

Morgan Haldenwanger Technical Ceramic (Wuxi) Co., Ltd.
摩根海登皇格技术陶瓷(无锡)有限公司



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摩根海登皇格技术陶瓷(无锡)有限公司

英国摩根先进材料公司成立于1856年，是先进材料领域的全球领导者，在伦敦证券交易所上市。

海登皇格作为全球领先的高科技陶瓷生产商1865年成立于德国，1997年加入摩根先进材料公司，是摩根重要的业务组成部分。在德国、中国和美国有工厂和机构，为全球的客户优质的产品和服务。

摩根海登皇格技术陶瓷(无锡)有限公司于1993年由海登皇格投资成立，并引进海登皇格技术，目前是英国摩根先进材料在中国的独资公司。

产品主要应用于玻璃、太阳能、建筑陶瓷、金属热处理、能源、半导体、钢铁、石化等领域。

Morgan Haldenwanger Technical Ceramic (Wuxi) Co., Ltd.

Morgan Advanced Materials plc. was founded in 1856, is a world leader in advanced materials field and listed on London Stock Exchange.

Haldenwanger, a world leader producer of state-of-the-art ceramics, was founded in 1865 in Germany, joined in Morgan Advanced Materials plc. in 1997, serves as an important business unit part of Morgan. Haldenwanger has factory sites and office in Germany, China and USA, provides high quality products and service for global customers.

Morgan Haldenwanger Technical Ceramic (Wuxi) Co., Ltd. was founded in 1993 invested by Haldenwanger Germany, imported technology of Haldenwanger, now it is a company wholly owned by Morgan Advanced Materials plc.

Our products can be used in the industry of glass, solar, architectural ceramic, metal thermal processing, energy, semiconductor, iron & steel, CPI and so on.



SILLIMANTIN系列陶瓷辊棒 CERAMIC ROLLERS

海登皇格是第一批成功地将陶瓷辊棒应用于辊道窑的公司，提供兼具卓越高温强度和优异热震性能的高品质辊棒。

Haldenwanger is one of the first manufacturers who successfully apply ceramic rollers into roller kiln, provides high quality rollers with outstanding high temperature strength and excellent thermoshock resistance.

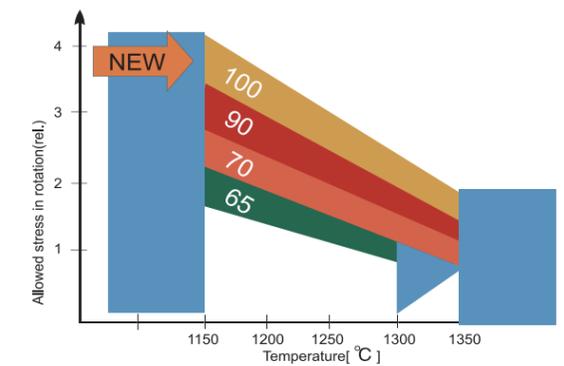
特性 Properties

- ◆卓越的高温强度 Excellent High Temperature Strength
- ◆良好的耐急冷急热性 Excellent Thermal Shock Resistance
- ◆杰出的耐腐蚀性 Outstanding Eroding Resistance
- ◆品质长期稳定 Consistent Roller Quality



应用 Application

- ◆SM65 生产地砖和玻化砖的主选产品。
- ◆SM65Z SM65材质的齿轮辊棒应用于辊道窑急冷带，有效改善辊棒的变形。
- ◆SM70 宽体窑炉高性价比辊棒。
- ◆SM90 更高的使用温度、更大的承载能力、优秀的耐急冷急热性、杰出的耐腐蚀性。高品质外墙砖、抛釉砖、内墙砖的主选产品。
- ◆SM100 具有比SM90更高的强度，同时具有同样优异的热震性能。特别适合于宽体窑及厚重产品的烧制。
- ◆SM65 One outstanding option for producers of floor tiles and vitrified tiles.
- ◆SM65Z Gear rollers of SM65 is applied for the cooling section of roller kiln, with improved anti-bending performance.
- ◆SM70 High cost-effective roller designed for wide-body kiln.
- ◆SM90 Higher application temperature, higher loading ability, excellent thermal shock and eroding resistance stability. Your first choice for high quality exterior wall tile, glazed tile and interior wall tile.
- ◆SM100 Higher strength than SM90, excellent thermal shock resistance. Especially it is the first choice for the wide-body kilns and the firing of heavy products.



