HEGGEL®

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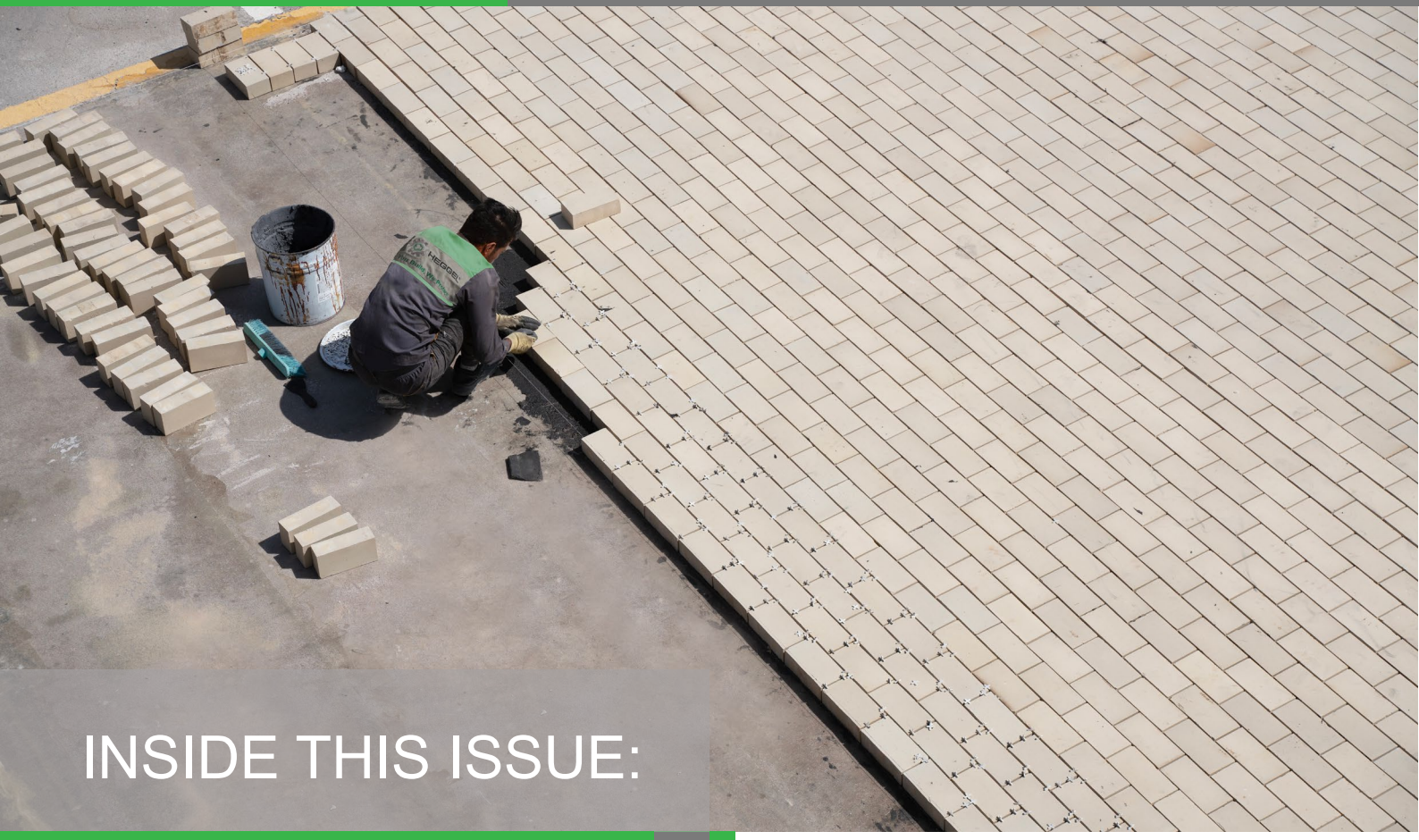
# NEWSLETTER

## HEGGEL® FU 633

October 2023



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## A Comprehensive Insight into Loading and Unloading Zones Across Key Sectors

**Loading and unloading areas** are crucial components of industrial environments. These zones are particularly vital in heavy industries such as oil and gas, petrochemicals, chemicals, and mining. They underpin operations and supply chain management by ensuring the smooth transfer of raw materials, chemicals, equipment, and finished products, with an emphasis on safety and efficiency.
Their design and resilience are paramount to accommodate the unique demands of each sector. For instance, they need to withstand the mechanical loads and potential chemical corrosiveness. Furthermore, they provide temporary storage for goods, guaranteeing a steady supply for loading and efficient spaces for unloading, particularly during peak operational times.

