CONSTRUCTION PROFESSIONALS CATALOG

ADVANCED
CEMENT TECHNOLOGY

Rapid Set KOMPONENT

by CTS Cement Manufacturing Corp.

TABLE OF CONTENTS

TABLE OF CONTENTS

REFERENCE

In partnership with Cementos de Chihuahua

ADVANCED CEMENT TECHNOLOGY

CORPORATE CAPABILITIES

Build Smart, Safe & Sustainable

Rapid Set® KOMPONENT®

by CTS Cement Manufacturing Corp.

WHO WE ARE

CTS Cement Manufacturing Corporation is the leader in advanced cement technology. We have an extensive history of providing innovative, high-performance cement products to the construction industry. As the leading manufacturer of calcium sulfoaluminate (CSA) cement in the United States, CTS offers rapid hardening cement products and Type-K shrinkage-compensating concrete products. Both are renowned for their proven performance, high quality, and exceptional service life.

Great companies are built by great people. At the heart of CTS Cement's success is our team of employee-owners whose integrity, commitment and willingness to go the extra mile stand behind everything we do. We have earned a strong reputation of providing outstanding products and service to designers, engineers, contractors, consultants, industry partners, customers, dealers and distributors. Every employee has a personal stake in helping you succeed.

WHAT WE DO

We support the design and construction communities, as well as Federal, State and public agencies to ensure a safe, durable and sustainable built environment. Our products have been used on notable landmarks like the Hoover Dam Bypass, the Pentagon, the Lincoln Tunnel, the San Francisco-Oakland Bay Bridge, as well as major roadways, airports, commercial and industrial projects worldwide. CTS Cement manufactures two of the industry's leading brands in cement for new concrete construction, restoration and repair – Rapid Set® and Komponent®.

Rapid Set® is a full line of professional-grade cement products made with Rapid Set® Cement, a calcium sulfoaluminate (CSA) cement technology. These products are engineered for high performance, versatility, low shrinkage, and rapid strength gain – performance characteristics that allow you to save significant time and money, with reduced installation times, labor requirements, and long-term operations and maintenance costs. Rapid Set gains structural strength in one hour. You can build faster, quickly put the structure or building into full service, and achieve durable, long-lasting results.

Komponent® is a line of shrinkage-compensating concrete products made with Type K cement technology. These products allow you to significantly reduce or eliminate control joints, and alleviate curling and cracking due to drying shrinkage. Resolving these inherent issues protects the integrity and durability of the concrete, and extends the life-expectancy of the installation. It also minimizes repair and maintenance costs, reduces life-cycle costs, and maximizes sustainability of concrete. Komponent prevents common and costly challenges related to concrete deterioration, repair, and structural failure.

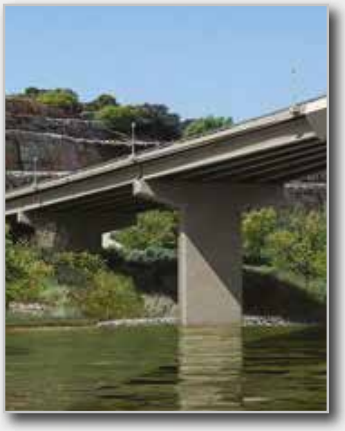
Building a Better World

Building a better world means going beyond the status quo and committing to progress and innovation. We challenge the way things have always been done – from the way we engineer and manufacture our cement, to the innovative products we develop, to the way we serve our customers. We partner with architects, engineers, designers, contractors and owners to create a safe, sustainable built environment for generations to come – project by project, community by community.

CTS Cement Production Facilities

CTS Package Production Facilities

CTS Packaging and Distribution



Industries We Support

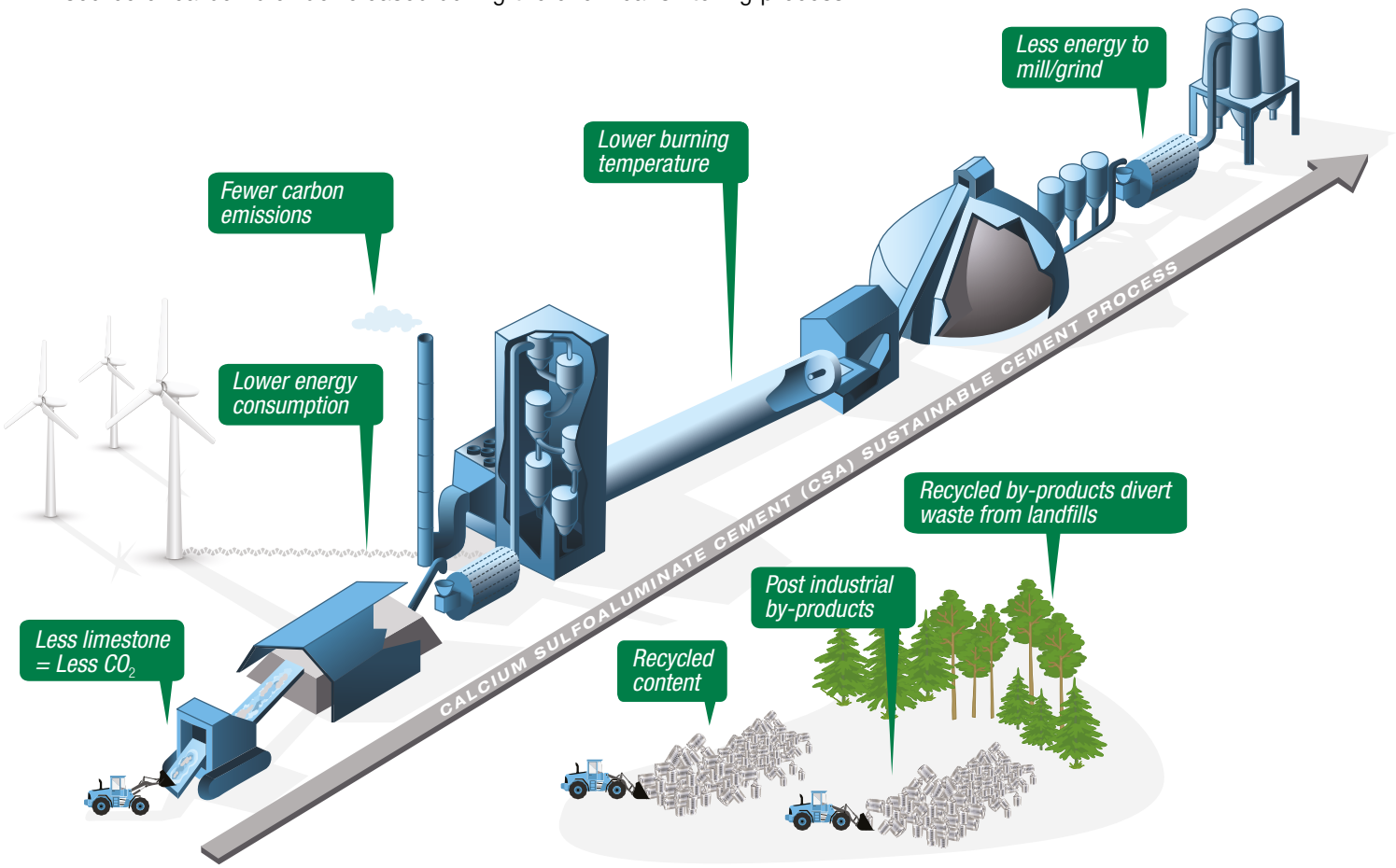
INFRASTRUCTURE
Highways, Roadways, Bridges and Viaducts

INDUSTRIAL
Water/Wastewater, Power & Energy, Manufacturing

INSTITUTIONAL
Schools, Universities, Healthcare, Correctional

SUSTAINABILITY

Calcium sulfoaluminate (CSA) cement technology provides a green alternative to traditional cements. The burning temperature needed to create CSA clinker is lower, with a less energy-intensive milling process required to grind it into cement. This less intensive manufacturing process reduces the overall consumption of energy and produces fewer carbon dioxide emissions. CSA cement also requires less limestone - the primary source of carbon dioxide released during the chemical sintering process.



32%
Reduced carbon emissions during production vs. portland cement

65%
Less consumption of natural resources and energy

2X
the service life of portland cement concrete

CSA cement technology extends the life-cycle of a project by significantly reducing or eliminating the challenges related to fatigue life, shrinkage, cracking, and porosity. CSA cement improves the sustainability of construction materials by reducing raw material use, energy demand, and overall carbon footprint. CSA cement increases the longevity and durability of the concrete.

AVIATION
Runways, Taxiways, Aprons, Hangars

MINING & TUNNELING
Shotcrete, Pumpable Grout, Cavity Fill, Pipe Liners

GOVERNMENT
Federal, State & Local Agencies, Public Works

Service & Support

We support the demanding requirements of the design and construction communities, and federal, state and public agencies to ensure a safe, durable and sustainable built environment. CTS Cement is the industry's trusted supplier for proven performance, high quality results, and expert technical support.

EDUCATION

We are committed to continuing education in our organization and in the design and construction communities. We offer a comprehensive educational program for architects, engineers, contractors, industry associations, and other industry participants interested in continuing their professional development or earning required learning units.

SERVICE

Our excellent customer service has raised the bar within the industry. We provide timely, efficient and personalized service in every aspect of our business. From Operations, Technical Support, Sales, Marketing, Logistics and Customer Service, we are committed to providing an outstanding experience.

TECHNICAL

The CTS Technical Team provides exceptional service and support, including materials testing, aggregate approvals, mix design assistance, specification support, and mixing, placement and installation recommendations.

FIELD

From pre-construction meetings to site installation, CTS offers field support worldwide to ensure your projects are successful.

VALUED PARTNERSHIPS

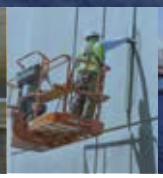
Innovation, initiative, and valued partnerships remain central to our business. As an employee-owned company, we have a personal stake in helping you succeed. We have earned a strong reputation within the industry for providing outstanding products and support to the design and construction communities, including:

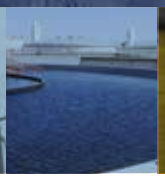
- Architects
- Engineers
- Owners & Developers
- Property Managers
- Public Works Teams
- General Contractors
- Specialty Concrete Contractors
  - Paving
  - Preservation
  - Renovation & Repair
  - Architectural Concrete
  - Polished Concrete

MARINE
Dams, Canals, Locks, Levees, Ports & Channels

COMMERCIAL
Retail, Hospitality, Recreation, Arenas, Convention Centers

MIXED USE
Urban Development, Multi-Family, Residential





CONTACT US

Whether you're building a new structure, engineering infrastructure, preserving an existing architectural build, repairing or restoring existing concrete elements, or preparing substrates for aesthetic finishes, we're here to help. Contact us for assistance with product selection, specifications, samples, mix designs, and more. CTS Cement's experienced team of engineers, material scientists, technical experts, and representatives are available to support your next project.

(800) 929-3030
www.CTScement.com
info@CTScement.com

CTS Cement Manufacturing Corp.
11065 Knott Avenue, Suite A Cypress, CA 90630
(800) 929-3030 • www.CTScement.com • info@CTScement.com

RAPID SET®
ALL PRODUCTS

Build Fast. Build To Last

	USES	TEST RESULTS	THICKNESS & YIELD
 **RAPID SET® CEMENT** **Rapid Hardening Hydraulic Cement** Replace ordinary portland cement for projects where fast return to service, high strength, and increased durability are desired. Mix with water and aggregates to produce high performance, concrete, mortar and grout mixtures that gain strength in as little as 1 hour. ASTM C1600	• Highway pavements • Bridges • Runways • Tunnels • Harbors • Precast • Sidewalks • Floors	Compressive Strength: 1 hr* 4500 psi (31.0 MPa) 3 hrs 5500 psi (37.9 MPa) 24 hrs 7000 psi (48.3 MPa) 28 days 8000 psi (55.2 MPa) *After final set	Thickness and yield will vary by mix design. For small projects, start with one 88-lb bag, 175 lb of sand, 175 lb of 3/8" to 3/4" stone and about 4 gallons of potable water. Specific gravity 2.98 *Also available in 50-lb bag*
 **CEMENT ALL®** **Multi-Purpose Repair Material & Non-Shrink Grout** A workable, high quality repair material with rapid strength gain and high durability. Ready for traffic in 1 hour. ASTM: C1107, C928, C387 Army Corps of Engineers CRD C621 LA Research and Report 24654 State and Local Approvals	• General and structural concrete repair • Doweling and anchoring • Industrial grouting • Formed work • Vertical and horizontal trowel applications	Compressive Strength: 1 hour* 3000 psi (20.7 MPa) 3 hours 5000 psi (34.5 MPa) 24 hours 6000 psi (41.4 MPa) 7 days 7000 psi (48.3 MPa) 28 days 9000 psi (62.1 MPa) *After final set	Up to 4" 55-lb bag yields 0.5 ft³ 25-lb box yields 0.2 ft³ 10-lb box yields 0.09 ft³
 **MORTAR MIX** **High-Strength Structural Repair Mortar** A fast and durable general purpose repair mortar. Rock solid in 1 hour. ASTM: C928, C387 State and Local Approvals	• General and structural concrete repair • Construction of pavements • Stucco and plaster repair • one-coat exterior plaster • Underlayments • Formed work • Vertical and overhead applications	Compressive Strength: 1 hour* 2500 psi (17.2 MPa) 3 hours 4000 psi (27.6 MPa) 24 hours 5000 psi (34.5 MPa) 7 days 5500 psi (37.9 MPa) 28 days 6500 psi (44.8 MPa) *After final set	1/2" to 6" 55-lb bag yields 0.5 ft³ 25-lb box yields 0.2 ft³
 **CONCRETE MIX** **Very Rapid Hardening Concrete** A high-performance, multi-purpose concrete repair material. Ready for traffic in 1 hour. ASTM: C928, C387 State and Local Approvals	• General and structural concrete repair • Construction of pavements • Formed work • Footings • Setting posts • Industrial floors • Machine bases	Compressive Strength: 1 hour* 3000 psi (20.7 MPa) 3 hours 3600 psi (24.8 MPa) 24 hours 4500 psi (31.0 MPa) 7 days 5500 psi (37.9 MPa) 28 days 6000 psi (41.4 MPa) *After final set	2" to 24" 60-lb bag yields 0.5 ft³
 **MORTAR MIX PLUS** **High-Strength Polymer-Modified Structural Repair Mortar** A high-performance, rapid hardening, multi-purpose repair material. ASTM: C928, C387	• High strength structural restoration • Vertical and overhead repairs • Spall repairs • Marine applications	Compressive Strength: 1.5 hours 2000 psi (13.8 MPa) 3 hours 3500 psi (24.1 MPa) 24 hours 5000 psi (34.5 MPa) 7 days 6000 psi (41.4 MPa) 28 days 7000 psi (48.3 MPa)	1/2" to 6" 55-lb bag yields 0.5 ft³
 **V/O REPAIR MIX** **Polymer-Modified Vertical Overhead Repair Material** High quality repair material with built-in corrosion inhibitor, self-curing technology, and 25-minute working time. Gray color matches most portland cement concrete surfaces. ASTM C928	• General concrete repair • Vertical and overhead applications • Spall repair • Horizontal applications	Compressive Strength: 2 hrs 2000 psi (13.8 MPa) 24 hrs 4000 psi (27.6 MPa) 28 days 6000 psi (41.4 MPa)	1/32" to 2" 50-lb bag yields 0.37 ft³ Thicknesses up to 6" are acceptable for vertical and small spot repairs.
 **WUNDERFIXX®** **Concrete Smoothing Compound** A high-performance blend of Rapid Set® hydraulic cement, polymers and finely ground aggregate used to achieve a smooth and uniform finish.	Patching and detailing on: • Tilt-up panels • Precast concrete • Concrete block • Other concrete surfaces	Compressive Strength: 24 hrs 1000 psi (6.90 MPa) 28 days 1500 psi (10.3 MPa)	Up to 1/2" 50-lb bag yields 115 ft² at 1/16" thick 9-lb box yields 20.7 ft² at 1/16" thick
 **ONEPASS®** **Wall Repair Material** An all-purpose, durable, fast-setting wall repair and joint compound. Apply in one coat, sand and paint in 90 minutes. ASTM: D3273, D3274	General construction and repair of: • Drywall and cement board • Magnesium oxide board • Plaster and smooth stucco • Masonry and other surfaces	Mold Resistance: 7 days 10 out of 10 14 days 10 out of 10 28 days 10 out of 10 (10 = No Mold)	Up to 1" 25-lb bag or box yields 77 ft² at 1/16" thick 9-lb box yields 28 ft² at 1/16" thick

	USES	TEST RESULTS	THICKNESS & YIELD
 **LevelFlor®** **Self-Leveling Underlayment** A fast setting and high flow self-leveling underlayment. Install flooring in 6 hours. ASTM C1708	• Underlayments • Level uneven floors • Floor repair • Interior/exterior	Compressive Strength: 24 hrs 3000 psi (20.7 MPa) 7 days 3500 psi (24.1 MPa) 28 days 5000 psi (34.5 MPa)	Up to 2" 50-lb bag yields 24 ft² to 30 ft² at 1/4" thick or 12 ft² to 15 ft² at 1/2" thick
 **TRU® Self-Leveling** **High Performance Architectural Topping** A fast setting, high strength, self-leveling topping ideal for polished concrete overlays. Ready for foot traffic in 2 to 3 hours and polish in 24 hours. ASTM C1708	• Polished floors • Integral colored and stained floors • Decorative toppings • Underlayments • Interior/exterior	Compressive Strength: 4 hrs 3000 psi (20.7 MPa) 24 hrs 5000 psi (34.5 MPa) 28 days 6500 psi (44.8 MPa)	3/8" to 1-1/2" 50-lb bag yields 15 ft² to 16 ft² at 3/8" thick or 11 ft² to 12 ft² at 1/2" thick
 **TRU® GRAY Self-Leveling** **High Performance Architectural Topping** A fast setting, high strength, self-leveling topping ideal for polished concrete overlays. Ready for foot traffic in 2 to 3 hours and polish in 24 hours. ASTM C1708	• Polished floors • Integral colored and stained floors • Decorative toppings • Underlayments • Interior/exterior	Compressive Strength: 4 hrs 3000 psi (20.7 MPa) 24 hrs 5000 psi (34.5 MPa) 28 days 6500 psi (44.8 MPa)	3/8" to 1-1/2" 50-lb bag yields 15 ft² to 16 ft² at 3/8" thick or 11 ft² to 12 ft² at 1/2" thick
 **TRU® PC Polished Concrete** **High-Performance, Self-Leveling Topping** An advanced, hydraulic cement-based, self-leveling topping. It can be ground and polished to expose the aggregate and simulate the appearance of polished concrete. Ready for foot traffic in 2 to 3 hours and polish in 24 hours. ASTM C1708	• Polished floors • Concrete gray color • Integral colored floors • Decorative toppings • Underlayments • Interior/exterior	Compressive Strength: 4 hrs 2800 psi (19.3 MPa) 24 hrs 5000 psi (34.5 MPa) 28 days 7000 psi (48.3 MPa)	3/8" to 1.5" 60-lb bag yields 16 ft² to 18 ft² at 3/8" thick
 **ACRYLIC PRIMER** **High-Adhesion Acrylic Primer** A concentrated, acrylic latex primer that improves the adhesion of Rapid Set® self-leveling underlayments. Apply to porous concrete surfaces to minimize pinholes.	• Seal porous substrates • Increase adhesion of Rapid Set® underlayments • Interior/exterior	Properties: • Concentrated formula • Extend with water • Accepts topping in 3 to 24 hours	2 mils 1 gallon yields 400 ft² to 600 ft²
 **TXP™ TRU® epoxy primer** **Two Component, Alkali Resistant Epoxy Primer** A high-performance, two-component, low VOC, moisture and alkali insensitive epoxy primer. Designed as a bonding agent for Rapid Set® TRU® flooring system. ASTM: D2196, D2240, D695, D790	• Seal porous substrates • Increase adhesion of Rapid Set® TRU® flooring system • Polished and decorative flooring systems • Interior/exterior	Properties: • Consists of resin and hardener • 60-minute working time • 12-hour cure time	12 mils 3-gallon kit yields 400 ft²
 **TXP™ FAST TRU® epoxy primer** **6-Hour, Two Component, Alkali Resistant Epoxy Primer** A 100% solids, high performance, fast-setting, zero VOC epoxy primer. Designed as a bonding agent for Rapid Set® TRU® flooring system. ASTM: D2196, D2240, D695, D790	• Seal porous substrates • Increase adhesion of Rapid Set® TRU® flooring system • Polished and decorative flooring systems • Interior/exterior	Properties: • Consists of resin and hardener • 30-minute working time • 6-hour cure time	10 to 12 mils 3-gallon kit yields 400 ft² to 480 ft²
 **CR: CONCRETE RESURFACER** **Resurface Worn, Old, Spalled Concrete** A polymer-modified concrete resurfacing material used to give concrete a new look. Matches the color of typical portland cement concrete.	• Repair old, damaged or discolored concrete • Interior/exterior	Compressive Strength: 24 hours 2000 psi (13.8 MPa) 28 days 4000 psi (27.6 MPa)	1/32" to 1/8" 25-lb bag yields 75 ft² at 1/16" thick
 **SKIM COAT** **For Patching, Skim Coating & Underlayment Projects** A fast-setting, self-curing, smooth skim coat. Install most floor coverings in 1 hour.	• Level floors and smooth concrete substrates prior to installing floor coverings • Repair uneven floors • Interior/exterior • Underlayment	Compressive Strength: 3 hrs 1000 psi (6.90 MPa) 24 hrs 1500 psi (10.3 MPa) 7 days 2000 psi (13.8 MPa) 28 days 3000 psi (20.7 MPa)	Up to 1" 20-lb bag yields 67 ft² at 1/8" thick or 33 ft² at 1/4" thick

	USES	TEST RESULTS	THICKNESS & YIELD
INFRASTRUCTURE			
 **DOT CEMENT** **Rapid Hardening Hydraulic Cement** A highly durable hydraulic cement with exceptional workability characteristics. Mix with aggregates and water to produce a fast setting, high quality concrete. State and Local Approvals	• Repairing highways • Bridge decks • Airport pavement • Industrial floors • Parking garage decks • Freezer floors	Compressive Strength: 1 hr* 3140 psi (21.6 MPa) 3 hrs 3725 psi (25.7 MPa) 24 hrs 4650 psi (32.1 MPa) 28 days 5500 psi (37.9 MPa) *After final set	1/2" to 24" 50-lb bag yields 1.8 ft³ in recommended concrete mix design
 **DOT REPAIR MORTAR** **Industrial Grade Concrete Repair Mortar** A high performance, fast-setting concrete repair material ideal where fast strength gain, high durability and low shrinkage are desired. Ready for traffic in 1 hour. ASTM C928 • State and Local Approvals	• Repairing highways • Bridge decks • Airport pavement • Industrial floors • Parking garage decks • Freezer floors	Compressive Strength: 1 hr* 3500 psi (24.1 MPa 3 hrs 4500 psi (31.0 MPa) 24 hrs 6500 psi (44.8 MPa) 28 days 9000 psi (62.1 MPa) *After final set	1/2" to 6" 70-lb bag yields 0.7 ft³ If greater than 6", extend up to 50% with pea gravel
 **DOT REPAIR MIX** **High Performance Repair Material** A mortar that can be used neat or extended up to 100% with coarse aggregate to produce a high performance concrete repair material. Ready for traffic in 1 hour. ASTM C928 • State and Local Approvals	• Concrete repair • Bridge and highway restoration • Parking deck and slab repair • Doweling and anchoring • Concrete overlays • Dowel bar retrofit	Compressive Strength: 1 hr* 3300 psi (22.8 MPa) 3 hrs 5000 psi (34.5 MPa) 24 hrs 7000 psi (48.3 MPa) 7 days 7500 psi (51.7 MPa) 28 days 9500 psi (65.5 MPa) *After final set	1/2" to 4" 55-lb bag yields 0.5 ft³ If greater than 4", extend up to 100% with pea gravel
 **DOT CONCRETE MIX** **High Performance, Fast Setting, Multi-Purpose Concrete Repair Material** A quality repair material with fast strength gain, high durability and low shrinkage. Ready for traffic and loading in 2 hours. ASTM C928 • State and Local Approvals	• Structural concrete repair • Bridge and highway repair • Parking decks and ramps • Sidewalks, steps and footings • Partial and full-depth repair • Joint repair and formed work	Compressive Strength: 2 hrs 3000 psi (20.7 MPa) 24 hrs 4500 psi (31.0 MPa) 7 days 6000 psi (41.4 MPa) 28 days 6500 psi (44.8 MPa)	2" to 24" 60-lb bag yields 0.42 ft³
STUCCO			
EISENWALL® **Premium Cement for Exterior Plaster** A premium hydraulic cement for exterior plastering applications. Apply as the scratch and brown coats in conventional 3-coat plaster applications, or as the base coat in one-coat stucco applications.  ASTM C1328 • ESR-2671 • UBC 25-1 LA RR 25358 • State and Local Approvals	• Commercial • Industrial • Institutional • Residential • New construction • Renovation/repair	Compressive Strength: 6 hrs 1500 psi (10.3 MPa) 24 hrs 2500 psi (17.2 MPa) 28 days 3500 psi (24.1 MPa)	3/8" to 2" 88-lb bag yields 5 yd² at 3/4" thick in recommended plaster mix design
STUCCO MIX **All-Purpose Stucco & Plaster Mix** A premium blend of Rapid Set® cement, quality plaster sand and high performance additives. Can be applied full depth or scratched, browned and color coated in one day.  ESR-2671 • UBC 25-1 LA RR 25358 • State and Local Approvals	• Commercial • Industrial • Institutional • Residential • New construction • Renovation/repair	Compressive Strength: 6 hrs 1500 psi (10.3 MPa) 24 hrs 2500 psi (17.2 MPa) 28 days 3500 psi (24.1 MPa)	3/8" to 2" 50-lb bag yields 7.0 ft² at
 3/4" thick **STUCCO PATCH** **Full-Depth Stucco Repair Material** A durable, fast setting, patching material for stucco repair. Easily textured to match a variety of stucco surfaces. Paint in 2 hours.	• Repair cracks, holes and voids in stucco surfaces • Window and door installations • Interior/exterior stucco	Compressive Strength: 24 hrs 2500 psi (17.2 MPa)	1/8" to 1" 50-lb bag yields 8 ft² at 3/4" thick 25-lb bag or box yields 0.2 ft³ 10-lb box yields 139 in³
GROUTING			
 **UltraFlow® 4000/8** **Non-Shrink Precision Grout** A fluid, high-flow grout that provides extended working time for large placements. ASTM C1107 Army Corps of Engineers CRD C621	• Machinery baseplates • Columns • Anchoring • Turbines • Doweling • Interior/exterior	Compressive Strength: 8 hrs 4000 psi (27.6 MPa) 24 hrs 6500 psi (44.8 MPa) 7 days 8000 psi (55.2 MPa) 28 days 8500 psi (58.6 MPa)	Up to 4" 55-lb bag yields 0.5 ft³
 **CTS CONSTRUCTION GROUT** **Non-Shrink, Multi-Purpose Grout** A versatile, non-shrink grout for structural and non-structural applications that can be used at a plastic, flowable or fluid consistency. ASTM C1107 • LA RR 25916 State and Local Approvals Army Corps of Engineers CRD C621	• Machinery baseplates • Load bearing pads • Precast components • Anchor bolts • Keyway joints • Interior/exterior	Compressive Strength with Fluid Consistency: 24 hrs 2500 psi (17.2 MPa) 7 days 7000 psi (48.3 MPa) 28 days 9000 psi (62.1 MPa)	1/2" to 2" 50-lb bag yields 0.44 ft³ at flowable consistency If greater than 2" thick, may be extended with pea gravel

SET CONTROL®
A retarding admixture that extends the working time, allowing more time for placing and finishing.
0.9-oz packet

BOND
A free-flowing redispersable polymer powder used in a variety of construction applications to improve bond strength and impact resistance.
2.3-oz packet

FIBER
A 100% pure ½" polypropylene multi-filament fiber containing no reprocessed materials that increases impact resistance and helps prevent shrinkage cracking in concrete, mortar, and grout mixes.
1.4-oz packet

FLOW CONTROL®
A flow enhancing additive that allows higher fluidity or lower water requirement.
2.1-oz packet

DARK
A pigment additive that darkens the color of cement.
4.2-oz packet

LIGHT
A pigment additive that lightens the color of cement.
2.5-oz packet

CORROSION INHIBITOR
A high performance additive designed to extend the life of reinforced concrete structures.
1.7-oz packet

FAST
An admixture designed to accelerate the hardening of Rapid Set products in low temperatures.
2.8-oz packet

EISENWALL® SET CONTROL®
A retarding admixture that extends the working time, allowing more time for placing and finishing.
5.7-oz packet

FAST

ROCK SOLID IN 1 HOUR

Minimize downtime and get to the next job sooner.

STRONG

3 TIMES STRONGER THAN PORTLAND CEMENT CONCRETE

Rapid Set products can exceed 10,000 psi in 28 days.

DURABLE

TWICE THE LIFESPAN OF PORTLAND CEMENT CONCRETE

Rapid Set has an 80-year lifetime with significantly lower replacement costs.

AVAILABILITY
Rapid Set® products are available through contractor and building supply dealers nationwide. Product availability may vary by location. Contact your local building material supplier for details. Bulk Rapid Set® Cement, Rapid Set® Latex Modified Concrete and Shrinkage Compensating Cement are also available. To find our products, call 800-929-3030 or visit ***CTScement.com***.

TECHNICAL SUPPORT
Contact Technical Support for assistance with product and application questions.
Tel: **800-929-3030** | Fax: **714-379-8270**
CTS Cement Manufacturing Corp.
11065 Knott Ave, Suite A, Cypress, CA 90630

CTScement.com


very strong income performance well ahead of prior
£ million
Income
PBT
H1 08 v H1 09
79%
100%
321; 4%
299; 4%
753; 10%
365; 5%
423; 5%
CAGR (03 – 08)
13%
7%
632; 8%
199; 3%
340; 4%
H1 08
H2 08
H1 09
4,784
(2,225)
852
5,074
(4,065)
811
10,489
(3,507)
(893)
3,411
(1,225)
1,820
(1,197)
6,089
(1,874)
4,215
4,505
1,431
6,267
2,335
7,119
5,231
3,411
05
06
07
08
H1 08
H1 09
Distribution marketing participation in the securities market.
20%
BNI
45%
JYT
35%
HUY
Distribution of the securities market key players
HRT
12%
BGY
FEW
Changes in the activity of the active and passive market is uncertain. Established positive trends in various market segments.

