



Innovations in Drill Stem Safety Valve Technology

DATA BOOK

JCS GROUP LLC

PURCHASE ORDER: 1088

PART NUMBER: NUX-812316-07AC2

UPPER TOP DRIVE VALVE NX

TRACE: 18364-1-1

FROM: PACKARD INTERNATIONAL, INC

22397 WHITE OAK DRIVE
CONROE, TX 77306-8859
281-399-8771
SO-18364
25 APRIL 2023

TO: JCS GROUP LLC

15319 GARETT GREEN CIR
HOUSTON, TEXAS 77095
USA

REGISTERED FIRM ISO-9001:2015 CERTIFICATE #0163



Innovations in Drill Stem Safety Valve Technology

TABLE OF CONTENTS

Material Certification -----	1
Magnetic Particle Certification -----	4
Shot Peening Certification -----	5
Coating Certification -----	6
Test Charts -----	7
Maintenance Sheet -----	9
BOM -----	15
Packard International's Certificate of Compliance/Origin -----	17

Steel Certificate of Test

1835 Dueber Ave. S.W.
Canton, Ohio 44706

ID #0569627-3

Page 1 of 3

TIMKEN STEEL 

2/10/2023

O T
L O
D
PACKARD INTERNATIONAL
22397 White Oak Drive
Conroe, TX 77306-8859 USA

S
H T
I O
P
PACKARD INTERNATIONAL
22397 White Oak Drive
Conroe, TX 77306-8859 USA

Customer Order: 0026214-00 Customer Part Number: MS-43-900
Mill Order: 21945-A (2287601) Heat Number(s): X1569

Description of Material

DIAMETER: 9.000 in (228.600 mm)
Shape: RD
Prod Type: BAR
Sales Type: HS220-27Ca4
Int Quality: ELECTRIC FURNACE-VACUUM DEGAS-ULTRASONIC
Condition: FORGED ROLLED - NORMALIZE - QUENCH - TEMPER - STRESS FREE

Specification

- PACKARD INTERNATIONAL MS-43 Rev. 0 12/06/2016 EXCEPT AS NOTED
- API 7-1 Rev. FIRST EDITION 03/01/2006 FOR UT ONLY - EXCEPT AS NOTED
- ASTM E1001 Rev. 11 08/01/2011 EXCEPT AS NOTED
- ASTM A29 / A29M Rev. 20 07/01/2020 EXCEPT AS NOTED
- ASTM A388 / A388M Rev. 19 09/01/2019 AS APPLICABLE TO RAW MATERIAL - EXCEPT AS NOTED
- ASTM E23 Rev. 18 11/01/2018
- ASTM A370 Rev. 20 09/01/2020

Chemistry Information

	%C	%Mn	%P	%S	%Si	%Cr	%Ni	%Mo	%Cu	%Al	%V	%As	%B	%Ca	%Cb
7C Ladle Min:	.28	.75			.15	.75	1.65	.35			.050				
.C Ladle Max:	.33	1.00	.025	.005	.35	1.00	2.00	.50	.35		.100				
X1569 Ladle:	.32	.97	.007	.001	.32	.97	1.88	.47	.24	.028	.081	.006	.0003	.0017	.003

	%Co	%Pb	%Sb	%Sn	%Ti	%W	%Zr
SPEC Ladle Min:							
SPEC Ladle Max:							

X1569 Ladle: .012 .0010 .001 .009 .002 .006 .002

Testing of elements performed at TimkenSteel Chemistry Labs except where noted.

Metallurgy Information

SPEC: Grain Size ASTM E112 SIZE 5/FINER

Heat X1569 SIZE: 7

When shipping document is attached it becomes part of this certification.

We certify the above materials have been inspected and tested in accordance with the methods prescribed in the governing specifications and consistent with our Standard Commercial Terms and Conditions for Sale, Manufacture, and Shipping, which are incorporated into and made part of this certification. The results of such inspections and tests conform with the applicable requirements including the purchase order, specification(s) and exception(s). This certificate or report shall not be reproduced except in full, without the written approval of TimkenSteel Corporation.

Notarized: _____

NOTARY PUBLIC

by



Ashley Langdon, Met Lab Technician

TimkenSteel Corporation

Steel Certificate of Test

1835 Dueber Ave. S.W.
Canton, Ohio 44706

ID #0569627-3

Page 2 of 3

TIMKEN STEEL 

2/10/2023

Customer Order: 0026214-00

Customer Part Number: MS-43-900

Bill Order: 21945-A (2287601)

Heat Number(s): X1569

Metallurgy Information

SPEC: Hardness ASTM E10 UOM BRINELL HARDNESS 285 Min LOCATION SURFACE FREQUENCY ONE END EACH
PIECE

BRINELL HARDNESS

PIECE	RESULT
01	361
01-2	358
02	346
03	371
04	364
05	370
06	350
07	362
08	360
09	354
10	373
11	368
12	365
12-2	361

SPEC: Hardness ASTM E10 UOM BRINELL HARDNESS 285 Min LOCATION 3 READ / 4 QUAD CMMT FREQUENCY PER
CUST SAMPLE PLAN REPORTING AVERAGE & INDIVIDUAL

