FASTORQ®

The Speed of Innovation.

AUTOTORQ HYDRAULIC CHAIN PIPE WRENCH OPERATION MANUAL

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INTRODUCTION

It is recommended that the operator read this manual completely prior to operation of the hydraulic chain pipe wrench to ensure safety.

This manual covers the following AutoTORQ Hydraulic Chain Pipe Wrench models.

MODEL NUMBER	PIPE OUTSIDE DIAMETER INCHES (MM)	MAX TORQUE FT-LB (NM)	WEIGHT LB (KG)
PW1	1 to 6 (25 to 114)	10,367 (14,422)	60 (27)
PW2	2-1/8 to 5 (54 to 127)	23,185 (31,398)	114 (52)
PW3	3 to 8-1/4 (76 to 210)	24,380 (33,055)	136 (62)
PW4	4-1/4 to 10-3/4 (108 to 273)	46,620 (63,208)	189 (86)
PW5	8-1/8 to 14 (206 to 356)	83,998 (113,886)	350 (159)

Table 1

Following are dimensions for each model to determine proper fit on pipe.

MODEL NUMBER	GRIPPING WIDTH INCHES (MM)	CLEVIS WIDTH INCHES (MM)	ARM WIDTH INCHES (MM)	TOTAL WIDTH INCHES (MM)
PW1	4 (102)	2-1/2 (64)	1-1/2 (38)	9 (229)
PW2	4-1/2 (114)	3-1/2 (89)	1-1/2 (38)	10-1/2 (267)
PW3	5 (1 27)	3-1/2 (89)	1-1/2 (38)	11 (279)
PW4	5 (127)	4 (102)	1-1/2 (38)	11-1/2 (292)
PW5	7-1/4 (184)	4-1/2 (114)	2-1/4 (57)	15 (381)

Table 2

SAFETY PRECAUTIONS

1. Always wear safety glasses and safety toe shoes at a minimum.
2. Select the right tool for the job.
3. Keep tools in good condition.
4. Use tools correctly.
5. Keep tools in a safe place.
6. Wear protective clothing, gloves and safety shoes as appropriate.
7. Use lengths of assembled chain. Do not build lengths from individual components.
8. Do not attempt to rework damaged chain by replacing only the components obviously faulty. The entire chain may be compromised and should be discarded.
9. Never electroplate assembled leaf chains or components. Plating will result in failure from hydrogen embrittlement.
10. Do not weld any chain or component. Welding spatter should never be allowed to come in contact with chain or components.
11. Leaf chains are manufactured exclusively from heat-treated steels and therefore must not be annealed. If heating a chain with a cutting torch is absolutely necessary for removal, the chain should not be reused.
12. Inspect chains frequently and regularly for link plate cracking, pin turning, pin protrusion and corrosion.
13. Use only Fastorq replacement parts to ensure proper strength.
14. DO NOT exceed the maximum operating pressure of 6,000 psi.
15. Keep hands and fingers away from pinch points.

INSPECTION

Before operating the wrench, it is important to inspect for any unusual wear on the chain or other components. Look for cracks in the wrench arm and reaction unit as well as bent pins and chain elongation (more information on chains is contained in the Maintenance section of this manual).

SETUP

The AutoTORQ Wrench Head (red) and Reaction Unit (black) are shipped assembled with the length of chain to loosen and tighten the largest pipe diameter in each tool's size range. Do not attempt to use the wrench on pipe diameters outside of the stated range in Table 1 for each model. It may be necessary to remove links to obtain the best fit on the desired pipe size. To remove one or more links, loosen the splice bolts (Figure 1), remove the required number of links, and reinstall the splice bolts. When the wrench is installed on the pipe, pay close attention to the screw portion of the chain to ensure that it is not coming in direct contact with the pipe (Figure 2). Also, make sure the chain screw is fully engaged by the nut before operating wrench. It may be necessary to adjust the number of links to ensure full engagement.

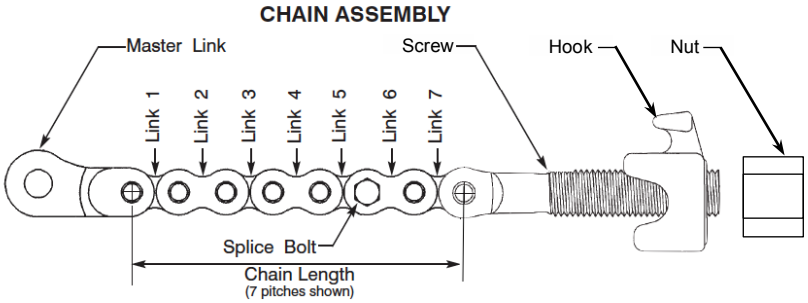
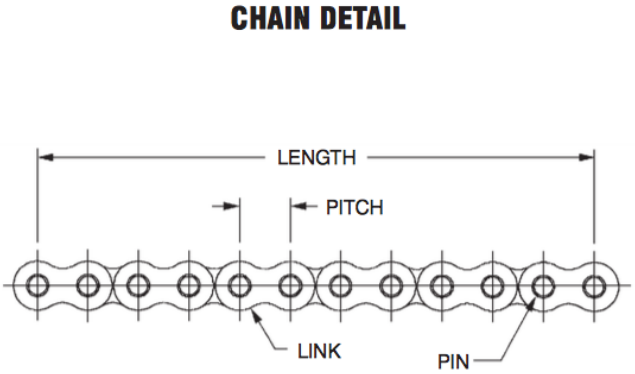
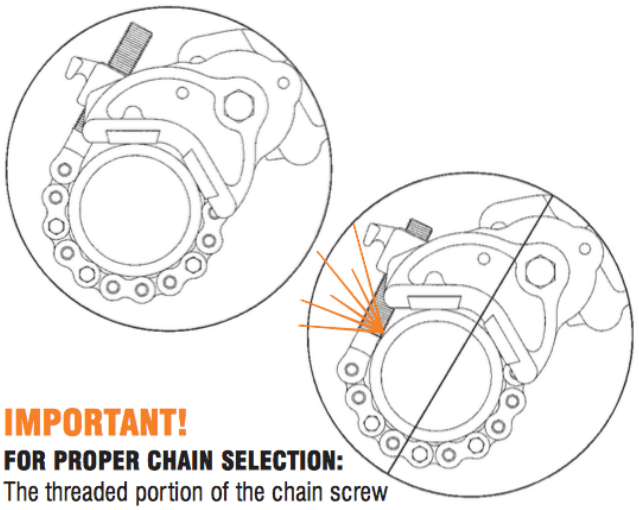


Figure 1



$$\text{ELONGATION (\%)} = \frac{\text{ACTUAL LENGTH}}{\text{ORIGINAL LENGTH}} \times 100$$



IMPORTANT!

FOR PROPER CHAIN SELECTION:
The threaded portion of the chain screw should **NEVER** contact the work piece. This places an additional load on the chain screw, which could result in breakage. Thread contact can be prevented by adding a 2 link section of chain.

