

Endurance Valve Products Ltd.

Vendor Code: 421643

P.O. Box 3007
Sherwood Park, Alberta
T8H 2T1
Phone: 780.416.9683 Fax: 780.416.9684
GST# 81449 9752

PURCHASE ORDER # 3500011269

SHIP TO:

Endurance Valve Products Ltd.
% Suncor Energy Oil Sands LP
OS FIREBAG
Via Hwy 63N of Fort McMurray
Firebag Site Alberta T9H 3E3
Ship to Code: AW03
PO# 3500011269

JUN 08 2022

DATE: June 3, 2022

Packing Slip

LINE ITEM	DESCRIPTION	PART NUMBER	ORDER QUANTITY	SHIP QUANTITY
1	93SP-2140 10" Endurance Knife Gate Valve 150#	FV-10-300-150FF-TL-A36/TFE/SS-17-4-BG-FB-X	1	1
2	93SP-2141 16" Endurance Knife Gate Valve 150#	FV-16-300-150FF-TL-A36/TFE/SS-17-4-BG-FB-X	2	2
TOTAL:			3	3

INSPECTED AT MCC (Authorized Personnel)

NAME (mandatory) W. J. [Signature]

ACCEPTED ☐ YES ☒ NO

BADGE # 682439

DATE June 8 2022

From O.A. Area Reliability & Quality

4562

Freight Carrier: Canadian Freightways (Acct: #1137212)
Freight Terms: FCA Longview, WA / Collect to Suncor Energy

Please Contact the Customer Service Department at 780.416.9683 with any questions or concerns

THANK YOU FOR YOUR BUSINESS!

Co. de
JUN 08 2022



ph: (780) 416-9683 fax: (780) 416-9684

www.endurancevalve.com

Documentation:

- Certificate of Compliance
- Hydrotest
- MTR's
- I.O.M's
- Endurance Stainless Steel Tag

Supplier: Endurance Valve Products Ltd.
Vendor Code: 241643
Model: FV-10-300-150FF-TL-A36/TFE/SS-17.4-BG-FB-X ✓
Ref Job # 13785
P.O.: P.O. 4503134050
Serial #'s 229221-1 ✓

Tag #'s 93SP-2140 ✓

CRN: 0C10259.2
Weight: 280 lbs



ph: (780) 416-9683 fax: (780) 416-9684
www.endurancevalve.com

Certificate of Compliance

Customer: Endurance Valve Products

P.O. Box 3007
Sherwood Park, Alberta

Purchase Order Number: 13785

Model Number: FV-10-300-150FF-TL-A36/TFE/SS-17.4-BG-FB-X
Serial #: 229221-1

Customer PO

P.O. 4503134050

WE DO HEREBY CERTIFY THAT ALL MATERIALS AS IDENTIFIED IN THE ATTACHED DOCUMENTS ARE IN ACCORDANCE WITH THE SPECIFIED REQUIREMENTS OF THE PURCHASE ORDER

THE FOLLOWING DOCUMENTS ARE ATTACHED:
TEST REPORTS
MTR'S
I.O.M'S

T Black

Regards,
Endurance Valve

CRN-0010259.2

280^{LB}

Fabricast Valve Manufacturers ID: 2201922

229221-1

10"

FV-10-300-150FF-TL-A36/TFE/SS-17.4-BG-FB-X

PD93-A-2006-1/2/3

P.O. 4503134050 / 3500011269

93SP-2140

13785

300^{PSI}

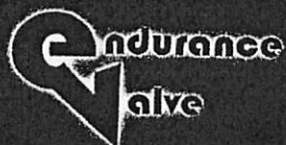
350°F

421643

A36

17.4^{ss}

PTFE



Testing Procedure and Process

Valve Description	FV-10-300-150FF-TL-A36/TFE/SS-17.4-BG-FB-X				
Serial Number	229221-1	Ref. #	13785	Size	10
Tag Number	93SP-2140	Design Pressure Body PSI/CWP	300		
Wetted Parts	17.4ss	Flange Material	A36	Design Pressure Seat PSI/CWP	300
Seat Type	Resilient ☒	Bi-Direct ☒	Metal ☐	Other ☐	

BODY TEST

Using a calibrated pressure tester which is re-calibrated every 360 days, Valve shall be hydrostatically pressure tested at 1.5 times the rated working pressure with no visible leakage through the body material allowed. (Leakage through the packing or gate seal shall not be cause for rejection)

Test Pressure	450	PSI	Test Duration	10	Minutes
Results of Test	☒ PASS	☐ FAIL			
QC Inspector	[Signature]			Date	5-17-22

SEAT TEST

Apply test pressure to the closed gate at 40PSI (low pressure seat test) and then 1.1. times the rated pressure (high pressure test). Test shall be performed in both flow directions if applicable. Standard acceptance criteria for metal seats are a maximum leakage rate of 40cc/min/NPS (MSS-SP-81) and .167cc/min/NPS (MSS-SP-61) measured at 40PSI. Acceptance criteria for resilient seats are drip tight from 0 PSI to required test pressure. After test, the valve seat is dried with compressed air and wiped down with a dry towel. Leakage will be captured using a measurable catch vessel. *Note - Class IV Leakage Rates are based off of 0.01% Capacity.

Metal Seat Test	0	PSI	Leakage Side 1	N/A	Leakage Side 2	N/A
Resilient Seat Test	330	PSI	Leakage Side 1	☒	Leakage Side 2	☒
Test Duration	Side 1	2	Minutes	Side 2	2	Minutes
Test Results	Side 1	☒ PASS	☐ FAIL	Permissible Leakage		
Test Results	Side 2	☒ PASS	☐ FAIL	☐ Not Applicable	0.000	
Tester	Nicholas Hicks				Date	5-17-22

OPERATIONAL TEST

Open and close the valve 10 full cycles. The valve should open and close smoothly without binding. After the operational test visually inspect the body, gate, stem and operator to ensure it meets Customer and Factory specifications. The valve shall be considered acceptable if it operates smoothly through the entire cycle and meets Factory Quality Requirements.

(For additional functional testing use form QF-82-05-1 to document results.)

QC Inspector	[Signature]	Date	5-17-22
Source Inspector		Date	

QF-82-03-1

Hydrostatic Testing

Issued by: Engineering	Effective Date: 4/25/2017	Rev. F
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BRIDGE CITY STEEL

HR CARBON STEEL PLATE-PLS ASTM-A36
3/16" X 60.0000" X 120.0000"
PART NO.

3/16 A36

PO/Rel 227256

/GEORGE KELLEY

Certificate of Mill Test Results

BL 20 -749583-001

20Dec21

Pg 1/1

EVRAZ

EVRAZ INC. NA

Evraz Oregon Steel 14400 N. Rivergate Blvd., Portland, Oregon 97203

REPORT OF CHEMICAL/PHYSICAL TESTS

ISO 9001

REGISTERED

US PLANT PRODUCED

SOLD TO

USA

FRANKWAY

AY

CERTIFICATE NO.	DATE	PAGE
1785583	Jul 15, 2021	1
ROLL ORDER NO.	DATE	
365609		
CUSTOMER ORDER NO.		
20-48581		
JOINED NO.		
SHIPPING NO.	DATE	
1785583	07/15/2021	
CARRIER		
GREEN TRANSFER		
CARTRUCK NO.		
1503		

THIS MATERIAL HAS BEEN MANUFACTURED, TESTED AND FOUND TO MEET THE SPECIFICATIONS AND PURCHASE ORDER REQUIREMENTS
CARBON STRUCTURAL QUALITY HOT ROLLED BAND TO MEET CHEMISTRY AND PHYSICALS OF
ASTM A36-19/ASME SA36 2019 ASTM A709-17 GRADE 36 [250]. KILLED FINE GRAIN
PRACTICE.

PHYSICAL PROPERTIES

ITEM	DESCRIPTION	HEAT NO.	SLAB	YIELD PSI X 100	TENSILE PSI X 100	% ELONG 8" 2"	% RA	HARDNESS BHN	BEND TEST	IMPACTS
1	0.1875 X 60.000ME X COIL .1830 MIN GAGE									
	1 PC 41740 LBS	+1 RS4769		590 590	730 740	27 27		(OUTER) (OUTER)		
	1 PC 41740 LBS TOTALS									

CHEMICAL ANALYSIS

HEAT NO.	C	Mn	P	S	Si	CU	NI	V	CB	Al	Cr	Mo	Ti	B	N	Ca	CE	Mc
+1 RS4769	.05	.86	.010	.004	.28	.35	.11	.004	.023	.035	.12	.03						
HEATS INDICATED WITH (1) WERE MELTED & FOUNDED IN CANADA. HEATS INDICATED WITH (+) WERE ROLLED IN THE USA.																		
..... END OF REPORT																		

I certify the above to be correct as contained in the records of EVRAZ INC. NA

By

Chemist

Wrap (Body)

BRIDGE CITY STEEL
(39) PLATE A36
5/16" X 96.0000" X 240.0000"
PART NO.

5116

A36

PO/ReI 227224

2547257

Certificate of Mill Test Results
SO FOR-046027-001
9Dec21
Pg 1/1

EVRAZ

EVRAZ INC. NA
Evraz Oregon Steel 14600 N. Rivergate Blvd., Portland, Oregon 97203

REPORT OF CHEMICAL/PHYSICAL TESTS

ISO 9001 REGISTERED		FAX 503-922-3000 300 AVENUE -0086		ORLAND ENDE U-0086	
S L D T O		US		US	
THIS MATERIAL HAS BEEN MANUFACTURED, TESTED AND FOUND TO MEET THE SPECIFICATIONS AND PURCHASE ORDER REQUIREMENTS CARBON STRUCTURAL QUALITY PLATE ASTM A36-19/ASME SA36 2019 ASTM A709-18 GRADE 36 NO WELD REPAIR. KILLED FINE GRAIN PRACTICE.		SHIPING NO. 1784132		DATE 06/30/2021	
CARRIER GREEN TRANSPORT		CUSTOMER ORDER NO. FOR-6802		DATE 06/30/2021	
DRAWING NO. 906		SHIPING NO. 1784132		DATE 06/30/2021	

ITEM	DESCRIPTION	HEAT NO.	SLAB	YIELD PSX100	TENSILE PSX100	% ELONG 8" 2"	% RA	HARDNESS BRIN TEST	IMPACTS
2	0.3125 X 96.0000 X 240.000								
	2 PCS 4084 LBS	+1 RS4757		590	705	32			
				500	640	30			
	2 PCS 4084 LBS TOTALS								

Stuffer Sides

HEAT NO.	C	Mn	P	S	Si	Cu	NI	V	CO	AL	Cr	MO	TI	B	N	CA	CE	W
+1 RS4757	.04	.85	.012	.006	.24	.35	.10	.003	.022	.044	.09	.03						
BRATS INDICATED WITH (+) WERE KILLED & POURED IN CANADA. BRATS INDICATED WITH (+) WERE ROLLED IN THE USA.																		
END OF REPORT																		

I certify the above to be correct as contained in the records of EVRAZ INC. NA By _____

Chemist

Warehouse Transfer

From Delta Varsteel to Corporate C

Transfer No

Heat Number

225638

420433

Customer Name

Customer PO#

VARSTEEL LTD. - DELTA (INTERC) DE-1089322

Shipper No

Heat Number

16415

420433

1/2 A3C

420433

EVRAZ EVRAZ INC. NA

P.O. Box 1670, Regina, Saskatchewan, Canada S4P 3C7

Form TCI- Revision 2, Date 13 Feb 2017

Test Certificate

Customer: VARSTEEL LTD. 39-20 4TH STREET LESTERIDGE AB T1M1V7	Customer P.O. No.: DCL-418 Product Description: CSA G40.21 (2011B4/130/385/45M A341B) A70901A36/ASHE M434010D CSA G40.21 (2011B385/45M)	Min Order No.: 41-3854-11 Shipping Method: RT14102	Ship Date: 16 Aug 21 Cert Rec: 9110323 (Page 1 of 1)
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Sheets: 0.490 X 60.00 X COIL (IN)

Tensile Piece			Tensile				Charpy Impact Test							
Block Id	Piece Id	Piece Dimensions	Td Log	YS (ksi)	UTS (ksi)	RA (ft-lb)	Zone 5 & 6	Avg Barrels	Abv. Energy (ft-lb)	% Shear	Td Temp	Td Bar	UTS Bar	Temp % Shear
420433	B9016	0.495 X 60.00	115000	72000		44	7							
420433	B9018	0.470 X 60.00	116000	72000		40	7							

Heat Id	Chemical Analysis																Method
	C	Mn	P	S	Si	Al	Ca	N	O	H	Co	Ti	Ni	B	Nb	CSY	
420433	.05	.54	.010	.006	.13	.043	.32	.20	.13	.06	.022	.001	.000	.0003	.0091	.22	

RESCRY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO RESCRY WAS INTENTIONALLY ADDED DURING THE MANUFACTURE OF THIS PRODUCT.
HOT-ROLLED COIL, INTENDED FOR CONVERSION TO GRADE, CERTIFIED TO CHEMISTRY ONLY.
COIL END PHYSICAL TEST RESULTS, IF REQUESTED, ARE FOR INFORMATION ONLY.
BALANCE OF CHEMISTRY IS INCH (TS)
HEATED AND POURED IN CANADA
420433 B0015 PCS: 1, NET: 44560

Horseshoe (Body)
Packing Box Sides

Customer Practice	VARSTEEL CERTIF THAT THIS MATERIAL WAS TESTED IN ACCORDANCE WITH THE APPROVED SPECIFICATION	Approved By: Kadi Dineel (Quality Representative)
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THIS MATERIAL HAS BEEN MANUFACTURED, TESTED AND FOUND TO MEET THE SPECIFICATIONS AND PURCHASE ORDER REQUIREMENTS
 EOS CARBON REGULAR QUALITY PLATE EXCESS PRIME STEEL PLATE.

CERTIFICATE NO.	DATE	PAGE
1804894	Dec 13, 2021	11
MILL ORDER NO.	DATE	
136736		
CUSTOMER ORDER NO.		
JOB/REQ. NO.		
SHIPPING NO.	DATE	
1804894	12/13/2021	
CARRIER		
UNKNOWN		
CAR/TRUCK NO.		
P17316-STA		

PHYSICAL PROPERTIES

ITEM NO.	DESCRIPTION	HEAT NO.	SLAB	YIELD PSI X 100	TENSILE PSI X 100	% ELONG 8" 2"	% RA	HARDNESS BHN	BEND TEST	IMPACTS
2	HSLA STRUCTURAL QUALITY PLATE ASTM A572-21 GRADE 50 ASME SA572 GRADE 50 2021 ASTM A709-18 GRADE 50 0.7480 X 94.920M X 415.250 1 PC 8361 LBS +# RS5688 605 800 45 Port Flanges (Body) Top Flange Gussets Gland Flange Yoke Top Yoke Pads									

CHEMICAL ANALYSIS

HEAT NO.	C	Mn	P	S	Si	Cu	NI	V	Co	Al	Cr	Mo	Ti	B	N	Ca	CE	McQand Elm Grain Size
RS5688	.06	1.40	.013	.004	.28	.44	.10	.004	.042	.037	.09	.05	.023		.0068			

HEATS INDICATED WITH (#) WERE MELTED & Poured IN CANADA.
 HEATS INDICATED WITH (+) WERE ROLLED IN THE USA.

