



ÇİMSA

REFRO40

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HIGH THERMAL STABILITY + FAST STRENGTH



Refro40 is a calcium aluminate cement developed by Çimsa's R&D Center using advanced technology and high-temperature testing facilities to meet the demanding requirements of refractory monolithics applications.

The product offers excellent thermal resistance up to 1250 °C, high abrasion resistance, and superior mechanical strength, making it ideal for castable refractories, furnace linings, and other heavy-duty industrial environments.

Refro40 is manufactured under fully integrated quality control processes:

- XRF for raw material chemical analysis
- XRD Rietveld for phase composition control
- Laser diffraction for particle size distribution
- Refractory performance testing and dry-mix application checks
- Cement analysis in compliance with TS EN 14647 standard

REFRO40 IS PRODUCED ACCORDING TO EN 14647 STANDARDS AND HAS THE FOLLOWING FEATURES.



Physical And Mechanical

| Physical And Mechanical | Çimsa Values (%) |
|---------------------------------------|-------------------------------------|
| Initial Set (hr) | 1 - 4 |
| Final Set | up to 120 minutes after initial set |
| Compressive Strength (MPa) | 6 hr ≥ 30,0 - 24 hr ≥ 50,0 |
| Specific Gravity (g/cm ³) | ≤3,3 |
| Residue at 45 microns (%) | ≤10,0 |
| Residue at 90 microns (%) | ≤2,0 |
| Blaine (cm ² /g) | ≥3000 |

Chemical Composition

| Al ₂ O ₃ (%) | CaO(%) | SiO ₂ (%) | Fe ₂ O ₃ (%) |
|------------------------------------|--------|----------------------|------------------------------------|
| ≥38,0 | ≤38,0 | ≤5,0 | ≤18,0 |

| TiO ₂ (%) | MgO (%) | SO ₃ (%) | Na ₂ Eq Alkali (%) | Cl-as ions (%) | S-as ions (%) |
|----------------------|---------|---------------------|-------------------------------|----------------|---------------|
| ≤3,0 | ≤1,0 | ≤0,2 | ≤0,3 | ≤0,01 | ≤0,1 |

Phase Composition

| | |
|----------------------|--|
| Major Mineral Phase | : CA |
| Minor Mineral Phases | : C ₁₂ A ₇ , C ₄ AF |

pH 3

Maintains structural integrity down to pH 3, offering strong resistance to acidic environments.

60 MPa

Reaches 60 MPa compressive strength within 24 hours—ideal for fast-track applications.

MAX

Its dense microstructure delivers superior abrasion resistance, further enhanced when combined with Rego.

-5 °C

Provides high thermal stability up to 1250 °C, making it a reliable choice for demanding refractory applications.



For mortar testing in accordance with EN 14647, a mix prepared with CEN standard sand and a water-to-cement ratio of 0.40 is used.

ADVANTAGES



THERMAL RESISTANCE

When used with appropriate refractory aggregates, Refro40 maintains stability and mechanical strength up to 1250 °C. In contrast, Portland cement loses its hydrated phases and integrity around 400 °C. This makes Refro40 an excellent choice for designing high-temperature resistant mortars and castable systems for refractory applications.



HIGH ABRASION RESISTANCE

The special calcium aluminate phase distribution of Refro40 ensures superior abrasion resistance even at elevated temperatures. When combined with Rego, the system's mechanical strength and service life are significantly enhanced.



RESISTANCE TO SULFATE ATTACKS

In conventional Portland cement systems, sulfate attack occurs due to reactions between aluminates and sulfate ions, causing expansion and cracking over time. This risk increases in environments exposed to seawater, groundwater, or chemicals. Refro40 contains no tricalcium aluminate phase and forms different hydration products, ensuring superior resistance to sulfate exposure.



LOW ALKALINE CONTENT

Portland cement typically has an equivalent alkali content above 0.6%, which, when combined with silica-containing aggregates, can cause alkali-silica reaction (ASR), resulting in gel formation and cracking. Refro40, with its lower equivalent alkali ratio, offers high resistance to these reactions.



LOW CHROMIUM +6 CONTENT

High chromium (VI) levels can cause skin sensitivity and irritation upon contact with cement. According to EU regulations, all cement products must contain less than 2 ppm of chromium (VI). Refro40 naturally meets this requirement, providing safer handling and compliance with health standards.



RESISTANCE TO ACID

Thanks to the inherent advantages of CAC technology, Refro40 provides excellent resistance to acidic environments. While Portland cement matrices begin to deteriorate below pH 7, Refro40 maintains its integrity down to pH 3. This feature makes it a preferred solution for applications exposed to aggressive chemical conditions.



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