Figure 2

Step 1: Install the Reaction Unit

1. Check orientation of the Reaction Unit (black) to make sure the arm will be pushing away from the nut when the cylinder strokes forward (Figure 9).
2. Install the Reaction Unit (black) on the stationary portion of the pipe assembly by placing the jaw on the pipe and wrapping the chain around the pipe (Figure 3).
3. Fit the hook over the pins in the jaw housing (Figure 4).
4. Tighten the nut with a wrench to take all the slack out of the chain. Pushing the wrench arm towards the nut will make tightening the nut easier (Figure 5).

Figure 3

Figure 4

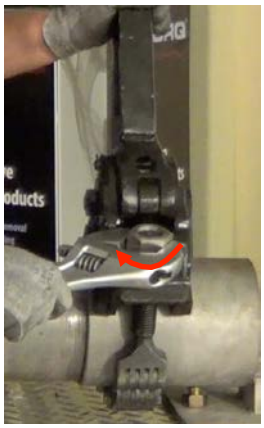


Figure 5

Step 2: Install the Wrench Arm

1. Check orientation of the Wrench Arm (red) to make sure the arm will be pushing away from the nut when the cylinder strokes forward (Figure 9).
2. Install the Wrench Arm on the portion of the pipe to be turned by placing the jaw on the pipe and wrapping the chain around the pipe (Figure 6). Make sure to leave space between the Wrench Arm and Reaction Unit for installation of the cylinder (Figure 9).
3. Fit the hook over the pins in the jaw housing (Figure 4 & 5).
4. Tighten the nut by hand until snug. Further adjustment may be necessary to make sure the Wrench Arm returns and resets by itself when the cylinder retracts.

Figure 6

Step 3: Install the Cylinder

1. Install the Cylinder by orienting the Reaction Block between the Wrench Head and Reaction Unit, sliding the Reaction Pin through the Reaction Block and Reaction Unit, and securing with nut and Cotter pin.
2. Attach Clevis to Wrench Arm by sliding the Clevis Pin through the Wrench Arm and Clevis and securing with the nut and Cotter pin.

Figure 7

Figure 8

The following picture shows the proper complete setup of the wrench on a pipe.

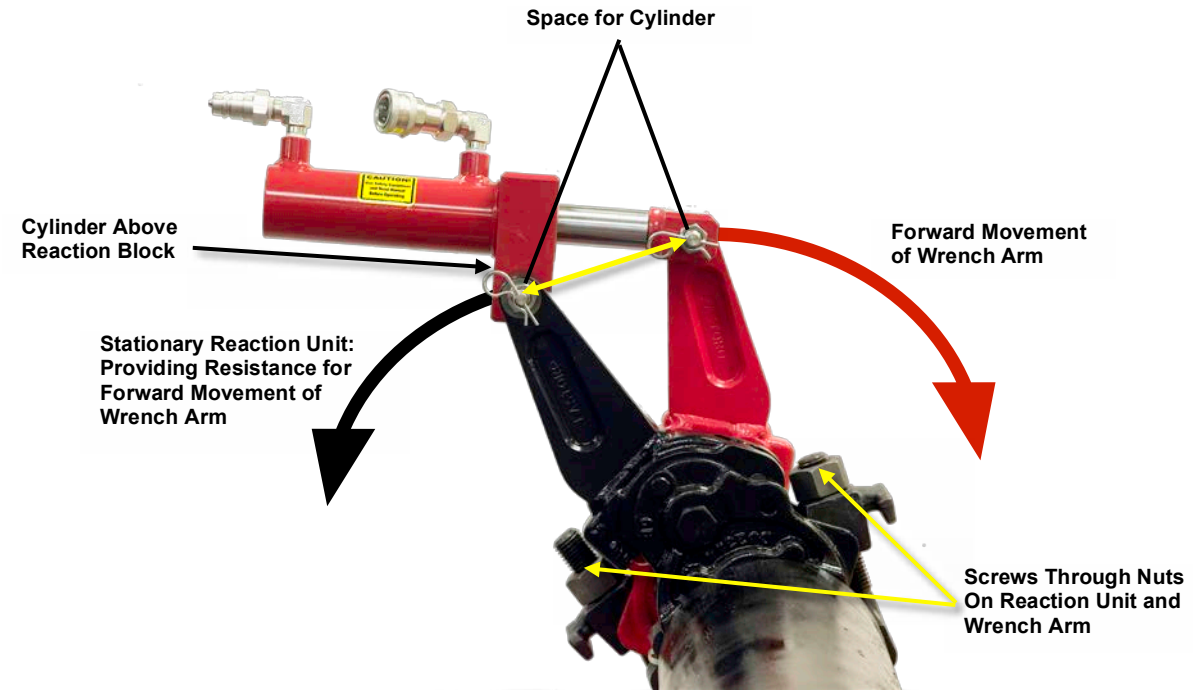


Figure 9

Watch the video for complete setup and operation of the AutoTORQ Hydraulic Chain Pipe Wrench at the Fastorq YouTube Channel https://youtu.be/He-HFhhjl4s.

OPERATION

Any HPU (Hydraulic Power Unit) capable of producing at least 6,000 psi can power the AutoTORQ Hydraulic Chain Pipe Wrench. The HPU must have a 4-way valve for operating double-acting cylinders.

WARNING: Before operating the wrench, make sure the relief valve on HPU is set below the maximum operating pressure of 6,000 psi. Damage to equipment and/or injury to personnel may result from not following this instruction.

