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TOP COLLAR HYDRAULIC NUT HNRN-C068-0900 & HNRN-C068-1000

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 must 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 the threaded portion of the tensioning tool is screwed on the bolt, and that the thread engagement is sufficient (see data sheet).

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 BEFORE MAKING THEM.

INAPPROPRIATE MODIFICATIONS MADE RENDER THE EQUIPMENT DANGEROUS.

Operation of the Hydraulic Nut

Tightening Procedure for Top Collar Hydraulic Nut

To install the top collar hydraulic nut on to a bolt proceed as follows, refer to drawing HNRN-C068-0900 or HNRN-C068-1000 as appropriate. These hydraulic nuts are pressurised via the application that they are fitted to and have no threaded hydraulic port.

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. Apply a small amount of grease to the 'o'-ring and locate it in the spot face on the base of the nut body. Place the body over the stud and align the locating dowel in to its hole in the application. Ensure the 'o'-ring does not fall from the body.
3. Screw the reaction nut and collar assembly onto the bolt.
4. Use two of the tightening holes provided in the top face of the reaction nut to screw the reaction nut down tightly to the piston top face.

Note

To check that the reaction nut is fully screwed onto the bolt, back off (rotate anticlockwise) the collar $\frac{1}{2}$ (half) a turn and proceed as above, once completed screw the collar down (rotate clockwise) until it makes contact with the 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 and higher load losses.

6. Assemble any other nuts on to the application in the same way.

Note

All the hydraulic nuts in the system are being tightened simultaneously.

7. Connect the hydraulic harness ensuring all couplings and nipples are securely connected.
8. Operate the hydraulic pump to pressurise the hydraulic nut(s). 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 body and collar. A groove in the piston will appear between the collar and body at full stroke.

9. 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).

10. Release the oil pressure slowly.
11. Disconnect the hydraulic harness and pump.

Release Procedure

1. Proceed as follows to remove the top collar hydraulic nuts.
2. Connect the hydraulic harness and pump unit to the application.
3. Operate the pump unit to pressurise all of the hydraulic nuts. 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 top collar hydraulic nut.

4. Unscrew the hydraulic nut collars in the system that are required to be released. Release the oil pressure slowly.
5. The reaction nut assembly should now be free to be unscrewed (turned anticlockwise) from the bolt. If the reaction nut proves to be tight with the collar, tap the top of the reaction nut gently with a soft mallet and try again. If the collar is still screwed down onto the body and the reaction nut cannot be unscrewed then it is likely that the collar was not screwed back far enough in operation 4, in this case repeat operations 3 to 5.

Note

If it is still not possible to remove the reaction nut from the bolt, contact Hydratight Limited for advice.

1. Trouble Shooting Guide

Problem/Symptom	Probable Cause	Corrective Action
Oil is leaking from the hydraulic connection.	The 'o'-ring is not seating properly.	Remove the reaction nut and nut body. Replace the 'o'-ring and reassemble.
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.	The collar was not turned off sufficiently.	Re-pressurise and turn collar off further.
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 application.	Release the pressure and check the hose connection.
The hydraulic nut body 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.

It is strongly recommended that in the event of seal failure, the hydraulic nuts are returned to Hydratight for seal replacement, however 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.

Hydraulic Seals Component Parts

The seal assembly comprises a nitrile rubber seal, a seal retaining ring and three screws. Care must be taken to ensure that the seal is not damaged or kinked before or during assembly.

Hydraulic Seals - Disassembly of Hydraulic Nut

Throughout the following instructions refer to drawings HNRN-C068-0900 or HNRN-C068-1000 as appropriate.

1. Place the reaction nut and the collar to one side.
2. Remove the piston from the body, using the two M4 x 0.7-6H holes on the top face of the piston if required.
3. Protect the metal feather edges on the piston at all times.
4. Using a small screwdriver remove the M2 x 0.4-6g x 8mm long seal retaining ring screws. Keep these in a safe place. Remove the retaining ring and place to one side.
5. Remove the seal from the piston.

Seal Assembly

1. Place the piston on a clean flat surface with the seal recess facing upwards.
2. Place the seal into the seal recess, aligning the seal screw holes with the three tapped holes in the piston.
3. Place the retaining ring on to the seal aligning the seal screw holes again.
4. Now fit the M2 x 0.4-6g x 8mm long screws through the retaining ring and seal into the piston.

5. Using a screwdriver screw the seal retaining screws in until they just touch the retaining plate. When all three screws are in this position gently turn the screws evenly, do not over tighten them, a pinched or crimped seal may not work correctly.

