



simply high temperature technology

HIGH TEMPERATURE METALLIC-CERAMIC  
**PRODUCTS, COMPONENTS AND SYSTEMS  
FOR ELECTRICALLY AND COMBUSTION-HEATED  
FURNACES**

660 °C – 1800 °C

HEATING | INSULATION | MEASURING



## PROFESSIONAL AND COMPETITIVE HIGH TEMPERATURE TECHNOLOGY

SCHUPP® Ceramics is an established specialist for high temperature technology. Our family-owned company has been developing, producing and marketing high-quality metallic-ceramic solutions for sintering, firing, melting and heat treatment since 1996. Whether in combustion- or electrically heated industrial and laboratory furnaces /kilns, our products, components and systems work reliably at

temperatures of 660 °C to 1800 °C. From approved standard products for high-precision firing process control to individual, custom-made products for electrical heating or thermal insulation – we provide standard and tailor-made solutions for industrial applications, production and research for customers around the world.

	Current Status 2016	Plan 2020
<b>OWNERS</b>	Michael E. Schupp and Employees: 100 %	Michael E. Schupp and Employees: 100 %
<b>TURNOVER</b>	11 Million EUR	18 Million EUR
<b>EMPLOYEES</b>	55	80
<b>COMPANY PREMISES</b>	3500 m <sup>2</sup>	4500 m <sup>2</sup>
<b>EQUITY CAPITAL</b>	57 %	70 %
<b>COMPANY DEPARTMENTS</b>	4	6
<b>NETWORK PRODUCTION PARTNER (WORLDWIDE)</b>	6 (200 Employees)	6

## YOUR APPLICATION INDUSTRIES TRADITIONAL & INNOVATIV



### SINTERING & FIRING

- Furnace & Kiln Manufacturer (Industry & Laboratory)
- Technical Ceramics
- Dental Technology (Zirconia)
- Ceramic Injection Moulding (CIM)
- Metal Injection Moulding (MIM)
- Bioceramics (Medical Ceramics)
- Electronic Passive Components (MLCC & LTCC)
- Catalyst Honeycombs, DPF Filter Ceramics Technology & Sensors (Exhaust System Technology)
- Soft & Hard Ferrites/Magnets
- Phosphorescent Pigments
- ITO Targets
- High Temperature Fuel Cells (SOFC)
- Batteries (Li & NaS)
- Luxury Goods (Watch & Car Industry)
- Structural Ceramics (Roof Tiles, Wall & Floor Tiles, Sanitary Ware, Stoneware Pipes)
- Abrasives/Grinding Wheels (Al<sub>2</sub>O<sub>3</sub> & SiC)
- Ceramic Tableware/Porcelain
- Refractory Materials
- Gas Turbine Technology
- Ceramic Powders (Oxide/Non-Oxide)
- Ceramic Raw Materials (Clay, Fire Clay)
- Sensor Technology (NO<sub>x</sub>, O<sub>2</sub>)
- HIP Technology



### MELTING

- Furnace Manufacturer
- Glass Ceramics
- Crystal Glass
- Borosilicate & Quartz Glass
- Jewellery Glass
- Crystal Growth Technology (Sapphire)
- Optical Glass Filaments
- Precious Metals
- Refractory Metals
- Super Metals
- Photovoltaic & Semiconductor (Si)



### HEAT TREATMENT

- Furnace Manufacturer
- Semiconductor Industry (Si & SiC)
- Diffusion Furnaces/CVD
- Forging Furnaces
- Sheet Steel & Steel-Mills
- Press Hardening
- Surface Hardening
- Gems (Sapphire & Rubies)
- Synthetic Crystals
- SiC-Technology
- Petrochemical Furnaces (Ethylene/Cracker)
- Turbine Technology (Aircraft Industry)
- Carbon Technology
- Elemental Analysis
- Laboratory Gas Technology (O<sub>2</sub>)



### MATERIAL (METALLIC/CERAMIC/GLASS) RESEARCH & DEVELOPMENT

- Technical Universities
- Research Institutes & Facilities
- Laboratories & Testing Institutes



### ENGINEERING

- Module Manufacturer for Furnace Lining
- Refractories Technology
- Manufacturer of Insulation Shapes, Milled Parts & High Temperature Paper/Boards
- Trading of High Temperature Components
- Hot Gas Filtration
- Domestic Appliance
- Heating Boilers
- Fire Protection

## TYPES OF HEATING



FOR ELECTRICALLY HEATED  
FURNACES



FOR COMBUSTION-HEATED  
FURNACES



## ADDING VALUE BY VALUING OTHERS

Flexibility and determination characterise how we meet our customers' requirements. Our international team of more than 50 employees are focused on assisting more than 900 customers worldwide. Trust, honesty and the will to make a difference define how we establish and maintain successful partnerships.