Tightening Pipe

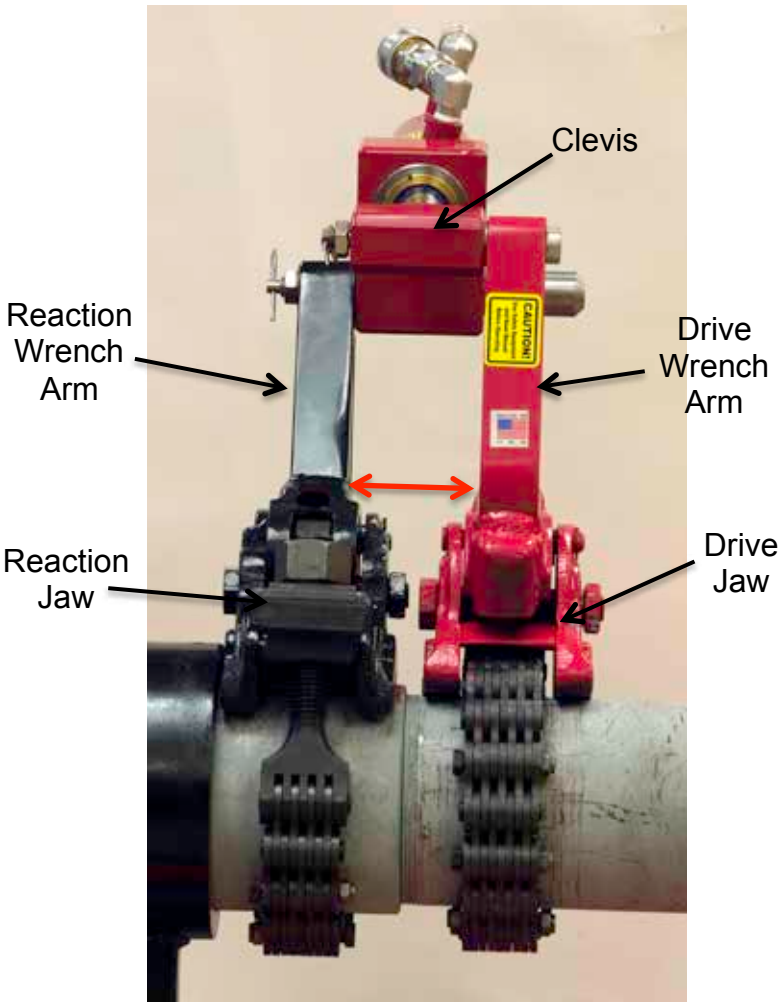
1. Connect the 2 hydraulic hoses from the HPU to the Hydraulic Chain Pipe Wrench ensuring that the feed line is at the rear of the cylinder and the return line is at the front of the cylinder. It may be necessary to change fittings on the wrench or hoses depending on the HPU used.
2. Use the Torque Calculation Spreadsheet (please contact Fastorq at 281.449.6466 or sales@fastorq.com if you do not have a copy of the spreadsheet) or a torque chart specific to the pipe size being assembled. The pressure setting for the HPU will correspond to a target torque value.
3. With the Clevis Pin removed from the Wrench Arm, stroke the cylinder forward by applying pressure on the feed circuit of the HPU until the stops.
4. Continue applying pressure and turn the relief valve in or out to achieve the proper pressure as indicated on the gauge on the HPU.
5. Return the cylinder by applying pressure to the return circuit.
6. Advance the cylinder once again to verify that it reaches the desired pressure.
7. Reconnect the Clevis Pin to the Wrench Arm and secure with the nut and Cotter pin. Tighten the pipe by alternating the pressure on the feed and return circuits to move the Wrench Arm back and forth. The wrench is designed to function with the assistance of an operator for positioning before and after each stroke. It is important for the operator to practice positioning the driver and reaction jaws for effective grip and manipulation of the wrench after each stroke so that the driver jaw slides back smoothly and re-grips the pipe for the next stroke.
8. When the Wrench Arm is no longer able to advance, watch the gauge on the HPU to ensure that the target pressure has been reached.
9. This completes the tightening sequence.

Loosening Pipe

1. Connect the 2 hydraulic hoses from the HPU to the Hydraulic Chain Pipe Wrench ensuring that the feed line is at the rear of the cylinder and the return line is at the front of the cylinder. It may be necessary to change fittings on the wrench or hoses depending on the HPU used.
2. With the Clevis Pin removed from the Wrench Arm, stroke the cylinder forward by applying pressure on the feed circuit of the HPU until the stops.
3. Continue applying pressure and turn the relief valve in or out to achieve 6,000 psi. pressure as indicated on the gauge on the HPU.
4. Return the cylinder by applying pressure to the return circuit.
5. Advance the cylinder once again to verify that it reaches the desired pressure.

6. Reconnect the Clevis Pin to the Wrench Arm and secure with the nut and Cotter pin. Tighten the pipe by alternating the pressure on the feed and return circuits to move the Wrench Arm back and forth. The wrench is designed to function with the assistance of an operator for positioning before and after each stroke. It is important for the operator to practice positioning the driver and reaction jaws for effective grip and manipulation of the wrench after each stroke so that the driver jaw slides back smoothly and re-grips the pipe for the next stroke.
7. When the Wrench Arm no longer meets resistance from the pipe connection, the pipe may be turned to completely disassemble without the assistance of the wrench.
8. This completes the loosening sequence.

Preventing Twisting



The image on the left shows the AutoTORQ Hydraulic Chain Pipe Wrench set up properly on a pipe.

When set up properly, the 2 jaws should be close but not touching. Each wrench arm should be perpendicular to the clevis.

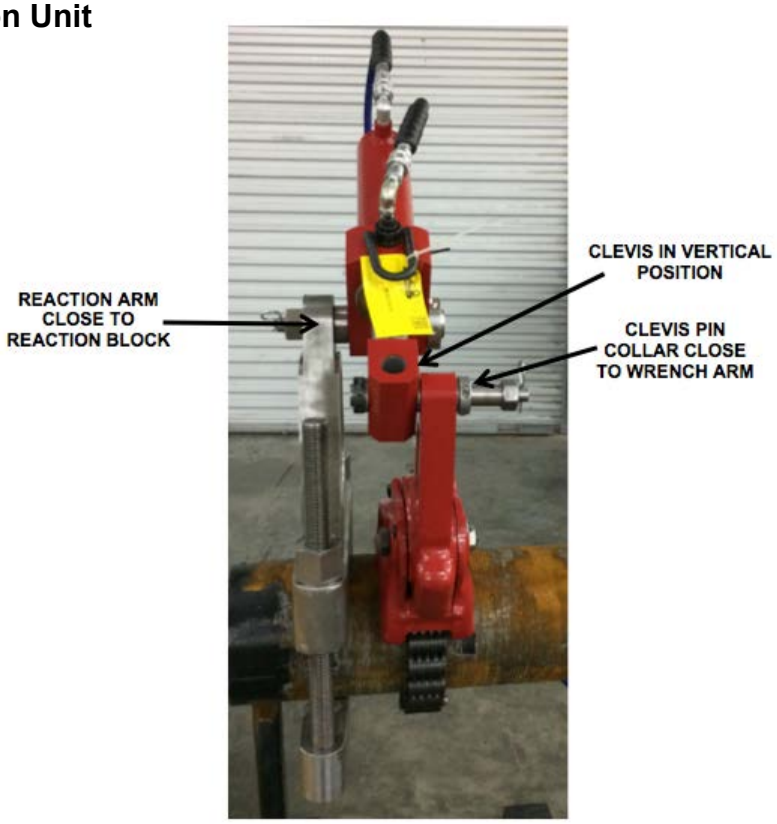
It is important to keep the distance between the 2 jaws to a minimum to avoid damage to the wrench. The double red arrow indicates this distance.

As pipe is loosened, the tendency is for the 2 jaws to drift apart. The operator may need to adjust the orientation of the 2 jaws periodically throughout the wrench operation.

If the 2 jaws are allowed to drift apart significantly, the wrench will twist out of alignment with each forward stroke of the cylinder. At higher torque, this may cause damage to the clevis, cylinder assembly or jaws.

