

Komponent[®] System News

For Non-Shrink and Low-Shrinkage Concrete

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CTS CEMENT
MANUFACTURING



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www.Type-K.com

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CTS Cement Manufacturing Corp. develops and manufactures innovative professional grade construction cement products: Fast setting products including Rapid Set® Cement, One Pass® drywall taping & repair compound, WunderFixx® for sacking and touch-up of tilt-up panels, and Stucco Patch®. These products are sold nationwide by quality material supply houses.

CTS Cement is the only producer of Type-K shrinkage compensating cement.

The CTS Cement corporate headquarters are located in Orange County, California.

System-K Concrete: Eliminates Rebar From Shrinkage-Compensating Concrete

*Warehouse floor
joint spacing:
130 feet*

For over 40 years, shrinkage-compensating concrete has been the choice in hundreds of buildings for quality concrete floors. These floors often have joint spacing of over 150 feet and are free of cracks and curling, which are the bane of conventional concrete floors.

To make shrinkage-compensation work, it is necessary to restrain the expansion of the concrete. This restraint places the concrete in compression. The early compression compensates for the subsequent drying shrinkage resulting in minimal cracking and curling. Until now, the required restraint has been achieved with conventional rebar in the slabs of about 0.15% steel each way.

Rebar is a barrier to efficient placement of the concrete, usually forcing the contractor to use a pump to place the concrete and impeding the efficiency of a laser screed. Furthermore, in recent months the cost of rebar has skyrocketed and in some cases it is difficult to obtain.

CTS System-K™ utilizes a special proprietary synthetic fiber to furnish the required restraint for shrinkage-compensation, thereby eliminating the need for rebar.



Top: Contractors finish a 120'x130' section of floor constructed with System-K™ concrete. No sawcut joints or rebar were necessary for the floor.

Bottom: Collins Construction built the 70,000 square foot warehouse in April 2004 for Sofa Express in Portland, TN.

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“There’s no comparison between a shrinkage-compensating concrete floor and a conventional concrete floor, it’s like day and night.”

**Perry Thessen,
Thessen Concrete**

CTS System-K™ was used on the new 70,000 square foot distribution center floor for Sofa Express, built by Collins Construction in Portland, TN. The floor was constructed by Thessen Concrete Contracting of Bowling Green, KY. Thessen Concrete has constructed several shrinkage-compensating concrete floors in the past decade. Perry Thessen, president of Thessen Concrete, has seen the benefits of the technology first hand. “There’s no comparison between a shrinkage-compensating concrete floor and a conventional floor, it’s like day and night,” says Thessen. “Conventional floors have a lot of joints and can curl and crack, but a shrinkage-compensating concrete floor doesn’t have those problems.” The 70,000 square foot floor ranged in thickness from 6 to 8 inches. Construction joint spacing was from 80 to 130 feet, with no sawcut joints in between, thereby reducing long term maintenance costs.

Construction

With the elimination of rebar from the floor, the concrete did not need to be pumped in to place.

The System-K™ concrete was placed directly out of the concrete mixer truck on to the ground. The absence of steel also made it easy for a laser screed to maneuver around the placement area. Utilizing System-K™, Thessen obtained excellent floor flatness and levelness numbers, averaging FF of 98.6 and FL of

61.0 five weeks after concrete placement. They also obtained a smooth trowel finish on the floor, with no visible evidence of fibers on the surface. “Working with the System-K™ concrete was just like working with conventional concrete,” said Thessen. “The fibers weren’t evident as they usually are in other fibrous concrete.” No special finishing techniques were necessary for the System-K™ concrete. A seven day wet cure was used to obtain a top-quality floor. The contractor thoroughly wet the concrete surface and covered it with burlene, and then re-wet as needed to maintain the required cure. Six weeks after

placement, no cracks have appeared. “So far the floor looks really great,” commented Thessen.

Concrete Proportioning

System-K™ is a combination of an expansive Type K cement component and proprietary synthetic fibers, both produced by CTS Cement Manufacturing. A typical 4000 PSI concrete mix can be easily converted to System-K™ by replacing 92 lbs of portland cement with 92 lbs of System-K™ expansive component and fibers per cubic yard.

For the Sofa Express project, Garrot Brothers Concrete of Portland, TN supplied the System-K™ concrete. Johnny Garrot, owner of the ready mix plant reported no problems batching the concrete.

