

Processing instructions V 7.0

REFRABOND[®]

Note: Please read the product information sheet first, to ensure that these are the right processing instructions for your product. This document describes the application procedure for ceramically bonding **REFRABOND[®]** mortars / adhesives.

The instructions contained in this document must be complied with during processing and installation of the respective refractory concrete. Modification of or deviations from the processing instructions can lead to major problems during installation, and possibly to total failure of the installed refractory material. These instructions provide general guidelines for storage, processing, and installation of the specific refractory material. If, due to specific site conditions, it appears necessary to deviate from the procedures described here, please consult Refratechnik Steel GmbH before starting work.

Storage

- In general: Store under cool, dry, and frost-free conditions.
- The shelf life stated in the product information sheet is valid from the production date, and only if storage is in accordance with our recommendations. The production date is stated on the packaging label.
- Under certain circumstances, material that has been properly stored may still be usable even after expiry of the stated shelf life. In such a case, conduct a setting test with a sample before using the material. In case of doubt, the expired material can be checked by Refratechnik Steel GmbH.
- Incorrect storage can greatly reduce shelf life, and can impair product quality.
- The original pallet wrapping foil should be left intact for as long as possible to protect the product. However, the foil is not a substitute for storage under cover.

- Also standing water, e.g. due to inadequate drainage of the storage area, can damage the material.
- Stacking of the goods supplied by us (in sacks, Big Bags, etc.) is done under the sole responsibility of the shipping company or customer. Refratechnik Steel GmbH accepts no liability for possible consequential damage (damaged packaging, personal injury, etc.).

Health and safety

- Always wear suitable safety goggles, dust mask, protective clothing, and working gloves.
- Always wash thoroughly after working with the material.
- Observe the information in the safety data sheet.

General information

- **REFRABOND[®]** is a ceramically bonding mortar / adhesive. Delivered dry in 25 kg sacks, it is mixed with water on site, and then applied.

- Always mix complete packaging units (1 sack). The use of partial quantities can lead to demixing and changed material properties.
- Only use clean drinking water, as otherwise the setting behaviour may be affected.
- Low temperatures can retard or even stop the setting process. Therefore, the temperature of material and mixing water must be at least 5 °C. In some cases, it might be necessary to heat the installation area.
- On the other hand, the setting process may be significantly accelerated at temperatures above 25 °C.
- Please take the expansion of the refractory material for your specific furnace application into account. The reversible and irreversible expansion values and the respective material properties are given in the product information sheet. Depending on the furnace operating conditions and the specific characteristics of the refractory material, any arising stresses and pressures must be

compensated by suitably designed expansion joints.

- During installation of the monolithic refractory material, please ensure correct anchoring to the existing furnace structure and/or to the existing or adjacent refractory material (e.g. with steel anchors, ceramic anchoring systems, etc.).
- Suitable measures must be taken to ensure that the water or water vapour generated during the drying & heat-up process is removed from the refractory lining without pressure build-up.
- With certain kiln structures and refractory linings, the drying process can cause the generated water or water vapour to diffuse outwards in the direction of the furnace shell instead of inwards to the hot side (kiln chamber). Therefore, suitable measures must be taken to ensure that the water or water vapour can escape to atmosphere. For this purpose, 10-mm holes drilled into the kiln's outer steel shell (at least 5 per m²) have proved to be successful.
- Regarding the build-up of water vapour pressure, attention must be given to the entire wall structure of the lining (wear lining/permanent lining/insulation). In the area behind the wear lining, it must also be ensured that only such materials are used, which provide an adequate (highest possible) permeability to the steel shell.
- If the permanent lining/insulating layers are used several times and only the wear lining is replaced, they can become clogged in the course of time due to moisture transport with dust contaminations, salts, etc., thereby also impeding moisture transport. Consequently, multiple use of such layers must be seen as counterproductive in terms of dewatering performance. It might even be safer also to replace the permanent lining, in order to ensure perfect flowthrough to the cold side.
- To ensure a continuous drying process, the complete kiln chamber must always be flushed with an adequate amount of fresh air during the entire drying and heat-up procedure. The air circulating in the kiln chamber may never be saturated with moisture.
- During heat-up, it is essential that flames do not impinge on the refractory lining only in small areas. Local overheating can result in severe damage of the refractory material. Therefore, it must be ensured that the entire lining surface is heated uniformly and without significant temperature differences.
- The mortar must have a spreadable consistency, so that narrow joints about 1.0 mm wide between bricks are possible. The product can be applied in a thickness of about 5...10 mm to smooth out unevenness in the kiln lining, for example where bricks are installed over a weld seam.
- Make sure that the mortar is evenly spread across the entire surface of the brick being coated.
- Adhesive that has cured is unusable – therefore do not attempt to make it re-usable by adding more mixing liquid.

Mixing

- When mixing the mortar, make sure that all the tools and containers used are clean, i.e. not contaminated with other mortar or cement dust, as this will result in premature setting of the mortar.
- A drilling machine fitted with an agitator is recommended for mixing.
- Data on the maximum and minimum amounts of water to be added is given in the product information sheet or on the packaging label.
- To obtain a homogeneous mixture and a total breakup of agglomerates, the dry material should be mixed wet for 5 minutes after adding the amount of mixing water stated on the packaging. The material should then be allowed to rest for 10 minutes with the mixer switched off, followed by mixing for a further 2 minutes
- The ceramically bonded mortar is now ready for application. We recommend not to mix more material than can be used within 8 hours. To prevent contamination, we recommend covering the mixed mortar, e.g. with plastic foil.

Setting and curing

- Ceramically bonding mortars create an extremely strong adhesive bond with adjacent bricks and masonry. Do not expect that this type of mortar will set at room temperature, as is the case with hydraulically bonding concretes. Solidification is achieved by sintering at high temperatures (> 1000 °C).
- The lining must be protected from frost until it has fully dried.

Drying and heating up

- We recommend that drying or heating up is not started before 24 hours after the end of installation. In some cases, however, an earlier start of drying and heating up may be acceptable. Please contact Refratechnik Steel GmbH in such cases.
- Refractory linings should be dried or heated up immediately after installation in order to expel the contained water. Freshly installed refractory linings should not be left undried for longer periods. In exceptional cases, please contact Refratechnik Steel GmbH beforehand.

- Please check the product information sheet to ensure that you have the right heat-up instructions for your product.
- The heat-up instructions must always be followed precisely. Hereby, it must be ensured that the respective heating curve is followed, monitored, and recorded by means of several correctly-positioned thermocouples. Moreover, a homogeneous temperature distribution must be ensured.