

THE RIGHT MATERIAL. THE LASTING ADVANTAGE.

Advanced ceramics for demanding industrial applications – developed for reliable performance where wear resistance, temperature stability, precision or chemical resistance are critical.

- ✓ **Longer service life**
Because the material matches the application – not the other way round.
- ✓ **Consistent production quality**
Through proprietary formulations, controlled manufacturing processes and quality from prototype to high-volume production.
- ✓ **Greater engineering possibilities**
With advanced ceramics that go beyond the limits of conventional material solutions.



TECHNICAL OVERVIEW

OF MATERIAL PROPERTIES

This advanced ceramics overview supports the comparison of key material properties and an initial material preselection. It provides a first orientation regarding the performance characteristics of the different material groups and helps identify suitable options for specific technical requirements. The final material selection is based on the application, geometry, manufacturing process and production requirements. Our experts will be happy to support you in selecting the most appropriate material for your specific application.

In addition to our advanced ceramics portfolio, we offer an established silicate ceramics platform for high-volume applications, as well as porous ceramic materials designed for controlled permeability, filtration and regulated mass transfer.



		Aluminium Oxide								Zirconia-Toughened Alumina				Alumina-Toughened Zirconia			Zirconia			Silicon Nitride		Silicon Carbide
Material	Unit	Rapox [®] brown	Rapal [®] light	Rapal [®] 96	Rapal [®] 100	Rapal [®] 200	Rapal [®] 250	Rapal [®] 300	Rapal [®] 200 AZ	Rapal [®] 250 AZ		Rapal [®] 300 AZ	Rapal [®] 1000 AZ	Rapal [®] 700 ZA	Rapal [®] 800 ZA	Rapal [®] 1000 ZA	Zirconia M	Zirconia Y	Zirconia Y-FSZ	Sildurit	Sildurit E	SSiC
Main Content	%	Al ₂ O ₃ ≥ 95	Al ₂ O ₃ ≥ 95	Al ₂ O ₃ ≥ 96	Al ₂ O ₃ > 99,6	Al ₂ O ₃ > 99,6	Al ₂ O ₃ > 99,8	Al ₂ O ₃ > 99,9	Al ₂ O ₃ / ZrO ₂ 85 / 15	Al ₂ O ₃ / ZrO ₂ 90 / 10		Al ₂ O ₃ / ZrO ₂ 75 / 25	Al ₂ O ₃ / ZrO ₂ 80 / 20	ZrO ₂ :Ce / Al ₂ O ₃ 90 / 10	ZrO ₂ :Ce, Y / Al ₂ O ₃ 60 / 40	ZrO ₂ :Ce, Y / Al ₂ O ₃ 95 / 5	ZrO ₂ : Mg 100	ZrO ₂ : Y 100	ZrO ₂ / Y ₂ O ₃ ≥ 85 / 13,5	Si ₃ N ₄ > 88	Si ₃ N ₄ / TiN > 38 / > 42	SiC / B ₄ C > 97 wt
Forming Process		Pressing	Pressing	Pressing	Pressing Extrusion	Pressing Injection moulding	Injection moulding	Pressing Injection moulding	Pressing Injection moulding	Injection moulding		Pressing	Pressing	Pressing	Pressing	Pressing	Pressing Extrusion Injection moulding	Pressing Extrusion Injection moulding	Extrusion	Pressing Injection moulding	Pressing	Pressing
Colour		Brown	White	White	Ivory Pink Red	Ivory Pink Red	Ivory Pink	Ivory	White	White		Light Yellow	White	Slightly Grey	White	Slightly Yellow	Yellow White	White Black	White	Dark Grey	Brown	Anthracite black
Density	g/cm³	≥ 3,80	≥ 3,80	> 3,65	>3,90	> 3,90	> 3,93	> 3,95	> 4,10	> 4,00		4,35	> 5,45	5,95	5,04	6,01	> 5,70	> 6,00	3,6-4,8**	> 3,20	> 3,90	> 3,12
Water Absorption	%	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	7,0-10,0	0	0	0
3-Point-Flexural Strength	MPa	> 280	> 280	> 280	> 300	> 400	> 440	> 460	> 500	> 500		-	1000 (1900 - after HIP)	-	-	-	> 570	> 1100	-	970	780	-
4-Point-Flexural Strength	MPa	-	-	-	-	-	-	-	-	-		700	-	720	-	1050	-	-	-	-	-	450
Fracture Toughness SEVNB	MPa m ^{1/2}	5	4,6	4,0	4,7	4,6	4,4	4,4	4,6	4,5		6,5	6,5	12,5	6,1	7,9	7,8	6,5	-	5,5	6,5	3,0
Vickers Hardness	HV 0,1	1500	1500	1450	1700	1900	1900	2100	1500	-		-	-	-	-	-	1050	1280	-	-	1800	2700
Vickers Hardness	HV 10	-	-	-	-	1800	-	-	-	-		1650	1400	1100	1330	1170	-	1250	-	1600	1400	2200
Modulus of Elasticity (E-modulus)*	GPa	320	320	320	380	380	380	380	360	360		350	256	200	230	210	200	194	-	290	340	400
Mean Coefficient of Linear Thermal Expansion (CTE) 30-600°C	10 ⁻⁶ K ⁻¹	7,5-8,5	7,5-8,5	7,5-8,5	7,5-8,5	7,5-8,5	7,5-8,5	7,5-8,5	7,5-8,5	7,5-8,5		-	9,9	-	-	-	9,5-10,5	9,5-10,5	-	2,9	5	3,5*
Mean Coefficient of Linear Thermal Expansion (CTE) 30-1000°C	10 ⁻⁶ K ⁻¹	8-9	8-9	8-9	8-9	8-9	8-9	8-9	8-9	8-9		-	10,2	-	-	-	10-11	10-11	11	3-4	5-6	4,5*
Thermal Conductivity* at RT	W/(m·K)	24	24	24	30	30	30	30	25	25		-	5,94	-	7,5	-	3	2,9	-	22	25	120
Specific Volume Resistivity at RT	Ω·cm	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴	10 ¹⁴		-	-	-	-	-	10 ¹³	10 ¹²	-	10 ⁰⁸	10 ⁻⁰³	10 ⁵ -10 ⁷
Thermal Shock Resistance	K	150	150	160	150	180	160*	160	-	-		-	470	-	-	-	250	250	-	600	300	200*