陶瓷辊棒物理性能 Physical Properties of Ceramic Roller

	单位 Unit	SM100	SM90	SM70	SM65
氧化铝含量 Al ₂ O ₃ Content	%	76-78	75-77	79-81	78-80
密度 Density	g/cm ³	2.90-3.00	2.80-2.90	2.75-2.85	2.70-2.80
吸水率 Water Absorption	%	4.5-5.5	5.0-6.0	5.5-6.5	6.0-7.0
常温抗折强度 RT Flexural Strength	MPa	70-80	65-75	60-70	55-65
热膨胀系数 (20至1000°C) Thermal Expansion(20-1000°C)	10 ⁻⁶ /°C	6	6	6	6
弹性模量 Modulus of Elasticity	GPa	95	90	85	80
最高使用温度 Maximum Use Temperature	°C	1350	1350	1350	1300
耐急冷急热性 Thermal Shock Resistance		很好 Very Good	很好 Very Good	很好 Very Good	很好 Very Good

以上物理数据来自实验室测试样品，仅供参考。
Please note that all values quoted are based on lab test pieces but only for guidance.



熔融石英辊棒 FUSED SILICA ROLLERS

- ◆ 熔融石英辊棒作为传输辊道广泛应用于安全钢化玻璃、太阳能、金属热处理、钢铁、PDP等行业。
- ◆ 石英辊棒的粗糙度、TIR都处于业界的最高水准。
- ◆ Fused silica rollers are used as transport rollers with application in safety tempering glass, solar industry, PDP and etc.
- ◆ The roughness, TIR of fused silica roller is in the highest standard of the industry.



熔融石英辊棒物理性能 Physical Properties of Fused Silica Roller

	单位 Unit	数值 Values
二氧化硅含量 SiO ₂ Content	%	99.6
密度 Density	g/cm ³	1.92-2.00
常温抗折强度 Flexural Strength	MPa(20°C)	30-40
	MPa(700°C)	45-60
弹性模量 Modulus of Elasticity	GPa	30-40
热膨胀系数 Thermal Expansion	10 ⁻⁶ /°C	0.5-0.9
吸水率 Water Absorption	%	4.5-6.0
孔隙率 Porosity	%	10-14
平均孔径 Mean Pore Radius	µm	≤0.4

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氮化硅涂层 Halcoat

- ◆ 在石英辊棒表面添加氮化硅涂层，可以有效阻止熔炼金属的侵蚀，显著延长辊棒的寿命，广泛应用于金属热处理炉。
- ◆ We are pleased to offer Halcoat coating (silicon nitride-Si₃N₄) which is used for the prevention of molten metals. It significantly extends the operational life of our fused silica rollers, often used in hot pressing furnaces.

尾端金属帽 Metal End Caps

- ◆ 该设计和装配是Morgan的独特专利。
- ◆ 该设计在国内外客户端已批量应用4年多时间，没有一例松脱现象。
- ◆ 我们希望能有机会挑战客户端更苛刻的应用状况。
- ◆ 金属帽表面采用镀铬工艺，更美观耐用。
- ◆ The design and assembly is Morgan unique patent.
- ◆ After over 4 years tracing in end users, there is no case of cap loose.
- ◆ We hope to challenge more severe condition.
- ◆ Apply Chromium plating process, attractive and durable.