PRODUCT SELECTION GUIDE

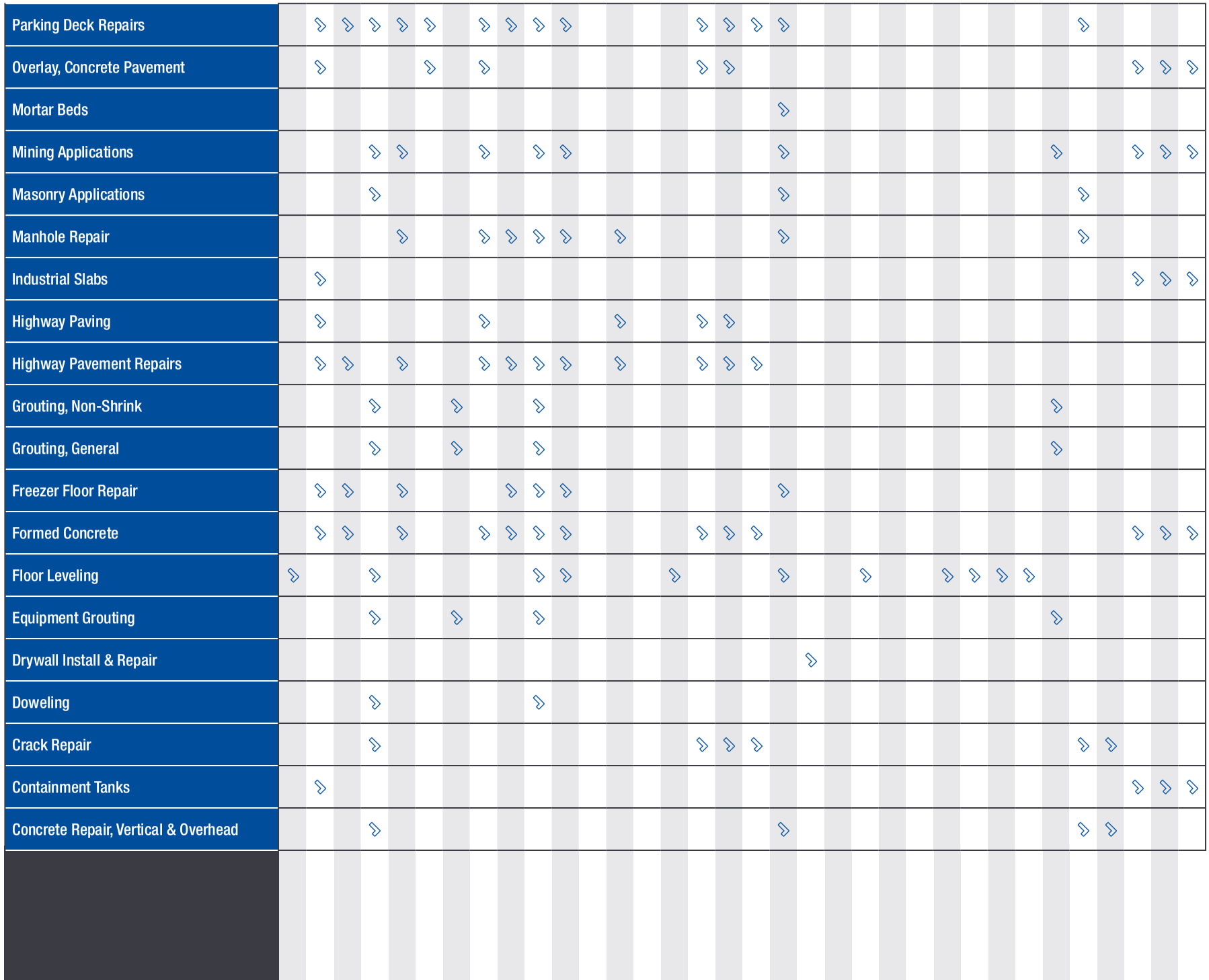
APPLICATION BY PRODUCT

Rapid Set KOMPONENT

by CTS Cement Manufacturing Corp.

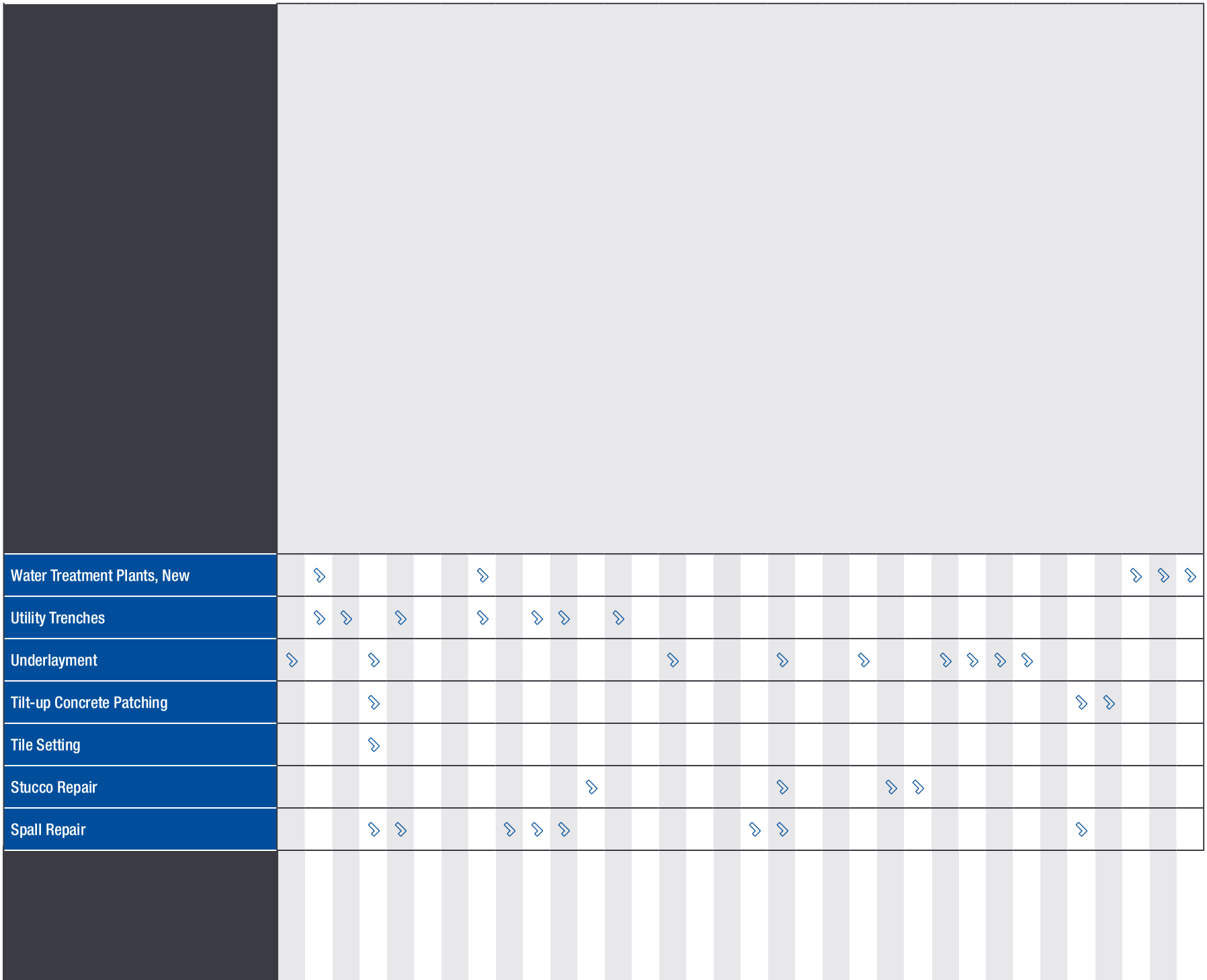
PRODUCT SELECTION GUIDE APPLICATION BY PRODUCT

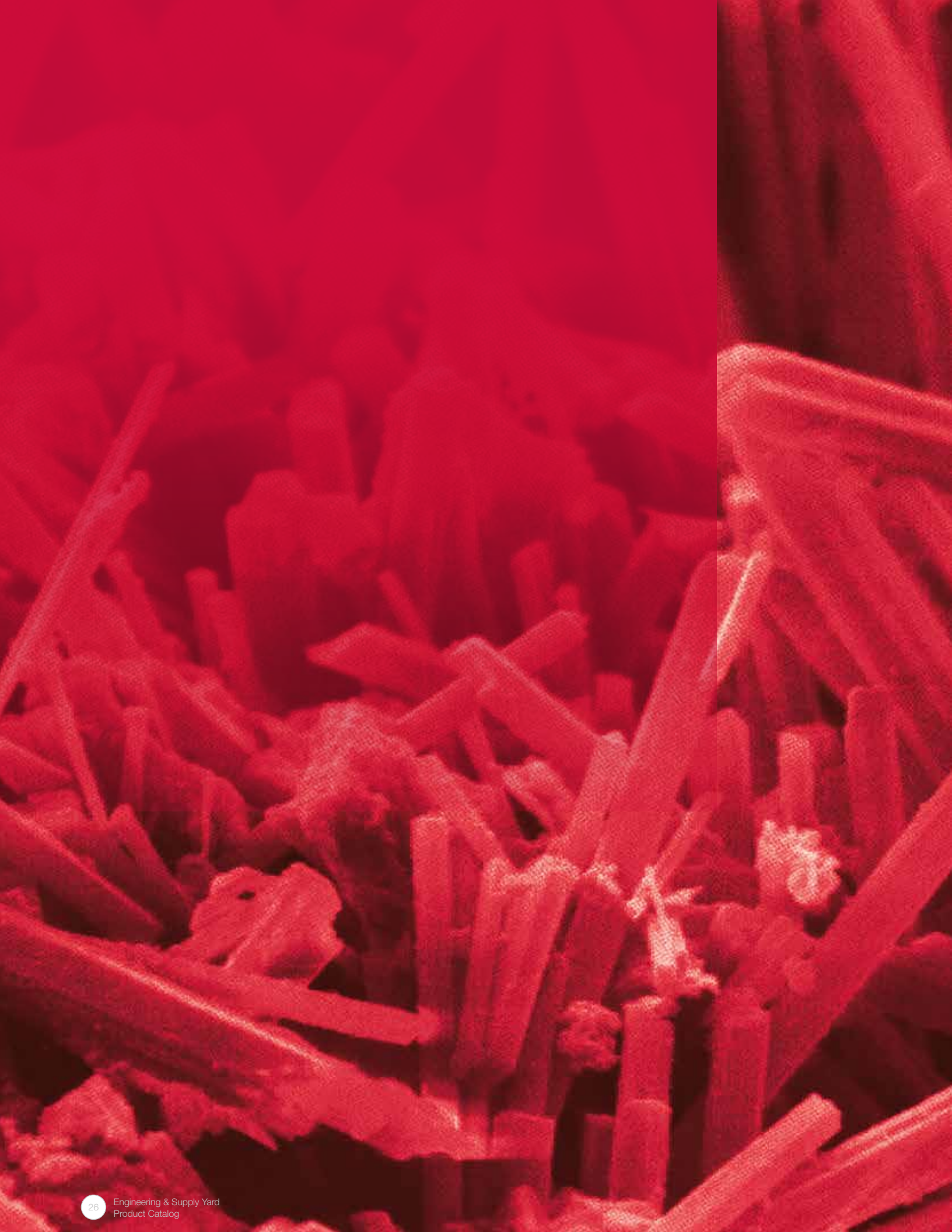
	Airport Pavement Repairs	Airport Paving	Anchoring	Base Plate Grouting	Bridge Deck Construction	Bridge Deck Repair	Casting, Ornamental & Architectural	Cement Board Installation	Concrete Floor Overlay	Concrete Repair, Architectural & Cosmetic	Concrete Repair, Seawall	Concrete Repair, Structural (0"-4")	Concrete Repair, Structural (1/2"-6")	Concrete Repair, Structural (2"-24"+)
Acrylic Primer									✓	✓				
Rapid Set® Cement (bulk)	✓	✓			✓	✓	✓				✓	✓	✓	✓
Rapid Set® Cement (bags)	✓	✓			✓	✓	✓				✓	✓	✓	✓
Cement All®			✓	✓		✓	✓		✓	✓	✓	✓		
Concrete Mix	✓					✓	✓				✓			✓
Concrete Resurfacer									✓	✓				
CTS Construction Grout				✓								✓	✓	✓
DOT Cement	✓	✓			✓	✓					✓			✓
DOT Concrete Mix	✓					✓	✓		✓		✓			✓
DOT Repair Mix	✓		✓	✓		✓			✓		✓		✓	✓
DOT Repair Mortar	✓					✓			✓		✓		✓	✓
Eisenwall®														
Flowable Fill	✓	✓												
Geotechnical Grouting														
LevelFlor®														
Low-P™ Cement	✓	✓			✓	✓			✓		✓	✓	✓	✓
Low-P™ FA1 Cement	✓	✓			✓	✓			✓		✓	✓	✓	✓
Low-P™ Repair Mortar	✓	✓				✓			✓		✓	✓	✓	✓
Mortar Mix						✓			✓		✓		✓	
OnePass®								✓						
Shotcrete														
Skim Coat														
Stucco Mix														
Stucco Patch														
TRU® PC									✓	✓				
TRU® PC Gray									✓	✓				
TRU® Self-Leveling									✓	✓				
TXP™ TRU® Epoxy Primer									✓	✓				
UltraFlow® 4000/8				✓										
V/O Repair Mix						✓				✓	✓	✓		
WunderFixx®								✓		✓				
Type-K		✓			✓									
Komponent®		✓			✓									
System-K™		✓			✓									

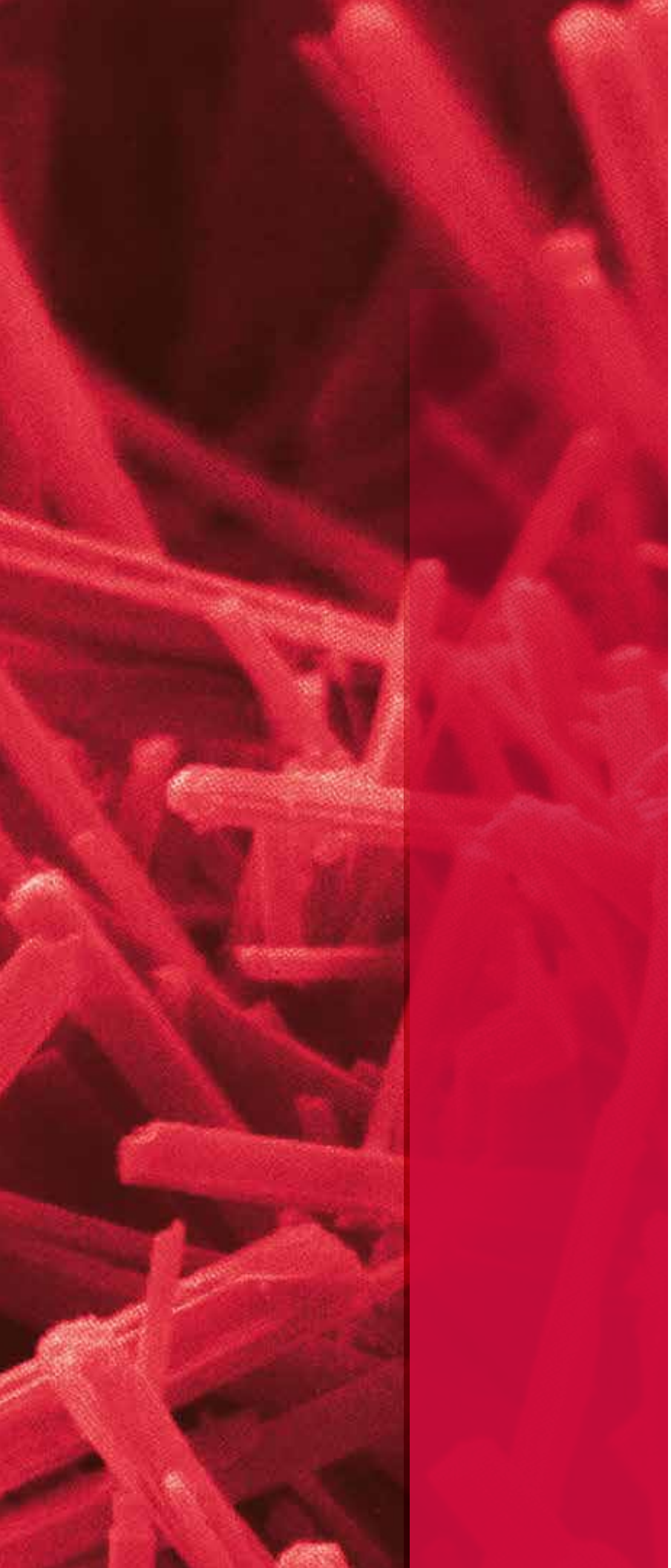

Parking Deck Repairs
Overlay, Concrete Pavement
Mortar Beds
Mining Applications
Masonry Applications
Manhole Repair
Industrial Slabs
Highway Paving
Highway Pavement Repairs
Grouting, Non-Shrink
Grouting, General
Freezer Floor Repair
Formed Concrete
Floor Leveling
Equipment Grouting
Drywall Install & Repair
Doweling
Crack Repair
Containment Tanks
Concrete Repair, Vertical & Overhead

PRODUCT SELECTION GUIDE APPLICATION BY PRODUCT

	Parking Structures, New	Parking Structures, Repair	Plaster Repair	Plastering, Exterior	Plastering, Interior	Post Setting	Sacking & Patching	Sewer	Shrinkage Compensating Concrete	Sidewalks, Ramps & Steps	Skim Coating Concrete & Block	Slabs, New	Slabs, Repair	Spackling
Acrylic Primer														
Rapid Set® Cement (bulk)	✓	✓										✓	✓	
Rapid Set® Cement (bags)		✓										✓	✓	
Cement All®							✓	✓		✓	✓		✓	
Concrete Mix		✓				✓		✓		✓		✓	✓	
Concrete Resurfacer		✓								✓			✓	
CTS Construction Grout		✓												
DOT Cement												✓		
DOT Concrete Mix		✓				✓		✓		✓			✓	
DOT Repair Mix								✓					✓	
DOT Repair Mortar								✓					✓	
Eisenwall®			✓	✓	✓									
Flowable Fill								✓						
Geotechnical Grouting														
LevelFlor®														
Low-P™ Cement	✓	✓						✓				✓	✓	
Low-P™ FA1 Cement	✓	✓						✓				✓	✓	
Low-P™ Repair Mortar		✓						✓					✓	
Mortar Mix			✓	✓	✓			✓		✓			✓	
OnePass®					✓						✓			✓
Shotcrete														
Skim Coat											✓			
Stucco Mix			✓	✓	✓									
Stucco Patch			✓	✓										
TRU® PC														
TRU® PC Gray														
TRU® Self-Leveling														
TXP™ TRU® Epoxy Primer														
UltraFlow® 4000/8														
V/O Repair Mix		✓						✓		✓	✓			
WunderFixx®					✓		✓				✓			
Type-K	✓								✓			✓		
Komponent®	✓								✓			✓		
System-K™	✓								✓			✓		


Water Treatment Plants, New
Utility Trenches
Underlayment
Tilt-up Concrete Patching
Tile Setting
Stucco Repair
Spall Repair





CEMENT TECHNOLOGY

WHAT IS RAPID SET® & KOMPONENT

WHAT IS RAPID SET® CEMENT?

RAPID SET® CEMENT is an advanced Calcium Sulfoaluminate cement (CSA) produced by CTS Cement Manufacturing Corporation. It is a high-performance, hydraulic cement that provides structural strength in one hour, reduced shrinkage, low permeability and superior resistance to sulfate attack. Rapid Set Cement is a standalone cement that, unlike other CSA cements, does not require binders or additives to achieve its superior performance. It has a low carbon footprint and is a highly sustainable alternative to portland cement.

OVER 1 MILLION CUBIC YARDS

of Rapid Set® Cement concrete pavement has been placed in major airports and highways worldwide.

Rapid Set® Cement is blended and packaged into a wide range of high-performance products

Products include: Structural repair mortars, concretes, self-leveling products, non-shrink grouts, exterior plasters, and other advanced cementitious materials

The need for a better cement technology drove the research and development that produced Rapid Set® Cement.

NOT ALL CEMENTS ARE ALIKE

There are inherent differences between portland cement and Rapid Set®

PORTLAND CEMENT

Portland cement has been the standard for many years, but it has inherent challenges. It shrinks excessively, cannot be accelerated without negative side effects, can be susceptible to attack by prevalent chemicals, and reacts destructively with certain aggregates.

RAPID SET® CEMENT

Using products based on Rapid Set Cement helps solve these problems.

HIGH PERFORMANCE

Differences in raw materials and manufacturing processes result in a higher performance chemistry. The calcium sulfoaluminate (C_4A_3S) hydrates quickly resulting in beneficial early ettringite formation. Ettringite is a strong, needle-like crystal that gives the material its quick-setting and high-early strength properties. Rapid Set Cement also contains one of the highest percentages of dicalcium silicate (C_2S), which provides excellent long-term strength. Rapid Set Cement is highly resistant to sulfate attack. It contains no tricalcium aluminate (C_3A), which is a major contributor to sulfate attack in portland cement concrete. When Rapid Set Cement is used in concrete, it provides superior performance in terms of reduced permeability and low shrinkage.

Traditionally, when fresh concrete is placed, the heavier particles settle and displace the mix water. The water then forms capillaries as it rises to the surface as bleed water. After the concrete has hardened, these capillaries become routes of entry for substances that attacks the concrete and reinforcing steel.

As Rapid Set Cement concrete is placed, the ettringite crystals rapidly consume mix water and create a three-dimensional lattice. This stops the settling and displacement process, which minimizes capillary formation and reduces permeability, resulting in more durable concrete.

Rapid Set Cement also uses mix water more efficiently than portland cement. This allows the placement of the concrete in a very workable consistency without the detrimental effects of excess mix water. Portland cement will only consume about half the mix water, leaving the excess water to evaporate over time, which results in drying shrinkage. At modest water-to-cement (w/c) ratios, Rapid Set Cement will consume essentially all of the water, minimizing drying shrinkage.

RAPID SET® INNOVATION

Rapid Set Cement technology is a greener alternative to traditional cements. CTS material scientists have innovated the cement chemistry and manufacturing processes to reduce energy consumption, use recycled industrial by-products, and improve the lifecycle of cement applications. This innovative approach provides a higher performance cement, reduces the carbon footprint, and makes a safer, and more sustainable world.

Rapid Set cement chemistry requires less limestone, reducing carbon dioxide emissions, and re-purposes recycled content to divert industrial waste from landfills. The manufacturing process is more energy efficient by lowering the kiln temperature and using less energy during grinding.

The kiln is operated at a lower temperature consuming less fuel. The grinding process is more efficient requiring less energy. and requires less energy during the milling process.

During manufacturing, by using recycled content and post-industrial resources, industrial waste is diverted from landfills.

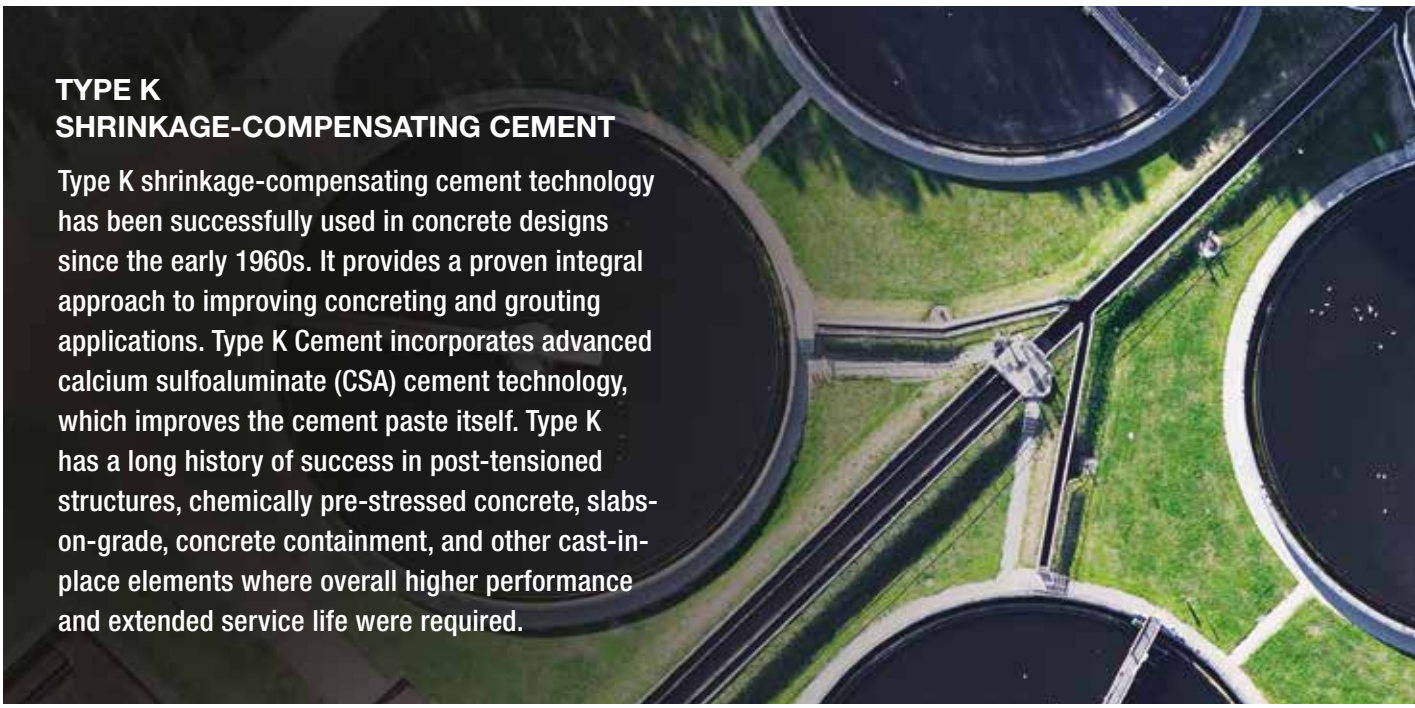
Rapid Set cement technology extends the lifecycle of a project by significantly reducing or eliminating the challenges related to fatigue life, shrinkage, cracking, and porosity. Rapid Set cement improves the sustainability of construction materials by reducing raw material use, energy demand, and overall carbon footprint.

DID YOU KNOW?

Rapid Set® cement has been proven in service since 1960.

WHAT IS KOMPONENT?

KOMPONENT® is a high-performance line of shrinkage-compensating cement solutions for concreting and grouting applications. Komponent products are based on Type K cement and are engineered to counteract drying shrinkage and structural movement due to volume change. It minimizes or eliminates drying shrinkage cracking, provides 30-40% greater abrasion resistance, reduces permeability, and improves sulfate resistance.



TYPE K
SHRINKAGE-COMPENSATING CEMENT

Type K shrinkage-compensating cement technology has been successfully used in concrete designs since the early 1960s. It provides a proven integral approach to improving concreting and grouting applications. Type K Cement incorporates advanced calcium sulfoaluminate (CSA) cement technology, which improves the cement paste itself. Type K has a long history of success in post-tensioned structures, chemically pre-stressed concrete, slabs-on-grade, concrete containment, and other cast-in-place elements where overall higher performance and extended service life were required.

MAXIMIZE VALUE

Komponent offers significant value in a wide variety of structural and non-structural designs and geotechnical applications. Value can be achieved with larger, more monolithic placements, up to 95% fewer control joints, reduced mobilizations, formwork, and waterstops, reduced temperature and shrinkage steel, and more.

Komponent technology is designed to eliminate common and costly challenges related to drying shrinkage cracking that result in deterioration and failure. Its advanced hydration mechanism prevents edge curling and corner breaks, overcomes restraint-to-shortening challenges, and minimizes overall repair and maintenance costs.

Time and material costs can be saved during construction and in-service, minimizing life-cycle costs while maximizing operational efficiency. Komponent is engineered to provide the best overall value in durable, sustainable concrete designs.

KOMPONENT

1

Komponent is an expansive cementitious additive blended with local portland to create Type K Cement. It provides a cost effective approach to producing shrinkage-compensating concrete, low shrinkage concrete, and non-shrink grout materials. Komponent can be added at the production plant or on the job site in proportions that achieve the specified amount of shrinkage compensation.

TYPE K

2

Type K Cement is a pre-blended cement (conforming to ASTM C845) consisting of Komponent and Type II portland cement. It is used to make shrinkage-compensating concrete, low shrinkage concrete and non-shrink grout materials. Pre-blended material is ideal for smaller projects or locations where production versatility is limited.

SYSTEM-K

3

System-K™ is a microfiber reinforced, shrinkage-compensated floor or topping slab system used in non-structural concrete designs with minimal reinforcement. It incorporates synthetic monofilament K-Fiber™ and Komponent with local portland cement and aggregates. These short, synthetic K-Fibers provide sufficient integral restraint that minimizes steel reinforcement requirements, and also improve the durability of the finished concrete. System-K offers a cost effective alternative to traditionally reinforced concrete slabs.

