

<b>Type of inspection document :</b> Inspection certificate acc. to EN 10204 / 3.1	A02	<b>Internal order No.:</b> 50006828 - 10	A08
<b>Purchaser :</b> ALLEIMA BENELUX B.V.  AMUNDSENWEG 4 5928 LT Venlo THE NETHERLANDS	A06	<b>Purchase order No. :</b>  <b>Purchaser's reference :</b>  <b>Project Id. :</b> 3000123	A07
<b>Product :</b> Seamless cold finished tube	B01/B04	<b>Steel designation :</b> 3R60 / 3R60	B02
<b>Dimension (OD x WT) :</b> 25,00 x 2,00AW mm	B09/B10	<b>Melting process :</b> AOD	C70
<b>Technical requirements :</b> ASME SA-213/SA213M-2023 ASTM A213/A213M-2022 ASTM A269/A269M- 2015a(Reap-2019) EN 10216-5 TC1 2021 EN 10305-1 (Only Tolerances-Table 5) AD 2000 W2 Einbaurohre-2022 AD 2000 W10-2019 NACE MR0175-2021/ISO 15156-3:2020, NACE MR0103/ISO 17945-1:2015 Alleima Spec. S-08921 PED 2014/68/EU			B03
<b>Supplementary information :</b> Manufacturing of stainless steel tubes in grade 3R60 / TP316/316L / UNS S31603 / 1.4435 from steel origin: Alleima Tube AB, Sweden. The qualified pre-material supplier is mentioned in the section "Extent of material delivery". Tube length 6000 mm (-0/+5 mm)			B14
The products, covered by this certificate, comply with specification and requirements of the order.			Z01
<b>Originator of the document :</b> QA - AC	A05/Z02	<b>Inspector's stamp:</b>	Z03

**Chemical composition (Heat analysis)**

Heat	C [%]	Si [%]	Mn [%]	P [%]	S [%]
571178	max 0.030 0,019	max 1.000 0,380	max 2.000 1,670	max 0.040 0,031	max 0.015 0,010
Heat	Cr [%]	Ni [%]	Mo [%]	N [%]	Co [%]
571178	17.000-18.000 17,100	12.500-14.000 13,100	2.500-3.000 2,630	max 0.100 0,039	info 0,150

<b>Type of inspection document :</b> Inspection certificate acc. to EN 10204 / 3.1	A02	<b>Internal order No.:</b> 50006828 - 10	A08
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Heat	Ti [%] info
571178	<0,003

**Product check analysis**

Heat	Lot	C [%]	Si [%]	Mn [%]	P [%]	S [%]
		max 0.030	max 1.000	max 2.000	max 0.040	max 0.015
571178	2152977-11	0,018	0,390	1,690	0,032	0,007

Heat	Lot	Cr [%]	Ni [%]	Mo [%]	N [%]
		17.000-18.000	12.500-14.000	2.500-3.000	max 0.100
571178	2152977-11	17,270	13,280	2,600	0,041

**Extent of material delivery**

Heat	Lot	Hollow supp.	No. of HTcycles <sup>1)</sup>	Pieces	Total length [m]	Total weight [kg] <sup>2)</sup>
571178	2152977-11	ALLEIMA SE	1	335	2 010.000	2 305.470

Note : <sup>1)</sup> Number of heat treatment cycles performed on the tubes.

<sup>2)</sup> Weight quantity is theoretically calculated, it might differ compared to shipping documents.

Chomutov, date : 18.10.2024

Type of inspection document :

A02

Internal order No.:

A08

Inspection certificate acc. to EN 10204 / 3.1

50006828 - 10

### Flaring test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
571178	2152977-11	WnF	pass
571178	2152977-11	EnF	pass

ST (sample type): WnF-West end, tube did not not used for flattening test,Enf-East end, tube did not not used for flattening test;

### Flaring test in acc. with EN 10216-5

Heat	Lot	Test result [pass/fail]
		pass
571178	2152977-11	pass

### Flattening test in acc. with ASTM A 1016

Heat	Lot	ST	Test result [pass/fail]
			pass
571178	2152977-11	W	pass
571178	2152977-11	E	pass

ST (sample type): E-East end of tube; W-West end of tube;

### Hardness test (HRB/HRC) in acc. with E18/S-08921/NACE

Heat	Lot	Hardness [HRB]	Hardness $\leq$ 22HRC [yes/no]
		max 80,000	yes
571178	2152977-11	76,000	yes
571178	2152977-11	77,000	yes

### Intergranular corrosion testing in acc. with ASTM A262E

Heat	Lot	Test result [pass/fail]
		pass
571178	2152977-11	pass

### Intergranular corrosion testing in acc. with EN ISO 3651-2/A

Heat	Lot	Test result [pass/fail]
		pass
571178	2152977-11	pass

**Type of inspection document :**

A02

Inspection certificate acc. to EN 10204 / 3.1

**Internal order No.:**

A08

50006828 - 10

**Longitudinal tensile test in acc. with A370 / EN ISO 6892-1**

Heat	Lot	Rp0,2 [MPa]	Rm [MPa]	A2" [%]	Amb.temper. [°C]	A5 [%]
		min 220,000	515,000-690,000	min 35,000	10,000-35,000	min 40,000
571178	2152977-11	286,200	573,800	53,400	24,000	50,300
571178	2152977-11	277,600	563,600	55,200	24,000	51,000

Heat	Lot	Rp1,0 [MPa]
		min 250,000
571178	2152977-11	316,300
571178	2152977-11	305,400

**Microstructure evaluation and Grain size WI-3815/ASTM E112**

The structure is free from grain boundary chromium carbide precipitations.

Heat	Lot	G.B.Cr.Carbides [No/Yes]	Grain size [(G)]
		No	5,000-14,000
571178	2152977-11	No	6,000

**Dimensional check**

Test results comply with specified criteria.

**HT - Final heat treatment of straight tubes**

All tubes have been solution annealed followed by accelerated cooling.

Solution annealing temperature 1090°C, soaking time min. 2 minutes.

Quench medium - protective gas.

**Inside cleanliness check**

Test results comply with specified criteria.

**NDT - Eddy current flaw detection in acc. E426/EN ISO 10893-1**

Test results comply with specified criteria.

**NDT - Visual inspection**

Test results comply with specified criteria.

**PMI - 100% positive material identification**

Test results comply with specified criteria.

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**Statement**

The raw material is free from radioactive contamination.

**Statement**

Material free from mercury and asbestos contamination.

**Statement**

The material have been manufactured within the scope of certified Quality Management System maintained in accordance with EN ISO 9001:2015.

**Straightness check**

Test results comply with specified criteria.