Diameter 直径公差: +/- 0.05 mm
TIR 直线度: ≤ 0.15 mm
Roughness 表面粗糙度: Ra ≈ 1.6 µm



Rollers with caps
带有金属套的熔融石英辊棒

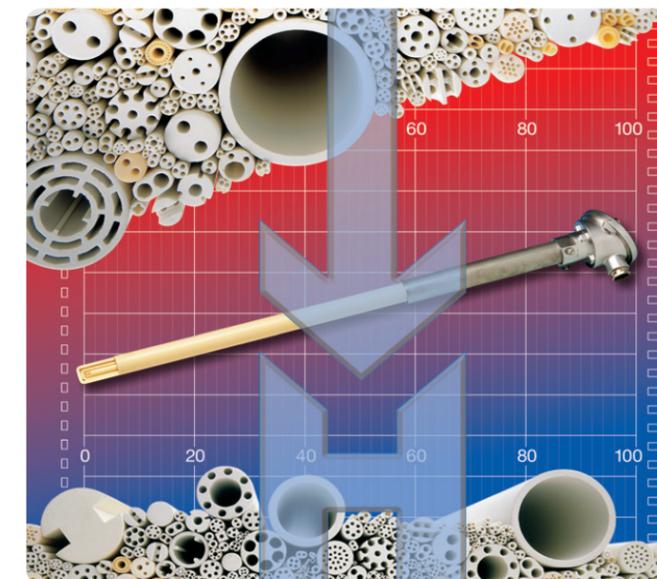
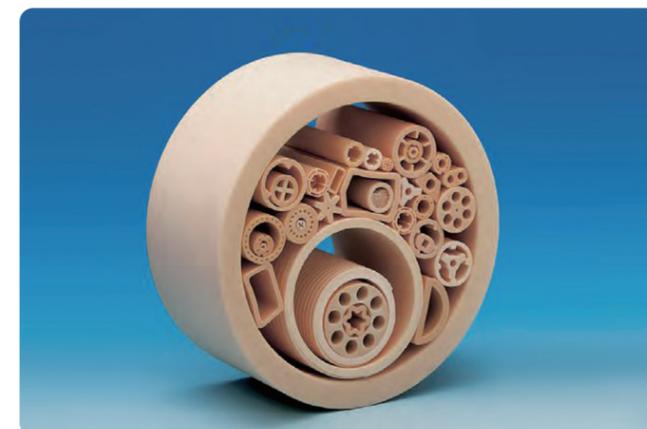
高纯刚玉 ALSINT 99.7

- ◆ 德国海登皇格公司生产高纯的刚玉产品，氧化铝含量达到99.7%。适用于高温、环境恶劣的工况。
- ◆ 主要应用于单晶硅、多晶硅铸锭炉、石化、半导体、电晕机、钢铁等行业，及作为热处理设备和科学分析仪器领域的基准材料使用等等。
- ◆ 具有优异的特性：耐火温度达到1800°C，很高的机械强度和密闭性能，很好的抗化学腐蚀性能。
- ◆ Haldenwanger Germany produces high purity corundum products Alsint 99.7 (Al₂O₃ 99.7%), which are used in working condition of high temperature and severe environment.
- ◆ Can be used in monocrystalline silicon furnace, DSS furnace, CPI, semiconductor, corona machine, steel, and as benchmark material in thermal treatment process and scientific analytical equipment.
- ◆ Exhibit excellent features including high refractory temperature up to 1800 C, high mechanical strength and gas tight capability.

高纯刚玉的物理性能 Physical Properties of Alsint 99.7

	单位 Unit	数值 Values
氧化铝含量 Al ₂ O ₃ Content	%	≥99.7
密度 Density	g/cm ³	3.75-3.94
吸水率 Water Absorption	%	≤0.2
常温抗折强度 RT Flexural Strength	MPa	300
热膨胀系数 (20 至700°C) Thermal Expansion (20-700°C)	10 ⁻⁶ /°C	7.8
弹性模量 Modulus of Elasticity	GPa	300-380
最高使用温度 Maximum Use Temperature	°C	1800
耐急冷急热性 Thermal Shock Resistance		很好 Very Good

以上物理数据来自实验室测试样品，仅供参考。
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为什么在测温领域要选择海登皇格陶瓷管？

- 1、采用挤出成型，尺寸精确 - 比注浆成型更好。
- 2、优异的抗高温性能 - 提高热电偶的使用寿命。
- 3、采用合适的原材料和工艺 - 避免贵金属丝的蒸发和脆化。
- 4、快速的交货及客户定制生产 - 为客户节省存货成本。

海登皇格在陶瓷管的制造领域拥有超过100年的生产经验，海登皇格根据标准DIN 60672-1生产的保护管和绝缘芯分三种标准材料，分别是Type C 799 / Alsint 99.7, Type C 610 / Pythagoras 和Type C 530 / Sillimantin60。

Why Haldenwanger ceramic tubes for temperature measurement ?

1. Dimensional accuracy through extrusion - trumps cast tubes.
2. Excellent high temperature properties - increases thermocouple service life.
3. The right raw materials and processes - avoiding the vaporisation / embrittlement of noble metal wire.
4. Fast lead times and custom manufacturing - Saving you money when it comes to storage and flexibility.