ADVANTAGES OF KOMPONENT

- Up to 95% fewer contraction/control joints
- Larger, more monolithic slab and wall placements (up to + 30,000 ft^2)
- Increased joint spacing (up to 300 ft)
- Increased L/W ratio (up to 3:1)
- Prevent curling, shrinkage cracking, corner breaks and edge spalls
- 30-40% Greater abrasion resistance
- No special structural re-design required
- Eliminate restraint-to-shortening challenges
- Eliminate pour/delay strips
- Thinner slabs and walls are viable
- Reduce temperature and shrinkage steel
- Reduce load transfer reinforcement
- Reduce waterstops, and minimize leakage and seapage points in containment structures

SUSTAINABILITY

ENVIRONMENTAL **POLICY STATEMENT**

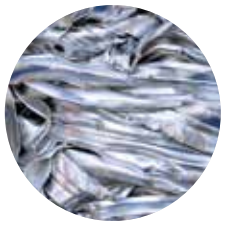
CTS Cement Manufacturing Corporation is committed to operating in an environmentally responsible manner. We manufacture cement in a conscientious manner to minimize CO2 emissions, protect natural resources, reduce waste, and reduce potential environmental and health hazards. It is our practice to assure the environmental integrity of our processes and facilities. As part of ongoing efforts to sustain the environment

ECO FRIENDLY SUSTAINABLE CONCRETE™

OUR COMMITMENT

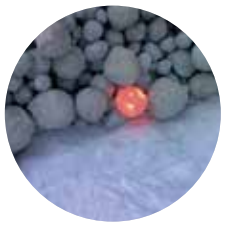
REDUCE WASTES

CTS Cement uses as raw materials, wastes from aluminum recycling and by-products from the production of various chemicals, such as synthetic calcium sulfate. By using by-products from the recycling of aluminum, we prevent such wastes from being released into the environment.



PROTECT NATURAL RESOURCES

By being part of the aluminum cycle, CTS Cement helps reduce the need to extract alumina from the ground. Recycling aluminum generates 95% less air pollution and 97% less water pollution than producing aluminum from bauxite ore. In addition, making aluminum from bauxite requires the production of petroleum coke, soda ash, and lime – all extracted from the ground. It also causes the emission of carbon dioxide and other air pollutants. Additionally, generates wastes such as red mud that require treatment and disposal. The use of synthetic gypsum also decreases the need to extract gypsum from the ground.



REDUCED CARBON EMISSIONS

Cement is made by heating limestone with other materials in a kiln. The resulting hard substance, called “clinker”, is ground with a small amount of gypsum to make the cement. Rapid Set® is more environmentally friendly than portland cement for three main reasons:

- Rapid Set® is made at lower temperatures, which means that its processing requires less fossil fuel.
- Rapid Set® requires less limestone per ton, thereby reducing CO_2 emissions.
- Rapid Set® has longer lifetime than portland. In pavement tests conducted at the Seattle/Tacoma International Airport by Construction Technology Laboratories, Inc. (CTL), the lifetime of Rapid Set® concrete was found to be twice as long as that of Portland concrete.

35%

Taking the cumulative effect of our three commitments into account, the carbon footprint of Rapid Set® cement clinker is just 35% of that portland cement.

LOWER CO_2 EMISSIONS

The amounts of CO_2 released into the atmosphere per 50-kg bag of cement are:

- **10.5 kg. CO_2 for Rapid Set®**
- **30 kg for portland**

In summary, we monitor the operations of our cement production plants to ensure compliance with federal and state regulations, as well as professional standards of good industry practices. Our technologies and operating procedures are designed to minimize health and safety risks. We provide a safe working environment, and ensure that employees are properly trained and have the right safety and emergency equipment.

ENVIRONMENTAL CLAIM

A GREENER HYDRAULIC CEMENT

Rapid Set® is a greener hydraulic cement primarily because it has a much smaller "carbon footprint" than portland cement. In its manufacturing process, it generates far less carbon dioxide (CO_2).

There are a number of reasons for the exceptional "Green" characteristics of Rapid Set® cement and concrete. In the case of cement production practice, the emissions of carbon dioxide gas result from two aspects of the high-temperature manufacturing process:

CEMENT KILN

First, in the cement kiln, the raw materials (limestone, clay, etc.) decompose, releasing large amounts of carbon dioxide gas into the atmosphere.

FUEL COMBUSTION

Second, the combustion of fuel (generally coal) with air in the cement kiln, also releases carbon dioxide, much the same as carbon dioxide gas is emitted from the exhaust pipe of a vehicle that is burning gasoline or diesel fuel.

In the case of portland cement, approximately 40% of emitted CO2 results from the burning of the fuel in a kiln, and 60% comes from the decarbonation of the limestone.1 A recent estimate for carbon dioxide emissions for portland cement production is 0.9 pounds of CO2 per pound of ground portland cement.[2]

1. Green in Practice: Technical Brief 102, 2008 PCA Publication, http://www.concretethinker.com/papers.aspx?DocID=312 • 2. Manufacturing Fact Sheet, 2008 PCA Briefing Kit Publication, http://www.cement.org/Briefingkit/manu_facts.asp • 3. Klemm Report 2008

ANALYSIS

An analysis of Rapid Set® manufacturing raw materials composition, pyroprocessing techniques, and cement grinding has established a baseline emission rate of 0.61 pounds of CO_2 per pound of Rapid Set® cement produced, broken down as follows:[3]

- **Only 0.21 pounds of CO_2 per pound of cement from fuel (coal) combustion because its burning temperature is approximately 220°C lower than that of portland processes.**
- **Only 0.40 pounds of CO_2 per pound of cement from thermal decarbonation of calcium carbonate (limestone).**

Rapid Set® cement and concrete provides lower emission of green house gases, lower emissions of smog-producing nitrogen oxides, increased lifespan leading to lower frequency of repairs or replacement, and improved sustainability through the use of recycled raw materials.

REDUCED ENVIRONMENTAL IMPACT

Rapid Set® also reduces the impact of cement production on the environment:

The reduced burning zone temperature needed to form Rapid Set® clinker has the additional advantage of producing lesser amounts of smog-producing oxides of nitrogen.

The softer and more friable nature of Rapid Set® clinker also lends itself to much easier grinding and a lower grinding mill energy consumption.

Hardened Rapid Set® concrete is much more durable than portland cement concrete, and has a particularly greater resistance to sulfate or other types of chemical attack. Due to its very rapid strength producing ettringite formation, lower porosity, and subsequent internal self-desiccation, Rapid Set® is extremely impervious to carbonation, freeze-thaw susceptibility, and acid rain leaching. Thus, it has a proven record of field performance that exceeds the normal useful life span of portland cement concrete.

A number of recycled products, such as waste calcium sulfate from chemical plants and recycled aluminum products (up to 20% by weight of the raw materials) enter into its composition. This improves the sustainability of the cement.

CTS Rapid Set® Cement
A "Green" Hydraulic Cement

Reducing CO_2 emissions by 32% - 36% over conventional portland cement

BY WALDEMAR A. KLEMM

Rapid Set® Cement differs from ordinary portland cement in most high performance construction applications, such as concrete highways, runways, bridges, and slab floors, where superior durability and rapid strength gain are required. Rapid Set® gains strength far faster than portland cement and in many instances can be put into service in as little time as one hour. Rapid Set® reaches compressive strengths in one day that an equivalent portland cement mix would require one month to achieve. For larger projects, Rapid Set® concrete mixtures may be batched using conventional ready mix equipment.

CARBON FOOTPRINT

More importantly, Rapid Set® has a much smaller **"carbon footprint"** than portland cement. This means that in its manufacturing process, with normal cement plant production equipment, it generates far less carbon dioxide (CO_2) than portland cement emits during its production process. Carbon dioxide is a **"Greenhouse Gas"** and is a major contributor to global warming and climate changes. Thus, Rapid Set® is a **"Green"** hydraulic construction material that is far superior in most respects to portland cement.

LOWER PRODUCTION TEMPERATURES

There are a number of reasons for the exceptional "Green" characteristics of Rapid Set® cement and concrete. In the case of cement production practice, the emissions of carbon dioxide gas result from two aspects of the high-temperature manufacturing process.

First, at the extremely high temperatures of a rotary cement kiln, the cement raw mix materials (limestone, clay, etc.) decompose and chemically react to form a marble-sized product called "cement clinker", which is subsequently cooled and then ground into face-powder fineness to produce the final cement product. During the heating or pyroprocessing stage, the limestone (calcium carbonate) constituent of the raw material kiln feed mixture loses its carbon content as evolved carbon dioxide.

Secondly, the combustion of fuel (generally coal) with air in a cement kiln, also releases carbon dioxide as a combustion product, much the same as carbon dioxide gas is emitted from the exhaust pipe of a vehicle that is burning gasoline or diesel fuel.

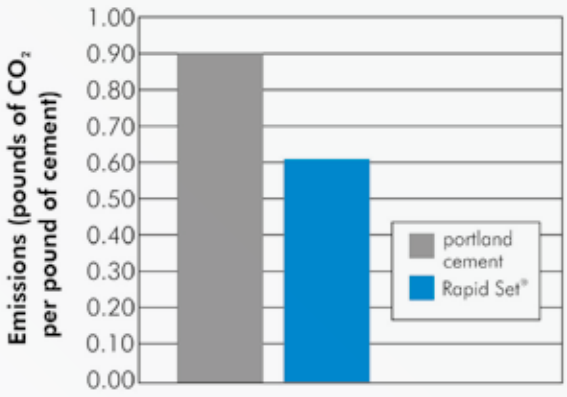


Fig. 1: CO_2 Emissions of portland cement compared to Rapid Set® cement

In the case of portland cement production, approximately 40% of emitted CO_2 results from the burning of the fuel in a kiln, and the remaining 60% of CO_2 comes from the decarbonation of the limestone in the kiln feed raw materials. World-wide, the emission of carbon dioxide from cement production is equivalent to about one pound of CO_2 per one pound of cement clinker that is burned. However, in portland cement production the clinker factor usually is 0.95, meaning that the portland clinker is interground into cement in large grinding mills with about 5% gypsum to control the cement or concrete setting process when water later is added to the dry mixture. In a recent change to the ASTM *Standard Specification for Portland Cement* (C 150), further additions of up to 5% limestone are permitted, with the gypsum, in the final grinding step. With these additional dilutions to the portland clinker constituent, the clinker factor may be somewhat lower. In fact, a recent estimate for carbon dioxide emissions for portland cement production in the U.S. is 0.9 pounds of CO_2 per pound of ground portland cement (Fig. 1).

The manufacturing of Rapid Set® clinker demonstrates significant reductions in North American and potentially global emissions of carbon dioxide from cement production. An analysis of Rapid Set® manufacturing raw materials composition, pyroprocessing techniques, and cement grinding has established **a baseline emission of 0.61 pounds of CO_2 per pound of Rapid Set® cement produced (Fig. 1).**

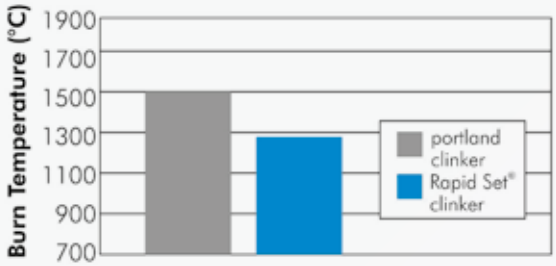


Fig. 2: Clinker burning temperature of portland cement and Rapid Set® cement

Rapid Set® exhibits a significantly smaller carbon footprint which is 60% to 70% the size of that produced by most portland cements made in the United States.

ENVIRONMENTAL ADVANTAGES

• Rapid Set® pyroprocessing emits 0.21 pounds of CO_2 per pound of cement from fuel (coal) combustion.

• Rapid Set® pyroprocessing emits 0.40 pounds of CO_2 per pound of cement from thermal decarbonation of calcium carbonate (limestone).

• Rapid Set® clinker is directly ground into cement with only very minimal, if any, additions of gypsum.

• Rapid Set® cement is never blended with portland cement to produce a fast-setting or rapid strength-developing product.

• Although Rapid Set® is somewhat similar to portland cement in mineralogical composition, its main constituents are calcium sulfoaluminate, dicalcium silicate, and anhydrous calcium sulfate. No tricalcium silicate is formed.

• The burning temperature of Rapid Set® clinker is 1,280°C (2,326°F), which is significantly lower than portland clinker burning temperatures (Fig 2).

• The average burning temperature of portland clinker is about 1,500°C (2,732°F) or more (Fig 2).

• The low-sulfur coal used to produce Rapid Set® clinker has an energy value of about 12,300 BTU per pound of coal, and a fixed carbon content of about 48%.

• The reduced burning zone temperature needed to form Rapid Set® clinker has the additional advantage of producing lesser amounts of smog-producing oxides of nitrogen.

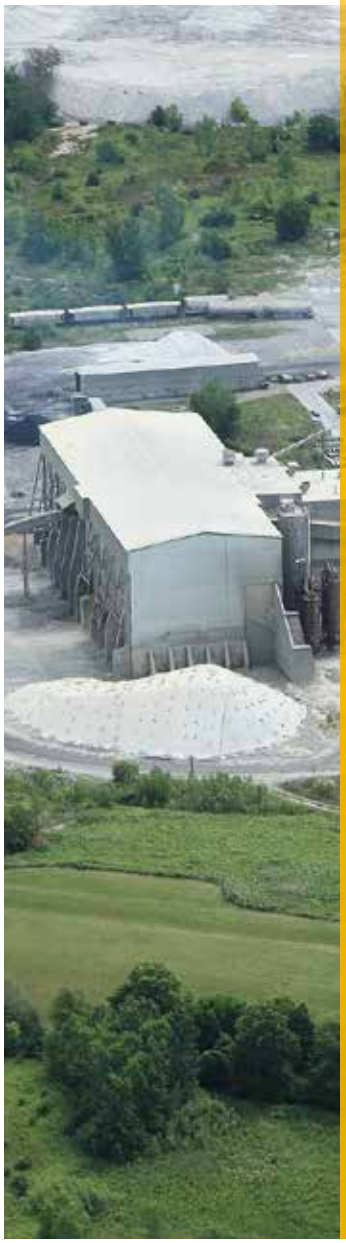
• The softer and more friable nature of Rapid Set® clinker also lends itself to much easier grinding and, therefore, a lower grinding mill energy consumption.

• Hardened Rapid Set® concrete is much more durable than portland cement concrete, and has a particularly greater resistance to sulfate or other types of chemical attack. Due to its very rapid strength producing ettringite formation, lower porosity, and subsequent internal self-desiccation, Rapid Set® is extremely impervious to carbonation, freeze-thaw susceptibility, and acid rain leaching. Thus, it has a proven record of field performance that exceeds the normal useful life span of portland cement concrete.

In summary, Rapid Set® cement not only is a greener cement due to its smaller carbon footprint than portland cement when manufactured, but also is a cement, mortar, or concrete that exhibits superior performance, durability, and an extended lifetime under most ambient temperature and field usage conditions.

Waldemar A. Klemm is a consultant in the cement industry. He has over 40 years of experience in the cement industry in plant process, chemistry, research and development activities, and environmental studies. He has authored 40 technical reports and scientific papers on clinkering chemistry, cement hydration, admixture research, cement manufacturing, and environmental analyses.

Waldemar holds patents on expansive cement production and fluoride mineralizers for clinkering. He has been an invited speaker at prestigious cement and concrete conferences and symposiums. He is a member of the American Chemical Society; the American Society for Testing and Materials (ASTM); and Fellow of the American Ceramic Society.



CTS Cement Manufacturing Corporation | Rapid Set® is committed to operating in an environmentally sustainable manner.

LEED COMPLIANCE

CTS manufactures cement operates in a responsible manner to minimize CO_2 emissions, protect natural resources, reduce waste, and reduce potential environmental and health hazards. Rapid Set® Cement, produced by CTS, utilizes 20% – 30% by weight of post-industrial recycled materials in the manufacturing process. In addition, 50% – 100% by weight of our cement products are manufactured with regional materials (within 500 miles of our production facilities).

Rapid Set® Cement products can contribute points to the following LEED performance areas.

MATERIALS AND RESOURCES (MR)
Recycled Content, 10% (1 point)
Recycled Content, 20% (1 point)
Regional Materials, 10% (1 point)
Regional Materials, 20% (1 point)

INDOOR ENVIRONMENTAL QUALITY (EQ)
Low-Emitting Materials, Paints and Coatings (1 point)

DURABLE MATERIALS (MR) (CANADA)
High Durability for Extended Life Cycle (1 point)

HEAT ISLAND EFFECT (SS)
Solar Reflective Index greater than 29 (1 point)

CTS PRODUCTION FACILITATES		
Dixon, CA	Gardena, CA	Tracy, CA
Mexico, MO	Chicago, IL	Logansport, IN
Fort Smith, AR	Harrisonville, MO	Bayville, NJ
Bethlehem, PA	Dupont, WA	Juarez, MX

Please contact CTS to verify production locations for specific products.

REPAIR & RESTORATION

DATASHEETS

- Cement All®
- Mortar Mix™
- Concrete Mix
- V/O Repair Mix
- WunderFixx®
- OnePass®

CEMENT ALL

Multi-Purpose Repair Material & Non-Shrink Grout

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® CEMENT ALL® is a high-performance, fast-setting, multi-purpose concrete repair material and non-shrink grout. Durable in wet environments, CEMENT ALL is a blend of Rapid Set hydraulic cement and specially graded fine aggregates. CEMENT ALL is non-metallic and no chlorides are added. Mix CEMENT ALL with water to produce a workable, high quality material that is ideal where rapid strength gain and high durability are desired. CEMENT ALL sets in 15 minutes and achieves structural strength in 1 hour.*

USES: Use CEMENT ALL for general and structural concrete repair, doweling and anchoring, industrial grouting, formed work, vertical and horizontal trowel applications. CEMENT ALL is ideal for airport, highway, industrial and marine applications.

ENVIRONMENTAL ADVANTAGES: Use CEMENT ALL to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your representative for LEED values and environmental information.

APPLICATION: Apply CEMENT ALL in thicknesses from featheredge to 4" (10 cm). For heavy loads and vehicle traffic, minimum thickness will vary. Not intended for high heat applications above 300°F (149°C). For deeper sections, use Rapid Set® Mortar Mix or Rapid Set® Concrete Mix. For overlay applications, a minimum of one test section should be prepared to evaluate the suitability of the materials and procedures.

SURFACE PREPARATION: For repairs, application surface shall be clean, sound and free from any materials that may inhibit bond, such as oil, asphalt, curing compound, acid, dirt and loose debris. Roughen surface and remove all unsound material. Apply CEMENT ALL to a surface that is thoroughly saturated with no standing water.

MIXING: The use of a power-driven mechanical mixer, such as a mortar mixer or a drill-mounted mixer, is recommended. Organize work so that all personnel and equipment are in place before mixing. Use clean potable water. **CEMENT ALL may be mixed using 3 to 5 quarts (2.8 L to 4.7 L) of water per 55-lb (25-kg) bag. Use less water to achieve higher strengths. Do not exceed 5 quarts (4.7 L) of water per bag.** For increased fluidity and workability, use Rapid Set® FLOW Control® plasticizing admixture from the Rapid Set® Concrete Pharmacy®. Place the desired quantity of mix water into the mixing container. While the mixer is running, add CEMENT ALL. Mix for the minimum amount of time required to achieve a lump-free, uniform consistency (usually 1 to 3 minutes). Do not retemper.

PLACEMENT: CEMENT ALL may be placed using traditional construction methods. Organize work so that all personnel and equipment are ready before placement. Place, consolidate and screed quickly to allow for maximum finishing time. Use a method of consolidation that eliminates air voids. Do not wait for bleed water; apply final finish as soon as possible. CEMENT ALL may be troweled, floated or broom finished. On flat work, do not install in layers. Install full-depth sections and progress horizontally. Do not install on frozen surfaces. To extend working time, use Rapid Set® SET Control® retarding admixture from the Concrete Pharmacy or cold mix water. CEMENT ALL may be applied in temperatures ranging from 45°F to 90°F (7°C to 32°C).

OVERVIEW

Highlights:
Fast: Sets in 15 minutes, structural strength in 1 hour*
Durable: Formulated for long life in critical applications
Excellent Bond: Superior adhesion to concrete, stone, brick, block, stucco and more
Structural: For repair and new construction
Multi-Purpose: Use for concrete repair, grouting, anchoring, casting, underlayment and more

Conforms to:
ASTM: C1107, C928, C387 and CRD C621
Army Corps of Engineers
LA Research and Report 24654
State and Local Approvals

MasterFormat® 2016	
03 01 30	Maintenance of Cast-in-Place Concrete
03 01 40	Maintenance of Precast Concrete
03 01 60	Maintenance of Grouting
03 01 70	Maintenance of Mass Concrete
03 53 19	Concrete Overlayment
03 54 16	Hydraulic Cement Underlayment
03 60 00	Grouting
03 61 00	Cementitious Grouting
03 62 13	Non-Metallic Non-Shrink Grouting
04 01 00	Maintenance of Masonry

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

CEMENT ALL Multi-Purpose Repair Material & Non-Shrink Grout

CURING: Water cure all Rapid Set® CEMENT ALL® installations by keeping exposed surfaces wet for a minimum of 1 hour. Begin curing as soon as the surface starts to lose its moist sheen. When experiencing extended setting time due to cold temperature or the use of retarder, longer curing times may be required. The objective of water curing shall be to maintain a continuously wet surface until the product has achieved sufficient strength.

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.

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. The use of Rapid Set® SET Control retarding admixture from the Rapid Set® Concrete Pharmacy will help offset the effects of high temperatures.

YIELD & PACKAGING: CEMENT ALL is available in 55-lb, 25-lb and 10-lb (25-kg, 11.3-kg and 4.5-kg) sizes. One 55-lb (25-kg) bag of CEMENT ALL will yield approximately 0.5 ft^3.

SHELF LIFE: CEMENT ALL has 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.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Set Time, ASTM C191 Mod.	
Initial set	15 minutes
Final set	35 minutes

Compressive Strength, ASTM C109 Mod.	
1 hour*	3000 psi (20.7 MPa)
3 hours	5000 psi (34.5 MPa)
24 hours	6000 psi (41.4 MPa)
7 days	7000 psi (48.3 MPa)
28 days	9000 psi (62.1 MPa)

Slant Shear Bond, ASTM C882 per C928	
24 hours	1500 psi (10.3 MPa)
28 days	2500 psi (17.2 MPa)

Splitting Tensile, ASTM C496	
7 days	700 psi (4.82 MPa)
28 days	880 psi (6.06 MPa)

Flexural Strength, ASTM C78	
7 days	600 psi (4.14 MPa)
28 days	800 psi (5.51 MPa)

*After final set
Data obtained at flow consistency 102 by ASTM C1437
All data produced at 70°F (21°C)

MORTAR MIX

High-Strength Structural Repair Mortar

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® MORTAR MIX is a high-performance, fast-setting, multi-purpose repair material. Durable in wet environments, MORTAR MIX is a blend of Rapid Set hydraulic cement and quality aggregates. MORTAR MIX is non-metallic and no chlorides are added. Mix MORTAR MIX with water to produce a workable, high quality mortar material that is ideal where fast strength gain, high durability and low shrinkage are desired. MORTAR MIX sets in 15 minutes and achieves structural strength in 1 hour.*

USES: Use MORTAR MIX for general and structural concrete repair, construction of pavements, stucco and plaster repair, one-coat exterior plaster, underlayments and formed work. MORTAR MIX is a versatile product that is suitable for vertical and overhead applications. For freeze thaw durability, in some geographical areas, MORTAR MIX contains an air-entraining admixture.

ENVIRONMENTAL ADVANTAGES: Use MORTAR MIX to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your representative for LEED values and environmental information.

APPLICATION: Apply MORTAR MIX in thicknesses from 1/2" to 6" (1.2 cm to 15.2 cm). For thicker applications, use Rapid Set® Concrete Mix. Not intended for high heat applications above 300°F (149°C). For overlay applications, a minimum of one test section should be prepared to evaluate the suitability of the materials and procedures.

SURFACE PREPARATION: For repairs, application surface shall be clean, sound and free from any materials that may inhibit bond, such as oil, asphalt, curing compound, acid, dirt and loose debris. Roughen surface and remove all unsound material. Apply MORTAR MIX to a thoroughly saturated surface with no standing water.

MIXING: The use of a power-driven mechanical mixer, such as a mortar mixer or a drill-mounted mixer, is recommended. Organize work so that all personnel and equipment are in place before mixing. Use clean potable water. **MORTAR MIX may be mixed using 3 to 5 quarts (2.8 L to 4.7 L) of water per 55-lb (25-kg) bag. Use less water to achieve higher strengths. Do not exceed 5 quarts (4.7 L) of water per bag.** For increased fluidity and workability, use Rapid Set® FLOW Control® plasticizing admixture from the Rapid Set® Concrete Pharmacy®. Place the desired quantity of mix water into the mixing container. While the mixer is running, add MORTAR MIX. Mix for the minimum amount of time required to achieve a lump-free, uniform consistency (usually 1 to 3 minutes). Do not retemper.

PLACEMENT: MORTAR MIX may be placed using traditional construction methods. Organize work so that all personnel and equipment are ready before placement. Place, consolidate and screed quickly to allow for maximum finishing time. Use a method of consolidation that eliminates air voids. Do not wait for bleed water; apply final finish as soon as possible. MORTAR MIX may be troweled, floated or broom finished. On flat work, do not install in layers. Install full-depth sections and progress horizontally. To extend working time, use Rapid Set® SET Control® retarding admixture from the Concrete Pharmacy or cold mix water. Do not install on frozen surfaces. MORTAR MIX may be applied in temperatures ranging from 45°F to 90°F (7°C to 32°C).

OVERVIEW

Highlights:
Fast: Sets in 15 minutes, structural strength in 1 hour*
Durable: Formulated for long life in critical applications
Structural: For repair and new construction
Multi-purpose: Use for concrete repairs, wall repairs, stucco repairs, one-coat exterior plaster, underlayments, floors, formed work, and more

Conforms to:
ASTM: C928, C387
State and Local Approvals

MasterFormat® 2016	
03 01 30	Maintenance of Cast-in-Place Concrete
03 01 40	Maintenance of Precast Concrete
03 01 50	Maintenance of Cast Decks & Underlayment
03 01 70	Maintenance of Mass Concrete
03 54 16	Hydraulic Cement Underlayment
04 01 00	Maintenance of Masonry
09 24 23	Cement Stucco

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

MORTAR MIX High-Strength Structural Repair Mortar

CURING: Water cure all Rapid Set® MORTAR MIX installations by keeping exposed surfaces wet for a minimum of 1 hour. Begin curing as soon as the surface starts to lose its moist sheen. When experiencing extended setting time due to cold temperature or the use of retarder, longer curing times may be required. The objective of water curing shall be to maintain a continuously wet surface until the product has achieved sufficient strength.

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.

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. The use of Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy will help offset the effects of high temperatures.

YIELD & PACKAGING: MORTAR MIX is available in 55-lb and 25-lb (25-kg and 11.3-kg) sizes. One 55-lb (25-kg) bag of MORTAR MIX will yield approximately 0.5 ft^3.

SHELF LIFE: MORTAR MIX has 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.

USER RESPONSIBILITY: Before using CTS products, read current technical data sheets, bulletins, product labels and safety data sheets. It is the user's responsibility to review instructions and warnings for any CTS products prior to use.

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Set Time, ASTM C266	
Initial set	15 minutes
Final set	35 minutes
Compressive Strength, ASTM C109 Mod.**	
1 hour*	2500 psi (17.2 MPa)
3 hours	4000 psi (27.6 MPa)
24 hours	5000 psi (34.5 MPa)
7 days	5500 psi (37.9 MPa)
28 days	6500 psi (44.8 MPa)
Slant Shear Bond Strength, ASTM C882 Mod. per C928	
24 hours	1200 psi (8.27 MPa)
28 days	2200 psi (15.2 MPa)
Splitting Tensile, ASTM C496 Mod.**	
7 days	450 psi (3.10 MPa)
28 days	550 psi (3.79 MPa)
Flexural Strength, ASTM C348 Mod**	
28 days	550 psi (3.79 MPa)
Freeze Thaw, C666	
Durability factor	95%
Length Change, ASTM C157 Mod. per C928 (max)	
28 days in air	-0.04
28 days in water	0.02

*After final set
**Data obtained at flow consistency 100 by ASTM C1437 at 70°F (21°C)

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

CONCRETE MIX

Very Rapid Hardening Concrete

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® CONCRETE MIX is a high-performance, fast-setting, multi-purpose concrete repair material. Durable in wet environments, CONCRETE MIX is a blend of Rapid Set hydraulic cement and quality aggregates. CONCRETE MIX is non-metallic and no chlorides are added. Mix CONCRETE MIX with water to produce a workable, quality concrete material that is ideal where fast strength gain, high durability and low shrinkage are desired. CONCRETE MIX sets in 15 minutes and is ready for traffic in 1 hour.*

USES: Use CONCRETE MIX for general and structural concrete repair, construction of pavements, formed work, footings, setting posts, industrial floors and machine bases. CONCRETE MIX contains an air-entraining admixture, in some geographical areas, for freeze-thaw durability.

ENVIRONMENTAL ADVANTAGES: Use CONCRETE MIX to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your representative for LEED values and environmental information.

APPLICATION: Apply CONCRETE MIX in thicknesses from 2" to 24" (5 cm to 61 cm). For thinner sections, use Rapid Set® Cement All® or Rapid Set® Mortar Mix. Not intended for high heat applications above 300°F (149°C). For overlay applications, a minimum of one test section should be prepared to evaluate the suitability of the materials and procedures.

SURFACE PREPARATION: For repairs, application surface shall be clean, sound and free from any materials that may inhibit bond, such as oil, asphalt, curing compound, acid, dirt and loose debris. Roughen surface and remove all unsound material. Apply CONCRETE MIX to a thoroughly saturated surface with no standing water.

MIXING: The use of a power-driven mechanical mixer, such as a mortar mixer or a drill-mounted mixer, is recommended. Organize work so that all personnel and equipment are in place before mixing. Use clean potable water. **CONCRETE MIX may be mixed using 3.5 to 4.5 quarts (3.3 L to 4.2 L) of water per 60-lb (27.2-kg) bag. Use less water to achieve higher strengths. Do not exceed 4.5 quarts (4.2 L) of water per bag.** For increased fluidity and workability, use Rapid Set® FLOW Control® plasticizing admixture from the Rapid Set® Concrete Pharmacy®. Place the desired quantity of mix water into the mixing container. While the mixer is running, add CONCRETE MIX. Mix for the minimum amount of time required to achieve a lump-free, uniform consistency (usually 1 to 3 minutes). Do not retemper.

