

WasteBasedBricks

# Installation Guide



# General Product Information

## PRODUCT STANDARD

WasteBasedBricks comply with the requirements of the harmonized European product standard NEN-EN 771-1 for clay bricks. WasteBasedBricks are produced on a project basis, and each production is accompanied by a Declaration of Performance (DoP) with the CE mark. The DoP specifies only the dimensions and frost resistance class that are project-specific and tested.

## WARRANTY

WasteBasedBricks come with a 10-year factory warranty for frost resistance. This warranty is provided by the manufacturer based on frost-thaw testing conducted for each production order.

## NL-BSB

The producer of WasteBasedBricks holds an NL-BSB product certificate based on BRL 52230 "ceramic products." This certificate demonstrates that the delivered ceramic products, including WasteBasedBricks, comply with the appropriate environmental and soil quality requirements.

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## FPC CERTIFICATE (PART OF CE MARKING)

With a CE marking, a manufacturer declares that the product meets the European legal requirements for safety, health, and the environment. EU member states cannot exclude a product from their market if it bears a legit CE marking. A CE marking is mandatory when a harmonized standard applies to the product, which is the case with NEN-EN 771-1 for WasteBasedBricks.

Our exclusive producer, Zilverschoon Randwijk, holds an FPC certificate. Factory Production Control (FPC) certification ensures quality control of procedures and inspections for the product. After a successful audit by a recognized external body, a Notified Body (NoBo), the producer receives an FPC certificate demonstrating compliance with European standards.

## PROCESSING

All WasteBasedBricks come with processing guidelines. These guidelines are provided for support purposes only, and FRONT® takes no responsibility for the processing quality. Reference may be made to the "Execution Guideline for Brick Masonry" by the KNB if needed.

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## **EXPANSION JOINTS**

Expansion joints in masonry involve interruptions in the brickwork to limit stresses resulting from imposed deformation due to temperature differences, shrinkage, creeping, and support settlements, thereby preventing crack formation. FRONT® offers dilation advice to its customers. This advice is provided by TCKI, commissioned by the customer, and follows the calculation rules established by the KNB. The invoice for this advice is covered by FRONT®.

## **MAINTENANCE**

Brick facades do not require maintenance and will remain aesthetically pleasing for a long time. Brick facades only become more beautiful with age!

## **SUSTAINABILITY**

Have you considered choosing sustainable options such as a demountable, circular system and lime mortar for your project? FRONT® can assist in finding suitable suppliers and provide project-specific advice on applying these products. Feel free to contact us for more information.

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## **TOLERANCES**

The WasteBasedBrick is a 'coarse ceramic product' subject to dimensional tolerances and size variation. Dimensional tolerance refers to the deviation of the average size of the batch from the specified size and is indicated by factors T1, T2, or Tm. Size variation is the difference between the smallest and largest brick in the batch and is indicated by factors R1, R2, or Rm.

## **COLOUR VARIATION**

The WasteBasedBrick is a building product made from industrial, construction and demolition waste, as well as the natural raw material clay. Due to the nature of the raw materials and the production process, it is an intrinsic property of the WasteBasedBrick to be a nuanced product. This means that the product has a particular variation in colour.

A pre-issued colour sample is always a reference sample and provides an indication. No rights can be derived from it. The actual characteristics are provided with a production sample.

# Processing Instructions

## **DELIVERY AND STORAGE**

Place the brick packages on a clean, dry, and flat surface (e.g., on scaffold boards) so that the bricks are stable and water and dirt cannot penetrate the bricks. Protect the packages from water ingress and contamination by covering them; ventilation must still be possible. Keep the packaging film of the brick packages open on the non-rain side during storage.

## **EVEN DISTRIBUTION BRICKWORK**

Use and process bricks from multiple packaging units simultaneously to prevent unwanted colour differences in the facade and achieve an even distribution of colour variation in the masonry.

## **MOISTURE DURING INSTALLATION**

The moisture content of the masonry brick at the time of installation should not be higher or lower than what is allowed by the mortar specifically designed for the brick. If in doubt, the water absorption of the bricks can be determined on-site.

