


HT# 61450

C 200 977

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 Via Industriale, 1 - 25021 BAGNOLO MELLA (BS) ITALY

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CERTIFICATE OF QUALITY AND MATERIAL TESTING

INSPECTION CERTIFICATE N. **AC/ 3545** DATE: **16/11/17**
 according to EN 10204.3.1

FIRM: **ESP SPECIALTY STEEL PRODUCTS - HOUSTON (TX)**
 ORDER: **P04992** ORDER CONFIRMATION: **205747**

HEAT	N. of PCS	MATERIAL DESCRIPTION	MATERIAL GRADE
61450	1	FORGED ROUND PEELED BAR Ø19" Lbs 16521,455 x 16,502 feet	316/316L UNS S31600 /S31603 SS1 Rev.5 ASTM A276-17 ASTM A479-17 ASTM A484-15 ASME Code Sec.II Part. A SA479-15 AMS 6653H AMS QQS 763D Cond.A AMS 6648M AMS S-7720 316 NACE MR 0103-15 NACE MR 0175/ISO 15156-2015

H.T. CONDITION: Solution annealed 1050°C (9h) + water quenched

HEAT ANALYSIS

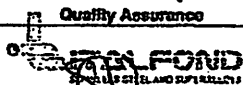
C	Mn	Si	P	S	Cr	Ni	Mo	Cu	Sn
0,016	1,77	0,20	0,025	0,0216	17,19	10,53	2,25	0,243	0,0065
Ca	Al	V	Ti	W	Ta	As	Co	Nb	Pb
0,0077	0,006	0,050	0,006	0,030	0,0066	-0,005	0,072	0,036	0,0021
B	N	Zr	Sb	Fe	PRE	Ferrite (%) ASTM E562	Grain size ASTM E112		
0,0001	0,072						5		

TEST RESULTS ON ACTUAL BAR PROLUNGATION

Temp. [°C]	Direction	R _{p0.2} [KSI]	R _m [KSI]	A [%]	Z [%]	KV (10 x 10 mm) [J]	Hardness
RT	L	38	81	55,9	61,1		HBw 163 HRC 2

Steelmaking process E.A.F. + A.O.D. refining
 No welding performed on material
 Material free from Mercury contamination
 Material inspected with a gamma spectrometer and with no radioactive contamination beyond the limits provided for by the EU-Radiation Protection 122- part 1, when relevant
 Mechanical tests performed according to ASTM A370-17 (Ø12,5mm-50mm length) + ASTM E10-17 + ASTM E18-17
 Corrosion test according to ASTM A262 Pr.E satisfactory performed
 Chemical analysis and mechanical properties according to ASTM A182-17-ASME SA182-15 (F316-F316L) - ASTM A183-16-ASME SA183-15 (Grade B8M Class 1)
 Country of melt and country of manufacture: Italy
 Italfond is in compliance with DFARS regulation 252.225-7017
 Forging ratio 3,4:1
 PMI performed

Jan 19/18

SURVEYORS	CUSTOMER INSPECTION	ITALFOND S.p.A. Quality Assurance
		 GARANZIA QUALITÀ

P200999
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CERTIFICATE OF QUALITY AND MATERIAL TESTING
MICROGRAPHIC EXAMINATION

INSPECTION CERTIFICATE N. **ME/ 3545** DATE : **16/11/17**
according to EN 10204.3.1

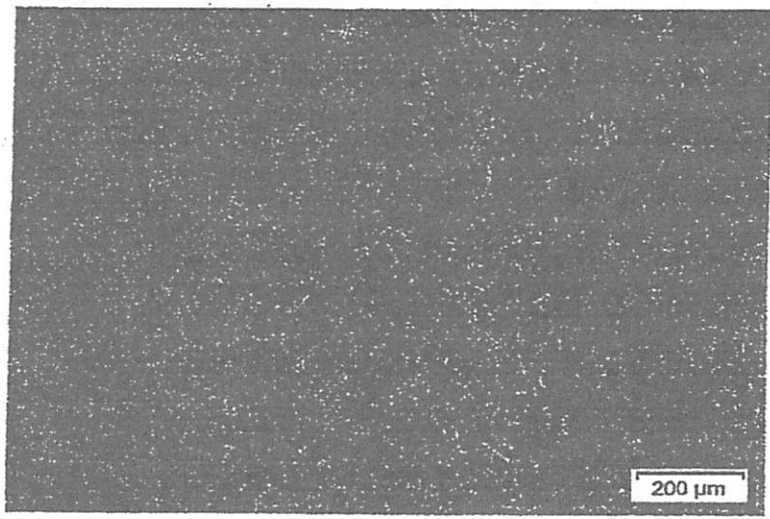
FIRM : **ESP SPECIALTY STEEL PRODUCTS - HOUSTON (TX)**
ORDER : **P04992** ORDER CONFIRMATION: **205747**

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H.T.-CONDITION : Solution annealed 1050°C (9h) + water quenched

MICROGRAPHIC EXAMINATION - MID RADIUS

Magnification: 100 x
Etching: electrolytic, Oxalic Acid 3v 90s according to ASTM E407



RESULT: Omogeneous structure free from detrimental phases and precipitates

SURVEYORS	CUSTOMER INSPECTION	ITALFOND S.p.A. Quality Assurance

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CERTIFICATE OF QUALITY AND MATERIAL TESTING
MACROGRAPHIC EXAMINATION

INSPECTION CERTIFICATE N. **ME2/ 3545** DATE: **16/11/17**
 according to EN 10204.3.1

FIRM: **ESP SPECIALTY STEEL PRODUCTS - HOUSTON (TX)**

ORDER: **P04992** ORDER CONFIRMATION: **205747**

HEAT	N. of PCS	MATERIAL DESCRIPTION	MATERIAL GRADE
61450	1	FORGED ROUND PEELED BAR Ø19" Lbs 16521,455 x 16,502 feet This report is a copy of original mill certificate and verifies that the product meets the requirements as originally ordered by Energy Steel Products. DATE: <u>1/5/18</u> VERIFIED BY: <u>ESJ</u>	316/316L UNS S31600 /S31603 SS1 Rev.5 ASTM A276-17 ASTM A479-17 ASTM A484-15 ASME Code Sec.II Part. A SA479-15 AMS 5653H AMS QQS 763D Cond.A AMS 5648M AMS S-7720 316 NACE MR 0103-15 NACE MR 0175/ISO 15156-2015

H.T. CONDITION : Solution annealed 1050°C (9h) + water quenched

MACROGRAPHIC EXAMINATION

Etching: 50% H₂O + 50% Hcl



SURVEYORS	CUSTOMER INSPECTION	ITALFOND S.p.A. Quality Assurance