



Certificate of Test

E112004

HEAT E112004 ORDER 633182/ 10 BOL 0219682 * CERTIFICATION * 10/30/12

SHIP TO:
COPPER AND BRASS SALES
8001 THYSSENKRUPP PARKWAY

NORTHWOOD 436190000

----- YOUR ORDER & DATE -----
5400148691 10/30/12 CUST# 0316001 CUST TAG#SSRD00244

----- ITEM DESCRIPTION -----
GRADE 316L/316 Ship Condition CONDA
Size 316L RND HRART CONDA 11.0000 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 3012

WO 2029549 Bundles: 1A

----- 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 (149 HB)
Hardness as shipped 79 HRB
Grain size 6.0 Tensile strength, KSI (MPa) 81.0 (558)
Micro OK 0.2% Yield Strngth, KSI (MPa) 41.9 (289)
Intergranular corrosion OK
Elongation % in 4D 63.5
Reduction of area % 76.0

----- CHEMICAL COMPOSITION -----
Carbon (C) .018 Manganese (Mn) 1.580
Phosphorus (P) .030 Sulphur (S) .023
Silicon (Si) .351 Chromium (Cr) 16.610
Nickel (Ni) 10.100 Cobalt (Co) .426
Copper (Cu) .409 Moly (Mo) 2.030
Nitrogen (N) .077 Columbium (Cb) .020
Titanium (Ti) .002 Aluminum (Al) .004
Tin (Sn) .007 Tantalum (Ta) .001
Vanadium (V) .060 Tungstem (W) .140
Columbium/
Tantalum (Cb+Ta) .021
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