



Certificate of Test

E111451

HEAT E111451 ORDER 626713/ 01 BOL 0214620 * CERTIFICATION * 11/07/11

SHIP TO:
COPPER AND BRASS SALES
8001 THYSSENKRUPP PARKWAY

NORTHWOOD 436190000

----- YOUR ORDER & DATE -----
5400122264 11/07/11 CUST# 0316001 CUST TAG#SSRD02054

----- ITEM DESCRIPTION -----
GRADE 316L/316 Ship Condition CONDA
Size 316L RND HRART CONDA 3.7500 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 3879

WO 2023446 Bundles: 1I, 1J

----- SPECIFICATIONS -----
AMS 5648L, 5653G SAE AMS-QQ-S-763B
ASME SA479 E07-E10 A11 ASTM A182 10a
ASTM A262 10 Practice A/F ASTM A276 10
ASTM A479 A479M 11 ASTM A484 11
ASTM E112 B6 ASTM A320 11 B8M Class 1
ASTM A193 11 B8M DIN 50049/EN 10204 3.1
DFARS 252.225.7014 6/05 Federal Spec QQ-S-763F
Copper & Brass 316L MAXX NACE MRC175-03, mid-rad hard
Process Annealed 1750F min EN 10204 Type 3.1 Document
NACE MRC175-03, ISO 15156:03

----- MECHANICAL & OTHER TESTS -----
Hardness as shipped (151 HB)
Hardness as shipped 79 HRB
Grain size 6.5
Micro OK
Intergranular corrosion OK
Hardness as tested
Tensile strength, KSI (MPa) 90.1 617
0.2% Yield Strength, KSI (MPa) 41.8 294
Elongation % in 4D 53.0
Reduction of area % 75.0

----- CHEMICAL COMPOSITION -----
Carbon (C) .018 Manganese (Mn) 1.570
Phosphorus (P) .027 Sulphur (S) .024
Silicon (Si) .386 Chromium (Cr) 17.150
Nickel (Ni) 10.060 Cobalt (Co) .297
Copper (Cu) .295 Moly (Mo) 2.310
Nitrogen (N) .086 Columbium (Cb) .009
Titanium (Ti) .007 Aluminum (Al) .005
Tin (Sn) .007 Boron (B) .003
Vanadium (V) .080
Columbium
Tantalum (Cb+Ta) .009
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. Marcano, Quality Manager