

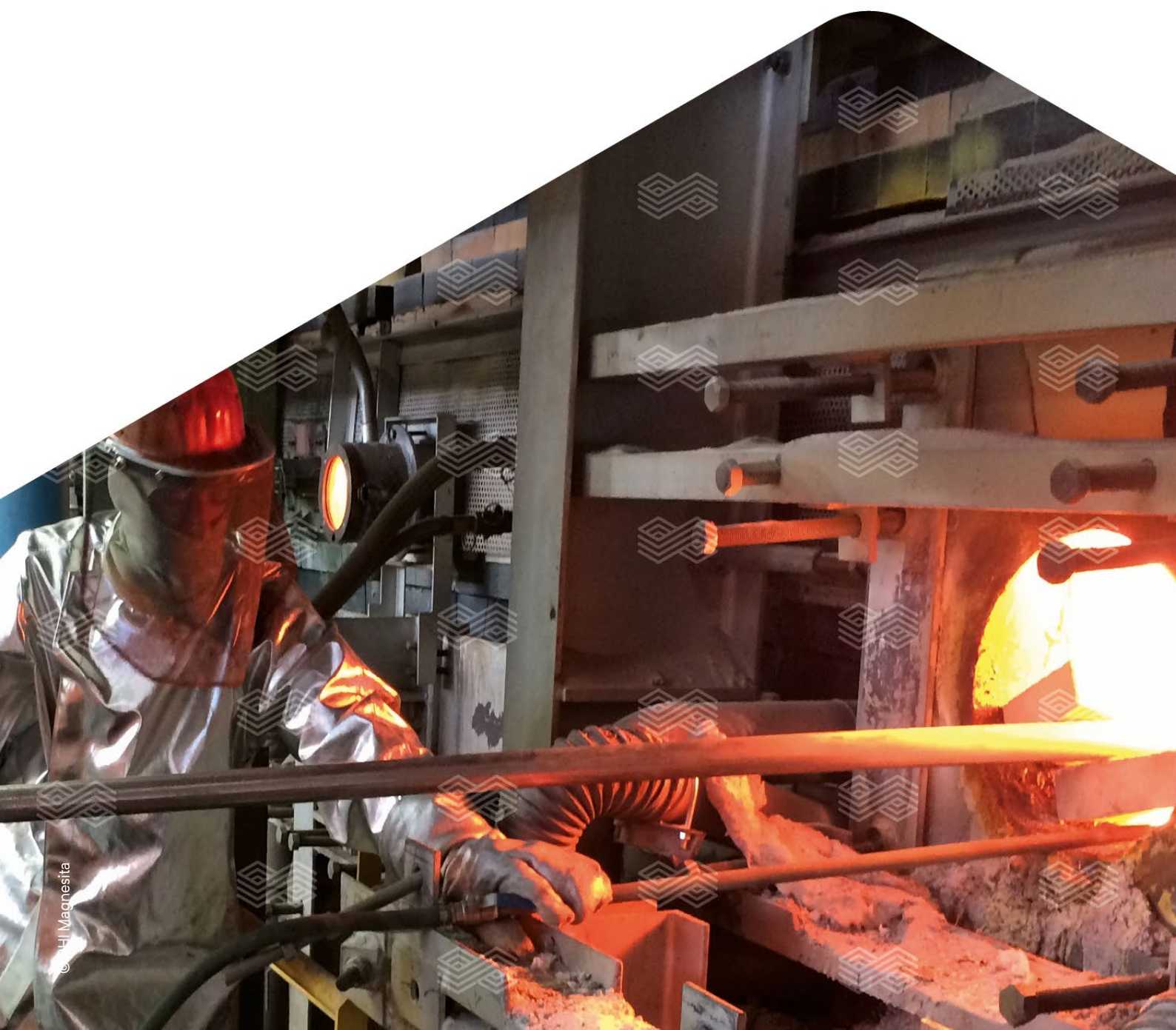


RHI MAGNESITA

GLASS / HOT REPAIR MATERIALS

热修用耐火材料

Refractory Materials for Hot Repairs



我们是 奥镁

玻璃工业里创新、可靠的合作伙伴

奥镁公司—全球耐火材料市场和技术的领导者，其玻璃工业的全球业务集中在制造业及矿产部。奥镁制造业及矿产部可以独立提供高端耐火材料产品并提供方案、完整解决包及服务。

奥镁的产品品牌，如Didier, Veitscher, Radex代表数十年的技术诀窍、创新技术与顶级质量。

奥镁玻璃具有遍布世界的销售与市场网络，确保了最好最可靠的客户服务。一个值得信赖的合作伙伴随时在你身边，及时为你提供协助与咨询，为你提供尤其是在紧急状态下的服务。

奥镁玻璃保证产品不断创新，使得我们的客户始终能接受到最好的材料。奥镁玻璃只使用经过精心挑选的原料。奥镁公司致力于研发低玻璃缺陷与高耐腐蚀性的耐火材料。

奥镁注重在生产中对资源有效地利用，并使用最高的环保标准，为环境保护作出积极贡献。

奥镁生产网络遍布世界各地。拥有35个具备尖端设备机械的生产厂，并得到国际环境和质量保障体系认证。

We are RHI Magnesita

An Innovative and Reliable Partner of the Glass Industry

RHI Magnesita is the global leader in refractories and concentrates its worldwide activities for the glass industry in the BU Process Industries & Minerals. RHI Magnesita Process Industries & Minerals offers high-end refractory products and solutions and services, from a single source.

RHI Magnesita's product brands, such as Didier, Veitscher, and Radex, stand for decades of know-how, innovative technology, and top quality.

A worldwide sales and service network ensures the best and most reliable customer service in the industry: competent employees with outstanding technical expertise are always available to solve problems and support customers in emergencies.

RHI Magnesita guarantees top product quality and continuous innovations in order to meet the increased requirements in the glass industry. Only carefully selected raw materials are used. R&D activities at RHI Magnesita focus on the development of refractory materials with low glass defect potential and high corrosion resistance.

RHI Magnesita makes an active contribution to protecting the environment through the effective use of resources in production and the highest environmental standards.

The worldwide manufacturing network of RHI Magnesita, which comprises 35 main production plants, is equipped with state-of-the-art production facilities and has international registered certificates for environment and quality assurance.

