



**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

|                     |                                                           |                                                           |
|---------------------|-----------------------------------------------------------|-----------------------------------------------------------|
| <b>Supplier:</b>    | <b>Endurance Valve Products Ltd.</b>                      |                                                           |
| <b>Vendor Code:</b> | <b>421643 / 0060004517</b>                                |                                                           |
| <b>Model:</b>       | <b>FV-16-300-150RF-WR-A36FP/V/TC-304FP-BG-IWR-X</b>       |                                                           |
| <b>Ref Job #</b>    | <b>13893</b>                                              |                                                           |
| <b>P.O.:</b>        | <b>3500184498</b>                                         |                                                           |
| <b>Serial #'s</b>   | <b>222402-1</b>                                           | <b>222402-2</b>                                           |
| <b>Tag #'s</b>      | <b>93SP-2141 16IN ENDURANCE<br/>KNIFE GATE VALVE 150#</b> | <b>93SP-2141 16IN ENDURANCE<br/>KNIFE GATE VALVE 150#</b> |
| <b>Weight:</b>      | <b>CRN: 0C10259.2<br/>800 lbs</b>                         |                                                           |



**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: 13893**

**Model Number: FV-16-300-150RF-WR-A36FP/V/TC-304FP-BG-IWR-X**

**Serial #: 222402-1 222402-2**

**Customer PO**

**3500184498**

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

Regards,  
Endurance Valve



# REGISTRATION CERTIFICATE

*This document certifies that the administration systems of*

## ***Fabricast Valve LLC***

*1061 Industrial Way, Longview, Washington 98632, USA*

*have been assessed and approved by QAS International to the following management systems, standards and guidelines:*

### ***ISO 9001:2015***

*The approved administration systems apply to the following:*

*Fabricast Valve, located in Longview WA, designs and manufactures custom fabricated knife gate valves for various industries including Canadian oil sands, municipal water/wastewater, chemical, mining, pulp & paper, food & beverage and power. Our designs adhere to ASME B16.34 national valve standards. We also maintain a CRN (Canadian Registration Number) which is a pressure vessel engineering certification, assuring our valves are built to current Canadian standards. We service local and national companies in the USA providing both cast and fabricated valves, and offer a 12-month warranty on all products. All ISO 9001:2015 clauses are applicable to the QMS.*

Original Approval      **26<sup>th</sup> September 2017**

Current Certificate      **26<sup>th</sup> September 2022**

Certificate Expiry      **26<sup>th</sup> September 2023**

Certificate Number      **US4186**

Signed: Certification Officer

**On behalf of QAS International**

This certificate remains valid while the holder maintains their administration systems in accordance with the standards and guidelines stated above, which will be audited annually by QAS International. The holder is entitled to display the above registration mark for the duration of this certificate, which should be returned to QAS International upon reasonable request.  
Issuing Office: QAS International, 5 Technology Park, Colindeep Lane, London, NW9 6BX, UK



April 08, 2019

**Attention:** Stephen Harkness  
CEMCORP LTD.  
2181 DUNWIN DRIVE  
MISSISSAUGA, ON L5L 1X2

**Email:** SHarkness@cemcorp.com

The design submission, tracking number 2019-01564, originally received on March 04, 2019 was surveyed and accepted for registration as follows:

**CRN :** 0C10259.2

**Accepted on:** April 08, 2019

**Reg Type:** ADDITION TO ACC. FITTING

**Expiry Date:** April 08, 2029

**Drawing No. :** FV-150 & FV-300 Rev 1 & 1 As Noted

**Fitting type:** KNIFE GATE VALVES

Design registered in the name of : FABRICAST VALVE

**The registration is conditional on your compliance with the following notes:**

- The scope of registration is the CRN renewal for 2"-36" Class 150 & 300, and adding 42" & 48" Class 150 & 300 knife gate valves.
- The valves shall be in full compliance with ASME B16.34 and MSS SP-135, with respect to dimensions, pressure and temperature ratings, materials, markings, inspections etc...
- The MDMT = -45 deg. F (as per client's email), valves components have to be Impact tested per the applicable Code of construction.

As indicated on AB-41 Statutory Declaration form and submitted documentation, the code of construction are B16.34 and other engineering analysis.

- This registration is valid only for fittings fabricated at the location(s) covered by the QC certificate attached to the accepted AB-41 Statutory Declaration form.
- This registration is valid only until the indicated expiry date and only if the Manufacturer maintains a valid quality management system approved by an acceptable third-party agency until that date.
- Should the approval of the quality management system lapse before the expiry date indicated above, this registration shall become void.

An invoice covering survey and registration fees will be forwarded from our Revenue Accounts.

If you have any question don't hesitate to contact me by phone at (780) 433-0281 ext 3382 or fax (780) 437-7787 or e-mail Stojanovic@absa.ca.

Sincerely,



STOJANOVIC, STEVAN, P. Eng.  
DOP Cert. No. D00008849

CRN-0C10259.2

800<sup>LBS</sup>

Fabricast Valve Manufacturers ID: 2210240

222402-1

16<sup>00</sup>

FV-16-300-150RF-WR-A36FPN/TC-304FP-BG-IWR-X

P.O. 3500184498

93SP-2141 16IN ENDURANCE KNIFE GATE VALVE 150#

13893

300<sup>PSI</sup>

400<sup>°F</sup>

421643 /  
0060004517

A36

304<sup>SS</sup>

Viton

CRN-0C10259.2

800 LBS

Fabricast Valve Manufacturers ID: 2210240

222402-2

16"

FV-16-300-150RF-WR-A36FP/V/TC-304FP-BG-IWR-X

P.O. 3500184498

93SP-2141 16IN ENDURANCE KNIFE GATE VALVE 150#

13893

300 PSI

400°F

421643 /  
0060004517

A36

304<sup>SS</sup>

Viton



Strive for Excellence

JAR-015

### Hydrostatic Test Report

Issued by: HR

Effective Date: 8/16/2022

Rev. C

Pg. 1 of 1

APPROVED: 8/16/2022 11:00 AM - Stosh Zydek

## Testing Procedure and Process

|                    |                                                |                                    |                                |                                |       |       |     |
|--------------------|------------------------------------------------|------------------------------------|--------------------------------|--------------------------------|-------|-------|-----|
| Valve Description: | FV-16-300-150RF-WR-A36FP/V/TC-304FP-BG-IWR-X   |                                    |                                |                                |       |       |     |
| Serial Number:     | 222402-1                                       |                                    |                                | Ref. PO#:                      | 13893 | Size: | 16" |
| Tag Number:        | 93SP-2141 16IN ENDURANCE KNIFE GATE VALVE 150# |                                    |                                | Design Pressure Body PSI/CWP:  |       | 300   |     |
| Wetted Parts:      | 304 SS / FLUORO                                | Flange Material:                   | A36 / FLUORO                   | Design Pressure Seat PSI/CWP:  |       | 300   |     |
| Seat Type:         | Resilient <input checked="" type="checkbox"/>  | Bi-Direct <input type="checkbox"/> | Metal <input type="checkbox"/> | Other <input type="checkbox"/> |       |       |     |

## BODY TEST

Each valve shall be given a shell test at a guage pressure no less than 150% the 38°C (100°F) design pressure rating, rounded up to the next higher 1 bar (25 psi) increment. The test shall be made with water at a temperature not above 50°C (125°F). The pressure shall be able to be applied on all internal walls of the valve body (Gate not required to be in the valve. If gate is present, test shall be made with the valve in the partially open position). No visible leakage through the body material allowed. Leakage through the packing or gate seal shall not be cause for rejection. The shell test duration shall not be less than 10 minutes. Visually detectable leakage through the pressure boundary walls is not acceptable. Leakage through the stem or gate packing shall not be cause for rejection.

\*TEST SHALL MEET OR EXCEED REQUIREMENTS OF ASME B16.34, MSS-SP-135, MSS-SP-81, or API 598

|                                |                                 |     |                |            |                  |                                                                        |
|--------------------------------|---------------------------------|-----|----------------|------------|------------------|------------------------------------------------------------------------|
| Test Pressure:                 | 450                             | PSI | Test Duration: | 10 minutes | Results of Test: | <input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL |
| Tester (Print/Sign):           | Lyman Alexander Symeon          |     |                |            | Date:            | 12/30/22                                                               |
| QC Inspector (Print/Sign):     | Nicholas Hicks - Nicholas Hicks |     |                |            | Date:            | 12/30/22                                                               |
| Source Inspector (Print/Sign): |                                 |     |                |            | Date:            |                                                                        |

## OPERATIONAL TEST

Open and close the valve 10 full cycles. The valve shall open and close smoothly without binding. After, visually inspect the body, gate, stem, and operator to ensure it meets customer and manufacturer specifications. The valve shall be considered acceptable if it operates smoothly through the entire cycle and meets manufacturer quality requirements.

|                                |                                 |  |  |  |       |          |
|--------------------------------|---------------------------------|--|--|--|-------|----------|
| Tester (Print/Sign):           | Lyman Alexander Symeon          |  |  |  | Date: | 12/30/22 |
| QC Inspector (Print/Sign):     | Nicholas Hicks - Nicholas Hicks |  |  |  | Date: | 12/30/22 |
| Source Inspector (Print/Sign): |                                 |  |  |  | Date: |          |

## SEAT TEST

Each valve designed for shut-off or isolation service, shall be given a seat/closure test. The seat test shall follow the shell test. Each valve shall be given a seat test at a guage pressure no less than 110% times the 38°C (100°F) design pressure rating, rounded up to the next higher 1 bar (25 psi) increment. The test shall be made with water at a temperature not above 50°C (125°F). The seat/closure test shall not be less than 2 minutes. For seat tests with double seating type (bi-directional), the test pressure shall be applied/tested on each side's seat. Tests shall be performed in the closed position.