I certify the above to be correct as contained in the records of EVRAZ INC. NA By John Zolt-Bel Chemist

PO 13785 Item #1
10" FV-150 T-Lok
Gate PMI

INTERNATIONAL INSPECTION

PMI Procedure: II-54-7, 2006 Rev.6
PMI Instrument: Thermo Scientific Niton XL2 980
Instrument S/N# 112678
Tech: D. Rosian

Reading No.	Time	Type	Duration	Units	Sequence	Item Description	Material ID	Ni	Ni Error	Cr	Cr Error	Results
1	4/15/2022 7:14	System Check	53.64	cps	Final	System Check 1 of 2						Pass
2	4/15/2022 7:15	System Check	54.06	cps	Final	System Check 2 of 2						Pass
3	4/15/2022 7:16	General Metals	10 %		Final	IARM 35NN Calibration Standard	1.25Cr(P11) : 0.75	0.157	0.045	1.113	0.047	Pass
4	4/15/2022 7:21	General Metals	10 %		Final	Job# 933-2 - 6" DSDE (1 of 9)	17-4 PH : *2.22	4.63	0.145	15.738	0.15	Pass
5	4/15/2022 7:22	General Metals	10 %		Final	Job# 933-2 - 6" DSDE (2 of 9)	17-4 PH : *2.58	4.734	0.143	15.667	0.146	Pass
7	4/15/2022 7:24	General Metals	10 %		Final	Job# 933-2 - 6" DSDE (3 of 9)	17-4 PH : *2.21	4.697	0.148	15.696	0.152	Pass
8	4/15/2022 7:24	General Metals	10 %		Final	Job# 933-2 - 6" DSDE (4 of 9)	17-4 PH : *2.21	4.7	0.147	15.721	0.152	Pass
9	4/15/2022 7:25	General Metals	10 %		Final	Job# 933-2 - 6" DSDE (5 of 9)	17-4 PH : *2.21	4.718	0.158	15.601	0.161	Pass
10	4/15/2022 7:26	General Metals	10 %		Final	Job# 933-2 - 6" DSDE (6 of 9)	17-4 PH : *2.22	4.643	0.142	15.764	0.148	Pass
11	4/15/2022 7:27	General Metals	10 %		Final	Job# 933-2 - 6" DSDE (7 of 9)	17-4 PH : *2.22	4.677	0.14	15.843	0.145	Pass
12	4/15/2022 7:27	General Metals	10 %		Final	Job# 933-2 - 6" DSDE (8 of 9)	17-4 PH : *2.22	4.602	0.143	15.828	0.15	Pass
14	4/15/2022 7:29	General Metals	10 %		Final	Job# 933-2 - 6" DSDE (19 of 9)	17-4 PH : *2.22	4.665	0.144	15.679	0.148	Pass
15	4/15/2022 7:32	General Metals	10 %		Final	Job# 933-4 - 8" DSDE (1 of 14)	17-4 PH : 1.46	4.112	0.14	15.21	0.149	Pass
16	4/15/2022 7:32	General Metals	10 %		Final	Job# 933-4 - 8" DSDE (2 of 14)	17-4 PH : 1.21	4.053	0.138	15.155	0.147	Pass
17	4/15/2022 7:33	General Metals	10 %		Final	Job# 933-4 - 8" DSDE (3 of 14)	17-4 PH : 0.90	4.014	0.133	15.174	0.143	Pass
18	4/15/2022 7:33	General Metals	10 %		Final	Job# 933-4 - 8" DSDE (4 of 14)	17-4 PH : 0.78	3.968	0.136	15.378	0.148	Pass
19	4/15/2022 7:33	General Metals	10 %		Final	Job# 933-4 - 8" DSDE (5 of 14)	17-4 PH : 0.88	4.013	0.135	15.22	0.146	Pass
20	4/15/2022 7:34	General Metals	10 %		Final	Job# 933-4 - 8" DSDE (6 of 14)	17-4 PH : 1.47	4.106	0.135	15.357	0.145	Pass
21	4/15/2022 7:34	General Metals	10 %		Final	Job# 933-4 - 8" DSDE (7 of 14)	17-4 PH : 0.91	4.016	0.134	15.389	0.146	Pass
22	4/15/2022 7:35	General Metals	10 %		Final	Job# 933-4 - 8" DSDE (8 of 14)	17-4 PH : 1.57	4.12	0.138	15.034	0.147	Pass
23	4/15/2022 7:35	General Metals	10 %		Final	Job# 933-4 - 8" DSDE (9 of 14)	17-4 PH : 0.27	3.947	0.133	15.346	0.145	Pass
24	4/15/2022 7:35	General Metals	10 %		Final	Job# 933-4 - 8" DSDE (10 of 14)	17-4 PH : 1.30	4.066	0.134	15.336	0.144	Pass
25	4/15/2022 7:36	General Metals	10 %		Final	Job# 933-4 - 8" DSDE (11 of 14)	17-4 PH : 0.00	3.831	0.133	15.278	0.147	Pass
26	4/15/2022 7:36	General Metals	10 %		Final	Job# 933-4 - 8" DSDE (12 of 14)	17-4 PH : 1.12	4.04	0.136	15.431	0.147	Pass
27	4/15/2022 7:36	General Metals	10 %		Final	Job# 933-4 - 8" DSDE (13 of 14)	17-4 PH : *1.81	4.14	0.14	15.368	0.149	Pass
28	4/15/2022 7:37	General Metals	10 %		Final	Job# 933-4 - 8" DSDE (14 of 14)	17-4 PH : 1.20	4.053	0.146	15.066	0.156	Pass
29	4/15/2022 7:40	General Metals	10 %		Final	Job# 913-2 - 16" TLOK (1 of 2)	17-4 PH : 0.35	3.957	0.136	15.184	0.148	Pass
30	4/15/2022 7:40	General Metals	10 %		Final	Job# 913-2 - 16" TLOK (2 of 2)	17-4 PH : 0.91	4.017	0.143	15.251	0.154	Pass
S/N 229221-1	36	4/15/2022 7:47	General Metals	10 %	Final	Job# 922 - 10" TLOK (1 of 1)	17-4 PH : *2.22	4.629	0.142	15.43	0.145	Pass

Technician: Daniel C Rosian 4/15/2022

304L Composition Range (ASME Sec.II)

Chromium (Cr): 18.0 - 20.0

Nickel (Ni): 8.0 - 13.0

Deca

INTERNATIONAL INSPECTION

Reading No.	Time	Type	Duration	Units	Sequence	Item Description	Material ID	Ni	Ni Error	Cr	Cr Error	Results
37	4/15/2022 7:48	General Metals	10 %		Final	Job# 974 - 12" UNI (1 of 1)	SS-304 : 0.22	8.258	0.179	18.288	0.159	Pass
40	4/15/2022 7:51	General Metals	10 %		Final	Job# 955-2 - 16" TLOK (1 of 2)	17-4 PH : 1.42	4.095	0.136	15.382	0.146	Pass
41	4/15/2022 7:51	General Metals	10 %		Final	Job# 955-2 - 16" TLOK (2 of 2)	17-4 PH : 1.33	4.073	0.137	15.367	0.148	Pass
42	4/15/2022 7:53	General Metals	10 %		Final	Job# 909 - 16" DS (1 of 3)	SS-304 : 1.46	7.93	0.191	17.973	0.172	Pass
45	4/15/2022 7:55	General Metals	10 %		Final	Job# 909 - 16" DS (2 of 3)	SS-304 : 0.98	7.929	0.175	18.021	0.157	Pass
46	4/15/2022 7:55	General Metals	10 %		Final	Job# 909 - 16" DS (3 of 3)	SS-304 : 0.98	7.932	0.179	17.753	0.159	Pass
47	4/15/2022 7:57	General Metals	10 %		Final	Job# 936 - 12" UNI (1 of 1)	SS-304 : 0.00	8.195	0.184	18.132	0.163	Pass
48	4/15/2022 8:00	General Metals	10 %		Final	Job# 975-1 - 28" UNI (1 of 1)	SS-304 : 0.09	8.141	0.191	17.917	0.169	Pass
49	4/15/2022 8:01	General Metals	10 %		Final	Job# 922-2 - 16" TLOK (1 of 2)	17-4 PH : 1.49	4.125	0.136	15.322	0.145	Pass
50	4/15/2022 8:02	General Metals	10 %		Final	Job# 922-2 - 16" TLOK (2 of 2)	17-4 PH : 1.39	4.084	0.135	15.494	0.147	Pass
53	4/15/2022 8:05	General Metals	10 %		Final	Job# 935-1 - 10" UNI (1 of 1)	17-4 PH : *2.22	4.627	0.142	15.458	0.146	Pass
54	4/15/2022 8:07	General Metals	10 %		Final	Job# 820-3 - 48" TLOK (1 of 2)	SS-304 : 0.08	7.863	0.191	18.308	0.173	Pass
55	4/15/2022 8:07	General Metals	10 %		Final	Job# 820-3 - 48" TLOK (2 of 2)	SS-304 : 0.18	7.891	0.183	18.201	0.165	Pass
56	4/15/2022 8:13	General Metals	10 %		Final	Job# 820-1 - 42" TLOK (1 of 4)	SS-304 : 0.00	8.026	0.193	18.182	0.174	Pass
57	4/15/2022 8:14	General Metals	10 %		Final	Job# 820-1 - 42" TLOK (2 of 4)	SS-304 : 0.00	8.082	0.178	18.446	0.16	Pass
58	4/15/2022 8:16	General Metals	10 %		Final	Job# 820-1 - 42" TLOK (3 of 4)	SS-304 : 0.45	8.021	0.175	18.387	0.159	Pass
59	4/15/2022 8:19	General Metals	10 %		Final	Job# 820-1 - 42" TLOK (4 of 4)	SS-304 : 0.02	8.08	0.182	18.07	0.163	Pass
61	4/15/2022 8:23	General Metals	10 %		Final	Job# 955-1 - 10" TLOK (1 of 1)	17-4 PH : *2.21	4.602	0.151	15.546	0.155	Pass
62	4/15/2022 8:24	General Metals	10 %		Final	Job# 922-2 - 36" DSDE (1 of 1)	SS-304 : 0.00	8.196	0.176	18	0.156	Pass
63	4/15/2022 8:28	General Metals	10 %		Final	Job# 822-2 - 36" DSDE (1 of 1)	SS-304 : 0.00	8.062	0.178	18.01	0.159	Pass
64	4/15/2022 8:32	General Metals	10 %		Final	Job# 928-1 - 6" UNI (1 of 1)	SS-304 : 0.38	7.995	0.179	17.996	0.161	Pass
65	4/15/2022 8:44	General Metals	10 %		Final	IARM 35NN Calibration Standard	1.25Cr(P11) : 0.75	0.13	0.043	1.114	0.046	Pass

17-4PH Composition Range

Chromium (Cr): 15.0 - 17.5

Nickel (Ni): 3.0 - 5.0

ARMI | MBH

ANALYTICAL LTD

ISO Certified: 9001 • 17025 • 17043 • 17034

Certificate of Analysis

IARM 35NN

Low Alloy Steel / F11 / 1¼Cr ½Mo / UNS K11572

Certified Reference Material

Values listed in wt.% with estimated uncertainties

Al	0.0134 ± 0.0005	As	0.0047 ± 0.0002	B	0.0003 ± 0.0001	Ca	0.0010 ± 0.0001
Co	0.0089 ± 0.0002	Cr	1.086 ± 0.001	Cu	0.174 ± 0.001	Fe*	97.22 ± 0.01
Mn	0.331 ± 0.001	Mo	0.478 ± 0.002	Nb	0.0017 ± 0.0001	Ni	0.125 ± 0.001
P	0.0063 ± 0.0001	Pb	0.0022 ± 0.0001	S	0.0038 ± 0.0005	Sb	0.0025 ± 0.0001
Si	0.559 ± 0.004	Sn	0.0087 ± 0.0001	Ta	0.0012 ± 0.0001	Ti	0.0019 ± 0.0001
V	0.0056 ± 0.0001	W	0.0035 ± 0.0001				



*Iron has been calculated as a balance element and was not directly measured by WD-XRF

Description and Intended Use

This Certified Reference Material comes in the form of a solid metal disk approximately 3mm thick by 38mm diameter. The intended use of this certified reference material may include, but is not limited to, the calibration of instruments and the validation of analytical methods. Independent evaluation for the intended use of this material should be conducted by the user.

Instructions for Use

1. The test surface is on the opposite side of the labeled surface, which includes the material identification. The entire thickness of the unit is certified. However, the user is cautioned not to measure disks less than 2 mm thick when using X-ray fluorescence spectrometry. Each packaged disk has been prepared by finishing the test surface using a lathe. The user must determine the correct surface preparation procedure for each analytical technique. The user is cautioned to use care when either resurfacing the disk or performing additional polishing, as these processes may contaminate the surface.
2. The material should be stored in a cool, dry location when not in use.

Analytical Reference Materials International • 276 Abby Road • Manchester, NH 03103
Telephone (603) 935-4100 • Fax (603) 935-4101 • www.ARMIL.com • ARMI@LGCgroup.com

IARM-35NN-F
6/30/2020 1/2

INTERNATIONAL
INSPECTION

PMI Procedure: II-54-...6 Rev.6
PMI Instrument: Thermo Scientific Niton XL2 980
Instrument S/N# 112678
Tech: D. Rosian



ph: (780) 416-9683 fax: (780) 416-9684
www.endurancevalve.com

INSTALLATION & MAINTENANCE

Valve: 150# TLOK

Flange Bolting: See bolt/torque chart

DESCRIPTION:

The FV-150 T-LOK is a fabricated knife-gate valve. It has two body liners and a seat all made of Teflon or UHMW. It is a bi-directional flow valve and can be installed inline facing either direction. Multiple rows of packing are used to seal the gate outside the flow area. The pressure rating of the FV-150 T-LOK is 150# - 150 CWP (cold working pressure). The Manufacturer will provide test reports with shipment

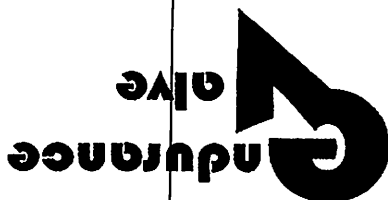
SHIPPING & STORAGE:

All valves are normally shipped in the "closed" position. Small valves (2" – 6") may be packaged in individual boxes. Larger valves and large quantities will be packaged on pallets, skids, or in boxes and will require a forklift, or appropriate machine, for moving. Storage should be a clean dry environment, such as a warehouse.

INSTALLATION:

Install the valve to the mating pipe flange using proper fastener size and length. Thread size will be provided with each valve. If fasteners are not included in the ordered shipment, customer/installer will need to obtain proper fasteners themselves and must measure the valve and flanges to ensure correct length. Studs and nuts should be used when possible to make fitting easier. Be careful not to bottom-out fasteners in the chest during installation as that area is usually a pressure boundary and can be adversely affected if stress is applied from fasteners. Washers should be used to help shorten the penetration of bolts in the chest holes when needed. (Reference Flange Installation Instructions)

Torque charts can be referenced for the mating flange fasteners in the installation process but will vary according to gasket type, size, and thickness used. Use the cross-torque pattern method for tightening the fasteners. Mating flanges must be parallel and true with each other and the valve. Do not use the valve to pull together or push apart the two mating pipes. After installation, open and close the valve to assure smooth operation.



ph: (780) 416-9683 fax: (780) 416-9684
 www.endurancevalve.com

MAINTENANCE:

The only item requiring maintenance/adjustment on the knife-gate valve is the packing. After shipment and installation, the packing gland may require adjustment to stop any leaks, especially if the valve has been in storage for a long period of time. When adjusting the packing gland fasteners, it is best to move along both sides of the gland to ensure even adjustment. To stop a leak, normally just a small amount of tightening per fastener is required. Do not tighten fasteners more than is necessary to stop the leak.