热修用耐火砖

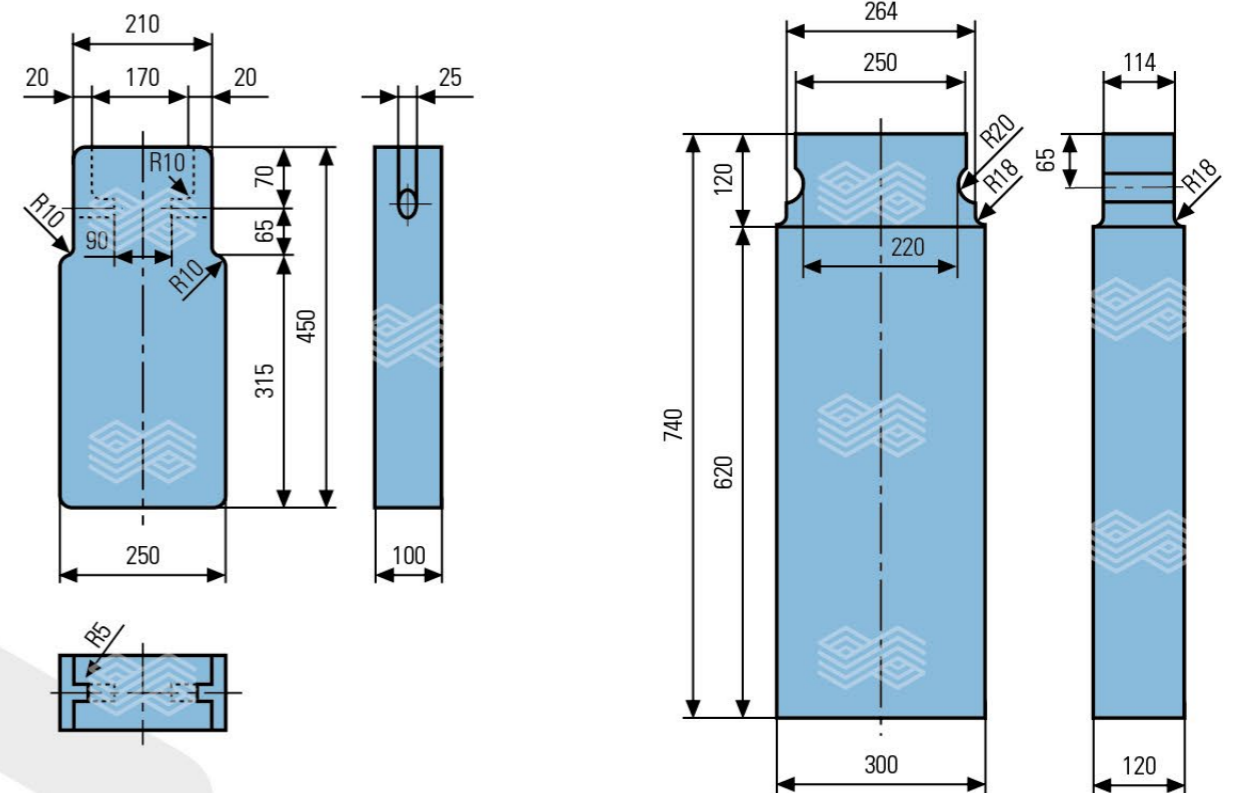
FONDAL SCW及FONDAL SXW 用于硅质大碓及上部结构

FONDAL SCW是一种基于高纯度电熔氧化硅的耐火材料产品。由于其具有非常低的热膨胀，抗热振性能极好。因而，FONDAL SCW广泛应用于热修补领域，且不需要预热。

FONDAL SCW具有很强的抗窑炉气氛侵蚀能力。此外，FONDAL SCW在有小块掉入窑炉的情况下会被溶解，而不会引起玻璃缺陷的产生。

FONDAL SXW是FONDAL SCW的产品延伸，如果有大型或者复杂的转型需要，FONDAL SXW是适合的选择。

吊砖应用：
Application example as suspended bricks:



Grade	Al ₂ O ₃	Fe ₂ O ₃	SiO ₂	BD	AP	CCS	TE	RUL
	%	%	%	g/cm ³	vol.%	MPa	1000 °C	T _{0.5}
							%	°C
FONDAL SCW	0.5	0.2	98.0	1.82	18.0	30	0.1	1600*
FONDAL SXW	0.9	0.1	98.5	1.85	15.0	35	0.1	1600*

Grade / 类别
AP 显气孔率 / Apparent porosity
BD 体积密度 / Bulk density
CCS 常温抗压强度 / Cold crushing strength
RUL 荷重软化温度 / Refractoriness under load
TE 热膨胀系数 / Thermal expansion

* 方石英晶相转变 / devitrified to cristobalite

Refractory Bricks for Hot Repairs

FONDAL SCW and FONDAL SXW: For silica crowns and superstructures

FONDAL SCW is a refractory block based on very pure fused silica. Due to this raw material basis, FONDAL SCW exhibits low thermal expansion, which in turn leads to very high thermal shock resistance. Therefore, FONDAL SCW is widely used for hot repair and does not require preheating.

FONDAL SCW has high corrosion resistance to gaseous components from a glass melt. Furthermore, FONDAL SCW dissolves without causing glass defects in case small pieces fall into the glass bath.

FONDAL SXW is an extension for FONDAL SCW. If large or complicated shapes are required, FONDAL SXW is the right choice.