Each industry has its specialized design considerations for these zones. Mining leverages expansive areas with trucks and conveyors for handling chemical by-products, ores and metals. The oil and gas sector relies on dedicated zones for pipelines and tankers to ensure the safe transfer of products, such as oils, gasoline and other chemicals. Steel production requires robust machinery, essential when managing molten metals. The cement industry predominantly uses conveyor systems, given its focus on limestone and clay. The chemical sector, dealing with a spectrum of compounds, has specific areas optimized for tankers, trucks and pipelines, facilitating the safe transfer of materials such as acids, alkalis, and solvents. Energy sectors, especially coal and nuclear, employ sophisticated zones to manage by-products and materials, with some even designed to handle agents like diluted nitric acid.

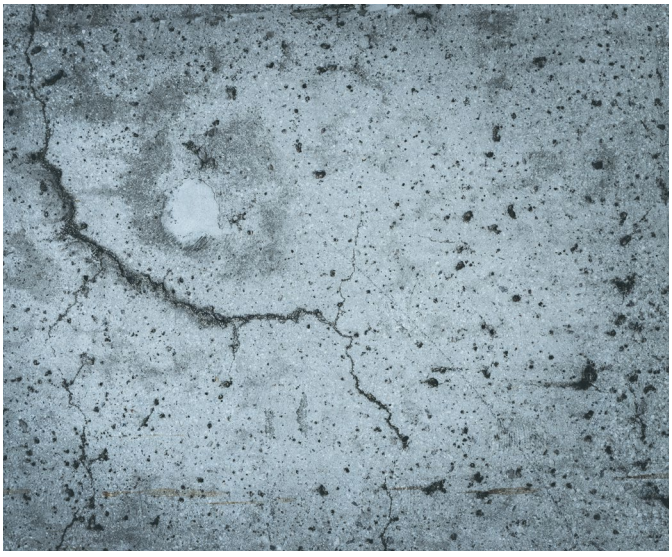
An evident trend is the increasing use of advanced, durable materials in these zones. Anti-skid surfaces on docks and platforms, tile/brick lining systems with anti-acid mortars, and corrosion-resistant materials all contribute to enhanced safety and longevity, especially in loading and unloading areas exposed to aggressive chemicals or adverse weather.

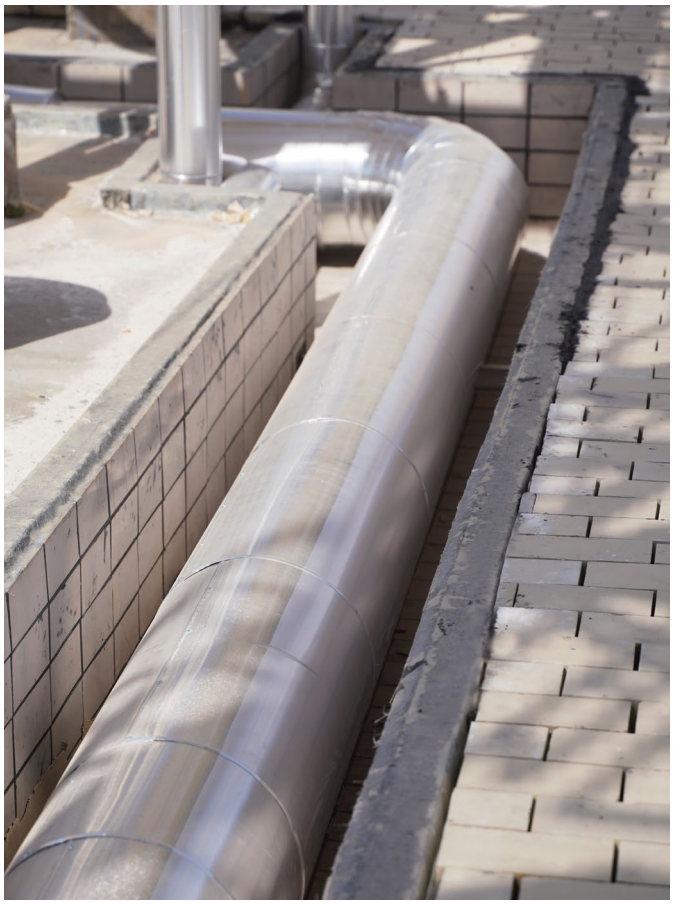
The consistent optimization and functional enhancement of these zones demonstrate the industry‘s proactive approach to addressing operational challenges. Their strategic design, coupled with state-of-the-art infrastructure, materials, and protection systems, underscores a commitment to efficiency, durability, and safety. As these zones become increasingly vital to industry processes, their ongoing improvements reflect both a commitment to current standards and a vision for future industry needs.

