

<b>Type of inspection document :</b> Inspection certificate acc. to EN 10204 / 3.1	A02	<b>Internal order No.:</b> 10073697 - 10	A08
<b>Purchaser :</b> ALLEIMA BENELUX B.V. . AMUNDSENWEG 4 5928 LT VENLO THE NETHERLANDS	A06	<b>Purchase order No. :</b> 800807 <b>Purchaser's reference :</b> 800807 <b>Project Id. :</b> 4003631	A07
<b>Product :</b> Seamless cold finished tube	B01/B04	<b>Steel designation :</b> 3R60 / 3R60	B02
<b>Dimension (OD x WT) :</b> 10,00 x 1,00AW mm	B09/B10	<b>Melting process :</b> AOD	C70
<b>Technical requirements :</b> ASME SA213/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 [%]
569289	max 0.030 0,019	max 1.000 0,400	max 2.000 1,680	max 0.040 0,029	max 0.015 0,009
Heat	Cr [%]	Ni [%]	Mo [%]	N [%]	
569289	17.000-18.000 17,210	12.500-14.000 13,220	2.500-3.000 2,640	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
569289	2114222-11	0,018	0,390	1,720	0,030	0,010

Heat	Lot	Cr [%]	Ni [%]	Mo [%]	N [%]
		17.000-18.000	12.500-14.000	2.500-3.000	max 0.100
569289	2114222-11	17,280	12,980	2,570	0,039

**Extent of material delivery**

Heat	Lot	Hollow supp.	No. of HTcycles <sup>1)</sup>	Pieces	Total length [m]	Total weight [kg] <sup>2)</sup>
569289	2114216-11	ALLEIMA SE	1	620	3 720.000	833.280
569289	2114218-11	ALLEIMA SE	1	600	3 600.000	806.400
569289	2114219-11	ALLEIMA SE	1	603	3 618.000	810.432
569289	2114220-11	ALLEIMA SE	1	558	3 348.000	749.952
569289	2114222-11	ALLEIMA SE	1	615	3 690.000	826.560
569289	2114223-11	ALLEIMA SE	1	594	3 564.000	798.336
569289	2114224-11	ALLEIMA SE	1	142	852.000	190.848

**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 :** 30.11.2023

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

Heat	Lot	ST	Test result
			[pass/fail]
			pass
569289	2114216-11		pass
569289	2114216-11		pass
569289	2114218-11		pass
569289	2114218-11		pass
569289	2114219-11		pass
569289	2114219-11		pass
569289	2114220-11		pass
569289	2114220-11		pass
569289	2114222-11		pass
569289	2114222-11		pass
569289	2114223-11		pass
569289	2114223-11		pass
569289	2114224-11		pass
569289	2114224-11		pass

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

Heat	Lot	ST	Test result
			[pass/fail]
			pass
569289	2114216-11		pass
569289	2114218-11		pass
569289	2114219-11		pass
569289	2114220-11		pass
569289	2114222-11		pass
569289	2114223-11		pass
569289	2114224-11		pass

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

Heat	Lot	ST	Test result
			[pass/fail]
			pass
569289	2114216-11		pass
569289	2114216-11		pass
569289	2114218-11		pass
569289	2114218-11		pass
569289	2114219-11		pass
569289	2114219-11		pass
569289	2114220-11		pass
569289	2114220-11		pass
569289	2114222-11		pass
569289	2114222-11		pass
569289	2114223-11		pass
569289	2114223-11		pass
569289	2114224-11		pass
569289	2114224-11		pass

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

Heat	Lot	ST	Hardness	Hardness ≤22HRC
			[HRB]	[yes/no]
			max 80,000	yes
569289	2114216-11		70,000	yes
569289	2114216-11		70,000	yes
569289	2114218-11		70,000	yes
569289	2114218-11		70,000	yes
569289	2114219-11		70,000	yes
569289	2114219-11		70,000	yes
569289	2114220-11		71,000	yes
569289	2114220-11		70,000	yes
569289	2114222-11		70,000	yes
569289	2114222-11		72,000	yes
569289	2114223-11		70,000	yes
569289	2114223-11		70,000	yes
569289	2114224-11		70,000	yes
569289	2114224-11		71,000	yes

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

Heat	Lot	ST	Test result
			[pass/fail]
			pass
569289	2114216-11		pass
569289	2114218-11		pass
569289	2114219-11		pass
569289	2114220-11		pass
569289	2114222-11		pass
569289	2114223-11		pass
569289	2114224-11		pass

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

Heat	Lot	ST	Test result
			[pass/fail]
			pass
569289	2114216-11		pass
569289	2114218-11		pass
569289	2114219-11		pass
569289	2114220-11		pass
569289	2114222-11		pass
569289	2114223-11		pass
569289	2114224-11		pass

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### 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
569289	2114216-11		279,000	570,900	58,300	62,500	310,700
569289	2114218-11		281,700	572,800	58,500	58,600	313,300
569289	2114219-11		285,300	578,900	54,600	61,000	314,300
569289	2114220-11		265,900	562,800	57,800	65,300	297,800
569289	2114222-11		281,600	577,000	55,100	60,200	310,900
569289	2114223-11		278,600	570,300	56,800	58,800	311,100
569289	2114224-11		278,000	559,200	62,000	66,300	307,400

### 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
569289	2114216-11		No	6,000
569289	2114218-11		No	6,000
569289	2114219-11		No	6,000
569289	2114220-11		No	6,000
569289	2114222-11		No	6,000
569289	2114223-11		No	5,000
569289	2114224-11		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.

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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.