**Resilient Seat Types:** Zero leakage shall occur

**Metal Seat Types:** Test pressure shall be 40 PSI. Maximum leakage of 40cc/min/NPS (MSS-SP-81/135) & .167cc/min/NPS (MSS-SP-61).

**Class IV Leakage Rates:** Test pressure shall be 40 PSI. Maximum leakage rates are based off of 0.01% valve capacity (Manufacturer predetermined Cv value) as gallons/minute.

\*LEAKAGE RATES SHALL BE IN OCCORDANCE WITH REQUIRED SPECIFICAITONS

|                                |      |                                 |                 |                                                                                                                |           |                 |                                                                                                                |           |
|--------------------------------|------|---------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------|-----------|-----------------|----------------------------------------------------------------------------------------------------------------|-----------|
| Metal Seat Test:               | 330  | PSI                             | Leakage Side 1: |                                                                                                                | N/A       | Leakage Side 2: |                                                                                                                | N/A       |
| Resilient Seat Test:           | 330  | PSI                             | Leakage Side 1: |                                                                                                                | 0         | Leakage Side 2: |                                                                                                                | N/A       |
| Permissible Leakage:           | 0.00 | Test Duration:                  | Side 1:         |                                                                                                                | 2 minutes | Side 2:         |                                                                                                                | 2 minutes |
| Test Results:                  |      |                                 | Side 1:         | <input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> Not Applicable |           | Side 2:         | <input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> Not Applicable |           |
| Tester (Print/Sign):           |      | Lyman Alexander Symeon          |                 |                                                                                                                |           |                 | Date:                                                                                                          | 12/30/22  |
| QC Inspector (Print/Sign):     |      | Nicholas Hicks - Nicholas Hicks |                 |                                                                                                                |           |                 | Date:                                                                                                          | 12/30/22  |
| Source Inspector (Print/Sign): |      |                                 |                 |                                                                                                                |           |                 | Date:                                                                                                          |           |

Reference Documents: JA-014, JA-015



Strive for Excellence

JAR-015

### Hydrostatic Test Report

Issued by: HR

Effective Date: 8/16/2022

Rev. C

Pg. 1 of 1

APPROVED: 8/16/2022 11:00 AM - Stosh Zydek

## Testing Procedure and Process

|                    |                                                |                               |                          |                               |                          |
|--------------------|------------------------------------------------|-------------------------------|--------------------------|-------------------------------|--------------------------|
| Valve Description: | FV-16-300-150RF-WR-A36FP/V/TC-304FP-BG-IWR-X   |                               |                          |                               |                          |
| Serial Number:     | 222402-2                                       | Ref. PO#:                     | 13893                    | Size:                         | 16"                      |
| Tag Number:        | 93SP-2141 16IN ENDURANCE KNIFE GATE VALVE 150# | Design Pressure Body PSI/CWP: |                          | 300                           |                          |
| Wetted Parts:      | 304 SS / FLUORO                                | Flange Material:              | A36 / FLUORO             | Design Pressure Seat PSI/CWP: |                          |
| Seat Type:         | Resilient <input checked="" type="checkbox"/>  | Bi-Direct                     | <input type="checkbox"/> | Metal                         | <input type="checkbox"/> |
|                    |                                                |                               |                          | Other                         | <input type="checkbox"/> |

## BODY TEST

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|                                |                                 |     |                |            |                  |                                                                        |
|--------------------------------|---------------------------------|-----|----------------|------------|------------------|------------------------------------------------------------------------|
| Test Pressure:                 | 450                             | PSI | Test Duration: | 10 minutes | Results of Test: | <input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL |
| Tester (Print/Sign):           | Lyman Alexander Syme            |     |                |            | Date:            | 12/30/22                                                               |
| QC Inspector (Print/Sign):     | Nicholas Hicks - Nicholas Hicks |     |                |            | Date:            | 12-30-22                                                               |
| Source Inspector (Print/Sign): |                                 |     |                |            | Date:            |                                                                        |

## OPERATIONAL TEST

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|                                |                                 |  |  |  |       |          |
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| QC Inspector (Print/Sign):     | Nicholas Hicks - Nicholas Hicks |  |  |  | Date: | 12-30-22 |
| Source Inspector (Print/Sign): |                                 |  |  |  | Date: |          |

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\*LEAKAGE RATES SHALL BE IN OCCORDANCE WITH REQUIRED SPECIFICAITONS

|                                |                                 |                |                                                                                                                |           |                                                                                                                |           |
|--------------------------------|---------------------------------|----------------|----------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------|-----------|
| Metal Seat Test:               | 330                             | PSI            | Leakage Side 1:                                                                                                | N/A       | Leakage Side 2:                                                                                                | N/A       |
| Resilient Seat Test:           | 330                             | PSI            | Leakage Side 1:                                                                                                | 0         | Leakage Side 2:                                                                                                | N/A       |
| Permissible Leakage:           | 0.00                            | Test Duration: | Side 1:                                                                                                        | 2 minutes | Side 2:                                                                                                        | 2 minutes |
| Test Results:                  |                                 | Side 1:        | <input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> Not Applicable | Side 2:   | <input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> Not Applicable |           |
| Tester (Print/Sign):           | Lyman Alexander Syme            |                |                                                                                                                |           | Date:                                                                                                          | 12/30/22  |
| QC Inspector (Print/Sign):     | Nicholas Hicks - Nicholas Hicks |                |                                                                                                                |           | Date:                                                                                                          | 12-30-22  |
| Source Inspector (Print/Sign): |                                 |                |                                                                                                                |           | Date:                                                                                                          |           |

Reference Documents: JA-014, JA-015

# Calibration certificate

## Kalibrierzeugnis

First used  
12-14-2022



Certificate no. 00116831  
Zeugnis-Nr.

### General

#### Allgemein

| Calibration certificate |                            |
|-------------------------|----------------------------|
| Kalibrierschein         |                            |
| Customer                | McMaster Carr IL           |
| Kunde                   | 600 N COUNTY LINE RD       |
|                         | ELMHURST, IL 60126-2081 US |
| Customer order number   | SO00596151-10              |
| Kundenbestellnummer     |                            |
| Order date              | 09/01/2022                 |
| Bestelldatum            |                            |
| Date of calibration     | 09/01/2022                 |
| Datum der Kalibrierung  |                            |
| Calibration Technician  | Wankao Williams            |
| Bearbeiter              |                            |

### Device under test (DUT)

#### Kalibriergegenstand (KG)

| Mechanical pressure gauge   |                    |
|-----------------------------|--------------------|
| Mechanisches Druckmessgerät |                    |
| Model                       | 232.34 4.5"        |
| Typ                         |                    |
| Serial number               | 8101U443           |
| Seriennummer                |                    |
| Scale range                 | (0 ... 1500) psi g |
| Anzeigebereich              |                    |
| Accuracy                    | 0.5 % FS           |
| Genauigkeit                 |                    |
| Resolution (scale division) | 10 psi             |
| Auflösung (Skalenwert)      |                    |
| TagNo                       | N/A                |
| Messstellen-Nr              |                    |

### Ambient conditions

#### Umgebungsbedingungen

|                           |                    |
|---------------------------|--------------------|
| Temperature               | (21 ± 1) °C        |
| Temperatur                |                    |
| Atmospheric pressure      | (986.1 ± 0.1) mbar |
| Atmosphärischer Luftdruck |                    |
| rel. humidity             | (57 ± 1) %         |
| Rel. Luftfeuchte          |                    |

### Place of calibration

#### Ort der Kalibrierung

|                      |                                          |
|----------------------|------------------------------------------|
| WIKA Instrument, LP  | g = (9.79541 ± 0.00002) m/s <sup>2</sup> |
| WIKAI Instrument, LP |                                          |

### Reference standards

#### Messbedingungen

| Working standard (WS) Electrical pressure gauge |                   |
|-------------------------------------------------|-------------------|
| Gebrauchsnorm (GN) Elektrisches Druckmessgerät  |                   |
| Model                                           | CPG8000-1347      |
| Typ                                             |                   |
| Calibration Certificate                         | 208314            |
| Kalibrierzeichen                                |                   |
| Scale range                                     | (0 ... 160) bar g |
| Anzeigebereich                                  |                   |
| Accuracy                                        | 0.025 % FS        |
| Genauigkeit                                     |                   |

# Calibration certificate

## Kalibrierzeugnis



Certificate no.  
Zeugnis-Nr.