Installing the Optional Low Profile Reaction Unit

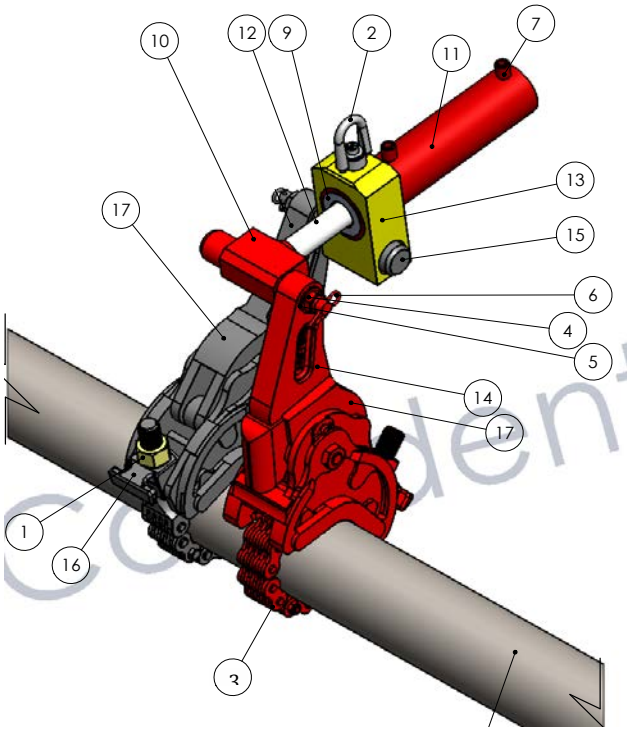
1. Sit the wrench arm piece of the Low Profile Reaction Unit on top of the pipe.
2. Slide the threaded rods on the bottom piece of the Low Profile Reaction Unit up through the top piece holes.
3. Slide the ZipNuts onto the threaded rods from the top down and secure by hand tightening.
4. Install the drive wrench arm in the same manner as described in the previous section.
5. Install the cylinder and secure the reaction pin and clevis pin. Make sure to rotate the clevis so that the clevis pin is through the short side.
6. Ensure the installed unit looks like the picture on the right. It is possible to set up the wrench with the drive wrench and reacion wrench reversed as well.



TROUBLESHOOTING

SYMPTOM	CAUSE	SOLUTION
Cylinder does not extend or retract	Hoses are not properly connected to the cylinder or HPU	Disconnect and reinstall hoses. Test cylinder for proper operation. It may be necessary to remove any dirt or debris from the fittings.
Wrench is loosening instead of tightening pipe	Wrench is not set up properly	See Figure 9 on Page 6 for correct setup.
Wrench is not gripping the pipe	Chain nut is not tight enough or jaws are dirty	Tighten the chain nut until the Wrench Arm grips the pipe but can still release on the return stroke.
Hoses are difficult to connect to cylinder or HPU	Hoses are pressurized (hydraulic lock)	Use Channel Lock type wrench to turn collar on coupler until pressure is released.

PARTS LIST



ITEM	DESCRIPTION	PART NUMBER				
		PW1	PW2	PW3	PW4	PW5
1	CHAIN HEX NUT	90521A247	90521A260	90521A260	90521A260	90521A044
2	HOIST RING	2994T61	2994T61	2994T61	2994T61	2994T61
3	DRIVE CHAIN ASSEMBLY	131-45-13D	151-45-11D	151-45-17D	151-45-23D7D	161-45-25D
4	CLEVIS HEX NUT	91847A540	91847A550	91847A550	91847A570	N/A
5	CLEVIS PIN ASSEMBLY	PWC150LGBHP002	PWC200015	PWC200014	PWC200014	PWC325005
6	HAIR PIN	92391A058	92391A058	92391A058	92391A058	N/A
7A	HYDRAULIC NIPPLE (NOT SHOWN)	3010-2	3010-2	3010-2	3010-2	3010-2
7B	HYDRAULIC COUPLER (NOT SHOWN)	3050-2	3050-2	3050-2	3050-2	3050-2
8	90° ELBOW	2085-4-4	2085-6-4	2085-6-4	2085-6-4	2085-6-4
9	CYLINDER GLAND	B2K635	A2K1159	B86205	B2K1138	A2K1027
10	CLEVIS	A2K1125	A2K1161	A2K1150	B2K1140	A2K1029
11	CYLINDER BARREL	B2K634	B2K1157	B2K846	B2K1135	B2K1026
12	CYLINDER ROD	B2K636	B2K1160	B2K841	B2K1136	B2K1028
13	CYLINDER REACTION BLOCK	A2K1126	B2K1158	B2K843	B2K1139	B2K1031
14	WRENCH (DRIVER) ARM	A2K1129D	B2K1155D	B2K1149D	B2K1142D	MDA8184L23D
15	REACTION PIN ASSEMBLY	A2K1127	B2K1162	B2K1151	B2K1145	PWC325005
16	REACTION CHAIN ASSEMBLY	131-45-15D	151-4513D	151-45-19D	151-45-25D7R	161-45-27D
17	REACTION ARM	A2K1129R	B2K1155R	B2K1149R	B2K1142R	MDA8184L23R
18	CYLINDER PISTON (NOT SHOWN)	A2K637	A2K847	A2K847	A2K1137	B2K1032
19	CYLINDER SEAL KIT (NOT SHOWN)	HCSK150	HCSK200	HCSK200	PWSK250	PWSK325
20	2-PIECE CLAMP-ON COLLAR FOR CLEVIS PIN (NOT SHOWN)	3370K19	3370K19	6436K17	6436K17	6436K45
21	CHAIN STUD HAIRPIN (NOT SHOWN)	92391A058	92391A058	92391A058	92391A058	92391A210
22	2-PIECE CLAMP-ON COLLAR FOR REACTION PIN (NOT SHOWN)	3370K26	6436K21	3370K35	3370K39	3370K39
22	REACTION PIN nut	91847A540	91847A540	91847A5470	91847A5470	N/A
23	REACTION PIN Hair Pin	92391A058	92391A058	92391A058	92391A058	N/A

CHAIN GUIDE

The service life of leaf chains can be altered by a variety of adverse operating conditions. The following information discusses the most important of these conditions for consideration when operating or scheduling replacement of leaf chain systems.

Overloading / Shock Load / Side Loading

• Attempting to “inch” loads which are beyond the rated capacity of the tool. •Striking the tool with a hammer or other object while force is being exerted in an attempt to loosen a frozen joint.
•Side pull on the chain. Pulling or pushing on the wrench from the side can cause side pull in a direction that is not along a perpendicular plane, inadequate support of the part being broken out, and improper seating of the part being broken out in a vise. Improper seating will occur when the O.D. of the part is not consistent within the width of the jaw.

Environmental Conditions

Wrench chains operate in widely varying environments, from wet outdoor conditions to mildly or highly corrosive industrial atmospheres. They can also be exposed to abrasives such as sand and grit.

The possible effects include:
Moisture - corrosion and rust reduce chain strength by causing pitting and cracking.
Temperature - very cold temperatures reduce chain strength by embrittlement. Chemical Solutions or Vapors - Corrosive attack of the chain components grain structure and / or the mechanical connections between the chain components (crevice corrosion) may occur. Cracking often is microscopic. Propagation to complete failure can be eventual or sudden.
Abrasives - Accelerated wearing and scoring of the articulating chain members (pins and plates) may occur, with a corresponding reduction in chain strength. Due to inaccessibility of the bearing surfaces (pin surfaces and plate apertures), wear and scoring are not readily noticeable.

