



plascera® **plasterm®**

LWK PlasmaCeramic
Engineering Ceramics and
Ceramic Coatings



plascera and plasterm – high tech solutions u

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LWK manufactures engineering ceramics using water plasma technology. Our products outperform conventional sintered ceramics for a variety of applications.

The ceramic parts are manufactured using a water stabilised plasma torch. In the plasma jet ceramic powder is melted, accelerated and projected onto a metal tool where the molten grains flatten and solidify, building a layered structure.

The result: Our world-wide unique **plasma ceramic** with its brand name **plascera®**.

WPT enables:

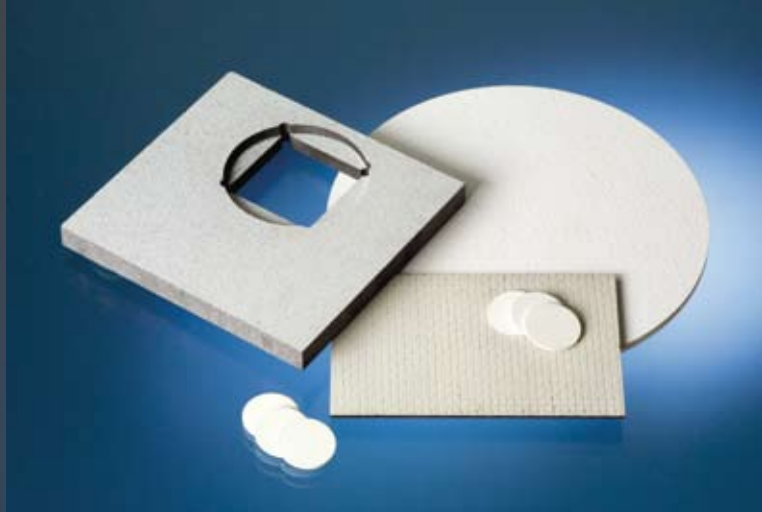
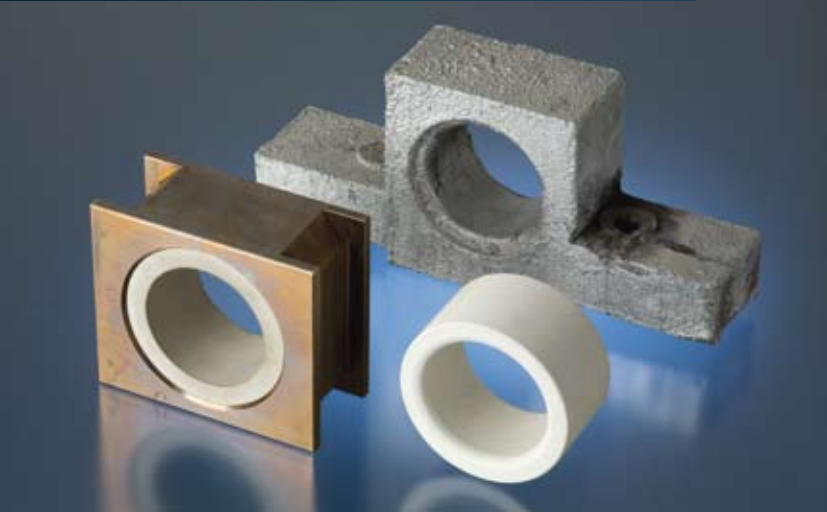
- The production of ceramic bodies of almost any dimensions (internal diameter from 10 mm to 1500 mm, max. length 7000 mm)
- Wall thicknesses from 1 mm to 50 mm
- Thin wall thicknesses even for large diameters and lengths
- Dimensional accuracy
- Reinforcement with fibrous materials or steel
- Short lead times (1 – 3 weeks)

Materials:

- Alumina
- Mullite
- Spinell
- Zirconia toughened alumina
- Zirconia
- Zirconium silicate

Technical features:

- Usable up to approx. 1700°C
- Outstanding temperature stability
- High thermal shock resistance
- Resistant to acids, lyes, solvents and other chemicals
- Resistant to oxidizing, inert or reducing atmosphere and vacuum
- Resistant to various molten metals (including zinc, tin, aluminium, bronze, copper)
- Low thermal conductivity
- Electrically insulating
- Produced in one single operation enabling short lead times
- Mechanical processing including turning, milling, drilling, grinding, lasering, water jet cutting



Using water plasma technology

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WPT can also be used to coat steel, graphite and various reinforced materials (e.g. plastics) with ceramics.