00116831

### Measurement results

#### Messergebnisse

| Reading DUT<br>Ablesung KG<br>psi | Reference value WS<br>Referenzwert GN<br>psi |         |
|-----------------------------------|----------------------------------------------|---------|
|                                   | ↑                                            | ↓       |
| 0                                 | 0.01                                         | 0.07    |
| 300                               | 302.21                                       | 302.61  |
| 600                               | 602.54                                       | 598.71  |
| 900                               | 903.61                                       | 900.56  |
| 1200                              | 1202.62                                      | 1201.54 |
| 1500                              | 1501.89                                      | 1501.89 |

| Reading DUT<br>Ablesung KG<br>psi | Deviation<br>Messabweichung<br>% |       |
|-----------------------------------|----------------------------------|-------|
|                                   | ↑                                | ↓     |
| 0                                 | 0.00                             | 0.00  |
| 300                               | -0.15                            | -0.17 |
| 600                               | -0.17                            | 0.09  |
| 900                               | -0.24                            | -0.04 |
| 1200                              | -0.17                            | -0.10 |
| 1500                              | -0.13                            | -0.13 |

### Statement of compliance

#### Konformitätsaussage

Device was found to be in tolerance!

Statements of compliance, where applicable, are based on test results falling within specified tolerance limits with no reduction by the uncertainty of the measurement process.

This calibration certificate shall not be reproduced, except in full, without the written approval of WIKA Instrument, LP.

WIKA Instrument, LP calibration certificates and stickers do not contain calibration intervals unless specified by the customer, as WIKA Instrument, LP will not dictate to our customers when they should re-calibrate their instruments.

The standards and calibration program at WIKA Instrument, LP complies with the requirements of ISO/IEC 17025:2017, ISO-9001:2015, and the current version of the WIKA Quality Manual (QM-01).

Standards used in this calibration are traceable to SI units of measurements through NIST or recognized international standards organizations. All calibrations are performed in ambient conditions of  $23.5 \pm 5$  deg C and 20-80% relative humidity.

Unless otherwise stated, date of issue is equal to the date of calibration.

**Calibration certificate**  
*Kalibrierzeugnis*



Certificate no.  
*Zeugnis-Nr.*

00116831

**Additional information**

**For RECALIBRATION email [calibration.us.services@wika.com](mailto:calibration.us.services@wika.com)**  
*Weitere Hinweise*

Device was calibrated according to the following procedure: WI-0854

*Test-Kommentar*



BRIDGE CITY STEEL  
(572) PLATE ASTM A572 GR 50 LCVN  
1/4" X 96.0000" X 240.0000"  
PART NO. 1/4 A572-50 22A0923

Certificate of Mill Test Results  
14Oct22  
Pg 1/1  
SO POR-047626-001

**NUCOR**  
NUCOR STEEL TUSCALOOSA, INC.

**MILL TEST CERTIFICATE**

Nucor Steel Tuscaloosa, Inc.  
1700 HOLT RD N.E.  
Tuscaloosa, AL 35404-1000  
800 800-8204  
customerservice@nucortusk.com

Page: 1 of 1

| Load Number | Tally          | Mill Order Number | PO NO   Line NO | Part Number | Certificate Number | Prepared         |
|-------------|----------------|-------------------|-----------------|-------------|--------------------|------------------|
| R302412     | 00000001066209 | N-196991-001      | POR-7062 1      |             | S06620901-1        | 05/16/2022 07:59 |

**Grade**

**Customer:**

**Order Description:**

Hot Roll Plate From Coil  
A572 50, 0.2500 IN x 96.000 IN x 480.000 IN

**Quality Plan Description:**

A57250 IMPACTS: ASTM A572-50-15/A709-50-16 H FREQUENCY IMPACTS

**Sold TO:**

CHAPEL STEEL Portland OR

**Ship TO:**

CHAPEL STEEL NORTHWEST Portland OR

**Sent TO:**

| Shipped Item | Heat/Slab Number | Certified By | C    | Mn   | P     | S     | Si   | Cu   | Ni   | Cr   | Mo    | Co    | V     | Al    | Ti    | N2    | B      | Ca     | Sn    | CEV  | ACI |
|--------------|------------------|--------------|------|------|-------|-------|------|------|------|------|-------|-------|-------|-------|-------|-------|--------|--------|-------|------|-----|
| 2D1342B      | 22A0923-04 ***   | 22A0923      | 0.07 | 1.08 | 0.011 | 0.004 | 0.03 | 0.27 | 0.07 | 0.23 | 0.020 | 0.035 | 0.007 | 0.033 | 0.014 | 0.010 | 0.0001 | 0.0017 | 0.006 | 0.32 |     |
| 2D1342C      | 22A0923-04 ***   | 22A0923      | 0.07 | 1.08 | 0.011 | 0.004 | 0.03 | 0.27 | 0.07 | 0.23 | 0.020 | 0.035 | 0.007 | 0.033 | 0.014 | 0.010 | 0.0001 | 0.0017 | 0.006 | 0.32 |     |

| Shipped Item | Certified By | Heat/Slab Number | Yield ksi | Tensile ksi | Y/T % | ELONGATION % |    | Bend OK? | Hard HB | Charpy Impacts (ft-lbs) |     |     | Shear % |      |   | Test Temp |       |
|--------------|--------------|------------------|-----------|-------------|-------|--------------|----|----------|---------|-------------------------|-----|-----|---------|------|---|-----------|-------|
|              |              |                  |           |             |       | 2"           | 8" |          |         | Size mm                 | 1   | 2   | 3       | 1    | 2 | 3         | Avg   |
| 2D1342B      | S2D1342FTT   | 22A0923-04 ***   | 58.0      | 73.4        | 79.0  | 27.9         |    |          |         | 5.0                     | 87  | 101 | 88      | 92.0 |   |           | -22 F |
| 2D1342B      | S2D1342BLL   | 22A0923-04 ***   |           |             |       |              |    |          |         | 5.0                     | 107 | 100 | 84      | 97.0 |   |           | -22 F |
| 2D1342B      | S2D1342FLI   | 22A0923-04 ***   |           |             |       |              |    |          |         | 5.0                     | 87  | 92  | 86      | 88.3 |   |           | -22 F |
| 2D1342B      | S2D1342MLI   | 22A0923-04 ***   | 60.1      | 74.6        | 80.6  | 26.7         |    |          |         |                         |     |     |         |      |   |           |       |
| 2D1342C      | S2D1342MTT   | 22A0923-04 ***   | 58.0      | 73.4        | 79.0  | 27.9         |    |          |         | 5.0                     | 87  | 101 | 88      | 92.0 |   |           | -22 F |
| 2D1342C      | S2D1342BLL   | 22A0923-04 ***   |           |             |       |              |    |          |         | 5.0                     | 107 | 100 | 84      | 97.0 |   |           | -22 F |
| 2D1342C      | S2D1342FLI   | 22A0923-04 ***   |           |             |       |              |    |          |         | 5.0                     | 87  | 92  | 86      | 88.3 |   |           | -22 F |
| 2D1342C      | S2D1342MLI   | 22A0923-04 ***   | 60.1      | 74.6        | 80.6  | 26.7         |    |          |         |                         |     |     |         |      |   |           |       |

Items: 2 PCS: 15 Weight: 49006 LBS

Mercury has not come in contact with this product during the manufacturing process nor has any mercury been used by the manufacturing process. Certified in accordance with EN 10204 3.1. No weld repair has been performed on this material. Yield strength is determined by the 0.2% offset method unless otherwise noted. Manufactured to a fully killed fine grain practice.

We hereby certify that the product described above passed all of the tests required by the specifications.

NUTEMPER TEMPER PASSED plate from coil  
ISO 9001:2015 Registered, PED Certified

*Daniel Green*  
Daniel Green - Chief Metallurgist

\*\*\* indicates Heats melted and Manufactured in the U.S.A.

WRAP

## TEST REPORT

IMR Report Number 202207296C

### SUMMARY

One coupon was received for mechanical testing.

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

### ROOM TEMPERATURE TENSILE TEST

| Laboratory Number         | Tensile Strength (ksi) | Yield Point (ksi) | Elongation in 2" (%) | Orig. Gauge Width (in.) |
|---------------------------|------------------------|-------------------|----------------------|-------------------------|
| 2207296-3FTT              | 72.5                   | 58.5              | 40                   | 0.508                   |
| Specification Req. (Min.) | 65                     | 50                | 19                   |                         |

Yield point determined by 0.5% extension method  
Direction = Transverse  
Method(s): ASTM A370-21 and ASTM A6-21

LIFTER SIDE

July 1, 2022

James Rhyasen  
State Plate  
7510 NE 99th St  
Vancouver, WA 98662

PO Number  
1155

Date Received  
June 23, 2022

Material  
3/4" Thick Steel Plate

Material Identity  
Heat# E2D263

Specification(s)  
ASTM A572-21<sup>st</sup>, Gr. 50



Reviewed by

Alex N. Fish  
Metallurgy & Chemistry Manager

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 AZLA, 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 T4280).