Rockwell C Hardness

PIECE NO.	SURF	Results		
		1.	2.	3.
01F - Q1	375	378	346	1"BS
?	372	374	377	
,	370	376	376	
QA	371	374	377	
03F - Q1	373	372	366	
Q2	370	376	369	
Q3	376	373	369	
Q4	370	374	367	
12B - Q1	371	373	374	
Q2	373	375	375	
Q3	373	374	373	
Q4	372	373	367	

SPEC: Impacts ASTM E23 DIRECTION LONGITUDINAL ENERGY AVERAGE 35 Min ENERGY INDIVIDUAL 24 Min
ENERGY UOM FT-LBS LOCATION MID TEMPERATURE -4 TEMPERATURE SCALE F TYPE CHARPY FREQUENCY
PER CUST SAMPLE PLAN

FT-LBS

Heat	Piece#	Temp	1	2	3	Avg.	Direction	Location	Type	Specimen Size
X1569	01F	-4 F	48	47	46	47	LONG.	MID	CHARPY FULL	
	03	-4 F	45	47	49	47	LONG.	MID	CHARPY FULL	
	12B	-4 F	43	45	45	44	LONG.	MID	CHARPY FULL	

8MM RADIUS STRIKER USED FOR IMPACT TESTING

Steel Certificate of Test

1835 Dueber Ave. S.W.
Canton, Ohio 44706

ID #0569627-3

Page 3 of 3

TIMKEN STEEL 

2/10/2023

Customer Order: 0026214-00
All Order: 21945-A (2287601)

Customer Part Number: MS-43-900
Heat Number(s): X1569

Metallurgy Information

SPEC: Impacts ASTM E23 DIRECTION LONGITUDINAL ENERGY AVERAGE 35 Min ENERGY INDIVIDUAL 24 Min
ENERGY UOM FT-LBS LOCATION 1 IN BELOW TEMPERATURE -4 TEMPERATURE SCALE F TYPE CHARPY
FREQUENCY PER CUST SAMPLE PLAN

FT-LBS

Heat	Piece#	Temp	1	2	3	Avg.	Direction	Location	Type	Specimen Size
X1569	01F	-4 F	56	55	55	55	LONG.	1 IN BELOW	CHARPY	FULL
	03	-4 F	57	58	59	58	LONG.	1 IN BELOW	CHARPY	FULL
	12B	-4 F	61	59	56	59	LONG.	1 IN BELOW	CHARPY	FULL

8MM RADIUS STRIKER USED FOR IMPACT TESTING

SPEC: Tensile ASTM E8 TENSILE 155,000 Min STRENGTH UOM PSI YIELD .2 140,000 Min 155,000 Max MIN
ELONGATION 14.0 Min GAUGE LENGTH 4 x Diameter MIN REDUCTION IN AREA 45.0 Min SHAPE ROUND
DIRECTION LONGITUDINAL TEMPERATURE ROOM LOCATION MID FREQUENCY PER CUST SAMPLE PLAN

Heat	Piece#	Tensile Strength	.2% Yld Strength	UOM	Elong%	Gauge Length	%Red	Specimen	Direction	Temp	Location
X1569	01F	168,577	145,155	PSI	15.8	2 IN	46.0	.505"	RD LONG.	RT	MID
	03	167,613	154,880	PSI	15.2	2 IN	45.7	.506"	RD LONG.	RT	MID
	12B	166,239	149,666	PSI	15.5	2 IN	45.6	.505"	RD LONG.	RT	MID

SPEC: Tensile ASTM E8 TENSILE 155,000 Min STRENGTH UOM PSI YIELD .2 140,000 Min 155,000 Max MIN
ELONGATION 14.0 Min GAUGE LENGTH 4 x Diameter MIN REDUCTION IN AREA 45.0 Min SHAPE ROUND
DIRECTION LONGITUDINAL TEMPERATURE ROOM LOCATION 1 IN BELOW FREQUENCY PER CUST SAMPLE PLAN

Heat	Piece#	Tensile Strength	.2% Yld Strength	UOM	Elong%	Gauge Length	%Red	Specimen	Direction	Temp	Location
1569	01F	167,668	154,947	PSI	17.6	2 IN	54.7	.505"	RD LONG.	RT	1 IN BELOW
	03	167,786	154,670	PSI	17.1	2 IN	54.9	.506"	RD LONG.	RT	1 IN BELOW
	12B	167,602	151,408	PSI	17.5	2 IN	56.3	.505"	RD LONG.	RT	1 IN BELOW

All Hardness and Tensile testing performed at TimkenSteel Metallurgical Lab except where noted.

