

# Properties and technical values of our materials

Properties	Symbol	Unit	Steatite C221	Steatite porous C230	Cordierite C410	Cordierite porous C520	Mullite C620	Aluminium oxide C795	Aluminium oxide C799	Zirconium oxide Y <sub>2</sub> O <sub>3</sub> partially stabilized C830 / TZP	Zirconium oxide MgO partially stabilized C830 / PSZ	Aluminium titanate ATI	
<b>Mechanical</b> (at room temp.)													
Open porosity	P <sub>a</sub>	% by vol.	0	35	0,5	20	0	0	0	0	0	7 - 16	
Min. density	ρ <sub>a</sub>	g/cm <sup>3</sup>	2,7	1,8	2,1	1,9	2,8	3,7	3,9	6,0	5,7	3,5	
Compressive strength	σ <sub>ab</sub>	MPa	900	100	300	200	-	1800	2100	2200	1800	450	
Bending strength	σ <sub>bb</sub>	MPa	140 <sup>1)</sup>	30 <sup>1)</sup>	60 <sup>1)</sup>	25 <sup>1)</sup>	150 <sup>2)</sup>	280 <sup>2)</sup>	300 <sup>2)</sup>	1100 <sup>1)</sup>	500 <sup>1)</sup>	40 <sup>2)</sup>	
Modulus of elasticity	E	GPa	110	-	-	-	150	280	300	205	205	35	
Mohs' hardness (index)	MH	Diamond=1	7	-	7	6	7	9	9	8	6,5	-	
Vickers hardness	HV <sub>10</sub>	GPa	-	-	-	-	-	12-15	17-23	12	9	5	
<b>Thermal</b>													
Coefficient of thermal linear expansion	20-100°C	α <sub>t</sub>	10 <sup>-6</sup> K <sup>-1</sup>	6-8	8-10	1-3	3-6	5-6	5-7	5-7	8-9	8-9	0,5
	20-300°C	α <sub>t</sub>	10 <sup>-6</sup> K <sup>-1</sup>	7-9	8-10	1-3	4-6	5-6	6-7,5	6-8	9-11	9-11	0,5 - 1,5
	20-600°C	α <sub>t</sub>	10 <sup>-6</sup> K <sup>-1</sup>	7-9	8-10	2-4	4-6	5-7	6-8	7-8	10-12	10-12	1 - 2
	20-1000°C	α <sub>t</sub>	10 <sup>-6</sup> K <sup>-1</sup>	8-9	-	2-4,5	4-6	5-7	7-9	7-9	11-13	11-13	1,5 - 2
Specific heat capacity	20-100°C	c <sub>p</sub>	Jkg <sup>-1</sup> K <sup>-1</sup>	800-900	800-900	800-1200	750-850	850-1050	850-1050	850-1050	450-500	450-550	800
Thermal conductivity	20-100°C	λ	Wm <sup>-1</sup> K <sup>-1</sup>	2 - 3	1,5 - 2	1,5 - 2,5	1,3 - 1,8	6-15	16 - 28	19 - 30	1,2 - 3,5	1,2-3,5	1,5 - 2,5
Resistance to thermal shock	ΔT	K		100	-	250	200	150	140	150	80	80	700
Max. application temperature	T	°C		1200	900	1200	1200	1200	1400	1500	1000	800	900
<b>Electrical</b>													
Electric strength	E <sub>d</sub>	kVmm <sup>-1</sup>		20	-	10	-	15	15	17	-	-	-
Withstand voltage (1-min.)	U	kV		30	-	15	-	20	18	20	-	-	-
Dielectric constant	48-62Hz	ε <sub>r</sub>	-	6	-	5	-	8	9	9	22	22	-
Dissipation factor 20°	48-62Hz	tanδ	10 <sup>-3</sup>	1,5	-	25	-	-	0,5	0,2	-	-	-
	1kHz	tanδ	10 <sup>-3</sup>	-	-	-	-	-	1	0,5	-	-	-
	1MHz	tanδ	10 <sup>-3</sup>	1,2	-	7	-	-	1	1	2	2	-
Volume resistivity	20°C	ρ <sub>v</sub>	Ωcm	10 <sup>13</sup>	-	10 <sup>12</sup>	-	10 <sup>13</sup>	10 <sup>14</sup>	10 <sup>14</sup>	10 <sup>11</sup>	10 <sup>11</sup>	10 <sup>14</sup>
	200°C	ρ <sub>v</sub>	Ωcm	10 <sup>11</sup>	10 <sup>10</sup>	10 <sup>8</sup>	10 <sup>9</sup>	10 <sup>11</sup>	10 <sup>12</sup>	10 <sup>12</sup>	-	-	-
	600°C	ρ <sub>v</sub>	Ωcm	10 <sup>7</sup>	10 <sup>7</sup>	10 <sup>5</sup>	10 <sup>5</sup>	10 <sup>6</sup>	10 <sup>8</sup>	10 <sup>8</sup>	10 <sup>3-10<sup>5</sup></sup>	10 <sup>3-10<sup>6</sup></sup>	10 <sup>9</sup>
T for volume resistivity	100 MΩcm	T <sub>k100</sub>	°C	500	500	200	-	300	500	500	100	100	-
	1 MΩcm	T <sub>k1</sub>	°C	800	800	400	500	600	800	800	350	350	-
Tracking behaviour	KF	KC-steps		600	600	600	600	-	600	600	600	600	-

The materials used for our components comply with DIN EN 60672.

The specified values refer to tests performed with test specimens and thus can only be used conditionally for serial components.

<sup>1)</sup> = three-point bending test

<sup>2)</sup> = four-point bending test