E2D263  
3/4 A572-50

## STATEMENT OF ANALYSIS

Page 2 Of 3

CONSIGNEE:

STATE PLATE LLC

7510 NE 99TH ST

DATE: 10 May 2022

BILL OF LADING NO.: AR356600

MILL ORDER NO.(s) 41-673792

VANCOUVER, WA 98662

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 |      |      |      |       | W2D645 C14 |       |       |      |       |
| 0.07                      | 1.45 | .0004 | 0.015 | 0.26       | 0.24 | 0.08 | 0.14 | 0.009 | 0.000      | 0.027 | 0.046 | 0.07 | 0.029 |
| 0.000 X 0 X               |      |       |       | SECONDS US |      |      |      |       | W2D645 C14 |       |       |      |       |
| 0.07                      | 1.45 | .0004 | 0.015 | 0.26       | 0.24 | 0.08 | 0.14 | 0.009 | 0.000      | 0.027 | 0.046 | 0.07 | 0.029 |
| 0.000 X 0 X               |      |       |       | SECONDS US |      |      |      |       | W2D645 C15 |       |       |      |       |
| 0.07                      | 1.45 | .0004 | 0.015 | 0.26       | 0.24 | 0.08 | 0.14 | 0.009 | 0.000      | 0.027 | 0.046 | 0.07 | 0.029 |
| 0.000 X 0 X               |      |       |       | SECONDS US |      |      |      |       | W2D645 C15 |       |       |      |       |
| 0.07                      | 1.45 | .0004 | 0.015 | 0.26       | 0.24 | 0.08 | 0.14 | 0.009 | 0.000      | 0.027 | 0.046 | 0.07 | 0.029 |
| 0.000 X 0 X               |      |       |       | SECONDS US |      |      |      |       | W2C581 E34 |       |       |      |       |
| 0.05                      | 1.44 | .0001 | 0.012 | 0.23       | 0.28 | 0.12 | 0.14 | 0.009 | 0.001      | 0.021 | 0.043 | 0.07 | 0.032 |
| 0.000 X 0 X               |      |       |       | SECONDS US |      |      |      |       | E2D074 B14 |       |       |      |       |
| 0.05                      | 1.45 | .0001 | 0.013 | 0.23       | 0.24 | 0.10 | 0.14 | 0.008 | 0.001      | 0.028 | 0.046 | 0.07 | 0.026 |
| 0.000 X 0 X               |      |       |       | SECONDS US |      |      |      |       | E2D263 B05 |       |       |      |       |
| 0.06                      | 1.26 | .0001 | 0.014 | 0.20       | 0.26 | 0.08 | 0.15 | 0.007 | 0.000      | 0.028 | 0.039 | 0.03 | 0.030 |
| 0.000 X 0 X               |      |       |       | SECONDS US |      |      |      |       | W2D615 B16 |       |       |      |       |
| 0.05                      | 1.45 | .0003 | 0.014 | 0.24       | 0.25 | 0.13 | 0.14 | 0.008 | 0.001      | 0.025 | 0.044 | 0.07 | 0.027 |

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Very truly yours.

SSAB ALABAMA INC.

Shipping

Export Declaration Exempt: NOEEI 30.36

## TEST REPORT

IMR Report Number 202209458A

### SUMMARY

One coupon was received for mechanical testing.

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

### ROOM TEMPERATURE TENSILE TEST

| Laboratory Number         | Tensile Strength (ksi) | Yield Point (ksi) | Elongation in 4D (%) | Orig. Gauge Dia. (in.) |
|---------------------------|------------------------|-------------------|----------------------|------------------------|
| 2209458-1RTT              | 91.0                   | 65.0              | 26                   | 0.503                  |
| Specification Req. (Min.) | 65                     | 50                | 19                   |                        |

Direction = Transverse @ 1/4 Thick  
Method(s): ASTM A370-21 and ASTM A6-21

August 30, 2022

James Rhyasen  
State Plate  
7510 NE 99th St  
Vancouver, WA 98662

PO Number  
1169

Date Received  
August 24, 2022

Material  
1" Thick Steel Plate

Material Identity  
Heat# A2G173

Specification(s)  
ASTM A572-21<sup>st</sup>, Gr. 50

GLAND FLANGE



Reviewed by

Handwritten signature of Adam Shaney.

Adam Shaney, CWI  
Weld Testing Specialist

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 T4280).

A572-50

A2G173

## STATEMENT OF ANALYSIS

Page 5 Of 5

CONSIGNEE:

DATE: 26 Jul 2022

STATE PLATE LLC

BILL OF LADING NO.: MR467931

7510 NE 99TH ST

MILL ORDER NO.(s) 41-681385 41-681385

VANCOUVER, WA 98662

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 |      |      |      |       | A2G173 B04 |       |       |      |       |
| 0.16                      | 1.32 | .0002 | 0.008 | 0.18       | 0.28 | 0.15 | 0.17 | 0.012 | 0.001      | 0.093 | 0.002 | 0.03 | 0.036 |
| 0.000 X 0 X               |      |       |       | SECONDS US |      |      |      |       | B2G650 A19 |       |       |      |       |
| 0.17                      | 0.99 | .0001 | 0.016 | 0.19       | 0.31 | 0.18 | 0.08 | 0.008 | 0.002      | 0.005 | 0.001 | 0.03 | 0.038 |
| 0.000 X 0 X               |      |       |       | SECONDS US |      |      |      |       | B2G652 A34 |       |       |      |       |
| 0.17                      | 1.05 | .0001 | 0.002 | 0.17       | 0.33 | 0.17 | 0.12 | 0.008 | 0.005      | 0.029 | 0.001 | 0.04 | 0.031 |
| 0.000 X 0 X               |      |       |       | SECONDS US |      |      |      |       | B2G509 B69 |       |       |      |       |
| 0.18                      | 1.29 | .0004 | 0.007 | 0.18       | 0.30 | 0.16 | 0.13 | 0.012 | 0.002      | 0.036 | 0.002 | 0.03 | 0.036 |
| 0.000 X 0 X               |      |       |       | SECONDS US |      |      |      |       | B2G542 C16 |       |       |      |       |
| 0.18                      | 1.07 | .0001 | 0.003 | 0.18       | 0.33 | 0.14 | 0.12 | 0.013 | 0.002      | 0.029 | 0.001 | 0.03 | 0.037 |
| 0.000 X 0 X               |      |       |       | SECONDS US |      |      |      |       | A2G030 B03 |       |       |      |       |
| 0.16                      | 1.12 | .0001 | 0.007 | 0.06       | 0.33 | 0.21 | 0.17 | 0.010 | 0.003      | 0.088 | 0.038 | 0.04 | 0.030 |
| 0.000 X 0 X               |      |       |       | SECONDS US |      |      |      |       | B2G529 A26 |       |       |      |       |
| 0.06                      | 1.00 | .0003 | 0.008 | 0.33       | 0.34 | 0.20 | 0.49 | 0.009 | 0.002      | 0.083 | 0.034 | 0.05 | 0.035 |
| 0.000 X 0 X               |      |       |       | SECONDS US |      |      |      |       | A2F303 E39 |       |       |      |       |
| 0.19                      | 1.03 | .0002 | 0.008 | 0.24       | 0.27 | 0.11 | 0.13 | 0.011 | 0.002      | 0.004 | 0.001 | 0.03 | 0.029 |

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SSAB IOWA INC.

Shipping

Export Declaration Exempt: NOEEI 30.36



EVRAZ INC. NA  
Evraz Oregon Steel 14400 N. Rivergate Blvd., Portland, Oregon 97203



## REPORT OF CHEMICAL/PHYSICAL TESTS

CERTIFICATE NO. 1829939  
DATE Jul 13, 2022  
PAGE 1

MILL ORDER NO. 377824  
CUSTOMER ORDER NO. 227840  
JOB/REQ. NO.  
BRIDGE CITY STEEL  
3865 NW ST HELENS RD  
PORTLAND, OR 97210  
USA  
SHIPPING NO. 1829939  
DATE 07/13/2022

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

### PHYSICAL PROPERTIES

| ITEM NO | DESCRIPTION                                    | HEAT NO. | SLAB | YIELD<br>PSI X 100 | TENSILE<br>PSI X 100 | % ELONG<br>8" 2" | % RA | HARDNESS<br>BHN | BEND<br>TEST | IMPACTS |
|---------|------------------------------------------------|----------|------|--------------------|----------------------|------------------|------|-----------------|--------------|---------|
| 2       | 1.0000 X 96.000ME X 240.000<br>3 PCS 19602 LBS | RS6516   |      | 470                | 710                  | 46               |      |                 |              |         |
| 3       | 1.2500 X 96.000ME X 240.000<br>1 PC 8168 LBS   | RS5965   |      | 470                | 730                  | 29               |      |                 |              |         |
|         | 1 PC 8168 LBS                                  | RS5966   |      | 462<br>460         | 720<br>740           | 29<br>34         |      |                 |              |         |
|         | 5 PCS 35938 LBS TOTALS                         |          |      |                    |                      |                  |      |                 |              |         |

PORT FLANGE  
YOKE TOP  
YOKE PAD  
LIFTER TOP

### CHEMICAL ANALYSIS

| HEAT NO.                                                                                                         | C             | Mn    | P     | S     | Si    | Cu    | Ni    | V     | Cr    | Mo    | Ti    | B     | N     | Ca    | CE    | McQuaid Elm<br>Grain Size |
|------------------------------------------------------------------------------------------------------------------|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------------|
| RS6516                                                                                                           | .19           | .85   | .010  | .005  | .04   | .35   | .16   | .002  | .08   | .04   |       |       |       |       |       |                           |
| RS5965                                                                                                           | .20           | .91   | .014  | .002  | .04   | .33   | .13   | .003  | .15   | .04   |       |       |       |       |       |                           |
| RS5966                                                                                                           | .19           | .88   | .014  | .002  | .05   | .31   | .11   | .003  | .15   | .03   |       |       |       |       |       |                           |
| HEATS INDICATED WITH (+) WERE MELTED & MANUFACTURED IN THE USA. HEATS INDICATED WITH (^) WERE ROLLED IN THE USA. |               |       |       |       |       |       |       |       |       |       |       |       |       |       |       |                           |
| .....                                                                                                            | END OF REPORT | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | .....                     |

Signature: [Handwritten Signature]

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

## TEST REPORT

IMR Report Number 202203035B

### SUMMARY

One sample was received for mechanical testing.

