



**World class in
ceramic components**

About Philips

We are...

- Founded in 1891
- Headquartered in Amsterdam, The Netherlands
- One of the largest global diversified industrial companies with sales in 2011 of EUR 22.6 billion
- A multinational workforce of 121,888 employees (January 2012)
- Globally present with manufacturing sites in 100 countries and sales outlets in 100 countries
- An R&D force with expenditures of EUR 1, 6 billion (2011)

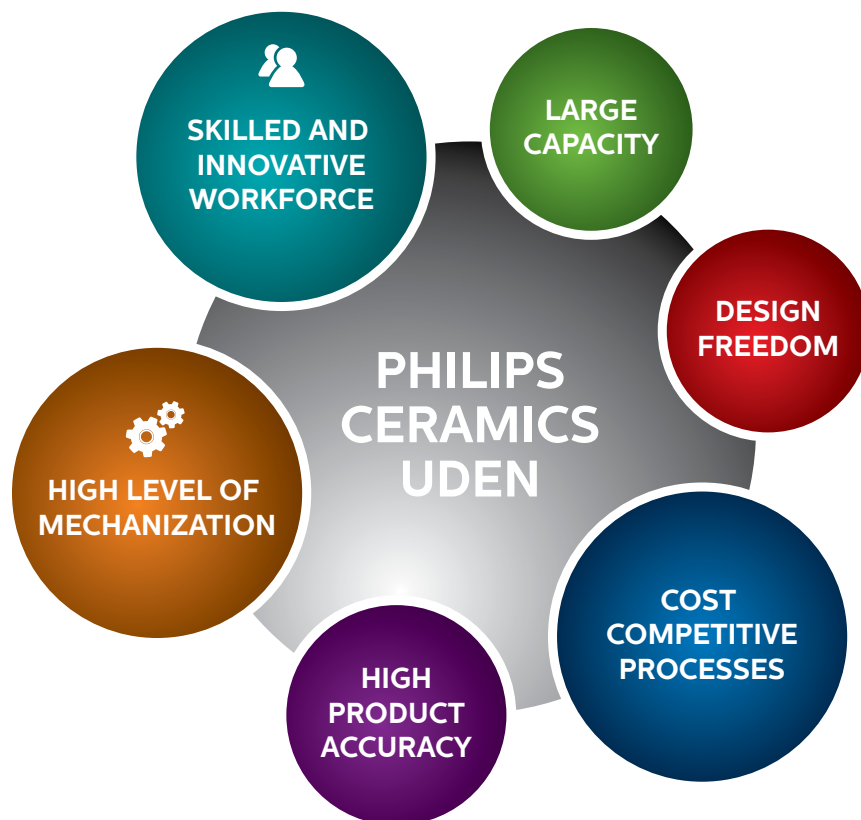
About Philips Ceramics Uden

Our core business at Philips Ceramics Uden is the development and manufacturing of translucent ceramics for High Intensity Discharge lamps. These lamps have a unique combination of high quality of light and low energy consumption.

Over the last 10 years Philips Uden invested heavily in the development of new production technologies. Main production technology is now the *Ceramic Injection Molding (CIM)* Technology. The investments in mechanization and CIM Technology, have resulted in a production facility that delivers high quality products against the lowest possible price.

We are able to compete with ceramic suppliers all over the world. With an annual CIM production capacity of over 25 Million translucent ceramic components, we are the largest translucent ceramic injection molding facility in the world.

Over the last years we are expanding our product portfolio towards non Lighting ceramic components. The technology developed over the past 40 years in ceramic processing is now being used for new products and developments in the fields of high quality ceramics.



Our technologies

Extrusion

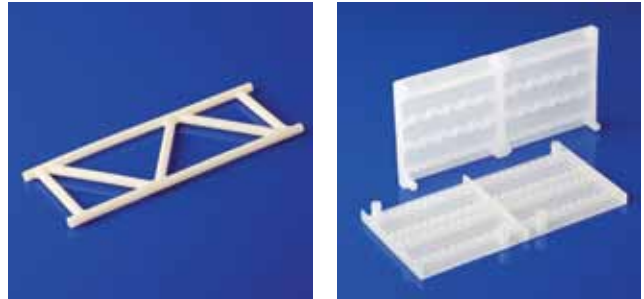
Extrusion of both alumina tubes and rods is one of our core technologies. The special drying process enables us to produce tubes and rods with high accuracy in radial dimensions.



Extruded tubes and rings

Joining

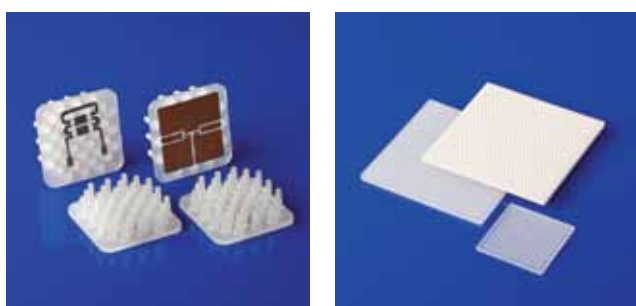
One of our unique competences is our joining process. When this assembly technology is used, the material characteristics of the joint after sintering are identical to the intrinsic material.