Heat Treatment

NORM Min: 1600.0 Max: 1800.0 DEG FAR

QUEN Min: 1550.0 Max: 1650.0 DEG FAR

TEMP Min: 1100.0 DEG FAR

Heat: X1569 Lot: 2287601

NORMALIZED - 1675 F - 1.3 hour(s)

AUSTENITIZED - 1625 F - 1.47 hour(s) - WATER quenched

TEMPERED - 1170 F - 2.35 hour(s)

Heat X1569 Melt Source: USA

Manufacturing: USA

Heat X1569 - Bottom Pour Ingot Cast Process

REDUCTION RATIO - 12.3:1

HEAT TREAT LOT NUMBER: 2287601

MATERIAL UT INSPECTED TO A 3.0MM FBH IN ACCORDANCE WITH API 7-1 AND ASTM A388 - RESULTS SATISFACTORY

MATERIAL WAS ELECTRIC FURNACE MELTED, VACUUM DEGASSED AND LADLE REFINED

In reference to Section 1502 ("Conflict Minerals") of the Dodd-Frank Wall Street Reform and Consumer Protection Act, no tantalum, tin, tungsten or gold was intentionally added to this material.

TimkenSteel Corporation



Testing &
Inspection

4601 South Pinemont Suite 136
Houston, Texas 77041
Phone (713) 939-0440

Magnetic Particle Certification Report

Details

Report:	Customer Info.:	Materials Applied
ND.2534.TX-3	PN: NUX-812316-07BC2*0 ; W.O.-018320 017 000700;	ARDROX
PO Number:	Specification:	Wet/Dry
0027852-00	WI-3	Wet
Customer:	Acceptance Criteria:	Color/Fluorescent
PACKARD INTERNATIONAL	ASTM E3024	Fluorescent
Test Location:	Equipment Used:	Batch #
IN-HOUSE	B300- YOKE- SN-17311	65030321
Material:	Calibration Due Date:	Particle Concentration
N/A	04-30-2023	.25
HT No.	AC/DC/HWAC	Part Condition:
N/A	AC	Clean
No. Pieces	Mag Method:	Light Intensity cm ² @ 15 Inches
6	Res/Cont	6120
	Cont	

Magnetization

Direct:		Amps:
N/A		
Cent Cond:	Dia:	Amps:
N/A	N/A	
Coils:	No. Turns:	Amps:
N/A	N/A	
Yoke:	Yoke Spacing:	L F:
X	6X6	10 lbs

Comments:

DUAL LIGHT METER- E5542EC86E7-1787 CAL DUE DATE: 05/22/2023. - Gauss Meter - SN: 13509 CAL DATE- 11-01-2022
Cal Due Date- 05-01-2023; Gauss Reading + or - 2 gauss.

Results

Material tested at 50 to 100 degrees F unless otherwise noted.

Material tested at 30% to 60% relative humidity unless otherwise noted.

All material demagnetized to +/- 3 gauss upon completion of inspection

Results:	Technician:	Date:
Pieces Acceptable	Brennan Stelly	04/11/2023
<u>6</u>	Qualification Date:	
Pieces Rejectable	04-30-2020	
<u>0</u>	SNT-TC-1A Level	
	ASNT NDT Level III	

Reports apply only to the material tested and/or inspected and do not necessarily represent the quality of apparently similar or identical material. Report/Certificate shall not be reproduced except in full, without written approval by Tejas Testing. ISO/IEC 17025 accreditation by PJA #86703

4d1113a7-e97f-47e4-b1a1-d149c0dc21e

Certificate of
Conformance

**CURTISS -
WRIGHT**

Metal Improvement Company, LLC

Curtiss-Wright Surface Technologies
9410 East Hardy
Houston, TX 77093

Phone: (713) 691-0257 Fax: (713) 691-4744

Customer Number#: 19186

Job Number# 69143-1

Customer Terms: NET 30 DAYS

Date: 4/11/2023

Sold To:

PACKARD INTERNATIONAL, INC.
22397 WHITE OAK DR

CONROE, TX 77306-8859

Ship To:

PACKARD INTERNATIONAL, INC.
22397 WHITE OAK DR

CONROE, TX 77306-8859

Your Shipper	Customer P.O.	Shipped Via	How	Date Shipped
	0027857-00		Collect	

We Have Processed the Following Items in accordance with Process No.: M19-154

Item	Quantity	PartNumber	Part Description
1.	6	NUX-812316-07BC2*0	CONNECTIONS

S/N Notes

W/O#: 018320 017 000900

Specs:

PACKARD: WI-04 REV 01

Cert. Data

Media: MI-110R, Intensity: .010-.012A, Coverage: 200%

ACTUAL INTENSITY:

BEFORE 0114A AFTER 0111A

DATE CERTIFIED 4-11-23

Cert By: Dale H. Hobbs

Title: OV

MIC CERTIFIES THE PARTS FURNISHED IN THIS SHIPMENT HAVE BEEN PROCESSED IN ACCORDANCE WITH THE SPECIFICATIONS ABOVE. INSPECTION RECORDS ARE ON FILE AND AVAILABLE FOR EXAMINATION.



14014 E Hardy Rd
Houston, TX 77039-1803
United States
Phone: (832) 327-6000
Fax: (832) 327-6001

Certificate of Compliance

Customer: Packard International, Inc.