The sample meets the specified tensile requirements of ASTM A36-19 for plates.

March 18, 2022

### ROOM TEMPERATURE TENSILE TEST

| Laboratory Number               | Tensile Strength (ksi) | Yield Point (ksi) | Elongation in 4D (%) | Orig. Gauge Dia. (in.) |
|---------------------------------|------------------------|-------------------|----------------------|------------------------|
| 2203035-2RTT                    | 67.5                   | 45.6              | 31                   | 0.504                  |
| Specification Req. (Range/Min.) | 58 – 80                | 36                | 21                   |                        |

Yield point determined by 0.5% extension method

Direction = Transverse @ 1/4 Thick

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

PO Number  
1109

Date Received  
March 10, 2022

Material  
1.25" Thick Steel Plate

Material Identity  
Heat# R0H001

Specification(s)  
ASTM A36-19

HORSESHOE  
TOP FLANGE  
GUSSET



Reviewed by

Handwritten signature of Adam Shaney.

Adam Shaney, CWI  
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 T4280).

TO H001

1/4 A36

## STATEMENT OF ANALYSIS

Page 4 Of 4

CONSIGNEE:

DATE: 08 Feb 2022

BILL OF LADING NO.: MR455020

MILL ORDER NO.(s) 41-666027 41-666027 41-666027

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 |      |      |      |       | A1L058 B01 |       |       |      |       |
| 0.17                      | 1.40 | .0001 | 0.007 | 0.17       | 0.32 | 0.21 | 0.14 | 0.010 | 0.002      | 0.094 | 0.045 | 0.05 | 0.029 |
| 0.000 X 0 X               |      |       |       | SECONDS US |      |      |      |       | A1L058 B01 |       |       |      |       |
| 0.17                      | 1.40 | .0001 | 0.007 | 0.17       | 0.32 | 0.21 | 0.14 | 0.010 | 0.002      | 0.094 | 0.045 | 0.05 | 0.029 |
| 0.000 X 0 X               |      |       |       | SECONDS US |      |      |      |       | A1L058 B01 |       |       |      |       |
| 0.17                      | 1.40 | .0001 | 0.007 | 0.17       | 0.32 | 0.21 | 0.14 | 0.010 | 0.002      | 0.094 | 0.045 | 0.05 | 0.029 |
| 0.000 X 0 X               |      |       |       | SECONDS US |      |      |      |       | A1L058 B01 |       |       |      |       |
| 0.17                      | 1.40 | .0001 | 0.007 | 0.17       | 0.32 | 0.21 | 0.14 | 0.010 | 0.002      | 0.094 | 0.045 | 0.05 | 0.029 |
| 0.000 X 0 X               |      |       |       | SECONDS US |      |      |      |       | A1L058 B01 |       |       |      |       |
| 0.17                      | 1.40 | .0001 | 0.007 | 0.17       | 0.32 | 0.21 | 0.14 | 0.010 | 0.002      | 0.094 | 0.045 | 0.05 | 0.029 |
| 0.000 X 0 X               |      |       |       | SECONDS US |      |      |      |       | R0H001 A03 |       |       |      |       |
| 0.15                      | 1.11 | .0001 | 0.001 | 0.02       | 0.01 | 0.03 | 0.05 | 0.010 | 0.002      | 0.006 | 0.000 | 0.00 | 0.036 |

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Very truly yours.

SSAB IOWA INC.

Shipping

Export Declaration Exempt: NOEEI 30.36

04-29-2022 17:39

Load - 4068815

BL - 17127095

blr466

Bridge City Steel LLC

Heat - B1E831

Cust. PO - 227720

Order - 21322877

**SSAB****Test Certificate**

1770 Bill Sharp Boulevard, Muscatine, IA 52761-9412, US

**WARNING:** This product can expose you to chemical(s) including nickel and nickel compounds, which are known to the State of California to cause cancer. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

Form TC1: Revision 4: Date 6 Feb 2019

|                                                                                                      |                                  |                                    |                                            |
|------------------------------------------------------------------------------------------------------|----------------------------------|------------------------------------|--------------------------------------------|
| <b>Customer:</b><br>KLOECKNER METALS CORPORATION<br>500 COLONIAL CENTER PKWY<br>ROSWELL<br>GA 30076  | <b>Customer P.O.No.:</b> 7615901 | <b>Mill Order No.</b> 41-641130-05 | <b>Shipping Manifest:</b> MR436417         |
| <b>Product Description:</b> ASTM A36(19)/A709(18)36/ASME SA36(19)<br>AASHTO M270(20)36, 0.80-1.20 MN |                                  | <b>Ship Date:</b> 09 Jun 21        | <b>Cert No:</b> 061107442<br>(Page 1 of 1) |
| <b>Size:</b> 1.250 X 120.0 X 480.0 (IN)                                                              |                                  |                                    |                                            |

| Tested Pieces: |          |                  |         | Tensiles: |           |     |             |     |         | Charpy Impact Tests |                   |   |   |     |         |   |   |     |         |         |              | BDWTT    |  |
|----------------|----------|------------------|---------|-----------|-----------|-----|-------------|-----|---------|---------------------|-------------------|---|---|-----|---------|---|---|-----|---------|---------|--------------|----------|--|
| Heat Id        | Piece Id | Tested Thickness | Tst Loc | YS (KSI)  | UTS (KSI) | %RA | Elong % 2in | 8in | Tst Dir | Hardness            | Abs. Energy(FTLB) |   |   |     | % Shear |   |   |     | Tst Tmp | Tst Dir | Tst Siz (mm) | Tmp %Shr |  |
| B1E774         | B10      | 1.248 (DISCRT)   | L 51    | 78        |           |     | 27          |     | T       |                     | 1                 | 2 | 3 | Avg | 1       | 2 | 3 | Avg |         |         |              |          |  |
| B1E831         | B47      | 1.248 (DISCRT)   | L 44    | 67        |           |     | 28          |     | T       |                     |                   |   |   |     |         |   |   |     |         |         |              |          |  |

| Heat Id | Chemical Analysis |      |      |      |     |        |     |     |     |     |      |      |      |       |       |     |     | ORGN |
|---------|-------------------|------|------|------|-----|--------|-----|-----|-----|-----|------|------|------|-------|-------|-----|-----|------|
|         | C                 | Mn   | P    | S    | Si  | Tot Al | Cu  | Ni  | Cr  | Mo  | Cb   | V    | Ti   | B     | N     | IIW |     |      |
| B1E774  | .21               | 1.15 | .009 | .001 | .24 | .034   | .33 | .13 | .13 | .04 | .002 | .004 | .009 | .0002 | .0065 | .46 | USA |      |
| B1E831  | .17               | .85  | .012 | .003 | .07 | .029   | .29 | .14 | .13 | .03 | .001 | .004 | .007 | .0001 | .0079 | .37 | USA |      |

KILLED STEEL  
MERCURY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO MERCURY WAS INTENTIONALLY ADDED DURING THE MANUFACTURE OF THIS PRODUCT.

CEV (IIW) = C + Mn/6 + (Cr+Mo+V)/5 + (Ni+Cu)/15  
MTR EN 10204:2004 INSPECTION CERTIFICATE 3.1 COMPLIANT  
100% MELTED, POURED, AND ROLLED IN THE USA

PRODUCTS SHIPPED:

B1E831 B47 PCES: 1, LBS: 20419 B1E774 B10 PCES: 1, LBS: 20419

(P)

Cust Part #:

WE HEREBY CERTIFY THAT THIS MATERIAL WAS  
TESTED IN ACCORDANCE WITH, AND MEETS THE  
REQUIREMENTS OF, THE APPROPRIATE SPECIFICATION

Brian Wales  
PRINCIPAL METALLURGIST

WEAR RING

B1E831

1/4 A36



EVRAZ INC. NA  
Evraz Oregon Steel 14400 N. Rivergate Blvd., Portland, Oregon 97203

## REPORT OF CHEMICAL/PHYSICAL TESTS

|                    |              |      |
|--------------------|--------------|------|
| CERTIFICATE NO.    | DATE         | PAGE |
| 1819608            | Apr 20, 2022 | 1    |
| MILL ORDER NO.     | DATE         |      |
| 375251             |              |      |
| CUSTOMER ORDER NO. |              |      |
| 227570             |              |      |
| JOB/REQ. NO.       |              |      |
|                    |              |      |
| SHIPPING NO.       | DATE         |      |
| 1819608            | 04/20/2022   |      |
| CARRIER            |              |      |
| GREEN TRANSFER     |              |      |
| CAR/TRUCK NO.      |              |      |
| 7A                 |              |      |

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  
EOS CARBON STRUCTURAL QUALITY PLATE ASTM A36-19/ASME SA36 2021 ASTM A709-18  
GRADE 36 FOR LASER QUALITY APPLICATIONS AIM .03 SI , .19 C NO WELD REPAIR.  
LASER QUALITY. KILLED FINE GRAIN PRACTICE.

