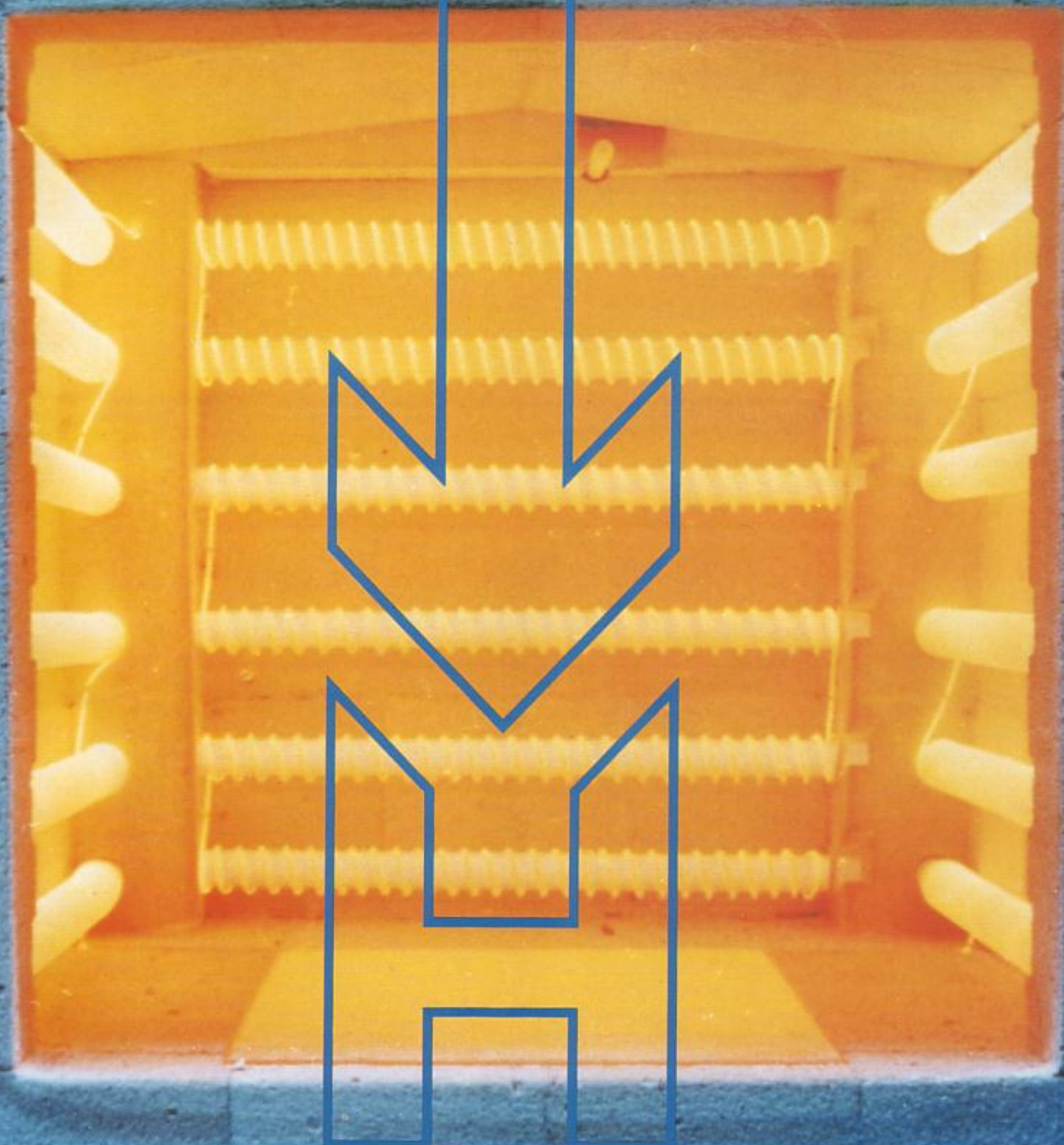


HALDENWANGER

Ceramic tubes



Impervious materials

Alsint 99,7-Tubes

Type 799 (DIN VDE 0335)
Al₂O₃ content 99.7%

Pythagoras-Tubes

Type 610 (DIN VDE 0335)
Al₂O₃ content approx. 60%