热修用耐火砖

Refractory Bricks for Hot Repairs

DURITAL AZ58P:
烧结锆莫来石

应用:
DURITAL AZ58P是一种陶瓷结合锆莫来石材料。可作为热修砖在热态下直接进入窑炉。DURITAL AZ58P有以下特点:

- 具有很好的抗热振性能。因此, 安装不需要预热。
- 抗玻璃侵蚀能力与电熔AZS砖相当。
- 低气泡指数

DURITAL AZ58P是热修时的无铬选择

1400 °C钠钙玻璃
静态标样侵蚀测试

材料 / Material: DURITAL AZ58P
液位线处侵蚀指数 / Flux line corrosion index: 1.0



DURITAL AZ58P:
Ceramicly bonded zircon mullite

Application:
DURITAL AZ58P is a ceramicly bonded zircon mullite brick. It can be inserted directly into the hot glass tank or used as a hot repair tile. DURITAL AZ58P has the following characteristics:

- High thermal shock resistance. Therefore no preheating is necessary for the installation
- High corrosion resistance to molten glass (comparable with fused cast AZS)
- Low blistering potential

DURITAL AZ58P is a chrome-free alternative for hot repairs.

Static plate corrosion test
in soda-lime glass at 1400 °C

材料 / Material: AZS32
液位线处侵蚀指数 / Flux line corrosion index: 1.0



Grade	Al ₂ O ₃	Fe ₂ O ₃	SiO ₂	ZrO ₂	BD	AP	CCS	TE	RUL
	%	%	%	%	g/cm ³	vol.%	MPa	1500 °C	T _{0.5}
								%	°C
DURITAL AZ58P	58.0	0.1	13.0	28.0	3.1	15.5	125	0.65	1670

Grade / 类别
AP 显气孔率 / Apparent porosity
BD 体积密度 / Bulk density
CCS 常温抗压强度 / Cold crushing strength
RUL 荷重软化温度 / Refractoriness under load
TE 热膨胀系数 / Thermal expansion

使用DURITAL AZ58P
对挂钩砖热修补

DURITAL AZ58P的安装
Installation of DURITAL AZ58P



Hot repair of tuckstones
with DURITAL AZ58P

在DURITAL AZ58P处焊补
Welding on DURITAL AZ58P



热修用耐火砖

Refractory Bricks for Hot Repairs

DURITAL RK30NP
烧结铬刚玉

应用：
窑炉池壁用热修贴砖

DURITAL RK30NP 是一种含30 wt.% Cr₂O₃的铬刚玉砖。与电熔AZS砖相比较，铬刚玉贴砖具有以下优点：

- DURITAL RK30NP比电熔AZS砖具有更强的抗侵蚀性能
- 由于具有极好的抗热振性能，DURITAL RK30NP不预热就可以直接安装。
- 如果需要更高的抗侵蚀能力，可采用DURITAL RK50NP

1500 °C钠钙玻璃静态标样 侵蚀测试

材料 / Material: DURITAL RK30NP
液位线处侵蚀指数 / Flux line corrosion index: 0.5



DURITAL RK30NP可以应用于无色玻璃或有色玻璃窑炉的池壁贴砖修补。而Cr₂O₃对于玻璃的污染未见发现。根据一个无色玻璃瓶罐窑炉在使用铬刚玉贴砖与玻璃液接触后对玻璃化学成分的分析显示，Cr₂O₃含量小于10 ppm，与正常运行微铬含量一样，没有变化。

DURITAL RK30NP and DURITAL RK50NP:
Ceramicly bonded chrome corundum

Application:
Hot repair tiles for tank sidewalls

DURITAL RK30NP is a tile based on chrome corundum. The Cr₂O₃ content amounts to 30%. In comparison with fused cast AZS, chrome corundum tiles have the following advantages:

- DURITAL RK30NP has higher corrosion resistance than fused cast AZS.
- Due to superior thermal shock resistance, DURITAL RK30NP can be installed without preheating.
- If higher corrosion resistance is desired, DURITAL RK50NP is recommended.