Hydraulic Seals - Reassembly of Hydraulic Nut

1. Ensure that all surfaces of the body and piston are free from dirt and other foreign particles.
2. Lubricate all inner faces concentrating on the seals and seal contact faces, preferably using hydraulic oil.
3. Position the piston assembly into the body assembly, ensuring that squareness between the components is maintained; apply pressure until the piston assembly is fully engaged with the body assembly.

Note

It may be possible to press the two assemblies together by hand but if necessary use a small bench press.

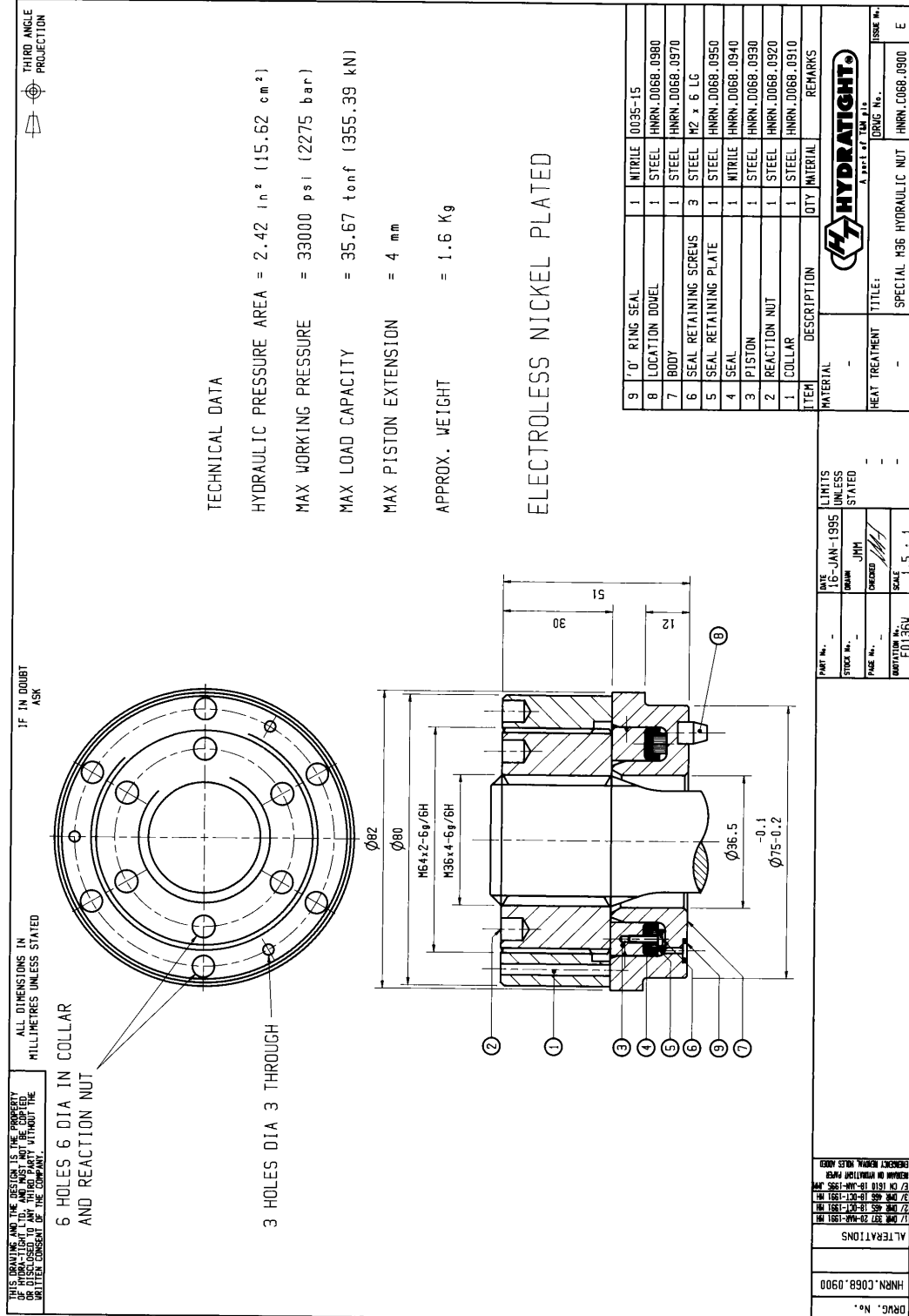
Assembly with the reaction nut and collar assembly and the 'o'-ring can only be completed on the application.