These conditions, when coupled with normal chain wear and inherent residual stress (normally in the chain as constructed), can result in environmentally assisted failure.

It is impossible to predict chain life under complex conditions, as the degree of hostility and its effects are dependent on many variables such as temperature, time of exposure, concentration of corrosive atmosphere or medium, degree of abrasive wear, etc. Establishing the degree and frequency of unpredictable dynamic loading is also difficult.

Normal Life Expectancy

A leaf chain's normal life expectancy can be expressed as a maximum percent of elongation. This is generally between 2% to 3% of pitch. As the chain flexes back and forth, the bearing joints (pins and inside link plates) gradually wear from articulation.

As with all steel bearing surfaces, the precision, hardened steel joints of leaf chain require a constant film of oil between mating parts to prevent wear and to resist corrosion.

Lubrication

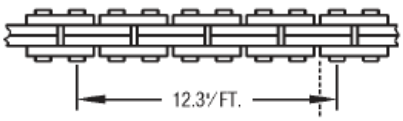
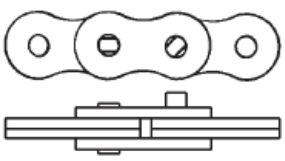
One of the most important but often overlooked factors is adequate lubrication. In addition to reducing internal friction, maintaining a film of oil on all chain surfaces will inhibit rusting and corrosion. This is important as corrosion of highly stressed hardened steel chain components can cause a major reduction in the load capacity of leaf chain and result in link plate cracking.

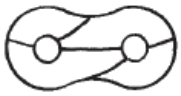
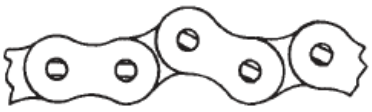
Protection from corrosion is important in storage as well as in service. The factory lubricant applied to the chain is a “Fingerprint Neutralizing Water Displacing Corrosion Preventive.” This is an excellent rust and corrosion inhibitor for chains in storage. When installing these chains new, do not attempt to steam clean or degrease this lubricant. A grade of SAE30 or 40 weight, non-detergent motor oil should be used as supplemental lubricant and a film of this oil should be maintained on all surfaces and internal bearing joints. Also, do not attempt to paint new chains. Though painting may help inhibit corrosion, it will seal off critical clearances and restricts oil from reaching the pin surfaces where it is needed for good joint lubrication.

When operating in dusty environments, lubricated chains will accumulate a paste-like buildup of grime. At periodic intervals, this buildup should be removed by cleaning and the chain should be immediately re-lubricated. Do not use caustic or acid type cleaners; use a stiff brush and a certified safe petroleum base solvent.

Periodic Inspection of Chain

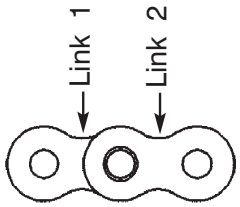
1. PRIOR TO EACH USE, LEAF CHAIN AND TOOLS SHOULD BE INSPECTED FOR SERVICEABILITY AND LUBRICATION.
2. USE ONLY FASTORQ REPLACEMENT PARTS – NO OTHER PARTS ARE OF COMPARABLE STRENGTH, QUALITY, AND INTERCHANGEABILITY.

APPEARANCE AND / OR SYMPTOM	PROBABLE CAUSE	CORRECTION
Excessive Length (Elongation) 	Normal Wear Permanent deformation (stretch) from overload	Replace chain Replace chain and correct cause of overload
Abnormal Protrusion of Pins 	Overloading Inadequate lubrication Side Loading	Replace chain and correct cause of overload Replace chain and improve lubrication Replace chain and correct cause of side load

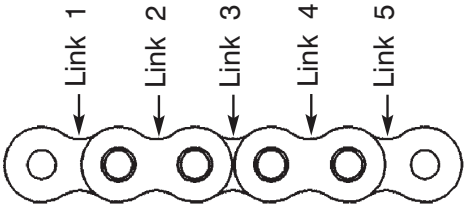
APPEARANCE AND / OR SYMPTOM	PROBABLE CAUSE	CORRECTION
Cracked Plates (Fatigue) 	Overloading Side Loading	Replace chain and correct cause of overload Replace chain and correct cause of side load
Arc-Like Cracked Plates (Stress Corrosion) 	Severe rusting or exposure to acidic or caustic medium, plus static stress at press fit between pin and plate.	Replace chain and protect from hostile environment
Enlarged Holes 	Overloading	Replace chain and correct cause of overload
Cracked Plates (Corrosion Fatigue) Perpendicular to Pitch Line, plus rust or other evidence of chemical corrosion 	Corrosive Environment	Replace chain and protect from hostile environment
Fractured Plates (Tension Mode) 	Overloading	Replace chain and correct cause of overload
Tight Joints 	Dirt or foreign substance packed in joints Corrosion and rust Bent pins	Clean and relube Replace chain and protect from hostile environment Replace chain