Static plate corrosion test in soda-lime glass at 1500 °C

材料 / Material: AZS32
液位线处侵蚀指数 / Flux line corrosion index: 1.0



DURITAL RK30NP is applied as hot repair tiles in flint glass and colored glass tanks. Cr₂O₃ contamination of the glass has not been reported. Chemical analysis by a flint container glass manufacturer demonstrated that the low Cr₂O₃ content in the glass of less than 10 ppm did not change. When the glass was in contact with the hot repair tiles, the Cr₂O₃ content still amounted to less than 10 ppm.

Grade	Al ₂ O ₃	SiO ₂	Cr ₂ O ₃	ZrO ₂	BD	AP	CCS	TE	RUL
	%	%	%	%	g/cm ³	vol.%	MPa	1500 °C	T _{0.5}
								%	°C
DURITAL RK30NP	63.0	2.5	29.0	2.0	3.5	15.0	190	1.2	> 1700
DURITAL RK50NP	37.0	1.8	53.0	4.4	3.8	15.5	100	1.2	> 1700

Grade / 类别
AP 显气孔率 / Apparent porosity
BD 体积密度 / Bulk density
CCS 常温抗压强度 / Cold crushing strength
RUL 荷重软化温度 / Refractoriness under load
TE 热膨胀系数 / Thermal expansion

池壁砖使用DURITAL RK30NP 铬刚玉贴砖热修



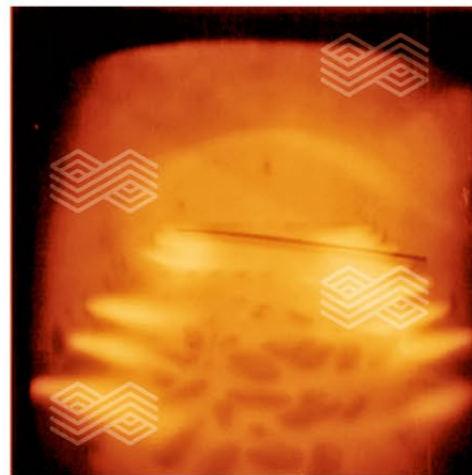
Sidewall hot repair with overcoating tiles from DURITAL RK30NP



热修补用耐火泥 Refractory Mixes for Hot Repairs

在长期的玻璃窑炉运行过程中，会不可避免地遇到一些修补情况。在各种的可选择的修补方案中，不停炉修补是首选，因为这样的选择对生产的影响最小。因此RHI Magnesita发展了几种专用的“热修补”耐火泥。全球许多用户使用这些热修补耐火泥作为他们日常维护的标准材料。

During the long service life of glass furnaces repair activities are inevitable. Of the various repair options available, a so-called hot repair, a repair without cooling down the furnace, is preferred as this option causes minimal disruption of production. RHI Magnesita has developed several mixes for this kind of repair. Customers around the world use these mixes as standard repair materials for their daily operations.



Grade	Al ₂ O ₃	SiO ₂	Fe ₂ O ₃	CaO	MgO	ZrO ₂	P ₂ O ₅	Cr ₂ O ₃	TL	MR	SL	ML
	%	%	%	%	%	%	%	%	°C	kg/dm ³	Months	
FONDIT K 0-6	0.3	99.0	0.1	0.1					1650	1.70	12	DIKASIL 2:1
STELLIT FS 0-3	1.5	98.0	0.2						1600	1.80	18	DIVASIL
COMPAC SHOT SB FS99-3	0.2	99.5	0.1						1650	1.80	18	DIVASIL (activator for shotcreting: DIKASIL SK)
RESISTIT ZS 150P 0-3	1.0	32.0	0.1			63.0	4.0		1650	3.75	12	Ready for use
RESISTIT ZM 160P 0-1	58.5	13.0	0.1			23.0	5.0		1600	3.30	12	Ready for use
RUBINIT VK		0.7	0.3	2.2	95.4		1.3		1750	2.70	9	H ₂ O
LEGRIT 100-0.5 (gelb) 0-4	28.0	20.5	15.0	23.5	9.0				1000	0.70	12	H ₂ O
DIDURIT RK64G-3	24.0	4.8	0.5					65.0	1800	3.40	8	H ₂ O
COMPAC SHOT RK64 -3	25.0	4.8	0.5					64.0	1800	3.40	8	H ₂ O (activator for shotcreting: DIKASIL SK)