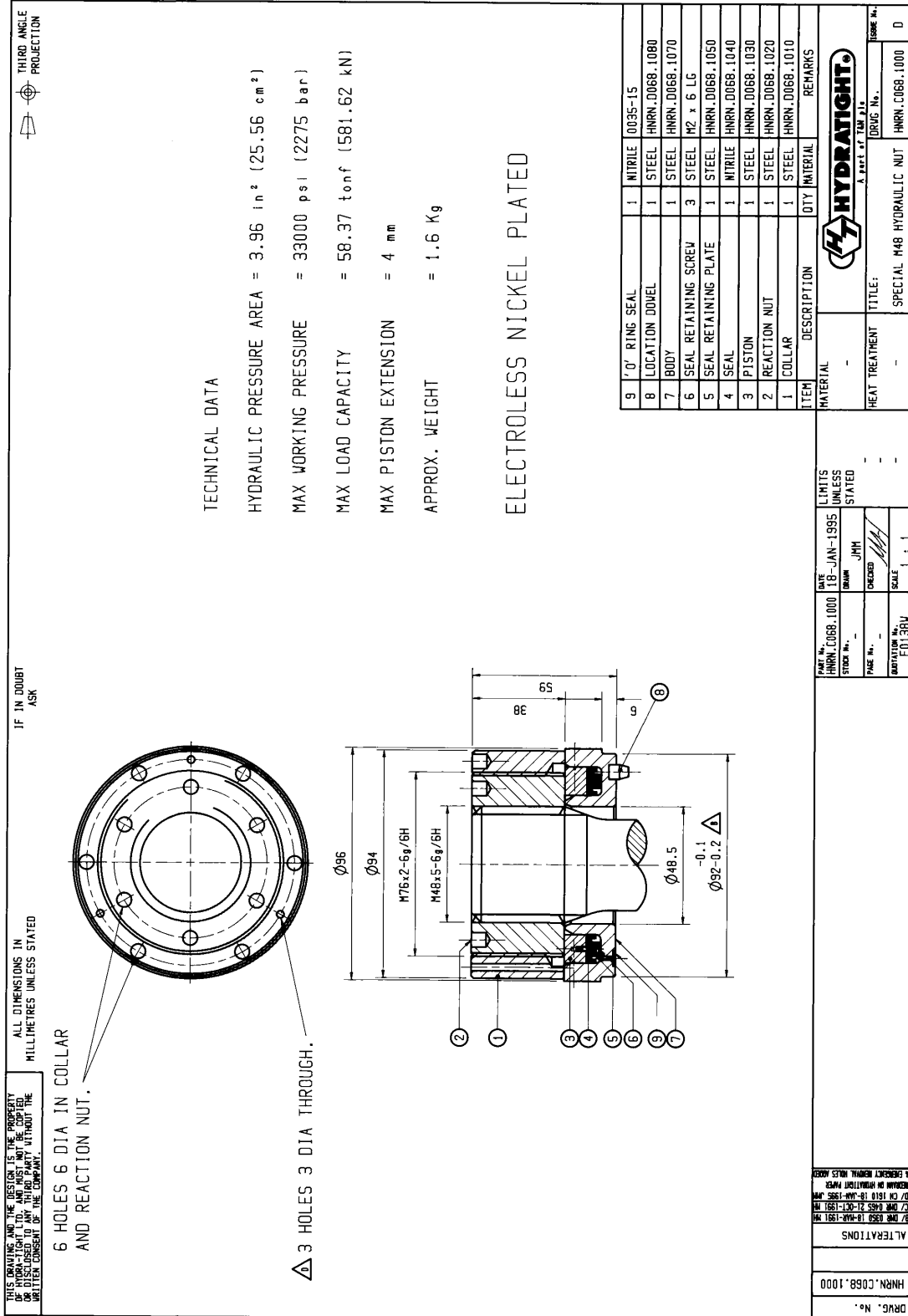
Storage of Equipment

Collar 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 body with a rust inhibitor.
4. Store tools upright.