## Navigating Chemical and Mechanical Challenges in Loading and Unloading Zones

Loading and unloading areas in industrial environments serve as critical junctures in the production and distribution chain. However, they are more than just transit points for goods and materials. These areas are frequently exposed to a myriad of chemical and mechanical hazards, which vary based on the specific industry.

In the mining industry, routine exposure to chemicals, particularly corrosive by-products like sulfuric acid, poses risks to surfaces such as floors when they come into contact. This challenge is compounded by the use of heavy machinery. The oil and gas industries are no less demanding; volatile compounds like methane, solvents, diluted and concentrated acids and alkalis, are among chemical causing deteriorating exposures while loading and unloading operations. Mechanical damages caused by ever-moving heavy vehicle traffic, add to the destructive effects of chemical exposures. Loading and unloading zones in steel and metals production encounter chemical residues from carbon monoxide, to deteriorative acids. Mechanically, the pressures from transfer equipment and other vehicles are also evident. Chemicals and petrochemical zones see a range of substances, from sulfuric acid and caustic soda to chlorine. In addition to these chemical exposures, the mechanical side involves heavy equipment used for loading and unloading operations, such as trucks, pressurized reactor vessels and pumping systems.





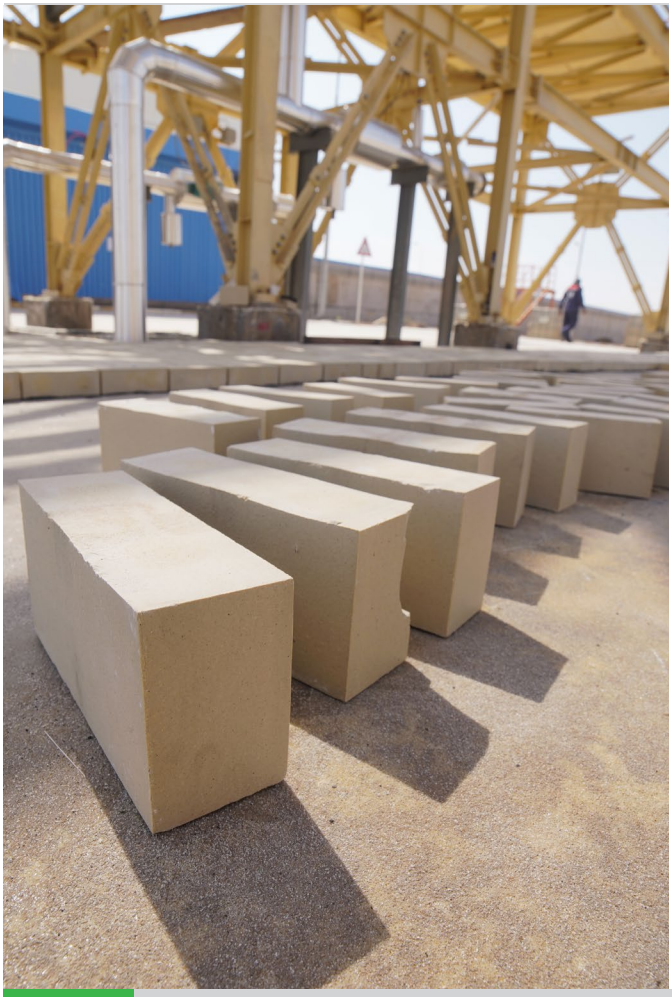
**Corrosion** in loading and unloading zones is one of the most pervasive and often overlooked challenges inflicted upon the flooring due to varied chemical exposures. As these areas serve as key transition points for a multitude of materials many of which are chemically active, the flooring becomes vulnerable to degradation over time. Chemicals, whether they originate from spills, leaks, or even residue, can react with the floor materials, leading to deterioration. Acids, alkalis, and even certain salts can cause pitting, discoloration, and weakening of the surface. Over time, these corrosive effects not only diminish the structural integrity of the floor but also increase the potential for accidents. As the corrosive process advances, it can result in structural failures, and operational halts.