In keeping with the principle *adding value by valuing others*, we cultivate our relationships with customers, production and research partners and employees. Similarly, it is understood that we handle materials and energy as responsibly and sparingly as possible.

These values have guided us since the company was founded in 1996, and we are always striving to live up to them. Your success and your satisfaction provide us with motivation, passion and impetus.



October 2015, SCHUPP®-Crew  
with our Company-Fellow "Sammy"

WE ARE ENGINEERS AND BUSINESSMEN,  
CRAFTSMEN AND WORKERS.  
THAT'S WHAT WE STAND FOR!





**MANFRED HERWEG**  
TECHNICAL DIRECTOR

## EXPERTISE AND EXPERIENCE IN HIGH TEMPERATURE TECHNOLOGY

We develop customised, high temperature systems that successfully integrate into our customers' thermal processes, which ensures efficiency and reliability. Our engineers and technicians precisely analyse the specific challenges of the application from the beginning of the project. They identify potential for improvement and work to find exactly the right technical and economical solution.

For complex requirements, we consciously focus on simple solutions in order to make your work easier

and reduce your costs. Our systems, components and products are built with knowledge gained from four decades of high temperature technology and a keen sense of current market development.

**WE UNDERSTAND OUR CUSTOMERS  
AND OUR BUSINESS!**



**ANDREI LOSCUTOV**  
COMMERCIAL DIRECTOR

## SALES ARE A MATTER OF TRUST

We trust our customers and we want them to trust us. That's why we rely on fair pricing, as well as cooperative dialogue and clear communication in all directions. Your contact person will answer your questions as quickly as possible thanks to many years of experience in high temperature technology.

We will accompany you on your journey: For the successful development of new business areas, our sales engineers will also advise and assist you with

practical measures. At the same time, creativity is as much a matter of course as our claim that we will constantly strive to improve for you.

**| YOU CAN RELY ON THAT!**

# UltraBoard & UltraVac

Efficient thermal insulation up to **1800 °C**



- Up to 1800 °C application temperature
- Low thermal conductivity
- Long service life due to very low shrinkage
- Easy machining (homogeneous structure)
- Standard dimensions for boards: 900 mm x 600 mm
- Thicknesses: 20, 25, 40, 50, 100 mm
- Density: up to 700 kg/m<sup>3</sup>

## BOARDS, CYLINDERS AND SHAPES MADE OF POLYCRYSTALLINE MULLITE/ALUMINA WOOL (PCW)



UltraBoard and UltraVac insulate electric-heated industrial and laboratory furnaces/kilns up to 1800 °C. Made of polycrystalline mullite/alumina wool (PCW), these parts are a high-quality alternative to insulation materials made of aluminosilicate wool (ASW), also known as refractory ceramic fibre (RCF). The shot-free quality, minimal shrinkage and

dimensional stability of our material guarantee a long service life, making it particularly economical. Special qualities up to 99 % alumina are available upon request.

## POLYCRYSTALLINE MULLITE/ALUMINA WOOL AND NEEDED BLANKETS



ITM-Fibermax® is the flexible thermal insulation variant – whether as a raw material in the form of wool and needed blankets. The material is an extremely good substitution for materials containing ceramic fiber.

The light, shot- and ceramic fibre-free material is particularly suitable for temperatures above 1250 °C as well as applications that require a chemical resistance.

Blankets needled on both sides are an indispensable component in module production. They have an alumina content of 72 %. We offer densities of 100 kg/m<sup>3</sup> and 130 kg/m<sup>3</sup>.

