

# Processing instructions V 300

## REFRAHARTH

## REFRAFRIT

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 **REFRAHARTH** and **REFRAFRIT** hearth ramming, installation, and patching mixes for electric arc furnaces. It does not apply for **REFRAMAM® CB DRY** or other earth-moist **REFRAMAM®** products.

The instructions contained in this document must be observed during processing and installation of the respective hearth ramming and patching mixes. 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 processing 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

- This product is a ready-to-use ramming granulate or patching mix. Delivered dry in Big Bags, it is processed directly on site. Bonding is purely ceramic at temperatures of at least 1000 °C. **REFRAHARTH** and **REFRAFRIT** do not contain a bonding agent, and therefore only exhibit low strength at room temperature.
- In cold weather, the dry material must be stored at higher ambient temperatures (at least 5 °C) before processing. **REFRAHARTH** and **REFRAFRIT** may only be installed at temperatures above 5 °C, and must be protected from frost before, during, and after application (heat the installation site if necessary).
- 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.).
- The remaining wear lining, onto which the product is to be installed, must be clean. Before application, all traces of slag or metal must be removed, until a perfectly clean surface of the remaining product is obtained. Frequently, this can be done with a jackhammer. Cleaning of the remaining lining is necessary to obtain a perfect bond between the surface and the new product.
- In case of a hot hearth repair with **REFRAHARTH**, a temperature of at least 1000 °C should exist to permit a certain amount of product sintering. Subsequently, a preheating phase with 1200 °C should be carried out before recharging the furnace.
- When repairing the benches or the hearth of an electric arc furnace with **REFRAFIT**, a temperature of at least 1000 °C should exist to permit a certain amount of product sintering. Subsequently, a preheating phase at 1200 °C should be carried out before recharging the furnace.
- 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.

## Processing

### Cold installation of the hearth and benches in electric arc furnaces:

- In case of cold installation of the electric arc furnace hearth with a **REFRAHARTH** product, the Big Bag suspended with a crane should be emptied directly on the hearth floor. Please note that the dropping height should be small to prevent separation and dust. The wall lining should be applied in layers. In order to achieve perfect ramming, every lining layer should be max. 20 cm thick, and the last layer max. 10 cm thick.
- The material must be distributed evenly over the hearth floor with a shovel or rake. Hereby, a loose filling height about 20 % higher than the required layer thickness should be observed. After distribution, the material must be compacted to ensure that it can develop its maximum performance.
- Also when using heavy vibratory rammers, a maximum filling height of 20 cm should not be exceeded.
- Before ramming, the air should be allowed to escape from the material by walking on the hearth, with shovels, or best with an adapted tool. About 15 % compaction can be achieved after two minutes of ramming. Compaction machines or plate vibrators are recommended for optimum compaction.
- Hereby, and depending on material, a compaction ratio of about 1.5:1 can be assumed.
- Subsequently, sheet metal plates should be laid out on the compacted floor to lessen the shock of the first charging operation.

- After the first charge, the upper layer of the material is adequately sintered to resist further charging.

### Hot hearth repair

- The hearth should be cleaned as thoroughly as possible (e.g. with oxygen lances). The dry material is thrown into the furnace and distributed. Compaction of the **REFRAHARTH** material should be done with a heavy object, such as a magnet or bar suspended from a crane. Intermediate and final repairs can be carried out in this way.
- The hearth surface temperature should be more than 1200 °C to ensure minimum sintering. Subsequently, a preheating phase at 1200 °C should be carried out before recharging the furnace.

### Hot bench repairs

Hot bench repairs can be carried out by means of different machines:

- Fetting machine: The **REFRAFIT** material is distributed with a rotating device
- Centrifugal casting machine: The **REFRAFIT** material is flung onto the hot surface with high energy.
- The hearth surface temperature should be more than 1200 °C to ensure minimum sintering. If this is not the case, the furnace should be preheated at 1200 °C for 30 minutes before charging.