

**System-K**

CTS System-K™ — DATASHEET

Fiber-Reinforced Type-K Concrete System

Type-K Concrete (also known as shrinkage-compensating concrete or expansive concrete) is used to reduce or eliminate joints and cracks. Type-K Concrete is made by using ASTM C 845 Type-K Cement instead of regular portland cement in the manufacturing of the concrete.

In 1966, CTS Cement Manufacturing Corporation began producing Type-K Cement.

In 1991, CTS improved the process and began producing Komponent™, which is expansive cement that is added to regular portland cement to produce Type-K Cement.

Now, we have improved the process again. CTS System-K™ includes Komponent™, and CTS K-Fiber™. Mix designs use about 15% CTS System-K™ and 85% locally available portland cement, so the expense of shipping portland cement around the country is eliminated.

CTS K-Fiber™: Unlike regular portland cement, Type-K Cement expands rather than shrinks. Per ACI "...expansion will induce tension in the reinforcement and compression in the concrete. On subsequent drying, the shrinkage merely relieves the expansive strains." This means when Type-K Cement is used to make Type-K Concrete, it is imperative that the early expansion of the cement be restrained. Traditionally this has been done with rebar, welded wire fabric, or steel fibers. CTS K-Fiber™ is a patented synthetic fiber that is manufactured to our specifications and is a significantly less expensive option.

CTS Cement funded a testing program with UCLA to determine which fibers, if any, could best provide the required restraint. They cast and measured hundreds of beams using six different fiber materials, five different fiber lengths, six different fiber diameters, and eight different fiber dosages. Their testing showed that certain fibers can provide the required restraint. The testing showed which fiber and dosage gave the best results. That fiber has been named CTS K-Fiber™ and is available from CTS Cement Manufacturing Corporation as part of CTS System-K™

BENEFITS:

There is no new technology here. We have simply combined proven technologies to produce a new system. A system that provides some amazing benefits to the owner.

Few, if any, cracks: Since the cement and, therefore, the concrete tries to expand rather than shrink, cracks are dramatically reduced or totally eliminated.

Few, if any, joints: Construction joint spacing of 100 to 150 foot is common. ACI states "...contraction joints are eliminated."

Little, if any, curling: Type-K Concrete will actually try to reverse curl (lift up in the middle), but the weight of the concrete prevents that and slabs stay flatter.

Little, if any, spalling: Cracks and joints that don't exist can't spall.

Minimal maintenance: Without cracks, joints, and curling, maintenance is minimal.

Lower life-cycle costs: Costs about the same or less initially, but saves a lot long term.

TYPICAL APPLICATIONS:

runways, pavement, bridges, reservoirs, tanks, secondary containment, parking garages, elevated decks, and highways.

BATCHING SYSTEM-K™ CONCRETE:

The Komponent® and K-Fibers™ (collectively known as System-K™) should be added at the concrete batch plant. Generally between 90 and 100 lbs. of System-K™ replace an equivalent weight of portland cement per cubic yard of concrete.

Bulk System-K™ should be weighed before the portland cement to ensure proper dosage. Bagged System-K™ should be added directly to the aggregate belt along with the rock to ensure complete mixing.

Once the System-K™ concrete is batched and in the ready-mix truck, let the concrete mix for about 5 minutes at 12 to 15 RPM.

Like other fibrous concrete, System-K™ can exhibit an apparent slump loss in the first 20 minutes, especially in warmer temperatures. Superplasticizer or retarder can be added to the concrete to compensate for this. [Contact a CTS Cement representative](#) for recommended dosage rates.