## ITM-Fibermax®

Flexible thermal insulation up to **1600 °C**



- Mullite structure, high-strength
- Shot-free and ceramic fibre-free
- Up to 1600 °C application temperature
- 72 % Al<sub>2</sub>O<sub>3</sub> content
- Long service life due to very low shrinkage
- Thicknesses of blankets: 6 mm to 25 mm
- Densities of blankets: 100 kg/m<sup>3</sup> and 130 kg/m<sup>3</sup>



# MolyTec

Electric heating and thermal insulation up to **1650 °C**



- Combination of MolyCom® and UltraBoard/UltraVac
- Up to 1650 °C application temperature
- Complete furnace linings as customised production according your requirements
- Our service: consulting, conception, heat transfer calculation, construction and installation

# UltraVac

Insulation boards, cylinders and shapes for your furnace lining up to **1800 °C**



## CUSTOMISED ELECTRIC HEATING SYSTEMS AND FURNACE LININGS



MolyTec combines intermetallic molybdenum disilicide ( $\text{MoSi}_2$ ) heating elements and polycrystalline mullite/alumina wool (PCW) shaped insulation parts to make turn-key heating systems for sophisticated areas like production, research and development environments. MolyTec is fully compatible with all technically comparable heating systems and can be integrated into almost any type of furnace system.

We also manufacture complete furnace sets of PCW insulation boards up to 1800 °C as an economical alternative for the re-lining of existing furnaces and for the production of new systems. In addition to the

furnace lining, we also offer the appropriate electric heating elements ( $\text{MoSi}_2$ ) upon request – **all from one source**. Development, planning and installation of both versions is always carried out at our company's premises. We draw upon our many years' experience in high temperature technology and in a wide range of application industries to find a solution that is both technically optimised and cost-efficient.

This is how we also quickly develop and implement special solutions with individual dimensions and structures to meet your requirements.

INDUSTRIAL STANDARD

## MolyCom®-Ultra 1700, 1800 and 1850

HIGH PURITY

## MolyCom®-Hyper 1800, 1800SC<sup>1)</sup> and 1800AP<sup>2)</sup>

Electric heating up to 1750 °C



<sup>1)</sup>SC - Super Clean  
<sup>2)</sup>AP - Anti Pest

- MolyCom®-Ultra – Industrial Standard
- MolyCom®-Hyper – High Purity trace elements are reduced to a minimum (1/10)
- Up to 1820 °C element temperature; up to 1750 °C application temperature
- High surface load and long service life of the elements
- Diameters from 3/6 mm to 12/24 mm and lengths from 25 mm to 2000 mm
- Geometries: U-, L-, W-shaped elements and other element geometries
- Fully compatible to elements of comparable manufactures
- All accessories available e.g. holders or connecting bands



Complex heating element geometries

## INTERMETALLIC MOLYBDENUM DISILICIDE HEATING ELEMENTS (MoSi<sub>2</sub>)



Whether industrial standard, high-purity demands or special resistance to oxidation – SCHUPP® Ceramics makes high temperature technology to suit your specific requirements. MolyCom®-Ultra 1700, 1800 and 1850 are particularly durable and conform to industrial standards. The heating elements form a self-healing protective layer of pure quartz. MolyCom®-Hyper 1800 is the solution for particularly high purity demands: Trace elements are reduced to a minimum (1/10 compared to competitor).

MolyCom®-Hyper 1800 and 1800SC<sup>1)</sup> allow sintering of zirconia without discolouration, also above 1600 °C. MolyCom®-Hyper 1800AP<sup>2)</sup> is a special type of element, one that is resistant to oxidation from 200 °C to 700 °C.

All heating elements are also fully compatible with other comparable manufacturers' elements. We create complex heating element geometries and offer all kinds of required accessories, such as holders or connecting bands.

# Process Temperature Control Rings PTCR

Universal, precise control of thermal processes from **660 °C** up to **1750 °C**



- 6 ring-types in a temperature range from 660 °C to 1750 °C
- Ensuring a reliable, outstanding and regular quality level
- Reducing of your quality assurance efforts
- Precise measuring results +/- 3 °C or better
- Easy handling and cost-efficient

## CERAMIC MEASURING RINGS FOR DOCUMENTING SINTERING, FIRING AND HEAT TREATMENT PROCESSES



Process temperature control rings PTCR make a decisive contribution to controlling and therefore to the quality of thermal processes. Thanks to their special ceramic material properties, they determine the heat input up to 1750 °C more precisely than conventional measurement methods. This enables precise furnace settings. The measuring rings are placed anywhere in the furnace and they precisely register the total amount of radiation, convection and

contact heat transferred to them. The degree of contraction is almost linear over the complete operating range of the PTCR, providing a practical measure of the accumulated heat during continuous or batch processes. We offer a web-based application to simplify the work with PTCR and the documentation of thermal processes – **PTCR WEB APP**. We provide digital micrometers with custom-fit receptacles for the rings and USB interfaces for data transfer.