Date: 4/17/2023

P.O. Number: 0027867-00

Our Job # 40250-02

Part Number: NUX-812316-07BC2 REV 0

Quantity: 6

Description:

PART: WO: 018320 017 001100

PerformaCoat, Inc. Certifies that the above mentioned parts have been processed in accordance with customer specification:

WI-5

And Manufacturers' recommended application procedures.

Product (s) applied:

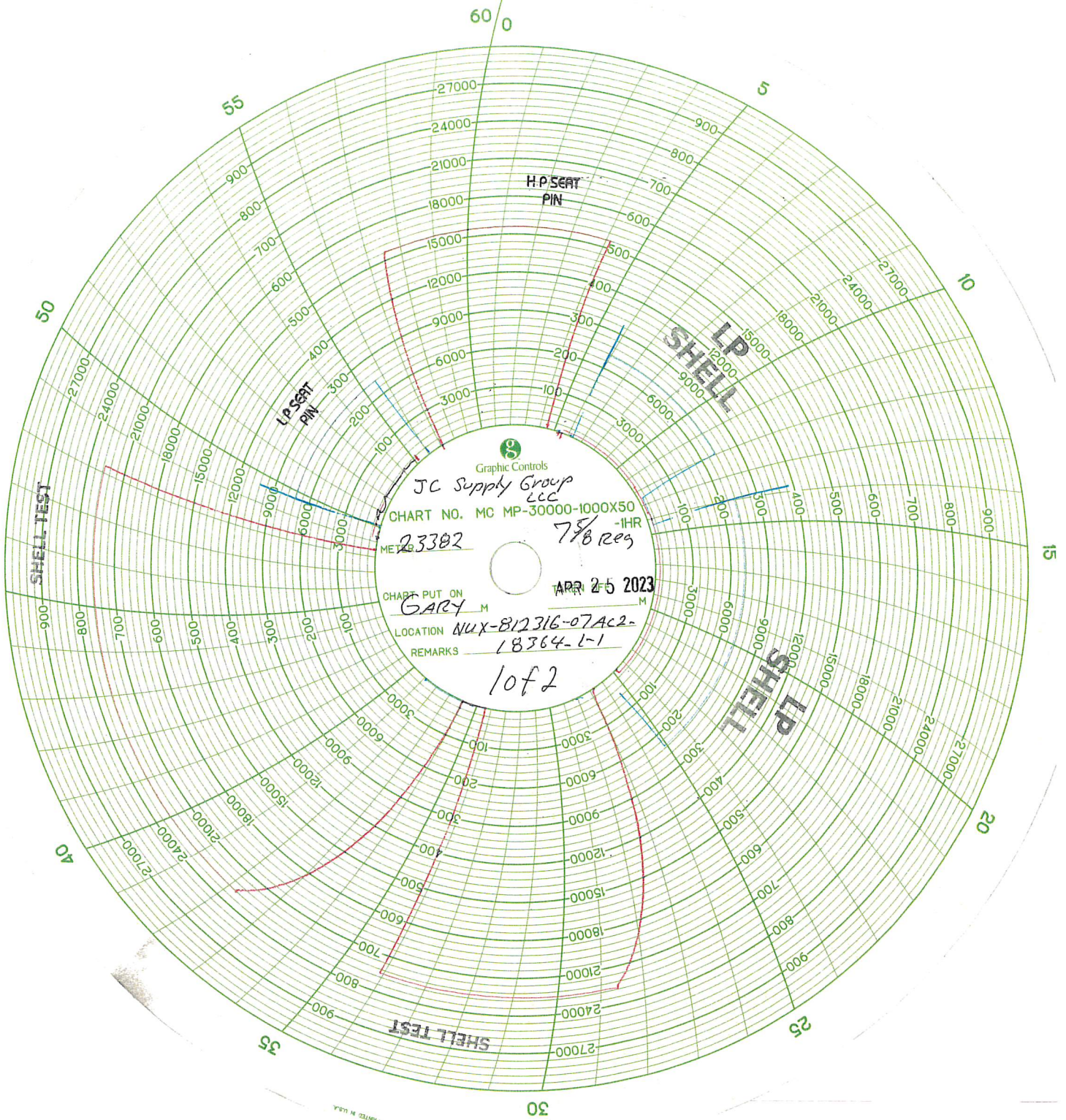
ZINC PHOSPHATE & OIL

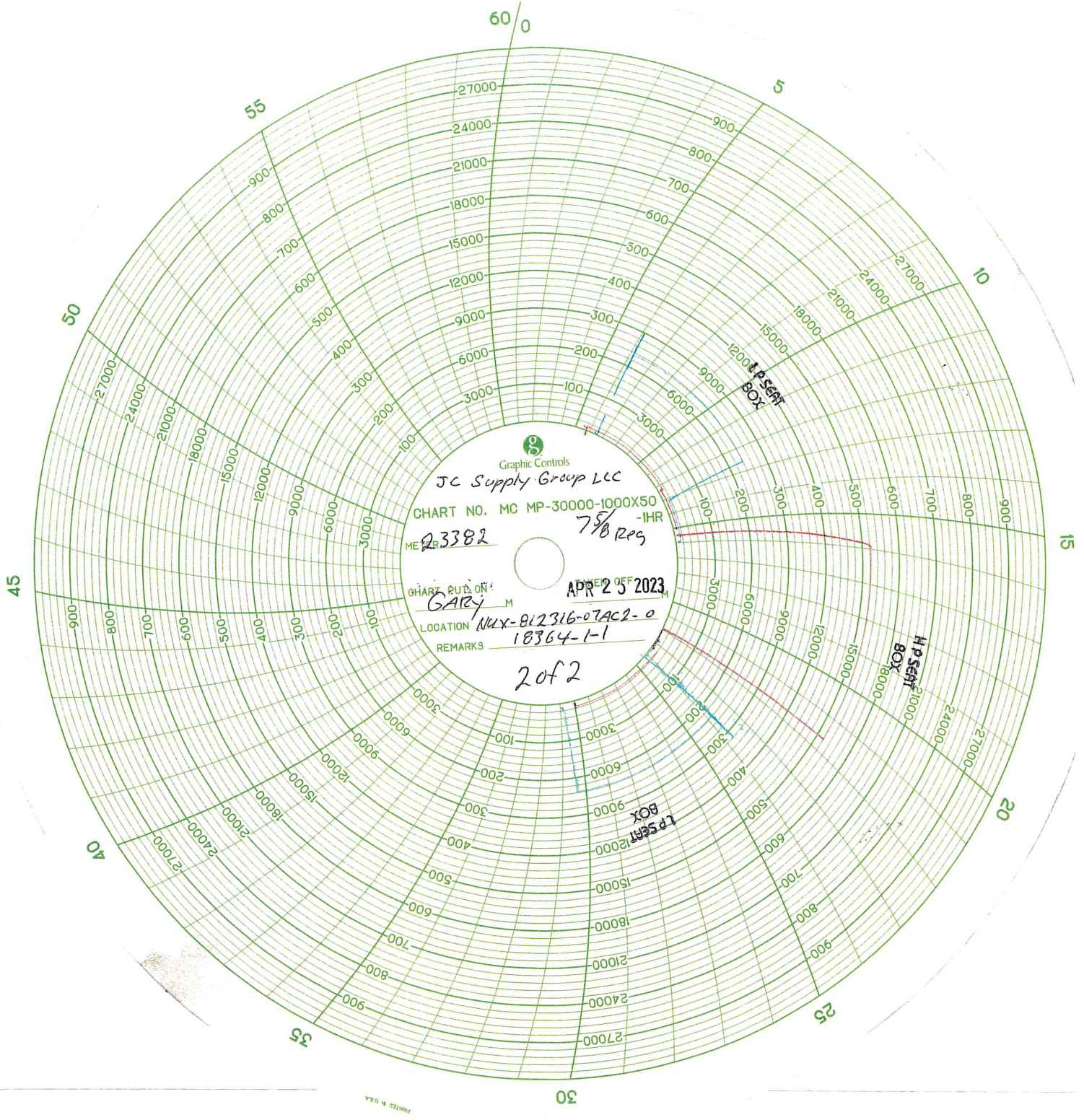
Signed:

Oscar Munoz

Date:

04/18/2023





PRINTED IN U.S.A.



NX KELLY VALVE

Operation and Maintenance Procedures Manual REV 1



SCOPE

This procedure provides general instructions for the assembly/disassembly, testing and operation of the Packard NX Kelly Valve with ID sizes:

- 1-3/4"
- 2-1/2"
- 2-13/16"
- 3-1/16"
- 3-3/4"

These valves may be Class 1 or Class 2, per API Spec 7-1. The information in this manual applies to both.

REFERENCES

The latest revisions of the following specifications may be used to obtain additional information regarding the procedures herein:

- API Specification 7-1
- Bill of Materials

PLEASE NOTE

More comprehensive resources are available at www.PackardInt.com.

ASSEMBLY/DISASSEMBLY TOOLS

Packard recommends the use of the following Assembly/Disassembly Tools for servicing the NX Kelly Valves:

<u>ID</u>	<u>Tool P/N</u>
1-3/4"	NADT-134
2-1/2"	NADT-213
2-13/16"	NADT-213
3-1/16"	SST-316-A
3-3/4"	SST-334-A