Valve Size	Bolt Size	Torque FT. lbs.
2"-4"	5/8"-11 UNC	55 (+/-5)
6"-8"	3/4"-10 UNC	65 (+/-5)
10"-12"	7/8"-9 UNC	110 (+/-10)
14"-16"	1"-8 UNC	135 (+/-10)
18"-20"	1-1/8"-8 UNC	150 (+/-10)
24"-30"	1-1/4"-8 UNC	200 (+/-10)
32"-48"	1-1/2"-8 UNC	250 (+/-10)

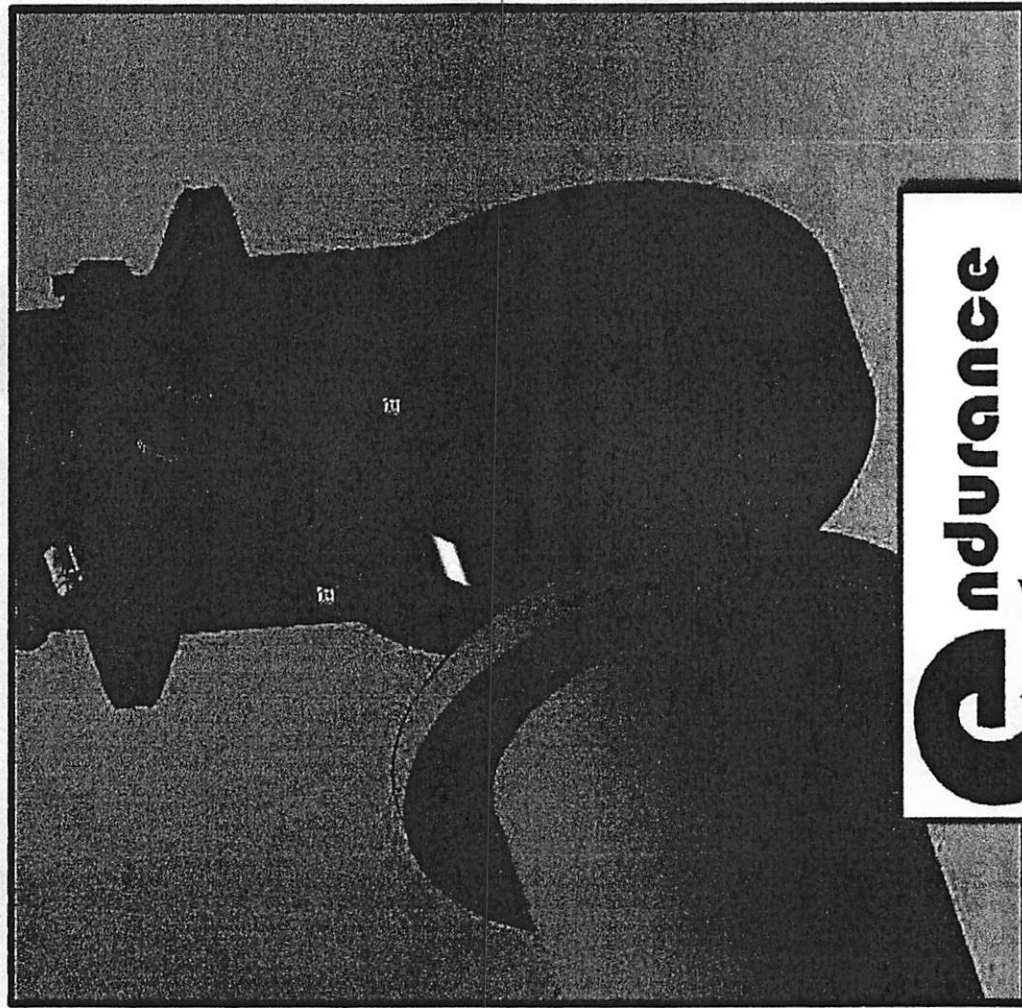
BOLTING STUDS TO VALVE-PIPING

Engineering

Endurance
Valve

STEP 1

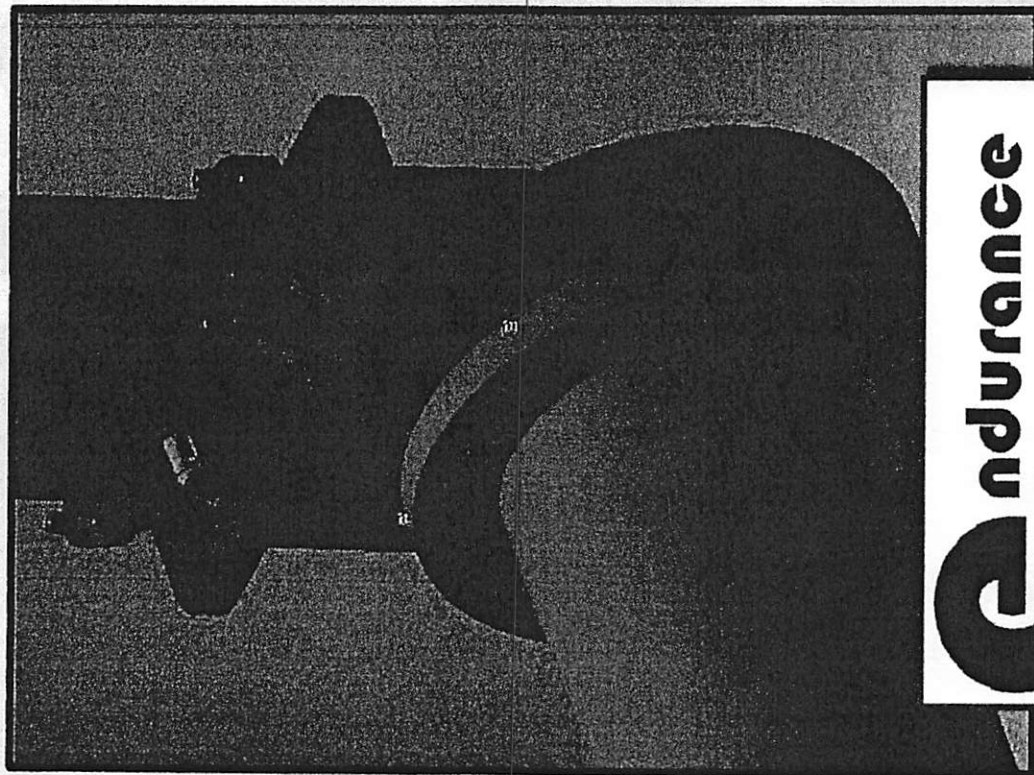
- Begin with 2 studs threaded into the valve next to each other



Endurance
valve

STEP 2

- Line-up to piping and slide flush to pipe and hand snug nuts w/washer



Endurance
valve

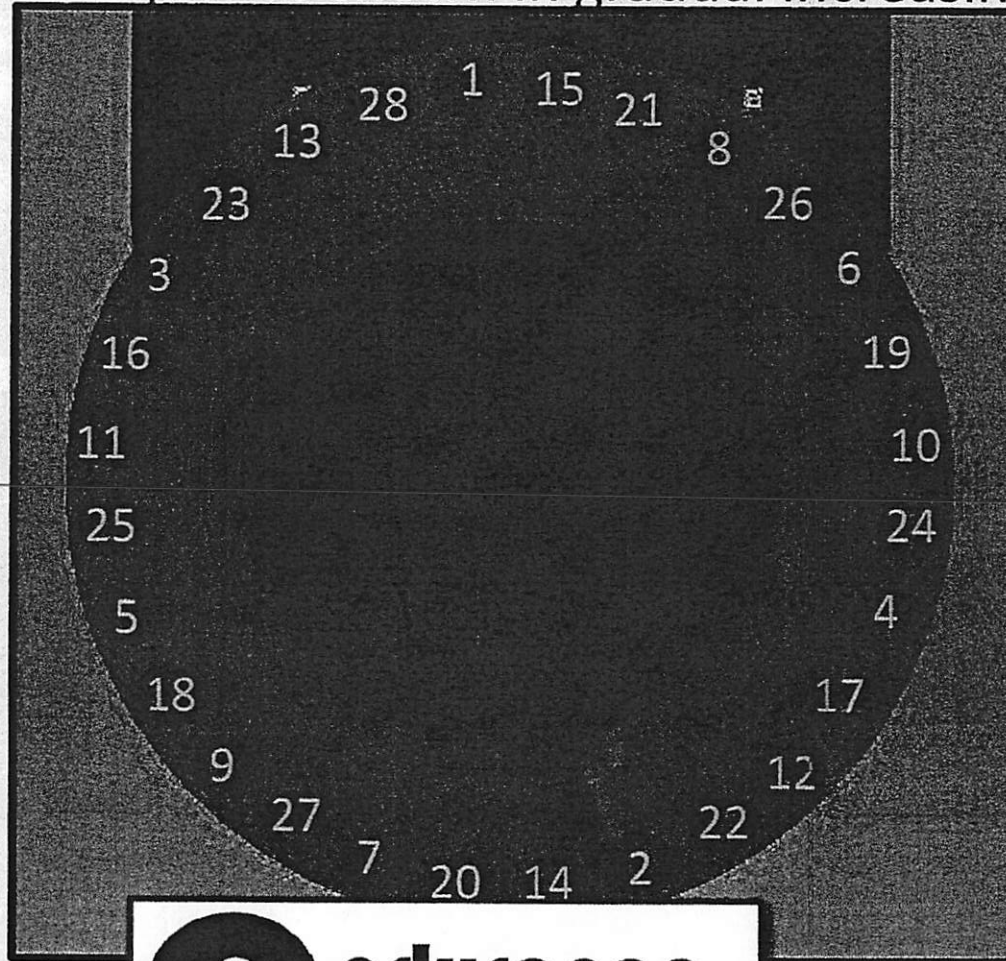
STEP 3

- Thread a nut $\frac{3}{4}$ of the way down another stud.
- Thread a 2nd nut down to the 1st nut.
- Place a washer on the longest side of the stud
- Thread stud by hand into the valve snug and remove upper nut
- Loosen nut and thread remaining stud into valve



STEP 4

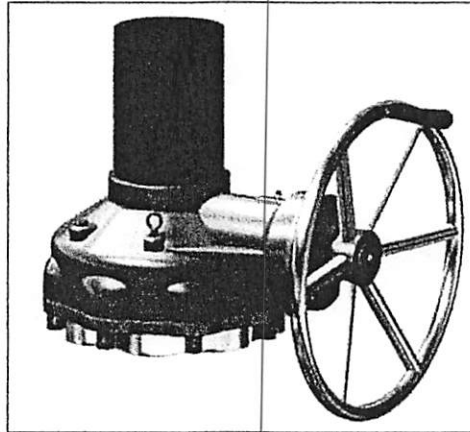
- Thread remaining studs and nuts into valve hand snug
- Then torque* in sequence shown in gradual increasing torque.



*torque sequence changes per valve size



SAMBO INDUSTRIAL BEVEL GEAR OPERATORS



BEVEL GEAR BOX

* MATERIAL & FEATURE

1) MATERIAL

HOUSING	Ductile Iron or WCB
BASE	Ductile Iron or WCB
END CAP	Ductile Iron or WCB
PINION	SCM440
BEVEL GEAR	SCM4
DRIVE SLEEVE	A105
STEM CAP	A36
LOCK NUT	A105

2) FEATURE

We have two kinds of manual bevel gear operator type, one is bevel gear and the other is be helical gear. The latter was bevel-spur gear. It has been changed helical gear, because of so rotating among the spur gears.

GENERAL TYPE ----- SB-VS10 SB-V8 (USED BEVEL GEAR)

SUPPORT BOX TYPE-1 - SB-V3-1 SB-V8-1 (USED BEVEL- HELICAL GEAR)

SUPPORT BOX TYPE-2 - SBV2-20 SBV8-20 (USED BEVEL- BEVEL GEAR)

SUPPORT BOX TYPE-3 - SBV2-20-1 SBV8-20-1 (USED BEVEL- BEVEL-BEVEL GEAR)

INSTALLATION

1) Mounting to valve

If the bevel gear operator has been supplied with a hand-wheel, it is recommended that it is fitted to the gearbox before mounting on the valves. About that, be careful the P.C. and tap size of gear box base.

2) Maintenance

Under normal operating conditions no maintenance is required for the bevel gear operator but should the valve be taken out of service for overhaul, the bevel gear operator baseplate may be removed and the grease changed using one of the following recommended lubricants.

Manufacturer : Yong Kang CO.,LTD

Name : Grease(GRANT SUPER GREASE)

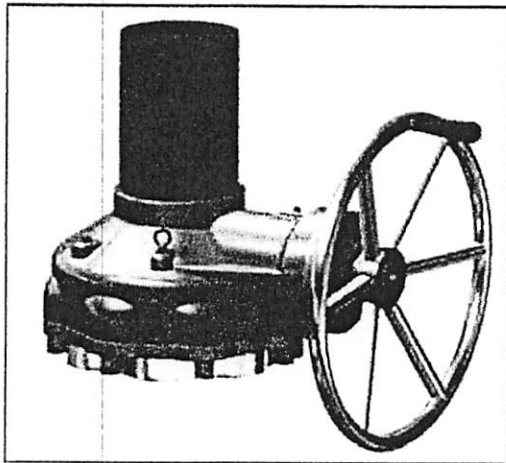
Temperature Range : -4°F □ 284°F (-20°C □ +140°C)

DEVICE OF OPERATION

1) **HAND WHEEL** : Hand-wheel can be located in quadrant, giving you good adaptability. You can install very easily, attach the wheel to the pinion, and a nut and screw.

2) **ACTUATOR** : If you would like to increase RPM, you may use an actuator.

3) **CHAIN WHEEL** : Overhead or inaccessible valves, when equipped with this device may be conveniently and safely operated from the floor.

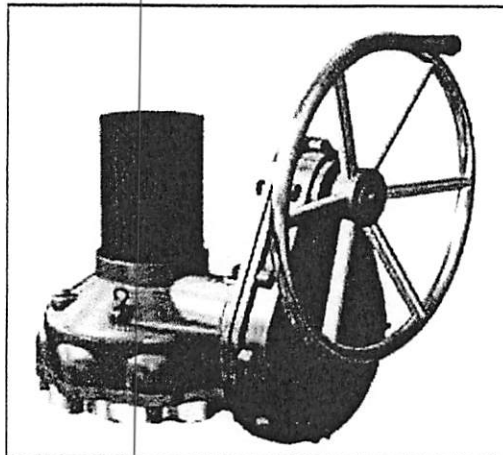


GENERAL TYPE-HORIZONTAL
TYPE-1 Stair

Specifications

- SB-VS10~SB-VS20
- SB-V0~SB-V2
- SB-V3~SB-V5

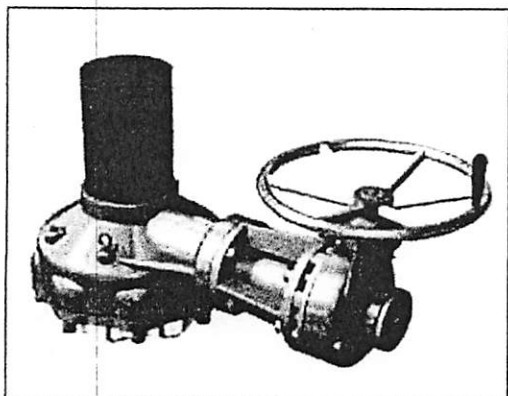
- SB-V6~SB-V8



SUPPORT BOX TYPE HORIZONTAL
TYPE - 2 Stairs

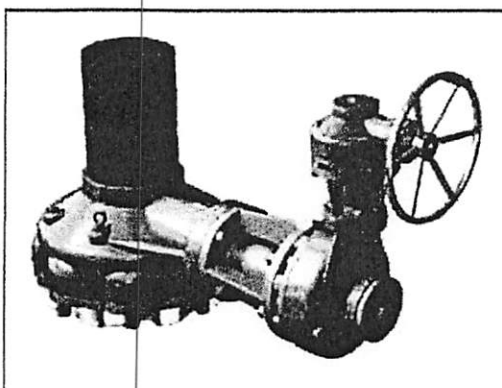
Specifications

- SB-V3-1~SB-V6-1
- SB-V7-1~SB-V8-1



SUPPORT BOX TYPE VERTICAL
TYPE - 2 Stairs

Specifications
- SBV2-20~SBV8~20



SUPPORT BOX TYPE HORIZZONTAL
TYPE - 3 Stairs

Specifications
SBV2~20-1~SBV8~20-1



ph: (780) 416-9683 fax: (780) 416-9684

www.endurancevalve.com

Documentation:

- Certificate of Compliance
- Hydrotest
- MTR's
- I.O.M's
- Endurance Stainless Steel Tag

Supplier:	Endurance Valve Products Ltd.
Vendor Code:	421643
Model:	FV-16-300-150FF-TL-A36/TFE/SS-17.4-BG-FB-X
Ref Job #	13785 Item #2
P.O.:	P.O. 4503134050
Serial #'s	229222-1 229222-2
Tag #'s	93SP-2141 93SP-2141
	0 0
	0
Weight:	CRN: 0C10259.2 1,100 lbs



ph: (780) 416-9683 fax: (780) 416-9684
www.endurancevalve.com

Certificate of Compliance

Customer: Endurance Valve Products

P.O. Box 3007

Sherwood Park, Alberta

Purchase Order Number: 13785 Item #2

Model Number:

FV-16-300-150FF-TL-A36/TFE/SS-17.4-BG-FB-X

Serial #:

229222-1

229222-2

Customer PO

P.O. 4503134050

WE DO HEREBY CERTIFY THAT ALL MATERIALS AS IDENTIFIED IN THE ATTACHED DOCUMENTS ARE IN ACCORDANCE WITH THE SPECIFIED REQUIREMENTS OF THE PURCHASE ORDER

THE FOLLOWING DOCUMENTS ARE ATTACHED:

TEST REPORTS

MTR'S

I.O.M'S

A handwritten signature in black ink, appearing to be 'J. R. R.', is written over the printed name 'Endurance Valve'.

