VNE

NEUMO Ehrenberg Group

MaxCore Introduction & 6Mo ™ Comparison to AL-6XN®

AL-6XN is a registered trademark of ATI Technologies Inc.

Our Program

- **Sanitary Tubing and Components**
  - **MaxCore 6MO**
    - **Ultra 6XN**
    - **AL6XN**
  - **Alloy 22**
  - **904L (obtain through Neumo)**

Our Program

- **Sanitary Tubing and Components - Vendors**
  - **MaxCore 6MO (stock)**
    - **Fittings supplier –Egmo / Neumo / VNE**
    - **Fabrication – VNE Manufacturing**
    - **Tubing Suppliers – Rath / United**
  - **Alloy 22 (stock)**
    - **Fittings supplier –Egmo / Neumo / VNE**
    - **Fabrication – VNE Manufacturing**
    - **Tubing Suppliers –United / Neumo**
  - **904L (obtain through Neumo)**

Applications

- **Pharmaceutical containing high chlorides and corrosive media**

  - **High Purity Water Systems**
  - **Buffer lines**
  - **CIP lines**

Applications

- **Food Processing where salt and acidic conditions are present**
  - **Meat Cookers**
  - **Baby food tanks**
  - **Corn syrup processors**
  - **Catsup / Ketchup**
  - **Tomato Processes , Tomato paste and tomato soup**
  - **Hot sauce**
  - **Soy sauce**
  - **Sports Drinks**

Applications

- Sea Water Applications
  - High Chloride Water Piping
  - High Chloride Fire Protection
- Brine refrigeration systems
- Combat MIC (Bacteria) Corrosion
- Power Plants
- CIP lines
- Pulp & Paper bleach lines

What's in a name?

- When working with 6% molybdenum alloys, the most common brand is AL-6XN®. What is this?
  - AL-6XN® is a trade name owned by Allegheny Ludlum Corporation.
  - "A" stands for Allegheny
  - "L" stands for Ludlum
  - "6" is representative of 6% Molybdenum content
  - "X" Extra (Nitrogen)
  - "N" is representative of the Nitrogen content within the alloy
- AL-6XN® is a name no different than "Kleenex™" or "Coca-Cola™"

Kleenex™ is a registered trademark of Kimberly-Clark Corporation
Coca-Cola™ is a registered trademark of the Coca-Cola Company

What's in a name?

- What is MaxCore 6Mo ™?
  - "Max" is representative of Maximum and is branded along the same lines as our MaxPure ™ line of fittings.
  - "Co" is representative of Corrosion
  - "re" is representative of Resistance
  - "6" is representative of 6% Molybdenum content
  - "Mo" is stands for Molybdenum
- MaxCore 6Mo ™ is a trade name no different than "Kleenex ™", "Coca-Cola ™" or AL-6XN ®

So if it's not the name, what is important?

- What is important is the chemical composition of the material.
- ASTM International (formerly known as American Society for Testing and Materials) develops and publishes a wide range of technical standards for materials, products, systems and services.
  - Adhering to the chemical composition as published in ASTM Standards guarantees materials meet the quality and performance levels as designed.

Chemical Composition AL6XN ®

Ni	Cr	Mo	C	N	Mn	Si	P	S	Cu	Fe
23.5-25.5	20.00-22.00	6.00-7.00	0.03 Max	0.18-0.25	2.0 Max	1.00 Max	.040 Max	0.03 Max	0.75 Max	Remainder

Chemical Composition MaxCore 6Mo ™

Ni	Cr	Mo	C	N	Mn	Si	P	S	Cu	Fe
23.5-25.5	20.00-22.00	6.00-7.00	0.03 Max	0.18-0.25	2.0 Max	1.00 Max	.040 Max	0.03 Max	0.75 Max	Remainder

So if it's not the name, what is important?