**Wear and Degradation** in the loading and unloading zones are intensified due to the persistent mechanical stresses they endure. These areas are frequently subjected to the weight and movement of heavy vehicles, machinery, and cargo, which can lead to a range of damages. Gradually, the repeated pressure from heavy loads, combined with the abrasive motion of vehicles and equipment, can result in cracks and wear patterns on the floor surface. Additionally, the constant vibration from machinery and traffic can exacerbate these issues, causing delamination or separation in layered flooring systems. The mechanical impact of dropped cargo or tools, the drag from pallets, and the strain from stationary equipment can also contribute to the deterioration of the floor‘s structural strength. As these damages accumulate, they not only present safety hazards but also necessitate frequent repairs and maintenance, impacting the overall efficiency of operations in these zones.

**The combined effects of chemical exposures and mechanical damages** in loading and unloading areas create a synergistic deterioration of the flooring. While chemical exposures can weaken, corrode, or alter the floor‘s material properties, mechanical damages introduce physical stress, leading to cracks, depressions, and abrasions. When these factors converge, the rate and extent of floor degradation amplify significantly. The weakened areas from chemical attacks become more susceptible to mechanical wear, and vice versa. This compounded deterioration can lead to premature flooring failure, presenting safety hazards, disrupting operations, and necessitating costly repairs or replacements. Each sector presents its own set of challenges; understanding these exposures is not just crucial for the safety of the workforce, and integrity of infrastructures but is also indispensable for ensuring efficient and uninterrupted operations. To safeguard against the dual threats of chemical exposures and mechanical stresses, it is essential to prioritize the use of durable flooring materials and conduct regular maintenance checks.

## Durability Reinforcement: Corrosion Protection and Mechanical Damage Prevention in Loading / Unloading Zones

Floors in loading and unloading areas face a relentless combination of chemical and mechanical challenges. While corrosive agents threaten to degrade the material integrity, mechanical loads and stresses challenge their resilience. It is crucial to employ strategies that holistically address both these challenges, ensuring prolonged floor life and operational efficiency.