Regards,
Endurance Valve

CRN-OC10259.2

1,100^{LBS}

Fabricast Valve Manufacturers ID: 2201922

229222-1

16"

FV-16-300-150FF-TL-A36/TFE/SS-17.4-BG-FB-X

PD93-A-2006-1/2/3

P.O. 4503134050 / 3500011269

93SP-2141

13785

300^{PSI}

350°F

421643

A36

17.4^{ss}

PTFE

CRN-OC10259.2

1,100^{LBS}

Fabricast Valve Manufacturers ID: 2201922

229222-2

16"

FV-16-300-150FF-TL-A36/TFE/SS-17.4-BG-FB-X

PD93-A-2006-1/2/3

P.O. 4503134050 / 3500011269

93SP-2141

13785

300^{PSI}

350°F

421643

A36

17.4^{ss}

PTFE



Testing Procedure and Process

Valve Description	FV-16-300-150FF-TL-A36/TFE/SS-17.4-BG-FB-X						
Serial Number	229222-1	Ref. #	13785	Size	16		
Tag Number	93SP-2141	Design Pressure Body PSI/CWP			300		
Wetted Parts	17.4ss	Flange Material	A36	Design Pressure Seat PSI/CWP			300
Seat Type	Resilient ☒	Bi-Direct ☒	Metal ☐	Other ☐			

BODY TEST

Using a calibrated pressure tester which is re-calibrated every 360 days, Valve shall be hydrostatically pressure tested at 1.5 times the rated working pressure with no visible leakage through the body material allowed. (Leakage through the packing or gate seal shall not be cause for rejection)

Test Pressure	450	PSI	Test Duration	10	Minutes	
Results of Test	☒ PASS ☐ FAIL					
QC Inspector	Lyman Alexander Sam Allen				Date	5/31/22

SEAT TEST

Apply test pressure to the closed gate at 40PSI (low pressure seat test) and then 1.1. times the rated pressure (high pressure test). Test shall be performed in both flow directions if applicable. Standard acceptance criteria for metal seats are a maximum leakage rate of 40cc/min/NPS (MSS-SP-81) and .167cc/min/NPS (MSS-SP-61) measured at 40PSI. Acceptance criteria for resilient seats are drip tight from 0 PSI to required test pressure. After test, the valve seat is dried with compressed air and wiped down with a dry towel. Leakage will be captured using a measurable catch vessel. *Note - Class IV Leakage Rates are based off of 0.01% Capacity.

Metal Seat Test	0	PSI	Leakage Side 1	N/A	Leakage Side 2	N/A
Resilient Seat Test	330	PSI	Leakage Side 1	0	Leakage Side 2	0
Test Duration	Side 1	2	Minutes	Side 2	2	Minutes
Test Results	Side 1	☒ PASS ☐ FAIL	Permissible Leakage			
Test Results	Side 2	☒ PASS ☐ FAIL	☐ Not Applicable 0.000			
Tester	Cash Reynolds				Date	5/31/22

OPERATIONAL TEST

Open and close the valve 10 full cycles. The valve should open and close smoothly without binding. After the operational test visually inspect the body, gate, stem and operator to ensure it meets Customer and Factory specifications. The valve shall be considered acceptable if it operates smoothly through the entire cycle and meets Factory Quality Requirements.

(For additional functional testing use form QF-82-05-1 to document results.)

QC Inspector	Lyman Alexander Sam Allen	Date	5/31/22
Source Inspector		Date	

QF-82-03-1	Hydrostatic Testing		
Issued by: Engineering	Effective Date: 4/25/2017	Rev. F	



Testing Procedure and Process

Valve Description	FV-16-300-150FF-TL-A36/TFE/SS-17.4-BG-FB-X							
Serial Number	229222-2			Ref. #	13785	Size	16	
Tag Number	93SP-2141			Design Pressure Body PSI/CWP		300		
Wetted Parts	17.4ss	Flange Material	A36	Design Pressure Seat PSI/CWP		300		
Seat Type	Resilient	☒	BI-Direct	☒	Metal	☐	Other	☐

BODY TEST

Using a calibrated pressure tester which is re-calibrated every 360 days, Valve shall be hydrostatically pressure tested at 1.5 times the rated working pressure with no visible leakage through the body material allowed. (Leakage through the packing or gate seal shall not be cause for rejection)

Test Pressure	450	PSI	Test Duration	10	Minutes	
Results of Test	☒ PASS ☐ FAIL					
QC Inspector	Lyman Alexander				Date	5/31/22

SEAT TEST

Apply test pressure to the closed gate at 40PSI (low pressure seat test) and then 1.1 times the rated pressure (high pressure test). Test shall be performed in both flow directions if applicable. Standard acceptance criteria for metal seats are a maximum leakage rate of 40cc/min/NPS (MSS-SP-81) and .167cc/min/NPS (MSS-SP-61) measured at 40PSI. Acceptance criteria for resilient seats are drip tight from 0 PSI to required test pressure. After test, the valve seat is dried with compressed air and wiped down with a dry towel. Leakage will be captured using a measurable catch vessel. *Note - Class IV Leakage Rates are based off of 0.01% Capacity.

Metal Seat Test	0	PSI	Leakage Side 1	N/A	Leakage Side 2	N/A
Resilient Seat Test	330	PSI	Leakage Side 1		Leakage Side 2	
Test Duration	Side 1	2	Minutes	Side 2	2	Minutes
Test Results	Side 1	☒ PASS ☐ FAIL	Permissible Leakage			
Test Results	Side 2	☒ PASS ☐ FAIL	☐ Not Applicable 0.000			
Tester	Cash Reynolds				Date	5/31/22

OPERATIONAL TEST

Open and close the valve 10 full cycles. The valve should open and close smoothly without binding. After the operational test visually inspect the body, gate, stem and operator to ensure it meets Customer and Factory specifications. The valve shall be considered acceptable if it operates smoothly through the entire cycle and meets Factory Quality Requirements.

(For additional functional testing use form QF-82-05-1 to document results.)

QC Inspector	Lyman Alexander	Date	5/31/22
Source Inspector		Date	

QF-82-03-1

Hydrostatic Testing

Issued by: Engineering

Effective Date: 4/25/2017

Rev. F

posco

Mill Test Certificate

Certificate No. : 210715-FH01KS-0008A1-0013

Date of Issue : Jul., 21, 2021

Order No. : 01S5007244

PO No. : 2107-47995

(47995)

Supplier : POSCO INTERNATIONAL CORPORATION

Commodity : HR COIL

Customer : CASCADIA METALS INC.

Spec & Type : ASTM A36

Size	Product No.	Quantity	Weight (kg) (lb)	Heat No.	Country of Melt & Pour	Position	Tensile Test			Division	Chemical Composition												
							YP (Kv)	TS (Kv)	EL (%)		C (%)	Si (%)	Mn (%)	P (%)	S (%)	Cr (%)	Ni (%)	Cu (%)	Mo (%)	Nb (%)	V (%)	Se-Al (%)	
4.70x1524xC	HPT1189601	1	16,880 37,434	SP96693	KOR	B	320	476	32	L P	0.1507 0.1495	0.006 0.004	0.687 0.004	0.0114 0.0117	0.0048 0.0044	0.022 0.023	0.017 0.016	0.026 0.024	0.003 0.003	0.001 0.001	0.001 0.001	0.025 0.022	
4.70x1524xC	HPT1189602	1	17,200 37,919	SP96693	KOR	B	320	476	32	L P	0.1507 0.1495	0.006 0.004	0.687 0.004	0.0114 0.0117	0.0048 0.0044	0.022 0.023	0.017 0.016	0.026 0.024	0.003 0.003	0.001 0.001	0.001 0.001	0.025 0.022	
4.70x1524xC	HPT1189101	1	17,160 37,631	SP96693	KOR	B	320	480	29	L P	0.1507 0.1495	0.006 0.004	0.687 0.004	0.0114 0.0117	0.0048 0.0044	0.022 0.023	0.017 0.016	0.026 0.024	0.003 0.003	0.001 0.001	0.001 0.001	0.025 0.022	
4.70x1524xC	HPT1189102	1	17,310 38,161	SP96693	KOR	B	320	480	29	L P	0.1507 0.1495	0.006 0.004	0.687 0.004	0.0114 0.0117	0.0048 0.0044	0.022 0.023	0.017 0.016	0.026 0.024	0.003 0.003	0.001 0.001	0.001 0.001	0.025 0.022	
4.70x1524xC	HPT1189201	1	16,930 37,324	SP96693	KOR	B	320	480	29	L P	0.1507 0.1495	0.006 0.004	0.687 0.004	0.0114 0.0117	0.0048 0.0044	0.022 0.023	0.017 0.016	0.026 0.024	0.003 0.003	0.001 0.001	0.001 0.001	0.025 0.022	
4.70x1524xC	HPT1189202	1	17,370 38,294	SP96693	KOR	B	320	480	29	L P	0.1507 0.1495	0.006 0.004	0.687 0.004	0.0114 0.0117	0.0048 0.0044	0.022 0.023	0.017 0.016	0.026 0.024	0.003 0.003	0.001 0.001	0.001 0.001	0.025 0.022	
4.70x1524xC	HPT1189301	1	16,980 37,434	SP96693	KOR	B	320	480	29	L P	0.1507 0.1495	0.006 0.004	0.687 0.004	0.0114 0.0117	0.0048 0.0044	0.022 0.023	0.017 0.016	0.026 0.024	0.003 0.003	0.001 0.001	0.001 0.001	0.025 0.022	
4.70x1524xC	HPT1189602	1	17,310 38,161	SP96693	KOR	B	320	480	29	L P	0.1507 0.1495	0.006 0.004	0.687 0.004	0.0114 0.0117	0.0048 0.0044	0.022 0.023	0.017 0.016	0.026 0.024	0.003 0.003	0.001 0.001	0.001 0.001	0.025 0.022	
*** Sub Total (040) ***		18	309,340 (kg)	881,968 (lb)																			
*** Grade Total ***		47	809,350 (kg)	1,784,288 (lb)																			
*** Grand Total ***		137	2,471,270 (kg)	5,448,141 (lb)																			
Last Item																							

* Position - T : Top, M : Middle, B : Bottom
 * Tensile Test Direction : Transversal, Gauge Length : 50 mm(Rectangular),
 YP Method : Upper Point
 * Division - L : Ladle Analysis, P : Products Analysis

We hereby certify that the material herein has been made in accordance with the order and is fully in compliance.
 This material has been fully killed and made by basic oxygen process.
 Test Certificate is issued according to ISO 10474/EN 10204 3.1.

Legal sanction can be imposed on forging. Improper use of product can cause safety issues.

Surveyor To :

Ko Jae Gon

POSCO

Gwangyang Works, 20-26, Pokposarang-gil, Gwangyang-si, Jeollanam-do, 57807, Korea

< PAGE : 13 >

Chief of material testing section

KO JAE GON

HR CARBON STEEL PLATE-PLS ASTM-A-36
3/8" X 60.0000" X 144.0000"
PART NO.

DAY

BL 20 -753373-001

3Mar22

Pg 1/1

Stuffer Sides

		California Steel Industries 14000 San Bernardino Ave. Fontana, California 92335		Mill Test Report				Purchase Order Shipment Number Delivery Number Sales Order Prod. Order Number Truck / RR ID Shipment Date Generated On Attention				20-48974 800135297 0251786628 0000231304 - 000014 0000280746 CHTT100628 00/00/00 11/03/21 Steve																	
								Page 01 of 01																					
General Order Information																													
Product : H.R. Band - Direct Ship (NSP) End Use : WAREHOUSE STOCK - FOR CONVERSION TO ASTM A-36 Thickness: 0.3890 IN NOM Width : 80.0000 IN Edge: Mill Length:										Oil : Finish : Coating Weight : Chem Treat : Origin : ROHS Compliant: Yes																			
Bill To _____							Ship To _____																						
Material Specification Requirements																													
Specification: ASTM-A1018-18-SS-GR.36-TYPE 2										CANBY, OH, 9/013																			
Add'l Req.										Devel. Practices: Cast Method:																			
P	Min	Max	Add'l Req.	Min	Max	Add'l Req.	Min	Max																					
S	0.030	0.030																											
Testing Parameters																													
Tensile		Bend		Hardness		Charpy																							
Freq. Orient. Loc. Gauge Len., (in) Yield Method R-Bar Strain N-Value Strain	HTLOT TRANS ID 2.0000 0.5% EUL																												
Chemical Analysis, wt%																													
Heat	Coil	Type	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn	Al	V	Ob	Ti	B	N	Ca										
011075		H	0.17	1.14	0.018	0.004	0.020	0.02	0.03	0.02	0.00	0.001	0.040	0.003	0.001	0.001	0.0003	0.004	0.0001										
Mechanical Testing Results																													
				Tensile		Elong		Y/T		T/Y		R-Bar Avg		Delta-R		N-Value		Bend		Hardness									
Heat	Coil	Loc	Yield Ksi	Tensile Ksi	Elong %	Y/T	T/Y	R-Bar Avg	Delta-R	N-Value	Loc	Result	Loc	Value															
011075		H	47.5	67.7	33.0	0.71	1.42																						
Charpy																													
Heat	Coil	Loc	Absorbed Energy, ft-lb				Percent Shear				Lateral Expansion, In.				 Dianne Wilson Chief - Laboratory Services I certify that the material described herein has been manufactured in accordance with the requirements of the referenced specification, and the test results conform to the specification requirements.														
			Spec 1	Spec 2	Spec 3	Avg	Spec 1	Spec 2	Spec 3	Avg	Spec 1	Spec 2	Spec 3	Avg															
Summary of Material on Delivery and Special Test Results																													
Heat	Steel Coil																												
011075	2143500																												
Special Statements																													
(1) TEST METHODS PER ASTM E8, E8M, E23, E23M, E233, E233M, E233M IN COMPLIANCE WITH ISO 17025. TEST TYPE "H" RESULTS MAY NOT BE IN ACCORDANCE WITH ISO 17025. THE DECISION RULE FOR COMPLIANCE TO THIS SPECIFICATION OR REQUIREMENTS IS BASED ON SIMPLE ACCEPTANCE.														EN10204:2004 TYPE 2.2 AND TYPE 3.1 COMPLIANT CSI-QM110414 Rev															
(2) MATERIAL IS BATCH COMPLIANT UNDER THE LATEST LIST OF SUBSTANCES PUBLISHED BY THE ECHA.																													
(3) MATERIAL IS ROHS COMPLIANT.																													



1945 Airport Road
Columbus, MS 39701
Phone: 662-245-4200
Fax: 662-245-4297

Metallurgical Certification

Order Number: 489637-1
Order Dimensions: 0.4900 x 60.0000 (in) (MIN) Sold To: Pacific Steel & Recycling Ship To: Pacific Steel & Recycling
Oil Type: PO Box 1549
Ordered Product: A36/SA36 "conversion to" - 19 PRIME HOT ROLLED BAND Great Falls, MT 59403 Clearfield, UT 84075
Part Number: HR .4900X60.0000 A36/SA36 Customer PO Number: 3919923-9 Cert Number: 1939820
Alt Part#: Load Number: S1203426 Ship Date: 10/15/2021

Chemical Analysis

Coil Number	Coil Weight	Heat	C	Mn	P	S	Si	Cu	Sn	Ni	Cr	Mo	Al	N	V	Nb	Ti	B	Ca	C(eq)
21B532745	46,240 lb.	B114699	.21	.45	.008	.002	.03	.10	.0040	.04	.04	.010	.025	.0083	.0010	.001	.001	< .0001	.0018	.312

Test 1

Mechanical Properties	English	Metric
Yield Strength	51.2 ksi	353 MPa
Tensile Strength	75.3 ksi	519 MPa
Elongation	34%	34%
N-Value	Not Reported	Not Reported
Hardness - HRBW	Not Reported	Not Reported
Direction	Transverse	
Gauge Length	2 inch	
Linear Footage	455 ft	139 m
Test Standard	ASTME	
Actual gauge	.4958 in	12.59 mm

We hereby certify the above is correct as contained in the records of the company. All tests performed according to ASTM standards: E8, A370, E18, E415, E1019, E646, E517 or JIS Z2241 or ISO 6892 as required. All Heats are Al Killed and Ca Treated. Melted and Manufactured in the USA in compliance to the American Iron and Steel Step Certification, Buy America Act Title 23 CFR § 635.410, and the Buy American Act Title 46 CFR § 381.2 (B) requirements.
Conversion to - meets chemistry requirements additional testing required

Certified by:

G. Traczyk

Certificated Date: 10/15/2021

Greg Traczyk
Hot Mill Metallurgical Engineer

Packing Box Sides

IMR TEST LABS

A Curtiss-Wright Business Unit
www.imrportland.com

5687-A SE International Way

Portland, OR 97222

T: 1.503.653.2904 | F: 1.503.653.9591

Stuffer Ends

TEST REPORT

IMR Report Number 202111866B

SUMMARY

One sample was received for mechanical testing.