CHAIN IDENTIFICATION GUIDE

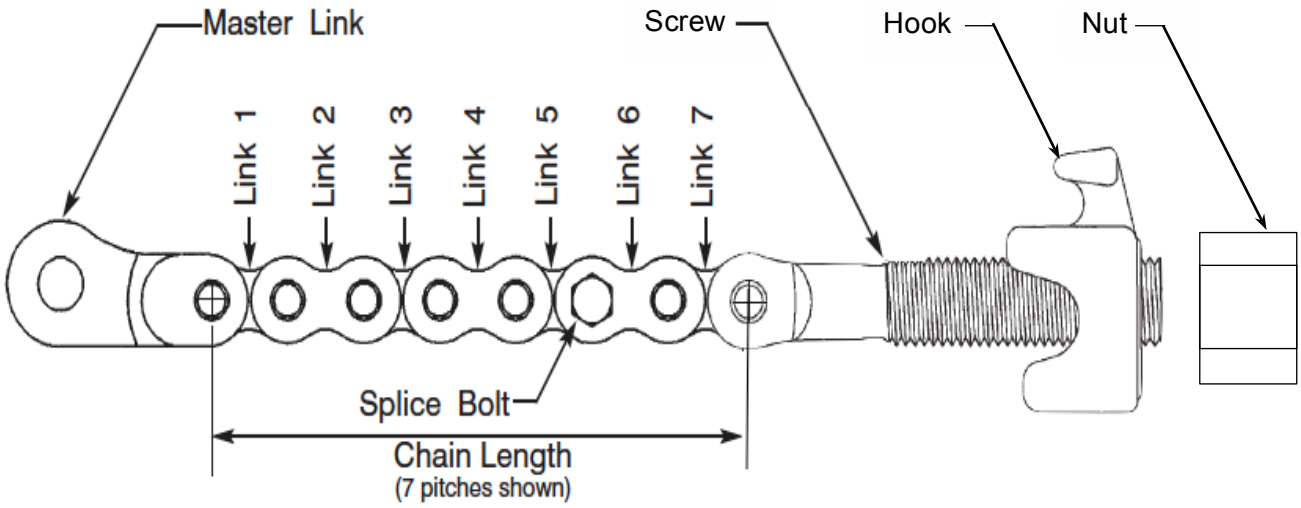
2 LINK SECTION



5 LINK SECTION



CHAIN ASSEMBLY



WHAT A CHAIN PART NUMBER TELLS YOU

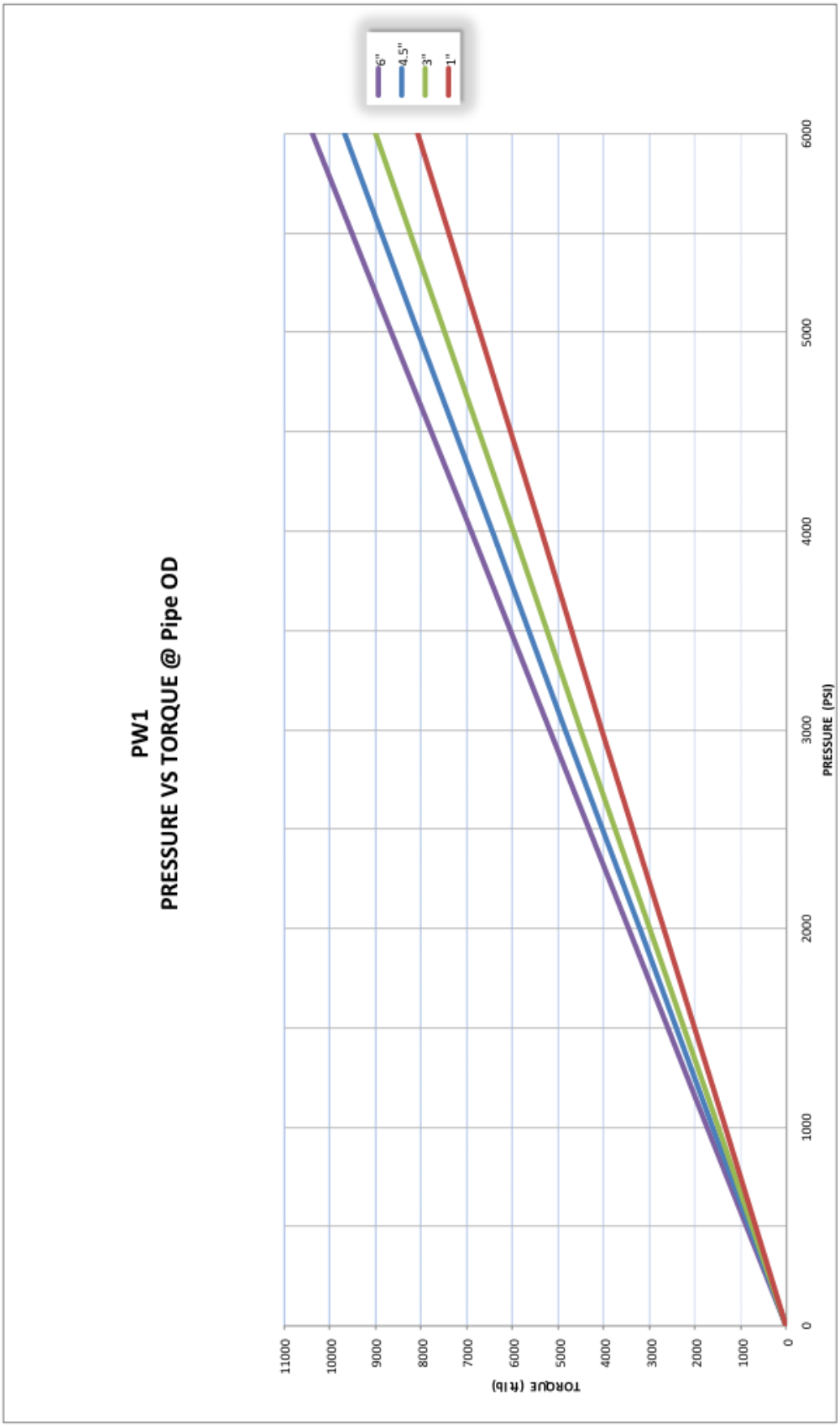