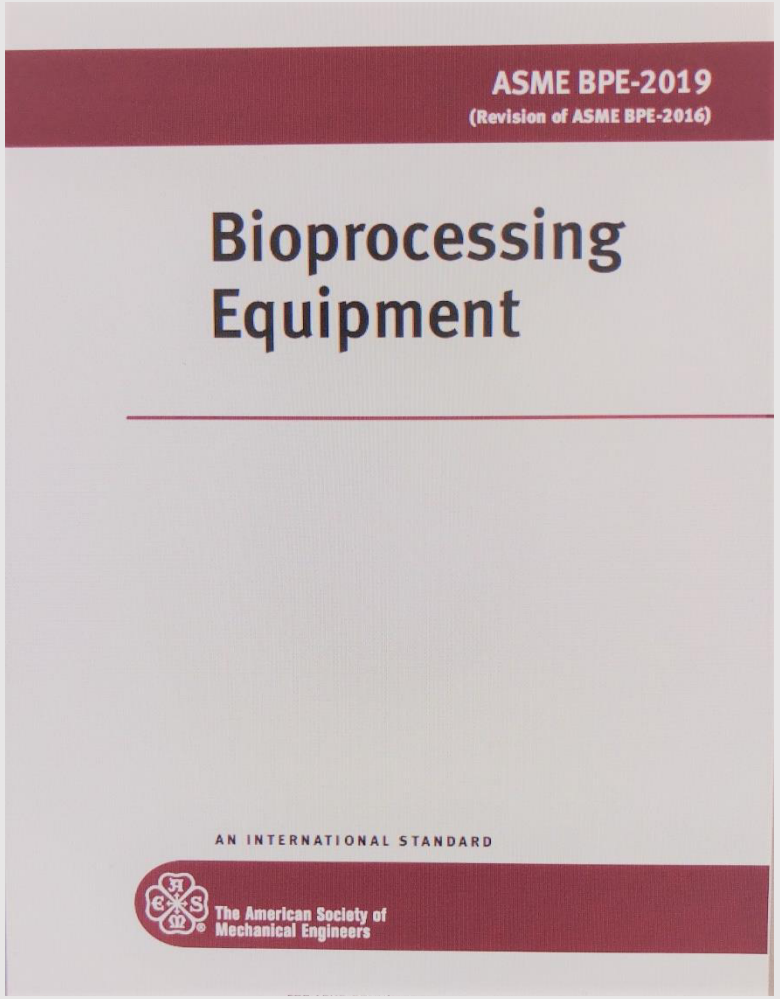
- Alloys are given a number designator. That number is issued by The Unified Numbering System for Metals and Alloys (UNS). The UNS # in itself, is not a specification but is instead a unified identifier of a metal or alloy for which controlling limits have been specified elsewhere. (i.e. ASTM Specifications).
- The UNS Number commonly associated with AL-6XN ® is N08367
- The UNS Number associated with MaxCore 6Mo ™ is N08367

So far, we have established the chemical composition and UNS number designators of AL-6XN ® and MaxCore 6Mo ™ are identical.

If MaxCore 6Mo ™ and AL-6XN ® are identical, what is the difference?

- In some cases there is no difference. VNE's line of MaxCore Tube and Fittings are fabricated from raw material fabricated from Allegheny Ludlum AL-6XN ® brand of steel and Outokumpu's brand name of Ultra 6XN ®.
- To be clear, we are not focused on the trade name of the material, but more on the chemical composition and UNS # designator guaranteeing the material adheres to the requirements of the ASTM standards. Both Allegheny Ludlum and Outokumpu's material meet this requirement and must be identical in order to carry the same UNS designator.
- The difference is the producing mill that fabricates the raw material from which the final product is made.

What does the BPE say about using AL-6XN® and MaxCore 6Mo™?



The BPE Standard does not use trade names within the document and has settled on the use of the UNS Designation number when possible as the identifier for materials of construction.

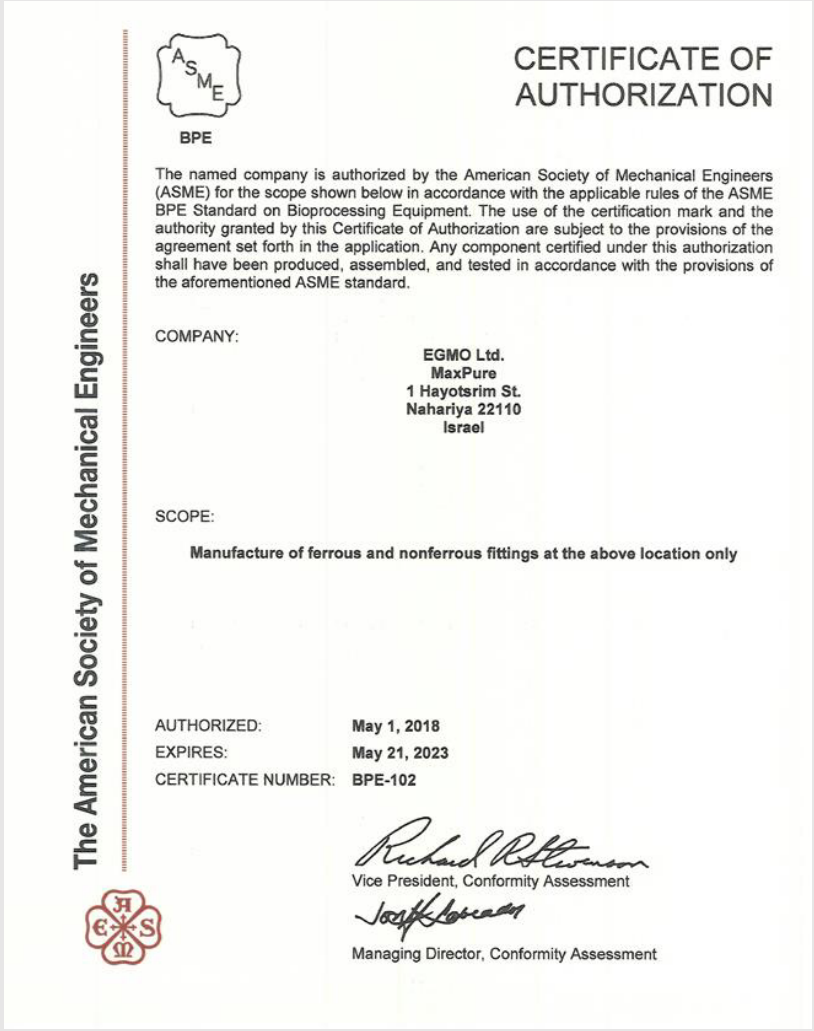
MaxCore 6MO and AL-6XN® fall withing the category of Superaustenitic Stainless Steels in Table MM-2.1-1 and are listed as UNS N08367.

