

KLÄGER 

INSIDE

Material-Information



Technical Ceramics

Al_2O_3

ZrO_2

ZTA / ATZ

Specials

Following technical ceramics are in serial production at Kläger.

Kläger is offering the processing of own compounds (Aluminiumoxid – several species, mixed ceramics) as well as materials which are commercial available. Due to the use of different process equipment we have the possibility of a thermal as well as a catalytical debinding. Debinding and sintering is done on the most effective technical and economical way as different kinds and sizes of ovens are available.

Aluminiumoxid (Al₂O₃)....

COMPOUNDS OF KLÄGER, INMATEC, BASF AND OTHERS

Material characteristics	Strength and hardness, wear resistant, corrosion resistant, biocompatible (inert), high thermal conductivity, perfect isolation, high temperature stability			
Applications	Stitching, leading, guiding, isolating, protecting and ...			
Pureness 96 %		Inmafed	--	--
Pureness 99,5 %	Kläger	--	--	
Pureness 99,7 % - 99,8 %	Kläger	Inmafed	Catamold	Others
Pureness 99,9 %	--	Inmafed	--	Others
Colours	Standard white / red (customised)			

Zirkonia (ZrO₂)....

COMPOUNDS OF INMATEC, BASF

Material characteristics	High bending strength, fracture toughness, wear resistant, corrosion resistant, biocompatible (inert), low thermal conductivity, scratch-resistant			
Applications	Cutting, Stitching, leading, guiding, isolating, holding, spreading and ...			
Pureness 99,9 %	--	Inmatec	Catamold	Others
Colours	--	white, black, blue, green, grey	white, black	white, black, blue, green, grey

Mixed Ceramics....

COMPOUNDS OF KLÄGER, OTHERS

Material characteristics	Customised (material combinations) adjustment of the material characteristics in accordance to the specific application			
Applikationen	Cutting, Stitching, leading, guiding, isolating, holding, spreading and ...			
ZTA (80% Al ₂ O ₃ & 20% ZrO ₂)	Kläger	--		Others
ATZ (20% Al ₂ O ₃ & 80% ZrO ₂)	Kläger	--	--	Others
ATZ (5% Al ₂ O ₃ & 95% ZrO ₂)	--	--	--	Others

Specials....

COMPOUNDS OF KLÄGER, BASF

Material characteristics	Development of new materials for serial production			
Al ₂ O ₃ porous	Kläger		--	--
Specials Compounds customised	Kläger	YES	--	--



Selected material datas in comparision

	Al ₂ O ₃	ZTA	ATZ	ZrO ₂	316 L
	Aluminiumoxid 99,7 - 99,9%	Mixed Oxides 80% Al ₂ O ₃ 20% ZrO ₂	Mixed Oxides 20% Al ₂ O ₃ 80% ZrO ₂	Ytrium stabilised Zirkonia	Stainless steel

MECHANICAL	Symbol	Unit					
Open porosity		[Vol %]	0	0	0	0	0
Density, min.	ρ	[Mgm ⁻³]	3,9	4,2	5,5	6.0	> 7,4
Bending strength	σ _B	[Mpa]	340	500	820	1000	520
Modulus of elasticity	E	[Gpa]	380	300	200	200	190
Vickers hardness	HV	[10 ² Nmm ⁻²]	18	17	14	12	1,2
Fracture toughness	K _{IC}	[MPa m]	4 - 5,5	4,4 - 5	--	5,8 – 10,5	--

ELECTRICAL	Symbol	Unit					
Electric strength	E _d	[kVmm ⁻¹]	> 257	--	--	--	--
Withstand voltage, min.	U	[kV]	20	--	--	--	--
Permittivity at 20° / 1 GHz		[--]	9	--	> 20	> 20	--
Spec. Resistance at 20 °C	ρ _{V>20}	[Ωcm]	10 ¹⁴	10 ⁹	10 ⁹	10 ⁹	0,0015
Spec. Resistance at 600 °C	ρ _{V>600}	[Ωcm]	10 ⁶	10 ⁶	--	10 ³ -10 ⁶	--

THERMAL	Symbol	Einheit					
Thermal expansion coefficient between 30-1000 °C	α 30-1000	[10 ⁻⁶ K ⁻¹]	8,5	8	11	10,5	17
Spec. thermal capacity between 30 - 600 °C	C _p , 30-1000	[Jkg ⁻¹ K ⁻¹]	850 - 1050	--	--	400 - 550	--
Thermal conductivity (100°C)	λ ₃₀₋₁₀₀	[Wm ⁻¹ K ⁻¹]	30	23	2	1,5	35
Thermal shock resistance	K		190	250	300	300	--
Operating temperature max.	T	[°C]	1650	1500	1200	1200	300

Attention should be paid to:

The materials listed in the table are only a selection. Many other ceramic materials are available on request. The data listed in the table relate to test parts on which they were determined. Therefore a transfer to other components is only of limited applicability. A liability towards the suitability of a specific application can not be guaranteed. We reserve the right to make technical changes. Property rights of third parties might be observed.