### PHYSICAL PROPERTIES

| ITEM NO | DESCRIPTION                 | HEAT NO. | SLAB | YIELD<br>PSI X 100 | TENSILE<br>PSI X 100 | % ELONG<br>8" 2" | % RA | HARDNESS<br>BHN | BEND<br>TEST | IMPACTS |
|---------|-----------------------------|----------|------|--------------------|----------------------|------------------|------|-----------------|--------------|---------|
| 2       | 1.0000 X 96.000ME X 240.000 |          |      |                    |                      |                  |      |                 |              |         |
|         | 3 PCS 19602 LBS             | ^ RS6514 |      | 635                | 760                  | 27               |      |                 |              |         |
| 3       | 1.2500 X 96.000ME X 240.000 |          |      |                    |                      |                  |      |                 |              |         |
|         | 2 PCS 16336 LBS             | ^ RS6515 |      | 463<br>515         | 725<br>715           | 34<br>28         |      |                 |              |         |
|         | 5 PCS 35938 LBS TOTALS      |          |      |                    |                      |                  |      |                 |              |         |

PORT FLANGE

### CHEMICAL ANALYSIS

| HEAT NO.                                                                                                         | C             | Mn    | P     | S     | Si    | Cu    | Ni    | V     | Cr    | Mo    | Ti    | B     | N     | Ca    | CE    | McQuay Em<br>Grain Size |
|------------------------------------------------------------------------------------------------------------------|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------------------------|
| RS6514                                                                                                           | .18           | .86   | .008  | .005  | .03   | .37   | .17   | .002  | .038  | .11   | .06   |       |       |       |       |                         |
| RS6515                                                                                                           | .18           | .86   | .009  | .004  | .06   | .41   | .20   | .002  | .040  | .11   | .05   |       |       |       |       |                         |
| HEATS INDICATED WITH (+) WERE MELTED & MANUFACTURED IN THE USA. HEATS INDICATED WITH (^) WERE ROLLED IN THE USA. |               |       |       |       |       |       |       |       |       |       |       |       |       |       |       |                         |
| .....                                                                                                            | END OF REPORT | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | .....                   |

*John Z. B...*

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

## MILL TEST REPORT

TA CHEN INTERNATIONAL, INC.

This MTR contains:1 pages (Page:1)

Cust#: IRCPOR Company#: I.R.C. ALUMINUM &amp; STAINLESS

MTR#: YYCL/YYCL2104038.pdf PO#: 10867 SO#: LGBVZ7

Item: 87560240304L#1 Bundle:BU54587-030 Heatno:YU195142



YEYOU YIH STEEL CO., LTD.

## Inspection Certificate

In Accordance with EN 10204:2004 TYPE 3.1

|                                                                                                                                                                                                                                                                                                                                                                                              |             |          |           |                     |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |       |         |                      |    |                 |      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------|-----------|---------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------|---------|----------------------|----|-----------------|------|
| Certificate No. : MT2104038                                                                                                                                                                                                                                                                                                                                                                  |             |          |           |                     |                   | Date: 2021/04/01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |       |         | PAGE: 1/1            |    |                 |      |
| Customer: TA CHEN STAINLESS PIPE COMPANY LIMITED<br>Contract No. : S2102001<br>Commodity: HOT ROLLED STAINLESS STEEL PLATE                                                                                                                                                                                                                                                                   |             |          |           |                     |                   | Material Specification: ASTM A240-19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |       |         |                      |    |                 |      |
| Physical Description                                                                                                                                                                                                                                                                                                                                                                         |             |          |           |                     |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |       |         |                      |    |                 |      |
| No.                                                                                                                                                                                                                                                                                                                                                                                          | Product No. | Grade    | Heat No.  | Size                | No of Pieces/Pcs  | Weight/Kgs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | FINISH | EDGE  | QUALITY |                      |    |                 |      |
| 1                                                                                                                                                                                                                                                                                                                                                                                            | BU54587     | 304/304L | YU195142  | 0.875" X 60" X 240" | 2                 | 3,353                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | NO.1   | SE    | PRIME   |                      |    |                 |      |
| Total                                                                                                                                                                                                                                                                                                                                                                                        |             |          |           |                     | 2                 | 3,353                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        |       |         |                      |    |                 |      |
| Chemical Composition(%)                                                                                                                                                                                                                                                                                                                                                                      |             |          |           |                     |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |       |         |                      |    |                 |      |
| No.                                                                                                                                                                                                                                                                                                                                                                                          | C           | Si       | Mn        | P                   | S                 | Ni                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Cr     | Mo    | N       | Cu                   | Ti | Country of melt |      |
| 1                                                                                                                                                                                                                                                                                                                                                                                            | 0.017       | 0.330    | 0.730     | 0.034               | 0.008             | 8.100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 18.290 | 0.230 | 0.043   | 0.380                |    | Taiwan          |      |
| Mechanical Properties                                                                                                                                                                                                                                                                                                                                                                        |             |          |           |                     |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |       |         |                      |    |                 |      |
| Solution Annealed 1080°C Water Cooling                                                                                                                                                                                                                                                                                                                                                       |             |          |           |                     |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |       |         |                      |    |                 |      |
| No.                                                                                                                                                                                                                                                                                                                                                                                          | Y.S.(MPa)   |          | T.S.(MPa) | Elongation %        | Hardness HRB/AVE. | Impact Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |       |         |                      |    |                 |      |
|                                                                                                                                                                                                                                                                                                                                                                                              | 0.2%        | 1%       |           |                     |                   | (20°C) / Min. 60 J                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |       |         | (-196°C) / Min. 60 J |    |                 |      |
|                                                                                                                                                                                                                                                                                                                                                                                              |             |          |           |                     |                   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2      | 3     | AVE.    | 1                    | 2  | 3               | AVE. |
| 1                                                                                                                                                                                                                                                                                                                                                                                            | 233         |          | 609       | 53                  | 80                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |       |         |                      |    |                 |      |
| YEYOU YIH STEEL CO., LTD.                                                                                                                                                                                                                                                                                                                                                                    |             |          |           |                     |                   | Remarks:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |       |         |                      |    |                 |      |
| An ISO 9001:2015 certified company<br>An ISO 14001:2015 certified company<br>EU PED 2014/68/EU Annex I,4.3 certified<br>AD2000/W0/W2/W10 certified<br>CPR EN10088-4 material manufacture certified<br>DNV.GL ship building stainless steel manufacture certified<br>NO.2 YONG GONG 10TH ROAD, YONG AN DISTRICT,<br>KAOHSIUNG CITY, TAIWAN 828, R.O.C.<br>TEL:886-7-6225616 FAX:886-7-6226808 |             |          |           |                     |                   | 1.Equivalent to QQS 766D-A X MG PRM.<br>2.Mercury Free and bending test OK.<br>3.NO repair of plate by welding.<br>4.Physical properties comply to the annealed of ASTM A666/ASME SA666 .<br>5.Material meets the hardness requirement of NACE MR0175.<br>6.Country of Manufacture : Taiwan<br>7.Intergranular corrosion comply to ASTM A262-15-A,-E.<br>8.ASME SA-240:2019<br>9.Permitted variations in dimensions comply to ASTM A480-19/ASME SA-480-19<br>10.DISCRETE MILL PLATE.<br>11.Chemical and physical properties comply to ASTM A479/19, ASME SA479/19,<br>ASTM A 276/17, AMS 5513J(304)/AMS 5511H(304L) |        |       |         |                      |    |                 |      |
| Manager of Quality Assurance Department<br><br>Albert Lee<br>We hereby certified the above statement to be true and correct in accordance with the material specification. This report can not be partially reproduced.                                                                                   |             |          |           |                     |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |       |         |                      |    |                 |      |

We hereby certify that the material described above has been detected and has no radiation contamination.