As further evidence to the support the removal of common alloy names, BPE has removed 316L callouts from the Standard and now refer to those when necessary as “316L type” in order to allow the use of European steels such as 1.4435 in its place.

It is recommended all specifications be revised to remove trade names in favor of the UNS designator.

What's the benefit of using MaxCore 6Mo™ Fittings?

- MaxCore 6Mo™ fittings are manufactured at our BPE Certified facility in Israel and carries the BPE certification Stamp.
- MaxCore 6Mo™ tubing is manufactured at a BPE Certified facility and carries the BPE certification Stamp.



The American Society of Mechanical Engineers

ASME BPE

CERTIFICATE OF AUTHORIZATION

The named company is authorized by the American Society of Mechanical Engineers (ASME) for the scope shown below in accordance with the applicable rules of the ASME BPE Standard on Bioprocessing Equipment. The use of the certification mark and the authority granted by this Certificate of Authorization are subject to the provisions of the agreement set forth in the application. Any component certified under this authorization shall have been produced, assembled, and tested in accordance with the provisions of the aforementioned ASME standard.

COMPANY:

EGMO Ltd.
MaxPure
1 Hayotsrim St.
Nahariya 22110
Israel

SCOPE:

Manufacture of ferrous and nonferrous fittings at the above location only

AUTHORIZED: **May 1, 2018**
EXPIRES: **May 21, 2023**
CERTIFICATE NUMBER: **BPE-102**

Vice President, Conformity Assessment

Managing Director, Conformity Assessment

*Max*Core Benefits

- **MaxCore** 6Mo ™ fittings are the only 6Moly Alloy BPE Certified fittings available on the market today.

2019 BPE Standard
Organizations that are authorized to use the ASME Single Certification Mark for marking items or constructions that have been constructed and inspected in compliance with ASME Codes and Standards are issued Certificates of Authorization. It is the aim of the Society to maintain the standing of the ASME Single Certification Mark for the benefit of the users, the enforcement jurisdictions, and the holders of the ASME Single Certification Mark who comply with all requirements.

- **MaxCore** 6Mo tubing is BPE Certified on sizes
- 1-1/2" and above.

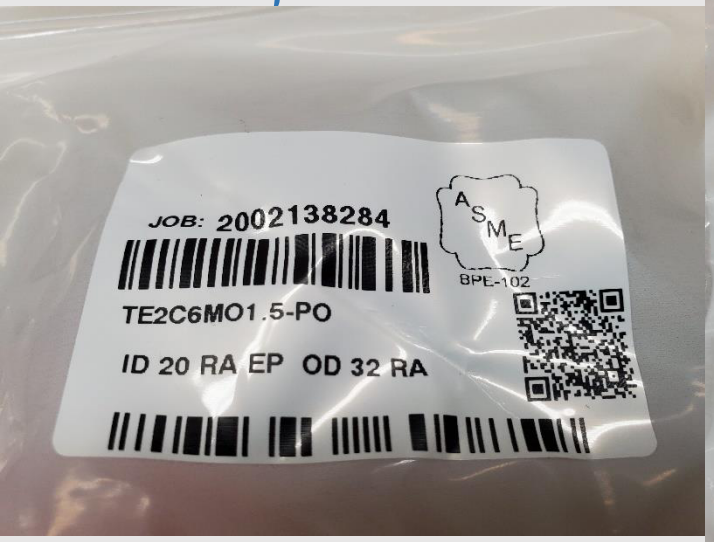
Tubing Specifications:

A269 spec indicates compliance with B31.1 Process Piping Code
SA 249 indicates compliance with the BPVC
A270 indicates compliance with 3A and BPE

LASER WELDED 1.500" x 0.064" MIN MAXCORE 6MO UNS N08367 DIN 1.4529 ASME BPE SF5 SA249/ SB676 CL 1 ASTM A249/A269/A270 /B676 CL 1 NDE HT#12345 XXX 2/06/19

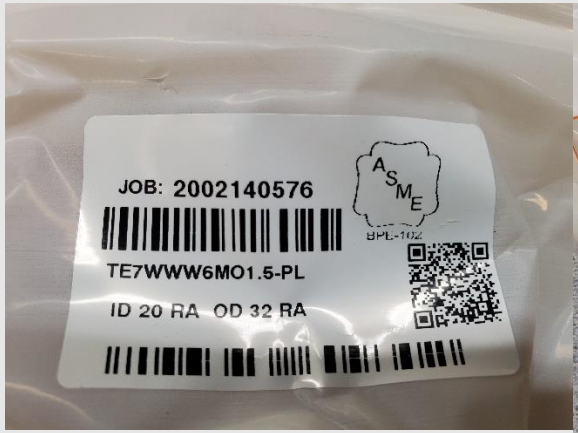
MaxCore Benefits

- **MaxCore** BPE fittings are plastic zip-lock bagged with a QR code for simple MTR download. Allows for immediate QA/QC reviews on the go or at a job site



