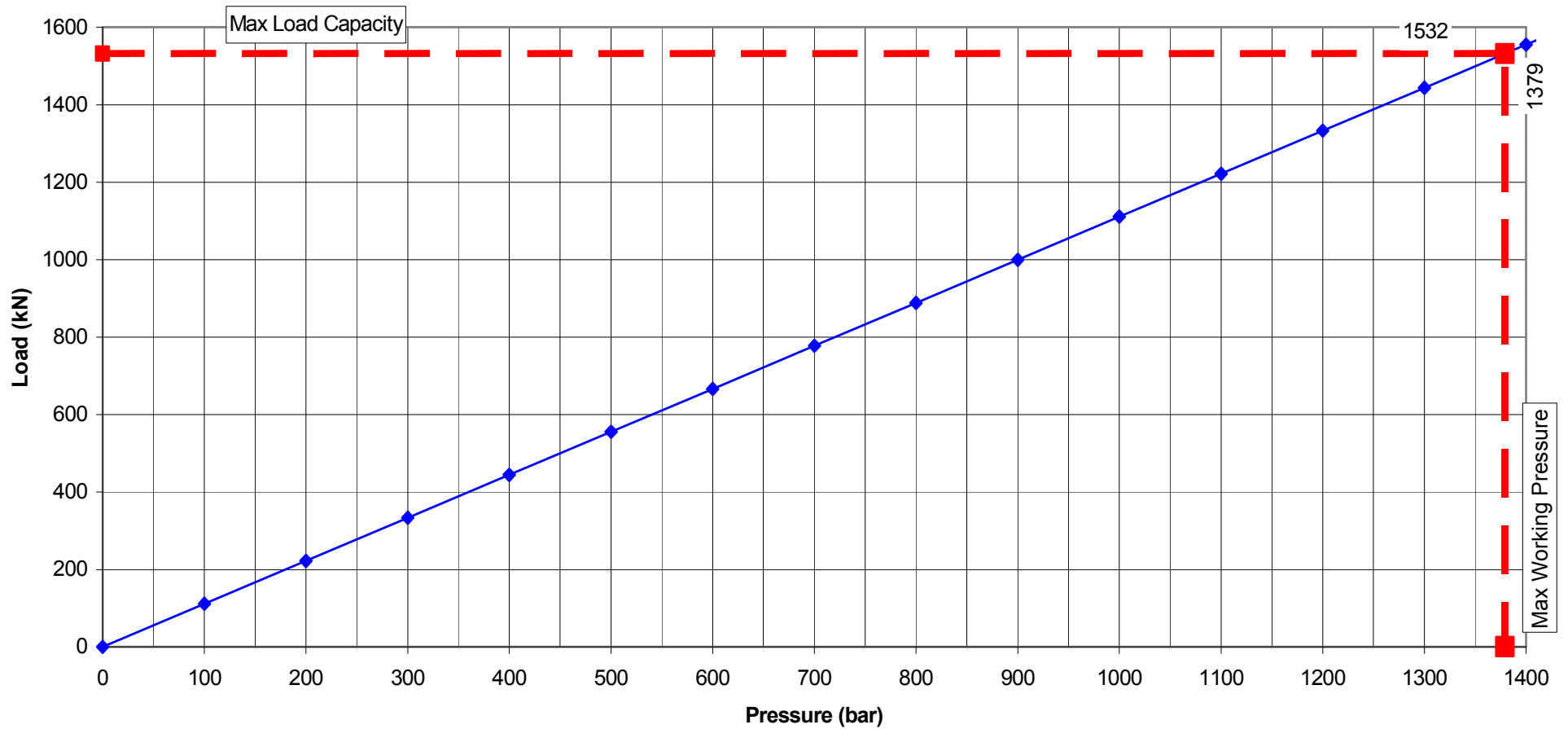
Note: The Load Loss Factor is based on a theoretical approximation of the amount of load lost when the pressure in the hydraulic head is released, and the load is transferred to the permanent nut. The main variable which affects the load loss factor is the grip length of the application.

IF IN DOUBT CONSULT HYDRATIGHT SWEENEY LTD FOR FURTHER INFORMATION

General Assembly Drawing



PRESSURE LOAD GRAPH
HNTC6002600C **M80 x 6**



Amendment Record

Revision	Description of Changes	Date	Signature
1	Original Issue	-	-
2	Hydratight logo updated and Amendment Record added	19-Dec-2006	GM