GATE



|              | Reading No | Time           | Type           | Duration | Units | Sequence | Item Description               | Material ID        | Cr    | Cr Error | Ni    | Ni Error | Results |
|--------------|------------|----------------|----------------|----------|-------|----------|--------------------------------|--------------------|-------|----------|-------|----------|---------|
|              | 1          | 12/8/2022 9:31 | System Check   | 53.79    | cps   | Final    | System Check 1 of 2            |                    |       |          |       |          | Pass    |
|              | 2          | 12/8/2022 9:32 | System Check   | 54.26    | cps   | Final    | System Check 2 of 2            |                    |       |          |       |          | Pass    |
|              | 3          | 12/8/2022 9:33 | General Metals | 11.99    | %     | Final    | IARM 35NN Calibration Standard | 1.25Cr(P11) : 1.04 | 1.079 | 0.046    | 0.162 | 0.046    | Pass    |
|              | 4          | 12/8/2022 9:33 | General Metals | 12.28    | %     | Final    | Job# 237-1 12" 240 (1 of 2)    | SS-316 : 1.38      | 16.83 | 0.162    | 9.924 | 0.201    | Pass    |
|              | 5          | 12/8/2022 9:34 | General Metals | 13       | %     | Final    | Job# 237-1 12" 240 (2 of 2)    | SS-316 : 1.00      | 16.96 | 0.155    | 9.964 | 0.193    | Pass    |
|              | 6          | 12/8/2022 9:35 | General Metals | 13.05    | %     | Final    | Job# 212-1 16" UNI (1 of 1)    | 17-4 PH : 1.17     | 15.23 | 0.145    | 4.046 | 0.135    | Pass    |
|              | 7          | 12/8/2022 9:36 | General Metals | 12.88    | %     | Final    | Job# 211-1 28" DS (1 of 2)     | SS-304 : 0.23      | 18.16 | 0.159    | 7.898 | 0.176    | Pass    |
|              | 8          | 12/8/2022 9:38 | General Metals | 12.98    | %     | Final    | Job# 211-1 28" DS (2 of 2)     | SS-304 : 0.51      | 18.13 | 0.157    | 7.944 | 0.174    | Pass    |
|              | 9          | 12/8/2022 9:39 | General Metals | 13.19    | %     | Final    | Job# 217-1 24" UNI (1 of 1)    | 17-4 PH : 1.59     | 15.66 | 0.147    | 4.109 | 0.135    | Pass    |
|              | 11         | 12/8/2022 9:41 | General Metals | 11.03    | %     | Final    | Job# 240-1 10" UNI (1 of 1)    | SS-304 : 0.78      | 18.35 | 0.16     | 7.872 | 0.177    | Pass    |
|              | 12         | 12/8/2022 9:42 | General Metals | 12.75    | %     | Final    | Job# 246 10" UNI (1 of 1)      | SS-304 : 0.70      | 17.94 | 0.158    | 7.972 | 0.177    | Pass    |
| S/N 222402-1 | 13         | 12/8/2022 9:44 | General Metals | 12.81    | %     | Final    | Job# 240-2 16" UNI (1 of 2)    | SS-304 : 1.45      | 18.18 | 0.158    | 7.928 | 0.175    | Pass    |
| S/N 222402-2 | 14         | 12/8/2022 9:47 | General Metals | 13.2     | %     | Final    | Job# 240-2 16" UNI (2 of 2)    | SS-304 : 0.63      | 18.11 | 0.158    | 7.961 | 0.175    | Pass    |
|              | 15         | 12/8/2022 9:51 | General Metals | 12.88    | %     | Final    | Job# 232-1 6" UNI (1 of 1)     | SS-304 : 0.00      | 18.11 | 0.162    | 7.99  | 0.18     | Pass    |
|              | 16         | 12/8/2022 9:52 | General Metals | 12.76    | %     | Final    | Job# 213-1 28" DS (1 of 1)     | SS-304 : 0.02      | 18.1  | 0.16     | 8.16  | 0.179    | Pass    |
|              | 17         | 12/8/2022 9:52 | General Metals | 11.64    | %     | Final    | Job# 251-1 26" DS (1 of 2)     | SS-304 : 1.34      | 18.31 | 0.173    | 8.414 | 0.195    | Pass    |
|              | 18         | 12/8/2022 9:54 | General Metals | 12.81    | %     | Final    | Job# 251-1 26" DS (2 of 2)     | SS-304 : 0.00      | 18.32 | 0.161    | 8.126 | 0.179    | Pass    |
|              | 19         | 12/8/2022 9:56 | General Metals | 11.85    | %     | Final    | IARM 35NN Calibration Standard | 1.25Cr(P11) : 0.75 | 1.103 | 0.046    | 0.14  | 0.043    | Pass    |

304L Composition Range (ASME Sec.II)

Chromium (Cr): 18.0 - 20.0

Nickel (Ni): 8.0 - 13.0

17-4PH Composition Range (ASME Sec.II)

Chromium (Cr): 15.0 - 17.5

Nickel (Ni): 3.0 - 5.0

Technician: Daniel C Rosian 12/8/2022

*D. Rosian*

| Reading No | Time | Type | Duration | Units | Sequence | Item Description | Material ID | Ni | Ni Error | Cr | Cr Error | Results |
|------------|------|------|----------|-------|----------|------------------|-------------|----|----------|----|----------|---------|
|------------|------|------|----------|-------|----------|------------------|-------------|----|----------|----|----------|---------|

**ARMI | MBH**  
ANALYTICAL LTD

ISO Certified • 9001 • 17025 • 17043 • 17034

## Certificate of Analysis

**IARM 35NN**

Low Alloy Steel / F11 / 1 $\frac{1}{4}$ Cr 1 $\frac{1}{2}$ Mo / 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@LCgroup.com  
IARM-35NN-F  
6/30/2020 1 / 2



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

[www.endurancevalve.com](http://www.endurancevalve.com)

## **INSTALLATION & MAINTENANCE**

Valve: 150# MO/UNI

Flange Bolting: See bolt/torque chart

### **DESCRIPTION:**

The FV-150 MO/UNI is a fabricated knife-gate valve with an O-Ring Seat and Metal-to-Metal back up seat, to seal the gate in the flow area. It is a unidirectional flow valve and needs to be installed with the flow arrows on the valve following the direction of the pipe line flow. Multiple rows of packing are used to seal the gate outside the flow area. The pressure rating of the FV-150 MO/UNI is 150# - 300 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)     |
|            |              |                 |

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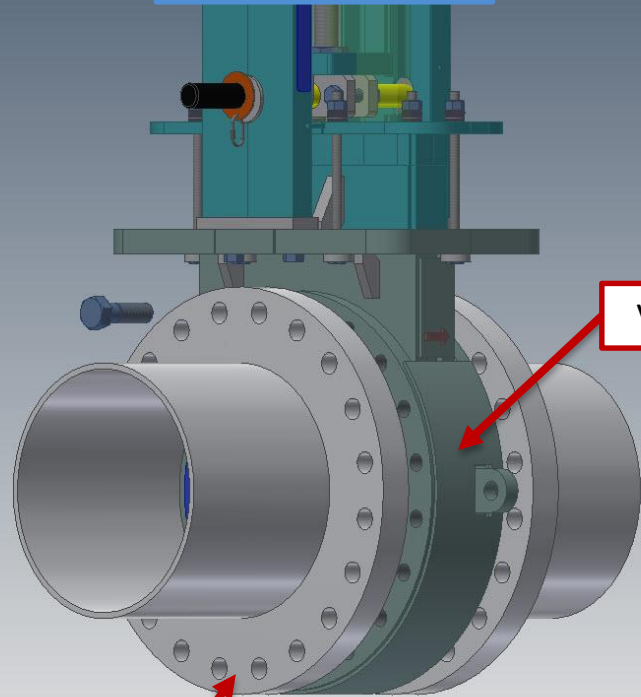
# Flange Bolting Instructions

---

**Engineering**



Isometric View

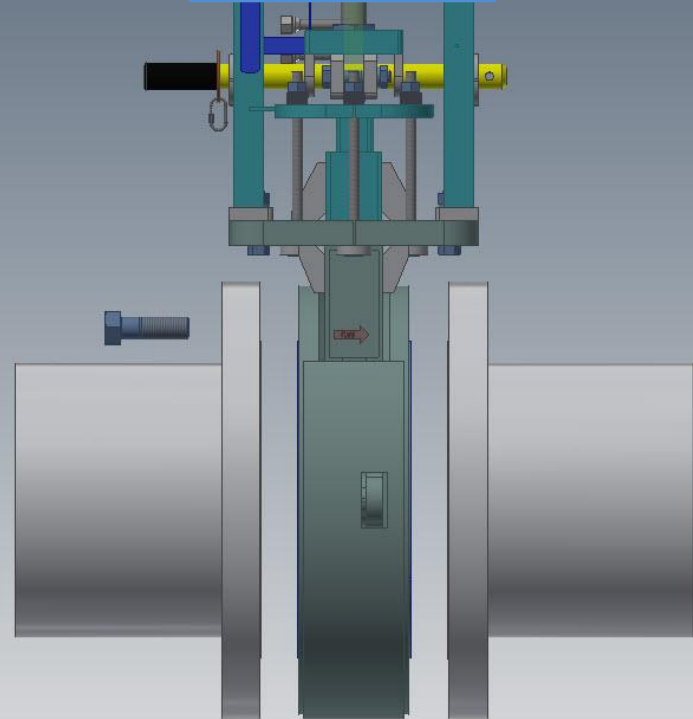


Valve

Pipe Flange

Image 1

Side View



$\sim \frac{1}{4}''$

Image 2

- Position pipe mating flanges and valve into approximate, final location (ensuring gasket is also in place).
- Offset the faces of the valve and mating flange about  $\frac{1}{4}$  inch.
  - This allows the flanges to be adjusted and wiggle room for the bolts to line up properly.

## Isometric View

- Insert bolt and screw it into the valve body only a few turns, then move on to next bolt.
  - Bolts should be inserted in a star-like pattern around the flange to avoid pulling flange too far in one direction.
  - Image 3 shows numbers next to the bolts that indicate example insertion order.
- If studs are being used, they should not be inserted into the valve prior to positioning it inline with the pipe mating flange.
  - This can make the installation process more difficult since bolt holes can become slightly askew during the manufacturing process.