Benefits of the manufacturing process:

- Layer thicknesses from 0.1 mm to 5.0 mm
- Excellent adhesion even in the case of major thermal expansion differences between the substrate and the coating
- Surface finishes ranging from very rough (Rz 60) to polished (Rz 15)
- Maximum dimensions
round parts: max. length 7000 mm,
max. Ø 1200 mm
flat parts: 2000 mm x 1000 mm

Technical coating features

- Usable up to approx. 1300°C
- Provides thermal and electrical insulation
- Tolerates thermal shocks
- Resistant to compression loads
- Can be used in a vacuum or in environments with various gases
- Prevents product contamination
- Is not wetted by various molten metals
- Avoids pick-up effect
- Resistant to friction and abrasion

Applications:

- Industrial furnace engineering: pipes, rotary tubes, insulating tubes, burner tubes, racks
- Steel industry: furnace rollers, bearing blocks
- Petrochemistry: ferrules
- Glass industry: furnace rollers
- Semiconductor industry: liner tubes
- Chemistry: ceramic reactors, combustion chambers
- Mechanical engineering: sheath tubes
- HT processes: rack for vacuum soldering
- Waste incineration: rotary tubes
- Waste separation: insulating tubes
- Crystal growth: protective tubes, insulating tubes



**LWK plasma ceramic:
extended service
life, enhanced resist-
ance and higher
profitability**

For more than 40 years LWK has been developing methods to protect engineering components from wear.

Our high level of expertise, good flexibility, staff qualifications and maximum customer dedication by expedient order handling have made us the partner chosen by numerous companies both in Germany and abroad.

LWK has firmly made its mark in the mechanical engineering industry, industrial furnace construction, the steel, petrochemical and glass industries and many others.

Our excellent reputation is based not only on fast problem solving – even over night – but also on the constant improvement of our processes and their flexible adjustment to suit customer applications.

Our stringent quality management system ensures standardised, repeatable production workflows to give our customers the safety which they can always rely on.

	Unit	Alumina Al ₂ O ₃	Spinel Al ₂ O ₃ /MgO	Mullite Al ₂ O ₃ /SiO ₂	Alumina/Zirc. Al ₂ O ₃ /ZrO ₂	Zirconia ZrO ₂ (MgO)
Main components	%	>99,8 Al ₂ O ₃	74-76 Al ₂ O ₃ 24-26 MgO	75-77 Al ₂ O ₃ 23-25 SiO ₂	75-76 Al ₂ O ₃ 24-25 ZrO ₂	73-74 ZrO ₂ 26-27 MgO
Alkali content	%	0,1	–	0,2	0,1	–
Density	g cm ⁻³	3,2	3,2	2,8	3,5	4,4
Water absorption capacity	%	13-15	7-9	7-9	8-10	12-14
Bending strength	MPa	35	45	30	40	15
Modulus of elasticity	GPa	40	75	35	25	12
Hardness HV30	–	210	240	550	340	220
Thermal expansion 20° C – 1000° C	10 ⁻⁶ K ⁻¹	8,4	8,6	5,5	6,5	9,2
Thermal expansion 20° C – 1200° C	10 ⁻⁶ K ⁻¹	8,7	9,0	5,7	7,0	4,0
Thermal conductivity 20° C	W m ⁻¹ K ⁻¹	3,5	2,5	1,2	2,2	0,2
Thermal conductivity 1200° C	W m ⁻¹ K ⁻¹	1,0	0,8	1,0	0,7	0,3
Dielectric strength	kV mm ⁻¹	4,5	4,2	3,0	3,5	3,3
Thermal shock resistance	–	good	good	very good	good	very good

Table shows approximate values for LWK main products.
Other ceramics are available upon request.

LWK

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