INSTALLATION: CONCRETE MIX may be placed using traditional construction methods. Organize work so that all personnel and equipment are ready before placement. Place, consolidate and screed quickly to allow for maximum finishing time. Use a method of consolidation that eliminates air voids. Do not wait for bleed water; apply final finish as soon as possible. CONCRETE MIX may be troweled, floated or broom finished. On flatwork, do not install in layers. Install full-depth sections and progress horizontally. To extend working time, use Rapid Set® SET Control® retarding admixture from the Concrete Pharmacy or cold mix water. Do not install on frozen surfaces. CONCRETE MIX may be applied in temperatures ranging from 45°F to 90°F (7°C to 32°C).

OVERVIEW

Highlights:

- Fast: Sets in 15 minutes, ready for traffic in 1 hour*
- Durable: Formulated for long life in critical applications
- Structural: For repair and new construction
- Multi-Purpose: Use for concrete repair, formed work, setting posts, footings, floors, machine bases, and more

Conforms to:

- ASTM: C928, C387
- State and Local Approvals

MasterFormat® 2016

03 01 30	Maintenance of Cast-in-Place Concrete
03 01 50	Maintenance of Cast Decks and Underlayment
03 01 70	Maintenance of Mass Concrete
03 33 00	Architectural Concrete - Cast-in-Place Concrete

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

CONCRETE MIX Very Rapid Hardening Concrete

CURING: Water cure all Rapid Set® CONCRETE MIX installations by keeping exposed surfaces wet for a minimum of 1 hour. Begin curing as soon as the surface starts to lose its moist sheen. When experiencing extended setting time due to cold temperature or the use of retarder, longer curing times may be required. The objective of water curing shall be to maintain a continuously wet surface until the product has achieved sufficient strength.

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.

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. The use of Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy® will help offset the effects of high temperatures.

YIELD & PACKAGING: CONCRETE MIX is available in 60-lb (27.2-kg) bags. One 60-lb (27.2-kg) bag of CONCRETE MIX will yield approximately 0.5 ft^3.

SHELF LIFE: CONCRETE MIX has 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.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Set Time, ASTM C403	
Initial set	15 minutes
Final set	35 minutes

Compressive Strength, ASTM C39	
1 hour*	3000 psi (20.7 MPa)
3 hours	3600 psi (24.8 MPa)
24 hours	4500 psi (31.0 MPa)
7 days	5500 psi (37.9 MPa)
28 days	6000 psi (41.4 MPa)

Slant Shear Bond, ASTM C882	
24 hours	1200 psi (8.27 MPa)
28 days	2200 psi (15.2 MPa)

Splitting Tensile, ASTM C496	
7 days	600 psi (4.14 MPa)
28 days	700 psi (4.83 MPa)

Flexural Strength, ASTM C78	
7 days	500 psi (3.45 MPa)
28 days	550 psi (3.79 MPa)

Length Change, ASTM C157 per C928 (max)**	
28 days in air	-0.04
28 days in water	0.02

*After final set
Data obtained at 4" slump by ASTM C143 at 70°F (21°C)

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

V/O REPAIR MIX

Vertical Overhead Repair Material

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® V/O REPAIR MIX is a high performance, polymer-modified blend of Rapid Set® Cement with additives and specially graded fine aggregate. V/O REPAIR MIX has been specially formulated to match the color of typical portland cement concrete. Cutting-edge Self-Curing Technology (SCT) means wet curing is not required in most applications. V/O REPAIR MIX is non-metallic and no chlorides are added. Combine V/O REPAIR MIX with water to produce a high quality repair material that is ideal where rapid strength gain, high durability, and low shrinkage are desired. Integral corrosion inhibitor is already added to increase protection of embedded reinforcement. V/O REPAIR MIX has a working time of 25 minutes and achieves 2000 psi in 2 hours.

USES: Use V/O REPAIR MIX for general horizontal concrete and spall repairs, including vertical and overhead applications.

ENVIRONMENTAL ADVANTAGES: Use V/O REPAIR MIX to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your CTS representative for LEED values and environmental information.

APPLICATION: Apply V/O REPAIR MIX in thicknesses from 1/32" to 2" (0.1 to 5.1 cm). For vertical applications and small spot repairs, thicknesses up to 6" (15.2 cm) are acceptable.

SURFACE PREPARATION: Surface must be clean, sound, and free of oil, curing compound, dust, mastic and other bond-breakers. Surface must be prepared to a minimum profile of ICRI CSP 3. Mechanically abrade surface and remove all unsound material. Apply V/O REPAIR MIX to a thoroughly saturated surface with no standing water.

MIXING: The use of a power-driven mechanical mixer, such as a mortar mixer or a drill-mounted mixer is recommended. Organize work so that personnel and equipment are in place before mixing. Use clean, potable water. **V/O REPAIR MIX may be mixed using 3.5 to 4.0 quarts (3.3 L to 3.8 L) of water per 50-lb (22.7-kg) bag. Use less water to achieve higher strengths. DO NOT exceed 4 quarts (3.8 L) of water per bag.** Place the desired quantity of mix water into the mixing container. While the mixer is running, add material. Mix for the minimum amount of time required to achieve a lump-free, uniform consistency (usually 2 to 3 minutes). Do not retemper. Avoid mixers that entrap large amounts of air.

INSTALLATION: V/O REPAIR MIX may be placed using traditional methods. Place and consolidate quickly to allow for maximum finishing time. Use a method of consolidation that eliminates air voids. Do not wait for bleed water. Apply final finish as soon as possible. V/O REPAIR MIX may be troweled, floated, shaved or broom finished. Do not install on frozen surfaces. To extend working time, use Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy®.

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.

OVERVIEW

Highlights:
Self-Curing Technology (SCT)
Integral corrosion inhibitor
Fiber reinforced
Freeze-thaw resistant
Concrete gray color
Polymer modified
Excellent bond
2000 psi (13.8 MPa) in 2 hours
25 minute working time

Conforms to:
ASTM C928

MasterFormat® 2016	
03 01 30	Maintenance of Cast-in-Place Concrete
03 01 40	Maintenance of Precast Concrete
03 01 50	Maintenance of Cast Decks and Underlayment
03 01 70	Maintenance of Mass Concrete

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

V/O REPAIR MIX Vertical Overhead Repair Material

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. The use of Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy® will help offset the effects of high temperatures.

CURING: Rapid Set® V/O REPAIR MIX does not require water curing or curing compound under moderate conditions at 70°F (21°C). In dry, windy or hot conditions, mist with water to maintain a continuously wet surface until the product has achieved sufficient strength.

YIELD & PACKAGING: One 50-lb (22.7-kg) bag of V/O REPAIR MIX will yield approximately 0.37 ft^3.

SHELF LIFE: V/O REPAIR MIX has 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.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Typical Set Time, ASTM C266	
Initial set	30 minutes
Final set	50 minutes

Compressive Strength, ASTM C109 Mod.	
2 hours	2000 psi (13.8 MPa)
24 hours	4000 psi (27.6 MPa)
28 days	6000 psi (41.4 MPa)

Flexural Strength, ASTM C348	
7 days	400 psi (2.8 MPa)
28 days	800 psi (5.5 MPa)

Scaling Resistance, ASTM C672 per C928	
Rating	0

Freeze Thaw Resistance, ASTM C666	
Durability factor	95%

Length Change, ASTM C157 per C928 (Air Storage)	
28 days (max)	0.03%

Length Change, ASTM C157 per C928 (Water Storage)	
28 days (max)	0.03%

Rapid Chloride Ion Penetration, ASTM C1202	
28 days	< 1000 coulombs

Data obtained at a flow consistency of 72 by ASTM C1437 at 70°F (21°C)

WUNDERFIXX®

Concrete Smoothing Compound

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® WUNDERFIXX® is a high performance, gray concrete smoothing compound. WUNDERFIXX is a blend of Rapid Set hydraulic cement, high-performance polymers and finely ground aggregate. Mix WUNDERFIXX with water to produce a workable, easy-to-apply mixture with excellent bonding characteristics. Trowel apply WUNDERFIXX to achieve a smooth and uniform finish. After applying, WUNDERFIXX may be sanded within 24 hours to achieve an ultra-smooth finish.

USES: Use WUNDERFIXX for cosmetic patching, detailing and smoothing. WUNDERFIXX is ideal for use on tilt-up panels, precast, formed work, concrete block and other concrete and masonry surfaces. Durable in wet environments, it is suitable for both interior and exterior applications. WUNDERFIXX may be used on vertical/overhead and non-wearing horizontal surfaces.

ENVIRONMENTAL ADVANTAGES: Use WUNDERFIXX to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your representative for LEED values and environmental information.

APPLICATION: Apply WUNDERFIXX in thicknesses from skim coat to 1/2" (1.3 cm). For thicker repairs, use appropriate Rapid Set® repair products. Consult your CTS Cement Representative for more information and training.

SURFACE PREPARATION: Application surface must be clean, sound and free from any materials that may inhibit bond, such as oil, asphalt, curing compound, acid, dirt and loose debris. Apply WUNDERFIXX to a surface that is dry or saturated with no standing water. A test area should be applied to determine suitability in the repair environment.

MIXING: The use of a drill-mounted mixing paddle is recommended. Organize work so that personnel and equipment are in place before mixing. **Use clean, potable water. WUNDERFIXX may be mixed using 6 to 8 quarts (5.7 L to 7.6 L) per 50-lb (22.7-kg) bag. Use less water to achieve higher strengths. Do not exceed 8 quarts (7.6 L) of water per bag.** For increased fluidity and workability, use Rapid Set® FLOW Control® plasticizing admixture from the Rapid Set® Concrete Pharmacy®. Place the desired quantity of mix water into the mixing container. While the mixer is running, add WUNDERFIXX. Mix for the minimum amount of time required to achieve a lump-free, uniform consistency. Do not retemper.

INSTALLATION: WUNDERFIXX has a working time of 60 minutes at a temperature of 70°F (21°C). Once in place, as the material becomes stiff (typically within 10 to 20 minutes), use a trowel to shave or cut the excess material to the desired shape. Material can be sanded, primed and painted the same day.

CURING: WUNDERFIXX does not require water curing or curing compound under moderate conditions at 70°F (21°C). In dry, windy or hot conditions, mist with water to maintain a continuously wet surface until the product has achieved sufficient strength.

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

OVERVIEW

Highlights:

- Easy To Use: Just add water, no admixtures needed
- High Performance: Patch, sand and paint the same day
- Ultra-Smooth Finish: Grit free and sandable within 24 hours
- Excellent Bond: Bonds to concrete, brick, block, plaster, tile and more
- Self-Curing Technology (SCT): No water curing needed under normal conditions

Conforms to:

ASTM C109

MasterFormat® 2016

03 01 40	Maintenance of Precast Concrete
03 01 50	Maintenance of Cast Decks and Underlayments
09 24 23	Cement Stucco

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

for cold temperatures, keep material warm, use heated mix water, and follow ACI 306 Procedures for Cold Weather Concreting.

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, pre-wet substrate (saturated surface dry), and follow ACI 305 Procedures for Hot Weather Concreting. The use of Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy® will help offset the effects of high temperatures.

YIELD & PACKAGING: Rapid Set® WUNDERFIXX® is available in 50-lb (22.7-kg) and 9-lb (4.1-kg) sizes. One 50-lb (22.7-kg) bag of WUNDERFIXX will yield approximately 115 ft^2 at 1/16".

SHELF LIFE: WUNDERFIXX has 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.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

ASTM C109 Mod.

Age	Compressive Strength
24 hours	1000 psi (6.90 MPa)
28 days	1500 psi (10.3 MPa)

All data produced at 70°F (21°C)

ONEPASS®

Patch, Sand & Paint in 90 Minutes

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® ONEPASS® Wall Repair is a high performance, fast-setting, multi-purpose wall repair material and joint compound. Durable in wet environments, ONEPASS does not promote mold and mildew growth. The formulation of ONEPASS includes premium grade hydraulic cement, high performance polymers and quality, finely ground aggregate. ONEPASS has a working time of up to 20 minutes. It may be painted in 90 minutes.

USES: ONEPASS is used for general construction and repair of wallboard, cement board, magnesium oxide board, plaster, smooth stucco, masonry, and many other surfaces. ONEPASS can also be used as a texturing material. ONEPASS is weather resistant, and durable in both interior and exterior applications.

ENVIRONMENTAL ADVANTAGES: Use ONEPASS to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your representative for LEED values and environmental information.

APPLICATION: Apply ONEPASS in thicknesses from featheredge to 1" (2.5 cm). Use screening to cover the hole and provide a backing for patches. Fill the hole with ONEPASS. This material should not be applied to substrates that may swell or deteriorate due to moisture exposure, or areas that may flex.

SURFACE PREPARATION: For repairs, application surface shall be clean, sound and free from any materials that may inhibit bond, such as oil, paint, chalk, acid, dirt and loose debris. Remove all unsound material.

MIXING: Organize work so that all personnel and equipment are in place before mixing. Use clean potable water. **ONEPASS may be mixed using one part water to two parts ONEPASS.** To increase working time, use Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy®. Place the desired quantity of mix water into the mixing container, then add the ONEPASS powder. Mix for the minimum amount of time required to achieve a lump-free, uniform consistency. Do not retemper.

PLACEMENT: Apply Rapid Set® ONEPASS with a trowel or putty knife. There is approximately 20 minutes working time at 70°F (21°C). Place quickly and cleanly to allow for maximum finishing time. Material may be sanded when dry (approximately 45 minutes after adding water). ONEPASS should not be applied if surface or ambient temperature is below 45°F (7.2°C).

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 and use heated mix water.

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. The use of SET Control retarding admixture from the Concrete Pharmacy will help offset the effects of high temperatures.

OVERVIEW

Highlights:

Fast: Apply in one coat, sand and paint in 90 minutes

Full-Depth Repair: Apply up to 1" thick. Low-shrink and crack resistant

Interior/Exterior: Water resistant, durable in wet environments

Mold Resistant: Does not promote growth of mold and mildew

Versatile: For construction and repair of dry-wall, plaster, masonry, smooth stucco, and many other surfaces. Control the set time by using hot/cold water or use Rapid Set® SET Control® additive

Tested and evaluated in accordance with:

ASTM: D3273, D3274

MasterFormat® 2016

09 24 23 Cement Stucco

09 29 00 Gypsum BoarD

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

CURING: Rapid Set® ONEPASS does not require water curing or curing compound under moderate conditions at 70°F (21°C). In dry, windy or hot conditions, mist with water to maintain a continuously wet surface until the product has achieved sufficient strength.

YIELD & PACKAGING: ONEPASS is available in 25-lb and 9-lb (11.3-kg and 4.1-kg) sizes. One 25-lb (11.3-kg) bag of ONEPASS will yield approximately 77 ft^2 (7.2 m^2) at 1/16" (0.2 cm) thick.

SHELF LIFE: ONEPASS has 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.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

FLOORING

ARCHITECTURAL
FLOORING SYSTEMS

ARCHITECTURAL FLOORING
COLOR CHART

AFSB COURSE

DATASHEETS

- LevelFlor®
- Concrete Resurfacer
- Skim Coat
- TRU® Self-Leveling
- TRU® PC
- TRU® Gray
- Acrylic Primer
- TXP Epoxy Primer
- TXP Fast Epoxy Primer

RAPID SET®
ARCHITECTURAL FLOORING SYSTEMS

DURABILITY & BEAUTY
Minimal Maintenance

When you want the most uniform and consistent polished concrete floor, TRU® Self-Leveling ensures the highest quality results on each and every flooring project. TRU is formulated with Rapid Set® Cement, giving you the best results not found elsewhere. TRU is ideal for floors that are stained, integrally colored, and decorative embedded aggregate flooring.

Why TRU® Self-Leveling?

- Specifically designed for polishing and decorative flooring applications
- Integral colors and aggregates allow for endless design possibilities
- Grinds and polishes extremely well – very little polymer means crystal clear floors (D.O.I. - Distinctive Of Image)
- Durable, one-component system
- 5000 psi (34.5 MPa) in 24 hours
- Foot traffic in 2-3 hours; coat with epoxy in 12 hours, ready for grinding in 24 hours
- More consistent flooring appearance (e.g. color, aggregate, polish, shine) and strength than traditional portland cement concrete
- Longest proven track record in polished overlays backed by years of testing
- Our floors are compliant with the National Floor Safety Institute (NFSI) and the American National Standard Institute (ANSI)
- Formulated with Rapid Set Cement

RAPID SET® ADVANCED CEMENT TECHNOLOGY

TRU® is engineered with the technically advanced Rapid Set® Cement. With Rapid Set Cement, you deliver fast, strong and durable results that are better for our environment.

	Rapid Set® Cement Concrete	Portland Cement Concrete
Structural strength	1 hour*	3 days
High traffic strength	1 day	28 days
Drying shrinkage	Reduced by 70%	Excessive
Cracking	Greatly reduced	Excessive
Sulfate attack	Resistant	Prone to
Alkali-silica reaction (ASR)	Resistant	Prone to
Carbon footprint	Reduced by 30%	Excessive
Lifetime (before needing replacement)	80 years	20-40 years

** After final set*

HIGH CLARITY FLOORS
FAST FLOORING SOLUTION

With our complete fast track flooring system, you can create the ultimate polished floor.

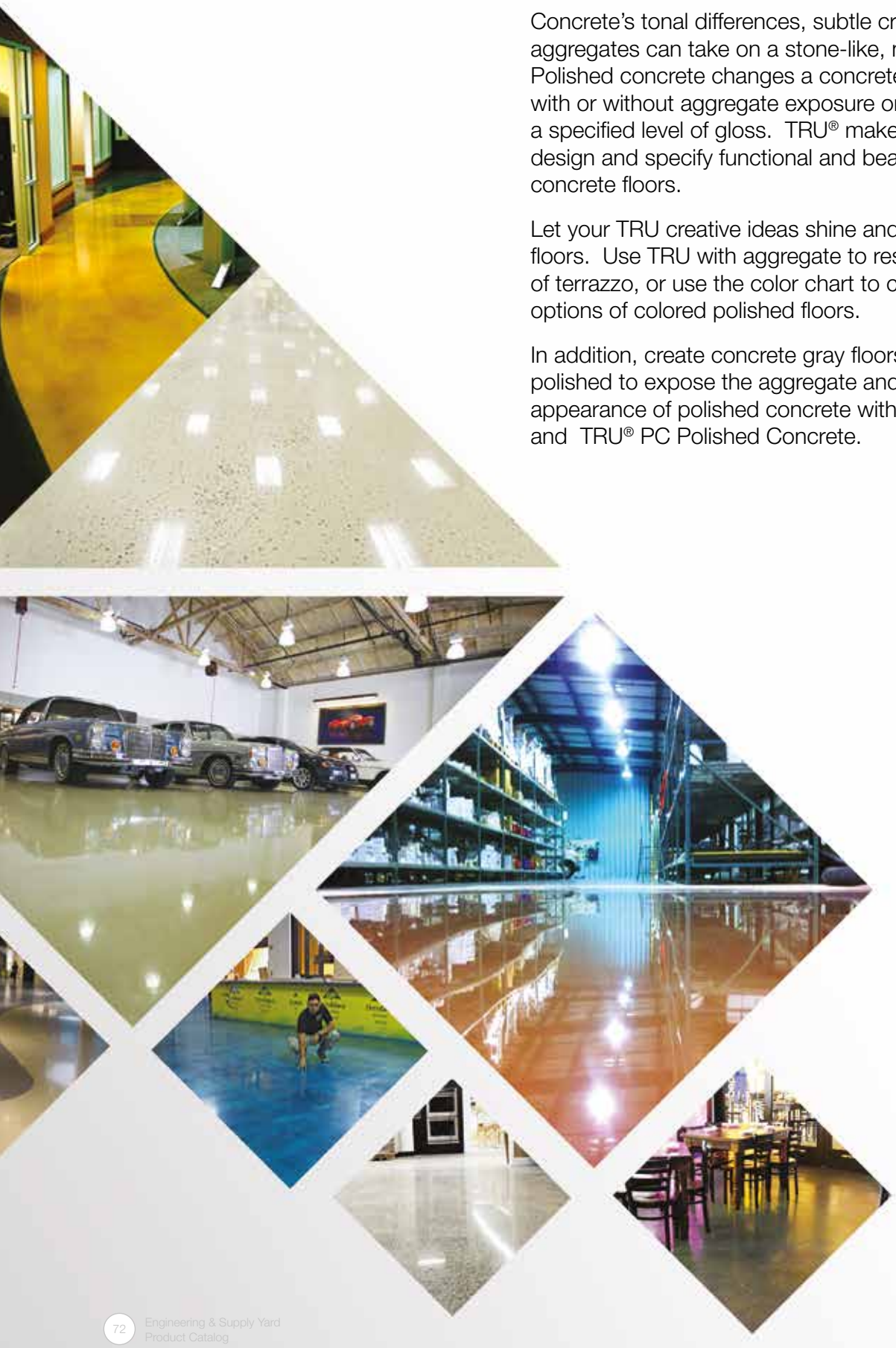
Because TRU® contains just trace amounts of polymer, TRU gives you high-gloss polished concrete with more clarity. Achieve high quality, high clarity, polished floors in fewer steps.

Behind schedule? No problem. Our fast-track flooring system helps you bring jobs up to speed to meet deadlines.

ESTABLISHED
PROVEN POLISHED OVERLAYS

Millions of square feet of concrete floors have been polished with TRU® flooring systems. TRU is the most established concrete overlay system across all sectors – commercial, industrial, retail and residential. TRU polished floors have been tested and have a lower slip coefficient of friction than other flooring systems. TRU meets or exceeds slip coefficient of friction by polished concrete industry standards. Building and facility owners trust TRU for their polished concrete floor needs.

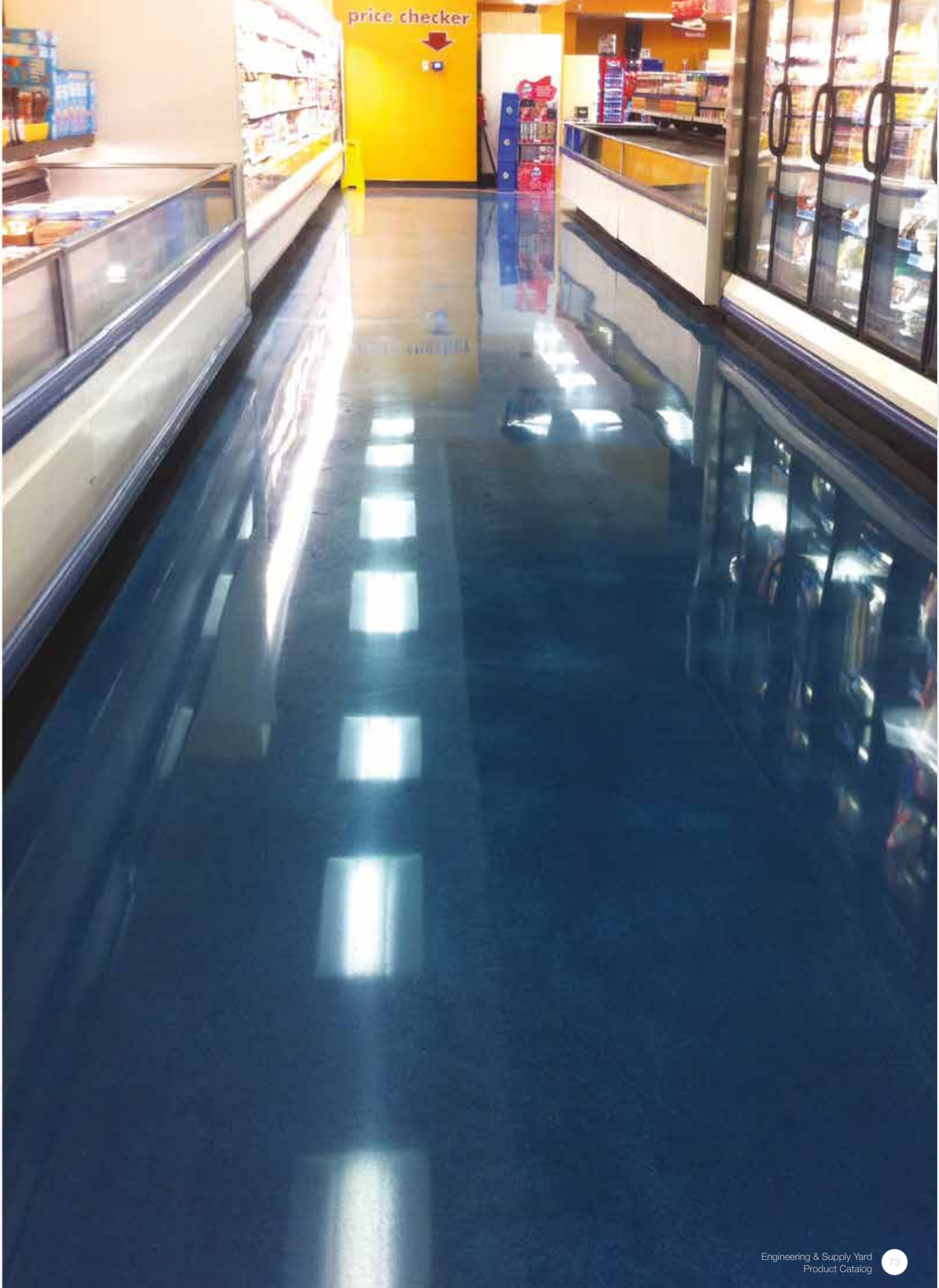
NATURAL BEAUTY FROM
POLISHED CONCRETE FLOORS



Concrete's tonal differences, subtle cracks and aggregates can take on a stone-like, natural feel. Polished concrete changes a concrete floor surface, with or without aggregate exposure or color, to achieve a specified level of gloss. TRU® makes it easy to design and specify functional and beautiful polished concrete floors.

Let your TRU creative ideas shine and sparkle in your floors. Use TRU with aggregate to resemble the look of terrazzo, or use the color chart to create unlimited options of colored polished floors.

In addition, create concrete gray floors that can be polished to expose the aggregate and simulate the appearance of polished concrete with TRU® Gray and TRU® PC Polished Concrete.


price checker

RENOWN **TRAINING SUPPORT** & **RESOURCES**

Our experts are skilled and experienced as former flooring contractors. They are on the forefront of architectural concrete floors, and know what contractors need to do to achieve the high quality, beautiful results you desire. Contractors who follow our flooring system have the highest rate of success.

TRU® has the largest preferred network of polishing contractors (and growing) ready to bring your vision to reality.

We are experienced in working on entire flooring systems with other manufacturers' equipment, tools and materials. This along with continuing education on the latest equipment, chemicals and trends, has made us the experts in the concrete flooring industry.

Receive Continuing Education Units (CEUs)

by taking the Polished Concrete Overlayments Course at www.CTScement.com/afsb

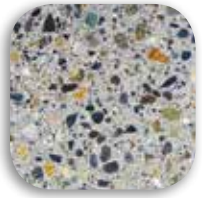
Rapid Set®

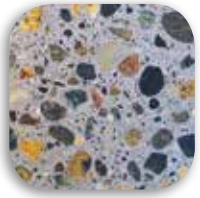
TRU® Self-Leveling Overlayments

COLOR CHART


TRU Self-Leveling
1000


TRU Gray
2000


TRU PC
3000


TRU PC with
1/4" PC Aggregate
3001

TRU® Integral Color


White 1003


Cool Gray 1170


Platinum 1171


Slate 1172


Charcoal 1174


Black 1162


Moon Rock 1152


Walnut 1234


Cappuccino 1254


Sand 1202


Gold 1092


Yellow 1102


Burnt Sienna 1024


Terra Cotta 1054


Chocolate 1084


Saddle Brown 1064


Violet 1142

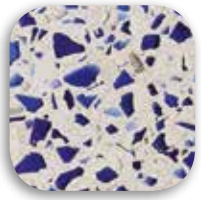

Scarlet 1112

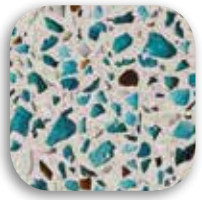

Olive Green 1192

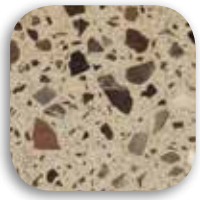

Emerald 1222


Royal Blue 1122

TRUazzo™

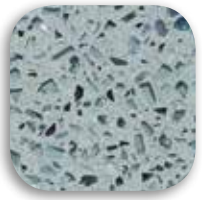

5003


5004


5005


5006


5007


5008


5013

Take the **POLISHED CONCRETE OVERLAYMENTS COURSE**
and receive Continuing Education Units (CEUs)

Visit www.CTScement.com/afsb

Learning Objectives

- Identify and recognize the characteristics of low moisture, fast curing self-leveling overlayments that can be polished to create a final finish.
- Investigate the design potential and innovative opportunities in using polished concrete overlayments in a variety of commercial, industrial, and residential buildings.
- Assess the functional contributions of polished concrete overlayments for their contributions to green and sustainable building design.
- Specify polished concrete overlayments with a variety of properties and formulate appropriate selections related to specific applications.

Credits: 1.00 HSW
Price: FREE

LEVELFLOR®

Self-Leveling Underlayment

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® LEVELFLOR® is an advanced hydraulic cement-based self-leveling underlayment that can be used both indoors and outdoors. LEVELFLOR rapidly levels, maintains workability for 20 minutes and produces a flat, strong surface with high bond strength. LEVELFLOR is designed for fast track leveling applications and can be covered with finished flooring in 4 to 16 hours at 70˚F (21˚C), depending on the flooring type. This advanced underlayment can be applied from featheredge to 2" (5.1 cm) thick and up to 5" (12.7 cm) thick when extended with aggregate. Contractors and engineers specify LEVELFLOR for self-leveling floor underlayment applications when a fast, durable and economical solution is required.

USES: Use LEVELFLOR when a high quality, fast-setting, self-leveling underlayment is needed. LEVELFLOR is ideal for all floor projects that need long flow life and working time while achieving high 24-hour strength. LEVELFLOR is an excellent choice for new floor projects and repair projects.

ENVIRONMENTAL ADVANTAGES: Use LEVELFLOR to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your Rapid Set representative for LEED values and more environmental information.

