

Inspection certificate Certificate of Conformance

0002119725



acc. to DIN EN 10204-3.1

Customer:

ALLEIMA TUBE AB

Your Order information	Heat	MO - No.	CO - No.
20.12.2023 800841 Kathrin Stross	561654	0002119725	0010081605

Nominal Dimension & Tolerances				
OD	+ 0.080 mm	3.180 mm	- 0.000 mm	
	+ 0.003 inch	0.125 inch	- 0.000 inch	
ID	+ 0.000 mm	1.760 mm	- 0.080 mm	
	+ 0.000 inch	0.069 inch	- 0.003 inch	
WT	+ 10.00 %	0.710 mm	- 10.00 %	
		0.028 inch		

Single length	6000 mm	+ 5.00 mm	- 0.00 mm
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Material Requirements	TP316/316L TCC acc. to ASTM A632-19 S3 , S - 08923 – v.1.0
Finish	bright annealed

Marking	ALLEIMA 3R60 ASTM A-632 TP 316/316L WNR 1.4435 EN 10216-5 TC1 CFA EN 1.4435 COLD SMLS 3.18 MM OD x 0.71 MM WT 1/8"x0.028" BWG HT 561654 LOT 0002119725 *QA-TUBE* Made by Alleima Germany
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Quantity	PCS	M / FT	KG / LBS
	598	3588.000 11771.654	161.000 354.941

Chemical composition

Heat No. 561654																
	C	Si	Mn	P	S	N	Cr	Cu	Mo	Nb	Ni	Ti	Pren-value			
Heat	0.019	0.37	1.56	0.031	0.010	0.044	17.38		2.62		13.10	<0.003	26.68 %			
Product	0.021	0.38	1.56	0.032	0.005	0.037	17.41		2.63		13.09					
	Ta	Nb+Ta	W	Co	V	Al	O	Fe	B	Ca	Mg	Pb	Ce	As	Sb	Sn
Heat																
Product																
Inclusion content	A: th h		B: th h		C: th h		D: th h		EB th h		ED th h					

Mechanical tests

	0,2% - Yield Strength MPa / KSI		1% - Yield Strength MPa / KSI		Tensile Strength MPa / KSI		Elongation %		Elongation at max. force		Reduct of Area	Hardness	
	min. 190 MPa		min. 225 MPa		490 - 690 MPa		A% min. 40 / A2"% min. 35		Ag %		Z%	HRB max. 90	
1	266	38.580	291	42.206	568	82.381	60.0	50.4				74	
2	267	38.725	292	42.351	569	82.527	59.0	48.9				73	
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Tensile test at elevated / low temperature

	temperature °C	0.2% - Yield Strength		1% - Yield Strength		Tensile Strength		Elongation %
		MPa	/ KSI	MPa	/ KSI	MPa	/ KSI	
1								
2								
1								
2								
1								
2								
1								
2								

Impact test

	temperature °C	Impact energy KV/		Average J	Lateral expansion		Average mm
		J			mm		
1							
2							
3							
4							
5							
6							

Surface roughness

	Roughness outside OD Ra max. 2 µm					Roughness inside ID Ra max. 4,5 µm				
	axial		radial			axial		radial		
	min	max	min		max	min	max	min		max
µm										
Ra	0.37	0.48				2.64	4.03			
Rq	0.48	0.62				3.24	5.00			
Rz	2.44	3.32				13.19	20.30			
Rt	2.72	5.31				16.50	32.27			
Rmax	2.64	5.31				14.91	28.48			
%										
tpa										
µin										
RMS	18.90	24.41				127.56	196.85			
CLA	14.57	18.90				103.94	158.66			

Corrosion tests

ASTM G48
Weight loss
Visual test 20X magnification
ASTM G28
Corrosion rate

Grain size

Requirement	Result
ASTM E112-13, aim for 5 or finer	5

Surface imperfections

Test position	Requirement	Result
ID		
OD		

Following tests were performed satisfactory:

	Tests		Requirements
1	yield strength Rp 0,2	Dehngrenze Rp 0,2	min. 190 MPa
2	yield strength Rp 1,0	Dehngrenze Rp 1,0	min. 225 MPa
3	tensile strength Rm	Zugfestigkeit Rm	490 - 690 MPa
4	elongation	Dehnung	A% min. 40 / A2"% min. 35
5	tensile test standard	Zugversuch Prüfnorm	ASTM A370-23 / ASTM E8/E8M-22
6	hardness	Härte	HRB max. 90
7	hardness standard	Härte Prüfnorm	ASTM E18-22
8	flaring test	Aufweit	ASTM A-632-19
9	flattening test	Ringfalt	EN ISO 8492:2013
10	roughness OD	Rauhtiefe AD	Ra max. 2 µm
11	roughness ID	Rauhtiefe ID	Ra max. 4,5 µm
12	corrosion test	Korrosionsprüfung ASTM A262	Practice E
13	corrosion test	Korrosionsprüfung DIN EN ISO	3651-2A
14	grain size	Korngröße	ASTM E112-13, aim for 5 or finer
15	eddy current test	Wirbelstromprüfung	ASTM A1016/A1016M-23 §24.8.2.1 / ASTM E426-16
16	procedure: eddy current test	Arbeitsanweisung: WS-Prüfung	QW 10-0101 Eddy Current Testing
17	Thermocouple cleaned	Thermocouple cleaned	acc. to ASTM A632-19 S3
18	inspection certificate	Zeugnis Art	3.1
19	Source of raw material	Ursprung	Alleima AB Sweden
20	Dimension and visual inspection	Maß- und Sichtprüfung	Without complaint
21	Melting process	Erschmelzungsart	The steel/material is AOD refined
22	Production	Produktion	Tubes are made in Germany
23	Alloy verification	Materialverwechslungsprüfung	100 % PMI
24	Heat treatment	Wärmebehandlung	in vacuum
25	Weld repairs	Schweißreparaturen	have not been performed
26	Radioactivity	Radioaktivität	Tubes have no radioactive contamination
27	Mercury	Quecksilber	has not come in contact with mercury
28	Contact	Kontakt	has not come in c. with low melting point elements
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The delivered products comply with the requirements of the order.

2024-01-19

Jonas Gührs

Quality assurance inspector

This certificate is produced electronically and is valid without signature.