# CERAMIC ADHESIVE FOR HIGH TEMPERATURE APPLICATIONS

MADE OF POLYCRYSTALLINE MULLITE/ALUMINA WOOL (PCW)



SCHUPP® Ceramics offers a reliable solution for connecting high temperature parts as well: FiberPlast C 1800 D permits reliable bonding or coating of ceramic fibre-based materials - such as insulation boards.

The single-component adhesive ready for use is particularly easy to process and will hold reliably and permanently at application temperatures up to 1750 °C. The plastic adhesive is made of polycrystalline mullite/alumina wool (PCW) with

added inorganic binders and specifically coordinated additives.

We will gladly develop special high temperature masses, such as adhesives or coatings, together with you to suit your requirements.

## FiberPlast C 1800 D

Permanent adhesion at highest temperatures up to **1750 °C**

- Bonded or coated ceramic fibre-based parts
- For permanently safe connections
- Application temperatures up to 1750 °C
- Single-component adhesive ready for use and easy to process
- Made of polycrystalline mullite/alumina wool (PCW)
- Also for repairs and maintenance work







**DR. KATARZYNA FAŁENTY**  
INNOVATION & TECHNOLOGY MANAGER

## QUALITY MANAGEMENT IS TEAMWORK

We want to help your company succeed, this is how we measure the value of our work. This is why we have developed a comprehensive quality management system that is reflected in the high standard of all of our systems, components and products.

We are committed to this quality: From the beginning to the end of the production chain,

everyone in the team always strives to optimise the results from development to practical implementation. This is the standard that we set for ourselves and for the close cooperation with our production partners and the RWTH Aachen University at our location.

**FOR YOUR SUCCESS, WE BELIEVE  
IT'S WORTH THE EFFORT!**



**VASILEIOS POURDAS**  
WAREHOUSE & LOGISTICS MANAGER

## LOGISTICS IS MORE THAN JUST TRANSPORTATION

The reliable integration of our systems, components and products into your supply chain is important to us. This is why we offer customised, simple logistics solutions across every single step of the process. Together with our international partners we always strive for more than punctual delivery.

With professional inventory management, clear delivery procedures and safety packaging, we ensure

the success of our customers' production, particularly in dynamic and complex markets.

**WE CONTROL, STORE, PACKAGE  
AND SORT THINGS OUT FOR YOU!**



OVERVIEW TECHNICAL DATA

All technical data sheets are available on [www.schupp-ceramics.com](http://www.schupp-ceramics.com).



MolyCom®-Ultra 1700, 1800 & 1850

INDUSTRIAL STANDARD		MolyCom®-Ultra 1700	MolyCom®-Ultra 1800	MolyCom®-Ultra 1850
Density	[kg/dm³]	5.8	5.8	6.5
Bending strength at 20 °C	[N/mm²]	350 – 450	350 – 450	350 - 450
Porosity	[%]	< 1	< 1	< 1
Max. element temperature (under air)	[°C]	1700	1780	1820
Max. furnace/ kiln temperature (under air)	[°C]	1600	1650	1750

MolyCom®-Hyper 1800 / -Hyper 1800SC / -Hyper 1800AP

HIGH PURITY		MolyCom®-Hyper 1800	MolyCom®-Hyper 1800SC <sup>1)</sup>	MolyCom®-Hyper 1800AP <sup>2)</sup>
Density	[kg/dm³]	5.7	5.7	5.7
Bending strength at 20 °C	[N/mm²]	350 – 450	350 – 450	350 – 450
Porosity	[%]	< 1	< 1	< 1
Max. element temperature (under air)	[°C]	1800	1800	1800
Max. furnace/kiln temperature (under air)*	[°C]	1750	1750	1750

\*Depending on furnace size and type. | <sup>1)</sup>SC - Super Clean / <sup>2)</sup>AP - Anti Pest