Alkali content 3%

Pythagoras 1800 Z-Tubes

Al₂O₃ content approx. 76%
Alkali content 0.3%

Halsic-I-Tubes

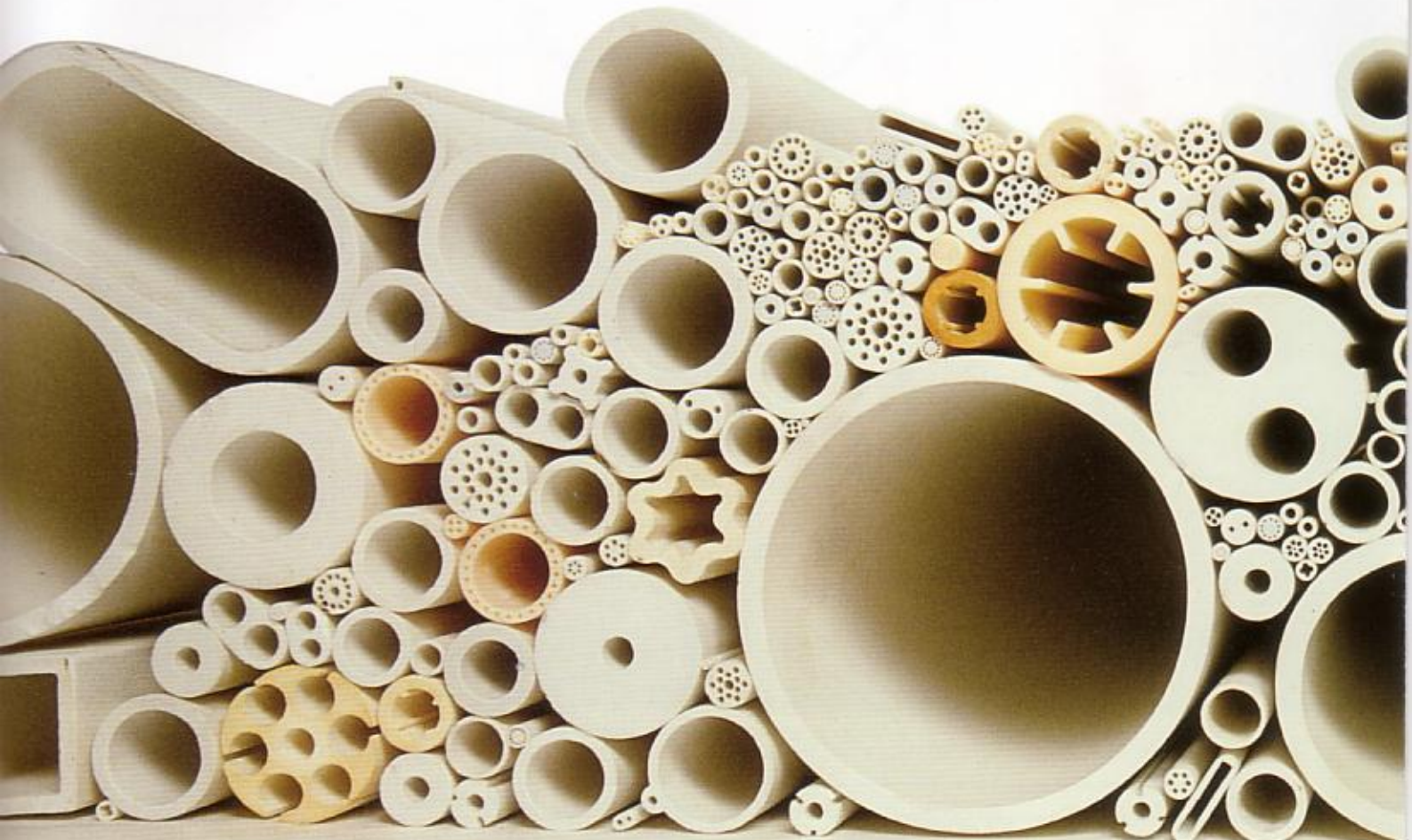
reaction bonded
Si-infiltrated SiC
SiC content approx. 90%
free Si approx. 10%

