



# Certificate of Test

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HEAT E141071 ORDER 654965/ 01 BOL 0229499 \* CERTIFICATION \* 10/14/14

SHIP TO:  
COPPER & BRASS SALES  
TMX DIVISION  
13338 ORDEN DRIVE  
SANTA FE SPRINGS 906700000

----- YOUR ORDER & DATE -----  
5400237709 10/07/14 CUST# 0316001 CUST TAG#SSRD00696

----- ITEM DESCRIPTION -----  
GRADE 316L/316 Ship Condition CONDA  
Size 316L RND HRART CONDA 5.0000 x 144.000 RL  
Country of Melt: UNITED KINGDOM Country of Mfg.: SWEDEN  
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 2 Total Weight 3475 Approx. Hot Red. Ratio 8:1

WO 2052635 Bundles: 1C, 1D

AMS 5648L, 5653H  
ASME SA479 2007-2013 Ed.  
ASTM A262 13 Practice A/E  
ASTM A479/A479M 14  
ASTM E112 96  
ASTM A193 12b B8M  
DFARS 252.225.7009 10/4/11  
Copper & Brass 316L MAXX

----- SPECIFICATIONS -----  
SAE AMS-QQ-S-763C  
ASTM A182 13a  
ASTM A276 13a  
ASTM A484 14  
ASTM A320 11 B8M Class 1  
DIN 50049/EN 10204 Type 3.1  
Federal Spec QQ-S-763F  
NACE MR0175-09, mid-rad hard

----- MECHANICAL & OTHER TESTS -----  
Hardness as shipped (150 HB )  
Hardness as shipped 79 HRB  
Grain size 5.0  
Micro OK  
Intergranular corrosion OK  
Tensile strength, KSI (MPa) 85.7 ( 591)  
0.2% Yield Strngth, KSI (MPa) 40.6 ( 280)  
Elongation % in 4D 55.0  
Reduction of area % 76.0

----- CHEMICAL COMPOSITION -----  
Carbon (C) .017 Manganese (Mn) 1.740  
Phosphorus (P) .027 Sulphur (S) .024  
Silicon (Si) .340 Chromium (Cr) 17.410  
Nickel (Ni) 10.270 Cobalt (Co) .315  
Copper (Cu) .440 Moly (Mo) 2.030  
Nitrogen (N) .082 Columbium (Cb) .010  
Titanium (Ti) .002 Aluminum (Al) .005  
Tin (Sn) .007 Tantalum (Ta) .005  
Vanadium (V) .050 Tungsten (W) .120  
Columbium/  
Tantalum (Cb+Ta) .015  
Iron (Fe) Balance  
Melt Practice EAF  
Refining Practice AOD  
De-long Ferrite 2.4

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  
Richburg, SC 29729

From: ThyssenKrupp Materials NA  
Cust. COPPER & BRASS SALES CANADA Del.: 2404168603  
CstAr CstOr 5400280028  
Wgt.: 870 LB Date 10/23/2015

From: TK Materials CA, Ltd.  
Cust. ATLANTIS INDUSTRIES Del.: 2404314114  
CstAr CstOr Bozo  
Wgt.: 169.650 LB Date 01/19/2016