Examples of joining technology

Injection molding

Over the past 10 years we developed the injection molding technology for ceramic products. The technology gives product designers an enormous design freedom. The highly mechanized CIM production facility is capable of producing very high volume quantities with very high accuracy against low cost.



Injection molded products

Firing

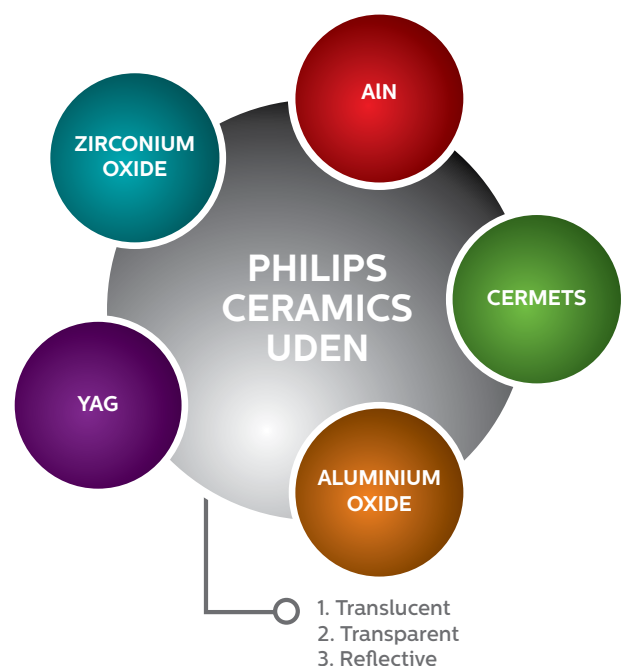
Our sintering methods are designed for creating products with very high density eliminating almost all pores. This results in material properties close to sapphire.

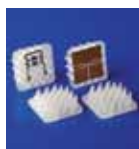


Product examples

Materials and optical properties

We have a wide range of material types that are used in combination with our process technologies. This enables us to control the optical appearance of products. We can make ceramics translucent, almost fully transparent or reflective ceramics with different levels of white coloring. Some examples of materials we process are aluminum oxide, zirconium oxide, YAG and cermets.





THERMAL CONDUCTIVITY

THERMAL RANGE



GAS TIGHT PROPERTIES



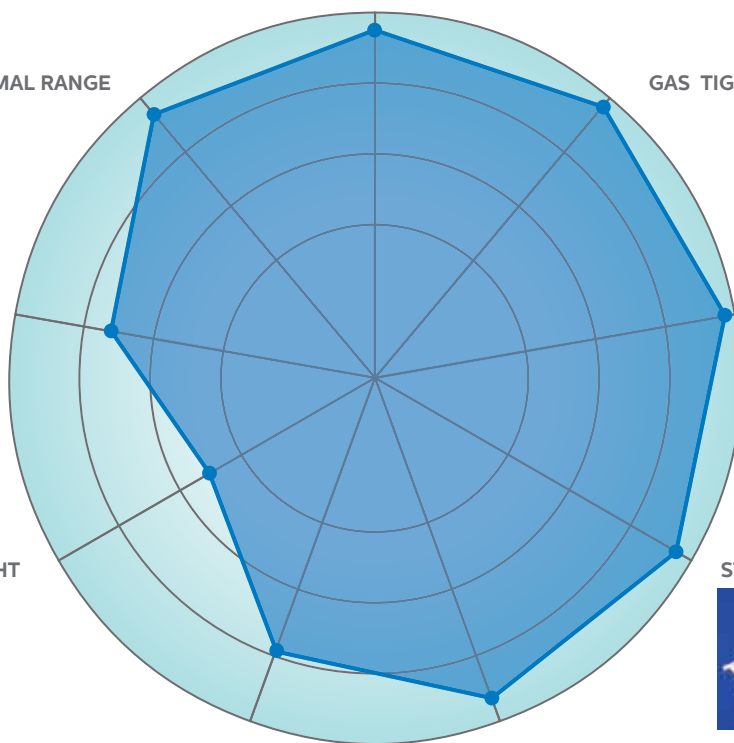
OPTICAL TRANSPARENCY



CHEMICAL INERTNESS



WEIGHT



STIFFNESS



DESIGN FREEDOM

HARDNESS



Unique, by a combination of strengths

Technical Data Sheet Ceramic Materials

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Properties	Al ₂ O ₃ > 99,9%	ZrO ₂	AlN	UNIT
Thermal Properties				
Thermal Conductivity	35-40	3	180	W/m.K at 25.0 °C
CTE, linear	5.5			µm/m.°C at 25.0 °C
Electrical Properties				
Dielectric Strength	>55k		15	V/mm
Gas Tight Properties				
Density	3.98	5,74	3,30	gr/cm ³
Porosity	No open porosity	No open porosity		
Chemical Inertness				
Hydrolitic Resistance	Better than type 1			
Stiffness				
Elasticity Modus	380	205	320	GPa
Hardness				
Mohs Scale	9	8		
Thermal Range				
Temperature	0 - 2000	0 - 900	0 - 1800	°C
Optical Transparency				
TLT (Total Light Transmittance)	>98			%
ILT (Inline Light Transmittance)	≈80			%

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