DISASSEMBLY PROCEDURE

1. Clean the assembled valve thoroughly.
2. Use the Operating Wrench to rotate the Ball to the fully OPEN position.
3. Place a thread protector on the valve pin end. Position the valve pin down.
4. Using Snap Ring Pliers, remove the first (of three) Circlip Rings.
5. Remove the Retainer Funnel.
6. Position the valve horizontally. Insert pulling tool through pin end, and engage the ID groove of the Spring Ring. Pull the Spring Ring toward the pin end, allowing for the removal of the four pieces of the Split Retainer Ring.
7. Remove the pulling tool, and return the valve to the pin down position.
8. Using the pulling tool through the box end, remove the Spring Ring, the Spring, and the Seat. Also remove the Seat's body seals.
9. Carefully remove the second Circlip Retaining Ring, being careful not to scratch the Ball
10. Use the Operating Wrench to rotate the Ball to the fully CLOSED position. The Ball can now be removed.
11. Remove the Stem, Sleeve and Coupler by tapping them from the outside of the valve toward the ID. Be sure to catch them, in order to prevent any damage to the seat.
12. Position the valve horizontally. Insert pulling tool through the pin end, and engage the ID groove of the remaining Seat. Pull the Seat toward the pin end, allowing for the removal of the second Circlip Retaining Ring.
13. Remove the pulling tool from the pin end. The final Seat and Spring can now be removed. Also remove the Seat's body seals (if not on the seat itself).
13. Discard O-Rings, but retain Seat PEEK Backup Rings (which are reusable).
14. Thoroughly clean and inspect all parts. Discard all that are worn or damaged.
15. Apply rust preventive to the end connections and Valve Body ID. Affix thread protectors.
16. Store the disassembled Valve Body and usable internal components in a controlled environment until assembly.

ASSEMBLY PROCEDURE

1. Thoroughly clean the Valve Body and all internal components.
2. Visually inspect the end connections and shoulder surface areas for signs of damage or wear.

Lubricate all O-Rings and Backup Rings with Military Grease PM600 prior to installation.
3. Assemble the Stem/Sleeve mechanism with new O-Rings and Backup Rings. Note that the fabric side of the Thrust Washer should face toward the valve OD.
4. Install new O-Rings and Backup Rings for the Upper Seat in the pin end body groove. Install Spring and Seat in the valve.
5. Maintaining position of the Seat, move the valve to the horizontal position. Insert the pulling tool through the pin end. Pull the Seat toward the pin end, allowing for installation of the first (of three) Circlip Retaining Rings. Remove the pulling tool.
6. Slide and push the Stem/Sleeve mechanism into position using the pulling tool, or other manner.
7. Use the Operating Wrench to rotate the Stem to the fully CLOSED position. Affix the Coupler to the Stem with a dab of grease to hold it in place.
8. Lubricate the Ball with a light coating of Liquid-O-Ring 600/1 Valve Life grease. Position it into the valve.

9. Turn the Stem to the fully OPEN position. Reinsert the pulling tool, again engaging the Upper Seat. Pull the Seat toward the pin end. This allows some additional space to push in the Ball, allowing for installation of the second Circlip.
10. Install new O-Rings and Backup Rings for the Lower Seat in the box end body groove. Install the Lower Seat in the valve.
11. Install the Spring and Spring Ring, and pull toward the pin end with the pulling tool.
12. Install the four pieces of the Split Retainer Ring. Release and remove the pulling tool.
13. Insert the Funnel Retainer in the valve.
14. Install the final Circlip Retaining Ring.
15. Liberally lubricate the threads with Liquid-O-Ring Zinc Based Thread Compound ZN-50. Affix thread protectors.
16. Store the assembled Valve in a controlled environment until required for use.

HYDROSTATIC TEST PROCEDURE

Hydrostatic testing of the Valve shall be performed per API Spec 7-1.

Pressure Testing of the Shell (to 1.5 times Working Pressure) is only required once, and has been performed by Packard at the time of initial assembly.

The following procedure verifies all seals after re-assembly, or whenever required:

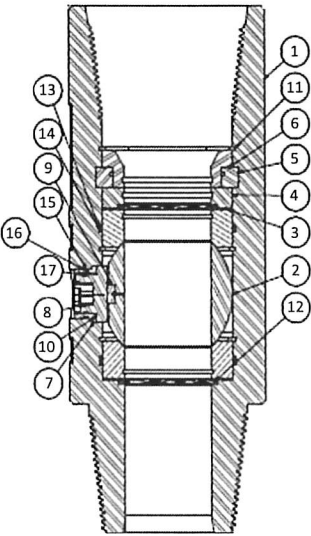
Note: Test Pressure shall be stabilized prior to the timing start for holding pressure.

For Class 1 Testing

- 1. Remove thread protectors from the assembled Valve, and install test plug and test cap on the box and pin connections.
- 2. Place the valve in the vertical pin down position.
- 3. Install the pressure line to the lower (pin) connection test cap. Install a bleed valve on top of the test cap in the open position.
- 4. Fill the Valve with water until it exits the bleed valve. Continue filling while the Valve is actuated several times to release any trapped air.
- 5. Adjust the Operating Stem to the fully CLOSED position. Leave the bleed valve open.
- 7. Perform the low pressure seat test at 250 psi. Stabilize pressure and hold for 5 minutes.
- 8. Perform the high pressure seat test at the Valve’s full working pressure. Stabilize pressure and hold for 5 minutes.
- 9. Open and close the valve after the high pressure test to release any trapped pressure in the cavity of the valve.

