

# TYPE K CEMENT

Pre-Blended Shrinkage-Compensating Cement



## PRODUCT DATASHEET

**DESCRIPTION:** TYPE K CEMENT (ASTM C845) is a pre-blended, finished hydraulic cement consisting of Komponent® cement powder admixture and portland cement used to create shrinkage-compensating concrete, low shrinkage concrete, and non-shrink grouts. This pre-blended finished cement provides consistent quality and is an ideal solution for remote projects where production capabilities are limited. TYPE K CEMENT is engineered to prevent negative volume change and drying shrinkage cracking by creating controlled expansion during placement and cure. The designed expansion overcomes the inherent shrinkage of portland and blended cement concretes. Concretes and grouts made with TYPE K CEMENT reduce permeability, provide up to 60% increased abrasion resistance, prevent slab curling and dominant joints, improve sulfate resistance, help maintain dimensional stability and optimize long-term performance. Design and construction are simplified by maximizing placement sizes, reducing mobilizations, and minimizing or eliminating joints, waterstops and pour strips.

**USES:** TYPE K CEMENT is used to create shrinkage-compensating concretes and grouts. It is ideal for use in cast-in-place, post-tensioned, and chemically pre-stressed designs. Common uses include: industrial and commercial slabs-on-grade, concrete containment structures, parking structures, bridge decks, topping slabs, and composite decks, architectural concrete, polished concrete, mass elements, underground structures, and other cast-in-place applications. Use anywhere improved dimensional stability, durability, aesthetics, and structural performance are required.

**ENVIRONMENTAL ADVANTAGES:** Use TYPE K CEMENT to reduce your carbon footprint and lower your environmental impact. Production of Komponent cement powder admixture emits far less CO<sub>2</sub> than portland cement. Contact your CTS Komponent Representative for EPD, LEED values and other sustainability information.

**APPLICATION:** Shrinkage-compensating concrete and other concrete materials made with TYPE K CEMENT are produced and delivered to the job site using conventional production equipment and installation practices. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Use standard industry best practices for hot and cold weather concreting. Protect concrete from freezing temperatures for 7 days after placement. Review the KOMPONENT Shrinkage-Compensating Concrete Technical Manual for design and installation considerations. Contact your CTS Komponent Representative for project support.

**BATCHING & MIXING:** TYPE K CEMENT is added at the batch plant using industry standard bulk cement batching and mixing equipment and incorporation methods. When using bagged units for smaller projects, alternate portable concrete batching solutions are available. Contact a CTS Komponent Representative for more information. For mix design guidelines and batching and mixing instructions, refer to the Komponent Shrinkage-Compensating Concrete Technical Manual for details.

**WATER/CEMENT RATIO:** Water/cement ratios between 0.40 and 0.55 are recommended. For lower water/cement ratio designs, contact your CTS Komponent Representative for project support.

**CURING:** For general applications, wet curing is required. Refer to the Shrinkage-Compensating Concrete Technical Manual and ACI 223 guidelines for additional information.

**COLD WEATHER:** Environmental and material temperatures below 70°F (21°C), relative humidity, wind speed and solar radiation may affect setting time and the rate of strength gain. Lower temperatures will have a more pronounced effect. Thinner sections will be more significantly affected. To compensate for cold temperatures, keep material warm, use heated mix water and follow ACI 306 Procedures for Cold Weather Concreting. When average high and low temperature is expected to fall below 40°F (4.4°C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301 (ACI 301M). Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

**WARM WEATHER:** Environmental and material temperatures above 70°F (21°C), relative humidity, wind speed and solar radiation may affect setting time and the rate of strength gain. Higher temperatures will have a more pronounced effect. To compensate for warm temperatures, keep material cool, use chilled mix water and follow ACI 305 Procedures for Hot Weather Concreting.

## OVERVIEW

### Highlights:

- Prevent drying shrinkage cracking
- Prevent curling
- Reduce joints by up to 95%
- Eliminate dominant joints
- Reduce reinforcement
- Increase abrasion resistance up to 60%
- Increase durability and lower permeability
- Improve sulfate resistance
- Protect against corrosion and deterioration
- Maximize pour sizes and minimize mobilizations
- Eliminate pour/delay strips
- Increased load capacity and reduced slab thickness
- Maintain dimensional stability
- Maintain long-term FF/FL
- Improve long-term structural behavior

### Tested in accordance with:

ASTM: C845, C806, C878

### MasterFormat® 2020

03 31 00	Cast-in-Place Concrete
03 31 19	Shrinkage-Compensating Structural Concrete
03 33 00	Architectural Concrete - Cast-in-Place Concrete
03 37 13	Shotcrete
03 47 00	Site-Cast Concrete
03 48 00	Precast Concrete Specialties
03 49 00	Glass-Fiber-Reinforced Concrete
03 53 19	Concrete Overlayment
03 61 00	Cementitious Grouting
03 62 13	Non-Metallic Non-Shrink Grouting
03 64 00	Injection Grouting
03 70 00	Mass Concrete

### Manufacturer:

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**PACKAGING & AVAILABILITY:** TYPE K CEMENT is only available in bulk delivered by rail. Minimum order quantities and additional lead times are required. Contact a CTS Komponent Representative for more information. Type K Cement is most commonly blended to meet ASTM C845 criteria at the local ready-mix plant. Standard industry mix design optimization, bulk cement batching and mixing equipment and incorporation methods are used. See the KOMPONENT data sheet for more information.