With more than 100 years of experience in the manufacture of ceramic tubes, Haldenwanger produces protecting tubes and insulating profiles from standardised materials such as Type C 799 / Alsint 99.7, Type C 610 / Pythagoras and Type C 530 / Sillimantin 60 using extrusion in accordance with DIN 60672-1.

碳化硅产品 HALSIC PRODUCTS

德国海登皇格生产的Halsic代表着四种性能卓越的碳化硅陶瓷材料。除了高品质的Halsic-R系列(重结晶碳化硅), Halsic-I(反应烧结碳化硅), Halsic-S(无压烧结碳化硅), 我们还提供已注册专利的Halsic-RX材料。由于独特的性能, 这种材料极具抗氧化性。

此外, 最近推出的Halsic-N(氮化硅结合碳化硅)也是一种高性能的窑具材料。

The name Halsic stands for four remarkable ceramic high performance materials from the silicon carbide (SiC) group. Aside from high-quality Halsic-R (recrystallised SiC), Halsic-I (silicon infiltrated SiC) and Halsic-S (sintered SiC), we offer our patented Halsic-RX material, which is extremely resistant to oxidation owing to unique SiC properties.

In addition, the recently launched Halsic-N (nitride bonded SiC) is often preferred as a high performance kiln furniture material.

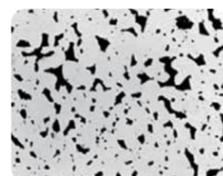
特性 Properties

- ◆ 优异的抗侵蚀和抗腐蚀能力
- ◆ 优异的热导率
- ◆ 杰出的抗氧化性
- ◆ 很高的机械强度
- ◆ 极好的抗热震性能
- ◆ 卓越的抗酸碱性
- ◆ Excellent corrosion resistance
- ◆ High mechanical strength
- ◆ Good thermal conductivity
- ◆ Excellent thermal shock resistance
- ◆ Outstanding oxidation resistance
- ◆ Excellent acid and alkali resistance

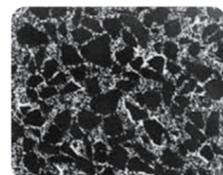
碳化硅材料的物理性能 Physical Properties of Halsic Materials

	单位 Unit	HALSIC-R	HALSIC-RX	HALSIC-I	HALSIC-S
含量: 碳化硅 Content: SiC 金属硅 Metallic Si	vol %	≥ 99	≥ 99	88 - 92 12 - 8	≥ 99
密度20°C Density	g/cm ³	2.7	2.7	3.1	3.1
吸水率 Water Absorption	weight %	5	5	≤ 0.1	≤ 0.1
抗折强度 20°C Flexural Strength	MPa	80 - 100	80 - 100	240 - 280	350 - 400
抗折强度 1300°C Flexural Strength	MPa	90 - 110	90 - 110	250 - 300	370 - 420
热膨胀系数 20 - 1000°C, 线性 Liner Thermal Expansion	10 ⁻⁶ K ⁻¹	4.5	4.5	4.3	5.0
热导率 200°C Thermal Conductivity	Wm ⁻¹ K ⁻¹	35	35	100	124
热导率 1200°C Thermal Conductivity	Wm ⁻¹ K ⁻¹	26	26	32	33
杨氏模量, 静态 20°C Young's Modulus, Static	GPa	280	280	370	420 _{动态(Dyn)}
热震性能 Thermal Shock Resistance	-	非常好 Very Good	非常好 Very Good	非常好 Very Good	非常好 Very Good
最高使用温度 Max. Temperature	°C	approx.2000*	approx.1650	approx.1350	approx.1600

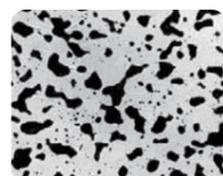
* 保护性气氛2000°C, 氧化气氛下1600°C.
Protective atmosphere 2000°C, Oxidizing atmosphere 1600°C.



