

# SYSTEM-K™

Microfiber Reinforced Shrinkage-Compensating Cement Concrete



## PRODUCT DATASHEET

**DESCRIPTION:** SYSTEM-K™ is a microfiber reinforced option for creating high-performance shrinkage-compensating concrete for non-structural slabs-on-grade, topping slabs, composite decks, and low shrinkage concrete slab-on-grade designs. It incorporates 1/4" synthetic K-Fiber™ and Komponent® that are combined with locally sourced portland cement. These short, synthetic K-Fibers provide sufficient shrinkage and temperature restraint and improve the overall durability of the finished concrete. SYSTEM-K offers a cost effective alternative to traditionally reinforced slabs by allowing you to significantly reduce traditional steel reinforcement requirements. Use only perimeter steel and re-entrant corner reinforcement in conjunction with K-Fiber and Komponent to create an economical, high-performance SYSTEM-K shrinkage-compensating slab. SYSTEM-K prevents drying shrinkage cracking, reduces permeability, provides up to 60% increased abrasion resistance, prevents slab curling, spalling and corner breaks, and helps maintain dimensional stability, long-term floor flatness and floor levelness. Design and construction are simplified by increasing placement sizes, reducing mobilizations, and minimizing control joints by up to 90%. Thinner slabs are also viable. SYSTEM-K contributes to sulfate resistance for placements where elevated sulfate conditions exist.

**USES:** SYSTEM-K™ Microfiber Reinforced Shrinkage-Compensating Concrete is ideal for commercial and industrial slabs-on-grade like warehouses, distribution centers, manufacturing and processing facilities, architectural and polished concrete designs, and many other applications where durability, dimensional stability, minimal or no control joints, and elimination of shrinkage cracking and slab curling is desirable. Synthetic K-Fibers provide shrinkage and temperature restraint and allow significant cost savings when compared with common steel reinforcement options.

**ENVIRONMENTAL ADVANTAGES:** Use SYSTEM-K Microfiber Reinforced Shrinkage-Compensating Cement to reduce the carbon footprint of concrete materials and lower environmental impact. Production of Komponent used in SYSTEM-K emits significantly less CO<sub>2</sub> than portland cement. Contact your CTS Engineering representative for LEED values and environmental information.

**APPLICATION:** Use SYSTEM-K Microfiber Reinforced Shrinkage-Compensating Cement to produce shrinkage-compensating concrete, topping slabs, composite decks, and low-shrink concrete mixes. Actual mix designs vary depending on application, regional portland cement characteristics, regional aggregate characteristics, supplementary cementitious materials, admixtures, and concrete performance requirements. Shrinkage-compensating concrete and other concrete materials made with SYSTEM-K are produced by conventional production equipment and installation practices. Provisions for perimeter reinforcement, re-entrant corner and penetration reinforcement must be made to ensure best results. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Do not place concrete if ambient temperatures exceed 90°F (32°C). Ambient conditions must be a minimum of 40°F (4°C) and rising at time of placement. Subgrade temperature must not be less than 40°F (4°C) at time of placement. Concrete temperature at placement must not be less than 55°F (13°C). Protect concrete from freezing temperatures for 7 days after placement. Do not place concrete that is 90 minutes or older measured from the time of initial production. Refer to the Shrinkage-Compensating Concrete Reference Guide for design details and installation considerations. Contact your CTS Engineering representative for project support at 1-800-929-3030.

**BATCHING & MIXING:** SYSTEM-K is blended at the concrete batch plant using common bulk cement equipment and incorporation methods. When using bagged units for smaller projects, alternate portable concrete batching solutions are available. Contact CTS Cement for information. Mix designs use a lab qualified dosage of Komponent to replace an equivalent weight of total cementitious content per cubic yard of concrete. Bulk Komponent should be weighed before the portland cement to ensure proper dosage. K-Fibers are added at a rate of one (1) pre-packaged 2.2 lb (1 kg) unit per cubic yard. They disperse easily and will not produce "hairy" concrete. For mix design guidelines and batching and mixing instructions, refer to the Shrinkage-Compensating Concrete Reference Guide for details.

**WATER/CEMENT RATIO:** Due to Komponent's efficient consumption of mix water during hydration, water/cement ratios between 0.40 and 0.55 are recommended. Ensure thorough mixing and dispersion throughout the load after all components have been added into the truck. Concrete production must comply with ASTM C94/94M except where otherwise stated in CTS Cement's published literature. For lower water/cement ratio designs, contact your CTS Engineering representative for project support at 1-800-929-3030.