Alsint 99,7-Tubes			Pythagoras-Tubes			Pythagoras 1800 Z-Tubes		Halsic-I-Tubes
mm	Outer/inner Ø mm		mm	Outer/inner Ø mm		mm	Outer/inner Ø mm	
0.8 × 0.3	26 × 20	120 × 100	0.8 × 0.3	20 × 15	80 × 70	48 × 40	20 × 13	
1.3 × 0.7	28 × 22	120 × 105	1.3 × 0.7	22 × 17	85 × 75	53 × 43	22 × 15	
1.6 × 1.0	30 × 23	130 × 110	1.6 × 1.0	24 × 18	90 × 75	60 × 52	25 × 18	
1.8 × 1.2	35 × 27	140 × 120	1.8 × 1.2	24 × 19	90 × 80	63 × 53	27 × 20	
2.0 × 1.0	38 × 30	140 × 125	2.0 × 1.0	26 × 18	95 × 85	70 × 60	30 × 20	
2.7 × 1.7	42 × 34	150 × 130	2.7 × 1.7	26 × 20	100 × 85	73 × 63	40 × 30	
3.0 × 2.0	46 × 38	155 × 135	3.0 × 2.0	28 × 22	105 × 90	75 × 65	42 × 32	
4.0 × 2.0	50 × 40	160 × 140	4.0 × 2.0	30 × 23	110 × 95	80 × 70	45 × 35	
5.0 × 3.0	55 × 45	170 × 150	5.0 × 3.0	31 × 25	115 × 100	82 × 72		
6.0 × 4.0	60 × 50	175 × 155	6.0 × 4.0	35 × 27	120 × 100	85 × 74		
8.0 × 5.0	65 × 56	180 × 160	8.0 × 5.0	38 × 30	125 × 105	86 × 76		
9.0 × 6.0	70 × 60	185 × 165	9.0 × 6.0	40 × 32	130 × 110	87 × 77		
9.6 × 6.4	72 × 62	190 × 170	9.6 × 6.4	45 × 38	140 × 120	88 × 78		
10.0 × 6.0	75 × 65	200 × 175	10.0 × 6.0	48 × 40	140 × 125	93 × 83		
12.0 × 8.0	80 × 70	220 × 200	12.0 × 8.0	50 × 40	150 × 130	95 × 85		
12.7 × 8.9	85 × 75	240 × 220	12.7 × 8.9	52 × 42	160 × 140	100 × 90		
14.0 × 10.0	90 × 80	260 × 240	14.0 × 10.0	55 × 46	170 × 150	105 × 90		
15.0 × 10.0	95 × 85	270 × 250	15.0 × 10.0	58 × 50	180 × 160	115 × 105		
17.0 × 12.0	100 × 85	300 × 280	15.0 × 11.0	60 × 50	190 × 170	120 × 110		
17.5 × 11.1	105 × 90	320 × 300	17.0 × 12.0	65 × 55	200 × 180			
20.0 × 15.0	110 × 95	420 × 380	17.0 × 13.0	70 × 60	240 × 220			
24.0 × 18.0	115 × 100	450 × 430	17.5 × 11.1	75 × 65	300 × 280			

max. length 3500 mm depending on diameter	max. length 3500 mm depending on diameter	max. length 2000 mm depending on diameter	max. length 3000 mm depending on diameter
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Dimensions not shown above can be made to order. The dimensions shown are a selection from our range. The maximum outer diameter which can be manufactured is 450 mm.

We supply the following types of tubes:
open both ends
closed one end
open both ends with flange
closed one end with flange



Porous materials

Sillimantin 60 NG-Tubes
medium fine structure
Al₂O₃ content
approx. 73-75%

Sillimantin 65-Rollers
fine structure
Al₂O₃ content 78-80%
Especially for roller hearth
kilns.

Sillimantin 60-Tubes
Type 530 (DIN VDE 0335)
medium fine structure
Al₂O₃ content
approx. 73-75%

