

ISTRA 45

General information

Istra 45 is a fused calcium aluminate (CA) cement typically used in refractory applications where service temperatures do not exceed 1350°C. It also may be used in a variety of applications in construction, corrosion resistance and other industries.

ISTRA 45 is composed of calcium aluminate phases which have the following characteristics:

- High early strength
- Refractoriness
- High abrasion resistance
- Resistance to biogenic sulfuric acid corrosion

ISTRA 45 has a shelf life of approximately six months if stored in a dry environment.

Production

ISTRA 45 is produced by melting selected raw materials (bauxite and limestone) in special kilns. After cooling, the clinker is ground using ball mills.

Quality

Like all other Calucem products, the production of ISTRA 45 is subject to stringent quality control. Constant monitoring of all components ensure a consistent quality. The production plant is certified according to EN ISO 9001 – certificate number CH08/1542 and the Environmental Management System EN ISO 14001 – certificate number CH08/1543.

Technical Data

The following information represents typical ranges for the chemical and physical properties of ISTRA 45 produced at our plant.

Chemical Composition (%)

| | |
|--------------------------------|------------|
| SiO ₂ | ≤ 9.0% |
| Al ₂ O ₃ | ≥ 44.0% |
| Fe ₂ O ₃ | ≤ 9.0% |
| CaO | 37.0-41.0% |
| MgO | ≤ 1.5 |
| SO ₃ | < 0,4 |

Mineralogical Composition

ISTRA 45 contains mainly monocalcium aluminate (CA). This mineral phase is responsible for the high early strength.

When mixed with water, ISTRA 45 forms calcium aluminate hydrates as its hydration products.

Mineral Phases of ISTRA 45:

| | |
|----------------------|---|
| Main mineral phase | CA |
| Minor mineral phases | C ₂ AS, CT, C ₁₂ A ₇ |

Physical Properties:

| | |
|----------------------------|--------------------------------|
| residue on sieve at: | 90 μm < 5% |
| Blaine Fineness | 3200 - 3800 cm ² /g |
| Bulk density | approx. 1.15 g/cm ³ |
| Specific gravity | 3.0 - 3.1 g/cm ² |
| Approximate melting point: | 1350°C |

Setting Time and Water Demand

The testing of the setting time is performed using the mortar in order to describe the behaviour of the ISTRA 45 in mixtures with a workable consistency. A mixture containing CEN-standard sand and using a water/cement ratio of 0.40 is produced for testing the mortar on the basis of EN 14647.

| | |
|-----------------------|-----------------------------------|
| Initial set (hrs:min) | 1:00 – 4:00 |
| Final set | maximum 120 min after initial set |
| Water demand | 26 ± 2% |

▶ **Development of strength**

Once setting has begun, strength develops very rapidly. After one day, the compressive strength is typically higher than Type I Portland cements after 28 days.

Development of Strength (N/mm²)

| | | |
|----------------------------|-------|-------|
| Time | 6 hrs | 1 day |
| Compressive Strength (MPa) | > 18 | > 40 |

▶ **Resistance against Corrosion**

High resistance against waste waters in combination with extraordinary abrasion resistance and high resistance against biogenic sulfuric acid corrosion (BSAC) makes ISTRA 45 an ideal product for sewer systems and waste water plants. When ISTRA 45 is mixed with water, the hydration products of calcium aluminate cement are formed. They are extremely resistant against aggressive, slightly acid waters (pH factor > 3) including water soluble sulfates.

▶ **Refractoriness**

ISTRA 45 can be used in mild to moderate refractory applications, such as artificial fireplace logs and hearths, where temperatures do not exceed 1350 °C. ISTRA 45 can be used in gunning mixes, as well as castables. It can be used as a stand-alone cement, or as part of a more complex hydraulic system.

▶ **Mixing Advice**

As with Portland cement, ambient conditions and temperatures of the ingredients will influence the length of time ISTRA 45 concretes and mortars will remain plastic and workable. Higher temperatures naturally will reduce this time while lower temperatures will extend it. Many types of mixes using ISTRA 45 are extremely sensitive to the characteristics of each ingredient in the mix, and may require substantial lab testing to obtain optimum properties.

▶ **Safety Instructions**

Please refer to our Material Safety Data Sheets for complete information. In general, CALUCEM calcium aluminate cements are not known to contain hazardous or toxic materials.

As of: 09/2014

All previous technical data sheets are no longer valid.