Cost Benefits

Generally the cost of a shrinkage-compensating concrete floor with rebar and 150 foot joint spacing is about the same as conventional concrete with rebar and 15 foot joint spacing. The cost of the expansive component in the concrete mix is offset by the reduction of joint costs.

On the Sofa Express 70,000 square foot job, it is estimated that switching to System-K™ saved \$21,963 over a conventional concrete floor.

Conventional concrete floors without rebar cost less than shrinkage-compensating concrete floors, however the cracking and curling of these floors result in substantial long term maintenance costs.

With System-K™ there is no rebar in the slab, which eliminates the need for pumping as the concrete is placed directly from the ready mix truck chute. Also the efficiency of the laser screed is improved as it is free to move about unimpeded by the rebar.

On the Sofa Express 70,000 square foot job, it is estimated that switching to System-K™ saved \$21,963 over a conventional concrete floor.

Five weeks after placement, a “hands-and-knees” inspection found the floor to be crack-free. Collins Construction is considering System-K™ for a 300,000 square foot warehouse floor just a few miles away in Portland, TN. ••



Unimpeded. Contractors place System-K™ concrete out of the concrete truck chute at the Sofa Express warehouse. Without rebar, pumping was unnecessary, and a laser screed could be easily maneuvered.



Success. Three 6'x50' slabs were placed to compare the performance of portland cement concrete with rebar, shrinkage-compensating concrete with rebar, and System-K™.

PCC Cracked, System-K™ Flawless

Engineers at CTS Cement and the University of California at Los Angeles (UCLA) have declared the first field test for System-K™ successful, proving its performance over conventional Portland cement concrete and rebar.

CTS placed three slabs-on-grade in the yard at Blue Daisy Cement Products in Gardena, CA. Each slab was 50 feet long by 6 feet wide by 6 inches thick. One slab contained a conventional 4000 PSI concrete mix and #4 rebar at 24" on center each way. The second slab contained shrinkage-compensating concrete and the same rebar configuration. The third slab contained System-K™ concrete with no rebar. Each slab was wet cured for a full seven days.

In the months following construction, the slabs were closely monitored for cracking.

Seven months after placement, a CTS engineer examining the slabs found three transverse shrinkage cracks on the conventional PCC slab. The cracks were spaced about 12 to 15 feet apart, and were each about 1/32" wide: a typical crack pattern for portland cement concrete slabs.



Cracks. Seven months after placement, the portland cement concrete slab had developed three shrinkage cracks, while the System-K and Komponent and rebar slabs remained crack-free.

A careful examination of the shrinkage-comp and System-K slabs showed no visible cracks, demonstrating that System-K™ performs as well as shrinkage-comp with rebar, and better than conventional PCC with rebar.

System-K™ can be used in new concrete floor construction to eliminate the need for rebar, extend joint spacing to 150', and practically eliminate shrinkage cracking and

curling. All of these benefits lead to a lower cost of construction and lower maintenance costs over the life of the floor. ••

System-K™ performs as well as shrinkage-comp with rebar, and better than conventional PCC and rebar.



The **Komponent® System News** is published quarterly by CTS Cement Manufacturing. For questions or comments, please contact **Kyle de Bruyn** at (310) 266-4570, or email kdebruyn@ctscement.com. Visit CTS Cement on the web at <http://www.ctscement.com/> and <http://www.Type-K.com/>

Are you considering a **System-K™** floor? Contact a CTS Cement representative for more information or to arrange a meeting.

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View current and past newsletters online at:

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RECENT PROJECTS

Some notable projects which have used CTS Type K cement, Komponent® System or System-K™ in the past three months:

OWNER	LOCATION	PROJECT
Bellavonce Beverage Co.	Nashua, NH	Distribution Center Floor
Sysco Foods	Rocky Hill, CT	Distribution Center Floor
U.S. Navy Ballistics Ctr.	Cumberland, MD	Warehouse Floor
Sofa Express	Portland, TN	Distribution Center Floor
Coca-Cola Beverages	Austin, TX	Warehouse Floor
Pfizer, Inc.	Detroit, MI	Floor Slab
Louisville Schools	Louisville, KY	Swimming Pool
Dayton Schools	Dayton, OH	Swimming Pool
Indianapolis Schools	Indianapolis, IN	Swimming Pool
Ohio Turnpike Commission	Northern Ohio	Bridge Deck
Oconee Nuclear Power Plant	Oconee, SC	Retaining Wall Repairs