General Arrangement Drawing





Technical Data Sheet

CUSTOMER:	BOSSARD	
TOOL SIZE:	M36 x 4	
TENSIONER ITEM No.	HNRN-C068-0900	
TENSIONER O.D.	82 mm	3.23 in
SEAL O.D.	63 mm	2.48 in
SEAL I.D.	44.5 mm	1.75 in
HYDRAULIC AREA:	1562 mm²	2.42 in²
MAX OPERATING PRESSURE:	2276 bar	33000 psi
MAX INITIAL LOAD:	355 kN	35.7 tons
MAX STROKE:	4 mm	0.16 in
MINIUM STUD PROTRUSION ABOVE JOINT FACE	51 mm	2.01 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 FOR FURTHER INFORMATION

TECHNICAL DATA SHEET

CUSTOMER:	BOSSARD	
TOOL SIZE:	M48 x 5	
TENSIONER ITEM No.	HNRN-C068-1000	
TENSIONER O.D.	96 mm	3.78 in
SEAL O.D.	81 mm	3.19 in
SEAL I.D.	57.5 mm	2.26 in
HYDRAULIC AREA:	2556 mm²	3.96 in²
MAX OPERATING PRESSURE:	2276 bar	33000 psi
MAX INITIAL LOAD:	582 kN	58.4 tons
MAX STROKE:	4 mm	0.16 in
MINIUM STUD PROTRUSION ABOVE JOINT FACE	59 mm	2.32 in

CALCULATION OF REQUIRED OPERATING PRESSURE

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

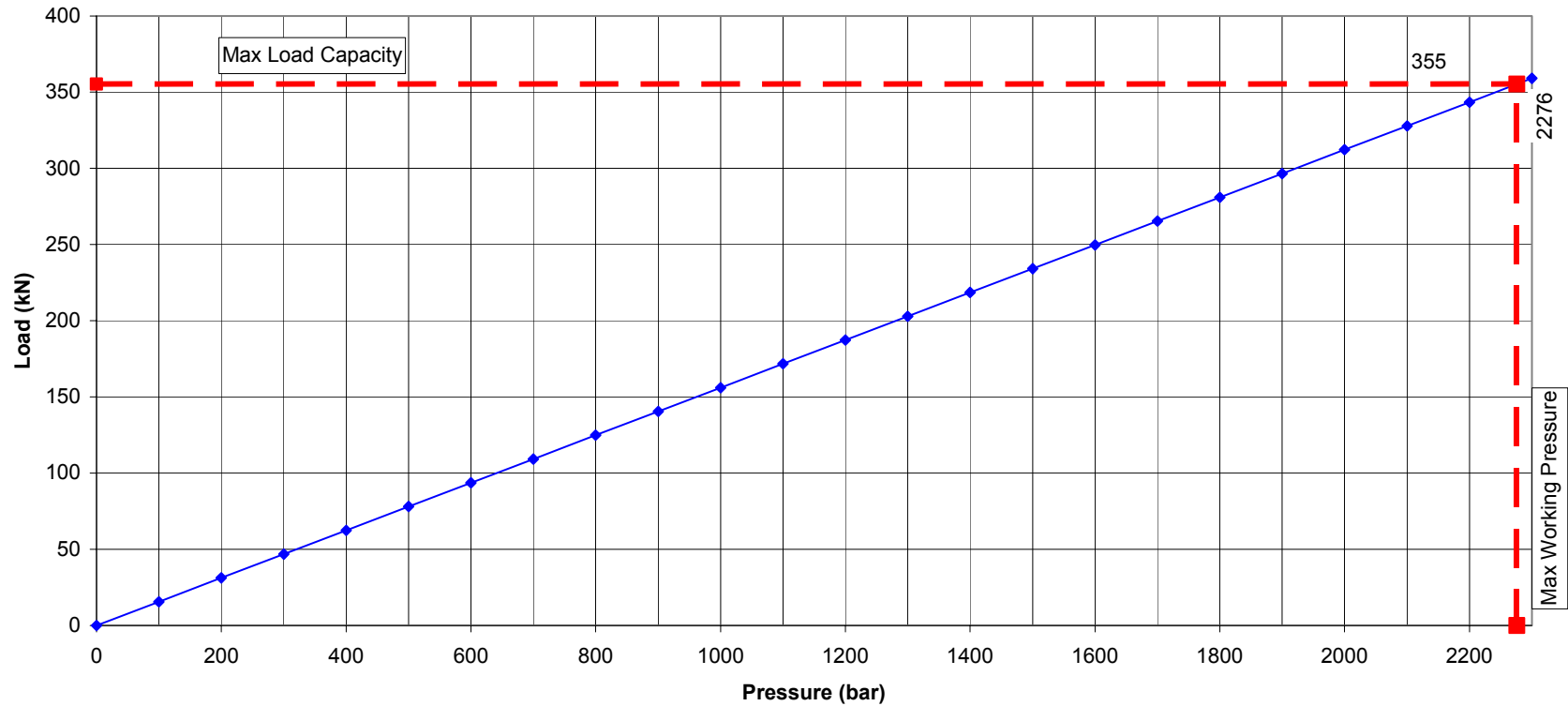
$$\text{Initial load} = \text{Residual Load} \times \text{Load loss Factor}$$

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.