## **MASONRY MORTAR**

Match the mortar hardness and the brick. For masonry in exterior walls, use at least mortar application type A according to BRL 1905 "Mortars for Masonry." Use mortar application type A modified with trass for quay walls and retaining walls. Preferably use a prefabricated mortar with a KOMO quality declaration, to ensure a consistent level of quality.

Request detailed mortar advice from the producer of the prefabricated mortar, who will indicate the requirements for the processing of the mortar in combination with the specified performance of the masonry brick. The mortar quality according to NEN-EN 998-2 (M5 - M15) should be determined in consultation with the architect/engineer.

When preparing the mortar on-site for the installation of a typically absorbent brick, from class IW3 according to BRL 1007 "Masonry Brick," the following volumetric composition ratios can be used during the summer period: Portland cement: lime: sand = 1 : 1 : 5. For the winter period, the volumetric composition ratio is 1 : 0.5 : 4.5.

To achieve good stackability and optimal construction speed, for bricks with low specific water absorption, the coarse fraction C4-C5,6 can make up a maximum of 10% to 15% of the sand volume or use concrete sand 0-4 for this purpose. Don't use admixtures in the mortar that is prepared and mixed on-site. The processing time for mortar is a maximum of two hours. For wet prefabricated mortar with a retarding agent, a maximum storage time of twelve hours is recommended.

## **JOINT MORTAR**

The joint mortar must meet the requirements of CUR Recommendation 61 "Pointing and Hydrophobizing Masonry." Preferably use prefabricated joint mortar supplied with a KOMO quality declaration, ensuring consistent quality. Request detailed mortar advice from the producer of the prefabricated joint mortar, who will indicate the requirements for the processing of the joint mortar. The joint mortar quality, according to CUR Recommendation 61 (VH15 - VH45), should be determined in consultation with the architect.

For a joint mortar prepared on the construction site, use a composition ratio in volume parts according to CUR Recommendation 61. Due to a high risk of 'burning', blast furnace cement is not recommended for masonry work. The sand must comply with NEN-EN 998-2 "Mortars for Masonry" and BRL 1905 "Mortars for Masonry," except for the prescribed grain size distribution. The guidelines stated in CUR Recommendation 61 apply to this.

## **BRICKLAYING**

Perform a complete visual inspection of the surrounding (load-bearing) structure regarding dimensions, flatness, anchoring, and stability, and carry out the masonry work according to the KOMO process certification of Masonry Constructions. The following guidelines apply:

- ◆ National Assessment Guideline for the Manufacture of Masonry and Adhesive-Constructions and/or Pointing SKG-IKOB publication BRL 2826
- ◆ Execution Guideline Masonry Constructions (Bricks, Blocks and Stones of Concrete, Aerated Concrete, and Calcium Silicate) SKG-IKOB publication No. PBL 0357
- ◆ Execution Guideline for Jointing Masonry SKG-IKOB publication No. PBL 0359
- ◆ Execution Guideline for Bonding of Facade Bricks SKG-IKOB publication No. PBL 0475

## **BRICKLAYING (continued)**

The weather conditions (outside temperature) and the moisture content of masonry bricks at the time of processing require attention. In low outside temperatures, the mortar used must be adjusted accordingly. Using overly dry or wet bricks can lead to poor workability and/or poor adhesion of the masonry mortar. In general, the following recommendations apply:

- ◆ Bricks with an initial water absorption of  $< 1.5 \text{ kg/m}^2 \cdot \text{min}$  (class IW1 and IW2)  
→ process dry
- ◆ Bricks with an initial water absorption of  $\geq 1.5 - < 4.0 \text{ kg/m}^2 \cdot \text{min}$  (class IW3)  
→ process wind-dry
- ◆ Bricks with an initial water absorption of  $\geq 4.0 \text{ kg/m}^2 \cdot \text{min}$  (class IW4)  
→ pre-wet

If a prefabricated masonry mortar is used, always follow the advice of the masonry mortar producer indicating the conditions for processing the mortar and the masonry bricks. Bricks that are too dry can be made suitable for processing by slightly wetting the brick packages one to two days before processing and allowing them to dry covered only at the top. This way, the bricks can be processed wind-dry, meaning dry on the outside and moist inside.