Sillimantin KS-Tubes
medium fine structure
Al₂O₃ content approx. 70%

Silicon Carbide-Tubes
fine and coarse structure
SiC content 75% - 90%
claybonded

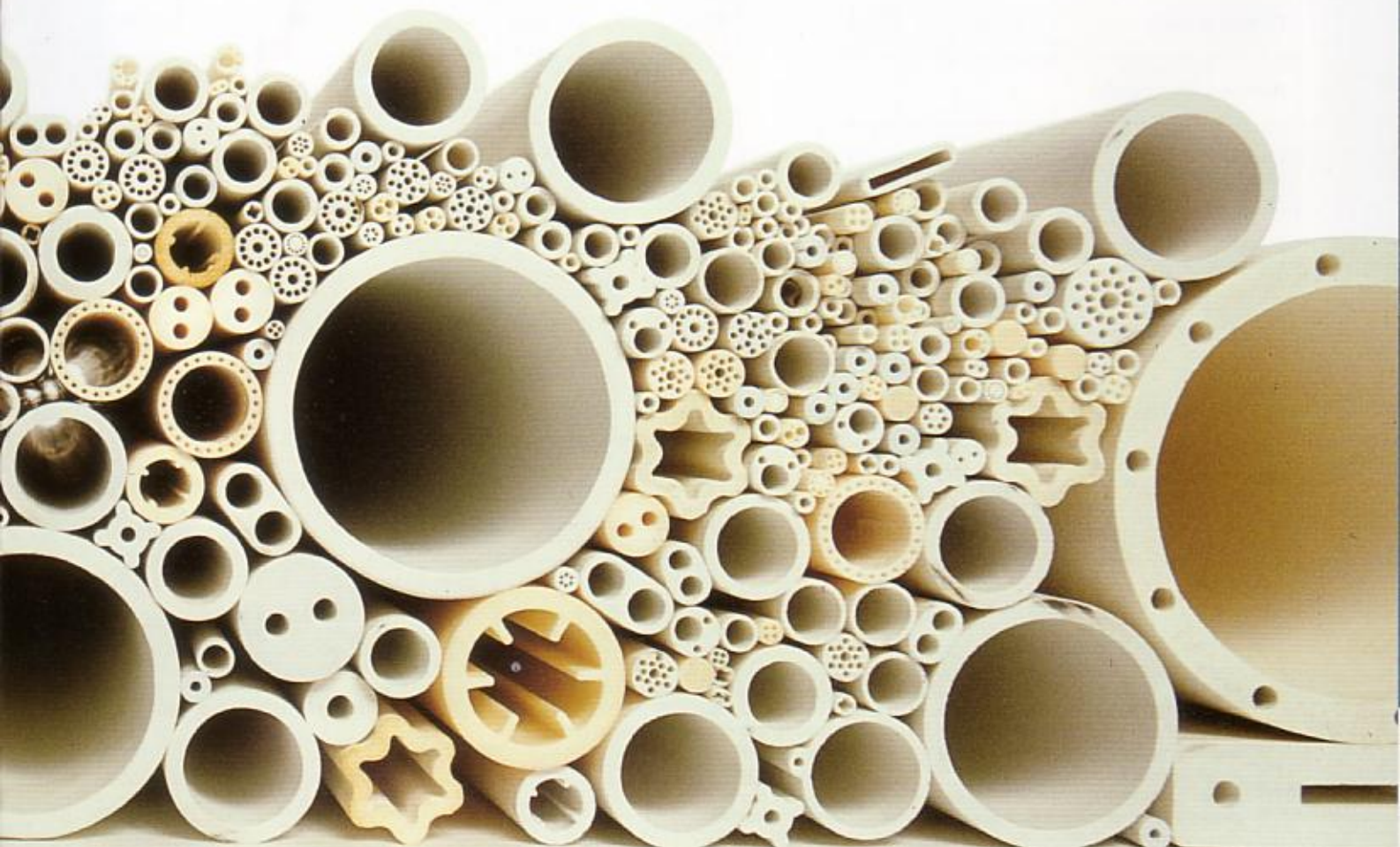
Halsic-R-Tubes
recrystallized SiC
SiC content 99%

