

<b>Type of inspection document :</b> Inspection certificate acc. to EN 10204 / 3.1	A02	<b>Internal order No.:</b> 50005076 - 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> 3000027	A07
<b>Product :</b> Seamless cold finished tube	B01/B04	<b>Steel designation :</b> 3R60 / 3R60	B02
<b>Dimension (OD x WT) :</b> 28,00 x 1,50AW 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 [%]
570701	max 0.030 0,022	max 1.000 0,400	max 2.000 1,670	max 0.040 0,030	max 0.015 0,007
Heat	Cr [%]	Ni [%]	Mo [%]	N [%]	Co [%]
570701	17.000-18.000 17,170	12.500-14.000 13,160	2.500-3.000 2,650	max 0.100 0,038	info 0,120

<b>Type of inspection document :</b> Inspection certificate acc. to EN 10204 / 3.1	A02	<b>Internal order No.:</b> 50005076 - 10	A08
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Heat	Ti [%] info
570701	0,013

**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
570701	2149063-11	0,020	0,400	1,750	0,032	0,005

Heat	Lot	Cr [%]	Ni [%]	Mo [%]	N [%]
		17.000-18.000	12.500-14.000	2.500-3.000	max 0.100
570701	2149063-11	17,140	13,000	2,630	0,044

**Extent of material delivery**

Heat	Lot	Hollow supp.	No. of HTcycles <sup>1)</sup>	Pieces	Total length [m]	Total weight [kg] <sup>2)</sup>
570701	2149063-11	ALLEIMA SE	1	191	1 146.000	1 135.686

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 : 23.09.2024

**Type of inspection document :**

A02

Inspection certificate acc. to EN 10204 / 3.1

**Internal order No.:**

A08

50005076 - 10

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

Heat	Lot	ST	Test result [pass/fail]
			pass
570701	2149063-11	EnF	pass
570701	2149063-11	WnF	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
570701	2149063-11	pass

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

Heat	Lot	ST	Test result [pass/fail]
			pass
570701	2149063-11	E	pass
570701	2149063-11	W	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
570701	2149063-11	73,000	yes
570701	2149063-11	75,000	yes

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

Heat	Lot	Test result [pass/fail]
		pass
570701	2149063-11	pass

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

Heat	Lot	Test result [pass/fail]
		pass
570701	2149063-11	pass

Type of inspection document :

A02

Internal order No.:

A08

Inspection certificate acc. to EN 10204 / 3.1

50005076 - 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
570701	2149063-11	292,800	578,500	53,800	24,000	49,100
570701	2149063-11	268,700	574,900	53,600	24,000	50,000

Heat	Lot	Rp1,0 [MPa]
		min 250,000
570701	2149063-11	327,200
570701	2149063-11	307,000

### 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
570701	2149063-11	No	7,000

### 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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Inspection certificate acc. to EN 10204 / 3.1

A02

**Internal order No.:**

50005076 - 10

A08

**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.