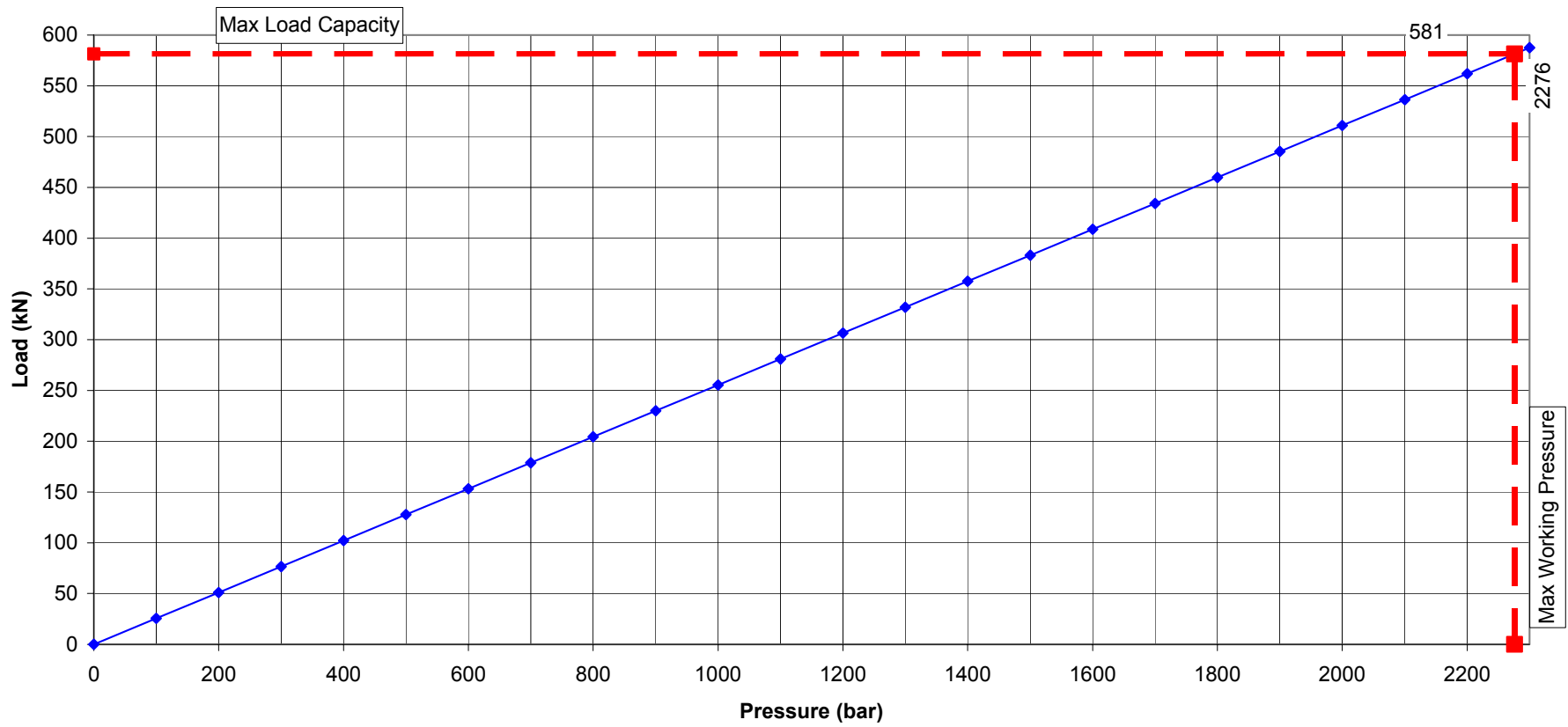
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Pressure Load Graph

PRESSURE LOAD GRAPH
HNRN-C068-0900 M36 x 4



PRESSURE LOAD GRAPH
HNRN-C068-1000 M48 x 5



Amendment Record

Revision	Description of Changes	CN No.	Date	Initials
1	Original Issue	-	19-Oct-06	MH
