



Advanced Ceramics for Electronic Applications

Material properties of Rubalit[®], Alunit[®] and Zirkolit[®]

Material Properties of Rubalit®, Alunit® and Zirkolit®

Property	Definition Property	Unit	Range	Zirkolit® ZrO ₂ 5Y C (88 wt-%)	Rubalit® 708 D
Al ₂ O ₃ content		[wt-%]	>=		95.8
Surface roughness R _a	@ as fired surface	[µm]	<=	0.2	0.8
Density		[g/cm ³]	>=	5.7	3.73
Bending strength DR sigma 0	double ring method @ 0.32 mm; thickness @ rings 6 / 12 mm double ring method @ 0.50 mm; thickness @ rings 6 / 12 mm double ring method @ 0.63 mm; thickness @ rings 6 / 12 mm double ring method @ 1.00 mm; thickness @ rings 6 / 12 mm double ring method @ 1.00 mm; thickness @ rings 7 / 14 mm double ring method @ 1.50 mm; thickness @ rings 6 / 12 mm	[MPa] [MPa] [MPa] [MPa] [MPa]	>= >= >= >= >=	800	300 300
Coefficient of thermal expansion (CTE)	@ 100°C – 200°C @ 100°C – 300°C @ 100°C – 600°C @ 100°C – 800°C	[10 ⁻⁶ /K] [10 ⁻⁶ /K] [10 ⁻⁶ /K] [10 ⁻⁶ /K]	+/- +/- +/- +/-	9–12 9–12 9–12 9–12	
Dielectric constant	@ 1 GHz @ 2mm thickness @ Ra <= 0,4µm @ 10 MHz @ 2mm thickness @ Ra <= 0,4µm @ 100 MHz @ 2mm thickness @ Ra <= 0,4µm	-/- -/- -/-	+/- +/- +/-		8.3–11.3 8.3–11.3 8.3–11.3
Dielectric loss factor	@ 1 GHz @ 2mm thickness @ Ra <= 0,4µm @ 10 MHz @ 2mm thickness @ Ra <= 0,4µm @ 100 MHz @ 2mm thickness @ Ra <= 0,4µm	[10 ⁻³] [10 ⁻³] [10 ⁻³]	<= <= <=		10 10 10
Dielectric strength	@ 0.500 mm thickness @ 0.635 mm thickness @ 1.000 mm thickness	[kV/mm] [kV/mm] [kV/mm]	>= >= >=	10	
Open porosity	@ oxidized anode	[vol-%]	+/-	none	
Specific heat capacity	@ 100°C @ 20°C	[J/g K] [J/g K]	>= >=	0.4 0.3	0.9 0.7
Thermal conductivity*	@ 20°C @ Xe-flash @ sample 16*16mm ² @ material specific thickness <= 3,5mm	[W/mK]		1.5	22.0
Volume resistivity	@ 20°C @ 200°C @ 400°C @ 600°C @ 800°C	[Ohm cm] [Ohm cm] [Ohm cm] [Ohm cm] [Ohm cm]	>= >= >= >= >=		10 ¹³ 10 ¹¹ 10 ⁹ 10 ⁷
Water absorption**		[wt-%]	<=	0.1	0.1
Chemical composition		-/-		The material main component is ZrO ₂ . Additional components are Y ₂ O ₃ and traces of other elements.	The material main component is Al ₂ O ₃ . Residue mainly consists of MgO, SiO ₂ and CaO and traces of other elements.

* typical value based on a measurement precision of +/- 10%

** precision of water absorption measurement is +/- 0.15%

Rubalit® 708S C	Rubalit® 708HP C	Rubalit® 710F C	Rubalit® 717 porous - - - C	Thomit® 600 D	Alunit® AIN 170 C	Alunit® AIN 170 D
96.0	96.0	99.6	98.5	45.0		
0.6	0.6	0.12	0.4	0.9	0.6	1.0
3.73	3.73	3.80	3.00		3.26	3.28
450	450	420 420	200	130	320 320	200
6.0–8.0 6.0–8.0 6.7–8.7 7.0–9.0	6.0–8.0 6.0–8.0 6.7–8.7 7.0–9.0	6.0–8.0 6.0–8.0 6.7–8.7 7.0–9.0	6.3–8.3 6.4–8.4 6.9–8.9 7.2–9.2	5.0–7.0 5.0–7.0 5.5–7.5 5.5–7.5	3.7–5.7 3.7–5.7 4.5–5.9 4.8–6.2	3.5–5.5 4.0–6.0 4.5–6.5 4.6–6.7
8.3–11.3 8.3–11.3 8.3–11.3	8.3–11.3 8.3–11.3 8.3–11.3	8.5–11.5 8.5–11.5 8.5–11.5			7.2–9.8 7.2–9.8 7.2–9.8	
10 10 10	10 10 10	10 10 10			10 10 10	
15	15	15		15	15 15	
0.7 0.7	0.8 0.7	0.8 0.7			0.7 0.6	0.7 0.6
22.0	22.0	25.0	18.0	2.0	170	170
10 ¹³ 10 ¹¹ 10 ⁹ 10 ⁷ 10 ⁷	10 ¹³ 10 ¹¹ 10 ⁹ 10 ⁷ 10 ⁷	10 ¹³ 10 ¹¹ 10 ⁹ 10 ⁷ 10 ⁷			10 ¹⁴ 10 ¹³ 10 ¹² 10 ⁹ 10 ⁹	10 ¹⁴ 10 ¹³ 10 ¹² 10 ⁹
0.1	0.1	0.1	6.0 none		0.1	0.1
The material main component is Al ₂ O ₃ . Residue mainly consists of MgO, SiO ₂ and CaO and traces of other elements.	The material main component is Al ₂ O ₃ . Residue mainly consists of MgO, SiO ₂ and CaO and traces of other elements.	The material main component is Al ₂ O ₃ . Residue mainly consists of MgO and traces of other elements.	The material main component is Al ₂ O ₃ . Residue mainly consists of MgO, SiO ₂ and CaO and traces of other elements.			

Indexes and parameters for ceramic substances

In order to profile ceramic substances certain parameters are indicated. The crystalline nature of these substances, statistical fluctuations in the composition of the substances and in the factors that impact on the production processes indicate

that the figures quoted are typically mean values and hence the substance parameters quoted in this brochure are only standard, recommended or guide values that might differ given dissimilar dimensions and production processes.



All herein aforementioned measured values were determined for test samples and are applicable as standard values. The values were determined on the basis of national or international standards and if these were not available, on the basis of CeramTec internal specifications standards. Statements regarding the suitability of products for certain types of applications are based on knowledge of typical requirements that are often placed on CeramTec products in generic applications and must not be transferred to specific applications. The same applies to the indicated values. The information contained herein does not constitute a guarantee for certain properties. CeramTec and its affiliates do not assume any responsibility for the correctness of such information nor for damages consequent to its use. Please note that all product, product specifications and data detailed in this media are subject to changes.

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