Grade / 类别 ML 混合液溶剂 / Mixing liquid
 Months / 月 MR 材料需要量 / Material requirement
 Ready for use / 直接使用 SL 储存期限 / Shelf life
 TL 使用温度限制 / Temperature limit of application

类别	原料	使用方法	实例应用范围
FONDIT K 0-6	电熔石英	捣打	硅质大碓，硅质上部结构，胀缝填充
STELLIT FS 0-3	电熔石英	喷补，浇筑	硅质大碓，硅质上部结构
COMPAC SHOT SB FS99-3	硅玻璃	喷补，浇筑	硅质大碓，硅质上部结构，整体大碓涂敷
RESISTIT ZS 150P 0-3	硅酸锆	浇筑，捣打，贴补	硅质大碓，硅质上部结构，抗侵蚀性强
RESISTIT ZM 160P 0-1	硅酸锆、刚玉	浇筑，捣打，贴补	AZS池底，AZS大碓
RUBINIT VK 0-5	氧化镁	浇筑，捣打	蓄热室碓及墙体（镁质）
LEGRIT 100-0.5 (gelb) 0-4	铬刚玉	喷补，捣打	蓄热室墙体密封
DIDURIT RK64G-3	铬刚玉	浇筑	使用铬刚玉砖的窑炉（玻纤炉）
COMPAC SHOT RK64 -3	铬刚玉	喷补	Fast chrome corundum brick construction (fiber glass)

Grade	Raw material	Application techniques	Examples of application areas
FONDIT K 0-6	Fused silica	Ramming	Silica crown, superstructure; filling the expansion joints
STELLIT FS 0-3	Fused silica	Gunning, casting	Silica crown, superstructure
COMPAC SHOT SB FS99-3	Silica glass	Gunning, casting	Silica crown, superstructure; overcoating of complete crown
RESISTIT ZS 150P 0-3	Zircon	Casting, ramming, patching	Silica crown, superstructure; higher corrosion resistance
RESISTIT ZM 160P 0-1	Zircon, corundum	Casting, ramming, patching	AZS bottom, AZS crown
RUBINIT VK	Magnesia	Casting, ramming	Regenerator crown and wall
LEGRIT 100-0.5 (gelb) 0-4	Vermiculite	Gunning, ramming	Sealing for regenerator wall
DIDURIT RK64G-3	Chrome corundum	Casting	Chrome corundum brick construction (fiber glass)
COMPAC SHOT RK64 -3	Chrome corundum	Gunning	Fast chrome corundum brick construction (fiber glass)



表中仅列常用的热修火泥种类，更多类别及型号产品详细信息，请联系 RHI Magnesita。

所列数据为标准数据，是在一个较长期间内根据有效的测试标准或是公司的内部的测试方法采集而得。它们不能被看作产品规范，因此不能被理解为产品特性的保证指标。我们保留继续技术改进以及更新技术产品信息的权利。表中所列数据依据产品最新的参数表。

The tables only show a selection of the most relevant grades. For more detailed information about different grades and shapes, please consult your RHI Magnesita advisor.

The values given are standard values ascertained on the basis of the applicable test standards and/or internal testing methods applied over a longer, representative period of time. However, these values should not be taken as binding specifications and may therefore not be understood as guaranteeing certain product properties. We reserve the right to continue further technical development and update the technical product information. The current values are listed in the latest edition of the technical data sheets.

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