



Certificate of Test E112181

HEAT E112181 ORDER 634279/ 04 BOL 0219415 * CERTIFICATION * 10/10/12

SHIP TO:
COPPER AND BRASS SALES
8001 THYSSENKRUPP PARKWAY

NORTHWOOD 436190000

----- YOUR ORDER & DATE -----
5400157253 10/10/12 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 5020

WO 2027141 Bundles: 1F

----- SPECIFICATIONS -----
AMS 5648L, 5653G SAE AMS-QQ-S-763B
ASME SA479 E07-E10 A11 ASTM A182 12
ASTM A262 10 Practice A/E ASTM A276 10
ASTM A479/A479M 11 ASTM A484 11
ASTM E112 96 ASTM A320 11 B8M Class 1
ASTM A193 11 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 (143 HB)
Hardness as shipped 76 HRB
Grain size 5.0 Tensile strength, KSI (MPa) 82.0 (565)
Micro OK 0.2% Yield Strngth, KSI (MPa) 36.8 (254)
Intergranular corrosion OK
Elongation % in 4D 57.0
Reduction of area % 77.0

----- CHEMICAL COMPOSITION -----
Carbon (C) .014 Manganese (Mn) 1.600
Phosphorus (P) .031 Sulphur (S) .025
Silicon (Si) .307 Chromium (Cr) 16.880
Nickel (Ni) 10.240 Cobalt (Co) .221
Copper (Cu) .454 Moly (Mo) 2.090
Nitrogen (N) .080 Columbium (Cb) .010
Titanium (Ti) .002 Aluminum (Al) .005
Tin (Sn) .008 Tantalum (Ta) .003
Vanadium (V) .060 Tungstem (W) .070
Columbium/
Tantalum (Cb+Ta) .013
Iron (Fe) Balance
Melt Practice EAF
Refining Practice AOD
De-long Ferrite

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

Copper & Brass Sales

Outokumpu Stainless Bar, Inc.
3043 Crenshaw Pkwy.
Richburg, SC 29729

Customer: M2M
Customer PO: 2012-260
Qty: 100 Weight: 1670
Ship/Deliv #: 2402234906
NP

M.F. Marcanio