

COPY

C101110



# Certificate of Test

## E131709\_9.0

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HEAT E131709

ORDER 649363/ 05 BOL 0226629 \* CERTIFICATION \* 03/17/14

SHIP TO:  
ASA ALLOYS EDMONTON  
20 CHALLENGER CRESCENT  
SHERWOOD PARK  
ALBERTA T8H 2R1 000000000

----- YOUR ORDER & DATE -----  
P032661 3/17/14 CUST# 1550000 CUST TAG#

----- ITEM DESCRIPTION -----  
**GRADE 316L** Ship Condition CONDA  
Size 316L RND HRART CONDA 9.0000 x 144.000 RL  
Country of Melt: UNITED KINGDOM Country of Mfg.: UNITED KINGDOM  
NAFTA Country of Origin is Country of Melt

No weld repair  
Free of mercury contamination, Free of radiation contamination  
No WEEE relevant substances; Meets EU electrical ROHS

Total Bundles 1 Total Weight 5550 Approx. Hot Red. Ratio 4:1

WO 2046881 Bundles: 1D

----- SPECIFICATIONS -----  
AMS 5648L, 5653H SAE AMS-QQ-S-763C  
ASME SA182 2007-2013 Ed ASME SA193 B8M CL1, 2013 Ed.  
ASME SA479 2007-2013 Ed. ASME SA320 B8M CL1, 2013 Ed.  
ASTM A182 13a ASTM A193 12b B8M Class 1D  
ASTM A262 98 Practice E ASTM A276 13a  
ASTM A479/A479M 13b ASTM A320 11 B8M Class 1  
ASTM A 182-82-97C DIN 50049/EN 10204 Type 3.1  
Federal Spec QQ-S-763F Federal Spec QQ-S-763E AM 1  
Prodec Quality NACE MR0175-09, ISO 15156:09

----- MECHANICAL & OTHER TESTS -----  
Hardness as shipped (140 HB )  
Hardness as shipped 76 HRB  
Grain size 4.5 Tensile strength, KSI (MPa) 81.0 ( 558)  
Micro OK 0.2% Yield Strngth, KSI(MPa) 32.9 ( 227)  
Intergranular corrosion OK  
Elongation % in 4D 60.6  
Reduction of area % 76.0

----- CHEMICAL COMPOSITION -----  
Carbon (C) .019 Manganese (Mn) 1.610  
Phosphorus (P) .033 Sulphur (S) .027  
Silicon (Si) .380 Chromium (Cr) 16.690 ✓  
Nickel (Ni) 10.100 ✓ Cobalt (Co) .171  
Copper (Cu) .370 Moly (Mo) 2.040 ✓  
Nitrogen (N) .072 Columbium (Cb) .004  
Titanium (Ti) .002 Aluminum (Al) .006  
Tin (Sn) .010 Tantalum (Ta) .001  
Vanadium (V) .040 Tungsten (W) .037  
Columbium/  
Tantalum (Cb+Ta) .005  
Iron (Fe) Balance  
Melt Practice EAF  
Refining Practice AOD  
De-long Ferrite 1.7

*OK*  
*4/30/14*

Knowingly & willfully falsifying or concealing a material act on this form, or making false, fictitious or fraudulent statements or representations herein could constitute a felony punishable under federal statutes. We hereby certify that the test results shown in this report are correct and accurate as contained in the records of the company and are in compliance with the specifications, codes, and standards listed above.

M.F. Marcanio, Quality Manager

Outokumpu Stainless Bar, LLC  
3043 Crenshaw Pkwy.  
Rohburg, SC 29729

*M.F. Marcanio*