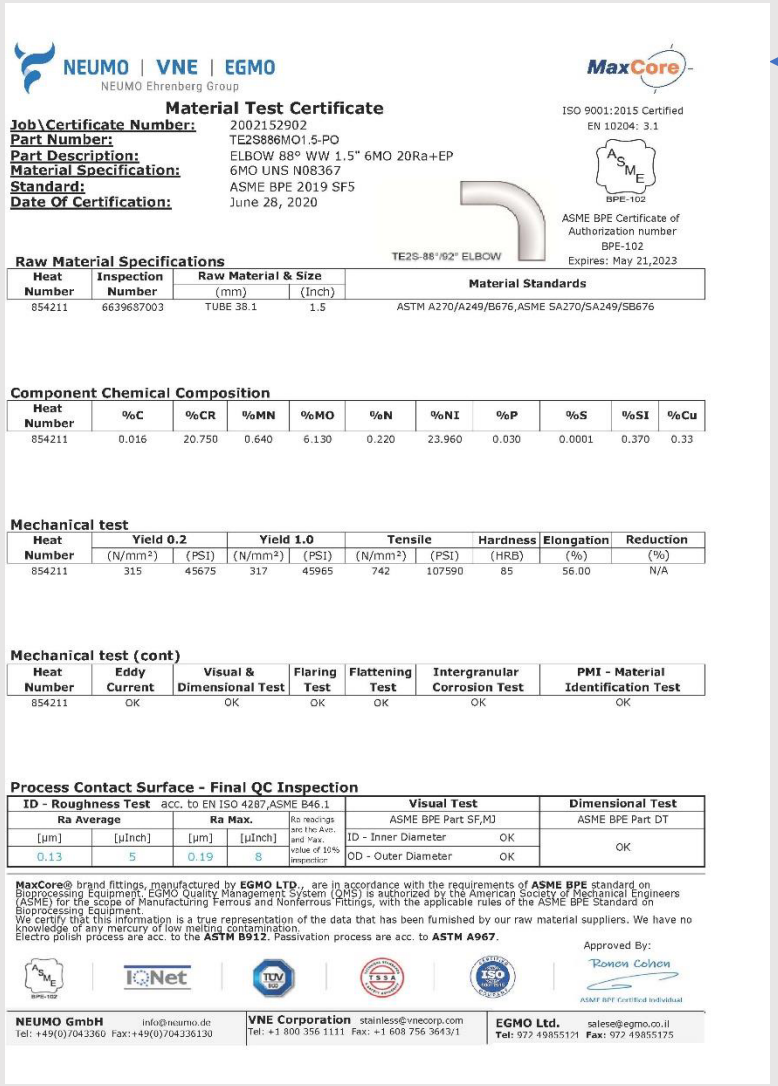
Color coded caps for quick material finish identification

Orange caps for Electropolished PO finished material



White caps for Mechanically Polished PL finished material

MaxCore MTR's



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NEUMO Ehrenberg Group

MaxCore

Material Test Certificate

ISO 9001:2015 Certified
EN 10204: 3.1

Job\Certificate Number:	2002152902
Part Number:	TE2S886MO1.5-PO
Part Description:	ELBOW 88° WW 1.5" 6MO 20Ra+EP
Material Specification:	6MO UNS N08367
Standard:	ASME BPE 2019 SF5
Date Of Certification:	June 28, 2020

BPE-102

ASME BPE Certificate of Authorization number BPE-102
Expires: May 21,2023

TE2S-88°/92° ELBOW

Raw Material Specifications

Heat Number	Inspection Number	Raw Material & Size (mm)	Raw Material & Size (Inch)	Material Standards
854211	6639687003	TUBE 38.1	1.5	ASTM A270/A249/B676,ASME SA270/SA249/SB676

Component Chemical Composition

Heat Number	%C	%CR	%MN	%MO	%N	%NI	%P	%S	%SI	%Cu
854211	0.016	20.750	0.640	6.130	0.220	23.960	0.030	0.0001	0.370	0.33

Mechanical test

Heat Number	Yield 0.2 (N/mm²)	Yield 0.2 (PSI)	Yield 1.0 (N/mm²)	Yield 1.0 (PSI)	Tensile (N/mm²)	Tensile (PSI)	Hardness (HRB)	Elongation (%)	Reduction (%)
854211	315	45675	317	45965	742	107590	85	56.00	N/A

Mechanical test (cont)

Heat Number	Eddy Current	Visual & Dimensional Test	Flaring Test	Flattening Test	Intergranular Corrosion Test	PMI - Material Identification Test
854211	OK	OK	OK	OK	OK	OK

Process Contact Surface - Final QC Inspection

ID - Roughness Test acc. to EN ISO 4287,ASME B46.1					Visual Test		Dimensional Test
Ra Average		Ra Max.		Ra readings are the Aver. and Max. value of 10% inspection	ASME BPE Part SF,MJ		ASME BPE Part DT
[µm]	[µInch]	[µm]	[µInch]		ID - Inner Diameter	OK	OK
0.13	5	0.19	8		OD - Outer Diameter	OK	

MaxCore® brand fittings, manufactured by **EGMO LTD.**, are in accordance with the requirements of **ASME BPE** standard on Bioprocessing Equipment. EGMO Quality Management System (QMS) is authorized by the American Society of Mechanical Engineers (ASME) for the scope of Manufacturing Ferrous and Nonferrous Fittings, with the applicable rules of the ASME BPE Standard on Bioprocessing Equipment.
We certify that this information is a true representation of the data that has been furnished by our raw material suppliers. We have no knowledge of any mercury of low melting contamination.
Electro polish process are acc. to the **ASTM B912**. Passivation process are acc. to **ASTM A967**.