SURFACE PREPARATION: Substrate must be clean, sound concrete that is free of gypsum compounds and all materials that may inhibit bond such as: oil, curing compound, dust, mastic, bond breakers, and other surface contaminants. Concrete vapor emission rates must comply with the finished flooring manufacturer's requirements. Smooth concrete and hard-troweled surfaces must be prepared to achieve a surface profile similar to ICRI CSP 3. Mechanical methods of surface preparation, such as shot blasting, are preferred. Acid etching is not recommended. Surface must be dry and be between 50˚F and 90˚F (10˚C and 32˚C), and be properly primed. Honor all moving joints and cracks.

PRIMING: Apply Rapid Set® Acrylic Primer to all substrate surfaces prior to placement. Follow the application instructions stated on the primer product packaging.

APPLICATION: Apply LEVELFLOR up to 2" (5.1 cm) thick. For thicknesses greater than 2" (5.1 cm), extend each 50-lb (22.7-kg) bag with 25 lb (11.3 kg) of clean, dry 3/8" (0.95 cm) pea gravel. When extended with aggregate, LEVELFLOR may be placed up to 5" (12.7 cm) thick.

MIXING: Add one 50-lb (22.7 kg) bag of LEVELFLOR to 4.5 to 5 quarts (4.3 L to 4.7 L) of clean, potable water. Do not exceed 5 quarts (4.7 L) of water. LEVELFLOR may be mixed using a 1/2" drill mounted paddle mixer or by using an appropriate mixer and pump. Mix 3 to 5 minutes until the mixture is smooth and lump-free. Avoid mixers that entrap large amounts of air. Mixed LEVELFLOR should be placed within 20 minutes at 70˚F (21˚C). Maintain material temperature between 60˚F and 80˚F (16˚C and 27˚C).

PLACEMENT: When primer is completely dry, pour or pump LEVELFLOR. Use a gauge rake to place the material. Use a Rapid Set® Spiked Roller to remove any entrapped air if necessary. A smoother trowel may be used to smooth the material. LEVELFLOR can be troweled to a featheredge to match existing elevations.

OVERVIEW

Highlights:

- Interior/Exterior: Formulated with Rapid Set® hydraulic cement. Provides long-life durability in wet and dry environments
- Quick Setting: Minimizes downtime. Ready for foot traffic in 2 to 4 hours. May be used as a temporary work surface prior to installation of finished flooring
- Fast Floor Installation: Ceramic tile flooring may be placed in as little as 4 hours
- High Strength: Achieves 3000 psi (20.7 MPa) compressive strength in 24 hours and 5,000 psi (34.5 MPa) in 28 days
- Easy To Use: Just add water

Tested in accordance with:

ASTM C1708

MasterFormat® 2016

03 01 50	Maintenance of Cast Decks and Underlayment
03 54 16	Hydraulic Cement Underlayment

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

LEVELFLOR® Self-Leveling Underlayment

CURING: No curing is required under moderate conditions of 70˚F (21˚C). If used in exterior applications, apply a fine water mist to the newly hardened surface of Rapid Set® LEVELFLOR® as soon as it can be done without marring the surface and continue until one hour after final set. Avoid excessively dry, windy, hot or sunny conditions.

FLOOR COVERINGS: Ceramic tile may be placed in as little as 4 hours and other moisture insensitive flooring may be placed in 6 hours. Allow LEVELFLOR to cure for 16 hours prior to installing moisture sensitive flooring. Always follow the flooring manufacturer's recommendations for Moisture Vapor Emission Rate and retained moisture. LEVELFLOR is not designed to function as a vapor barrier. To determine if LEVELFLOR is suitable for your specific application, install and evaluate jobsite test sections using the prepared substrate and the specified finished floor.

LEVELFLOR may be used as a temporary work surface for foot traffic in 2 to 4 hours and rubber wheel traffic in 24 hours at 70˚F (21˚C). LEVELFLOR is not designed to be a permanent finished floor surface. LEVELFLOR may be used as an underlayment in moisture control systems.

YIELD & PACKAGING: LEVELFLOR is available in 50-lb (22.7 kg) polyethylene-lined bags. Coverage is 24 ft^2 to 30 ft^2 (2.2 m^2 to 2.8 m^2) at 1/4" (0.6 cm) thickness and 12 ft^2 to 15 ft^2 (1.1 m^2 to 1.4 m^2) at 1/2" (1.3 cm) thickness for flat surfaces.

SHELF LIFE: LEVELFLOR has 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.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Tested In Accordance with ASTM C1708*	
Working time	20 minutes
Flow life	15 minutes
Walk-on time	2 to 4 hours
Install moisture insensitive flooring	6 hours
Install moisture sensitive flooring	16 hours
VOC content	0 g/L

Set Time, ASTM C266*	
Initial set	2 hours

Compressive Strength, ASTM C109*	
24 hours	3000 psi (20.7 MPa)
7 days	3500 psi (24.1 MPa)
28 days	5000 psi (34.5 MPa)

Flexural Strength, ASTM C348*	
7 days	1150 psi (7.93 MPa)

*Data obtained at 70°F (21°C)

CR: CONCRETE RESURFACER

Resurface Worn, Old, Spalled Concrete

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® CR: CONCRETE RESURFACER is an advanced hydraulic cement-based polymer-modifed mortar that can be used both indoors and outdoors to resurface worn, old or spalled concrete, giving a new concrete look. CR has been specially formulated to match the color of typical portland cement concrete. Cutting-edge self-curing technology (SCT) means wet curing is not required in most applications. CR has a working time of up to 30 minutes and can receive foot traffic in as soon as 2 to 3 hours.

USES: Use CR when a new wear surface is desired to repair old, damaged or discolored concrete.

ENVIRONMENTAL ADVANTAGES: Use CR to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your CTS representative for LEED values and environmental information.

APPLICATION: Typical application thicknesses range from 1/32" to 1/8" (0.08 to 0.32 cm). In smaller areas, CR may be applied up to 1/2" (1.2 cm) thick.

SURFACE PREPARATION: Surface must be clean, sound, and free of oil, curing compound, dust, mastic and other bond breakers. Surface shall be prepared to a minimum profile of ICRI CSP 2. Mechanical methods of surface preparation such as shotblasting are preferred. Acid etching is not recommended. Surface must be dry and have a minimum temperature of 50°F (10°C).

PRIMING: Priming is not required. For porous substrates, use Rapid Set® Acrylic Primer to minimize the formation of pinholes on the surface. Follow all product application instructions.

MIXING: The use of a power-driven mechanical mixer, such as a mortar mixer or a drill-mounted mixer, is recommended. Organize work so that personnel and equipment are in place before mixing. Use clean potable water. **CR may be mixed using 2.5 to 3 quarts (2.3 L to 2.8 L) of water per 25-lb (11.3-kg) bag. Use less water to achieve higher strengths. Do not exceed 3 quarts (2.8 L) of water per bag.** Place the desired quantity of mix water into the mixing container. While the mixer is running, add material. Mix for the minimum amount of time required to achieve a lump-free, uniform consistency (usually 2 to 3 minutes). Do not retemper. Avoid mixers that entrap large amounts of air. Mixed CR should be used within 30 minutes at 70°F (21°C).

PLACEMENT: CR may be placed using traditional methods. Place quickly to allow for maximum finishing time. Once applied, typical finishing time is 5 to 10 minutes. Thinner applications will set faster. Do not wait for bleed water; apply final finish as soon as possible. CR may be troweled, floated or broom finished. Do not install on frozen surfaces.

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.

OVERVIEW

Highlights:

- Rapid strength gain
- Polymer modified
- Self-curing technology (SCT)
- Concrete gray color
- Foot traffic in 2 to 3 hours
- 30 minute working time
- Interior/exterior

Conforms to:

ASTM C109

MasterFormat® 2016

03 01 30	Maintenance of Cast-In-Place Concrete
03 01 40	Maintenance of Precast Concrete
03 01 50	Maintenance of Cast Decks and Underlayments
03 01 70	Maintenance of Mass Concrete
03 53 19	Concrete Overlayment
03 54 16	Hydraulic Cement Underlayment

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

CR: CONCRETE RESURFACER Resurface Worn, Old, Spalled Concrete

WARM WEATHER: Environmental and material temperatures above 70°F (21°C) may shorten 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. The use of Rapid Set® SET Control® set retarding admixture from the Rapid Set® Concrete Pharmacy® will help offset the effects of high temperatures.

CURING: Rapid Set® CR: CONCRETE RESURFACER does not require water curing or curing compound under moderate conditions at 70°F (21°C). In dry, windy or hot conditions, mist with water to maintain a continuously wet surface until the product has achieved sufficient strength. CR cures to a light gray color. Walk on time is approximately 2 to 3 hours.

YIELD & PACKAGING: One 25-lb (11.3 kg) bag of CR will yield approximately 0.24 ft^3. The coverage is approximately 75 ft^2 (6.97 m^2) at 1/16" (0.16 cm) depth or 150 ft^2 (13.93 m^2) at 1/32" (0.08 cm) depth. Coverage may vary due to jobsite conditions.

SHELF LIFE: CR has 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.

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

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Compressive Strength, ASTM C109 Mod.**	
24 hours	2000 psi (13.8 MPa)
28 days	4000 psi (27.6 MPa)

**Data obtained at 3 quarts of water.
All data produced at 70°F (21°C).

SKIM COAT

For Patching, Skim Coating & Underlayments

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® SKIM COAT is a smooth (unsanded), fast curing, hydraulic cement-based floor underlayment. Use under flooring for concrete repairs, patching and skim coating on interior and exterior projects. Apply from featheredge to 1" (2.5 cm).

USES: Use SKIM COAT to repair, level and smooth concrete substrates prior to the installation of floor coverings such as VCT, sheet vinyl, carpet, tile, pavers, and other protective toppings.

ENVIRONMENTAL ADVANTAGES: Use SKIM COAT to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your representative for LEED values and environmental information.

APPLICATION: Apply SKIM COAT in thicknesses from featheredge to 1" (2.5 cm). Most floor coverings can be installed over SKIM COAT in as little as 1 hour. Coatings and epoxy toppings can be applied over SKIM COAT in 16 hours. Please comply with instructions from the floor covering manufacturer regarding substrate moisture and moisture testing. For sections deeper than 1" (2.5 cm), use Rapid Set® Cement All®, Rapid Set® Mortar Mix or Rapid Set® Concrete Mix. Conduct a minimum of one field test using the prepared substrate and finished floor covering to evaluate the suitability of the materials and procedures.

SURFACE PREPARATION: Application surfaces must be clean, sound and free from any materials that may inhibit bond, such as oil, dirt, mastic, asphalt, sealing compounds, acids, wax and loose debris. Smooth concrete surfaces should be mechanically abraded by scarifying, grinding, shot blasting or other approved methods. Acid etching is not recommended. Do not use solvents or adhesive removers as means of cleaning the substrate. Application surface must be between 50°F (10°C) and 90°F (32°C). In temperatures above 80°F (27°C), pre-wet the substrate with water before applying SKIM COAT. Honor all moving joints and cracks.

MIXING: Mix using a 1/2" drill with a mixing paddle or a margin trowel for small jobs. **Use 4 quarts (3.8 L) of clean water per 20-lb (9.1-kg) bag.** Place water in the mixing container. While mixing, add SKIM COAT. Mix for the minimum amount of time required to achieve a lump-free, uniform consistency (usually 1 to 3 minutes). Do not add additional water after initial mixing. For increased fluidity and workability, use Rapid Set® FLOW Control® plasticizing admixture from the Rapid Set® Concrete Pharmacy®. Contact CTS Cement for more information about the use of these additives.

PLACEMENT: Organize work so that all personnel and equipment are ready before placement. After mixing, place, consolidate and screed quickly to allow for maximum finishing time. Trowel and/or float to achieve desired finish as soon as possible. Do not install on frozen surfaces. To extend working time, use Rapid Set® SET Control® retarding admixture from the Concrete Pharmacy or cold mix water. SKIM COAT may be applied in temperatures ranging from 50°F (10°C) to 90°F (32°C). The working time of SKIM COAT is approximately 15 to 20 minutes at 70°F (21°C) ambient temperature.

OVERVIEW

Highlights:
Excellent Bond: Bonds to concrete, brick, block and more
Versatile: Apply featheredge to 1" (2.5 cm)
Fast Setting: Workable for 20 minutes; walk on in 1 hour
Interior/Exterior: Mold and mildew resistant
Easy To Use: Just add water; no primer or curing compound required

MasterFormat® 2016	
03 01 30	Maintenance of Cast-in-Place Concrete
03 01 50	Maintenance of Cast Decks and Underlayment
03 54 16	Hydraulic Cement Underlayment

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

SKIM COAT For Patching, Skim Coating & Underlayments

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.

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. The use of Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy® will help offset the effects of high temperatures.

CURING: Rapid Set® SKIM COAT does not require water curing or curing compound under moderate conditions at 70°F (21°C). In dry, windy or hot conditions, mist with water to maintain a continuously wet surface until the product has achieved sufficient strength.

YIELD & PACKAGING: SKIM COAT is available in 20-lb (9.1-kg) bags. One 20-lb bag will yield approximately 67 ft^2 (6.2 m^2) at 1/8" (0.3 cm) depth or 33 ft^2 (3.1 m^2) at 1/4"(0.6 cm) depth. Coverage may vary due to jobsite conditions.

SHELF LIFE: SKIM COAT has 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.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Set Time, ASTM C191 Mod.	
Initial set	25 minutes
Final set	40 minutes

Compressive Strength, ASTM C109 Mod.	
3 hours	1000 psi (6.9 MPa)
24 hours	1500 psi (10.3 MPa)
7 days	2000 psi (13.8 MPa)
28 days	3000 psi (20.7 MPa)

All data produced at 70°F (21°C)

TRU® SELF-LEVELING

High Performance Architectural Topping

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® TRU® SELF-LEVELING is a high performance architectural topping and resurfacer that can be used indoors and outdoors. TRU rapidly levels, maintains workability for 20 minutes, and produces a smooth, strong surface with high-bond strength. TRU is ready for foot traffic in 2 to 3 hours and ready for coatings in 12 hours. As an interior and exterior product, TRU is durable in wet or dry conditions.

USES: Use TRU for finished floors in commercial, institutional and recreational facilities.

ENVIRONMENTAL ADVANTAGES: Use TRU to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your representative for LEED values and environmental information.

APPLICATION: Apply TRU when a high quality, fast, polishable topping is required. TRU is ideal for projects that need long flow life and working time while achieving high early strength. TRU cures to a natural (off-white) color. A customized appearance can be achieved by adding integral colors and/or decorative aggregate. Protective coatings, sealers or epoxies can be applied per the manufacturer's recommendations after 12 hours.

SURFACE PREPARATION: Substrate must be clean, sound concrete that is free of gypsum compounds and all materials that may inhibit bond such as: oil, curing compound, dust, mastic, bond breakers, and other surface contaminants. Mechanical methods of surface preparation such as shot blasting are preferred. Surface must be ICRI CSP 3 to 5. Acid etching the substrate is not recommended. Surface must be dry and be properly primed. Surface and ambient temperatures must be between 50°F to 90°F (10°C to 32°C).

PRIMING: When placing TRU as a decorative topping, Rapid Set® TXP™ or Rapid Set® TXP™ FAST epoxy primer with sand broadcast to refusal is the preferred method of priming. When TRU is not being placed as a decorative topping, Rapid Set® Acrylic Primer may be applied to the prepared concrete substrate. Follow all product specifications and instructions.

MIXING: Add one bag of TRU to 4.0 to 4.5 quarts (3.8 to 4.3 L) of clean, potable water. Mix 3 to 5 minutes until the mixture is smooth and lump-free. Avoid mixers that entrap large amounts of air. Mixed TRU should be used within 20 minutes at 70°F (21°C). Maintain material temperature between 60°F and 80°F (16°C and 27°C). **Do not exceed 4.5 quarts (4.3 L) per bag.**

PLACEMENT: Arrange work area to permit continuous placement without cold joints. Pour or pump the TRU onto the prepared and primed substrate with a minimum thickness of 1/8" (3 mm) over the highest point. A minimum of 3/8" thickness (10 mm) is required for polished flooring. Please refer to CTS Technical Bulletins for more information. All existing joints and moving cracks must be honored up through the topping. TRU will flow and level out within its 15 minute flow life. Use a gauge rake to coax the material into place as required. Use a Rapid Set® Spiked Roller to remove any entrapped air. For thicknesses greater than 1.5" (3.8 cm), extend each 50-lb (22.7-kg) bag of TRU with 25 lbs (11.3 kg) of clean, dry 3/8" (10 mm) pea gravel.

CURING: No wet curing is required under normal conditions at 70°F (21°C). If used in exterior applications, apply a fine water mist to the newly hardened surface of TRU as soon as it can be done without marring the surface, and continue until one hour after final set. Avoid excessively dry, windy, hot or sunny conditions.

Adhesives, thin set or paint can be applied after 6 hours. If used as a topping that will receive traffic, a high-quality sealer or epoxy can be applied per the manufacturer's recommendations after 12 hours.

OVERVIEW

Highlights:

- Decorative: Designed specifically for polishing and decorative flooring applications
- Outstanding Clarity & Gloss: Highly polishable due to low polymer content and high density
- Versatile: Use as a topping, resurfacer or underlayment, incorporate colors and aggregates to create numerous design possibilities
- Fast Track: Foot traffic in 2 to 3 hours, coatings in 12 hours, grind and polish in 24 hours
- High Strength: 5000 psi (34.5 MPa) in 24 hours, 6500 psi (44.8 MPa) in 28 days
- Interior/Exterior: Durable in dry and wet areas

Tested in accordance with:

ASTM C1708

MasterFormat® 2016

03 01 50	Maintenance of Cast Decks and Underlayment
03 53 19	Concrete Overlayment
03 54 16	Hydraulic Cement Underlayment

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

POLISHING: Rapid Set® TRU® SELF-LEVELING may be polished after 24 hours at normal conditions. TRU grinds and polishes much like concrete and can achieve a very high gloss and Distinctness-of-Image (DOI) due to its high density and low polymer content. Polishing any topping requires a high degree of experience and craftsmanship. Contact CTS Cement for a list of approved installers.

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.

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.

YIELD & PACKAGING: TRU is available in 50-lb (22.7-kg) polyethylene-lined bags. Yield is 0.45 ft^3 per 50-lb (22.7-kg) bag. Coverage is 15 ft^2 to 16 ft^2 (1.4 m^2 to 1.5 m^2) at 3/8" (10 mm) thickness and 11 ft^2 to 12 ft^2 (1.02 m^2 to 1.11 m^2) at 1/2" (13 mm) thickness for flat surfaces.

SHELF LIFE: TRU has 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.

USER RESPONSIBILITY: TRU GRAY is a rigid, non-structural topping. It is not possible to predict the appearance of micro-cracking in a non-structural topping and such overlayments may not be capable of restraining movement from the substrate. Reflective cracks may appear due to vibration, substrate flexure or existing joints and cracks. TRU GRAY is designed as a wear surface for foot traffic, forklift traffic or other rubber-wheeled traffic. The result of highly localized imposed loads, such as steel or hard-plastic wheeled traffic, heavy metal equipment, or pallets with protruding nails, may cause abrasion or gouging to the flooring surfaces. Due to its cementitious nature, TRU GRAY cannot be completely homogenous in appearance and optical variations to the finished floor should be expected. TRU GRAY is not recommended in locations subjected to freezing temperatures or where deicing salts will be used.

Before using CTS products, read current technical data sheets, bulletins, product labels and safety data sheets at www.CTScement.com. It is the user's responsibility to review instructions and warnings for any CTS products prior to use.

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Working time	20 minutes
Flow life	15 minutes

Compressive Strength, ASTM C109 Mod.*	
4 hours	3000 psi (20.7 MPa)
24 hours	5000 psi (34.5 MPa)
28 days	6500 psi (44.8 MPa)

Slant Shear Bond Strength, ASTM C882 Mod.*	
7 days	2100 psi (14.5 MPa)
28 days	2900 psi (20.0 MPa)

Tensile Strength, ASTM C307*	
7 days	210 psi (1.44 MPa)
28 days	365 psi (2.51 MPa)

Flexural Strength, ASTM C348*	
24 hours	850 psi (5.86 MPa)
28 days	1900 psi (13.1 MPa)

*Data obtained at 70°F (21°C)

TRU® PC POLISHED CONCRETE

High Performance, Self-Leveling Topping

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® TRU® PC POLISHED CONCRETE is an advanced, professional grade, hydraulic cement-based, self-leveling topping. It can be ground and polished to expose the aggregate and simulate the appearance of polished concrete. TRU PC levels rapidly, maintains workability for up to 20 minutes, produces a dense surface, and has high bond strength. TRU PC is ready for foot traffic in 2 to 3 hours. As an interior and exterior product, TRU PC is durable in wet or dry conditions.

USES: Use TRU PC for polished concrete floors in schools, airports, warehouses, retail, restaurants, lobbies, and more.

ENVIRONMENTAL ADVANTAGES: Use TRU PC to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your representative for LEED values and environmental information.

APPLICATION: Use TRU PC when a high quality, fast, polishable concrete topping is required. TRU PC is ideal for projects that need long flow life and working time while achieving high early strength. TRU PC cures to a gray color with the appearance of concrete. Protective coatings, sealers or epoxies can be applied per the manufacturer's recommendations after 12 hours.

SURFACE PREPARATION: Substrate must be clean, sound concrete that is free of gypsum compounds and all materials that may inhibit bond such as: oil, curing compound, dust, mastic, bond breakers, and other surface contaminants. Mechanical methods of surface preparation such as shot blasting are preferred. Surface shall be ICRI CSP 3 to 5. Acid etching the substrate is not recommended. Surface must be dry and be properly primed. Surface and ambient temperatures shall be between 50°F to 90°F (10°C to 32°C).

PRIMING: Use Rapid Set® TXP™ or Rapid Set® TXP™ Fast epoxy primers with sand broadcast to refusal. Follow all product specifications and instructions.

MIXING: For each bag of TRU PC use 3.75 to 4.0 quarts (3.5 L to 3.8 L) of potable water. For polished floors, use less water to achieve maximum aggregate exposure with minimal grinding. Start with 3.75 quarts (3.5 L) per bag. Add the measured amount of water to the mixing container. While the mixer is running, add TRU PC. Additional water may be added if necessary. **Do not exceed 4.25 quarts (4.0 L) per bag.**

Multi-bag batches produce more uniform results. For 5-bag batches, use 18.75 quarts (17.7 L) of water in the appropriate sized batch mixer. Mix using a helix style mixing paddle. After the final bag is added to the batch, mix an additional 2 to 3 minutes until the mixture is lump-free. If additional flow is required, add 0.5 quart (0.5 L) increments of water and check the flow. Do not exceed 21.25 quarts (20.1 L) per 5 bags. Avoid mixers that entrap large amounts of air. Mixed TRU PC should be placed within 20 minutes. Maintain material temperature between 60°F (16°C) and 80°F (27°C).

PLACEMENT: Arrange work area to permit continuous placement without cold joints. Place the TRU PC onto the prepared and primed substrate with a minimum thickness of 3/8" (10 mm). For floors subjected to high-load, rubber-wheeled traffic, TRU PC must be applied at a minimum thickness of 1/2" (13 mm). All existing joints and moving cracks must be honored up through the topping. TRU PC will flow and level out within its 15 minute flow life. Use a gauge rake to coax the material into place as required. Immediately after placement, use a Rapid Set® TRU PC Spiked Roller to remove any entrapped air. A smoother may be used on the surface.

OVERVIEW

Highlights:

- Polished Concrete Appearance: A high-flow topping that simulates polished concrete
- Outstanding Clarity & Gloss: Highly polishable due to low polymer content and high density
- Fast Track: Foot traffic in 2 to 3 hours, grind wet or dry in 24 hours, apply coatings in 12 hours
- High Strength: 5000 psi (34.5 Mpa) in 24 hours, 7000 psi (48.3 Mpa) in 28 days
- Interior/Exterior: Durable in dry and wet areas

Tested in accordance with:

ASTM C1708

MasterFormat® 2016

03 01 50	Maintenance of Cast Decks and Underlayment
03 53 19	Concrete Overlayment
03 54 16	Hydraulic Cement Underlayment

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

TRU® PC POLISHED CONCRETE High Performance, Self-Leveling Topping

CURING: No wet curing is required under normal conditions at 70°F (21°C). If used in exterior applications, apply a fine water mist to the newly hardened surface of Rapid Set® TRU PC POLISHED CONCRETE as soon as it can be done without marring the surface, and continue until one hour after final set. Avoid excessively dry, windy, hot or sunny conditions.

POLISHING: TRU PC may be polished after 24 hours at normal conditions. TRU PC grinds and polishes much like concrete and can achieve a very high gloss and Distinctness-of-Image (DOI) due to its high density and low polymer content. Polishing any topping requires a high degree of experience and craftsmanship. Contact CTS Cement for a list of approved installers.

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.

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.

YIELD & PACKAGING: TRU PC is available in 60-lb (27.2-kg) polyethylene-lined bags. Yield is 0.5 ft^3 (0.01 m^3) per 60-lb (27.2-kg) bag. Coverage is approximately 16 ft^2 (1.5 m^2) at 3/8" (10 mm) thickness or 12 ft^2 (1.1 m^2) at 1/2" (13 mm) thickness for flat surfaces.

SHELF LIFE: TRU PC has 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.

USER RESPONSIBILITY: TRU PC is a rigid, non-structural topping. It is not possible to predict the appearance of micro-cracking in a non-structural topping and such overlayments may not be capable of restraining movement from the substrate. Reflective cracks may appear due to vibration, substrate flexure or existing joints and cracks. TRU PC is designed as a wear surface for foot traffic, forklift traffic or other rubber-wheeled traffic. The result of highly localized imposed loads, such as steel or hard-plastic wheeled traffic, heavy metal equipment, or pallets with protruding nails, may cause abrasion or gouging to the flooring surfaces. TRU PC is designed to have a non-uniform appearance and optical variations to the finished floor should be expected. TRU PC is not recommended in locations subjected to freezing temperatures or where deicing salts will be used.

Before using CTS products, read current technical data sheets, bulletins, product labels and safety data sheets at www.CTScement.com. It is the user's responsibility to review instructions and warnings for any CTS products prior to use.

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Working time	20 minutes
Flow life	15 minutes

Compressive Strength, ASTM C109*	
4 hours	2800 psi (19.3 MPa)
24 hours	5000 psi (34.5 MPa)
28 days	7000 psi (48.3 MPa)

*Data obtained at 70°F (21°C)

TRU® GRAY SELF-LEVELING

High Performance Architectural Topping

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® TRU® GRAY SELF-LEVELING is a high performance, architectural topping and resurfacer that can be used indoors and outdoors, in wet or dry environments. TRU GRAY rapidly levels, maintains workability for 20 minutes, and produces a smooth, strong surface with high-bond strength. TRU GRAY is ready for foot traffic in 2 to 3 hours.

USES: Use TRU GRAY for finished floors in commercial, institutional and recreational facilities.

ENVIRONMENTAL ADVANTAGES: Use TRU GRAY to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your representative for LEED values and environmental information.

APPLICATION: Apply TRU GRAY when a high quality, fast, polishable, cement gray topping is required. TRU GRAY is ideal for projects that need long flow life and working time while achieving high early strength. A customized appearance can be achieved by adding decorative aggregate. Protective coatings, sealers or epoxies can be applied per the manufacturer's recommendations after 12 hours.

SURFACE PREPARATION: Substrate must be clean, sound concrete that is free of gypsum compounds and all materials that may inhibit bond such as: oil, curing compound, dust, mastic, bond breakers, and other surface contaminants. Mechanical methods of surface preparation such as shot blasting are preferred. Surface must be ICRI CSP 3 to 5. Acid etching the substrate is not recommended. Surface must be dry and be properly primed. Surface and ambient temperatures must be between 50°F (10°C) and 90°F (32°C).

PRIMING: When placing TRU GRAY as a decorative topping, Rapid Set® TXP™ or Rapid Set® TXP™ FAST epoxy primers with sand broadcast to refusal is the preferred method of priming. When TRU GRAY is not being placed as a decorative topping, Rapid Set® Acrylic Primer may be applied to the prepared concrete substrate. Follow all product specifications and instructions.

MIXING: Add one bag of TRU GRAY to 4.0 to 4.5 quarts (3.8 to 4.3 L) of potable water. Mix 3 to 5 minutes until the mixture is smooth and lump-free. Avoid mixers that entrap large amounts of air. Mixed TRU GRAY should be used within 20 minutes at 70°F (21°C). Maintain material temperature between 60°F (16°C) and 80°F (27°C). **Do not exceed 4.5 quarts (4.3 L) per bag.**

PLACEMENT: Arrange work area to permit continuous placement without cold joints. Pour or pump the TRU GRAY onto the prepared and primed substrate with a minimum thickness of 1/8" (3 mm) over the highest point. A minimum of 3/8" thickness (10 mm) is required for polished flooring. Please refer to CTS Technical Bulletins for more information. All existing joints and moving cracks must be honored up through the topping. TRU GRAY will flow and level out within its 15 minute flow life. Use a gauge rake to coax the material into place as required. Use a Rapid Set® Spiked Roller to remove any entrapped air. For thicknesses greater than 1.5" (3.8 cm), extend each 50-lb (22.7-kg) bag of TRU GRAY with 25 lbs (11.3 kg) of clean, dry 3/8" (10 mm) pea gravel.

CURING: No wet curing is required under normal conditions at 70°F (21°C). If used in exterior applications, apply a fine water mist to the newly hardened surface of TRU GRAY as soon as it can be done without marring the surface, and continue until one hour after final set. Avoid excessively dry, windy, hot or sunny conditions. Adhesives, thin set or paint can be applied after 6 hours. If used as a topping that will receive traffic, a high-quality sealer or epoxy can be applied per the manufacturer's recommendations after 12 hours.