161 – 45 – 07 D

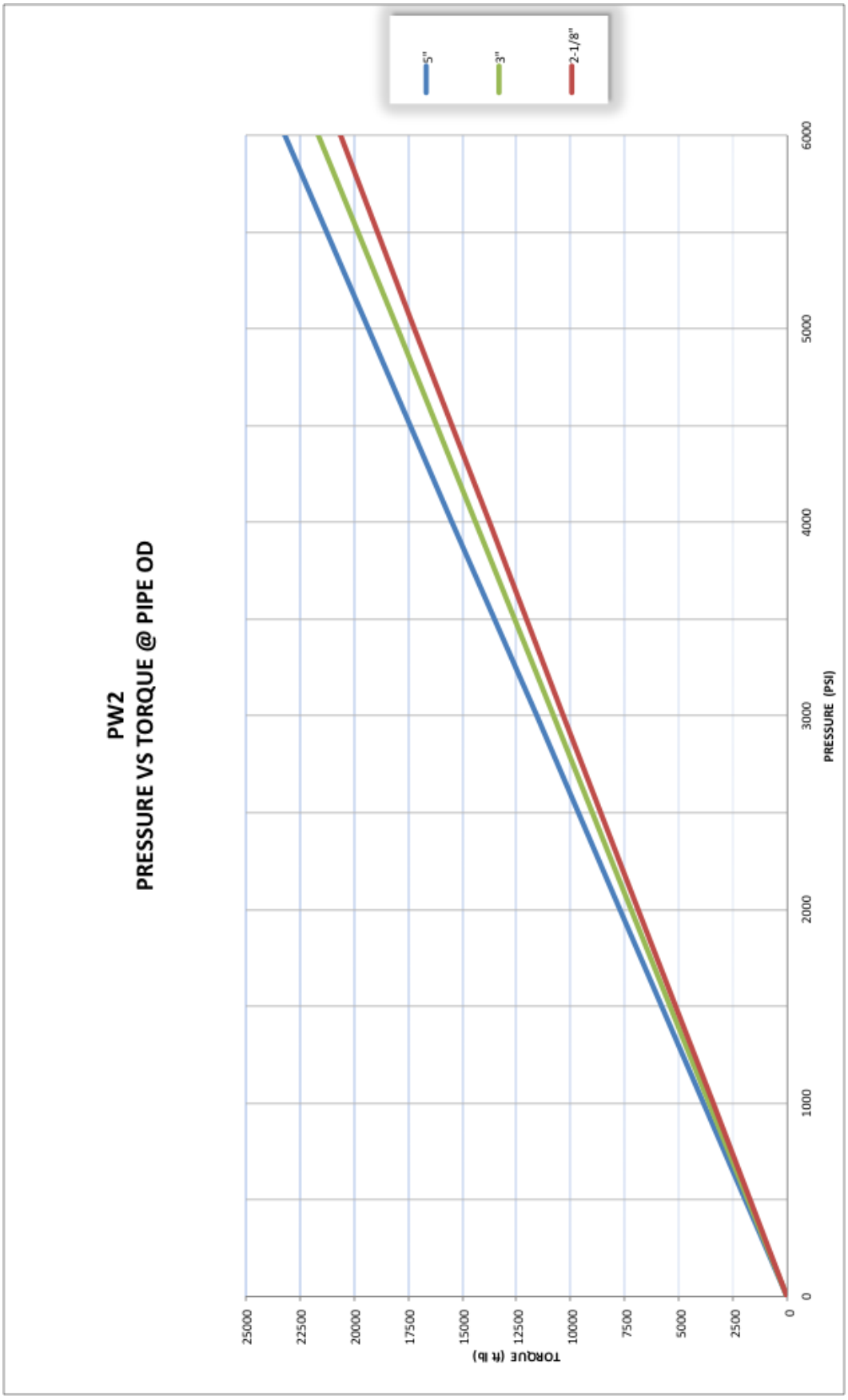
Chain Size
131
151
161
181
201

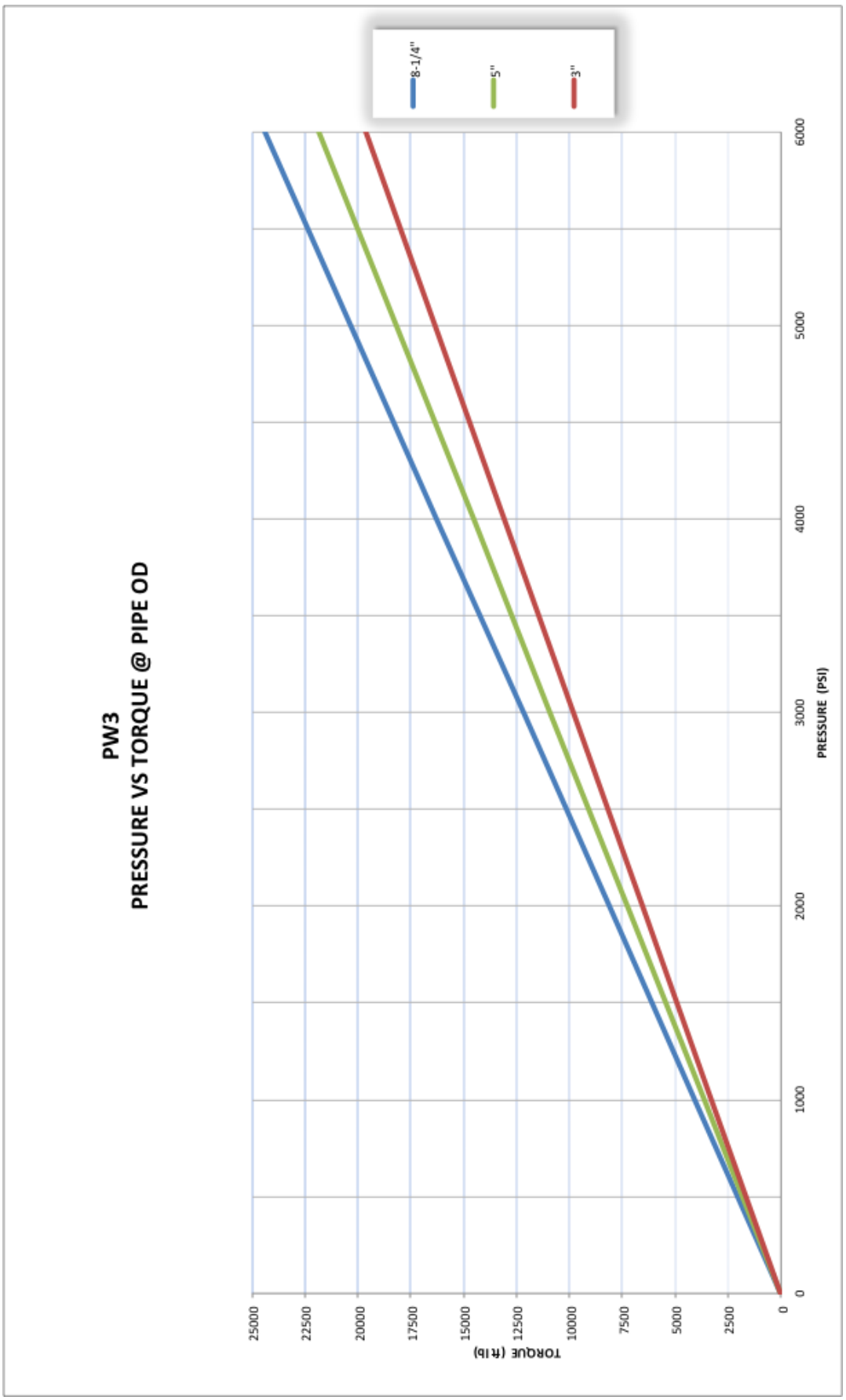
Chain Combination
(see page 7)
22
34
44
45
56