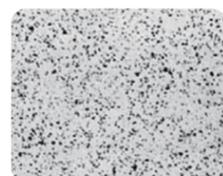
HALSIC-R
重结晶碳化硅坚实的碳化硅基体, 具有典型的开放的相对粗糙的孔结构。



HALSIC-I
反应烧结碳化硅显微结构显示为无孔, 灰色为反应烧结的碳化硅基体, 白色为渗透的金属硅。



HALSIC-RX
以参杂的重结晶碳化硅为基体的横梁, 在陶瓷快烧应用中可以承受大约2000次循环(1420°C, 5-7小时, 冷进冷出)。显微结构显示完整的碳化硅基体和圆孔。



HALSIC-S
无压烧结碳化硅显微结构显示闭孔, 以及典型的微孔分布。



定制产品 CUSTOMIZED PRODUCT

定制产品主要是基于熔融石英和氧化铝莫来石两种材料生产的各种形状的产品。除此之外, 我们还可以根据客户需求提供其他材料。

The material of customized product mainly contains fused silica and alumina-mullite, we can produce many shapes based on the materials. Besides the two materials, we can also provide other materials according to request.

熔融石英产品 Fused Silica Products

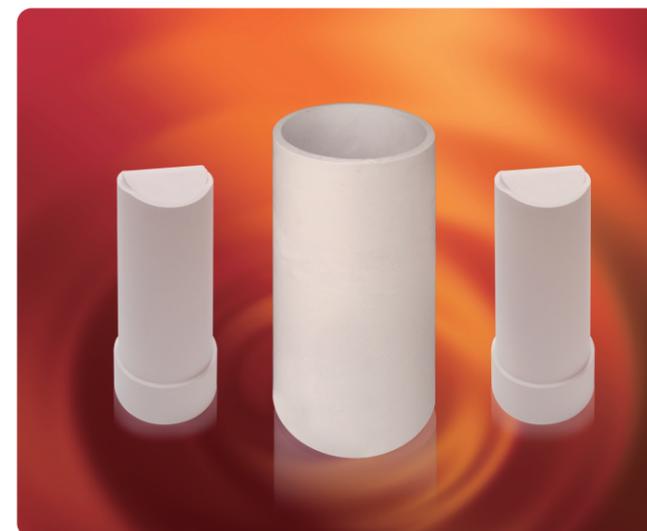
包括熔融石英板, 熔融石英坩埚等, 还可以根据客户图纸生产其他复杂形状的产品。广泛应用于太阳能、低压铸造、钢铁、玻璃、化工等行业。

Our silica products concludes plate and crucible and other complex shapes according to customer request, can be widely used in solar, metallurgy, iron & steel and chemical industries and so on.

石英制品物理性能 Physical Properties of Fused Silica Product

项目 Items	单位 Unit	数值 Values
二氧化硅含量 SiO ₂ Content	%	99.6
密度 Density	g/cm ³	1.85-1.95
常温抗折强度 Flexural Strength	MPa	25-35
常温耐压强度 Compressive Strength	MPa	65-80
弹性模量 Modulus of Elasticity	GPa	30-40
热膨胀系数 Coefficient of Thermal Expansion	10 ⁻⁶ /°C	0.5-0.9

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陶瓷件 CERAMIC PARTS

具有很高的强度、优异的热震性、耐高温性和很好的绝缘性。广泛应用于各种工业炉和工业设备。

They have high strength, excellent thermal shock resistance, high temperature resistance and very good insulation, can be used in many types of industrial furnaces and appliances.



CP650陶瓷件
CP650 Ceramic Parts

陶瓷件的物理性能 Physical Properties of Ceramic Parts

	单位 Unit	CP990	CP950	CP650
氧化铝含量 Al ₂ O ₃ Content	%	98-99.5	93-96	65-70
密度 Density	g/cm ³	≥3.8	≥3.6	2.0-2.3
吸水率 Water Absorption	%	≤0.1	≤0.2	14-16
常温抗折强度 RT Flexural Strength	MPa	≥320	≥300	≥20
常温耐压强度 RT Compressive Strength	MPa	≥1300	≥1200	≥80
热膨胀系数 Thermal Expansion	10 ⁻⁶ /°C	7.6-8.5	6.5-7.8	5.0-6.0
导热系数 Thermal Conductivity	W/m·°C	30-40	20-30	/
介电常数 Dielectric Constant		9.0-10.5	9.0-10.0	2.0-3.0
体积电阻率 Volume Resistivity	Ω·cm	>10 ¹⁴	>10 ¹⁴	>10 ¹⁴
绝缘强度 Insulation Strength	KV·mm ⁻¹	16-18	13-16	>3
最高使用温度 Maximum Temperature	°C	1700	1600	1250

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