OVERVIEW

Highlights:

- Decorative: Designed specifically for polishing and decorative flooring applications
- Outstanding Clarity & Gloss: Highly polishable due to low polymer content and high density
- Versatile: Use as a topping, resurfacer or underlayment, incorporate aggregates to create numerous design possibilities
- Fast Track: Foot traffic in 2 to 3 hours, coatings in 12 hours, grind and polish in 24 hours
- High Strength: 5000 psi (34.5 MPa) in 24 hours, 6500 psi (44.8 MPa) in 28 days
- Interior/Exterior: Durable in dry and wet areas

Tested in accordance with:

ASTM C1708

MasterFormat® 2016

03 01 50	Maintenance of Cast Decks and Underlayment
03 53 19	Concrete Overlayment
03 54 16	Hydraulic Cement Underlayment

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

TRU® GRAY SELF-LEVELING High Performance Architectural Topping

POLISHING: Rapid Set® TRU® GRAY SELF-LEVELING may be polished after 24 hours at normal conditions. TRU GRAY grinds and polishes much like concrete and can achieve a very high gloss and Distinctness-of-Image (DOI) due to its high density and low polymer content. Polishing any topping requires a high degree of experience and craftsmanship. Contact CTS Cement for a list of approved installers.

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.

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.

YIELD & PACKAGING: TRU GRAY is available in 50-lb (22.7-kg) polyethylene-lined bags. Yield is 0.45 ft^3 per 50-lb (22.7-kg) bag. Coverage is 15 ft^2 to 16 ft^2 (1.4 m^2 to 1.5 m^2) at 3/8" (10 mm) thickness and 11 ft^2 to 12 ft^2 (1.02 m^2 - 1.11 m^2) at 1/2" (13 mm) thickness for flat surfaces.

SHELF LIFE: TRU GRAY has 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.

USER RESPONSIBILITY: TRU GRAY is a rigid, non-structural topping. It is not possible to predict the appearance of micro-cracking in a non-structural topping and such overlayments may not be capable of restraining movement from the substrate. Reflective cracks may appear due to vibration, substrate flexure or existing joints and cracks. TRU GRAY is designed as a wear surface for foot traffic, forklift traffic or other rubber-wheeled traffic. The result of highly localized imposed loads, such as steel or hard-plastic wheeled traffic, heavy metal equipment, or pallets with protruding nails, may cause abrasion or gouging to the flooring surfaces. Due to its cementitious nature, TRU GRAY cannot be completely homogenous in appearance and optical variations to the finished floor should be expected. TRU GRAY is not recommended in locations subjected to freezing temperatures or where deicing salts will be used.

Before using CTS products, read current technical data sheets, bulletins, product labels and safety data sheets at www.CTScement.com. It is the user's responsibility to review instructions and warnings for any CTS products prior to use.

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Working time	20 minutes
Flow life	15 minutes

Compressive Strength, ASTM C109 Mod.*	
4 hours	3000 psi (20.7 MPa)
24 hours	5000 psi (34.5 MPa)
28 days	6500 psi (44.8 MPa)

Slant Shear Bond Strength, ASTM C882 Mod.*	
7 days	2100 psi (14.5 MPa)
28 days	2900 psi (20.0 MPa)

Tensile Strength, ASTM C307*	
7 days	210 psi (1.44 MPa)
28 days	365 psi (2.51 MPa)

Flexural Strength, ASTM C348*	
24 hours	850 psi (5.86 MPa)
28 days	1900 psi (13.1 MPa)

*Data obtained at 70°F (21°C)

ACRYLIC PRIMER

High-Adhesion Acrylic Primer

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® ACRYLIC PRIMER is a concentrated acrylic primer that improves the adhesion of Rapid Set self-leveling flooring products to prepared concrete. ACRYLIC PRIMER acts to prevent pinholes from forming in the finished surface.

SURFACE PREPARATION: ACRYLIC PRIMER is intended for use on prepared concrete. Surface must be dry, porous, clean, sound, and free of oil, curing compounds, dust, mastic and other bond breakers. Mechanically profile the surface by shot blasting or grinding. Acid etching the concrete surface is not recommended.

MIXING & APPLICATION: Shake well to ensure there is no sediment in the container bottom and to thoroughly mix the primer. Mix with water at low speed using a drill and paint mixer in a clean container.

For normal concrete, mix at a ratio of 1 part primer to 1 part water. Excessively absorbent concrete surfaces require multiple coats with the first coat mixed at 1 part primer to 3 parts water. Additional coats must be mixed at 1 part primer to 1 part water. Allow each coat to dry and become tack free. Repeat as necessary until the final coat of primer stays wet for at least 20 minutes. Lower temperatures and/or higher humidity will extend drying time.

Apply primer to substrate and work into the concrete surface with a soft-bristle push broom. Paint roller or spray application will not achieve sufficient coverage. Spread evenly to avoid puddles and to thoroughly coat the surface. Maintain material, surface, and ambient temperatures above 50°F (10°C).

Apply Rapid Set® self-leveling flooring products when the primer is thoroughly dry. If more than 24 hours have elapsed, reapply primer.

COVERAGE & PACKAGING: ACRYLIC PRIMER is available in 1-gallon bottles. Coverage is about 400 ft^2 to 600 ft^2 per gallon.

SHELF LIFE: ACRYLIC PRIMER has a shelf life of 2 years the from date of manufacture if when stored properly in a dry location, protected from moisture, out of direct sunlight, and in an undamaged package. Do not allow material to freeze.

USER RESPONSIBILITY: Before using CTS products, read current technical data sheets, bulletins, product labels and safety data sheets at www.CTScement.com. It is the user's responsibility to review instructions and warnings for any CTS products prior to use. Acrylic Primer is not for use in wet environments or on substrates that have a Moisture Vapor Emission Rate greater than 5 lbs. per 1000 sq. ft. in 24 hours or relative humidity greater than 79%.

OVERVIEW

Highlights:

Improves Adhesion: Seals porous concrete to prevent pinholes

Coverage: 400 ft^2 to 600 ft^2

MasterFormat® 2016

03 05 00	Concrete Bonding Agents, Admixtures and Adhesives

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

ACRYLIC PRIMER High-Adhesion Acrylic Primer

WARNING: AVOID CONTACT WITH EYES AND SKIN. Close container after each use. Do not reuse container. Dispose of container and primer residue in accordance with federal, state and local waste disposal regulations. Do not flush primer down drains, sewers or waterways. Carefully read and follow all cautions and warnings on product label. For complete safety information, please refer to product SDS available at www.CTScement.com. If material comes in contact with eyes, flush with cool, clean water for 15 minutes with eyes open. If irritation persists, consult a physician. If material comes in contact with skin, wash thoroughly with soap and water. If irritation persists, consult a physician. Always use in a well-ventilated area. Avoid inhalation. KEEP OUT OF REACH OF CHILDREN. Acrylic Primer is non-toxic, non-explosive and non-flammable.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Properties
Extend with water
Accepts topping in 3 to 24 hours
Light blue color

Thickness
2 mils

Yield	
1 gallon	400 ft^2 to 600 ft^2

Data obtained at flow consistency at 70°F (21°C)

TXP™ FAST TRU® EPOXY PRIMER

Two Component, Alkali Resistant Epoxy Primer

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® TXP™ FAST is a 100% solids, high performance, fast-setting, zero VOC epoxy primer. It is designed for use as part of a Rapid Set® TRU® finished flooring system. With TXP FAST, the overlayment may be placed in as little as 6 hours. It has been specially formulated to have excellent substrate wetting capabilities to promote penetration and adhesion. TXP FAST is moisture tolerant and resistant to elevated pH levels. It is not designed to be a moisture vapor barrier.

SURFACE PREPARATION: TXP FAST is intended for use on prepared concrete. Surface must be dry, porous, clean, sound, and free of grease, oil, curing compounds, dust, mastic and other contaminants or bond breakers. Mechanically profile the surface by shot blasting or grinding to achieve ICRI Concrete Surface Profile (CSP) 3. Acid etching the concrete surface is not permitted. Upon completion of mechanical preparation, remove all shot, dust, dirt and debris.

MIXING & APPLICATION: Remove TXP FAST Part B and the liner from the can to reveal TXP FAST Part A. Mix Part A for 2 minutes with a drill and Jiffy-type paint mixer. Then, **add the entire contents of Part B to the entire contents of Part A and mix for an additional 2 minutes. Proper proportioning and homogenization are absolutely critical for success; do not attempt to mix partial kits. Use the drill and Jiffy-type mixer to mix at slow speed (less than 500 rpm) to avoid air entrainment. Do not hand mix.** Ensure that the material from the sides and bottom of the pail has been thoroughly mixed in.

PLACEMENT: Pour the entire mixed TXP FAST kit onto the surface. Spread the TXP FAST with a squeegee to the appropriate coverage rate: 400 ft^2 to 480 ft^2 (37 m^2 to 42 m^2) at 12 mils to 10 mils (0.4 mm to 0.3 mm) thickness per kit. To achieve a uniform thickness, back roll perpendicular to the squeegee application with a 1/2" (12.7 mm) nap roller. Use a paint brush for hard to reach areas. Immediately broadcast with clean, dry silica sand (#20 or #30 mesh) to rejection (approximately 50 lbs to 75 lbs per 100 ft^2 or 2.4 kg to 3.6 kg per m^2). Sweep and vacuum to remove all loose sand after a minimum curing period of 6 hours. Areas that are bare or not seeded to rejection must be recoated. Within 24 hours, those areas may be reprimed and rebroadcast. After 24 hours, the floor must be mechanically abraded, primed, broadcast and cured prior to proceeding.

Surface and ambient temperatures must be between 40°F and 100°F (4°C and 38°C). Maintain ambient conditions for at least 72 hours after system placement.

At 70°F (21°C), Rapid Set TXP FAST has a pot life of approximately 15 minutes and a working time greater than 30 minutes. Lower temperatures will extend the pot life and may require additional mixing. Higher temperatures will shorten the pot life.

JOINTS & REPAIRS: TXP FAST should not be used in expansion joints, isolation joints, construction joints or any moving cracks. All moving joints must be honored through the finished floor and filled with an appropriate joint sealant or filler. Small dormant cracks may be filled with the TXP FAST epoxy. For spalls, prime the surface with TXP FAST. Then, fill the repair with epoxy mortar made with a mixture of 1.5 parts fine sand and 1 part TXP FAST by volume. Once the repair area has been filled, continue with the

OVERVIEW

Highlights:

- Fast Cure: Ready for overlayment in as little as 6 hours
- Easy Application: Excellent working time
- User Friendly: No volatile organic compounds (VOC)
- High Bond Strength: Exceptional adhesion to concrete substrates
- Seals Porous Concrete: Designed to prevent pinholes

Tested in accordance with:

ASTM: D2196, D2240, D695, D790

MasterFormat® 2016

03 05 00	Concrete bonding agents, admixtures and adhesives

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

TXP™ FAST TRU® EPOXY PRIMER Two Component, Alkali Resistant Epoxy Primer

application coat of the TXP FAST and subsequent system installation in accordance with product requirements.

OTHER SUBSTRATES: Rapid Set® TXP™ FAST can be used on properly prepared epoxy coatings, steel, ceramic tile, quarry tile and terrazzo. Consult CTS Cement's Technical Department for installation requirements.

CLEAN-UP: Before TXP FAST has hardened, it can be removed from tools with denatured alcohol.

COVERAGE & PACKAGING: TXP FAST is available in 3-gallon kits. Coverage is 400 ft^2 to 480 ft^2 (37 m^2 to 42 m^2) at 12 mils to 10 mils (0.4 mm to 0.3 mm) thickness. Coverage rates are approximate and will vary due to the porosity and surface profile of the concrete substrate.

SHELF LIFE: TXP FAST has a shelf life of 18 months when stored properly in a dry location, protected from moisture, out of direct sunlight, 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. It is the user's responsibility to review instructions and warnings for any CTS products prior to use. Contact CTS prior to product installation when additional information is required, or when project conditions are not in compliance with specifications and/or installation requirements.

Always comply with subsequent manufacturer's testing and installation requirements when their products are used in conjunction with Rapid Set® TRU® flooring products.

WARNING: AVOID BREATHING OF VAPORS. FORCED LOCAL EXHAUST IS RECOMMENDED TO EFFECTIVELY MINIMIZE EXPOSURE. NIOSH approved, organic vapor respirators and forced exhaust are recommended in confined areas, or when conditions (such as heated polymer, sanding) may cause high vapor concentrations. Do not weld on, burn or torch any epoxy material. Hazardous vapor is released when an epoxy is burned. Avoid skin or eye contact. Wash skin with soap and water if contact occurs. If eye contact occurs, flush with water for 15 minutes and obtain medical attention. Read and understand all cautions on container labels and safety data sheets before using this material.

Appropriate cartridge-type respirator must be used during application in confined areas. **KEEP OUT OF REACH OF CHILDREN.**

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Components	Resin and hardener
Solids content	100%
Color	Off white
Mixed viscosity (77°F, Brookfield LV-DVE), ASTM D2196	800 cP
Pot life	15 minutes
Tack-free rime	3 hours
Foot traffic	6 hours
Coverage at 10 mil	160 ft^2 per gallon

Application Conditions	
Ideal temperature	60°F to 75°F
Acceptable temperature	40°F to 100°F
Concrete pH	8-13
MVER (Wet vapor emission rate)	MVER 10 lbs/1000 sq ft per 24 hrs (ASTM F1869)
Relative humidity (RH)	100% (ASTM F2170)

Typical Characteristics	
Hardness, ASTM D2240	80 Shore D
Adhesion to Concrete	>500 psi (3.44 MPa)
Compressive strength, ASTM D695	9,850 psi (67.9 MPa)
Flexural strength, ASTM D790	9,680 psi (66.5 MPa)
VOC content	0 g/L

GROUTING

DATASHEETS

- UltraFlow® 4000/8
- CTS Construction Grout

ULTRAFLOW®

Non-Shrink Precision Grout

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® ULTRAFLOW® 4000/8 is a high-performance, non-shrink precision grout with rapid strength gain. ULTRAFLOW is a high quality blend of Rapid Set cement, additives, and specially graded sand that can be mixed to any consistency from damp pack to fluid with an extended working time to allow for large placements, but gains strength quickly and reaches 4000 psi in 8 hours. ULTRAFLOW is non-metallic and no chlorides are added. ULTRAFLOW is ideal for grouting under base plates and large machinery installations where rapid strength gain and high durability are desired.

USES: ULTRAFLOW is used for structural and non-structural applications, including precision grouting under base plates, precast components, machinery and equipment bases, keyway joints, load bearing pads, columns, anchor bolts, dowel rods and other indoor/outdoor non-shrink applications.

SURFACE PREPARATION: Concrete substrate must be clean, sound, have a rough texture with exposed aggregate, free from oil, dirt, asphalt, sealing compounds, acids, wax, and loose debris. Bolt holes must be cleaned out and grouted in advance to prevent sagging. Remove rust and scale from metal surfaces. Equipment must be secured in place to prevent movement during the grouting procedure. Substrate must be SSD (Saturated, Surface Dry). Saturate the substrate with clean water for a minimum of 4 hours and preferably 24 hours before grout placement. Remove any standing water or puddles before placement of the material. Protect baseplate and concrete base from temperature extremes, such as direct sunlight for 24 hours prior to and following grouting.

FORMS: Forms must be watertight and non-absorbent. Use polyurethane foam, putty, or caulk to seal the joints. Forms must be coated or lined with bond breaker or form release. Provide adequate vent holes to avoid air entrapment. Provide a head placement of 45 degree angle to facilitate placement for grout pour. Build forms 1" higher than bottom of plate and leave 2" to 3" between side of plate and form.

MIXING: Mix with a mechanical mortar mixer or an electric drill with a paddle device if possible. Add potable water to bucket and mechanical mixer first, then add dry grout material while mixing. Adjust water temperature to maintain mixed grout temperature from 45°F to 90°F (7°C to 32°C). Mix thoroughly for a minimum of 3 to 5 minutes. Adjust the water to achieve the desired flow consistency. Adding too much water may induce bleeding and segregation. Gauge fluid consistency within 25 to 35 seconds with ASTM C939 Flow Cone Method. ULTRAFLOW is fluid for 30 minutes and remains workable for 1 hour.

Consistency of the grout is dependent on jobsite variables such as ambient temperature, water temperature, product temperature and mixing method. .

For deep pours over 2", 3/8" pea gravel may be added but only after consulting with the CTS Cement Technical Service Department. Do not add any additional dry materials such as cement, sand, additives or admixtures.

PLACEMENT: The concrete, plate, and ambient temperatures must be from 45°F to 90°F and remain in that range until the grout has reached final set. Place grout continuously

OVERVIEW

Highlights:
Non-Shrink: Durable bearing support and load transfer
Rapid Return to Service: Exceeds 4000 psi (27.6 MPa) in 8 hours
Long Flow Life & Extended Working Time: Fluid for 30 minutes
Effective Bearing Area: 98% area provides maximum support and load transfer
Versatile: Mix to any consistency - fluid, flowable, plastic or damp pack
Freeze Thaw Resistant: Durable in the harshest climates

Conforms to:
ASTM C1107
CRD C621

MasterFormat® 2016	
03 01 60	Maintenance of Grouting
03 60 00	Grouting
03 61 00	Cementitious Grouting
03 62 13	Non-Metallic Non-Shrink Grouting

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

onto the 45 degree headbox from one side of the plate to minimize air entrapment. Rapid Set® ULTRAFLOW® 4000/8 must fill the entire space being grouted and remain in contact with the plate. Use multiple mixers if required to ensure continuous placement. It is important for the grout to extend at least 1/2-in up the edges of the plate to provide a small head pressure that will keep the grout in contact with the plate bottom. Do not vibrate the grout. The grout shoulder may be cut back as soon as the strength is sufficient to maintain its formed shape. Immediately after cut back and finishing, cover with clean wet rags until final set. Have all required tools, equipment and materials as close to the grouting area as possible.

CURING: Apply a curing compound in accordance with ASTM C309 immediately or wet cure with clean potable water on open surfaces after initial set for 6-8 hours. Once forms are removed, use preferred curing method on exposed grout surfaces. Grouted equipment may be put into service as soon as desired grout strengths are achieved.

SHELF LIFE: ULTRAFLOW 4000/8 has 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.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Set Time, ASTM C191 Mod.	
Initial set	95 minutes
Final set	150 minutes

Compressive Strength, ASTM C109 Mod.	
8 hours	4000 psi (27.6 MPa)
1 day	6500 psi (44.8 MPa)
3 days	7500 psi (51.7 MPa)
7 days	8000 psi (55.2 MPa)
28 days	8500 psi (58.6 MPa)

Slant Shear Bond, ASTM C882 per C928	
28 days	2000 psi (13.8 MPa)

Freeze-Thaw Resistance, ASTM C666	
300 Cycles	99%

All data produced at 70°F (21°C)

CONSTRUCTION GROUT

Multi-Purpose, Non-Shrink, Contractor Grade ASTM C1107 Grout
for Structural and Non-Structural Grouting

PRODUCT DATASHEET

DESCRIPTION: CTS CONSTRUCTION GROUT is a versatile, non-shrink grout that can be mixed to any consistency from damp pack to fluid. CONSTRUCTION GROUT is a high quality blend of portland cement, non-shrink additives, and specialty sand. When mixed with water, CONSTRUCTION GROUT produces a durable, high strength material that can be used for grouting and general concrete applications on interior and exterior projects. The final color of CONSTRUCTION GROUT is gray.

USES: Use CONSTRUCTION GROUT for structural and non-structural applications, including precision grouting, base plates, precast components, machinery and equipment bases, anchor bolts, concrete repair, keyway joints, load bearing pads, and other non-shrink applications.

SURFACE PREPARATION: Concrete surfaces must be clean, sound, and free from any materials that may inhibit bond such as oil, dirt, asphalt, sealing compounds, acids, wax, and loose debris. When bonding is important, all surfaces must be mechanically abraded by scarifying, grinding, shot blasting, or other approved methods. Placement area must be between 45°F to 90°F (7°C to 32°C). Saturate the substrate with clean water for a minimum of 4 hours and preferably 24 hours before grout placement. Remove any standing water or puddles before placement of the material.

FORMS: Construct forms to be watertight and non-absorbent. Joints must be sealed with polyurethane foam, caulk, or putty. Forms must be coated or lined with bond breaker or form release. Provide adequate vent holes to avoid air entrapment. Construct a head placement at a 45 degree angle to facilitate the grout pour. Build forms 1" higher than the base of the plate and 1" to 3" between all sides of the plate and form.

MIXING: The use of a power-driven mechanical mixer, such as a mortar mixer or a drill-mounted mixer, is recommended. Add potable water, then add dry grout material while mixing. Adjust water temperature to ensure the mixed grout is between 45°F and 90°F (7°C and 32°C). Mix for a minimum of 4 to 5 minutes. Working time is approximately 15-20 minutes.

Consistency of the grout is dependent on jobsite variables such as ambient temperature, water temperature, product temperature, and mixing method.

USE THE FOLLOWING MIX WATER GUIDELINES:

Plastic consistency – 5.0 quarts

Flowable consistency – 5.5 quarts

Fluid consistency – 5.75 quarts

Adjust the water to achieve the desired flow consistency. Do not exceed 6.25 quarts of water per 50-lb bag. Adding too much water may induce bleeding and segregation. Fluid consistency is achieved when the material flows through the flow cone in 25 to 35 seconds per ASTM C939.

For deep pours over 2", extension is required. Add up to 25 lbs of clean, dry 3/8" pea gravel for every 50-lb bag. If increased fluidity is needed, do not exceed an 8" slump (ASTM C143) to prevent segregation. This may require less than the stated maximum (6.25 quarts) water dosage. Do not add any additional dry materials such as cement,

OVERVIEW

Highlights:
Non-Shrink: Provides dimensional stability and enhanced durability for precision grouting and concrete application
Quick Setting: Minimizes downtime and ready for loading in 24 hours
Multi-Purpose: Use for grouting, anchoring and many general concrete applications
Mix To Any Consistency: From damp pack to fluid
High Strength: Achieves 10,000 psi (69 MPa) compressive strength in 28 days at flowable consistency
Easy To Use: Just add water

MasterFormat® 2016	
03 01 30	Maintenance of Cast-in-Place Concrete
03 01 40	Maintenance of Precast Concrete
03 01 50	Maintenance of Grouting
03 01 70	Maintenance of Mass Concrete
03 60 00	Grouting
03 61 00	Cementitious Grouting
03 62 13	Non-Metallic Non-Shrink Grouting

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

CONSTRUCTION GROUT

Multi-Purpose, Non-Shrink, Contractor Grade ASTM C1107 Grout for Structural and Non-Structural Grouting

sand, additives or admixtures.

PLACEMENT: Place grout continuously into forms in one placement. CTS CONSTRUCTION GROUT may be placed by pump. Limit the amount of vibration during grout placement to reduce potential segregation. CONSTRUCTION GROUT must fill all areas and stay in contact with load bearing area. Remove forms once grout has achieved final set. All machinery near grout placement must be shut down for 24 hours.

CURE: Use a curing compound in accordance with ASTM C309 upon final set or wet cure with clean potable water on open surfaces for three days.

YIELD & PACKAGING: CONSTRUCTION GROUT is available in 50-lb (22.7-kg) bags. One 50-lb bag will yield 0.44 ft^3 at a flowable grout consistency. Coverage may vary due to jobsite conditions.

TEMPERATURE: CONSTRUCTION GROUT may be applied in temperatures ranging from 45°F to 90°F (7°C to 32°C).

SHELF LIFE: CONSTRUCTION GROUT has 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.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Consistency	Plastic	Flowable	Fluid
Set Time, ASTM C266			
Initial set (hours)	4.5	5.5	6.5
Final set (hours)	6.5	7.5	10
Compressive Strength, ASTM C109 Mod.			
24 hours (psi)	4000 psi (27.6 MPa)	3200 psi (22 MPa)	2500 psi (17.2 MPa)
7 days (psi)	9000 psi (62 MPa)	8000 psi (55.2 MPa)	7000 psi (48.3 MPa)
28 days (psi)	11000 psi (75.8 MPa)	10000 psi (68.9 MPa)	9000 psi (62 MPa)
Post Hardened Height Expansion, ASTM C1090			
28 days	0-0.03%	0-0.03%	0-0.03%
Prehardened Height Expansion, ASTM C827			
At Final Set	0-0.30%	0-0.30%	0-0.30%

Data is obtained through laboratory conditions at 70°F

PAVEMENT & OVERLAYS

RAPID SET® BULK TECHNICAL BROCHURE

DATASHEETS

- Rapid Set® Datasheet
- DOT Repair Mix
- DOT Repair Mortar
- DOT Concrete Mix
- DOT Cement
- Low-P™ Cement
- Low-P™ FA1 Cement
- Low-P™ Repair Mortar

MAXIMIZE PERFORMANCE

WITH ADVANCED CEMENT TECHNOLOGY

Infrastructure and Transportation Product Line Overview

www.CTScement.com

Rapid Set KOMPONENT

by CTS Cement Manufacturing Corp.

MAXIMIZE PERFORMANCE & EXTEND ASSET LIFE

Concrete, the world's most widely used building material, has a proven track record of long-term performance in the development of infrastructure, commerce and many modern conveniences in today's built environment.

The current state of America's infrastructure, a well-publicized "Poor" rating for roads and bridges across the country, illustrates the precarious condition of these integral economic assets. This requires a paradigm shift in designing new structures, and in repairing and rehabilitating existing ones. Industry initiatives are focused on preventing deterioration and failure, maximizing durability and service life, and improving safety. By improving performance standards, these objectives can be achieved.

Integrating higher quality materials, design and construction methods also minimizes maintenance, repair and replacement costs, and inconveniences to commuters and businesses. This ensures wise stewardship of today's investments for tomorrow's generations, creating a safer, more sustainable built environment.

[1] ASCE 2013 Report Card for America's Infrastructure; http://www.infrastructurereportcard.org

CHANGING THE PARADIGM

The most common challenges associated with concrete deterioration and failure are related to cracking, chemical attack, and long-term durability. Traditional industry solutions designed to overcome the shortcomings of ordinary portland cement concrete can have undesirable side effects on other key performance aspects, like compressive strength and long-term dimensional stability.

The answer lies beyond ordinary portland cement and prescriptive admixtures – in advanced Rapid Set® Cement technology powered by belitic calcium sulfoaluminate (bCSA) cement. The CSA cement technology in Rapid Set® Cement, originally developed in the 1950s, is engineered to achieve significantly higher levels of performance in these three key performance areas: crack resistance, chemical resistance, and long-term durability. Today, millions of cubic yards of concrete using CSA cement technology are placed worldwide each year.

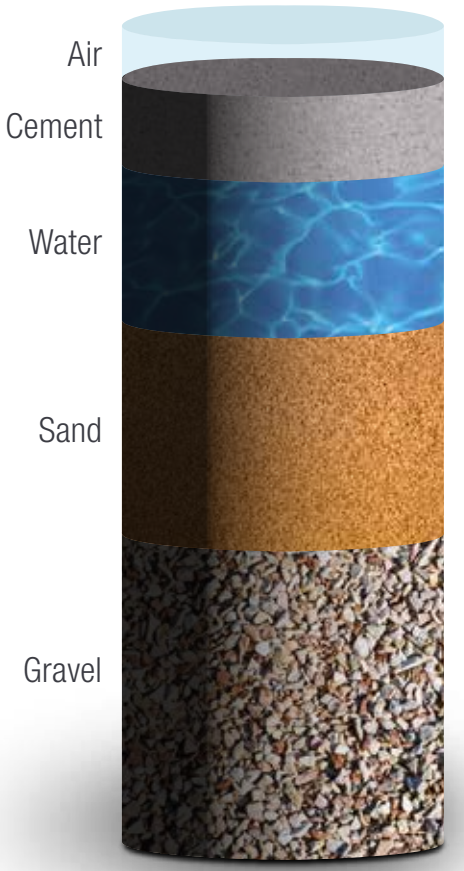
CRACKING CONCRETE

Drying shrinkage is one of the major causes of cracking in ordinary portland cement (OPC) concrete and concrete repair materials, leading to deterioration and failure. A certain amount of water (roughly 0.45 w/c ratio by weight) is required in all hydraulic cement concretes to coat the cement particles and ensure adequate fluidity for placement. When the cement particles hydrate and form cementitious compounds, some of this mix water is consumed in the associated chemical reaction. Any leftover water is termed “water of convenience” and migrates to the surface as ”bleed water". This excess water increases the w/c ratio at the surface, and creates capillary channels and voids that result in drying shrinkage, and creates points of entry for contaminants.

Rapid Set® Cement technology addresses this issue. By using a more efficient hydration mechanism when water is combined with CSA cement, over 98% of the mix water is consumed in the hydration reaction, compared to roughly 50% consumption in OPC concrete. Greater consumption of water with CSA cement minimizes “water of convenience” and the resulting drying shrinkage cracking. This produces stronger, more durable concrete and concrete repair materials. These characteristics are intrinsic to Rapid Set® Cement’s chemical composition and are achieved without supplementary cementitious materials or admixtures.

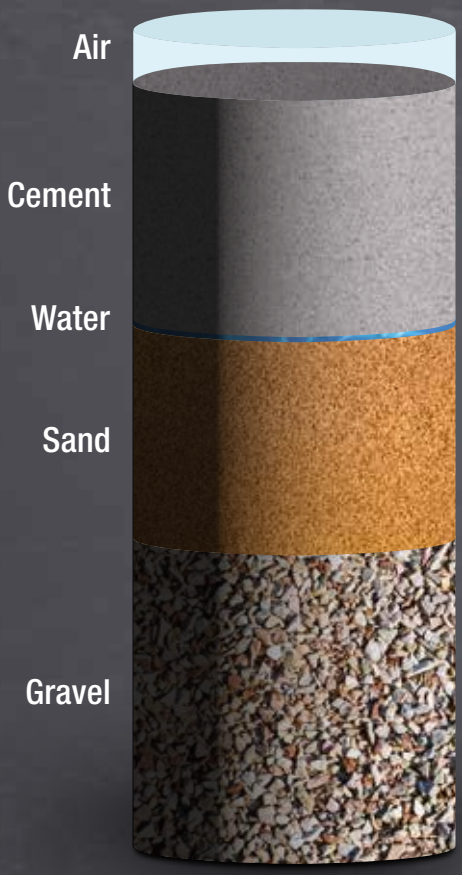
PORTLAND CEMENT CONCRETE

Only hydrates approximately 55% (0.25 w/c) of the mix water, leaving approximately 45% for evaporation



CSA CEMENT CONCRETE

Hydrates approximately 98% (0.45 w/c) of the mix water, leaving approximately 0-2% for evaporation



IMPROVE PERFORMANCE

1 Eliminates Water of Convenience

from migrating to the surface. This prevents voids and capillary channels common within OPC placements that lead to shrinkage cracking, contamination and deterioration.