The sample meets the specified tensile requirements for plates.

November 2, 2021

ROOM TEMPERATURE TENSILE TEST

Laboratory Number	Tensile Strength (ksi)	Yield Point (ksi)	Elongation in 2" (%)	Orig. Gauge Width (in.)
2111866-2FTT	90.5	71.0	31	0.505
ASTM A36-19 Req. (Range/Min.)	58 - 80	36	21	
ASTM A709-18, Gr. 36 Req. (Range/Min.)	58 - 80	36	21	

Yield point determined by 0.5% extension method

Direction = Transverse

Method(s): ASTM A370-20 and ASTM A6-19

PO Number
7112

Date Received
October 26, 2021

Material
5/8" Thick Steel Plate

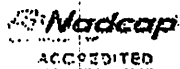
Material Identify
Heat# M1H086

Specification(s)
ASTM A36-19; and
ASTM A709-18, Gr. 36

Reviewed by

Raelynn Webb

Raelynn Webb
Technical Review



All procedures were performed in accordance with the IMR Quality Manual, current revision, and related procedures; and the P&W MCL Manual F-23 and related procedures as applicable. The information contained in this test report represents only the material tested and may not be reproduced, except in full, without the written approval of IMR Test Labs ("IMR"). IMR maintains a quality system in compliance with the ISO/IEC 17025 and is accredited by A2LA, certificate #1140.07. IMR will perform all testing in good faith using the proper procedures, trained personnel and equipment to accomplish the testing required. Conformance will be based on results without measurement uncertainty applied, unless otherwise requested by the customer. IMR's liability to the customer or any third party is limited at all times to the amount charged for the services provided. All test samples will be retained for a minimum of 3 months and may be destroyed thereafter, unless otherwise specified by the customer. The recording of false, fictitious, or fraudulent statements or entries on this document may be punished as a felony under federal statutes. IMR Test Labs is a GEAE S-400 approved lab (Supplier Code T4260).

Rem Steel Sales, Inc

Page 1 of 1

IMR PTL #202111866B

PMI

STATEMENT OF ANALYSIS

Page 1 Of 5

CONSIGNEE:

INC.

DATE: 21 Sep 2021

BILL OF LADING NO.:

AR343733

MILL ORDER NO.(s)

41-653798 41-653798 41-653798

41-653798 41-653798

PORTLAND, OR 97217

PRODUCT: PIPE HSS SHEET X PLATE COIL

THE ANALYSIS OF THE PRODUCT ON THIS LOAD IS AS FOLLOWS:

SIZE				GRADE				HEAT NO.					
ELEMENT - ALLOY THRESHOLD													
%C	%Mn	%B	%Ti	%Si	%Cu	%Ni	%Cr	%P	%S	%V	%CB	%Mo	%AL
—	1.65	.0008	0.05	0.60	0.40	0.30	0.30	—	—	0.10	0.06	0.08	0.30
0.000 X 0 X				SECONDS US				M1H705 D13					
0.15	1.17	.0001	0.008	0.04	0.18	0.10	0.15	0.006	0.002	0.056	0.024	0.05	0.033
0.000 X 0 X				SECONDS US				M1H705 D13					
0.15	1.17	.0001	0.008	0.04	0.18	0.10	0.15	0.006	0.002	0.056	0.024	0.05	0.033
0.000 X 0 X				SECONDS US				M1H705 D13					
0.15	1.17	.0001	0.008	0.04	0.18	0.10	0.15	0.006	0.002	0.056	0.024	0.05	0.033
0.000 X 0 X				SECONDS US				M1H086 A42					
0.16	1.17	.0001	0.009	0.03	0.18	0.10	0.15	0.007	0.001	0.086	0.038	0.05	0.034
0.000 X 0 X				SECONDS US				E1H163 C45					
0.16	1.16	.0001	0.008	0.22	0.30	0.16	0.10	0.010	0.002	0.083	0.000	0.03	0.023
0.000 X 0 X				SECONDS US				E1G209 C38					
0.05	1.24	.0003	0.008	0.35	0.30	0.20	0.61	0.014	0.001	0.083	0.039	0.07	0.034
0.000 X 0 X				SECONDS US				W1F615 A12					
0.05	1.16	.0001	0.008	0.28	0.31	0.10	0.18	0.013	0.001	0.003	0.002	0.04	0.026
0.000 X 0 X				SECONDS US				W1F692 D28					
0.17	1.25	.0003	0.004	0.24	0.27	0.15	0.11	0.011	0.004	0.084	0.001	0.05	0.023

We trust this is the information you require.

Very truly yours,

SSAB ALABAMA INC.

Shipping

Export Declaration Exempt NOEEI 30.36

IMR TEST LABS

A Curtiss-Wright Business Unit
www.imrportland.com

5687-A SE International Way

Portland, OR 97222

T: 1.503.653.2904 | F: 1.503.653.9591

Horseshoe (Body)
Gland Flange
Lifter Sides

TEST REPORT

IMR Report Number 202200305B

SUMMARY

One sample was received for mechanical testing.

The sample meets the specified tensile requirements of ASTM A572-21st, Gr. 50 for plates.

January 12, 2022

ROOM TEMPERATURE TENSILE TEST

Laboratory Number	Tensile Strength (ksi)	Yield Point (ksi)	Elongation in 2" (%)	Orig. Gauge Width (in.)
2200305-2FTT	87.5	57.5	32	0.501
Specification Req. (Min.)	65	50	19	

Yield point determined by 0.5% extension method
Method(s): ASTM A370-20 and ASTM A6-19

PO Number
1074

Date Received
January 10, 2022

Material
3/4" Thick Steel Plate

Material Identity
Heat# B1H651

Specification(s)
ASTM A572-21st, Gr. 50



Nadcap
ACCREDITED

Reviewed by

Elwin Aragon

Elwin Aragon
Technical Review

All procedures were performed in accordance with the IMR Quality Manual, current revision, and related procedures; and the P&W MCL Manual F-23 and related procedures as applicable. The information contained in this test report represents only the material tested and may not be reproduced, except in full, without the written approval of IMR Test Labs ("IMR"). IMR maintains a quality system in compliance with the ISO/IEC 17025 and is accredited by A2LA, certificate #1140.07. IMR will perform all testing in good faith using the proper procedures, trained personnel, and equipment to accomplish the testing required. Conformance will be based on results without measurement uncertainty applied, unless otherwise requested by the customer. IMR's liability to the customer or any third party is limited at all times to the amount charged for the services provided. All test samples will be retained for a minimum of 3 months and may be destroyed thereafter, unless otherwise specified by the customer. The recording of false, fictitious, or fraudulent statements or entries on this document may be punished as a felony under federal statutes. IMR Test Labs is a GEAE S-400 approved lab (Supplier Code T4260).

State Plate

B1H651
3/4" A572-50

PMI

STATEMENT OF ANALYSIS

Page 1 Of 4

CONSIGNEE:

DATE: 19 Dec 2021

BILL OF LADING NO.: MR451682

MILL ORDER NO.(s) 41-662125 41-662125

V

PRODUCT: PIPE _____ HSS _____ SHEET X _____ PLATE _____ COIL _____

THE ANALYSIS OF THE PRODUCT ON THIS LOAD IS AS FOLLOWS:

SIZE				GRADE				HEAT NO.						
ELEMENT - ALLOY THRESHOLD														
%C	%Mn	%B	%Ti	%Si	%Cu	%Ni	%Cr	%P	%S	%V	%CB	%Mo	%AL	
—	1.65	.0008	0.05	0.60	0.40	0.30	0.30	—	—	0.10	0.06	0.08	0.30	
0.000 X 0 X				SECONDS			US		A1K203 C18					
0.06	0.97	.0003	0.008	0.34	0.38	0.20	0.56	0.011	0.002	0.084	0.031	0.04	0.028	
0.000 X 0 X				SECONDS			US		A1K203 C14					
0.06	0.97	.0003	0.008	0.34	0.38	0.20	0.56	0.011	0.002	0.084	0.031	0.04	0.028	
0.000 X 0 X				SECONDS			US		B1J653 C20					
0.06	1.26	.0004	0.009	0.37	0.37	0.28	0.53	0.012	0.003	0.068	0.029	0.03	0.036	
0.000 X 0 X				SECONDS			US		A1H917 D25					
0.17	1.19	.0002	0.008	0.10	0.33	0.20	0.16	0.011	0.006	0.066	0.020	0.03	0.029	
0.000 X 0 X				SECONDS			US		B1J777 A02					
0.06	1.23	.0003	0.008	0.31	0.34	0.26	0.53	0.011	0.005	0.064	0.029	0.02	0.029	
0.000 X 0 X				SECONDS			US		B1H651 D13					
0.07	1.47	.0003	0.008	0.23	0.36	0.20	0.30	0.013	0.003	0.097	0.049	0.05	0.037	
0.000 X 0 X				SECONDS			US		B1H651 D13					
0.07	1.47	.0003	0.008	0.23	0.36	0.20	0.30	0.013	0.003	0.097	0.049	0.05	0.037	
0.000 X 0 X				SECONDS			US		B1H651 D13					
0.07	1.47	.0003	0.008	0.23	0.36	0.20	0.30	0.013	0.003	0.097	0.049	0.05	0.037	

We trust this is the information you require.
 Very truly yours,
 SSAB IOWA INC.

Shipping

Export Declaration Exempt: NOEEI 30.36

BRIDGE CAR Y STEEL
(36) PLATE A36/ABS GR A 100% DOMESTIC
1" X 96.0000" X 240.0000"
PART NO.

PO/Rel 227249

Certificate of Mill Test
SO POR-046058-001

Results
16Dec21
Pg 1/1

Attn:

NUCOR
PLATE MILL GROUP

P.O. Box 279
Winton, NC 27386
(252) 356-3700

Mill Test Report Page 2

1506 River Rd
Coffield, NC 27922
(252) 356-3700

Issuing Date : 08/25/2021 BIL No. : 601081 Load No. : 816053 Our Order No. : 1900533 Cust. Order No. : POR-6846
Vehicle No: LHY 62066 Sold To: Ship To: TRANSFER
Specification: 1/1,0000" x 99,000" x 480,000"
ASTM A36-19/ABS Grade A July 2021/ASME SA36 2019/2021 ASTM
A709 Grade 36-48/ASTM A131-19 Grade A

Marking:

Heat No	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Al(Ppt)	V	Nb	Ti	N	Ca	B	Su	Ceq	Pcm
1606088	0.17	0.85	0.010	0.001	0.14	0.23	0.10	0.08	0.02	0.030	0.005	0.003	0.002		0.0020	0.0001	0.008	0.35	0.23

Plate Serial No	Pieces	Tons	Tensile Test			
			Dir.	(psi) Yield	(psi) Tensile	Elong. % in 2" Elong. % in 8"
1606088-02	2	13.08	T	44,300	69,400	28.1
			T	44,200	68,800	28.8
1606088-03	6	39.20	T	44,300	69,400	28.1
			T	44,200	68,800	28.8

Mohsib Ibrahim
10/11/2021
Work Order #4977666



Port Flanges (Body)
Top Flange
Yoke Pads

Manufactured to fully killed fine grain practice by Electric Arc Furnace. Welding or weld repair was not performed on this material. Mercury has not been used in the direct manufacturing of this material. Produced as continuous cast discrete plate as-rolled, unless otherwise noted in Specification. For Mexico shipments to the Sales Office, please contact us at Sales@nucor.com
Yield by 0.5%UI method unless otherwise specified. Ceq = C+(Mn/5)+(Cr+Mo+V/5)+(Cu+Ni/15)
Pcm = C+(Si/30)+(Mn/20)+(Cu/20)+(Nb/60)+(Cr/20)+(Mo/15)+(V/10)+58
Milled and Manufactured in the USA. ISO 9001:2015 certified, PED 2014/68/EU, 97/23/EC 772 Annex 1, Para. 4.3 Compliant. API Q1-1951
DIN 5049 3.1, EN 10204 3.1(2004) 3.1B(1993) DIN EN 10204 3.1(2005) compliant. ABS QA-3824366

We hereby certify that the contents of this report are accurate and correct. All test results and operations performed by the material manufacturer are in compliance with the applicable specifications, including customer specifications.

T. A. Deprotis
T. A. Deprotis, Metallurgist

9/19/2021 5:27:28 PM

REPORT OF CHEMICAL/PHYSICAL TESTS

CERTIFICATE NO.	DATE	PAGE
1813017	Feb 24, 2022	2
MILL ORDER NO.	DATE	
136736		
CUSTOMER ORDER NO.		
JOB/REQ. NO.		
SHIPPING NO.	DATE	
1813017	02/24/2022	
CARRIER		
UNKNOWN		
CAR/TRUCK NO.		
P17435-BCS		

ISO 9001 REGISTERED U.S. PATENT OFFICE	SOLD TO	Y 103	103	17	USA	PROS
--	---------	----------	-----	----	-----	------

THIS MATERIAL HAS BEEN MANUFACTURED, TESTED AND FOUND TO MEET THE SPECIFICATIONS AND PURCHASE ORDER REQUIREMENTS
EOS CARBON REGULAR QUALITY PLATE EXCESS PRIME STEEL PLATE.

PHYSICAL PROPERTIES									
ITEM NO	DESCRIPTION	HEAT NO.	SLAB	YIELD PSI X 100	TENSILE PSI X 100	% ELONG 8" 2"	% RA	HARDNESS BEND BHN	IMPACTS
2	CARBON STRUCTURAL QUALITY PLATE ASTM A36-19/ASME SA36 2021 ASTM A709-18 GRADE 36 AASSTO M270-GR 250 (36) 1.0000 X 96.000M X 220.000								
	1 PC 5990 LBS +@ N26481			450	640	32			

Port Flanges (Body)
Top Flange
Yoke Pads

CHEMICAL ANALYSIS																		McQuay-Norris Grant S-20
HEAT NO.	C	Mn	P	S	Si	Cu	Ni	V	Co	Al	Cr	Mo	Ti	B	N	Ca	CE	
N26481	.15	.83	.013	.007	.19	.01	.05	.004		.031	.02						.25	
N26481:	Cb=<0.005, Mo=<0.005																	
HEATS INDICATED WITH (+) WERE MELTED & POURED IN RUSSIA.																		
HEATS INDICATED WITH (+) WERE ROLLED IN THE USA.																		

22-2-20

I certify the above to be correct as contained in the records of EVRAZ INC. NA By _____ Quality Systems Coordinator



EVRAZ INC. NA

Evraz Oregon Steel 14400 N. Rivergate Blvd., Portland, Oregon 97203

REPL... OF CHEMICAL/PHYSICAL TESTS

CERTIFICATE NO.	DATE	PAGE
1809314	Jan 24, 2022	1
MILL ORDER NO.	DATE	
372904		
CUSTOMER ORDER NO.		
227314		
JOB/REQ. NO.		
SHIPPING NO.	DATE	
1809314	01/24/2022	
CARRIER		
GREEN TRANSFER		
CAR/TRUCK NO.		
28		

ISO 9001

REGISTERED

U.S. PLATE PRODUCER

S
O
L
D
T
O

BRIDGE CITY STEEL
3865 NW ST HELENS RD
PORTLAND, OR 97210
USA

BRIDGE CITY STEEL
3865 NW ST HELENS RD
PORTLAND, OR 97210
USA

THIS MATERIAL HAS BEEN MANUFACTURED, TESTED AND FOUND TO MEET THE SPECIFICATIONS AND PURCHASE ORDER REQUIREMENTS
E08 CARBON STRUCTURAL QUALITY PLATE ASTM A36-19/ASME SA36 2021 ASTM A709-18
GRADE 36 FOR LASER QUALITY APPLICATIONS NO WELD REPAIR. LASER QUALITY. KILLED
FINE GRAIN PRACTICE. AIM .03 SI, .19 C.