Approved By:
Ronen Cohen
ASME BPE Certified Individual

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EGMO Ltd. salese@egmo.co.il
Tel: 972 49855121 Fax: 972 49855175

Original Mill Certs available if required

NEUMO | VNE | EGMO
NEUMO Ehrenberg Group

MaxCore

Material Test Certificate

ISO 9001:2015 Certified
EN 10204: 3.1

Job\Certificate Number:	2002152902
Part Number:	TE2S886MO1.5-PO
Part Description:	ELBOW 88° WW 1.5" 6MO 20Ra+EP
Material Specification:	6MO UNS N08367
Standard:	ASME BPE 2019 SF5
Date Of Certification:	June 28, 2020

BPE-102

ASME BPE Certificate of Authorization number BPE-102
Expires: May 21,2023

TE2S-88°/92° ELBOW

Raw Material Specifications

Heat Number	Inspection Number	Raw Material & Size (mm)	Raw Material & Size (Inch)	Material Standards
854211	6639687003	TUBE 38.1	1.5	ASTM A270/A249/B676,ASME SA270/SA249/SB676

MaxCore BPE fittings MTR have a picture depicting the fitting for easy identification

Targets

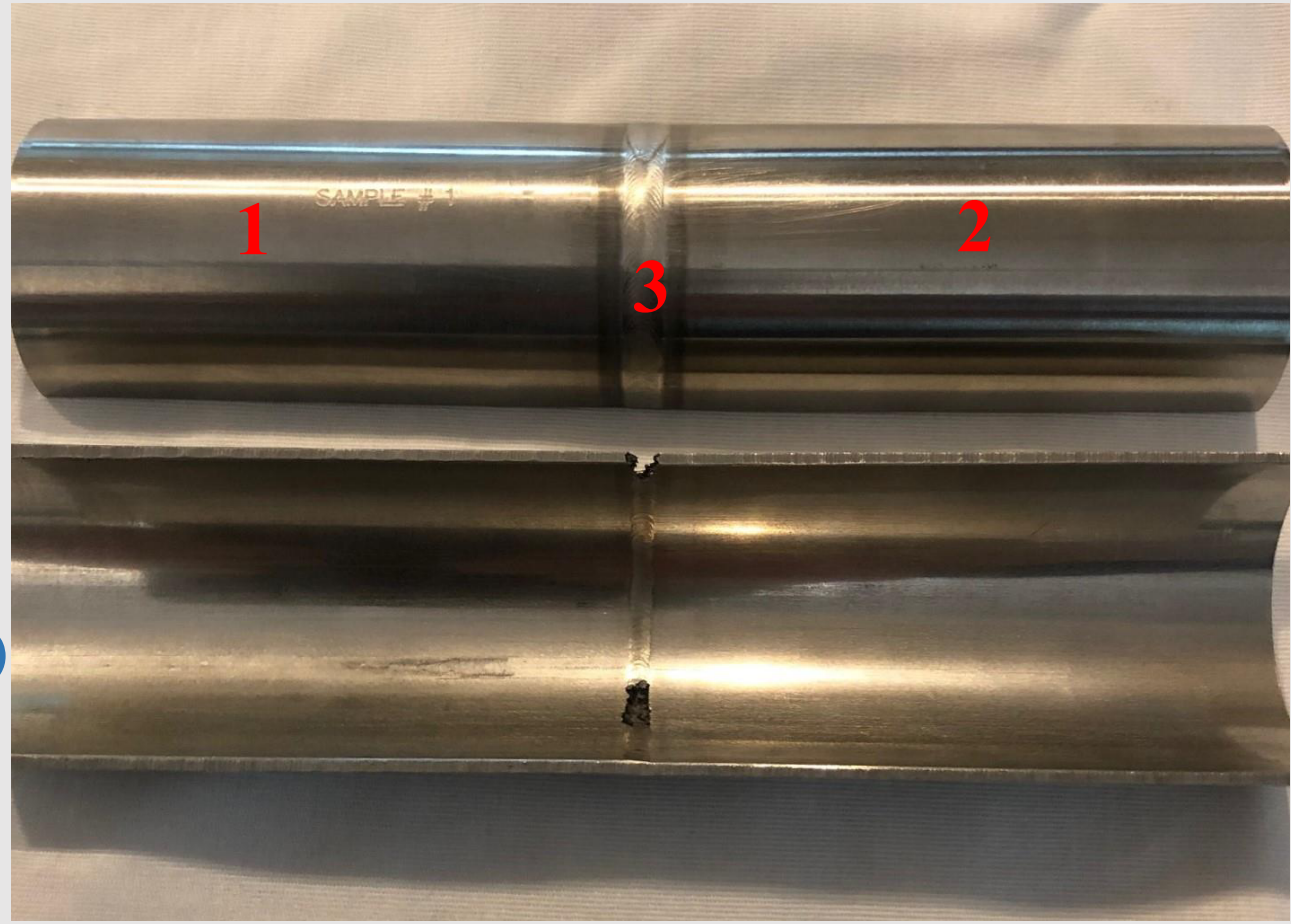
- **Distribution should target**
  - **Engineering Departments at Processors**
  - **A&E Firms**
  - **Engineering and Sales Departments of OEM's**
  - **Food**
  - **Beverage**
  - **Fine Chemical**
  - **Cosmetic / Health & Beauty**
  - **Pharmaceutical**