Complete the masonry work in the prescribed bond according to the requirements of good craftsmanship. To achieve uniform adhesion between bricks and masonry mortar, it is necessary to "fully and solidly" lay the bricks. If it is struck through, "fully and solidly" laying the bricks is a requirement. Place the most beautiful side of the brick in the visible area and the potentially sand-coated side facing upwards. Lay bricks with a frog (depression on the flat, sand-coated side) with the frog facing upwards.

An expansion joint plan is recommended to prevent cracking in the masonry. Expansion joints must be carried out carefully. FRONT® provides custom dilatation advice for all ceramic products conducted by TCKI.

Under a vertical expansion joint, a vertical joint with a width of 5 mm is understood, which may or may not be filled with rot-resistant compression tape and is present across the entire thickness of the masonry wall. Please note: a flush joint (with a width of 0 mm) does not qualify as an expansion joint. In buildings taller than 15 meters, the expansion joints must be filled with compression tape.

## **BRICKLAYING (continued)**

A horizontal expansion joint (at the location of masonry support) is defined as a horizontal joint filled with oil-free sealant on the backing, present across the entire thickness of the masonry wall, with a width of 10 mm between the bottom of the support and the top of the underlying masonry. Expansion joints must be completely free from mortar and grout.

To ensure proper ventilation and drainage of the air cavity, one head joint per every three to four stretchers should be left open at all horizontal terminations of the masonry, such as below and above a window frame. For adequate moisture drainage behind the outer leaf, one head joint per every two stretchers should be left open at the connection of the masonry to the foundation.

Cavity wall ties must be embedded in the fully applied mortar of the bed joint, such that after laying the next layer of bricks, the ties are positioned in the centre of the bed joint. Cavity wall ties should not allow moisture to transfer to the inner leaf. Under no circumstances should frames be anchored to the outer leaf. Do not use sliding anchors in vertical expansion joints.

Masonry reinforcement should be placed in the centre of the mortar of the bed joint. The process involves first applying half of the required amount of mortar, then placing the reinforcement, and finally applying the remaining amount of mortar. Different qualities of masonry reinforcement exist for interior and exterior applications. For exterior applications, use galvanized reinforcement with an epoxy coating or stainless steel reinforcement.

The effective air cavity width must be at least 20 mm. Effective cavity refers to the space between the insulation material and the mortar droppings, cut bricks, or other irregularities. This means that during the design phase, a minimum design cavity width of 40 mm plus insulation thickness should be considered. This principle is also included in the requirements for the GIW guarantee.

During masonry work, the air cavity must be kept free from spilt mortar and pieces of brick that could create moisture bridges between the outer leaf and the inner structure. Minimize the formation of mortar droppings on the cavity side and also pay attention to other protruding elements such as cut bricks.

## **BRICKLAYING (continued)**

After bricklaying, the mortar should be scraped out deep enough so that the depth of the joint matches the average thickness of the bed joint and the head joint (square cross-section). The scraped masonry should be brushed with a stiff broom.

Masonry should be done in a way that prevents mortar smears on the bricks. If there are any smears on the masonry, they should be removed before pointing. Particular attention should be given to the handling of glazed bricks. The etching effect of lime hydrate should be taken into account, as it can cause dull spots on the glazed brick surface. Mortar smears on glazed bricks should be promptly removed.

Prevent the soiling of masonry. Protect the bottom of the masonry from splashes of water whenever there is a possibility. To protect the masonry from splashing water from the scaffold, it is recommended to fold the first scaffold part adjacent to the facade. Avoid using the single-scaffold system if possible.

Prevent the occurrence of efflorescence, cement haze, and loss of adhesion by adequately protecting the fresh masonry from drying out and water ingress for a minimum of 48 hours, preferably longer. Also, avoid wetting the insulation material during and after construction. Preferably, work with a scaffold equipped with mesh cloth and a cover. If not possible, it is recommended to use a lightweight plastic covering profile. Refer to the KNB publication "Clean Masonry" for further information.

If jointing is carried out continuously, it is advised to take protective measures against rainwater and drying to prevent colour variations on the joint surface due to changing weather conditions. The use of colour-matched pointing mortar further reduces the chances of colour differences.

The use of hydrochloric acid to remove efflorescence is strongly discouraged. Only use cleaning agents specifically designed for masonry based on sulfamic acid. Refer to the KNB publication "Clean Masonry" for further information.

