

<b>Type of inspection document :</b> Inspection certificate acc. to EN 10204 / 3.1	A02	<b>Internal order No.:</b> 50006000 - 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> 3000073	A07
<b>Product :</b> Seamless cold finished tube  <b>Dimension (OD x WT) :</b> 9,53 x 1,65AW mm	B01/B04	<b>Steel designation :</b> 3R60 / 3R60  <b>Melting process :</b> AOD	B02
<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 [%]
570890	max 0.030 0,020	max 1.000 0,390	max 2.000 1,720	max 0.040 0,029	max 0.015 0,008

Heat	Cr [%]	Ni [%]	Mo [%]	N [%]	Co [%]
570890	17.000-18.000 17,390	12.500-14.000 13,240	2.500-3.000 2,620	max 0.100 0,037	info 0,130

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Heat	Ti [%] info
570890	<0,003

**Product check analysis**

Heat	Lot	C [%] max 0.030	Si [%] max 1.000	Mn [%] max 2.000	P [%] max 0.040	S [%] max 0.015
570890	2148239-11	0,018	0,370	1,750	0,027	0,008

Heat	Lot	Cr [%] 17.000-18.000	Ni [%] 12.500-14.000	Mo [%] 2.500-3.000	N [%] max 0.100
570890	2148239-11	17,500	13,090	2,570	0,033

**Extent of material delivery**

Heat	Lot	Hollow supp.	No. of HTcycles <sup>1)</sup>	Pieces	Total length [m]	Total weight [kg] <sup>2)</sup>
570890	2148237-11	ALLEIMA SE	1	635	3 810.000	1 234.440
570890	2148238-11	ALLEIMA SE	1	608	3 648.000	1 181.952
570890	2148239-11	ALLEIMA SE	1	623	3 738.000	1 211.112
570890	2148240-11	ALLEIMA SE	1	471	2 826.000	915.624

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 : 06.09.2024

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

Heat	Lot	ST	Test result [pass/fail]
			pass
570890	2148237-11		pass
570890	2148237-11		pass
570890	2148238-11		pass
570890	2148238-11		pass
570890	2148239-11		pass
570890	2148239-11		pass
570890	2148240-11		pass
570890	2148240-11		pass

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

Heat	Lot	ST	Test result [pass/fail]
			pass
570890	2148237-11		pass
570890	2148238-11		pass
570890	2148239-11		pass
570890	2148240-11		pass

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

Heat	Lot	ST	Test result [pass/fail]
			pass
570890	2148237-11		pass
570890	2148237-11		pass
570890	2148238-11		pass
570890	2148238-11		pass
570890	2148239-11		pass
570890	2148239-11		pass
570890	2148240-11		pass
570890	2148240-11		pass

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

Heat	Lot	ST	Hardness [HRB]	Hardness $\leq$ 22HRC [yes/no]
			max 80,000	yes
570890	2148237-11		76,000	yes
570890	2148237-11		76,000	yes
570890	2148238-11		77,000	yes
570890	2148238-11		78,000	yes
570890	2148239-11		78,000	yes
570890	2148239-11		78,000	yes
570890	2148240-11		77,000	yes
570890	2148240-11		77,000	yes

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

Heat	Lot	ST	Test result [pass/fail]
			pass
570890	2148237-11		pass
570890	2148238-11		pass
570890	2148239-11		pass
570890	2148240-11		pass

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

Heat	Lot	ST	Test result [pass/fail]
			pass
570890	2148237-11		pass
570890	2148238-11		pass
570890	2148239-11		pass
570890	2148240-11		pass

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

Heat	Lot	ST	Rp0,2 [MPa]	Rm [MPa]	A2" [%]	A5 [%]	Rp1,0 [MPa]
			min 220.000	515.000-690.000	min 35.000	min 40.000	min 250.000
570890	2148237-11		263,900	547,300	53,600	48,600	294,000
570890	2148238-11		289,400	559,600	58,800	63,700	318,800
570890	2148239-11		282,000	550,400	55,000	61,400	311,800
570890	2148240-11		273,900	548,100	52,600	56,900	304,100

**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 [No/Yes]	Grain size [(G)]
			No	5.000-14.000
570890	2148237-11		No	6,000
570890	2148238-11		No	6,000
570890	2148239-11		No	6,000
570890	2148240-11		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.

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**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.

**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.