Outer/inner ø mm	Outer/inner ø mm	Outer/inner ø mm	Outer/inner ø mm	Outer/inner ø mm	Outer/inner ø mm
20 × 15	25.0 × 15.0	20 × 15	15 × 7	17 × 12	20 × 10
22 × 17	26.9 × 17.0	22 × 17	20 × 12	20 × 15	22 × 12
24 × 19	27.0 × 17.0	24 × 19	20 × 15	22 × 17	25 × 15
26 × 18	27.7 × 17.0	26 × 18	25 × 15	24 × 19	30 × 20
28 × 22	30.0 × 20.0	28 × 22	25 × 18	26 × 18	32 × 22
30 × 23	31.0 × 21.0	30 × 23	30 × 20	26 × 20	34 × 24
35 × 27	33.0 × 23.0	35 × 27	35 × 25	28 × 22	35 × 25
40 × 32	33.7 × 23.0	40 × 32	40 × 30	30 × 23	40 × 30
50 × 40	33.7 × 23.7	50 × 40	45 × 35	31 × 25	45 × 35
60 × 50	34.0 × 22.5	60 × 50	50 × 40	33 × 28	50 × 38
70 × 60	35.0 × 28.0	70 × 60	55 × 45	35 × 27	
80 × 70	36.0 × 24.0	80 × 70	60 × 48	40 × 32	
90 × 75	36.0 × 25.0	90 × 75		45 × 35	
100 × 85	40.0 × 30.0	100 × 85		50 × 40	
110 × 95	42.0 × 32.0	110 × 95		55 × 45	
120 × 100	42.4 × 32.4	120 × 100		60 × 50	
130 × 110	55.0 × 45.0	130 × 110		65 × 55	
140 × 120		140 × 120		70 × 60	
160 × 140		160 × 140		75 × 65	
200 × 175		200 × 175		80 × 70	
250 × 230		250 × 230		85 × 75	
330 × 310		330 × 310		90 × 75	

max. length 3200 mm depending on diameter	max. length 3400 mm depending on diameter	max. length 3500 mm depending on diameter	max. length 2000 mm depending on diameter	max. length 2000 mm depending on diameter	max. length 3000 mm depending on diameter
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Insulators and short insulating tubes for thermocouple elements are made in our materials ALSINT 99,7 TYPE 799 and PYTHAGORAS TYPE 610.

The tolerances adhered to are according to DIN 40 680. Closer tolerances on enquiry.



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Physical properties*

		Impervious materials				Porous materials					
Dimension		Alsint 99,7	Pythagoras 1800 Z	Pythagoras	Halsic-I	Sillimantin 60 NG	Sillimantin 65	Sillimantin 60	Sillimantin KS	SiC clay-bonded *****	Halsic-R
Al ₂ O ₃ content	%	99.7	76	60	SiC/Si content 90/10	73-75	78-80	73-75	70	SiC content 70-90	SiC content ≥ 99
Alkali content	%	0.05	0.3	3.0	—	—	—	—	—	—	—
Type acc. to DIN VDE 0335	—	799	—	610	—	—	—	530	—	—	—
Water absorption	%	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2	5	5	12	12	10	5
Leakage rate at 20° C (Helium) hPa · dm ³ · s ⁻¹		10 ⁻¹⁰	—	10 ⁻¹⁰	—	—	—	—	—	—	—
Density	g · cm ⁻³	3.80-3.93	3.10	2.60	3.00-3.10	2.65	2.60	2.35	2.35	2.40	2.60-2.70
Young's modulus	GPa	370	—	110	360	95	80	60	60	—	230
Flexural strength	MPa	300	150	120	230	50	45	35	30	30	90-100
Hardness (Mohs scale)	—	9	8	8	—	—	—	—	—	—	—
Thermal expansion	20- 700° C 20-1000° C	7.8 8.6	5.6 6.0	5.4 6.0	3.7 4.3	5.2 5.7	— 6.1	5.3 5.7	5.3 5.7	5.0 5.0	3.9 4.5
Thermal conductivity	20- 100° C	26.0	3.5	2.0	90.0	—	—	1.4	1.4	28.0	30.0
Maximum working temperature**	° C	1700	1600	1500	1350***	1650	1400	1350	1350	1400	1600*** < 2000****
Dielectric strength related to 1.5 mm wall thickness	kV · mm ⁻¹	17	15	17	—	—	—	—	—	—	—
Volume resistivity D.C. at 20° C	Ω · cm	10 ¹⁴	10 ¹³	10 ¹³	—	—	—	—	—	—	—
Thermal shock resistance	—	good	very good	good	very good	good	very good	very good	very good	very good	very good
Diameter of pores approx.	µm	—	—	—	—	8-9	1	2	2	6	21-27

* The physical properties of our products stated above are only valid for test specimens. The transfer of these values to other forms and dimensions is true only up to a point. In practice Alsint 99,7 samples p.e. have a flexural strength between 160 and 300 MPa, depending on wall thickness, geometry, surface finish, aftertreatment and manufacturing process.

** depending on applied load; for tube materials determination according to DIN 43724 / DIN 43725.

*** in oxidizing atmospheres;

**** under protective atmosphere/vacuum;

***** properties for general information because of different qualities.