* The values given are based on literature references and should therefore be considered as guidelines.

** The density may vary depending on the open porosity.

The values given here were determined on test specimens and are typical for this material. They serve as a guideline for the design of ceramic components and are therefore not directly applicable to your products. Please do not hesitate to contact us for further information.

WHY RAUSCHERT?

Targeted material selection from a broad portfolio

Selecting the right ceramic material means balancing application requirements, operating conditions, component geometry, manufacturing process and production targets.

We help translate these factors into a clear material recommendation.

- ✓ **Tested close to the application**
Well-equipped in-house laboratories support material testing, analysis and validation, helping ensure that decisions are based on more than data-sheet values.
- ✓ **Developed for specific requirements**
Continuous material development helps adapt ceramic materials to demanding applications, instead of forcing the application to fit a standard material.
- ✓ **Built for reliable production**
Secure access to qualified raw materials supports stable quality, reproducible properties and dependable series production.

Not sure which material is the right choice?

Talk to our material experts about your application. We will support you in selecting the most suitable ceramic material for your requirements.

By considering factors such as operating conditions, mechanical loads and manufacturing requirements, we help identify the best solution. Where required, we can adapt existing materials or develop customised material formulations to meet specific application requirements.



**DO YOU HAVE A CHALLENGE?
YOUR CHALLENGE IS WHAT DRIVES US – CONTACT US**

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Subject to changes and errors. The information contained in this document provides only general descriptions of the available technical options and performance characteristics. We would be pleased to provide you with an individual quotation.