Corrosion Study

Sample:

1. 6 Mo Tube
2. 6 Mo Tube
3. Automatic fusion weld no insert ring

The top sample is ½ of the sample representing the piece prior to testing. The bottom sample is representative of the test results after immersion in the test solution.



Corrosion Test

ASTM G-48 Practice C (modified immersion test)

6%$FeCl_3$ + 1% HCl at 50° C (122° F) for 72 hours

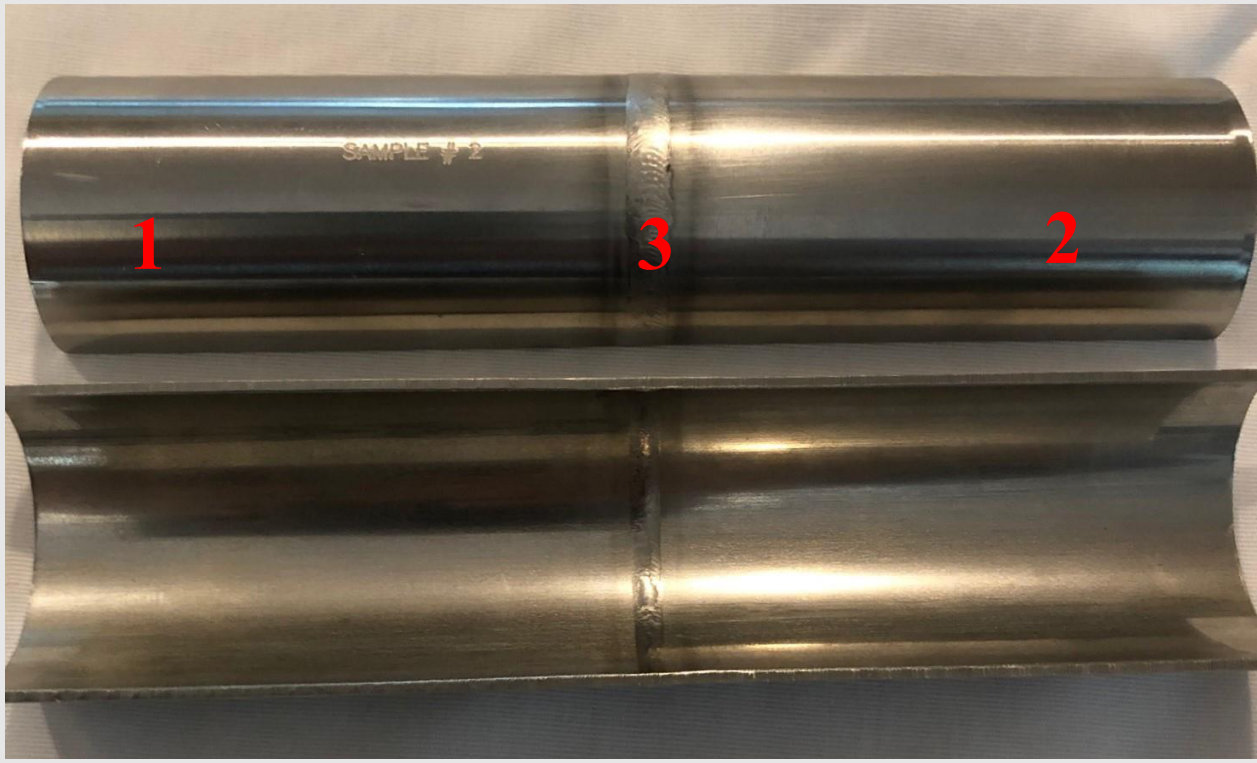
Each test run independently with fresh solution

Corrosion Study

Sample:

1. 6 Mo Tube
2. 6 Mo Tube
3. Automatic fusion weld
   Alloy 22 washer style
   insert ring

The top sample is ½ of the sample representing the piece prior to testing. The bottom sample is representative of the test results after immersion in the test solution.