**CURING:** For general applications, wet cure is required. For complete production, batching, mixing and curing instructions, refer to the CTS Shrinkage-Compensating Concrete Reference Guide and ACI 223 for additional details.

## OVERVIEW

### Highlights:

- Prevent drying shrinkage cracking
- Reduce control joints up to 90%
- Increase abrasion resistance up to 60%
- Increase durability and lower permeability
- Improve sulfate resistance
- Protect against corrosion and deterioration
- Increase placement sizes and minimize mobilizations
- Prevent slab curling and maintain FF/FL

### Conforms to:

- ASTM C845 - Type K
- Used to create Type K Shrinkage-Compensating Concrete (ACI 223)

### MasterFormat® 2016

- 03 01 30 Maintenance of Cast-in-Place Concrete
- 03 01 50 Maintenance of Cast Decks and Underlayment
- 03 31 00 Cast-in-Place Concrete
- 03 31 19 Shrinkage-Compensating Non-Structural Concrete
- 03 33 00 Architectural Concrete - Cast-in-Place Concrete
- 03 37 13 Shotcrete
- 03 37 16 Pumped Concrete
- 03 37 19 Pneumatically Placed Concrete
- 03 47 00 Site-Cast Concrete
- 03 48 00 Precast Concrete Specialties
- 03 53 19 Concrete Overlayment
- 03 61 00 Cementitious Grouting
- 03 62 13 Non-Metallic Non-Shrink Grouting

### Manufacturer:

CTS Cement Manufacturing Corp.  
12442 Knott St.  
Garden Grove, CA 92841  
Tel: 800-929-3030 | Fax: 714-379-8270  
Web: www.CTScement.com  
E-mail: info@CTScement.com

# SYSTEM-K™ Microfiber Reinforced Shrinkage-Compensating Cement Concrete

**COLD WEATHER:** Environmental and material temperatures below 70°F (21°C) may delay setting time and reduce 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) may speed setting time and increase 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.

**PACKAGING & AVAILABILITY:** Komponent Shrinkage-Compensating Cement is available in 50 lb (22.7 kg) polyethylene-lined bags and 2000 lb (907 kg) bulk bags. It is also available in bulk tanker trucks and railcars. K-Fibers are provided separately in pre-packaged, 2.2 lb (1 kg) dissolvable bags.

**SHELF LIFE:** Komponent bagged units used in SYSTEM-K Microfiber Reinforced Shrinkage-Compensating Cement have a shelf life of 12 months when stored properly in a dry location, protected from moisture, out of direct sunlight, and in an undamaged package. Sealed bulk storage containers extend the shelf life of Komponent up to 2 years when stored properly and protected from adverse environmental conditions. K-Fibers have a shelf life of 3 years from the date of manufacture when stored properly, in a dry location, protected from moisture, out of direct sunlight, unopened and in an undamaged package.

**USER RESPONSIBILITY:** Before using CTS products, read current technical data sheets, bulletins, product labels and safety data sheets at [www.CTScement.com](http://www.CTScement.com). 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 SYSTEM-K application. For detailed information on use and applications of shrinkage-compensating cement technology, refer to CTS Cement's Shrinkage-Compensating Concrete Reference Guide and contact your CTS Engineering representative for project support at 1-800-929-3030.

**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

SYSTEM-K™ Microfiber Reinforced Shrinkage-Compensating Concrete is made using Komponent® with K-Fibers™ batched with local portland cement.

Listed below are mix design examples using SYSTEM-K. For assistance developing project specific mix designs or very low permeability mixes, contact CTS Cement's Engineering or Technical Service team.

All mixes should be tested in a lab using methods designed for shrinkage-compensating cements to ensure suitability for the required application.

### SYSTEM-K CONCRETE

Portland Cement	464 lb (210.5 kg)
Komponent	100 lb (45.4 kg)
K-Fiber	2.2 lbs (1.0 kg)
Fine Aggregate ASTM C33	1214 lb (550.7 kg)
Coarse Aggregate ASTM C33	1935 lb (877.7 kg)
Water	282 lb (127.9 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 (146mm)
Expansion, 7 days ASTM C878	0.041%
Compressive Strength, 7 days ASTM C39	3283 psi (22.6 MPa)
Compressive Strength, 28 days ASTM C39	5120 psi (35.3 MPa)



USGBC and related logo is a trademark owned by the U.S. Green Building Council and is used by permission.