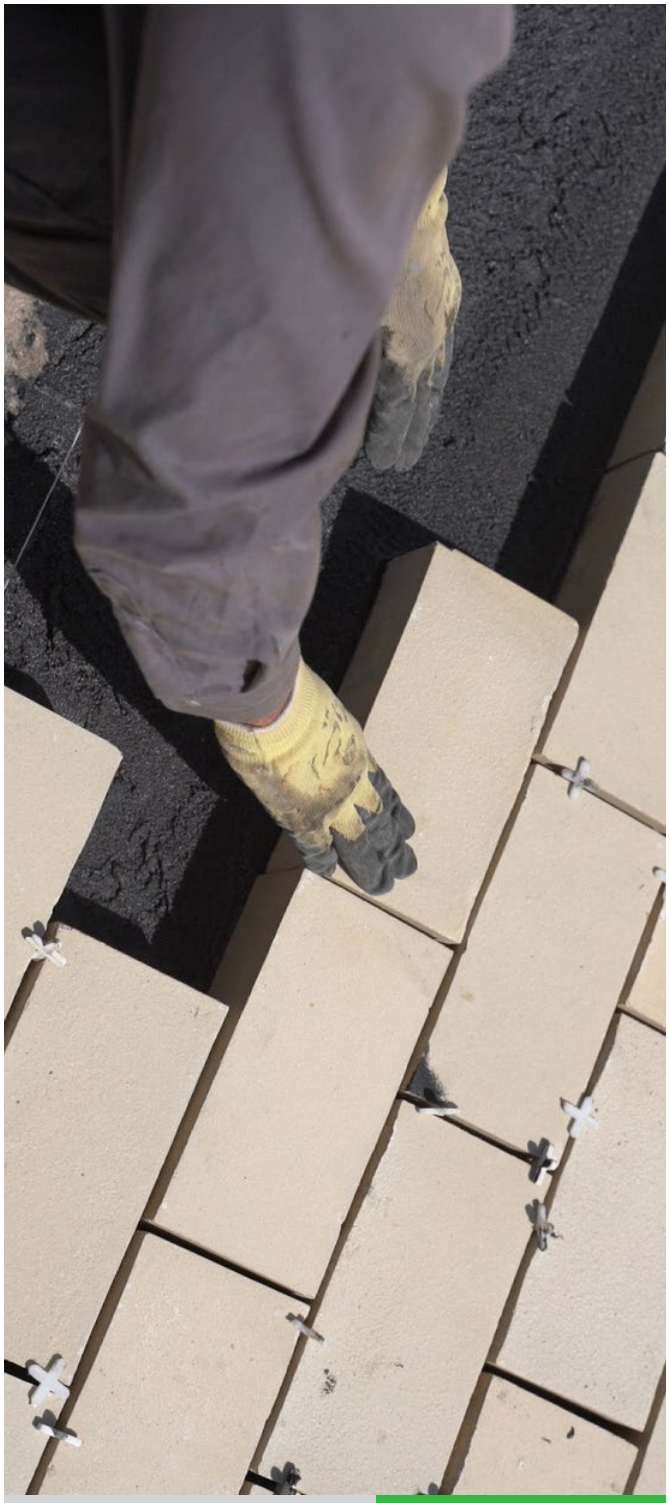


Epoxy and polyurethane coatings, along with other common methods such as concrete sealers, rubber matting, and stainless-steel plating, provide limited protection primarily against diluted chemicals and minor abrasions. They are not designed for long-term resistance to concentrated, aggressive chemicals. These traditional techniques, while somewhat effective for everyday use, fall short in harsher chemical environments, leading to potential structural compromise. They often require frequent upkeep or replacement due to wear and degradation, incurring additional costs and operational interruptions. Even methods aimed at reinforcing structural integrity, like densifiers, hardeners, and joint fillers, lack comprehensive efficacy against persistent, high-concentration corrosive challenges.

To achieve rigorous chemical resistance and sustained durability, industries must consider investing in advanced, targeted technologies for corrosion control. In this context, Acid-Resistant Tile or Brick Lining Systems, especially when fortified with specialized mortars, emerge as a superior defense, offering enduring resilience against chemical exposures and mechanical impacts. This strategy stands out as a long-term solution, diminishing maintenance frequency and guaranteeing consistent, extended protection.

## Industrial Surface Integrity in Loading / Unloading Zones by Utilizing Diverse Mortars in Acid-Resistant Tile / Brick Lining Systems

In industrial loading and unloading zones, where the dynamics of operations demand surfaces robust enough to withstand both intense mechanical stresses and diverse chemical exposures, the protective systems employed become crucial.



Mortars, especially when combined with tiles and bricks, play a pivotal role in safeguarding these surfaces. These tiles and bricks, designed to be acid-resistant, combined with the binding strength and protective properties of mortars, ensure that the mechanical requirements are well-satisfied. The brick or tile lining systems, when laid with a robust mortar, create a barrier that amplifies protection against the rigors of industrial operations.