Additional Steps for Class 2 Testing

- 10. Repeat Steps 2 through 9, but with the valve in the pin up position, and testing this time from the box end.
- 11. Repeat the low pressure seat test at 250 psi. Stabilize pressure and hold for 5 minutes.
- 12. Open and close the valve after the pressure test to release any trapped pressure in the cavity of the valve.



ITEM	DESCRIPTION
1	VALVE BODY
2	SINGLE SLOT BALL
3	UNIVERSAL SEAT
4	SPRING RING
5	UPPER SPLIT RETAINER
6	RETAINER FUNNEL
7	CLASS2 SLEEVE
8	CLASS2 STEM
9	COUPLER
10	THRUST WASHER
11	CIRCLIP RING
12	NESTED SPRING
13	SEAT QUAD RING
14	SEAT BU RING
15	SLEEVE O-RING
16	SLEEVE BACK-UP RING
17	STEM T-SEAL CLASS2
18	ASSY/DISSASS TOOL
19	7/8 HEX WRENCH

MAINTENANCE

1. Maintenance Scheduling

- If the pressure test fails or the valve becomes difficult to operate, remove the valve from service immediately. Disassemble, clean thoroughly, inspect, replace worn parts, reassemble, and test.
- The frequency of required maintenance will vary depending upon the drilling factors of pressure, mud weight/composition/contamination, rate of penetration, and hook load.
- In conjunction with the frequency of maintenance, how the maintenance is performed is critical. Basic maintenance should be performed to avoid a failure; not in response to a failure. Drilling mud can become contaminated, and it hardens with time when static. Proper control of the drilling fluid will help reduce corrosion and wear from contamination, but static hardening is the real enemy. The Ball is spherical and the cavity it fits into is cylindrical so there is an annular space around the Ball and Seats where the mud will enter then sit and harden. A more frequent maintenance schedule will minimize this type of failure. Frequent pressure testing of the valve does not affect operation. The internal components are made from premium materials that combat the effects of corrosion, designed to withstand working pressure, processed to ensure extended life, and tested at final acceptance.
- How the valve is used and the frequency of maintenance are the priority in ensuring a long

operating life. The valve should be operated at balanced pressure. If the valve is closed when the mud pumps are started and it is opened with pressure from above, the operating life will be shortened.

- If the valve is used for twelve weeks, and it still operates smoothly, it should be removed from service and the basic maintenance routine should be performed. If, at the twelve week interval, it does not operate smoothly, the maintenance interval should be shortened to nine weeks. Then at nine weeks, if it is still operating smoothly, the interval should remain nine weeks. If it is not operating smoothly, the interval should be shortened to six weeks.

2. Repair and Seal Kit Usage Order

- Repair Kits include a Ball, an Upper Seat, a Lower Seat, Spring(s), a Seal Kit and Seat PEEK Backup Rings.
- Seal Kits include all Elastomers.
- At each maintenance interval the types of kits should be alternated: Seal Kit, then Repair Kit, then Seal Kit, then Repair Kit, and so on, unless the Ball and Seats are damaged, in which case a Repair Kit should be used.

3. Maintenance Routine

- Once a valve is removed from service, it should be cleaned immediately. The longer a valve sits with mud inside, the harder the mud will become and the more difficult it will be to repair.

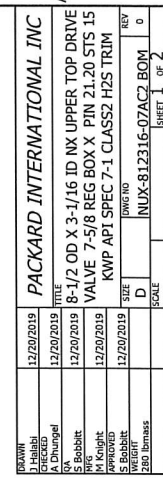
- Disassemble the valve following the Disassembly Procedure. Clean every internal component, and the inside of the valve thoroughly, preferably with a high pressure and/or high temperature washer or with a mild solvent using a stiff nylon brush, to remove all contaminants. Use of highly abrasive pads or power tools is not recommended on sealing areas as these areas are critical surface finishes and dimensions.
- Once everything is cleaned, parts should be inspected for damage or wear in the seal areas. The seal areas are: the OD of the Ball, the areas of the Seats that touch the Ball, the areas of the Seats near the body seals, and the seal grooves in the Valve Body. Worn or damaged parts and all O-Rings and Backups shall be replaced. Prior to assembly, new parts should be inspected and coated with the proper greases.
- Stem and Sleeve O-Rings and Backups should be installed then coated with Military Grease PM600. After installing the rings in their grooves, a small amount of grease should be put in one spot and pushed around the rings and into the open spaces in the O-Ring grooves between the rings and their complementing Backups.
- Body O-Rings and Backup Rings should be installed and then coated with Liquid-O-Ring 600/1 Valve Life grease. After installing the rings in their grooves, a small amount of grease should be put in one spot and pushed around the rings and into the open spaces in the O-Ring grooves between the rings and their complementing Backups.

- Liberally coat the spherical surface of the Ball with Liquid-O-Ring 600/1 Valve Life grease.
- After assembly, the valve shall be pressure tested as described in the Hydrostatic Test Procedure section.
- Once the valve passes hydrostatic testing, the end connections should be coated with Liquid-O-Ring ZN-50 Tool Joint and Drill Collar Compound, and thread protectors should be installed immediately.
- The valve can then be placed back into service.
- If the valve is not put into service, store the valve in a dry place.