**SHELF LIFE:** TYPE K CEMENT in sealed bulk storage containers have a shelf life of up to 2 years when stored properly protected from adverse environmental conditions.

**USER RESPONSIBILITY:** Before using CTS products, read current technical data sheets, bulletins, product labels and safety data sheets at [www.CTScement.com/Komponent](http://www.CTScement.com/Komponent). It is the user's responsibility to review instructions and warnings for any CTS products prior to use.

**TECHNICAL SUPPORT:** CTS Cement provides contractors, engineers, and project owners with in-house and field technical services on any TYPE K CEMENT application. For detailed information on use and applications of TYPE K CEMENT and shrinkage-compensating cement technology, refer to CTS Cement's Shrinkage-Compensating Concrete Reference Guide.

**WARNING: DO NOT BREATHE DUST. AVOID CONTACT WITH SKIN AND EYES.** Use material in well-ventilated areas only. Exposure to cement dust may irritate eyes, nose, throat, and the upper respiratory system/lungs. Silica exposure by inhalation may result in the development of lung injuries and pulmonary diseases, including silicosis and lung cancer. Seek medical treatment if you experience difficulty breathing while using this product. The use of a NIOSH/MSHA-approved respirator (P-, N- or R-95) is recommended to minimize inhalation of cement dust. Eat and drink only in dust-free areas to avoid ingesting cement dust. Skin contact with dry material or wet mixtures may result in bodily injury ranging from moderate irritation and thickening/cracking of skin to severe skin damage from chemical burns. If irritation or burning occurs, seek medical treatment. Protect eyes with goggles or safety glasses with side shields. Cover skin with protective clothing. Use chemical resistant gloves and waterproof boots. In case of skin contact with cement dust, immediately wash off dust with soap and water to avoid skin damage. In case of skin contact with wet cement, wash exposed skin areas with cold running water as soon as possible. In case of eye contact with cement dust, flush immediately and repeatedly with clean water, and consult a physician. If wet cement splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

Please refer to the SDS and [www.CTScement.com](http://www.CTScement.com) for additional safety information regarding this material.

**LIMITED WARRANTY:** CTS Cement Manufacturing Corp. (CTS) warrants its materials to be of good quality and, at its option, will replace or refund the purchase price of any material proven to be defective within one (1) year from date of purchase. The above remedies shall be the limit of CTS' responsibility. Except for the foregoing, all warranties expressed or implied, including merchantability and fitness for a particular purpose, are excluded. CTS shall not be liable for any consequential, incidental, or special damages arising directly or indirectly from the use of the materials.

**⚠ WARNING**

CANCER and REPRODUCTIVE HARM - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

## TYPICAL PHYSICAL DATA

The mix designs provided here are EXAMPLES of slab-on-grade and grout mixes when using TYPE K CEMENT. Contact a CTS Komponent Representative for assistance developing project specific mix designs or for specialty use applications. All mixes should be tested in a qualified lab using methods designed for shrinkage-compensating cements (i.e., ASTM C878, ASTM C806) to confirm suitability for the required application and verify dosage with regional materials.

Trial batching is necessary to verify actual performance of the mix. The project engineer, contractor, and concrete producer are responsible for ensuring the mix design properties are appropriate for the application and anticipated environmental conditions.

### TYPE K CONCRETE made with TYPE K CEMENT

TYPE K CEMENT	560 lb (254 kg)
Fine aggregate ASTM C33	1800 lb (816.5 kg)
Coarse Aggregate ASTM C33	1095 lb (496.7 kg)
Water	309 lb (140.2 kg)
Hydration Stabilizer ASTM C494	Minimum 2oz/ctw (0.06kg/ctw)
Water Reducer ASTM C494	24 oz (0.68 kg)

### Performance

Slump (+/- 1.5") ASTM C143	5.75 in (146 mm)
Expansion, 7 days ASTM C878	0.045%
Compressive Strength, 7 days ASTM C39	3400 psi (23.4 MPa)
Compressive Strength, 28 days ASTM C39	4500 psi (31.0 MPa)
Specific Gravity, TYPE K CEMENT	3.13

### NON-SHRINK GROUT made with TYPE K CEMENT

TYPE K CEMENT	946 lb (429 kg)
Fine Aggregate ASTM C33	2640 lb (1197.5 kg)
Water	434 lb (196.9 kg)
Hydration Stabilizer ASTM C494	Minimum 2oz/ctw (0.06kg/ctw)
Water Reducer ASTM C494	24 oz (0.68 kg)

### Performance

Expansion, 7 days ASTM C878	0.045%
Compressive Strength, 7 days ASTM C109 Mod.	4800 psi (33.1 MPa)
Compressive Strength, 28 days ASTM C109 Mod.	7250 psi (49.6 MPa)
Specific Gravity, TYPE K CEMENT	3.13



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