



Certificate of Test

PRODEC QUALITY

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HEAT E161370 ORDER 672976/ 01 BOL 0238775 * CERTIFICATION * 03/22/17

SHIP TO:
COPPER AND BRASS SALES
3001 THYSENKRUPP PARKWAY

NORTHWOOD 436190000

----- YOUR ORDER & DATE -----
5400342993 3/08/17 CUST# 0316001 CUST TAG#SSRD00244

----- ITEM DESCRIPTION -----
GRADE 316L/316 PRODEC QUALITY 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 4481 Approx. Hot Red. Ratio 6:1

WO 2072911 Bundles: 1DA

----- SPECIFICATIONS -----
AMS 5648M, 5653H SAE AMS-QQ-S-763D
ASME SA479 2007-2015 Ed. ASTM A182/A182M 16a
ASTM A262 15 Practice A/E ASTM A276-16a
ASTM A479/A479M 16a ASTM A484 16
ASTM E112 96 ASTM A320 15a B8M Class 1
ASTM A193 16 B8M DIN 50049/EN 10204 Type 3.1
DWARS 252.225.7009 10/4/11 Federal Spec QQ-S-763F
Copper & Brass 316L MAXX NACE MR0175-09, mid-rad hard
NACE MR0103-10 UNS S31600, AISI 316

----- MECHANICAL & OTHER TESTS -----
Hardness as shipped (192 HB)
Hardness as shipped 90 HRB
Grain size 6.5 Tensile strength, KSI (MPa) 89.6 (618)
Micro OK 0.2% Yield Strngth, KSI (MPa) 48.2 (332)
Intergranular corrosion OK
Elongation % in 4D 47.4
Reduction of area % 71.3

----- CHEMICAL COMPOSITION -----
Carbon (C) .012 Manganese (Mn) 1.710
Phosphorus (P) .037 Sulphur (S) .025
Silicon (Si) .340 Chromium (Cr) 16.650
Nickel (Ni) 10.150 Cobalt (Co) .301
Copper (Cu) .480 Moly (Mo) 2.050
Nitrogen (N) .080
Iron (Fe) Balance
Melt Practice EAF
Refining Practice AOD
De-long Ferrite .8

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
3001 Denshaw Pkwy
Reno, NV 89529

From: TK Materials CA, Ltd.

Cust. M2M MACHINING

Del.: 2405133131

CstAr

CstOr 2017-733

Wgt.: 914.490 LB

Date 04/03/2017