

UltraTM series

INDUSTRIAL FLOOR CONCRETE

ultra performance | ultra quality | ultra innovation



DESCRIPTION

INDUSTRIAL FLOOR CONCRETE is Lafarge's specialised concrete specifically designed to provide maximum performance for the demanding requirement of modern, cost-effective industrial applications. **INDUSTRIAL FLOOR CONCRETE** has been designed to conform to guidelines in "Model Specification for Industrial Floors" contained in SABS 1200G and the C&CI's (Cement & Concrete Institute's) publication "Concrete Industrial Floors on the Ground".

DESIRABLE PROPERTIES OF INDUSTRIAL FLOORS ARE:

- High wear resistance
- Good compressive and flexural strength
- Overall dimensional stability
- Zero cracking
- Zero curling or warping

WHERE TO USE

- Driveways (industrial and commercial)
- Floors (industrial and commercial)
- Cold room floors
- Hardstand areas
- Parking garages (industrial and commercial)

ADVANTAGES OF INDUSTRIAL FLOOR CONCRETE

- High performance floor
- Increased abrasion resistance
- Increased ability of load transfer at saw cut joints
- Reduced potential for plastic shrinkage cracking
- Reduced potential for drying shrinkage cracking
- Lower risk of curling
- Increased dimensional stability
- Overall lower maintenance costs

CHARACTERISTICS AND MINIMUM STANDARDS OF INDUSTRIAL FLOOR CONCRETE

- **STRENGTH:** The minimum grade concrete supplied is a 30MPa for light duty industrial and commercial applications where rubber wheeled traffic is used. This grade concrete may exceed the structural requirements but provides improved abrasion resistance and impermeability when power trowelled.
- **AGGREGATE SIZE:** The nominal size of coarse aggregate should not be greater than 25% of the thickness of the floor slab. The maximum size aggregate should be a nominal 37,5mm concrete stone, which is often blended with a 13,2mm or 9,5mm concrete stone to improve workability during construction phase. To improve the abrasion resistance only aggregates with a high 10% fine aggregate crushing test value are used. The coarse aggregate content is maximised to reduce the water requirement of a concrete mix.
- **SLUMP:** Is the assessment of the freshly mixed concrete to determine the ease with which it can be mixed, placed, consolidated and finished to a homogeneous condition. Typically, Industrial Floor Concrete is supplied with a target slump of 75mm, within an acceptable range of 50mm to 100mm.
- **SHRINKAGE:** The primary factors controlling dimensional stability of concrete are drying shrinkage and construction practices. Drying shrinkage is addressed through the overall reduction of the cement paste proportion using the maximum aggregate size and content. Reducing the fine aggregate content reduces the water required in the mix. The water requirement can be further reduced by using admixtures. The above actions in a concrete mix reduce the overall potential for drying shrinkage. Industrial Floor Concrete can achieve a drying shrinkage value of less than 0,05% (0,5mm/1m length).
- **CEMENT:** Shall be a CEM I or CEM II complying with SABS ENV 197-1. A minimum cement content of 310kg/m³ is required to ensure the overall compressive and flexural strength performance of the concrete which should be no less than 30MPa and 3,8MPa respectively. The above cement type allows for a maximum of 20% cement extender using either slag or fly ash.
- **MICRO FIBRE:** Polypropylene micro fibres are added to Industrial Floor Concrete in either 600g/m³ or 900g/m³. The addition of micro fibres drastically reduces bleeding of concrete and the potential of plastic shrinkage cracking. Impermeability is also increased, resulting in improved impact and abrasion resistance.

DESIGN ELEMENTS

TO REDUCE THE POTENTIAL FOR CURLING, THE FOLLOWING CRITERIA NEED TO BE CONSIDERED:

- Slab thickness influences the potential for curling by the fact that thicker slabs are heavier to lift than thinner slabs.
- Panel sizes should not be greater than 30 times the slab thickness or greater than 4,5metres square, whichever is the lesser. Depending on the thickness of the slab, the

potential for curling is reduced by decreasing the slab surface to thickness ratio (generally recommended slab surface is 4m x 4m).

- Isolation of the slab from walls, columns and manholes is imperative to reduce slab restraint and induced stress, which causes cracking.

SITE PRACTICE

ALTERNATE LONG STRIP

A preferred method of construction is alternate long strip construction with transverse saw cuts. This method has the following advantages:

- Reduced number of saw cuts
- Due to initial drying shrinkage being most evident at early ages, the infill strip takes up some of the initial shrinkage of the adjacent strip, thereby increasing the effectiveness of load transfer at all saw cut joints.

GENERAL GOOD CONSTRUCTION PRACTICES INVOLVE:

- Level control: Non-uniform thickness in slab will result in cracking in the thinnest section and failure in maximum applied loads.
- Effective compaction is defined as the immersion of a high frequency

vibratory poker needle, followed by a minimum of two passes of a vibratory screed beam.

- Finishing power trowelling to the required specified finish without the addition of cement or water.
- Effective curing is achieved through fog spraying or water curing for minimum of 7 days. Alternatively, commercial curing compounds of white-pigmented resin are very effective. These methods will reduce the potential rapid loss of moisture, which exacerbates the curling of slabs.

MICRO FIBRES:

The slab's environmental conditions on site, such as wind temperature and humidity, affect the drying out of the slab and its potential for plastic drying shrinkage. To minimise the risk, polypropylene micro fibres are introduced throughout the matrix. This reduces the ability of plastic cracking

to develop by constantly changing the micro-crack direction. The shrinkage value with typical 7 and 28 day cube results for a mix based on the minimum standards are as follows:

Shrinkage	< 0,05%
Compressive	+/- 21MPa @ 7 days
Compressive	+/- 36MPa @ 28 days
Flexural	+/- 4.4MPa @ 28 days

** These values can differ from region.*

Please contact your local Lafarge Technical Department for a detailed performance concrete design.

SAFETY PRECAUTIONS

The use of safety goggles and gloves is recommended when placing concrete.



FIRST AID

EYES: Immediately flush eyes, including under lids, with water for at least 15 minutes to remove all particles. If necessary, seek medical advice.

SKIN: Wash skin with cold water and a pH neutral soap as soon as possible, except where open wounds are visible. Attention should be paid to wounds and fresh scars which should be covered with protective paraffin gauze. Seek medical help in cases of prolonged contact with wet concrete.

INGESTION: Rinse mouth with clean water. If swallowing has occurred drink plenty of milk or water. Do not induce vomiting. Seek medical attention immediately.

INHALATION: Remove to fresh air. If symptoms persist seek medical attention.

CONTACT DETAILS

FOR FURTHER INFORMATION, CONTACT THE LAFARGE TECHNICAL DEPARTMENT AT ANY OF THE CENTRES BELOW:

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