

MATERIALS BULLETIN

NEW LEAN DUPLEX STAINLESS SHAFT FROM NORTH AMERICAN STEEL GAINS “USDA APPROVAL” FOR USE IN DAIRY APPLICATIONS

USDA Certification - 3A Format For Sanitary/Practice Standards

National Sanitation Foundation – Approved For Drinking Water Applications According To ANSI/NSF 61

Sheffield™ Micro-Duplex “MDSS” (Lean Duplex) is a valuable UPGRADE for the most common stainless grades currently found in many of the food processing and packaging industries. (Replaces 304, 316, 410 and 416)

With this one new grade, you will be able to limit duplication in inventory, and completely do away with scrap and bar end-cuts. You will receive a more corrosion resistant product: a product that will machine and weld better, and a product that will give you nearly twice the strength of type 304 and type 316L stainless.

- The economical solution – eliminate scrap - North American Steel will cut shafts to your length, in most cases with no additional charges.
- **Sheffield™ Micro-Duplex “MDSS” (Lean Duplex)** may be purchased as a TG&P Precision (Bearing-Fit) finished shaft to save you time and money.
- **Sheffield™ Micro-Duplex “MDSS” (Lean Duplex)** is also available in a Fine-Turned “Oversize” finish; less expensive than the precision bearing-fit material. You will experience up to 80% less stock removal and cut your machine time in half. Note: Semi-Finished Oversize will finish to the size; 1-1/2” diameter will finish to 1-1/2” TG&P.

Advantages – Lean Duplex Stainless

- Corrosion Fatigue Resistance
- Up To 3 Times The Strength Of Type 316L
- Improved Machinability
- High Energy Absorption
- Low Thermal Expansion
- Stress Corrosion Cracking (SCC)* Resistance
- Pitting Resistance
- Crevice Corrosion Cracking Resistance
- Intercrystalline Corrosion Resistance
- Erosion/Corrosion Resistance

Stock Sizes

3/4”	7/8”	15/16”	1”	1-1/8”
1-3/16”	1-1/4”	1-5/16”	1-3/8”	1-7/16”
1-1/2”	1-5/8”	1-3/4”	1-15/16”	2”
2-3/16”	2-1/4”	2-7/16”	2-1/2”	2-3/4”
2-15/16”	3”	3-7/16”	3-1/2”	3-15/16”
4”	4-7/16”	4-1/2”	4-15/16”	5”

Metric Sizes

20 MM	25 MM	30 MM	40 MM	50 MM
60 MM	70 MM	80 MM	90 MM	

Diameter Tolerances

Bearing Fit – TG&P Only..... (-.0005”/-.0015”)

At time of order, please specify which finish you need: TG&P, Bearing-Fit Tolerance Stock or Semi-Finished Oversize Stock.

Phone: 800-321-9310 Fax: 800-441-5052 Web: www.northamerican-steel.com

Sheffield™ Micro-Duplex “MDSS” Critical Data

Typical Chemistry – Lean Duplex S.S.

Cr	Ni	Mn	Mo	N
22.0	2.0	5.0	.6 max	.30
C	Si	Cu	Ph	S
.04 max	1.0	.1/.8	.04	.03

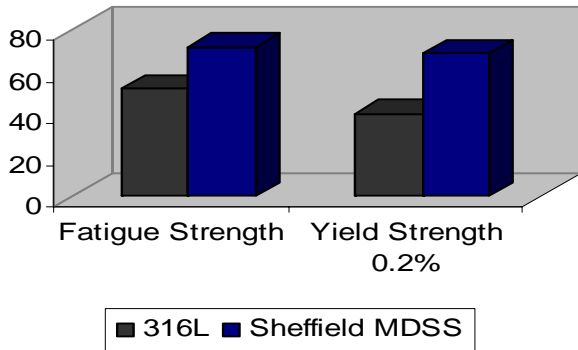
Meets the following standards:
 UNS S32101, ASTM A276 and A479, ASME SA479
 and ASME VIII Section II Code Case 2418

Mechanical Properties

Brinell Hardness 290 BHN max.
 Tensile Strength 94,000 P.S.I. min.
 Yield Strength 65,000 P.S.I. min.
 Elongation in 2” 30%

Fatigue Failure Resistances Chart

Sheffield™ Micro-Duplex “MDSS” (Lean Duplex) has been evaluated (pulsating tensile fatigue) at 2 million cycles with a probability rupture listed at 50%.