2 Eliminates Curling and Warping

of concrete placements due to rapid moisture loss at slab surfaces. Preventing these common occurrences reduces corner breaks and impact spalls that occur when exposed to in-service traffic, and associated repair and maintenance costs.

3 Maintains Design Strength

throughout the concrete/concrete repair placement by eliminating a detrimental change in w/c ratio at the surface. This results in higher impact, abrasion and spall resistance.

98%

Full hydration of cement particles and efficient consumption of 98% or more of the mix water achieves key industry objectives.

PROOF POSITIVE

ASTM C1581, known as the "Ring Test", is the industry standard for determining crack resistance by quantifying the age of initial cracking of restrained concrete or mortar material. Results are based on evaluation of shrinkage, tensile strength, modulus, and tensile creep. Comparative results based on independent lab tests of Rapid Set® Concrete and a competitive portland cement/admixture mix design provide insights about the exceptional performance characteristics of CSA cement-based materials.

METHOD	TRADITIONAL OPC + ADDITIVES	RAPID SET® CONCRETE	RAPID SET® ADVANTAGES
ASTM C157 • Length Change • 3x3 Shrinkage Bars • 28 Day Water Cure • 28 Day Air Cure	Average -0.045%	Average -0.020%	Less than 1/2 the Shrinkage of OPC Concrete
ASTM C1581 • Restrained Shrinkage, Net Time to Cracking • 3 Ring Specimens • 50% RH, 73°F	Average Cracked at 8.90 Days	Average None at 90 Days	Exceptional Crack Resistance
ASTM C1581 • Restrained Shrinkage, Stress Rate • 3 Ring Specimens • 50% RH, 73°F	Average 22.53 psi/day	Average 1.66 psi/day	14x Lower Stress Rate
ASTM C1581 • Restrained Shrinkage, Cracking Potential • 3 Ring Specimens • 50% RH, 73°F	Moderate to High	Low	Exceptional Crack Resistance

ASTM C1581 Ring Test

This test is designed to determine the age of initial cracking of restrained concrete repair materials. Forces contributing to cracking are evaluated. Material is cast around a steel ring with strain gauge sensors on the interior that measure developed stresses at defined intervals. Susceptibility to cracking is relative to tensile stresses exceeding tensile strength of the material.

SULFATE RESISTANCE

Rapid Set® Cement provides the highest resistance to sulfate attack. Unlike OPC (including Type II moderate sulfate resistance and Type V high sulfate resistance), Rapid Set® Cement contains no tri-calcium aluminate (C_3A) compounds. Because "[it] is the C_3A that attacks sulfates, concrete vulnerability can be reduced by using cements low in C_3A."[2] Rapid Set® Cement minimizes the potential for sulfate attack by eliminating C_3A altogether.

Rapid Set® Cement also provides low porosity, low permeability, and lower alkali content. This makes it an exceptional solution for reducing alkali-silica reaction (ASR)[3] and preventing catastrophic concrete failures. Its low porosity and prevention of drying shrinkage cracking resists chloride ion penetration and resulting deterioration of the concrete and corrosion of steel reinforcement.

FREEZE/THAW RESISTANCE

Rapid Set® Cement's low permeability is resistant to freezing and thawing exposures. Its rapid hydration and strength gain allow it to be used in cold weather installations that are not possible with OPC mix designs. This extends the construction, repair and maintenance season in colder regions and provides a ready solution for emergency repairs when colder conditions prevail.

DIMENSIONAL STABILITY

The early, marginal expansive nature of Rapid Set® Cement makes it ideal for use in concrete repair and renovation, and restrained placement applications. Rapid Set® materials are highly compatible with portland cement-based materials, and create a strong bond that eliminates "shrink back" at patch or repair perimeters, and prevents de-bonding.

[2] American Concrete Institute, "ACI 365.1R-00 – Service-Life Prediction" (Farmington Hills, MI: ACI Committee 365, 2000)

[3] CTL Report 059154. "ASTM C 1600-07 Testing, Rapid Hardening Cement," (Skokie, IL: CTLGroup ID 2236701, 2010)

[4] National Transportation Product Evaluation Program. "NTPEP Product Evaluation Report #2014-01-010 and #2014-01-011," (Washington, D.C.: NTPEP Reports, 2015)

NOT ALL RAPID STRENGTH CEMENTS ARE ALIKE

Rapid Set® Cement excels in key performance criteria including: advanced material properties, installation efficiencies, application versatility, and sustainability. Rapid Set® is not ordinary portland cement mixed with admixtures, nor is it an accelerator. And, it is not a calcium aluminate cement prone to strength regression. It is an innovative, proven belitic calcium sulfoaluminate (bCSA) advanced cement technology used worldwide on projects where time, money and long-term durability are essential.

		RAPID SET® (CSA CEMENT) ASTM C1600	Competitive Rapid Setting Cements				Other
			ACCELERATED TYPE-III FOUR HOUR PORTLAND CEMENT ASTM C150	CSA PORTLAND BLEND ASTM C1157, C595, C1600	HAC / CAC (CALCIUM ALUMINATE) ASTM C1600	REACTIVE FLY ASH CEMENT ASTM C1600	ASPHALT
SUSTAINABILITY	Durable 80+ Year Lifetime	✓					
	Zero Shrinkage	✓					
	Low CO_2 Technology	✓				✓	
ADVANTAGES	In Use with Proven Performance Since 1994	✓					✓
	Structural Stength in One Hour	✓		✓	✓	✓	
	Volumetric & Ready-Mix Production	✓		✓			
APPLICATIONS	Pavements	✓	✓	✓	✓	✓	✓
	Bridge Deck Overlays	✓	✓				✓
	Repair Applications	✓		✓	✓	✓	
	Structural Repair Applications	✓	✓	✓			
MATERIAL PROPERTIES	Unaffectd by Strength Regression	✓	✓	✓		✓	✓
	Low Porosity	✓					
	100% Sulfate Resistant	✓					✓

FAST IS DURABLE

RAPID SET® CHANGES THE GAME

Structural Stength in One Hour

Rapid Set® Cement products gain structural strength in one hour, allowing quick return to service and minimal commuter disruption and congestion. You save significant time and money, with reduced installation times and labor requirements – while maximizing goodwill in the surrounding communities and businesses.

Short-Term Repair Can Be a Long-Term Solution

Rehabilitated concrete is often associated with a limited life span. With Rapid Set® Cement technology, that is no longer the case. Extensive independent fatigue testing proves that Rapid Set® Cement concrete achieves a service life of up to 100 years. This extended life span maximizes asset life while minimizing lifecycle costs and ensuring maximum return on the asset investment.

The Near Zero Shrinkage Solution

Traditional concrete and concrete repair materials shrink extensively leading to cracking, curling, spalling, and ultimately, deterioration and failure. With Rapid Set® Cement technology, drying shrinkage is reduced to near zero. Durability is increased and the potential for cracking minimized or eliminated without the use of additives. This cannot be achieved with ordinary portland cement and shrinkage reducing admixtures.

Low Carbon Footprint, Maximum Sustainability

Rapid Set® Cement has several sustainability advantages: 32% reduced carbon emissions, 65% lower consumption of natural resources and energy, and 2 times the service life of traditional cement. By maximizing long-term durability and extending service life, you achieve a higher level of sustainability and minimize resource utilization, asset maintenance, repair and replacement.

A common misconception in concrete and concrete repair materials is that trade-offs are unavoidable and concessions must be made between speed and performance. This is due to the adverse effects of common prescriptive additives used in portland cement-based materials.

With Rapid Set® Cement technology, the paradigm shifts. Concessions do not need to be made. You can achieve speed and exceed performance.

Decades of proven in-service performance, extensive independent testing, and collaborative industry and academic testing programs have demonstrated the exceptional performance of CSA cement-based Rapid Set® technology.[5]

After 2 Years
Type II Portland
(8% C_3A)

After 6 Years
C_4A_3S Cement
(0% C3A)

[5] *CTL Report 103009. "CTS-Sulfate 08-98," (Skokie, IL: CTLGroup, 1998)*

AN INNOVATIVE SOLUTION

Demands on existing infrastructure continue to increase. The construction of new assets is vital to continued economic growth and regional development worldwide. And for stakeholders, time is money. Maximizing service life while minimizing thoroughfare disruption and associated user costs for construction, maintenance, and repair is essential. Rapid Set® Cement technology provides an innovative solution to achieve exceptional, sustainable results. Building a safer, more sustainable and economical built environment is possible today.

1. ★★★★★ Maximize Productivity with 1-Hour Structural Strength
2. ★★★★★ Ideal for Low Temperature Installations
3. ★★★★★ Low Shrinkage, Thin Overlays Are Possible
4. ★★★★★ Optimize Panel and Precision Grouting Operations
5. ★★★★★ Minimize Disruptions and Downtime

AVAILABILITY & SUPPORT

Rapid Set® Cement and pre-blended Rapid Set® products are available in bulk transport for large infrastructure and construction projects. Bagged products are available for small and medium sized applications and repair projects. Materials are distributed in the United States and worldwide.

Production options include Volumetric (or “Mobile”) mixers that produce concrete “on-demand”, ensuring a fresh mix every time while eliminating overages, shortages and lost loads. Regional Ready-Mix and portable on-site batch plants are also available.

CTS Cement’s Engineering, Technical Service and Support teams are available to provide training to engineering and construction teams, participate in pre-construction meetings, and assist with mix designs and pre-qualification requirements

CASE STUDIES

OHIO TURNPIKE

In the early 1980s, the Ohio Turnpike Authority initiated a High Performance Bridge Deck Replacement Program that included an evaluation of bridge deck replacements using conventional portland cement concrete and Type K Shrinkage-Compensating Concrete. The Type K Shrinkage-Compensating Concrete was used on a variety of bridge decks located on US Route 33, I-675 and I-80.

In 2008, results of the High Performance Bridge Deck Replacement Program were published noting a dramatic improvement in performance of the Type K Shrinkage-Compensating Concrete placements. In decks placed between 1984 through 1989, inspection reports indicated 95 to 97.8% of the bridge decks to be “crack free” with less than 3% reported with only minor cracking related to drying shrinkage. No Moderate or Severe cracking was noted on any of the Type K bridge decks.

The Ohio Turnpike Authority Chief Engineer offered commendation for the performance results. “Type K Shrinkage-Compensating Concrete addresses many concerns for the safety to ride characteristics. We don’t even think about cracks, crack maintenance or spalls on our shrinkage-compensating concrete decks. We’re expecting 35-year life on the decks’ wearing surface.”

This is a testament to the industry’s leading technology for durable, long-life pavement solutions for both new construction, renovation and repair.

ROCKFORD AIRPORT

Eliminating joints in runways and taxiways has long been an objective of the Federal Aviation Administration (FAA). Joints are usually the location of spalling, causing a "bumpy" landing experience for passengers. They also create safety hazards for airport personnel, costly maintenance and repair projects, and expensive engine repairs when loose concrete fragments (e.g. foreign object debris – FOD) are sucked into jet engine intakes.

After lengthy research initiatives conducted by the FAA to identify the most durable pavement solution that would reduce the number of joints required on airport runways and taxiways and significantly reduce the costs associated with maintenance and repair, Type K Shrinkage-Compensating Concrete was chosen for use on one of the most unusual concrete slabs ever constructed. In 1993, this innovative, post-tensioned, steel fiber reinforced pavement solution was placed at the Rockford International Airport's Runway Extension project in Rockford, Illinois. It was placed next to a conventional portland cement concrete "control" section to provide comparative performance results.

Using steel fiber reinforced Type K Shrinkage-Compensating Concrete, the contractor was able to place two contiguous "Innovative Pavement Slabs" (IP1 and IP2, respectively) of taxiway paralleling a new runway extension. IP1 and IP2 were placed in 75-foot wide pavement sections with post-tensioning able to be delayed up to 7 days. The additional flexural strength provided by using steel fibers allowed a reduction in pavement thickness to 10 inches. Transverse joints were cut in IP1 at varying span lengths from 85 feet to 200 feet to test how far apart natural cracking of the material would be with increased joint spacing. IP2 used steel fiber reinforced Type K Shrinkage-Compensating Concrete for a 1,200 foot long placement with longitudinal post-tensioning and no saw-cut shrinkage control joints. A slip-sheet was used to reduce subgrade drag. IP2 utilized the longitudinal pre-stressing characteristics of Type K with post-tensioned tendons placed 12 inches apart to prevent shrinkage cracking. The increased flexural strength provided by post-tensioning allowed further reduction in slab thickness to only 7 inches.

The FAA's "Constructability Report" recorded that the "use of Type K did not create handling, storing or delivery problems." The pavement was inspected quarterly for five years. And after 10 years of heavy use, the slab was performing exceptionally well with minimal cracking and virtually no spalling. The FAA's Pavement Condition Index (PCI) reported the conventional OPC control slab in Good condition (PCI of 67), the non post-tensioned Type K cement slab (IP1) in Very Good condition (PCI of 82), and the post-tensioned Type K cement slab (IP2) in Excellent condition (PCI of 98).

With proven performance for over 60 years, Type K Shrinkage-Compensating Concrete is the industry's most durable long-life pavement solution engineered to reduce life-cycle costs, maximize sustainability, prevent costly FOD damage and repairs – all while keeping runways and taxiways open and passengers satisfied with on-time performance!

"The pavement has held up extremely well. The cracking has been very, very minimal. There were some initial concerns with the fibers breaking loose, but that has not occurred. It has not caused any Foreign Object Damage (FOD) concern."

– Franz Olson, Deputy Director of Operations & Facilities at Chicago-Rockford International Airport

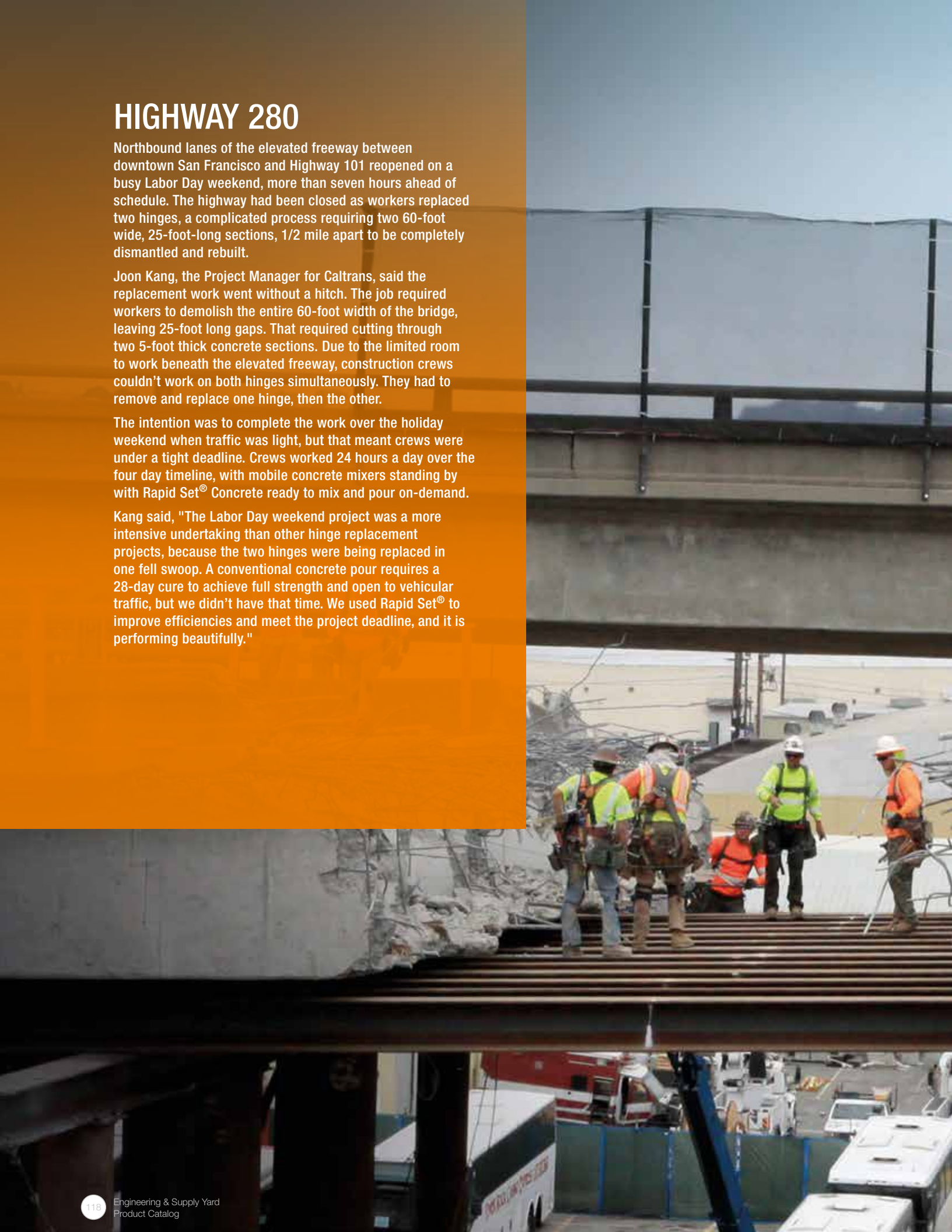
HIGHWAY 280

Northbound lanes of the elevated freeway between downtown San Francisco and Highway 101 reopened on a busy Labor Day weekend, more than seven hours ahead of schedule. The highway had been closed as workers replaced two hinges, a complicated process requiring two 60-foot wide, 25-foot-long sections, 1/2 mile apart to be completely dismantled and rebuilt.

Joon Kang, the Project Manager for Caltrans, said the replacement work went without a hitch. The job required workers to demolish the entire 60-foot width of the bridge, leaving 25-foot long gaps. That required cutting through two 5-foot thick concrete sections. Due to the limited room to work beneath the elevated freeway, construction crews couldn't work on both hinges simultaneously. They had to remove and replace one hinge, then the other.

The intention was to complete the work over the holiday weekend when traffic was light, but that meant crews were under a tight deadline. Crews worked 24 hours a day over the four day timeline, with mobile concrete mixers standing by with Rapid Set® Concrete ready to mix and pour on-demand.

Kang said, "The Labor Day weekend project was a more intensive undertaking than other hinge replacement projects, because the two hinges were being replaced in one fell swoop. A conventional concrete pour requires a 28-day cure to achieve full strength and open to vehicular traffic, but we didn't have that time. We used Rapid Set® to improve efficiencies and meet the project deadline, and it is performing beautifully."




2700

CTS Cement Manufacturing Corp. | 11065 Knott Avenue, Cypress, CA 90630 | www.CTScement.com

RAPID SET® CEMENT

Rapid Hardening Hydraulic Cement

PRODUCT DATASHEET

DESCRIPTION: RAPID SET® CEMENT is a high performance, rapid hardening hydraulic cement. Use RAPID SET CEMENT to create concretes, mortars, and grouts that achieve structural strength in one hour. Engineered for low shrinkage and superior resistance to chemical attack, Rapid Set Cement maximizes service life and minimizes maintenance.

USES: Use RAPID SET CEMENT to replace ordinary portland cement for projects where fast return to service, high strength, and increased durability are desired. Rapid Set cement-based materials are ideal for a diverse range of interior and exterior projects including highway pavements, bridges, runways, tunnels, precast, sidewalks, floors, and many other applications. For larger jobs, RAPID SET CEMENT mixtures may be batched using conventional ready mix or volumetric mixer equipment. Many state and local municipalities throughout the United States specify RAPID SET CEMENT in their concrete mix designs when speed and durability are important.

ENVIRONMENTAL ADVANTAGES: Use RAPID SET CEMENT to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your representative for LEED values and environmental information.

APPLICATION: Customize the mix for specific applications. A trial batch is recommended to optimize performance. For small projects, start with one 88-lb (40-kg) bag of RAPID SET CEMENT, 176 lb (79.8 kg) of sand, 176 lb (79.8 kg) of 1/4" to 3/4" (0.6 cm to 1.9 cm) stone and about 4 gallons (15.1 L) of potable water. For calculating volume, the specific gravity is 2.98 g/cm^3. Contact CTS technical support for additional assistance, if needed.

FOR 50-LB BAG: Customize the mix for specific applications. A trial batch is recommended to optimize performance. For small projects, start with one 50-lb (22.7-kg) bag of RAPID SET CEMENT, 100 lb (45.4 kg) of sand, 100 lb (45.4 kg) of 1/4" to 3/4" (0.6 cm to 1.9 cm) stone and about 2.3 gallons (8.7 L) of potable water. For calculating volume, the specific gravity is 2.98 g/cm^3. Contact CTS technical support for additional assistance, if needed.

Place material quickly and strike off with a screed. Apply desired finish. Concrete admixtures are available from the Rapid Set® Concrete Pharmacy®.

SURFACE PREPARATION: For repairs, application surface shall be clean, sound and free from any materials that may inhibit bond, such as oil, asphalt, curing compound, acid, dirt and loose debris. Mechanically abrade surface and remove all unsound material. Apply RAPID SET CEMENT concrete to a thoroughly saturated surface with no standing water.

CURING: Most materials made with RAPID SET CEMENT must be water cured. Keep exposed surfaces wet for a minimum of 1 hour. Begin curing as soon as the surface starts to lose its moist sheen. When experiencing extended setting time due to cold temperature or the use of retarder, longer curing times may be required. The objective of water curing shall be to maintain a continuously wet surface until the product has achieved sufficient strength.

Alternative curing methods may be suitable in some applications. Methods include, but are not limited to, the use of surface applied curing compounds conforming to ASTM C309. The material formulator is responsible for the mix design and determining the appropriate curing method.

OVERVIEW

Highlights:
Advanced rapid hardening technology
Use to create fast-setting concrete, mortar and grout
Inherent sulfate resistance and low shrinkage
Ready for service in as little as 1 hour
Interior/exterior

Conforms to:
ASTM C1600

MasterFormat® 2016	
03 01 30	Maintenance of Cast-in-Place Concrete
03 01 40	Maintenance of Precast Concrete
03 01 50	Maintenance of Cast Decks and Underlayment
03 01 60	Maintenance of Grouting
03 01 70	Maintenance of Mass Concrete
03 31 00	Structural Concrete Cast in Place
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 49 00	Glass-Fiber-Reinforced Concrete
03 53 19	Concrete Overlayment
03 61 00	Cementitious Grouting
03 62 13	Non-Metallic Non-Shrink Grouting

MasterFormat® 2016

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

RAPID SET® CEMENT Rapid Hardening Hydraulic Cement

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.

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. The use of Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy® will help offset the effects of high temperatures.

AVAILABILITY: RAPID SET® CEMENT is available in 50-lb and 88-lb (22.7-kg and 39.9-kg) bags, 2000-lb (907.2-kg) super sacks and bulk tankers.

SHELF LIFE: RAPID SET CEMENT has 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.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Set Time, ASTM C191 Mod.	
Initial set	15 minutes
Final set	20 minutes

Compressive Strength, ASTM C109 Mod.	
1.5 hours	4500 psi (31.0 MPa)
3 hours	5500 psi (37.9 MPa)
24 hours	7000 psi (48.3 MPa)
28 days	8000 psi (55.2 MPa)

All data produced at 70°F (21°C)

DOT REPAIR MIX

High Performance Concrete Repair Material

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® DOT REPAIR MIX is a high performance, fast setting, multi-purpose repair material. Durable in wet environments, DOT REPAIR MIX is a blend of Rapid Set hydraulic cement, high performance additives and ASTM C33 concrete sand. DOT REPAIR MIX is non-metallic and no chlorides are added. Mix DOT REPAIR MIX with water to produce a flowable, quality repair material that is ideal where fast strength gain, high durability and low shrinkage are desired. DOT REPAIR MIX is ready for traffic and loading within 1 hour.*

USES: Use DOT REPAIR MIX for concrete repair, highway repair, dowel bar retrofit, construction of pavements and bridges, parking decks and ramps, sidewalks and steps, joint repair and formed work. DOT REPAIR MIX contains an air-entraining admixture, in some geographical regions, for freeze thaw durability.

ENVIRONMENTAL ADVANTAGES: Use DOT REPAIR MIX to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your Rapid Set representative for LEED values and further environmental information.

APPLICATIONS: Apply DOT REPAIR MIX in thicknesses from 1/2" to 4" (1.2 cm to 10.2 cm). For thicker applications, DOT REPAIR MIX can be extended with up to 100% clean, dry coarse aggregate (up to 3/4") conforming to ASTM C33.

SURFACE PREPARATION: For repairs, application surface shall be clean, sound and free from any materials that may inhibit bond such as oil, asphalt, curing compound, acid, dirt and loose debris. Mechanically abrade surface and remove all unsound material. Apply DOT REPAIR MIX to a thoroughly saturated surface with no standing water.

MIXING: The use of a power driven mechanical mixer, such as a mortar mixer or a drill-mounted mixer, is recommended. Organize work so that all personnel and equipment are in place before mixing. Use clean potable water. **DOT REPAIR MIX may be mixed using 3 to 4.5 quarts (2.8 L to 4.3 L) of water per 55-lb (25 kg) bag. Use up to 5 quarts (4.7 L) when extended with dry coarse aggregate. Use less water to achieve higher strengths.** Place the desired quantity of mix water into the mixing container. While the mixer is running, add DOT REPAIR MIX. Mix for the minimum amount of time required to achieve a lump-free, uniform consistency (usually 1 to 3 minutes). Do not retemper.

PLACEMENT: DOT REPAIR MIX may be placed using traditional construction methods. Organize work so that all personnel and equipment are ready before placement. Place, consolidate and screed quickly to allow for maximum finishing time. Use a method of consolidation that eliminates air voids. On flat work, do not install in layers; install full depth sections and progress horizontally. Do not wait for bleed water. Apply final finish as soon as possible. DOT REPAIR MIX may be troweled, floated or broom finished. The working time for DOT REPAIR MIX is 10 to 25 minutes at 70°F (21°C). To extend working time, use Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy® or use cold mix water. Do not install on frozen surfaces. DOT REPAIR MIX may be applied in temperatures ranging from 45°F to 90°F (7°C to 32°C).

OVERVIEW

Highlights:
Fast: Ready for traffic and loading in 1 hour
Durable: Formulated for long life in critical applications
Structural: For repair and new construction
Extendable: Add rock for large placements
Easy To Use: Mix to fluid or stiff consistency
Multi-Purpose: Use for concrete repair, highway repair, dowel bar retrofit, construction of pavements, bridges, parking decks, ramps, sidewalks, steps, joint repair, formed work and more

Conforms to:
ASTM C928
California Test No. 551

MasterFormat® 2016	
03 01 30	Maintenance of Cast-in-Place Concrete
03 01 40	Maintenance Of Precast Concrete
03 01 50	Maintenance of Cast Decks and Underlayment
03 01 70	Maintenance of Mass Concrete

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

DOT REPAIR MIX High Performance Concrete Repair Material

CURING: Water cure all Rapid Set® DOT REPAIR MIX installations by keeping exposed surfaces wet for a minimum of 1 hour. Begin curing as soon as the surface starts to lose its moist sheen. When experiencing extended setting time due to cold temperature or the use of retarder, longer curing times may be required. The objective of water curing shall be to maintain a continuously wet surface until the product has achieved sufficient strength.

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.

WARM WEATHER: Environmental and material temperatures above 70°F (21°C) may shorten 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. The use of Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy® will help offset the effects of high temperatures.

YIELD & PACKAGING: DOT REPAIR MIX is available in 55 lb (25 kg) bags. One 55 lb (25 kg) bag of DOT REPAIR MIX will yield approximately 0.5 ft^3. When extended 60% by weight with quality coarse aggregate, yield is approximately 0.7 ft^3. When extended 100% by weight with quality coarse aggregate, yield is approximately 0.9 ft^3.

SHELF LIFE: DOT REPAIR MIX has 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.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Neat Bag (3.0 to 4.5 quarts)	60% Extension (3.5 to 4.75 quarts)	100% Extension (3.5 to 5.0 quarts)
Yield		
0.5 ft^3	0.7 ft^3	0.9 ft^3
Compressive Strength		
ASTM C109 Mod.	ASTM C39	ASTM C39
1 hr* 3300 psi	1 hr* 2800 psi	1 hr* 2500 psi
3 hrs 5000 psi	3 hrs 4600 psi	3 hrs 4200 psi
24 hrs 7000 psi	24 hrs 6800 psi	24 hrs 6500 psi
7 days 7500 psi	7 days 7200 psi	7 days 7000 psi
28 days 9500 psi	28 days 9000 psi	28 days 8500 psi
Flexural Strength, ASTM C78		
4 hrs 450 psi	4 hrs 400 psi	4 hrs 400 psi
7 days 700 psi	7 days 650 psi	7 days 600 psi
28 days 900 psi	28 days 850 psi	28 days 800 psi
Modulus of Elasticity, ASTM C469		
7 days 4,400,000 psi	7 days 4,100,000 psi	7 days 3,900,000 psi
28 days 5,100,000 psi	28 days 4,500,000 psi	28 days 4,000,000 psi
Slant Shear Bond Strength, ASTM C882 per C928		
1 day 1500 psi	1 day 1200 psi	1 day 1100 psi
7 days 2000 psi	7 days 1800 psi	7 days 1700 psi
Splitting Tensile Strength, ASTM C496		
7 days 700 psi	7 days 500 psi	7 days 390 psi
28 days 900 psi	28 days 600 psi	28 days 415 psi
Resistance of Concrete to Rapid Freezing and Thawing, ASTM C666 Procedure A		
Durability factor 300 Cycles: 95%	Durability factor 300 Cycles: 95%	Durability factor 300 Cycles: 95%
Scaling Resistance, ASTM C672 per C928		
Scaling of material at 25 cycles: 0.05 lb/ft^2	Visual rating at 25 cycles - 2	Visual rating at 25 cycles - 1
Length Change, ASTM C157 modified per ASTM C928		
Air Cure: -0.08% Water Cure: 0.02%	Air Cure: -0.07% Water Cure: 0.01%	Air Cure: -0.05% Water Cure: 0.05%
*Data obtained at flow consistency of 105 by ASTM C1437 at laboratory conditions	*Data obtained at slump consistency at 6" by ASTM C143 at laboratory conditions	*Data obtained at slump consistency at 6" by ASTM C143 at laboratory conditions

*After final set
Results will vary depending on aggregates and jobsite conditions

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

DOT REPAIR MORTAR

High Performance Concrete Repair Mortar

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® DOT REPAIR MORTAR is a high performance, fast-setting concrete repair material. Durable in wet environments, DOT REPAIR MORTAR is a blend of Rapid Set hydraulic cement, high performance additives and ASTM C33 concrete sand. DOT REPAIR MORTAR is non-metallic and no chlorides are added. Mix DOT REPAIR MORTAR with water to produce a flowable, quality repair material that is ideal where fast strength gain, high durability and low shrinkage are desired. DOT REPAIR MORTAR achieves structural strength in 1 hour.*

USES: Use DOT REPAIR MORTAR where high performance rapid strength gain, early return to service is desired. DOT REPAIR MORTAR is ideal for repairing highways, bridge decks, airport pavement, industrial floors, parking garage decks, and freezer floors. DOT REPAIR MORTAR contains an air-entraining admixture for freeze thaw durability.