PHYSICAL PROPERTIES

ITEM NO.	DESCRIPTION	HEAT NO.	SLAB	YIELD PSI X 100	TENSILE PSI X 100	% ELONG 8" 2"	% RA	HARDNESS BHN	BEND TEST	IMPACTS
1	1.2500 X 96.000ME X 240.000									Gussets
	2 PCS 16336 LBS	+! RS5967		474	725	28				
2	0.7500 X 96.000ME X 240.000									
	4 PCS 19604 LBS	+! RS5173		625	800	23				
				466	720	38				
3	1.0000 X 96.000ME X 240.000									
	3 PCS 19602 LBS	+! RS5173		485	735	34				
	9 PCS 55542 LBS TOTALS									

CHEMICAL ANALYSIS

	HEAT NO.	C	Mn	P	S	Si	Cu	Ni	V	Cb	Al	Cr	Mo	Ti	B	N	Ca		CE	McQuaid 8m Grain Size
+!	RS5967	.18	.91	.012	.003	.03	.32	.11	.003	.001	.033	.11	.03							
+!	RS5173	.18	.87	.013	.001	.06	.33	.13	.003	.001	.054	.12	.02							
+!	RS5173	.18	.87	.013	.001	.06	.33	.13	.003	.001	.054	.12	.02							
HEATS INDICATED WITH (!) WERE MELTED & POURED IN CANADA.																				
HEATS INDICATED WITH (+) WERE ROLLED IN THE USA.																				

..... END OF REPORT

I certify the above to be correct as contained in the records of EVRAZ INC. NA

By

Quality Systems Coordinator

BRIDGE CITY STEEL INC.
STAINLESS PLATE SPL 1/4" x 60" x 120" HRAP ASTM A-240 304L

PO/Rel: 227497

Inv: 1088992

Date: 02/24/2022

Heat: N82C



NORTH AMERICAN
STAINLESS

METALLURGICAL TEST REPORT

6870 Highway 42 East
Ghent, KY 41045-9615
(502) 347-6000

Certificate: 725477 01 Mill No:
Customer: 9585 046

WEST COAST METALS
C/O PRO-COIL
11919 SMITH AVE.
SANTA FE SPRINGS, CA 90670

SHIP TO:
WEST COAST METALS
C/O PRO-COIL
11919 SMITH AVE.
SANTA FE SPRINGS, CA 90670

Date: 9/24/2021 Page: 1
Steel: 304/304L
Finish: HRAP

Your Order: F039822

NAS Order: AN 0954386 04

Corrosion: ASTM A262/15,180 Bend-OK

PRODUCT DESCRIPTION:

STAINLESS STEEL COIL, HRAP; UNS 30400/30403
ASTM A240/20a, A480/20a, A666/15; ASME SA240/19, SA480/19, SA666/19
CHEM ONLY ON FOLLOWING ASTM: A276/17, A479/20, A484/20b, A312/21
CHEM ONLY ON FOLLOWING ASME: SA312/19, SA479/19
AMS 5213K/5133J XHRP; MIL-S-5059D XM13 (X CON MEAS); MIL-4043B
NACE MR0175/150 15156-3-2015 A, MR0103/07: Q35766D-A X HRG PERM
FIN. SOLUTION ANNEAL TEMP 1900F, WATER QUENCHED

REMARKS:

Mat'l is Free of Mercury Contamination. No weld repairs.
EN 10204:2004 3.1; RoHS 1, 2 & 3 Compliant
Material is Free of Radioactive Contamination
Steel Making Process: EAF, AOD, & Cont. Casting
Product Mfg. by a Quality Mgt. Sys. in Conf. w/ISO 9001
Melted & Manufactured in the USA; Mat'l is DEFAA Compliant

Product ID #	Coil #	Thickness	Width	Weight	Length	Mark	Pieces
04N82C E	* 04N82C E	.2500	60.0000	20.610	COIL	399.50	6

CHEMICAL ANALYSIS CM(Country of Mill) ES(Spain) US(United States) ZA(South Africa) JP(Japan) HRAB, ISO/IEC 17025, Certificate# 12321
Chemical Analysis per ASTM A751/20

HEAT	CM	C %	CR %	CU %	MN %	MO %	N %	NI %	P %	S %
N82C	US	.0200	18.0500	.3630	1.8445	.2890	.0816	8.0810	.0270	.0010
SI %										
.3050										

MECHANICAL PROPERTIES

Product ID #	Coil #	T	UTS	20C	.2% YS	20C	ELONG	%	Hard	Tail
04N82C E	04N82C E	P T	94.22	51.44	52.79	90.50	89.50			

NAS hereby certifies that the analysis on this certification is correct. Based upon the results and the accuracy of the test methods used, the material meets the specifications stated. These results relate only to the items tested and this report cannot be reproduced, except in its entirety, without the written approval of NAS.

Technical
Dept. Mgr.

KRIS LARK

9/27/2021

083842

Gate MTR

siy | acroni

10162251-20030266-174390

Izdajatelj / Certifikat:
Originator of Inspection Document
Aussteller der Bescheinigung:SIJ ACRONI, d.o.o.
KRT-KAKOVOST
Cesta Borisa Kidriča 44
SI - 4270 Jesenice
Slovenia, EUTel.: +386 4 584 10 16
Fax: +386 4 584 10 71
E-Mail: gorazd.kosec@acroni.si
W: http://www.acroni.si

Page 1 / 5

Prevzemni certifikat 3.1 / Inspection Certificate 3.1 / Abnahmeprüfzeugnis 3.1 EN 10204:2004	Prejemnik / Consignee / Empfänger JACQUET WEST 22400 LUCERNE STREET 90745 CARSON UNITED STATES
Št. dokumenta / Document No. / Bescheinigungs Nr. 10162251-20030266-174390 z / dated / vom 31.03.2021	
Kupčeva št. naročila / Purchaser's order No. / Kundenbestell Nr. 11879-52250	Proizvajalčeva št. naročila / Manufacturer's works order No. / Werksauftrag Nr. 20030266 z / dated / vom 02.02.2021
Št. Dobavnega lista / Packing list No. / Lieferschein Nr. 10162251 z / dated / vom 31.03.2021	Kupčeva št. izdelka / Purchaser Article No. / Artikel Nr. des Kunden
Št. Računa / Account No. / Kontonummer 2120101006790	Datum izdaje / Date of Issue / Ausgabedatum 31.03.2021

Zahteva / Requirements / Anforderungen		Oznaka jekla / Steel designation / Stahlbezeichnung
ASME SA-693 BPVC.II.A-2019 (ANNEALED)		S17400 630
ASTM A 693:2016 (annealed)		S17400 630
SAE AMS 5604-J (LAB.H900 ANNEALED) (Acroni is not AS9100 certified)		S17400 630
Customer Grade		HOT ROLLED STAINLESS STEEL 17-4PH
Specifikacija kupca / Customer specification No. / Kundenspezifikation		
Dodatne zahteve / Supplementary requirements / Zusätzliche anforderung		
Dobavno stanje / Product delivery condition / Lieferzustand des Erzeugnisses		
ŽARJENO / ANNEALED / GEGLÜHT		
Stanje površine / Surface finish / Oberflächenbehandlung		
Brez popravila z varjenjem / No weld repair / Keine Schweißreparatur		

Oznaka izdelka / Marking of the product / Kennzeichnung des Erzeugnisses						
Znak proizvajalca Manufacturer's mark Zeichen des Herstellers	Oznaka jekla Steel designation Stahlbezeichnung	Št. plošče Plate No. Tafel Nr	Št. sarže Heat No. Schmelzen Nr.	Dimenzije izdelka Product dimensions Abmessungen des Erzeugnis	Zig kontrolorja Stamp of the works Inspector Stempel des Werkssachverständigen	Zig prevzemalca Stamp of the inspection representative Stempel des Abnahmebeauftragten
SIJ ACRONI						
Dodatne Oznake / Other marks / Andere Kennzeichen						

Oznaka dobave / Marking of material delivery / Umfang der Lieferung							
Poz. Item. Pos.	Št. Sarže Heat No. Schmelzen Nr.	Št. plošče Plate No. Tafel Nr.	Teoretična teža Mass Masse (kg)	Teža neto Actual mass Ist Masse (kg)	Dimenzije izdelka Product dimension Maße des Erzeugnisses (inch)	Št. kosov No. of pieces Stückzahl	Št. vzorca Sample No. Probe Nr.
2	315536	2032635602	1864.19	1840.00	0.750 / 79.00 / 240.00	1	2032635602

Način izdelave jekla / Steelmaking process / Stahlherstellungsverfahren E + VOD

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Odgovorna oseba / Werkssachverständiger / Works Expert : Gorazd Kosec

JACQUET
FICHE#
45988

Gate MTR

sij | acroni

10162251-20030266-174390

[izdajatelj] Certifikat:
Originator of Inspection Document:
Aussteller der Bescheinigung:

SIJ ACRONI, d.o.o.
KRT-KAKOVOST
Cesta Borisa Kidriča 44
SI - 4270 Jesenice
Slovenia, EU

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E-Mail: gorazd.kosec@acroni.si
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Page 2 / 5

Pogoji toplotne obdelave / Heat treatment details / Wärmebehandlung Details

Solution annealing at 1900°F +/-25°F (1038°C +/- 14°C) for a time commensurate with thickness and cooling to below 90°F (32°C).

Precipitation hardening at 900°F +/-10°F (482°C +/- 6°C) for 60 minutes +/- 5 minutes

Mehanične lastnosti pri sobni temperaturi / Mechanical properties at room temperature / Mechanische Eigenschaften bei Raumtemperatur														
St. sarže Heat No. Schmelzen Nr.	St.vzorca Sample No. Probe Nr.	Smer vzorca Sample orientation Proben lage			Meja plastičnosti Yield or proof strength Streck- oder Dehngrenze (KSI)		Nat. trdnost Tensile str. Zugfestigkeit (KSI)	Zg. meja plastičnosti Upper Yield strenght Obere Streckgrenze (KSI)	Kontrakcija Reduction of area Brucheinsch nürung (%)	Raztezek Elongation Bruchdehnung (%)			Razmerje Ratio Beziehung	Trdota Hardness Härte
		T/L	T/B	1/2; 1/3; 1/4; S2	Rp0,2	Rp1,0	Rm	ReH	Z	A5	A50	A80	Rp/Rm	
Zahteve Requirements Anforderung		MIN												
		MAX												
315536	2032635602	T	T	S2	118.21		141.85	9.0						
T- Prečno / Transverse / Quer L- Vzdolžno / Longitudinal / Längs T- Glava / Top / Kopf B- Noga / Bottom / Fuss 1/2 - Odvzem vzorca na sredini / Taking the sample at the center of product / Unter der Probe in der Mitte des Produkt 1/3 - Odvzem vzorca po deb 1/3 pod površino / Thickness 1/3 under the surface / Dicke 1/3 unter der Oberfläche 1/4 - Odvzem vzorca po deb 1/4 pod površino / Thickness 1/4 under the surface / Dicke 1/4 unter der Oberfläche S2- Odvzem vzorca po deb 2 mm pod površino / Thickness 2 mm under the surface / Dicke 2 mm unter der Oberfläche														

Trdota / Hardness / Härte (HB)				
St. sarže Heat No. Schmelzen Nr.	St. vzorca Sample No. Probe Nr.	Meritev / Measurement / Messungen		
				1
Zahteva Requiem Anforderung	MIN MAX			353.0
315536	2032635602			302.0

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Page 3 / 5

H 900 - Mechanical properties at Precipitation hardening condition at 900°F /482°C

Mehaniške lastnosti - simulacija toplotne obdelave / Mechanical properties - simulation of the heat treatment / Mechanische Eigenschaften - Simulation der Wärmebehandlung														
St. sarže Heat No. Schmelzen Nr.	St. vzorca Sample No. Probe Nr.	Smer vzorca Sample orientation Proben lage			Meja plastičnosti Yield or proof strenght Streck- oder Dehngrenze (KSI)		Nat. trdnost Tensile str. Zugfestigkeit (KSI)	Zg. meja plastičnosti Upper Yield strenght Obere Streckgrenze (KSI)	Kontrakcija Reduction of area Bruchelnschn ürung (%)	Raztezek Elongation Bruchdehnung (%)			Razmerje Ratio Beziehung	Trdota Hardness Härte
		T/L	T/B	1/2; 1/3; 1/4; S2	Rp0,2	Rp1,0	Rm	Reh	Z	A5	A50	A80	Rp/Rm	
Zahteve Requirements Anforderung		MIN			170.0		190.00	35.0			10.0			
		MAX												
315536	2032635602	T	T	S2	170.0		193.77		42.0	11.0				
T- Prečno / Transverse / Quer L- Vzdolžno / Longitudinal / Längs T- Glava / Top / Kopf B- Noga / Bottom / Fuss 1/2 - Odvzem vzorca na sredini / Taking the sample at the center of product / Unter der Probe in der Mitte des Produkt 1/3 - Odvzem vzorca po deb 1/3 pod površino / Thickness 1/3 under the surface / Dicke 1/3 unter der Oberfläche 1/4 - Odvzem vzorca po deb 1/4 pod površino / Thickness 1/4 under the surface / Dicke 1/4 unter der Oberfläche S2- Odvzem vzorca po deb 2 mm pod površino / Thickness 2 mm under the surface / Dicke 2 mm unter der Oberfläche														

Trdota - simulacija toplotne obdelave / Hardness - simulation of the heat treatment / Härte - Simulation der Wärmebehandlung (HB)													
St. sarže Heat No. Schmelzen Nr.	St. vzorca Sample No. Probe Nr.	Meritev / Measurement / Messungen											
		1											
Zahteve Requirem Anforderung	MIN	375.0											
	MAX	444.0											
315536	2032635602	388.0											

Kemija / Analiza / Chemical Composition / Chemische Zusammensetzung											
St. Sarže / Heat No. / Schmelzen Nr.	315536										
%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Cu	%Mo	%Nb	%Ta	%Co
0.031	0.316	0.814	0.013	0.0001	15.11	4.23	3.409	0.081	0.206	0.007	0.017

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Page 4 / 5

Dodatne zahteve / Additional requirements / Zusätzliche Anforderungen :

Št. sarže / Heat No. / Schmelzen Nr. : 315536

Nb+Ta

0.213

Kontrola oznak, identifikacije, površine, oblike in dimenzij / Control of marking and identification, surface appearance, shape and dimensional properties / Prüfung von Kennzeichnung, Identifizierung, Oberfläche, Form und Maße :

ASME SA 480 Ed.2019 OK

ASTM A480/A480M-20 OK

Neponuštljene preiskave / Non destructive test / Zerstörungsfreie Prüfungen

Ultrazvočni pregled / Ultrasonic inspection / Ultraschallprüfung :

Ultrazvočni pregled po EN10160-S2-E3: OK / Ultrasonic inspection acc.EN10160-S2-E3: OK / Ultraschallprüfung nach. EN10160-S2-E3: OK

Dobro kakovostno izdelavo po AMS 2315 / FERRI measured Acc. AMS 2315 / FERRI gemessen Acc. AMS 2315			
Št. vzorca Sample No. Probe Nr.	Št. sarže Heat No. Schmelzen Nr.	%	
Zahteve Requiem Anforderung	MIN MAX	5.0	
2032635602	315536	0.2	

Opombe / Remarks / Bemerkungen

Potrjujemo da dobavljeni izdelki ustrezajo zahtevam naročila / We confirm herewith that the delivered products comply with the purchase order / Es wird bestätigt, daß die Erzeugnisse den Bestellanforderungen entsprechen

Država porekla = Država izdelave taline = Država izdelave slaba - SLOVENIJA - EU / Country of Origin = Country of melt = Country of slab: SLOVENIA - EU / Herkunftsland = Land der schmelze = Land der Bramme - SLOVENIA - EG

Materijal ni kontaminiran z živim srebrom. / Free from Known Contamination with Mercury. / Keine kontamination mit Quecksilber.

Materijal je skladen z RoHS direktivo. Podrobnosti na: <https://slj.acroni.si/assets/magazine-files/RoHS-declaration-April-2020.pdf> / Material fully comply with RoHS directive, Details on: <https://slj.acroni.si/assets/magazine-files/RoHS-declaration-April-2020.pdf> / Material ausgestattet mit RoHS-Richtlinien, Einzelheiten

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TECHNICAL

Page 5/5

auf: <https://slj.acroni.si/assets/magazine-files/RoHS-declaration-April-2020.pdf>

Sistem vodenja kakovosti je certificiran po ISO 9001. Št. Certifikata: 12 100 6200 TMS. Izdajatelj: TÜV SÜD Management Service GmbH. / Quality Management
System is certified according to ISO 9001. Certificate no. 12 100 6200 TMS, issued by TÜV SÜD Management Service GmbH. / Qualitätsmanagementsystem
zertifiziert nach ISO 9001. Zertifikat Nr. 12 100 6200 TMS der TÜV SÜD Management Service GmbH.