Among the array of mortars available, cementitious ones, though versatile and commonly used, often fall short against certain corrosive agents, particularly acids. Epoxy mortars for instance, while offering impressive adhesion, excel against organic solvents or alkalis but might falter against particular acids. Polyester mortars, formulated from unsaturated polyester resin, bring a decent chemical resistance to the table, yet their resilience under relentless mechanical wear can be questionable.

For the specialized needs of loading and unloading zones, furan-based mortars stand out. With their foundation in synthetic thermosetting resins, furan-based mortars exhibit resistance to a wide chemical spectrum, making them a versatile protective material. Their thermal resilience ensures they maintain performance even at higher temperatures. Moreover, their characteristic low permeability acts as a shield against chemical spills, safeguarding the foundational structure. Considering their exceptional mechanical strength, furan-based mortars, especially when paired with acid-resistant tile or brick lining systems, present themselves as the prime solution for the challenges posed by industrial loading and unloading areas.

Within the vast landscape of industrial protective solutions, **HEGGEL FU 633** emerges as a formidable choice. This mortar encapsulates the robust nature of furan resins, delivering a versatile and multi-faceted protection for a variety of industrial applications. Its remarkable resistance to a wide array of acids and alkalis positions **HEGGEL FU 633** as a trusted choice in settings where the chemical environment can be both diverse and aggressive.

# HEGGEL® FU 633

## Two-Component Furan Resin Mortar

**HEGGEL FU 633** is a two-component mortar developed with a modified, aldehyde-free furan resin, specifically designed for the bedding and jointing of acid-resistant ceramic bricks, tiles, or carbon bricks.

**HEGGEL FU 633** demonstrates excellent chemical resistance against an extensive array of media. Whether it is various inorganic or organic acids and alkalis, solvents, hydrocarbons, oils, or fuels, this mortar holds its ground. Its versatility is further underscored by its remarkable adhesion to substrates. This comprehensive chemical resistance ensures that surfaces treated with **HEGGEL FU 633** remain protected across diverse industrial scenarios.

**HEGGEL FU 633** is specifically engineered for tile and brick lining applications across a spectrum of industries and areas, encompassing the chemical sector, wastewater and process water treatment, power plants, and more.
**HEGGEL FU 633** in tile and brick lining systems accommodate both full-joint and hollow-joint installations.

The broad-spectrum resistance becomes particularly invaluable in areas like loading and unloading zones, which are often subjected to unpredictable chemical interactions. Beyond its chemical resilience, **HEGGEL FU 633** also offers the mechanical durability essential for these high-traffic and mechanically demanding areas.
With innovative formulation, **HEGGEL FU 633** can withstand conditions up to 180°C. Such a feature makes **HEGGEL FU 633** exceptionally suitable for industrial environments where varying temperature conditions are a norm.

Beyond its intrinsic resistive properties, **HEGGEL FU 633** brings ease of application, notably with its compatibility with joint injectors. This feature streamlines the application process, ensuring even and consistent jointing. Furthermore, **HEGGEL FU 633** proves to be a cost-effective solution, owed in large part to its favourable resin/filler ratio. The high filler content of the mortar enhances its volume, optimizing usage and ensuring more coverage without compromising quality.

## Application Areas

- Channels
- Pits
- Sumps
- Warehouses
- Workshops
- Neutralization lines
- Pickling lines
- Chemical processing plants
- Petrochemical facilities
- Pharmaceutical manufacturing zones
- Industrial processing areas
- Wastewater treatment facilities
- Metal refining and smelting zones
- Tank and storage areas
- Loading/unloading areas
- Reactor rooms
- Pump and compressor stations
- Containment areas
- Chemical batching areas
- Mixing rooms

| Technical Data | Value | Unit |
|---|---|---|
| **Hardness**<br>ASTM D2240 | > 60 | Shore D |
| **Abrasion resistance**<br>ASTM C241 | 11 | $cm^3/50\ cm^2$ |
| **Flexural strength**<br>ASTM C580 | 45 | MPa |
| **Compressive strength**<br>ASTM C579 | 79 | MPa |
| **Tensile strength**<br>DIN EN ISO 527 | 10 | MPa |
| **Adhesive strength to ceramic tiles**<br>DIN EN ISO 4624 | > 2.0 | MPa |