

Processing instructions V 9.0

REFRADRY®

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 dense **REFRADRY®** dry filling mixes with/without inorganic-chemical bonding.

The instructions contained in this document must be complied with during processing and installation of the respective **REFRADRY®** material. 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

- This product is a dry filling mix. Delivered dry in 25 kg sacks or in Big Bags, it

is processed on site without the addition of water or other liquids.

- **REFRADRY®** can be used for two application areas:
 - Backfilling material for ladles
 - Ladle well filler sandMake sure that you have the right type of product for your application.

Backfilling material for ladles:

Filling empty spaces. The material cures by means of inorganic-chemical bonding and the application of heat.

Ladle well filler sand:

Material without a bonding agent is preferably used as ladle well filler sand.

- **REFRADRY®** is used primarily for backfilling gaps and empty spaces, e.g. in the lining of steel ladles. Hereby, the voids between the wear lining and the permanent lining are filled with **REFRADRY®** dry filling mix to create a force-locked bond.

- Always process complete packaging units (1 sack or 1 Big Bag). The use of partial quantities can lead to demixing and changed material properties.
- 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.

Processing

Backfilling material for ladles:

All gaps and empty spaces should be filled with **REFRADRY®** as completely and positively as possible. This should be done during installation of the wear lining bricks. To ensure that filling is as complete and positive as possible, the filling height should not exceed 30 cm per filling operation.

During installation or shortly afterwards, **REFRADRY®** must be compacted by rodding or vibration. The material is cured by the application of heat during the first heat-up.

Ladle slide backing sand:

REFRADRY® types that are used for ladle slide backing are installed in accordance with usual on-site procedures.

Setting and curing

- **REFRADRY®** (backfilling type) does not set at room temperature – it only cures at temperatures above 600 °C.
- **REFRADRY®** (ladle well filling type) never cures – not even at high temperatures.

Drying and heating up

- **REFRADRY®** contains neither water nor any other liquid binding agent, so that a drying procedure is not necessary. **REFRADRY®** can be heated up immediately after installation is completed.
- There is no specific drying or heating up procedure for **REFRADRY®**. Drying and heating up of all **REFRADRY®** materials must be done according to the recommendations for drying/heating the adjacent refractory material (bricks, concrete, etc.).