

<b>Type of inspection document :</b> Inspection certificate acc. to EN 10204 / 3.1	A02	<b>Internal order No.:</b> 10050759 - 30	A08
<b>Purchaser :</b> ALLEIMA BENELUX B.V.  AMUNDSENWEG 4 5928 LT VENLO THE NETHERLANDS	A06	<b>Purchase order No. :</b> 800745  <b>Purchaser's reference :</b> 800745  <b>Project Id. :</b> 4003215	A07
<b>Product :</b> Seamless cold finished tube	B01/B04	<b>Steel designation :</b> 3R60 / 3R60	B02
<b>Dimension (OD x WT) :</b> 9,53 x 1,65AW mm	B09/B10	<b>Melting process :</b> AOD	C70
<b>Technical requirements :</b> ASME SA213/SA213M-2021 ASTM A213/A213M-2022 ASTM A269/A269M-2015a (Reap.2019) EN 10216-5 TC1 2021 EN 10305-1 (Only Tolerances-Table 5) PED 2014/68/EU Alleima SPEC S-08921 AD 2000 Merkblatt W2 2022 AD 2000 W10 - 2019			B03
<b>Supplementary information :</b> Manufacturing of stainless steel tubes in grade 3R60 / TP316L / 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 [%]
567404	max 0.030 0,019	max 1.000 0,420	max 2.000 1,640	max 0.040 0,031	max 0.015 0,007
Heat	Cr [%]	Ni [%]	Mo [%]	N [%]	
567404	17.000-18.000 17,300	12.500-14.000 13,230	2.500-3.000 2,630	max 0.100 0,040	

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**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
567404	2088215-11	0,018	0,400	1,650	0,027	0,006

Heat	Lot	Cr [%]	Ni [%]	Mo [%]	N [%]
		17.000-18.000	12.500-14.000	2.500-3.000	max 0.100
567404	2088215-11	17,330	13,280	2,580	0,037

**Extent of material delivery**

Heat	Lot	Hollow supp.	No. of HTcycles <sup>1)</sup>	Pieces	Total length [m]	Total weight [kg] <sup>2)</sup>
567404	2088210-11	ALLEIMA SE	1	592	3 552.000	1 150.848
567404	2088211-11	ALLEIMA SE	1	613	3 678.000	1 191.672
567404	2088212-11	ALLEIMA SE	1	610	3 660.000	1 185.840
567404	2088213-11	ALLEIMA SE	1	587	3 522.000	1 141.128
567404	2088215-11	ALLEIMA SE	1	565	3 390.000	1 098.360
567404	2088223-11	ALLEIMA SE	1	601	3 606.000	1 168.344

**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 :** 2.3.2023

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

Heat	Lot	ST	Test result [pass/fail]
			pass
567404	2088210-11		pass
567404	2088210-11		pass
567404	2088211-11		pass
567404	2088211-11		pass
567404	2088212-11		pass
567404	2088212-11		pass
567404	2088213-11		pass
567404	2088213-11		pass
567404	2088215-11		pass
567404	2088215-11		pass
567404	2088223-11		pass
567404	2088223-11		pass

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

Heat	Lot	ST	Test result [pass/fail]
			pass
567404	2088210-11		pass
567404	2088211-11		pass
567404	2088212-11		pass
567404	2088213-11		pass
567404	2088215-11		pass
567404	2088223-11		pass

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

Heat	Lot	ST	Test result [pass/fail]
			pass
567404	2088210-11		pass
567404	2088210-11		pass
567404	2088211-11		pass
567404	2088211-11		pass
567404	2088212-11		pass
567404	2088212-11		pass
567404	2088213-11		pass
567404	2088213-11		pass
567404	2088215-11		pass
567404	2088215-11		pass
567404	2088223-11		pass
567404	2088223-11		pass

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**Hardness test (HRB) in acc. with ASTM E18 / 7-2-1261**

Heat	Lot	ST	Hardness
			[HRB]
			max 80,000
567404	2088210-11		78,000
567404	2088210-11		79,000
567404	2088211-11		77,000
567404	2088211-11		77,000
567404	2088212-11		78,000
567404	2088212-11		78,000
567404	2088213-11		79,000
567404	2088213-11		79,000
567404	2088215-11		79,000
567404	2088215-11		79,000
567404	2088223-11		79,000
567404	2088223-11		79,000

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

Heat	Lot	ST	Test result
			[pass/fail]
			pass
567404	2088210-11		pass
567404	2088211-11		pass
567404	2088212-11		pass
567404	2088213-11		pass
567404	2088215-11		pass
567404	2088223-11		pass

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

Heat	Lot	ST	Test result
			[pass/fail]
			pass
567404	2088210-11		pass
567404	2088211-11		pass
567404	2088212-11		pass
567404	2088213-11		pass
567404	2088215-11		pass
567404	2088223-11		pass

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

Heat	Lot	ST	Rp0,2	Rm	A2"	A5	Rp1,0
			[MPa]	[MPa]	[%]	[%]	[MPa]
			min 220,000	515,000-690,000	min 35,000	min 40,000	min 250,000
567404	2088210-11		287,800	567,500	53,200	58,600	321,700
567404	2088211-11		293,500	558,400	55,800	62,900	325,500
567404	2088212-11		283,100	558,400	56,800	64,600	311,800
567404	2088213-11		287,800	558,200	54,400	62,900	318,000
567404	2088215-11		300,400	566,200	58,800	65,700	327,900
567404	2088223-11		302,400	562,600	59,000	62,600	337,600

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

The structure is free from grain boundary chromium carbide precipitations.

Heat	Lot	ST	G.B.Cr.Carbides	Grain size
			[No/Yes]	[(G)]
			No	5.000-14.000
567404	2088210-11		No	6,000
567404	2088211-11		No	6,000
567404	2088212-11		No	6,000
567404	2088213-11		No	7,000
567404	2088215-11		No	6,000
567404	2088223-11		No	6,000

### Dimensional check

Test results comply with specified criteria.

### HT - Final heat treatment of straight tubes

Bright annealing at 1150°C with min. 0,25 minute holding time.

Quenched by forced cooled inert gas.

### Inside cleanliness check

Test results comply with specified criteria.

### NDT - Eddy current flaw detection in acc. ASTM E426

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.

### 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.

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**Straightness check**

Test results comply with specified criteria.