



## Alumina Cement Type AL-CEM

### General Information

ZIRCAR Ceramics' Alumina Cements Type AL-CEM are single-part, water-based adhesives designed for bonding ZIRCAR Ceramics' fibrous ceramic products to themselves or to other porous refractory materials, such as insulating firebricks and lightweight castables. These products are also useful as coating cements to improve the hardness, oxidation and corrosion resistance of low-density substrates.

**TYPE AL-CEM** is the highest purity  $Al_2O_3$  cement and exhibits the greatest chemical inertness.

**TYPE AL-CEM/XT** is based upon AL-CEM and contains a modifier that provides extended working time and extra hardness.

**TYPE AL-CEM/XTW** is a more aqueous and finer version of AL-CEM/XT, making it more suitable for spray application.

**TYPE AL-CEM Super** contains additional polycrystalline alumina filler materials.

When stirred, these dilatant suspensions flow. After stirring, AL-CEM and AL-CEM/XT have the consistency of a high-quality latex paint. AL-CEM/XTW has the consistency of heavy cream and AL-CEM Super is more putty-like.

These products form strong bonds upon drying. Curing at 425°C (800°F) or more will render the bond stable to re-exposure to water or humid conditions. ZIRCAR Ceramics' Alumina Cements are non-flammable, not affected by freezing and are mildly acidic (pH 5). Shelf life is 1 year.



### Characteristics & Properties

| Type   | AL-CEM       | AL-CEM/XT    | AL-CEM/XTW | AL-CEM Super |
|--|--------------|--------------|------------|--------------|
| Typical Calcined Composition, wt%  |              |              |            |              |
| $Al_2O_3$  | 99.00        | 98.20        | 98.20      | 97.70        |
| $SiO_2$  | 0.92         | 1.52         | 1.52       | 2.04         |
| Other  | 0.08         | 0.28         | 0.28       | 0.26         |
| Specific Gravity, g/cc   | 1.95         | 1.95         | 1.3        | 2.06         |
| Solids Content, %  | 70           | 72           | 48         | 74           |
| Weight per Wet Pint, kg (lb.)  | .91 (2)      |              |            |              |
| Maximum Use Temperature*, °C (°F)  | 1800 (3272)  | 1700 (3092)  |            |              |
| Melting Point, °C (°F)   | >1870 (3398) | >1800 (3272) |            |              |
| * Maximum use temperature is influenced by numerous variables. As an example, these cements can be used as the adhesive in butcher-block furnace linings operating to 1800°C (3272°F). |              |              |            |              |
| Coverage by 1 Pint of AL-CEM as 0.01in. thick layer on Fibrous Ceramic Insulation averages 0.7 sq m (7 sq ft.). AL-CEM/XT and AL-CEM Super are typically applied in thicker layers.    |              |              |            |              |

The data presented herein is intended to help the user to determine the appropriateness of this material for their application. This data is a nominal representation of this product's properties and characteristics and therefore should not be used in preparing specifications.

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Technical Data Bulletin  
Alumina Cement Type AL-CEM  
[www.zircarceramics.com](http://www.zircarceramics.com)  
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# Alumina Cement Type AL-CEM

## Suggested Applications

Bonding ZIRCAR fibrous ceramic materials together and to other other materials with porous surfaces.

Coating surfaces of ZIRCAR boards, blankets and papers for improved hardness and resistance to abrasion and chemical attack.

Repairing cracks and openings in furnace walls composed of fibrous ceramic material.

Forming of shapes (rigid tubes, boats, setters, supports, process fixtures etc.) by bonding of rigid and flexible ZIRCAR fibrous ceramic materials.

Bonding agent in manufacture of high-alumina composites and laminates.

## Availability of Standard Cements

| ITEM #  | DESCRIPTION        |
|---------|--------------------|
| C4001   | AL-CEM, 1 PT       |
| C4002   | AL-CEM, 1 QT       |
| C38B-01 | AL-CEM/XT, 1 PT    |
| C38B-02 | AL-CEM/XT, 1 QT    |
| C38D-01 | AL-CEM/XTW, 1 PT   |
| C38D-02 | AL-CEM/XTW, 1 QT   |
| C38C-01 | AL-CEM Super, 1 PT |
| C38C-02 | AL-CEM Super, 1 QT |

## To Order

**Standard items:** specify quantity, item # and description.

Standard items are available for immediate shipment from stock.