Meritve sevanja: NI RADIOAKTIVNEGA ONESNAŽENJA / Measuring Radiation: NO RADIOACTIVE CONTAMINATION / messen: KEINE ERHÖHTE
RADIOAKTIVITÄT

Spektrometerska analiza PMI v skladu API RP 578: OK / Spectrometer Sorting Test PMI according to API RP 578: OK / Spektrometer Sortiertest PMI nach API RP
578: OHNE BEANSTANDUNG

Vizualni pregled: OK / Visual Inspection: OK / Sichtprüfung: OHNE BEANSTANDUNG

DFARS compliant per 252.225.7003 and 252.225.872-1

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JACQUET
FICHE#

45988

INTERNATIONAL INSPECTION

Reading No	Time	Type	Duration	Units	Sequence	Item Description	Material ID	Ni	Ni Error	Cr	Cr Error	Results
1	4/15/2022 7:14	System Check	53.64	cps	Final	System Check 1 of 2						Pass
2	4/15/2022 7:15	System Check	54.06	cps	Final	System Check 2 of 2						Pass
3	4/15/2022 7:16	General Metals	10	%	Final	IARM 35NN Calibration Standard	1.25Cr(P11) : 0.75	0.157	0.045	1.113	0.047	Pass
4	4/15/2022 7:21	General Metals	10	%	Final	Job# 933-2 - 6" DSDE (1 of 9)	17-4 PH : *2.22	4.63	0.145	15.738	0.15	Pass
5	4/15/2022 7:22	General Metals	10	%	Final	Job# 933-2 - 6" DSDE (2 of 9)	17-4 PH : *2.58	4.734	0.143	15.667	0.146	Pass
7	4/15/2022 7:24	General Metals	10	%	Final	Job# 933-2 - 6" DSDE (3 of 9)	17-4 PH : *2.21	4.697	0.148	15.696	0.152	Pass
8	4/15/2022 7:24	General Metals	10	%	Final	Job# 933-2 - 6" DSDE (4 of 9)	17-4 PH : *2.21	4.7	0.147	15.721	0.152	Pass
9	4/15/2022 7:25	General Metals	10	%	Final	Job# 933-2 - 6" DSDE (5 of 9)	17-4 PH : *2.21	4.718	0.158	15.601	0.161	Pass
10	4/15/2022 7:26	General Metals	10	%	Final	Job# 933-2 - 6" DSDE (6 of 9)	17-4 PH : *2.22	4.643	0.142	15.764	0.148	Pass
11	4/15/2022 7:27	General Metals	10	%	Final	Job# 933-2 - 6" DSDE (7 of 9)	17-4 PH : *2.22	4.677	0.14	15.843	0.145	Pass
12	4/15/2022 7:27	General Metals	10	%	Final	Job# 933-2 - 6" DSDE (8 of 9)	17-4 PH : *2.22	4.602	0.143	15.828	0.15	Pass
14	4/15/2022 7:29	General Metals	10	%	Final	Job# 933-2 - 6" DSDE (19 of 9)	17-4 PH : *2.22	4.665	0.144	15.679	0.148	Pass
15	4/15/2022 7:32	General Metals	10	%	Final	Job# 933-4 - 8" DSDE (1 of 14)	17-4 PH : 1.46	4.112	0.14	15.21	0.149	Pass
16	4/15/2022 7:32	General Metals	10	%	Final	Job# 933-4 - 8" DSDE (2 of 14)	17-4 PH : 1.21	4.053	0.138	15.155	0.147	Pass
17	4/15/2022 7:33	General Metals	10	%	Final	Job# 933-4 - 8" DSDE (3 of 14)	17-4 PH : 0.90	4.014	0.133	15.174	0.143	Pass
18	4/15/2022 7:33	General Metals	10	%	Final	Job# 933-4 - 8" DSDE (4 of 14)	17-4 PH : 0.78	3.968	0.136	15.378	0.148	Pass
19	4/15/2022 7:33	General Metals	10	%	Final	Job# 933-4 - 8" DSDE (5 of 14)	17-4 PH : 0.88	4.013	0.135	15.22	0.146	Pass
20	4/15/2022 7:34	General Metals	10	%	Final	Job# 933-4 - 8" DSDE (6 of 14)	17-4 PH : 1.47	4.106	0.135	15.357	0.145	Pass
21	4/15/2022 7:34	General Metals	10	%	Final	Job# 933-4 - 8" DSDE (7 of 14)	17-4 PH : 0.91	4.016	0.134	15.389	0.146	Pass
22	4/15/2022 7:35	General Metals	10	%	Final	Job# 933-4 - 8" DSDE (8 of 14)	17-4 PH : 1.57	4.12	0.138	15.034	0.147	Pass
23	4/15/2022 7:35	General Metals	10	%	Final	Job# 933-4 - 8" DSDE (9 of 14)	17-4 PH : 0.27	3.947	0.133	15.346	0.145	Pass
24	4/15/2022 7:35	General Metals	10	%	Final	Job# 933-4 - 8" DSDE (10 of 14)	17-4 PH : 1.30	4.066	0.134	15.336	0.144	Pass
25	4/15/2022 7:36	General Metals	10	%	Final	Job# 933-4 - 8" DSDE (11 of 14)	17-4 PH : 0.00	3.831	0.133	15.278	0.147	Pass
26	4/15/2022 7:36	General Metals	10	%	Final	Job# 933-4 - 8" DSDE (12 of 14)	17-4 PH : 1.12	4.04	0.136	15.431	0.147	Pass
27	4/15/2022 7:36	General Metals	10	%	Final	Job# 933-4 - 8" DSDE (13 of 14)	17-4 PH : *1.81	4.14	0.14	15.368	0.149	Pass
28	4/15/2022 7:37	General Metals	10	%	Final	Job# 933-4 - 8" DSDE (14 of 14)	17-4 PH : 1.20	4.053	0.146	15.066	0.156	Pass
29	4/15/2022 7:40	General Metals	10	%	Final	Job# 913-2 - 16" TLOK (1 of 2)	17-4 PH : 0.35	3.957	0.136	15.184	0.148	Pass
30	4/15/2022 7:40	General Metals	10	%	Final	Job# 913-2 - 16" TLOK (2 of 2)	17-4 PH : 0.91	4.017	0.143	15.251	0.154	Pass
36	4/15/2022 7:47	General Metals	10	%	Final	Job# 922 - 10" TLOK (1 of 1)	17-4 PH : *2.22	4.629	0.142	15.43	0.145	Pass

304L Composition Range (ASME Sec.II)

Chromium (Cr): 18.0 - 20.0

Nickel (Ni): 8.0 - 13.0

Technician: Daniel C Rosian 4/15/2022

D. C. Rosian

PO 13785
16" FV-150T-Lok
Gate MTR

INTERNATIONAL INSPECTION

Reading No	Time	Type	Duration	Units	Sequence	Item Description	Material ID	Ni	Ni Error	Cr	Cr Error	Results
37	4/15/2022 7:48	General Metals	10 %		Final	Job# 974 - 12" UNI (1 of 1)	SS-304 : 0.22	8.258	0.179	18.288	0.159	Pass
40	4/15/2022 7:51	General Metals	10 %		Final	Job# 955-2 - 16" TLOK (1 of 2)	17-4 PH : 1.42	4.095	0.136	15.382	0.146	Pass
41	4/15/2022 7:51	General Metals	10 %		Final	Job# 955-2 - 16" TLOK (2 of 2)	17-4 PH : 1.33	4.073	0.137	15.367	0.148	Pass
42	4/15/2022 7:53	General Metals	10 %		Final	Job# 909 - 16" DS (1 of 3)	SS-304 : 1.46	7.93	0.191	17.973	0.172	Pass
45	4/15/2022 7:55	General Metals	10 %		Final	Job# 909 - 16" DS (2 of 3)	SS-304 : 0.98	7.929	0.175	18.021	0.157	Pass
46	4/15/2022 7:55	General Metals	10 %		Final	Job# 909 - 16" DS (3 of 3)	SS-304 : 0.98	7.932	0.179	17.753	0.159	Pass
47	4/15/2022 7:57	General Metals	10 %		Final	Job# 936 - 12" UNI (1 of 1)	SS-304 : 0.00	8.195	0.184	18.132	0.163	Pass
48	4/15/2022 8:00	General Metals	10 %		Final	Job# 975-1 - 28" UNI (1 of 1)	SS-304 : 0.09	8.141	0.191	17.917	0.169	Pass
S/N 229222-1 S/N 229222-2	49	4/15/2022 8:01	General Metals	10 %	Final	Job# 922-2 - 16" TLOK (1 of 2)	17-4 PH : 1.49	4.125	0.136	15.322	0.145	Pass
	50	4/15/2022 8:02	General Metals	10 %	Final	Job# 922-2 - 16" TLOK (2 of 2)	17-4 PH : 1.39	4.084	0.135	15.494	0.147	Pass
	53	4/15/2022 8:05	General Metals	10 %	Final	Job# 935-1 - 10" UNI (1 of 1)	17-4 PH : *2.22	4.627	0.142	15.458	0.146	Pass
	54	4/15/2022 8:07	General Metals	10 %	Final	Job# 820-3 - 48" TLOK (1 of 2)	SS-304 : 0.08	7.863	0.191	18.308	0.173	Pass
	55	4/15/2022 8:07	General Metals	10 %	Final	Job# 820-3 - 48" TLOK (2 of 2)	SS-304 : 0.18	7.891	0.183	18.201	0.165	Pass
	56	4/15/2022 8:13	General Metals	10 %	Final	Job# 820-1 - 42" TLOK (1 of 4)	SS-304 : 0.00	8.026	0.193	18.182	0.174	Pass
	57	4/15/2022 8:14	General Metals	10 %	Final	Job# 820-1 - 42" TLOK (2 of 4)	SS-304 : 0.00	8.082	0.178	18.446	0.16	Pass
	58	4/15/2022 8:16	General Metals	10 %	Final	Job# 820-1 - 42" TLOK (3 of 4)	SS-304 : 0.45	8.021	0.175	18.387	0.159	Pass
	59	4/15/2022 8:19	General Metals	10 %	Final	Job# 820-1 - 42" TLOK (4 of 4)	SS-304 : 0.02	8.08	0.182	18.07	0.163	Pass
	61	4/15/2022 8:23	General Metals	10 %	Final	Job# 955-1 - 10" TLOK (1 of 1)	17-4 PH : *2.21	4.602	0.151	15.546	0.155	Pass
	62	4/15/2022 8:24	General Metals	10 %	Final	Job# 922-2 - 36" DSDE (1 of 1)	SS-304 : 0.00	8.196	0.176	18	0.156	Pass
	63	4/15/2022 8:28	General Metals	10 %	Final	Job# 822-2 - 36" DSDE (1 of 1)	SS-304 : 0.00	8.062	0.178	18.01	0.159	Pass
	64	4/15/2022 8:32	General Metals	10 %	Final	Job# 928-1 - 6" UNI (1 of 1)	SS-304 : 0.38	7.995	0.179	17.996	0.161	Pass
	65	4/15/2022 8:44	General Metals	10 %	Final	IARM 35NN Calibration Standard	1.25Cr(P11) : 0.75	0.13	0.043	1.114	0.046	Pass

17-4PH Composition Range

Chromium (Cr): 15.0 - 17.5

Nickel (Ni): 3.0 - 5.0

ARMI | MBH

ANALYTICAL LTD

ISO Certified • 9001 • 17025 • 17043 • 17034

Certificate of Analysis

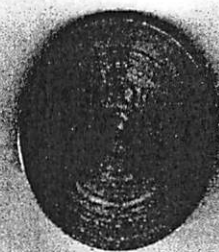
IARM 35NN

Low Alloy Steel / F11 / 1¼Cr ½Mo / UNS K11572

Certified Reference Material

Values listed in wt.% with estimated uncertainties

Al	0.0134 ± 0.0005	As	0.0047 ± 0.0002	B	0.0003 ± 0.0001	Ca	0.0010 ± 0.0001
Co	0.0089 ± 0.0002	Cr	1.086 ± 0.001	Cu	0.174 ± 0.001	Fe*	97.22 ± 0.01
Mn	0.331 ± 0.001	Mo	0.478 ± 0.002	Nb	0.0017 ± 0.0001	Ni	0.125 ± 0.001
P	0.0063 ± 0.0001	Pb	0.0022 ± 0.0001	S	0.0038 ± 0.0005	Sb	0.0025 ± 0.0001
Si	0.559 ± 0.004	Sn	0.0087 ± 0.0001	Ta	0.0012 ± 0.0001	Ti	0.0019 ± 0.0001
V	0.0056 ± 0.0001	W	0.0035 ± 0.0001				



*Iron has been calculated as a balance element and was not directly measured by WD-XRF

Description and Intended Use

This Certified Reference Material comes in the form of a solid metal disk approximately 3mm thick by 38mm diameter. The intended use of this certified reference material may include, but is not limited to, the calibration of instruments and the validation of analytical methods. Independent evaluation for the intended use of this material should be conducted by the user.

Instructions for Use

1. The test surface is on the opposite side of the labeled surface, which includes the material identification. The entire thickness of the unit is certified. However, the user is cautioned not to measure disks less than 2 mm thick when using X-ray fluorescence spectrometry. Each packaged disk has been prepared by finishing the test surface using a lathe. The user must determine the correct surface preparation procedure for each analytical technique. The user is cautioned to use care when either resurfacing the disk or performing additional polishing, as these processes may contaminate the surface.
2. The material should be stored in a cool, dry location when not in use.

Analytical Reference Materials International • 276 Abby Road • Manchester, NH 03103
Telephone (603) 935-4100 • Fax (603) 935-4101 • www.ARMIL.com • ARMI@LGCgroup.com

IARM-35NN-F
6/30/2020 1/2

INTERNATIONAL
INSPECTION

PMI Procedure: IL-54-06 Rev.6
PMI Instrument: Thermo Scientific Niton XL2 980
Instrument S/N# 112678
Tech: D. Roslan



ph: (780) 416-9683 fax: (780) 416-9684
www.endurancevalve.com

INSTALLATION & MAINTENANCE

Valve: 150# TLOK

Flange Bolting: See bolt/torque chart

DESCRIPTION:

The FV-150 T-LOK is a fabricated knife-gate valve. It has two body liners and a seat all made of Teflon or UHMW. It is a bi-directional flow valve and can be installed inline facing either direction. Multiple rows of packing are used to seal the gate outside the flow area. The pressure rating of the FV-150 T-LOK is 150# - 150 CWP (cold working pressure). The Manufacturer will provide test reports with shipment

SHIPPING & STORAGE:

All valves are normally shipped in the "closed" position. Small valves (2" – 6") may be packaged in individual boxes. Larger valves and large quantities will be packaged on pallets, skids, or in boxes and will require a forklift, or appropriate machine, for moving. Storage should be a clean dry environment, such as a warehouse.

INSTALLATION:

Install the valve to the mating pipe flange using proper fastener size and length. Thread size will be provided with each valve. If fasteners are not included in the ordered shipment, customer/installer will need to obtain proper fasteners themselves and must measure the valve and flanges to ensure correct length. Studs and nuts should be used when possible to make fitting easier. Be careful not to bottom-out fasteners in the chest during installation as that area is usually a pressure boundary and can be adversely affected if stress is applied from fasteners. Washers should be used to help shorten the penetration of bolts in the chest holes when needed. (Reference Flange Installation Instructions)

Torque charts can be referenced for the mating flange fasteners in the installation process but will vary according to gasket type, size, and thickness used. Use the cross-torque pattern method for tightening the fasteners. Mating flanges must be parallel and true with each other and the valve. Do not use the valve to pull together or push apart the two mating pipes. After installation, open and close the valve to assure smooth operation.

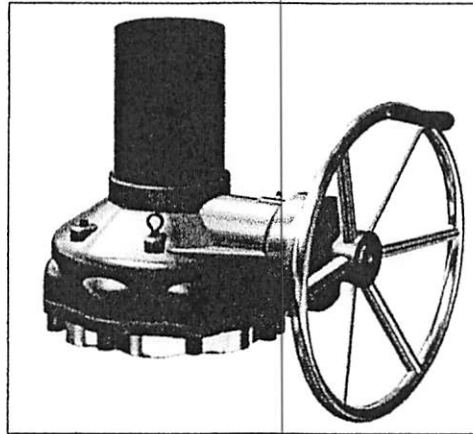


MAINTENANCE:

The only item requiring maintenance/adjustment on the knife-gate valve is the packing. After shipment and installation, the packing gland may require adjustment to stop any leaks, especially if the valve has been in storage for a long period of time. When adjusting the packing gland fasteners, it is best to move along both sides of the gland to ensure even adjustment. To stop a leak, normally just a small amount of tightening per fastener is required. Do not tighten fasteners more than is necessary to stop the leak.