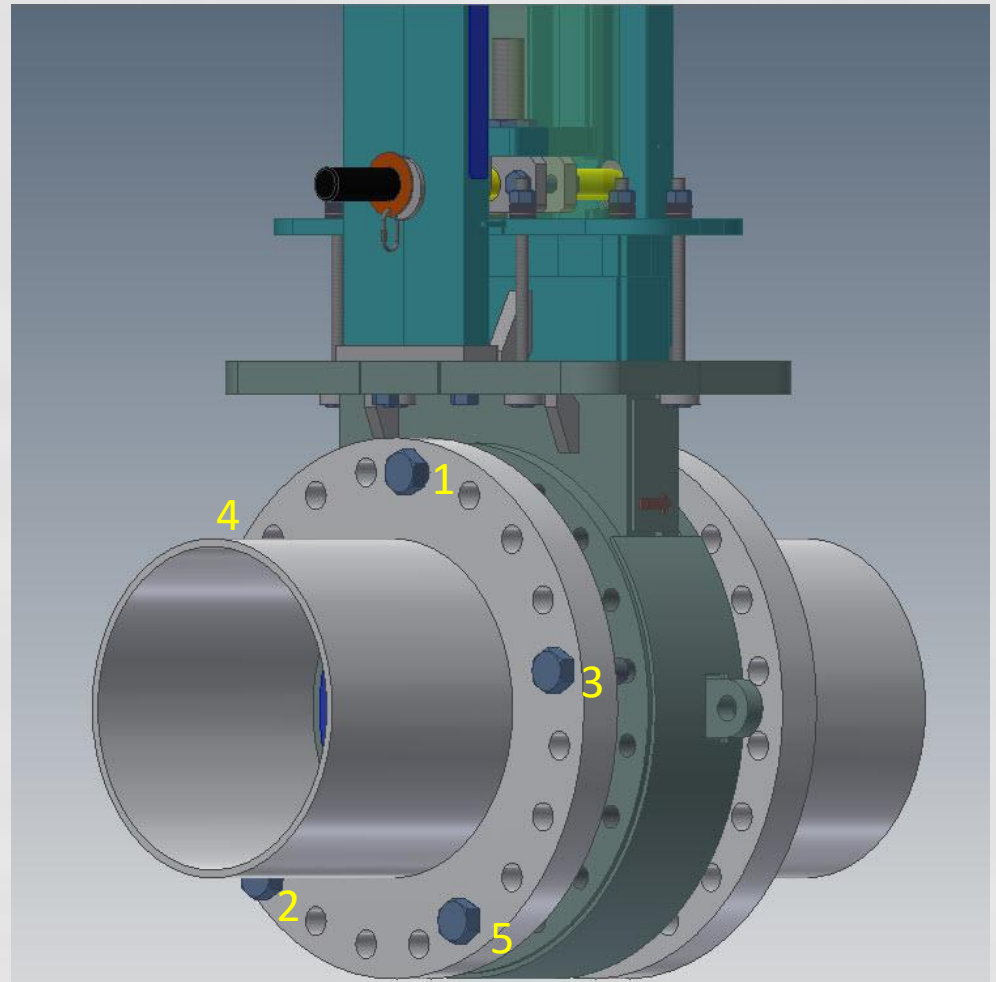


Image 3

## Isometric Views

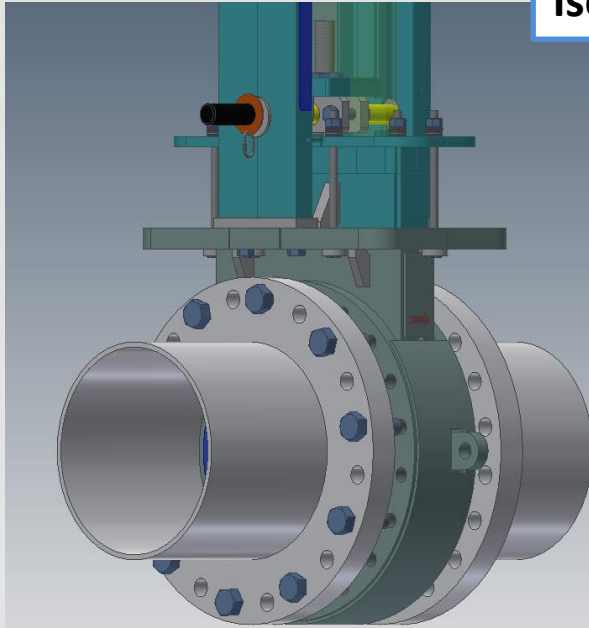


Image 4

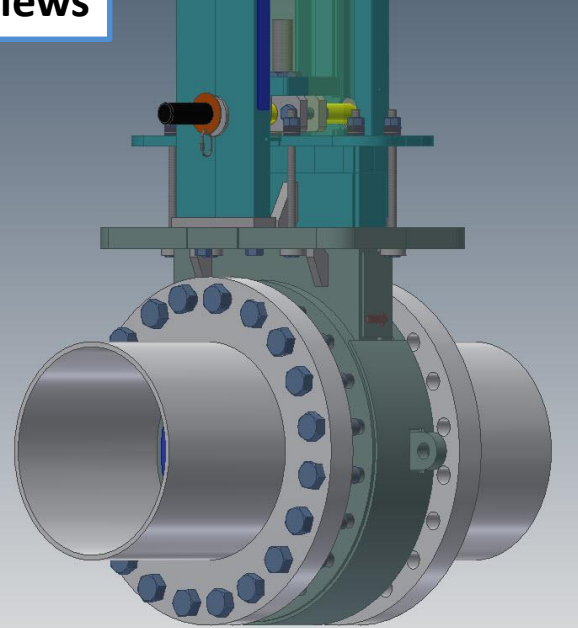
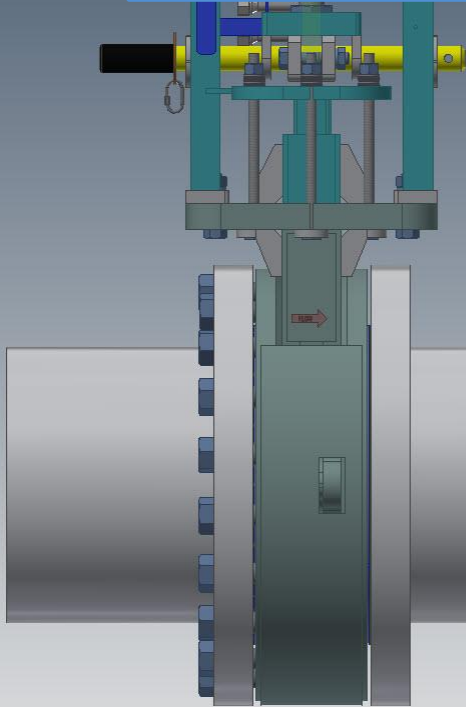


Image 5

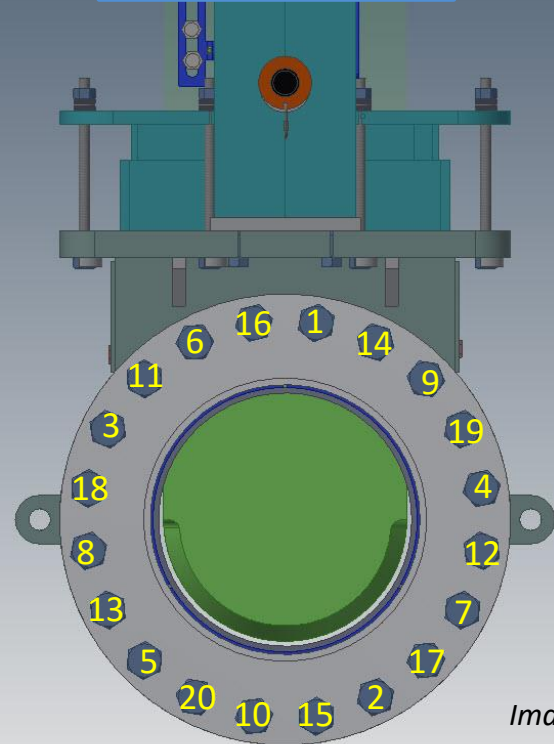
- Continue inserting all remaining bolts in the same type of insertion pattern (ref. Image 3), remembering to thread them in only a few turns keeping the flanges loose and free to be adjusted.

**Side View**



*Image 6*

**Front View**



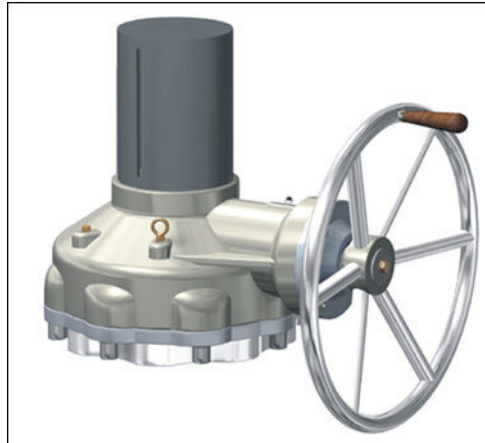
*Image 7*

After all bolts are inserted, they can then be tightened to snug the mating flange up with the valve body.

- Bolt-tightening pattern should follow a similar procedure as the initial insertion pattern.
  - Image 7 shows an example of the bolt-tightening order.

\*Torque specifications are not provided by Endurance Valve.

# 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 adaptation. You can install very easily, attach the wheel to the pinion, and a nut 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