**Custom preparations,** such as a 5-gallon bucket, are available.

ZIRCAR Ceramics' AL-CEM cements are useful in a wide number of applications. The image to the right shows a large butcher-block 1700°C furnace roof that combines ZIRCAR Ceramics' Alumina Insulation Types AL-25/1700 and Alumina Type Backer Board with AL-CEM/XT. Information on how to apply this type of cement is provided on page 3.



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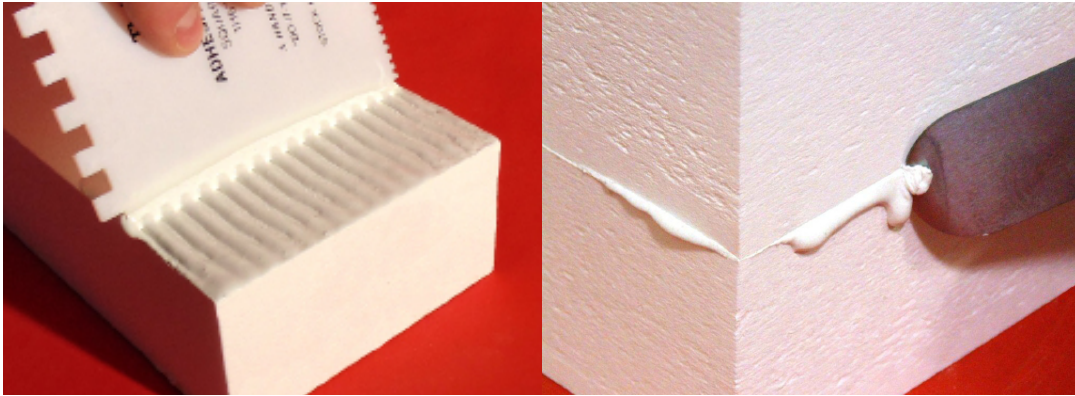
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## Application Instructions - Bonding

- 1) Clean surfaces to be joined or coated, making certain they are free of organic binders, oil and other contaminants.
- 2) Mix contents thoroughly before using.
- 3) Apply cement thoroughly and evenly to all cleaned surfaces to be joined or coated. Application of cement with a 1/8" notched trowel as shown below, usually ensures the cement will remain fluid until parts to be bonded are mated.
- 4) When bonding parts, contact wet surfaces using slight pressure to assure match of parts. Clamping bonded parts is usually not required, however gravity weighted drying will help cement to consolidate during drying.
- 5) After bond tacks up, gently remove excess squeezed-out cement as shown below.
- 6) Dry the joined or coated pieces thoroughly before moving or placing into service. The time required to dry varies from a few minutes to a day or more, depending on the size and ability to dry out the part. Drying may be accelerated by heating or oven drying at not greater than 90°C (200°F). Curing will take place after exposure to 450°C.



## Application Instructions - Coating

- 1) Gather part, cement, notched trowel (1/16" notches) or brush, sponge, di water in spray bottle
- 2) Mix cement thoroughly in its original container by vigorously shaking in hand. Shake until you feel it begin to flow and then continue shaking for another 30 seconds.
- 3) Lightly spray item to be coated with DI water until uniformly moistened as evidenced by touch.
- 4) Pour an adequate volume of cement onto the surface to be coated.
- 5) Evenly distribute cement with the notched trowel being careful not to gouge the material.
- 6) Moisten sponge with DI water and lightly burnish the surface, knocking down the humps left by the trowel. Rinse, re-wet sponge, and repeat as necessary to achieve desired thickness and appearance. Careful not to leave the coating too thick or it will shrink and craze (crack).
- 7) Dry at room temperature for ~ 20 minutes, then force dry as necessary.
- 8) Cure @ 425°C (797°F) for 2 hrs.

## Application Instructions - Spray coating - AL-CEM/XTW ONLY

- 1) Clean surfaces to be joined or coated, making certain they are free of organic binders, oil and other contaminants.
- 2) Mix contents thoroughly before using.
- 3) For best results apply AL-CEM/XTW in thin layers using an HVLP gravity-fed sprayer system.
- 4) Allow to air-dry between layers.
- 5) Burnish final sprayed surface to desired smoothness using soft, lightly moist sponge.
- 6) Cure coated parts by firing to 450°C (842°F)



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