Corrosion Test

ASTM G-48 Practice C (modified immersion test)

6%$FeCl_3$ + 1% HCl at 50° C (122° F) for 72 hours

Each test run independently with fresh solution

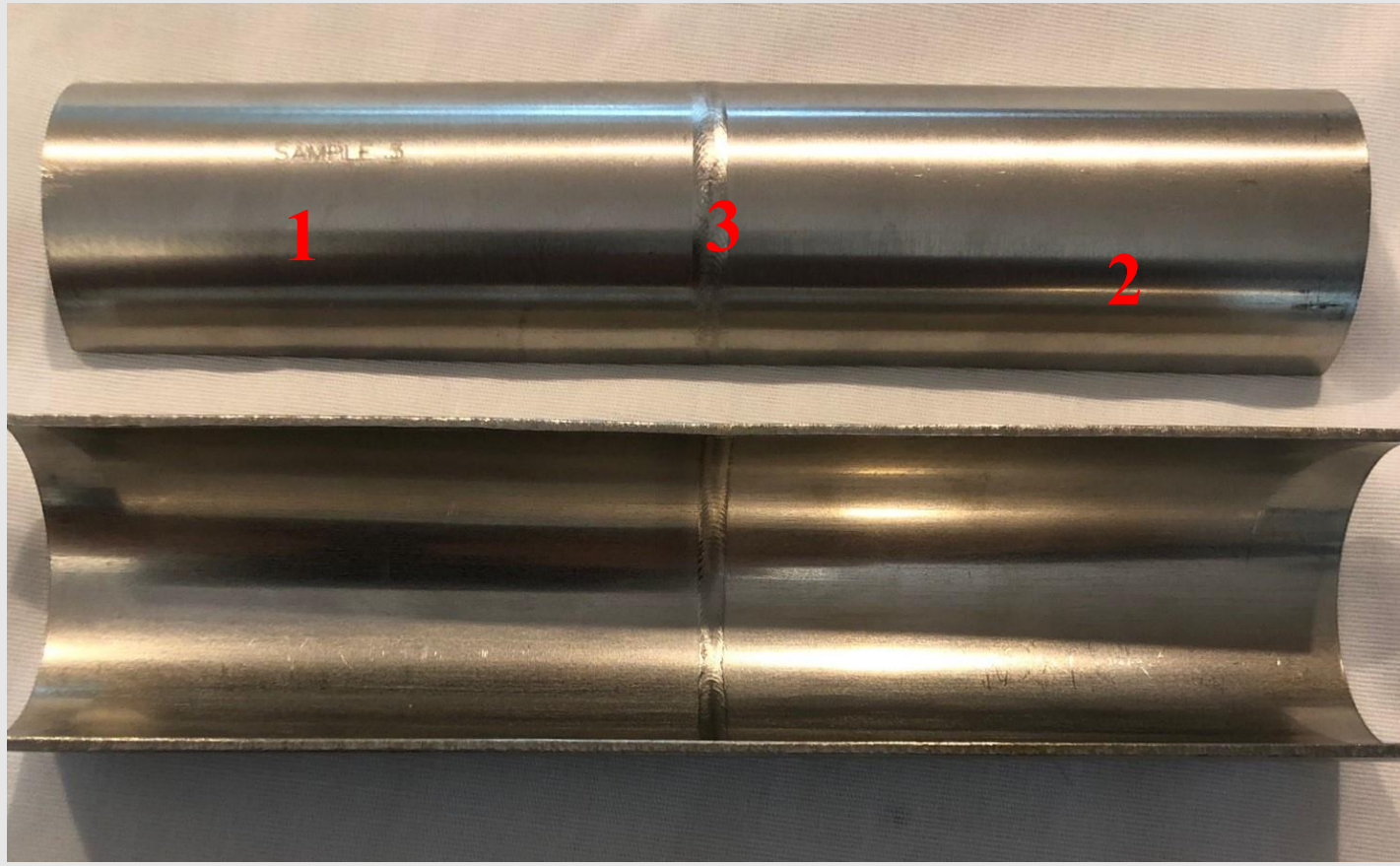
Corrosion Study

Sample:

1. 6 Mo Tube
2. 6 Mo Tube
3. Automatic fusion weld

No insert ring- *full solution anneal* after welding @ 2100° F with rapid nitrogen quench

The top sample is ½ of the sample representing the piece prior to testing. The bottom sample is representative of the test results after immersion in the test solution.



Corrosion Test

ASTM G-48 Practice C (modified immersion test)