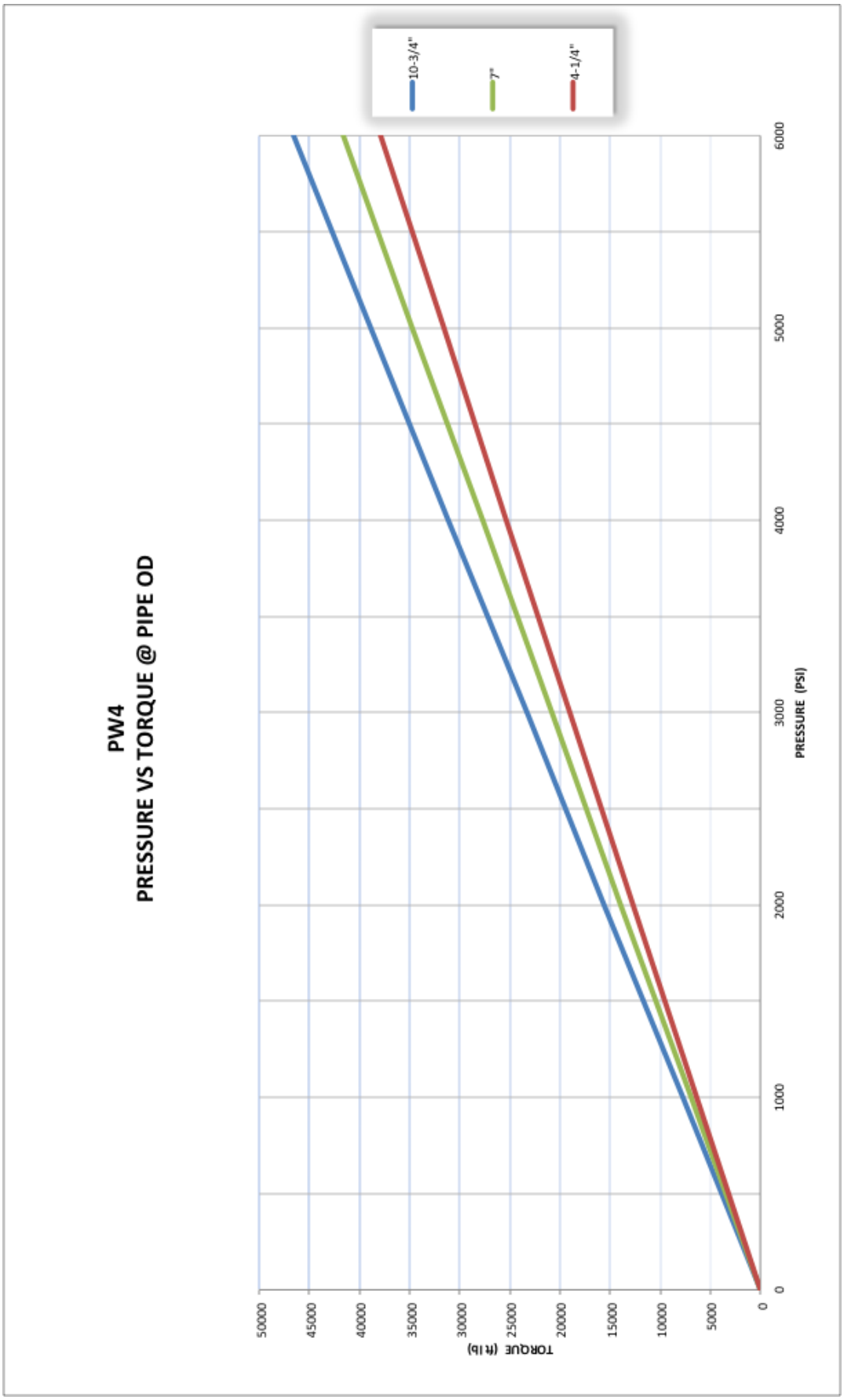
Tong Type
D = Drill Pipe Tong

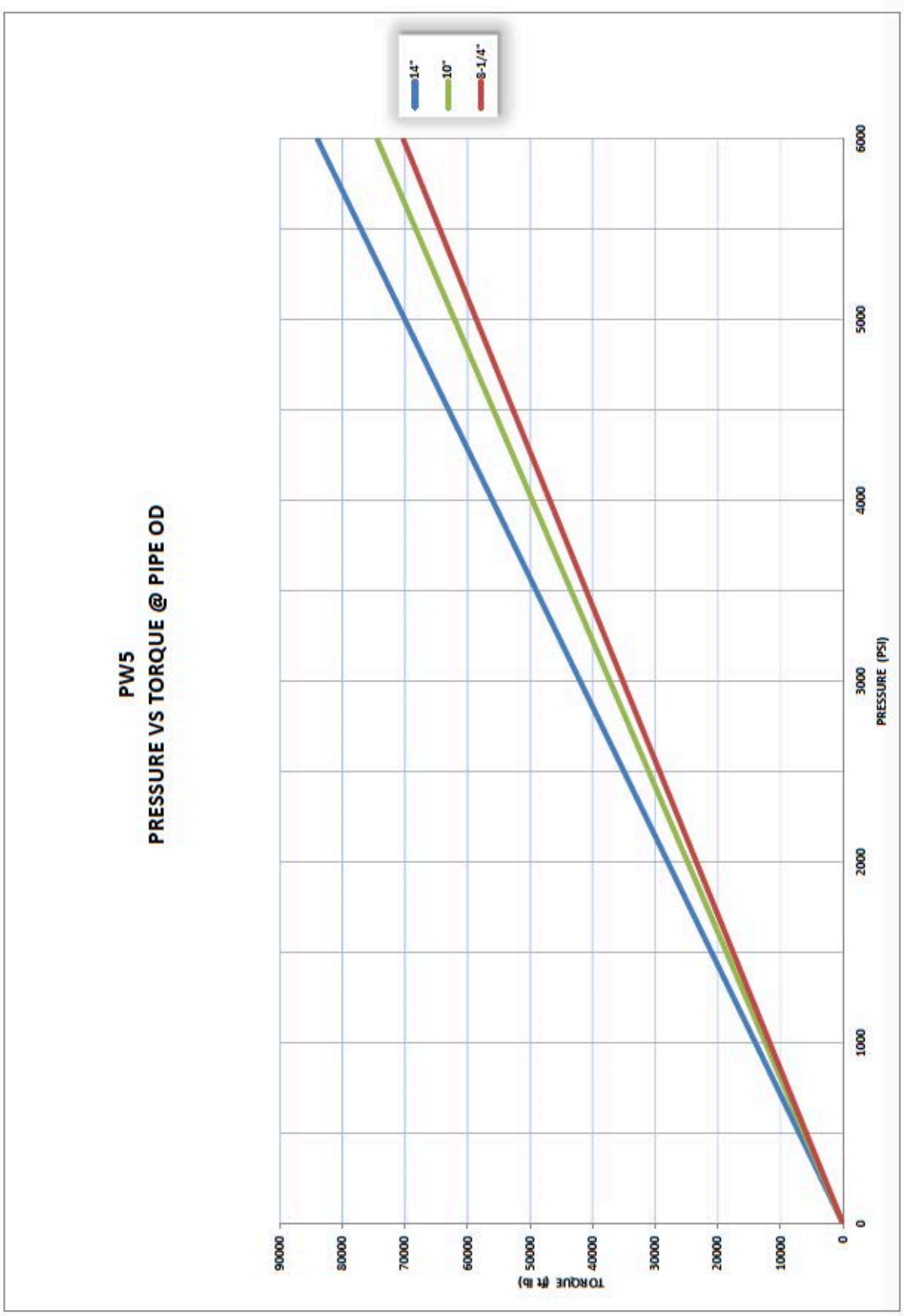
Chain Length (pitches)
(see above)


PW1
PRESSURE VS TORQUE @ Pipe OD
6"
4.5"
3"
1"
TORQUE (ft lb)
11000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
PRESSURE (PSI)
0
1000
2000
3000
4000
5000
6000


PW2
PRESSURE VS TORQUE @ PIPE OD
5"
3"
2-1/8"
TORQUE (ft lb)
25000
22500
20000
17500
15000
12500
10000
7500
5000
2500
0
PRESSURE (PSI)
0
1000
2000
3000
4000
5000
6000


PW3
PRESSURE VS TORQUE @ PIPE OD
8-1/4"
5"
3"
TORQUE (ft lb)
25000
22500
20000
17500
15000
12500
10000
7500
5000
2500
0
PRESSURE (PSI)
0
1000
2000
3000
4000
5000
6000


PW4
PRESSURE VS TORQUE @ PIPE OD
10-3/4"
7"
4-1/4"
TORQUE (ft lb)
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
PRESSURE (PSI)
0
1000
2000
3000
4000
5000
6000


PW5
PRESSURE VS TORQUE @ PIPE OD
14"
10"
8-1/4"
TORQUE (ft lb)
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
PRESSURE (PSI)
0
1000
2000
3000
4000
5000
6000