Valve Size	Bolt Size	Torque FT. lbs.
2"-4"	5/8"-11 UNC	55 (+/-5)
6"-8"	3/4"-10 UNC	65 (+/-5)
10"-12"	7/8"-9 UNC	110 (+/-10)
14"-16"	1"-8 UNC	135 (+/-10)
18"-20"	1-1/8"-8 UNC	150 (+/-10)
24"-30"	1-1/4"-8 UNC	200 (+/-10)
32"-48"	1-1/2"-8 UNC	250 (+/-10)

SAMBO INDUSTRIAL BEVEL GEAR OPERATORS



BEVEL GEAR BOX

* MATERIAL & FEATURE

1) MATERIAL

HOUSING	Ductile Iron or WCB
BASE	Ductile Iron or WCB
END CAP	Ductile Iron or WCB
PINION	SCM440
BEVEL GEAR	SCM4
DRIVE SLEEVE	A105
STEM CAP	A36
LOCK NUT	A105

2) FEATURE

We have two kinds of manual bevel gear operator type, one is bevel gear and the other is be helical gear. The latter was bevel-spur gear. It has been changed helical gear, because of so rotating among the spur gears.

GENERAL TYPE ----- SB-VS10 SB-V8 (USED BEVEL GEAR)

SUPPORT BOX TYPE-1 - SB-V3-1 SB-V8-1 (USED BEVEL- HELICAL GEAR)

SUPPORT BOX TYPE-2 - SBV2-20 SBV8-20 (USED BEVEL- BEVEL GEAR)

SUPPORT BOX TYPE-3 - SBV2-20-1 SBV8-20-1 (USED BEVEL- BEVEL-BEVEL GEAR)

INSTALLATION

1) Mounting to valve

If the bevel gear operator has been supplied with a hand-wheel, it is recommended that it is fitted to the gearbox before mounting on the valves. About that, be careful the P.C. and tap size of gear box base.

2) Maintenance

Under normal operating conditions no maintenance is required for the bevel gear operator but should the valve be taken out of service for overhaul, the bevel gear operator baseplate may be removed and the grease changed using one of the following recommended lubricants.

Manufacturer : Yong Kang CO.,LTD

Name : Grease(GRANT SUPER GREASE)

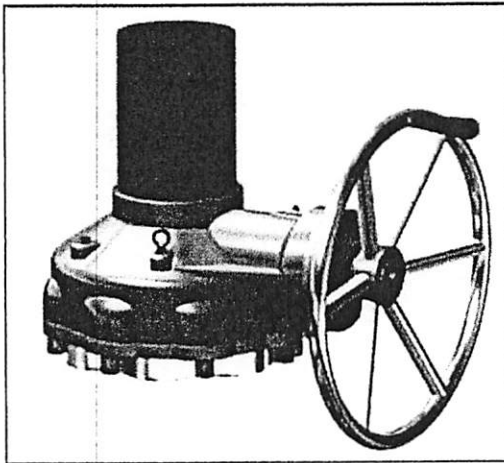
Temperature Range : -4°F $\square$ 284°F (-20°C $\square$ $+140^{\circ}\text{C}$)

DEVICE OF OPERATION

1) **HAND WHEEL** : Hand-wheel can be located in quadrant, giving you good adaptability. You can install very easily, attach the wheel to the pinion, and a nut and a screw.

2) **ACTUATOR** : If you would like to increase RPM, you may use an actuator.

3) **CHAIN WHEEL** : Overhead or inaccessible valves, when equipped with this device may be conveniently and safely operated from the floor.

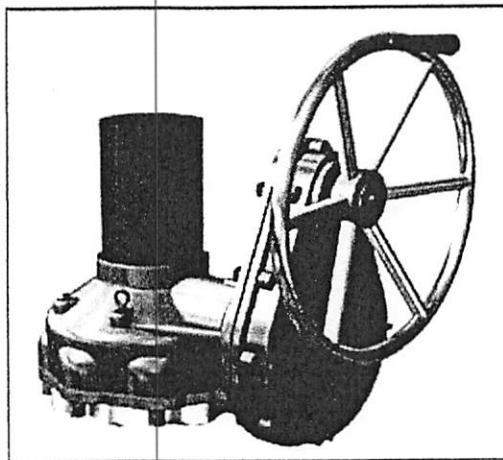


GENERAL TYPE-HORIZONTAL
TYPE-1 Stair

Specifications

- SB-VS10~SB-VS20
- SB-V0~SB-V2
- SB-V3~SB-V5

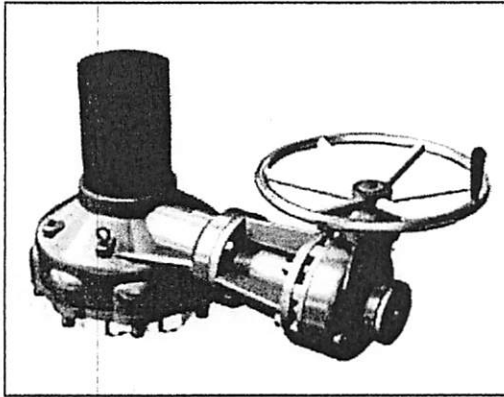
- SB-V6~SB-V8



SUPPORT BOX TYPE HORIZONTAL
TYPE - 2 Stairs

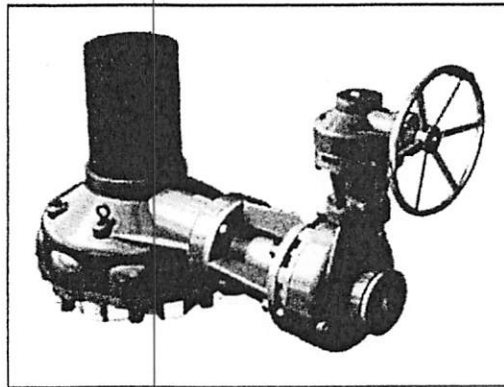
Specifications

- SB-V3-1~SB-V6-1
- SB-V7-1~SB-V8-1



SUPPORT BOX TYPE VERTICAL
TYPE - 2 Stairs

Specifications
- SBV2-20~SBV8~20



SUPPORT BOX TYPE HORIZZONTAL
TYPE - 3 Stairs

Specifications
SBV2~20-1~SBV8~20-1

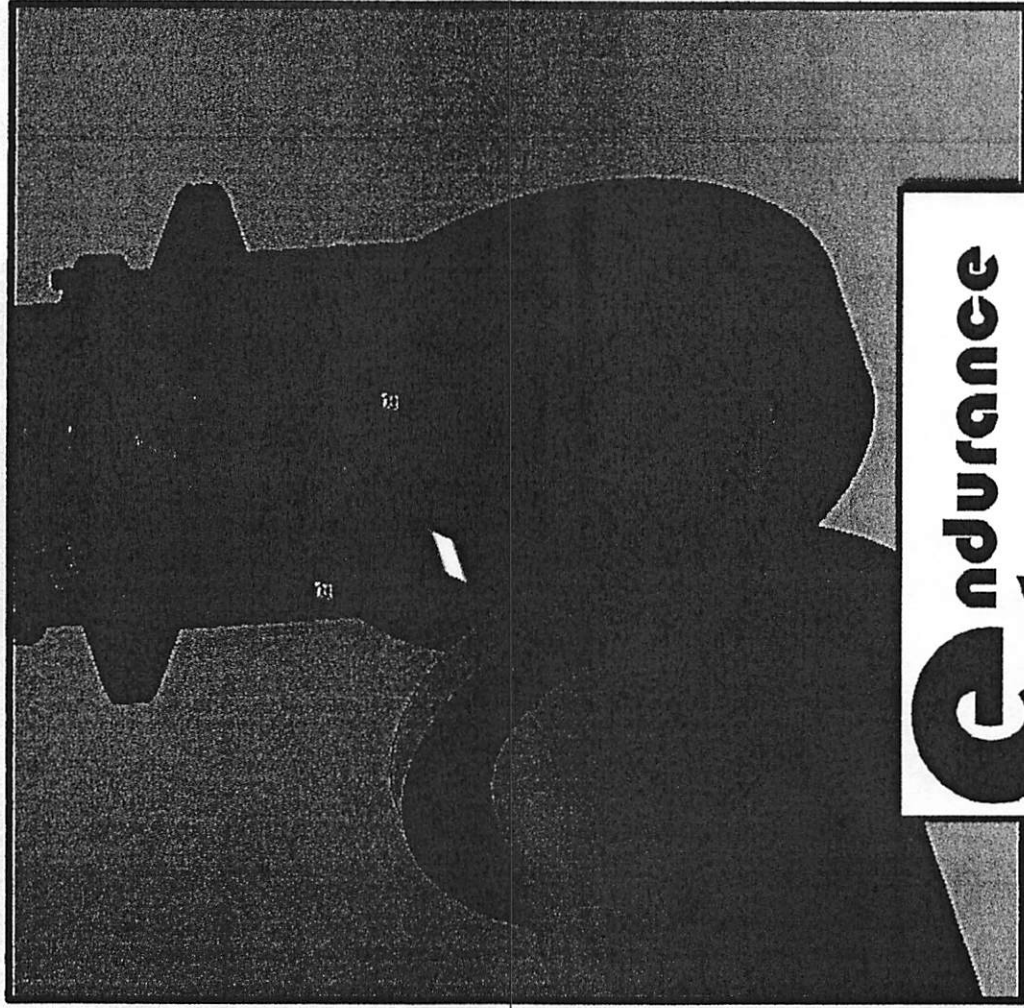
BOLTING STUDS TO VALVE-PIPING

Engineering



STEP 1

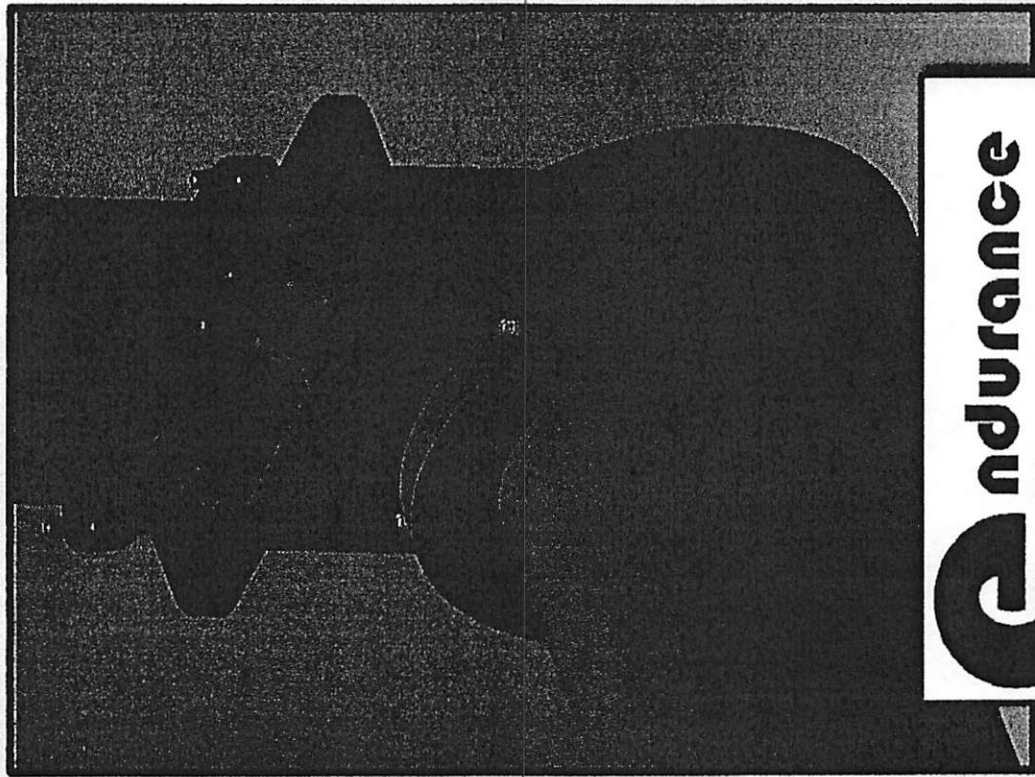
- Begin with 2 studs threaded into the valve next to each other



Endurance
valve

STEP 2

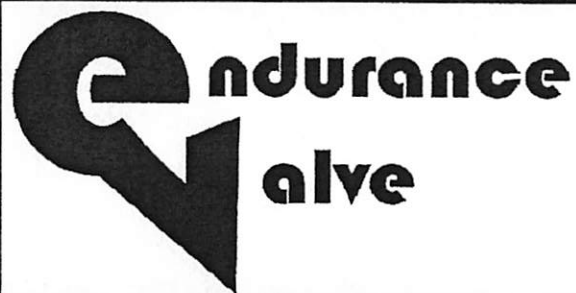
- Line-up to piping and slide flush to pipe and hand snug nuts w/washer



Endurance
7 alve

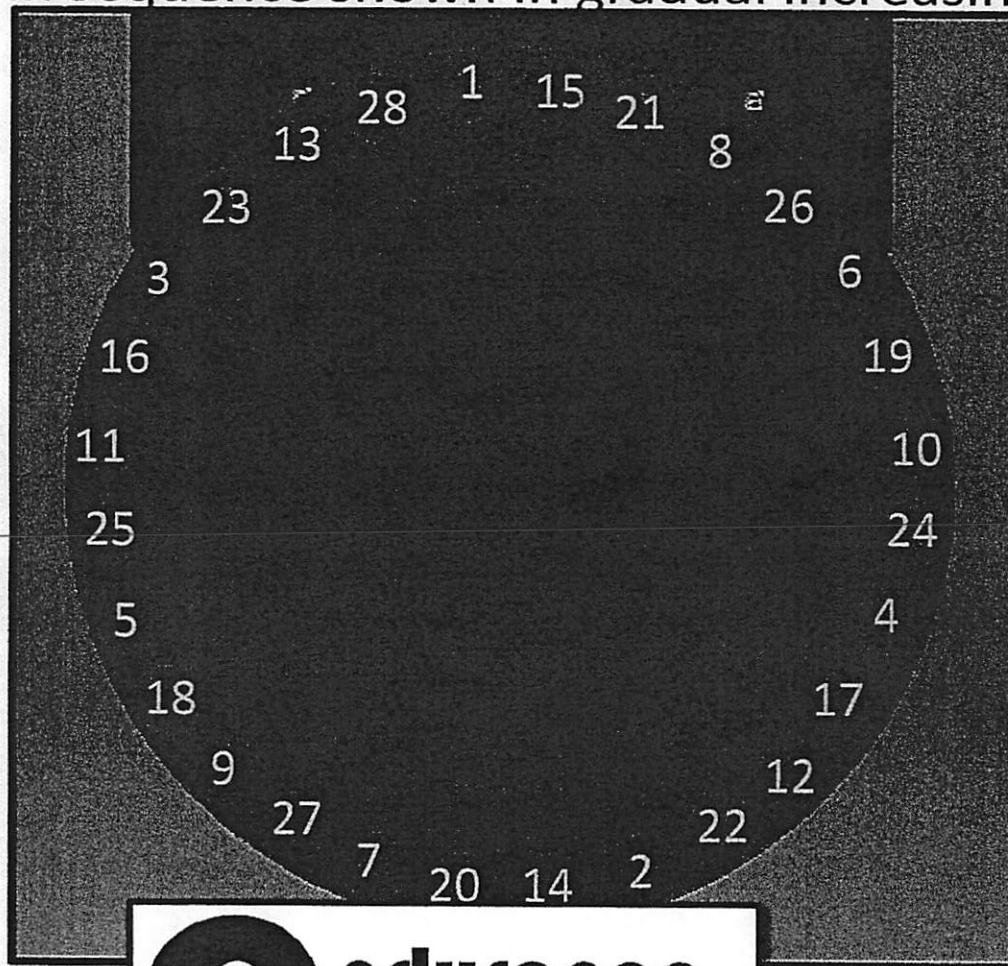
STEP 3

- Thread a nut $\frac{3}{4}$ of the way down another stud.
- Thread a 2nd nut down to the 1st nut.
- Place a washer on the longest side of the stud
- Thread stud by hand into the valve snug and remove upper nut
- Loosen nut and thread remaining stud into valve



STEP 4

- Thread remaining studs and nuts into valve hand snug
- Then torque* in sequence shown in gradual increasing torque.



*torque sequence changes per valve size

