



# Certificate of Test

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HEAT E140065 ORDER 653095/ 06 BOL 0230039 \* CERTIFICATION \* 11/19/14

SHIP TO:  
COPPER & BRASS  
VANCOUVER  
19044 95A AVENUE SURREY  
VANCOUVER BC V4N 4 000000000

----- YOUR ORDER & DATE -----  
5400230383 7/24/14 CUST# 0316001 CUST TAG#SSRD00147

----- ITEM DESCRIPTION -----  
GRADE 316L/316 Ship Condition CONDA  
Size 316L RND HRART CONDA 8.5000 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 4640 Approx. Hot Red. Ratio 5:1

WO 2048421 Bundles: 1F

----- SPECIFICATIONS -----  
AMS 5648L, 5653H SAE AMS-QQ-S-763C  
ASME SA479 2007-2013 Ed. ASTM A182 13a  
ASTM A262 13 Practice A/E ASTM A276 13a  
ASTM A479/A479M 14 ASTM A484 14  
ASTM E112 96 ASTM A320 11 B8M Class 1  
ASTM A193 12b B8M DIN 50049/EN 10204 Type 3.1  
DFARS 252.225.7009 10/4/11 Federal Spec QQ-S-763F  
Copper & Brass 316L MAXX NACE MR0175-09, mid-rad hard

----- MECHANICAL & OTHER TESTS -----  
Hardness as shipped (151 HB )  
Hardness as shipped 79 HRB  
Grain size 5.5 Tensile strength, KSI (MPa) 84.0 ( 579)  
Micro OK 0.2% Yield Strngth, KSI (MPa) 38.3 ( 264)  
Intergranular corrosion OK  
Elongation % in 4D 56.6  
Reduction of area % 73.0

----- CHEMICAL COMPOSITION -----  
Carbon (C ) .017 Manganese (Mn) 1.660  
Phosphorus (P ) .033 Sulphur (S ) .026  
Silicon (Si) .470 Chromium (Cr) 16.720  
Nickel (Ni) 10.100 Cobalt (Co) .231  
Copper (Cu) .330 Moly (Mo) 2.040  
Nitrogen (N ) .073 Columbium (Cb) .008  
Titanium (Ti) .003 Aluminum (Al) .005  
Tin (Sn) .007 Tantalum (Ta) .001  
Vanadium (V ) .050 Tungsten (W ) .050  
Columbium/  
Tantalum (Cb+Ta) .009  
Iron (Fe) Balance  
Melt Practice EAF  
Refining Practice AOD  
De-long Ferrite 2.2

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

Autokumpu Stainless Bar, LLC  
3043 Crenshaw Pkwy  
Richburg, SC 29729

From: TK Materials CA, Ltd.

Cust. M2M MACHINING

Del.: 2405024980

CstAr

CstOr 2016-710

Wgt.: 980 LB

Date 02/03/2017