

OUTOKUMPU

Certificate of Test

15199 OD. HT # G8764



* CERTIFICATION *

HEAT G8764 ORDER 0470615/001 SON 10520F BOL 0130685 TAG 1571817 03/24/05

SHIP TO:
UNALLOY/I.W.R.C. (BRAMPTON)
7925 GOREWAY DRIVE

BRAMPTON ON L6T 5

15199-OD 3/24/05 YOUR ORDER & DATE
CUST# UNAIWR01 CUST TAG#

ITEM DESCRIPTION
GRADE 316L/316
Size 316L HRART RND BAR 10-3/4 STD Country of Melt: USA
Ship Condition A Country of Mfg.: USA
NAFTA Country of Origin is Country of Melt

Total Bundles 1 SON Weight 3640

SPECIFICATIONS

THE PRODUCTS LISTED ON THIS MILL TEST REPORT SATISFY PREFERENCE CRITERION B AS DEFINED IN ARTICLE 401 OF THE NORTH AMERICAN FREE TRADE AGREEMENT.
AMS 5648K, 5653F SAE-AMS QQ-S-763
ASME SA182 E01 A03 CHEMISTRY ASME SA193 E01 A02 (MCR)
ASME SA479 E01 ASME SA320 B8M CL1 E01
ASTM A182-04A CHEMISTRY ASTM A262 98 PRACTICE E
ASTM A276 04 ASTM A314 97
ASTM A479 04 ASTM A484 03A
ASTM E112 96 ASTM A320 03 B8M CLASS 1
ASTM A 193 04B B8M (MCR) DIN 50049/EN 10204 3.1B
MIL-S-7720A SOL ANNEAL @ 1900F MIN/WQ
TIME SUFF. TO SOLN CARBIDES NACE MR0175-03
FED STD QQ-S-763F UNS S31600/S31603, AISI316/316L
ESP/UNALLOY-IWRC MS-SS1 REV 3 SOLUTION ANNEALED CONDITION
FREE OF CONT. CARBIDE NETWORK NO WELD REPAIR
FREE OF MERCURY CONTAMINATION

HOWCO METALS MANAGEMENT CERTIFIED TRUE COPY	
HEAT No. G8764	SO No. 17162
P.O. No. DA & CO	
AUTH SIGNATORY	DATE
FOR HOWCO METALS MANAGEMENT PAGE 1 OF 1	

MECHANICAL & OTHER TESTS

Test Condition	A		
Hardness as shipped	178 HBW	Hardness as tested	178 HBW
Hardness as shipped	(87 HRBS)	Hardness as tested	(87 HRBS)
Grain size	4.0	Tensile strength, KSI (MPa)	80.8 (557)
Micro	OK	0.2% Yield Strngth, KSI (MPa)	39.3 (271)
Intergranular corrosion	OK	Elongation % in 4D	61.5
Macro	OK	Reduction of area %	76.7

CHEMICAL COMPOSITION

Carbon (C)	.023	Manganese (Mn)	1.460
Phosphorus (P)	.021	Sulphur (S)	.026
Silicon (Si)	.420	Chromium (Cr)	16.580
Nickel (Ni)	10.260	Cobalt (Co)	.080
Copper (Cu)	.340	Moly (Mo)	2.080
Nitrogen (N)	.066	Columbium (Cb)	.030
Boron (B)	.002	Vanadium (V)	.090
Columbium/ Tantalum (Cb+Ta)	.030		
Iron (Fe)	Balance		
Melt Practice	EAF		
Refining Practice	AOD		
De-long Ferrite	.0		



This report is a copy of original mill certificate and verifies that the product meets the requirements as originally ordered by Unalloy/IWRC. DATE: 03/24/05 VERIFIED BY: [Signature]

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.

Outokumpu
3043 Crenshaw Pkwy.
Richburg, SC 29729

M.F. Marcanio, Quality Manager

[Signature]