It is recommended not to lay bricks at daytime temperatures below 0° C. When masonry is still carried out in such conditions, protective measures are recommended. Follow the instructions of the masonry mortar manufacturer when using pre-mixed mortar in such cases. Do not use frozen bricks.



## **POINTING**

The masonry should neither be too dry nor too wet for pointing. The ideal situation is to allow the masonry to cure for at least 28 days or more, after which it should be thoroughly moistened (one day before pointing). Especially with low water-absorbing bricks, it is advisable to wait as long as possible before pointing to significantly reduce the chances of efflorescence formation. It is recommended to maintain a minimum period of two weeks between masonry and pointing.

Before starting the pointing process, dust and mortar residue should be removed.

The square cross-section of the joint must be completely filled, and the jointing mortar should be adequately compacted. For standard pointing work, meaning, the joint should be set to a depth of approximately 10 to 12 mm.

During pointing, avoid filling expansion joints and open perpend, and after pointing, check if all open expansion joints and open perpend are entirely free of mortar residue. Consider the possibility of colour variations in the pointing ("scaffolding lines") due to changing weather conditions, and take protective measures to prevent this.

Ensure that mortar smears on the bricks are avoided during pointing. Special attention should be given to the handling of glazed bricks. Consider the etching effect of lime hydrate, which can cause dull spots on the glazed brick surface. Immediately remove mortar smears on glazed bricks.

Prevent the soiling of the masonry. Protect the bottom part of the masonry from splashing water when there is a chance of it occurring. To protect the masonry from splashing water from the scaffold, it is recommended to fold the first section of the scaffold adjacent to the facade. Preferably, do not work with the single scaffold system.

Prevent the occurrence of efflorescence, cement haze, and loss of adhesion by adequately protecting the fresh pointing for a minimum of 48 hours, preferably longer, from drying out and water ingress. Refer to the KNB publication "Clean Masonry" for further information.

## **JOINING (continued)**

The use of hydrochloric acid to remove efflorescence is strongly discouraged. Refer to the KNB publication "Clean Masonry" for further information.

It is advised not to carry out pointing at daytime temperatures below 5° C. If pointing is still done under such conditions, protective measures are recommended. Follow the instructions of the pointing mortar manufacturer when using pre-mixed pointing mortar in such cases.

## **FLUSH POINTING**

Place the profiles in such a way that back-buttering can also be done behind them. The masonry string is set up with a special support block.

During the masonry work, the bed and perpend joints should be "fully and solidly" masoned. Jointing can be continued when the mortar has sufficiently hardened but is still plastic enough to be smoothly finished. Determining this moment depends on the absorbent nature of the brick and the weather conditions during the masonry process.

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## **PROCESSING**

When working with stone-like materials, fine dust can be released, including when working with bricks. This includes mechanical actions such as drilling, milling, chiselling, sanding, grinding, or sawing. Therefore, it is recommended to always take personal protective measures (P3/FFP3 respirators) to prevent the inhalation of potentially harmful dust particles when mechanically processing bricks.

Furthermore, it is always advisable to carry out the operations with water supply to prevent the spread of dust. If this is not possible, the dust should be extracted close to the source. In general, good ventilation helps to limit dust concentrations in enclosed spaces. Tools are used when mechanically processing stone-like materials.

## **PROTECTION**

Always use the necessary personal protective equipment and follow the safety instructions provided by the tool suppliers. Wear safety gloves, safety goggles, safety shoes, and also proper hearing protection.

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## **WORKING CONDITIONS**

Work in construction is often heavy. Therefore, the brick industry has developed a fully mechanized system for handling dividable brick packages. This allows for fully mechanical transportation from the factory to the scaffolding. As a result, it is not necessary to manually lift and transport the bricks, which significantly relieves the mason's workload.

At the same time, scaffolding suppliers have developed systems that eliminate the need for the mason to stoop low or reach high. This has demonstrably reduced the strain on the back.

For proper work procedures that minimize physical strain as much as possible, it is recommended to follow the A-Leaflet "Masonry and Bonding" provided by the Arbouw Foundation.

## Contact FRONT<sup>®</sup>

**We invite everyone to discover the possibilities of WasteBasedBricks and to make sustainable building the standard together.**

For questions and suggestions, please reach out to:

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