6%$FeCl_3$ + 1% HCl at 50° C (122° F) for 72 hours

Each test run independently with fresh solution

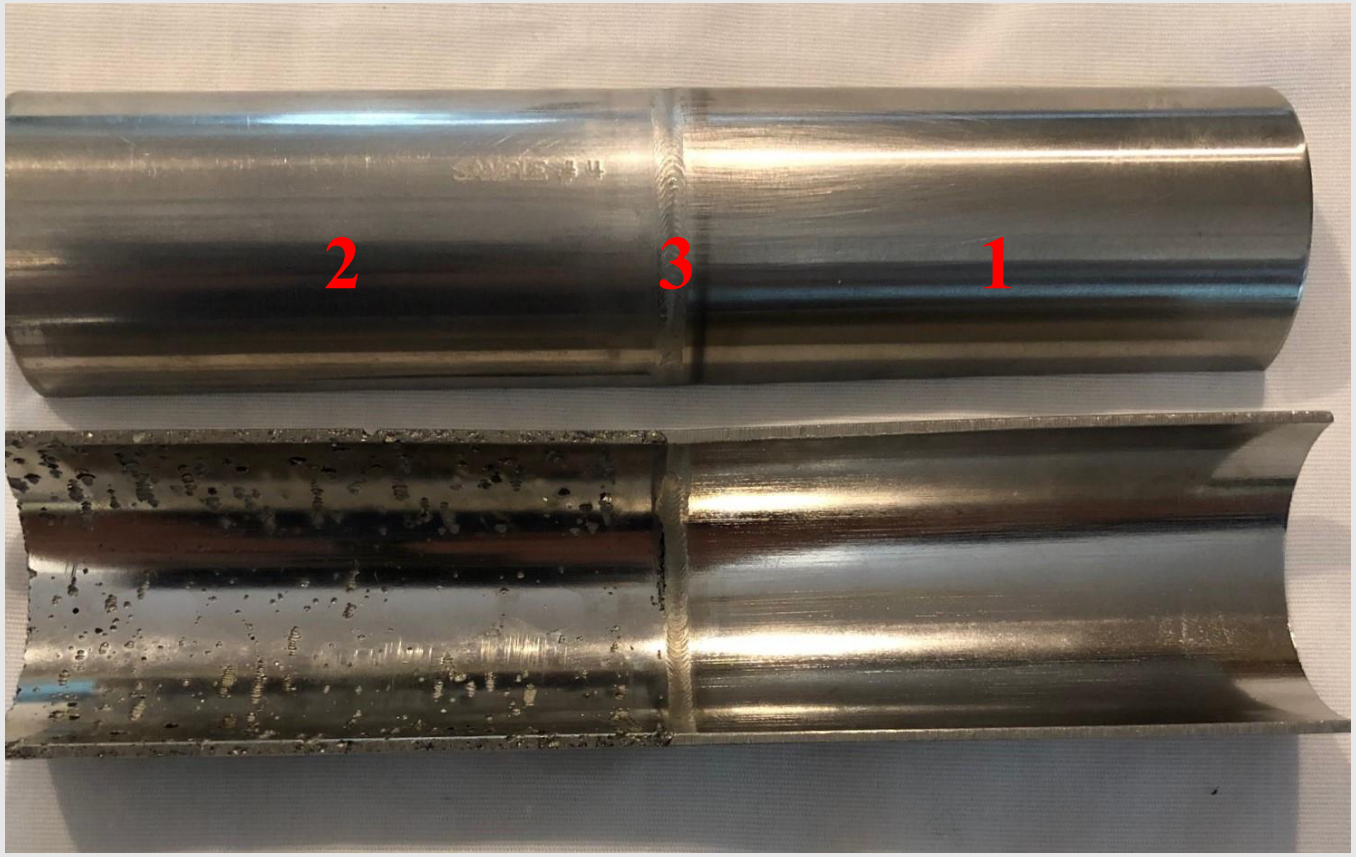
Corrosion Study

Sample:

1. 6 Mo Tube
2. 316L S/S Tube
3. Automatic fusion weld

No insert ring, No anneal

The top sample is ½ of the sample representing the piece prior to testing. The bottom sample is representative of the test results after immersion in the test solution.



Corrosion Test

ASTM G-48 Practice C (modified immersion test)

6%$FeCl_3$ + 1% HCl at 50° C (122° F) for 72 hours

Each test run independently with fresh solution

Seminars

- **The following is a list of seminar topics available through VNE Corp.**
- **Real World Challenges** – In depth look at common problems in process applications and ways to control "man-made" problems. *30 – 45 Minutes*
- **Basic Corrosion** – In depth look at different forms of corrosion and ways to control corrosion through proper handling, welding, and installation. *1.5 hours*
- **Material Selection** – A look at materials of construction and the seven steps in picking the right alloy for construction. *1 hour*
- **Introduction to Corrosion Resistant Alloys:** A look at high nickel & 6% Moly alloys and their use for controlling corrosion in sanitary applications along with cost comparisons of materials and installation. *1 hour*
- **The Role of Alloying Elements** – Looks at the different alloying elements and purposes of use in the steel making process. *30-45 min*
- **Passivation**- What is it, how is it done, and why do it? *30 min*
- **Rouging**- An in-depth study of the three different forms of rouge and how to control it. *30-45 min*
- **Surface Finish for Stainless Steel Alloys**- Presentation of a study on surface finish showing what's available and what does it really mean. *30-45 min*
- **Annealing of Stainless Steel**- This presentation looks at the different annealing processes and benefits of annealing and its relation on corrosion resistance. *30 min*

Some presentations cover similar information. By combining topics, a full seminar excluding breaks / lunch would run about 5-6 hours. If you would like to schedule a seminar at your location, please contact your **Regional Sales Manager** to discuss your topics of interest and to determine a time and date. Seminars can be offered through ***WEBEX*** in lieu of on-site.

Questions

Questions or Comments?

Please Contact your Regional Sales Manager or

Ken Kimbrel

E-mail: kkimbrel@vnecorp.com

Ph: 417-827-2526