Size [mm]	ø d [mm]	ø c [mm]	Lu [mm]	Le [mm]	a [mm]	f [mm]	g [mm]
3/6*	3	6	60 – 400	25 – 500	25	25	15
4/9*	4	9	60 – 400	25 – 500	25	25	15
6/12*	6	12	70 – 1000	40 – 1400	50	45	25
9/18	9	18	70 – 1000	50 – 2000	60	75	30
12/24	12	24	100 – 1000	60 – 2000	80	100	40

Other dimensions on request. \*Also available as MolyCom®-Hyper 1800, MolyCom®-Hyper 1800SC and MolyCom®-Hyper 1800AP. Maximum length: Le 650 mm and Lu 500 mm.



MolyTec Heating Systems up to 1650 °C

A combination of MolyCom®-Ultra or -Hyper with UltraBoard or UltraVac are produced and adjusted on customer request. Possible geometries: panels, cylinders/tubes.



UltraBoard & UltraVac up to 1800 °C

Type		1500/300	1600/400	1650/400	1750/400	1750/400P	1750/400PS	1850/400	1850/500
SiO <sub>2</sub>	[%]	37	35	33	28	22	15	15	15
Al <sub>2</sub> O <sub>3</sub>	[%]	63	65	67	72	78	85	85	85
Classification temperature	[°C]	1500	1600	1650	1750	1750	1750	1850	1850
Max. furnace/ kiln temperature	[°C]	1420	1480	1600	1700	1700	1700	1800	1800
Density	[kg/m³]	300	400	400	400	400	400	400	500
Thermal conductivity	[W/mK]	0.20 (1200 °C)	0.22 (1200 °C)	0.28 (1400 °C)	0.29 (1400 °C)	0.24 (1400 °C)	0.33 (1400 °C)	0.34 (1400 °C)	0.38 (1400 °C)
Linear shrinkage	[%]	1.2 (1500 °C/ 24 Std.)	0.5 (1600 °C/ 24 Std.)	0.2 (1600 °C/ 24 Std.)	0.2 (1700 °C/ 24 Std.)	0.0 (1700 °C/ 24 Std.)	0.7 (1700 °C/ 24 Std.)	-0.5 (1700 °C/ 24 Std.)	-0.2 (1700 °C/ 24 Std.)

Standard dimensions UltraBoard: 900 mm x 600 mm x (20, 25, 40, 50, 100 mm) – Other dimensions available on request. UltraVac: Dimensions on request. Different geometries possible.

Densities are available up to 700 kg/m³. UltraBoard A99 1600/500 is available on request. (Al<sub>2</sub>O<sub>3</sub> = 99 %).



ITM-Fibermax® Bulk Wool & Needled Blankets up to 1600 °C

Type	Al <sub>2</sub> O <sub>3</sub> [%]	Density [kg/m³]	Thermal conductivity [W/mK]	Thickness [mm]	Sizes [mm]	Type of packaging	Comments
Bulk Wool 1600	72	-	-	-	-	10 kg bag of wool	unchopped/ chopped
Blanket 1600/100	72	100	0.42 (1200 °C)	12.5* 25*	610 x 7200*	roll	needled
Blanket 1600/130	72	130	0.36 (1200 °C)	12.5* 25*	610 x 7200*	roll	needled

\*Width also in 1220 mm available. Special sizes or thicknesses are available on request.



Process Temperature Control Rings PTCR 660 °C – 1750 °C

Type	Temperature range [°C]	Color	Dimensions
PTCR-UTH	660 – 900	yellow	Ø Outer: 20 mm  Ø Inner: 10 mm  Standard height: 7 mm Special height: 3.5 mm
PTCR-ETH	850 – 1100	pale green	
PTCR-LTH	970 – 1250	pink	
PTCR-STH	1130 – 1400	green	
PTCR-MTH	1340 – 1520	yellow	
PTCR-HTH	1450 – 1750	white	



FiberPlast C 1800 D up to 1750 °C

Type	Al <sub>2</sub> O <sub>3</sub> [%]	Density [kg/m³]	Type of packaging	Comments
FiberPlast C 1800 D	80	1400 (wet) 1050 (dry)	1 kg, other packaging available on request	Ready to use, wet moldable for adhesive bonding, repair & maintenance.





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