In summation, control of the drilling fluid, proper use, control of the maintenance interval, and proper maintenance routine will ensure long service life.

NOTE: Failure to follow the procedures detailed in this manual may result in damage and subsequent premature valve failure.





1. THIS IS A CRITICAL LOAD COMPONENT AND IS DESIGNED TO COMPLY WITH THE REQUIREMENTS OF API SPECIFICATION 7-1 CURRENT EDITION.
2. THE BODY MATERIAL CONFORMS TO PACKARD MATERIAL SPECIFICATION AISI4330 V MOD PER PACKARD MS43 WITH THE FOLLOWING REQUIREMENTS:
 - A. THE MINIMUM HARDNESS IS 285 BRINELL (311-363 BHN) REF.
 - B. THE MATERIAL MIN YIELD STRENGTH OF 140 KSI.
 - C. MAGNETIC PARTICLE INSPECTION PER WT-3 (ASTM E 709, ISO 9934-1) IN THE FINISH-MACHINED CONDITION PRIOR TO COATING.
 - D. THE TRACEABILITY NUMBER FOR THE COMPLETE ASSEMBLY WILL BE CROSS-REFERENCED TO THE DOCUMENTATION.
3. DOCUMENTATION TO INCLUDE:
 - REPORT OF LADLE CHEMISTRY
 - REPORT OF TENSILE AND YIELD STRENGTH (ASTM A 370, ISO 6892)
 - REPORT OF ELONGATION AND REDUCTION IN AREA TESTING.
 - REPORT OF CHARPY IMPACT VALUES PER ISO 148 (ASTM A 370 OR E 23) V NOTCH. 31 FT-LBS AVG WITH NO SINGLE VALUE BELOW 24 FT-LBS AT -40°F.
 - REPORT OF HARDNESS TESTING (ASTM A370, ISO 6506-1).
 - REPORT OF NDE INSPECTION.
4. MATERIAL TRACEABILITY TO BE MAINTAINED PER THE SERIALIZATION METHOD PRESCRIBED IN THE SPECIFICATION AND PROCEDURE MANUAL DP-5.7.3.
5. STAMPING WITH TRACEABILITY NUMBER, INSIDE DIAMETER, AND THE SIZE AND STYLE OF THE CONNECTION AT EACH END AS SHOWN IN THE MARKING DETAIL DRAWING. STAMP WITH RADIUS CHARACTER (LOW STRESS) AS SPECIFIED BY API 7-1.
6. END CONNECTIONS ARE PER API 7-2 CURRENT EDITION. CONNECTION SHOT PEENED PER PACKARD WT-4.
7. BODY PHOSPHATIZED PER PACKARD SPECIFICATION WT-5.
8. THREAD PROTECTORS ARE INCLUDED.
9. API 7-1 CLASS OF OPERATION: CLASS2.
10. H2S TRIM.
11. LOAD CAPACITY
 - MAKE-UP TORQUE: 57,700 TO 60,000 FT-LBS
 - TENSILE RATING AT MAX MAKE-UP : 2,209,000
12. OPERATING LIMITS:
 - MAX INTERNAL/EXTERNAL WORKING PRESSURE: 15,000 PSI WORKING PRESSURE
 - OPERATING TEMPERATURE RANGE: -40°F(-20°C) TO 194°F(90°C)



CERTIFICATE OF COMPLIANCE/ORIGIN

Packard Sales Order: **18364**

Customer: **JCS GROUP LLC**

Customer Purchase Order: **1088**

Part Number: **NUX-812316-07AC2**

Trace Number: **18364-1-1**

Part Description: **UPPER TOP DRIVE VALVE NX**



SINGLE CRANK LOW TORQUE OPERATION

8-1/2" OD X 3-1/16" ID

7-5/8 REG BOX X PIN

21.25" STS, STEM: .887" Hex.

RATED AT 15,000 PSI WORKING PRESSURE (22,500 PSI SHELL TEST PRESSURE),

H2S TRIM, PHOSPHATE COATED,

MANUFACTURED AND TESTED PER API SPEC 7-1 CLASS2.

COMPLETE WITH DATABOOK, OPERATING WRENCH AND THREAD PROTECTORS.

Packard International Certifies the products furnished on the referenced Sales Order have been supplied to the requirements stated on the Customer Purchase Order, and Packard International design specifications that meet or exceed API Specifications. Packard International Quality System is ISO 9001 recognized and licensed to API Spec 7-1 current versions. The products supplied by Packard International are manufactured at our facility or by an approved supplier of component parts and/or services. All parts have passed manufacturing hydrostatic tests as specified by the API. Charts are available in the Data Book and are available upon request.

Harmonic Code Number: **8431.43.8060**

Country of Origin: **USA**

Schedule B: **8431.43.8060**

ECCN: **EAR99**

Smith Bobbitt, QA Manager

25-April-23