U-Bend Testing

{in a 40% CaCl₂ boiling solution (100°C) for 500 hours}

	Longitudinal / Transverse
Sheffield Micro-Duplex “MDSS” (Lean Duplex)	No SCC (after 500 hours)
304L Commercial Grade Stainless	SCC Cracking (< 150 hrs)

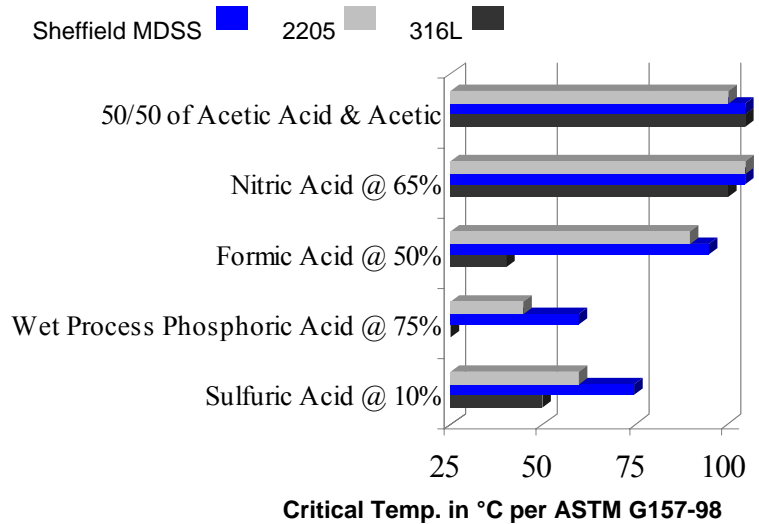
Stress Corrosion Cracking (SCC)

The duplex grain structure of Sheffield Micro-Duplex “MDSS” (Lean Duplex), with its continuous Ferritic phase means this product is much less sensitive to stress corrosion cracking (SCC). Austenitic stainless grades, such as 304 and 316 are more susceptible to SCC.

Where sulfide stress cracking and stress corrosion cracking resistance in sour oilfield environments are required, Sheffield Micro-Duplex “MDSS” (Lean Duplex) would be an excellent consideration.

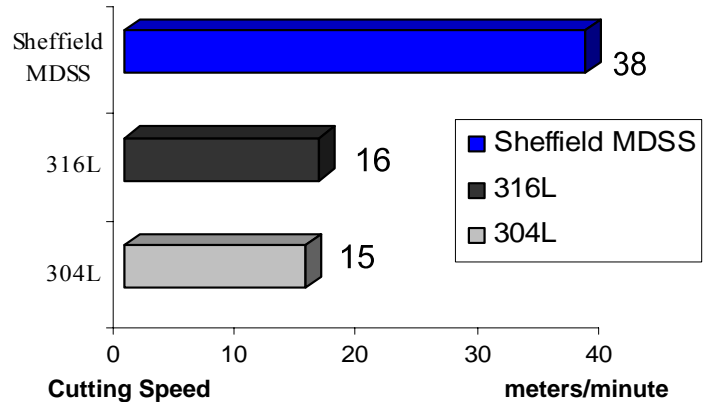
General Corrosion Resistance

Higher Critical Temperature shows equal or superior general corrosion resistance when Sheffield™ Micro-Duplex “MDSS” (Lean Duplex) is compared to other common stainless steels.



Machinability Data – Lean Duplex

Drilling with Standard Method
 V1000 for HSS Tools



Relative Machinability

