

**Inspection certificate**  
**Certificate of Conformance**

0002058742



acc. to DIN EN 10204-3.1

**Customer:**

ALLEIMA BENELUX B.V.

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Your Order information	Heat	MO - No.	CO - No.
17.03.2022 800725 12 Kathrin Stross	567445	0002058742	0010038989

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Nominal Dimension & Tolerances					Results dimensional test	
					min.	max.
<b>OD</b>	+ 0.080 mm + 0.003 inch	25.400 mm 1.000 inch	- 0.080 mm - 0.003 inch		25.41	25.43
<b>ID</b>		22.920 mm 0.902 inch				
<b>WT</b>	+ 10.00 %	1.240 mm 0.049 inch	- 10.00 %		1.13	1.28

<b>Single length</b>	6000,00 mm	+ 5.00 mm	- 0.00 mm
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<b>Material Requirements</b>	1.4435/TP316/316L 7-2-1261 Rev. 25, ASTM A213/A213M-23, ASTM A269/A269M-22, DIN EN 10216-5:2021-06, ASME SA-213/SA-213M (21)
<b>Finish</b>	CFA, bright annealed

<b>Marking</b>	ALLEIMA 3R60 ASTM/ASME A/SA-213AW A-269 COLD SML EN 10216-5 TC1 CFA TP 316/316L EN 1.4435 NDE 25.40 MM OD x 1.24 MM WT 1" x .049" BWG/SWG HT 567445 LOT 0002058742 Made by Alleima in Germany *QA TUBE*
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Quantity	PCS	M / FT	KG / LBS
	86	516.000	1692.913    387.000    853.180

Chemical composition

Heat No. 567445																
	C	Si	Mn	P	S	N	Cr	Cu	Mo	Nb	Ni	Ti	Pren-value			
Heat	0.021	0.39	1.68	0.031	0.008	0.037	17.09		2.62		13.06					26.37 %
Product	0.023	0.41	1.68	0.032	0.009	0.036	17.15		2.62		13.00					
	Ta	Nb+Ta	W	Co	V	Al	O	Fe	B	Ca	Mg	Pb	Ce	As	Sb	Sn
Heat																
Product																
Inclusion content	A:		B:		C:		D:		EB		ED					
	th		th		th		th		th		th					
	h		h		h		h		h		h					

Mechanical tests

	0,2% - Yield Strength		1% - Yield Strength		Tensile Strength		Elongation %		Elongation at max. force	Reduct of Area	Hardness
	MPa / KSI	MPa / KSI	MPa / KSI	MPa / KSI	MPa / KSI	MPa / KSI	A5% min. 40, A2" % min. 35	Ag %	Z%	HRB max. 80 / HRC max. 22	
1	234	33.937	264	38.288	544	78.897	55.5	60,0			71/ <20
2	232	33.647	262	37.998	542	78.607	52.2	59,6			67/ <20
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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 J	Average J	Lateral expansion mm	Average mm
2					
3					
4					
5					
6					

**Surface roughness**

	Roughness outside OD Ra max. 1 µm				Roughness inside ID aim for Ra max. 1 µm			
	axial		radial		axial		radial	
	min	max	min	max	min	max	min	max
<b>µm</b>								
Ra	0.15	0.35			0.17	0.32		
Rq	0.22	0.51			0.25	0.50		
Rz	1.69	3.18			1.97	2.96		
Rt	1.91	6.31			2.77	7.79		
Rmax	1.87	6.16			2.43	7.79		
%								
tpa								
<b>µin</b>								
RMS	8.66	20.08			9.84	19.68		
CLA	5.91	13.78			6.69	12.60		

**Corrosion tests**

<b>ASTM G48</b>	
Weight loss	Visual test 20X magnification
<b>ASTM G28</b>	
Corrosion rate	

**Grain size**

Requirement	Result
ASTM E112-13, 5 or finer (5-14) / longitudinal direction	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. 220 MPa
2	yield strength Rp 1,0	Dehngrenze Rp 1,0 min. 250 MPa
3	tensile strength Rm	Zugfestigkeit Rm 515 - 690 MPa
4	elongation	Dehnung A5% min. 40, A2"% min. 35
5	tensile test standard	Zugversuch Prüfnorm ASTM A370-22 / ASTM E8/E8M-22
6	hardness	Härte HRB max. 80 / HRC max. 22
7	hardness standard	Härte Prüfnorm ASTM E18-22
8	flaring test	Aufweit ASTM A1016/A1016M-18a pt. 22
9	flattening test	Ringfalt ASTM A1016/A1016M-18a pt. 19/ EN ISO 8492:2013
10	roughness OD	Rauhtiefe AD Ra max. 1 µm
11	roughness ID	Rauhtiefe ID aim for Ra max. 1 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, 5 or finer (5-14) / longitudinal direction
15	structure	Gefüge no carburization/ no intergran. carbide precip.
16	intermetallic phases	Intermetallische Phasen free from intermetallic phases and precipitates
17	eddy current test	Wirbelstromprüfung ASTM A1016/A1016M-18a §25.8.2.1/ASTM E426-16/DIN EN ISO 10893-1:2020-10
18	procedure: eddy current test	Arbeitsanweisung: WS-Prüfung QW 10-0101 Eddy Current Testing
19	ovality	Ovalität max. 0,005" (max. 0,127 mm)
20	straightness	Geradheit max. 1,5 mm/m
21	inspection certificate	Zeugnis Art 3.1
22	Source of raw material	Ursprung Alleima AB Sweden
23	Dimension and visual inspection	Maß- und Sichtprüfung Without complaint
24	Melting process	Erschmelzungsart The steel/material is AOD refined
25	Production	Produktion Tubes are made in Germany
26	Alloy verification	Materialverwechslungsprüfung 100 % PMI
27	Heat treatment	Wärmebehandlung at 1120°C ~ 10 minutes
28	cooling medium	Abkühlmedium hydrogen atmosphere / heat exchanger / jet- fan
29	Weld repairs	Schweißreparaturen have not been performed
30	Radioactivity	Radioaktivität Tubes have no radioactive contamination
31	Mercury	Quecksilber has not come in contact with mercury
32	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.

2023-08-01

Jonas Gührs

Quality assurance inspector

This certificate is produced electronically and is valid without signature.