ENVIRONMENTAL ADVANTAGES: Use DOT REPAIR MORTAR to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your Rapid Set representative for LEED values and further environmental information.

APPLICATION: Apply DOT REPAIR MORTAR in thicknesses from 1/2" (1.2 cm) to 6" (15.2 cm). For repairs over 3/4" thick, DOT REPAIR MORTAR may be extended up to 50 lbs with coarse aggregate. Use only clean, dry aggregate with a nominal maximum size of 3/8" to 3/4" conforming to ASTM C33.

SURFACE PREPARATION: For repairs, application surface shall be clean, sound and free from any materials that may inhibit bond such as oil, asphalt, curing compound, acid, dirt and loose debris. Mechanically abrade surface and remove all unsound material. Apply DOT REPAIR MORTAR to a thoroughly saturated surface with no standing water.

MIXING: The use of a power driven mechanical mixer, such as a mortar mixer or a drill mounted mixer, is recommended. Organize work so that all personnel and equipment are in place before mixing. Use clean potable water. **DOT REPAIR MORTAR may be mixed using 3.5 to 5.0 quarts (3.3 L to 4.7 L) of water per 70-lb (32-kg) bag. Use up to 5.0 quarts (4.7 L) when extended with dry coarse aggregate. Use less water to achieve higher strengths.** Place the desired quantity of mix water into the mixing container. While the mixer is running, add DOT REPAIR MORTAR. Mix for the minimum amount of time required to achieve a lump-free, uniform consistency (usually 1 to 3 minutes). Do not retemper.

PLACEMENT: DOT REPAIR MORTAR may be placed using traditional construction methods. Organize work so that all personnel and equipment are ready before placement. Place, consolidate and screed quickly to allow for maximum finishing time. Use a method of consolidation that eliminates air voids. On flat work, do not install in layers; install full depth sections and progress horizontally. Do not wait for bleed water. Apply final finish as soon as possible. DOT REPAIR MORTAR may be troweled, floated or broom finished. Do not install on frozen surfaces. The working time for DOT REPAIR MORTAR is 10 to 25 minutes at 70°F (21°C). To extend working time, use Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy® or use cold mix water. DOT REPAIR MORTAR may be applied in temperatures ranging from 45°F to 90°F (7°C to 32°C).

OVERVIEW

Highlights:
Fast: Ready for traffic and loading in 1 hour
Durable: Formulated for long life in critical applications
Structural: For repair and new construction
Extendable: Add rock for large placements
Easy to use: Mix to fluid or stiff consistency
Multi-purpose: Use for concrete repair, highway repair, construction of pavements, bridges, parking decks, ramps, sidewalks, steps, joint repair, formed work and more

Conforms to:
ASTM C928

MasterFormat® 2016	
03 01 30	Maintenance of Cast-in-Place Concrete
03 01 40	Maintenance of Precast Concrete
03 01 50	Maintenance of Cast Decks and Underlayment
03 01 70	Maintenance of Mass Concrete

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

DOT REPAIR MORTAR High Performance Concrete Repair Mortar

CURING: Water cure all Rapid Set® DOT REPAIR MORTAR installations by keeping exposed surfaces wet for a minimum of 1 hour. Begin curing as soon as the surface starts to lose its moist sheen. When experiencing extended setting time due to cold temperature or the use of retarder, longer curing times may be required. The objective of water curing shall be to maintain a continuously wet surface until the product has achieved sufficient strength.

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.

WARM WEATHER: Environmental and material temperatures above 70°F (21°C) may shorten 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. The use of Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy® will help offset the effects of high temperatures.

YIELD & PACKAGING: DOT REPAIR MORTAR is available in 70-lb (32-kg) bags. One 70-lb (32-kg) bag will yield approximately 0.7 ft^3 (0.02 m^3). Each bag of DOT Repair Mortar may be extended to yield approximately 0.9 ft^3 (0.02 m^3), using 50 lbs of quality coarse aggregate.

SHELF LIFE: DOT REPAIR MORTAR has 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.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Set Time, ASTM C266 Mod.	
Initial set	15 minutes
Final set	30 minutes
Compressive Strength, ASTM C109 Mod.	
1 hour*	3500 psi (24.1 MPa)
3 hours	4500 psi (31.0 MPa)
24 hours	6500 psi (44.8 MPa)
7 days	8000 psi (55.2 MPa)
28 days	9000 psi (62.1 MPa)
Flexural Strength, ASTM C78	
4 hours	500 psi (3.45 MPa)
24 hours	650 psi (4.48 MPa)
28 days	1200 psi (8.27 MPa)
Slant Shear Bond, ASTM C882 per C928	
24 hours	2000 psi (13.8 MPa)
28 days	2200 psi (15.2 MPa)
Freeze/Thaw, ASTM C666	
300 cycles	Durability factor >95%

*After final set
Data obtained at flow consistency 100 by ASTM C1437 at 70°F (21°C)

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

DOT CONCRETE MIX

High-Performance, Fast-Setting, Multi-Purpose Concrete Repair Material

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® DOT CONCRETE MIX is a high-performance, polymer-modified, fast-setting, fiber reinforced concrete repair material. Durable in wet environments, DOT CONCRETE MIX is a blend of Rapid Set hydraulic cement, high performance additives, fibers and quality ASTM C33, 3/8" aggregates. DOT CONCRETE MIX has been specially formulated to match the color of typical portland cement concrete. DOT CONCRETE MIX is non-metallic and no chlorides are added. Combine DOT CONCRETE MIX with water to produce a workable, quality concrete repair material that is ideal where fast strength gain, high durability and low shrinkage are desired. Integral Rapid Set® Corrosion Inhibitor and air entrainment additives are already added to increase protection of embedded reinforcement and freeze thaw durability. DOT CONCRETE MIX achieves structural strength within 2 hours.

USES: Use DOT CONCRETE MIX for general and structural concrete repair, highway repair, footings, airport pavements, construction of pavements, bridges, parking decks, ramps, sidewalks, steps, joint repair and formed work.

ENVIRONMENTAL ADVANTAGES: Use DOT CONCRETE MIX to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your Rapid Set representative for LEED values and further environmental information.

APPLICATION: Apply DOT CONCRETE MIX in thicknesses from 2" to 24" (5 cm to 61 cm). For thinner applications, Rapid Set® DOT Repair Mix, Rapid Set® DOT Repair Mortar, Rapid Set® Mortar Mix, Rapid Set® Mortar Mix Plus or Rapid Set® V/O Repair Mix.

SURFACE PREPARATION: For repairs, application surface shall be clean, sound and free from any materials that may inhibit bond such as oil, asphalt, curing compound, acid, dirt and loose debris. Mechanically abrade surface and remove all unsound material. Apply DOT CONCRETE MIX to a thoroughly saturated surface with no standing water.

MIXING: The use of a power driven mechanical mixer, such as a mortar mixer or a drill mounted mixer, is recommended. Organize work so that all personnel and equipment are in place before mixing. Use clean potable water. **DOT CONCRETE MIX may be mixed using 3.0 to 3.5 quarts (2.8 L to 3.3 L) of water per 60-lb (27.2-kg) bag. Use less water to achieve higher strengths. Do not exceed 3.5 quarts (3.3 L) of water per bag.** Place the desired quantity of mix water into the mixing container. While the mixer is running, add approximately two-thirds of the DOT CONCRETE MIX and continue mixing for 30 to 60 seconds. While mixing, add the remaining DOT CONCRETE MIX. Mix for an additional 1 to 2 minutes or until a lump-free, uniform consistency is achieved. Do not retemper.

PLACEMENT: DOT CONCRETE MIX may be placed using traditional construction methods. Organize work so that all personnel and equipment are ready before placement. Place, consolidate and screed quickly to allow for maximum finishing time. Use a method of consolidation that eliminates air voids. On flat work, do not install in layers; install full depth sections and progress horizontally. Do not wait for bleed water; apply final finish as soon as possible. DOT CONCRETE MIX may be troweled, floated or broom finished. The working time for DOT CONCRETE MIX is 15 to 20 minutes at 70°F (21°C). To extend

OVERVIEW

Highlights:
Fast: Ready for traffic and loading in 2 hours
Durable: Formulated for long life in critical applications
Integral Corrosion Inhibitor: Corrosion resistance for embedded reinforcement
Polymer modified
Fiber reinforced
Air Entrained: Freeze thaw durability
Concrete gray color
Structural: For repair and new construction
Multi-Purpose: Use for concrete repair, airport pavements, highway repair, construction of pavements and bridges, parking decks and ramps, sidewalks and steps, joint repair, formed work and more

Conforms to:
ASTM C928

MasterFormat® 2016	
03 01 30	Maintenance of Cast-in-Place Concrete
03 01 40	Maintenance Of Precast Concrete
03 01 50	Maintenance of Cast Decks and Underlayment
03 01 70	Maintenance of Mass Concrete
03 33 00	Architectural Concrete - Cast-In-Place Concrete

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

DOT CONCRETE MIX High-Performance, Fast-Setting, Multi-Purpose Concrete Repair Material

working time, use Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy® or cold mix water. Do not install on frozen surfaces. DOT CONCRETE MIX may be applied in temperatures ranging from 45°F to 90°F (7°C to 32°C).

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.

WARM WEATHER: Environmental and material temperatures above 70°F (21°C) may shorten 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. The use of SET Control retarding admixture from the Concrete Pharmacy will help offset the effects of high temperatures.

CURING: Water cure all Rapid Set® DOT CONCRETE MIX installations by keeping exposed surfaces wet for a minimum of 1 hour. Begin curing as soon as the surface starts to lose its moist sheen. When experiencing extended setting time due to cold temperature or the use of retarder, longer curing times may be required. The objective of water curing shall be to maintain a continuously wet surface until the product has achieved sufficient strength.

YIELD & PACKAGING: DOT CONCRETE MIX is available in 60-lb (27.2 kg) bags. One 60-lb (27.2 kg) bag of DOT CONCRETE MIX will yield approximately 0.42 ft^3.

SHELF LIFE: DOT CONCRETE MIX has 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.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Compressive Strength, ASTM C39	
2 hours	3000 psi (20.7 MPa)
24 hours	4500 psi (31.0 MPa)
7 days	6000 psi (41.4 MPa)
28 days	6500 psi (44.8 MPa)
Splitting Tensile Strength, ASTM C496	
28 days	300 psi (2.1 MPa)
Slant Shear Bond Strength, ASTM C882 per C928	
24 hours	1700 psi (11.7 MPa)
7 days	2300 psi (15.9 MPa)
28 days	3000 psi (20.7 MPa)
Modulus of Elasticity, ASTM C469	
28 days	3.6 x 10^6 psi
Scaling Resistance, ASTM C672 per C928	
50 cycles	Visual rating - 1
Freeze Thaw Resistance, ASTM C666	
Durability factor	97%
Length Change, ASTM C157 per C928 (Air Storage)	
7 days	0.015%
28 days	0.035%
Length Change, ASTM C157 per C928 (Water Storage)	
7 days	0.001%
28 days	0.008%
Rapid Chloride Ion Penetration, ASTM C1202	
28 days	< 1000 Coulombs

Data obtained at 4" slump by ASTM C143 at 70°F (21°C)

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

DOT CEMENT

Industrial Grade, Fast-Setting Cement

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® DOT CEMENT is a high performance, rapid hardening hydraulic cement. Durable in wet environments, DOT CEMENT is specially formulated blend of Rapid Set® Cement and high performance additives. DOT CEMENT is non-metallic and no chlorides are added. Mix DOT CEMENT with washed concrete sand and stone (ASTM C33 grade) at a 1-2-2 ratio to produce a durable concrete. DOT CEMENT is formulated for long life in freeze-thaw regions. DOT CEMENT can be ready for traffic and loading in 1 hour.

USES: Use DOT CEMENT concrete for the repair of pavement, bridge decks, industrial floors, parking garage decks, freezer floors, formed work, and more. Volumetric mixing equipment may be used for large projects. DOT CEMENT contains an air entraining admixture for freeze-thaw durability.

ENVIRONMENTAL ADVANTAGES: Use DOT CEMENT to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your representative for LEED values and environmental information.

APPLICATION: Customize the mix for specific applications. A trial batch is recommended to optimize performance. For small projects, start with one 50-lb (22.7-kg) bag of DOT CEMENT, 100 lb (45.4 kg) of sand, 100 lb (45.4 kg) of 1/4" to 3/4" (0.64 cm to 1.9 cm) stone and about 2.1 gallons (7.9 L) of clean, potable water. For calculating volume, the specific gravity is 2.96 g/cm^3. Contact CTS technical support for additional assistance, if needed. DOT CEMENT based concrete may be installed in thicknesses from 2" to 24" (5.1 cm to 61 cm). Required thickness will depend on jobsite specifications.

SURFACE PREPARATION: For repairs, application surface must be clean, sound and free from any materials that may inhibit bond, such as oil, asphalt, curing compound, acid, dirt and loose debris. Mechanically abrade surface and remove all unsound material. Apply DOT CEMENT concrete to a thoroughly saturated surface with no standing water.

MIXING: The use of a power-driven mechanical mixer, such as a mortar mixer or a mobile volumetric concrete mixer, is recommended. **Mix one 50-lb (22.7-kg) bag of DOT CEMENT with 100 lbs (45.4 kg) of sand and 100 lbs (45.4 kg) of 3/8" to 3/4" (0.64 cm to 1.9 cm) stone and 2.1 gallons (7.9 L) of clean, potable water.**

Mix and place material quickly.

PLACEMENT: DOT CEMENT based concrete may be placed using traditional construction methods. Place, consolidate and screed quickly to allow for maximum finishing time. Do not wait for bleed water. Apply final finish as soon as possible. Place material into repair area and strike off with a screed. On flat work, do not install in layers. Install full-depth sections and progress horizontally. Use a method of consolidation that eliminates air voids. Working time is approximately 20 minutes at 70°F. To extend working time, use Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy® or cold mix water. DOT CEMENT based concrete may be applied in temperatures ranging from 45°F to 90°F (7°C to 32°C).

OVERVIEW

Highlights:

Fast: Ready for traffic and loading in 1 hour

Multi-Use: Customize mix designs according to your application

Structural: For repair and new construction

Air Entrained: Formulated for long life in freeze-thaw regions

Conforms to:

ASTM C1600

Approved:

Used on state (DOT) and local projects

MasterFormat® 2016

03 01 30	Maintenance of Cast-in-Place Concrete
03 01 50	Maintenance of Cast Decks and Underlayment
03 01 70	Maintenance of Mass Concrete
03 31 00	Structural Concrete Cast In Place
03 48 00	Precast Concrete Specialties
03 53 19	Concrete Overlayment

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

DOT CEMENT Industrial Grade, Fast-Setting Cement

CURING: Most materials made with Rapid Set® DOT CEMENT must be water cured. Keep exposed surfaces wet for a minimum of 1 hour. Begin curing as soon as the surface starts to lose its moist sheen. When experiencing extended setting time due to cold temperature or the use of retarder, longer curing times may be required. The objective of water curing shall be to maintain a continuously wet surface until the product has achieved sufficient strength.

Alternative curing methods may be suitable in some applications. Methods include, but are not limited to, the use of surface applied curing compounds conforming to ASTM C309. The material formulator is responsible for the mix design and determining the appropriate curing method.

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.

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, pre-wet substrate (saturated surface dry) and follow ACI 305 Procedures for Hot Weather Concreting. The use of Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy® will help offset the effects of high temperatures.

YIELD & PACKAGING: Rapid Set® DOT CEMENT is available in 50-lb (22.7-kg) bags, 2000-lb (907.2-kg) super sacks and bulk tankers. In the recommended mix design, one bag of DOT CEMENT will yield approximately 1.8 ft^3 of concrete.

SHELF LIFE: DOT CEMENT has 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.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Compressive Strength, ASTM C39	
1.5 hours	3140 psi (21.6 MPa)
3 hours	3725 psi (25.7 MPa)
24 hours	4650 psi (32.1 MPa)
28 days	5500 psi (37.9 MPa)

Flexural Strength, ASTM C78	
4 hours	500 psi (3.44 MPa)
1 day	650 psi (4.48 MPa)
28 days	1200 psi (8.27 MPa)

Bond Strength, ASTM C882 per C928	
24 hours	2000 psi (13.8 MPa)
28 days	2200 psi (15.2 MPa)

Freeze/Thaw, ASTM C666 (Procedure A)	
1,000 cycles (weight loss 1.07%)	Dynamic modulus: 91%

ASTM C666 in a 10% solution of Sodium-Chloride (as per North Eastern spec.)	
25 cycles	0.3% loss

All data produced at 70°F (21°C)

LOW-P™ CEMENT

Low Permeability Cement For Bridge Deck Overlays & Repairs

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® LOW-P™ CEMENT is a low permeability, corrosion resistant, fast setting hydraulic cement based on advanced cement technology. When mixed with water and aggregates, LOW-P CEMENT produces concrete mixtures with unparalleled performance and ease of use. The finished LOW-P CEMENT concrete exhibits exceptional long-life durability in harsh freeze-thaw conditions.

RECOMMENDED USES: LOW-P CEMENT is ideal for fast-track bridge deck overlays, elevated deck repairs, pavement repairs and general concrete projects where low chloride ion permeability, corrosion resistance, and fast strength gain are desired. LOW-P CEMENT is a high value alternative to latex modified concrete (LMC), microsilica, low slump, and silica fume concrete.

ENVIRONMENTAL ADVANTAGES: Use LOW-P CEMENT to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your representative for Leed values and environmental information.

SURFACE PREPARATION: Concrete bonding surfaces should be clean, sound, and free from any materials that may inhibit bond such as oil, asphalt, curing compounds, acids, dirt and loose debris. Complete surface preparation in accordance with project specifications. Immediately prior to placement of LOW-P CEMENT concrete the repair surface should be thoroughly saturated with water for a period of no less than 1 hour. Standing water and puddles should be removed from the surface. Scrub coats or brush-in coats are not required. Please refer to the LOW-P CEMENT Technical Guide for surface preparation recommendations.

FIELD TESTS: Conduct field tests panels at the jobsite using the prepared bonding surface and the LOW-P CEMENT concrete to determine actual field performance and suitability for your intended use.

MIX & PLACE: LOW-P CEMENT concrete mixtures may be batched using volumetric mixer equipment or drum/mortar mixers. The working time is approximately 15-20 minutes. This time can be extended to one hour or more by using citric acid retarder. Roller and truss screeds can be used for small overlay placements. Self propelled screed/finishing equipment should be used for all large applications. Patching and small overlay work may require additional internal vibration. Straight edges or bull floats can be used directly behind screed/finisher equipment to assure closure of concrete surface. Surface retardants or water misting should be used to reduce evaporation. Broom or tine the concrete as soon as the surface can hold the finish. For more information, please refer to LOW-P CEMENT Technical Guide.

CURING: For overlays, the surface should be covered promptly after final finishing with a single, clean layer of wet burlap followed by a layer of clear polyethylene film. Patches can be water cured by maintaining a moist sheen on the surface. The curing should continue until the concrete has reached the strength desired. Depending on temperatures and specified strength, this will usually be within 1-3 hours after the final finishing. During this period, apply more water, as needed, to keep the entire concrete surface continuously wet.

OVERVIEW

Highlights:

- Low Permeability: Improved resistance to attack from chlorides and de-icing salts
- Excellent Freeze-Thaw Resistance: Achieves a durability factor of 99 after 300 cycles (ASTM C666)
- Fast Setting: Minimizes downtime and is ready for traffic in 1 to 3 hours
- Single Component Cement: Just add water and aggregates
- Hydraulic Cement-Based Formula: Provides excellent long life durability
- High sulfate resistance
- Easy to place, high slump, non-segregating formula

Conforms to:

ASTM: C928, C387

State and Local Approvals

MasterFormat® 2016

03 01 30	Maintenance of Cast-in-Place Concrete
03 01 50	Maintenance of Cast Decks and Underlayment
03 01 70	Maintenance of Mass Concrete
03 31 00	Structural Concrete Cast-in-Place
03 53 19	Concrete Overlayment

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

LOW-P™ CEMENT Low Permeability Cement For Bridge Deck Overlays & Repairs

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.

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. The use of citric acid (retarder) will help offset the effects of high temperatures.

YIELD & PACKAGING: Rapid Set® LOW-P™ CEMENT is available nationwide in 2000-lb super sacks and in bulk. When used in a typical mix design, 2000 lbs will yield about 3 to 3.5 cubic yards of concrete.

SHELF LIFE: LOW-P CEMENT has 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.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

MIX DESIGNS	
Low-P™ Cement	658 lbs (298 kg)
Coarse Aggregate 3/8"-1/2"	1450 lbs (658 kg)
Fine Aggregate	1600 lbs (726 kg)
Citric Acid (retarder)*	2.4 lb (1.08 kg)
Water	296 lbs (134 kg)

PHYSICAL DATA	
Set Time, ASTM C191 Mod.	
Initial set	30 minutes
Final set	40 minutes
Slump, ASTM C143	
7-9 inches	
Compressive Strength, ASTM C39	
3 hours	4500 psi (31.0 MPa)
6 hours	6000 psi (41.4 MPa)
24 hours	7000 psi (48.3 MPa)
7 days	8000 psi (55.2 MPa)
28 days	9000 psi (62.1 MPa)
Bond Strength, ASTM C882 per C928	
24 hours	1200 psi (8.27 MPa)
7 days	1900 psi (13.1 MPa)
28 days	2200 psi (15.21 MPa)
Shrinkage, ASTM C157 Mod.	
7 days	0.003%
28 days	0.023%
Freeze-Thaw, ASTM C666	
300 cycles (Durability factor)	105.1
Rapid Chloride Ion Penetration, ASTM C1202	
28 days	< 1000 Coulombs

*Citric acid can be used to extend the setting time of Low-P™ Concrete. Please contact CTS Cement for dosage recommendations. Note: Performance will vary based on actual aggregate properties and project variables. Complete trial batches to verify performance. All data produced at 70°F (21°C).

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

LOW-P™ FA1

Very High Early Strength Powder Polymer-Modified Concrete Overlay

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® LOW-P™ FA1 is a low permeability, corrosion resistant, fast-setting hydraulic cement based on advanced cement technology. When mixed with water and aggregates, LOW-P FA1 produces concrete mixtures with unparalleled performance and ease of use. The finished LOW-P FA1 concrete exhibits exceptional long-life durability in hard freeze-thaw conditions.

APPLICATIONS: LOW-P FA1 is ideal for fast-track bridge deck overlays, elevated deck repairs, pavement repairs and general projects where low chloride ion permeability, corrosion resistance, and fast strength gain are desired. LOW-P FA1 is a high value alternative to Latex Modified Concrete (LMC), low slump, and microsilica / silica fume concrete.

ENVIRONMENTAL ADVANTAGES: Use LOW-P FA1 to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your CTS representative for LEED values and environmental information.

SURFACE PREPARATION: For repairs, application surface shall be clean, sound and free from any materials that may inhibit bond, such as oil, asphalt, curing compound, acid, dirt and loose debris. Roughen surface and remove all unsound material. Apply LOW-P FA1 concrete to a thoroughly saturated surface with no standing water for a period of no less than 1 hour. Standing water and puddles should be removed from the surface. Scrub coats or brush-in coats are not required.

MIXING: LOW-P FA1 concrete mixes may be batched using continuous volumetric mixer equipment or a weight batch mixer. Organize work so that all personnel and equipment are in place before mixing. Use clean potable water. Working time is approximately 15 to 20 minutes. For increased fluidity and workability, use Rapid Set® FLOW Control® plasticizing admixture from the Rapid Set® Concrete Pharmacy®. CAUTION: Do not use additional fly ash or microsilica additives, pozzoloanic or Portland pozzolan materials. Admixtures containing calcium chloride or any other admixtures must be approved by CTS Cement Mfg. Corp.

PLACEMENT: Rapid Set® LOW-P™ FA1 may be placed using traditional methods. Organize work so that all personnel and equipment are ready before placement. Place, consolidate, and screed quickly to allow for maximum finishing time. Do not wait for bleed water. Apply final finish as soon as possible. LOW-P FA1 concrete may be troweled, floated or broom finished. Do not install on frozen surfaces. Use a method of consolidation that eliminates air voids. Roller and truss screeds can be used for small overlay placements. Self-propelled screed/finishing equipment should be used for all large applications. Patching and small overlay work may require additional internal vibration. Straight edge or bull floats can be used directly behind screed/finisher equipment to ensure closure of concrete surface. Surface retardants or water misting should be used to reduce evaporation. Broom or tine the concrete as soon as the surface can hold the finish applied.

COLD WEATHER: Environmental and material temperatures below 70ºF (21ºC) 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

OVERVIEW

Highlights:
Low Permeability: Less than 1000 coulombs
Fast: Minimizes downtime. Ready for traffic in 1 to 3 hours
Strong: 3 hours – 3200 psi (22 MPa), 28 days – 7500 psi (51.7 MPa)
Durable: Non-metallic, no added chlorides, sulfate resistant, ASR resistant, freeze-thaw resistant
Environmentally friendly
Lower Carbon Emission: 47% Lower carbon emission, contains post industrial recycled content
Ease of Use: Integral powder latex
Easy To place: High slump, non-segregating formula
Corrosion Protection: Resistance to corrosion caused by chlorides and deicing salts
Integral corrosion inhibitor

MasterFormat® 2016	
03 01 30	Maintenance of Cast-in-Place Concrete
03 01 50	Maintenance of Cast Decks and Underlayment
03 01 70	Maintenance of Mass Concrete
03 05 00	Concrete Bonding Agents, Admixtures and Adhesives
03 31 00	Structural Concrete Cast In Place
03 53 19	Concrete Overlayment

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

for cold temperatures, keep material warm, use heated mix water and follow ACI 306 Procedures for Cold Weather Concreting.

WARM WEATHER: Environmental and material temperatures above 70ºF (21ºC) 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. The use of Rapid Set® Set Control® retarding admixture from the Rapid Set® Concrete Pharmacy® will help offset the effects of high temperatures.

CURING: For overlays, the surface should be covered promptly after final finishing with a single, clean layer of wet burlap. Immediately following the covering of wet burlap, a layer of clear polyethylene film should be placed over the wet burlap. Patches can be water cured by maintaining a moist sheen on the surface. The curing layers should remain until the concrete has reached the strength desired. Depending on temperature and specified strength, this will usually be within 1 to 3 hours after final finishing. During this period, apply more water, as needed, to keep the entire concrete surface continuously wet.

FIELD TESTS: Conduct field test panels at the jobsite using the prepared substrate and the approved Rapid Set® LOW-P™ FA1 concrete to determine actual field performance and suitability for the intended use.

YIELD & PACKAGING: LOW-P FA1 is available nationwide in 2000-lb super sacks and 50-lb bags. When used in a typical mix design, 2000 lb will yield about 3 yd^3 to 3.5 yd^3 of concrete.

STORAGE & SHELF LIFE: LOW-P™ FA1 has 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.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

MIX DESIGN

Cement – 658 lbs (298 kg)
Washed Concrete Sand, ASTM C33 – 1512 lbs (686 kg)
3/8" Rock Aggregate – 1417 lbs (643 kg)
Water to Cement Ratio – 0.42

PHYSICAL DATA

Setting Time, ASTM C191 Mod.	
Initial set	30 minutes
Final set	40 minutes

Compressive Strength, ASTM C39	
3 hours	3200 psi (22.1 MPa)
24 hours	5000 psi (34.5 MPa)
7 days	6000 psi (41.4 MPa)
14 days	7000 psi (48.3 MPa)
28 days	7500 psi (51.7 MPa)

Slant Shear Bond Strength, ASTM C882 Mod.	
24 hours	1200 psi (8.3 MPa)
28 days	2000 psi (13.8 MPa)

Shrinkage, ASTM C157 Mod.	
7 days	0.003%
28 days	0.023%

Density	
Specific Gravity	2.86

Rapid Chloride Penetration, ASTM C1202	
28 days	< 1000 Coulombs

Freeze Thaw, ASTM C666 Procedure	
300 Cycles RDF	95
Weight loss	0.29

All data produced at 70°F (21°C)
Performance will vary based on actual aggregate properties and project variables. Complete trial batches to verify performance.

LOW-P™ REPAIR MORTAR

Rapid-Setting Repair Mortar for Low Permeability Applications

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® LOW-P™ REPAIR MORTAR is a specialty mortar that produces a low permeability, corrosion resistant, fast setting concrete repair material that allows for early opening to traffic. No chlorides are added.

USES: Full and partial depth repair of concrete pavements, bridge deck overlays, elevated deck repairs, parking structures, new slab construction, formed concrete work, and grouting.

ENVIRONMENTAL ADVANTAGES: Use LOW-P REPAIR MORTAR to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your representative for Leed values and environmental information.

SURFACE PREPARATION: Concrete bonding surfaces should be clean, sound, and free from any materials that may inhibit bond such as oil, asphalt, curing compounds, acids, dirt and loose debris. Complete surface preparation in accordance with project specifications. Roughen surface and remove all unsound concrete. Immediately prior to placement the repair surface should be thoroughly saturated with water. Standing water and puddles should be removed from the surface.

MIXING: The use of a power driven mechanical mixer is recommended. Organize work so that all personnel and equipment are in place before mixing. Use clean potable water and mix whole bags only. **LOW-P REPAIR MORTAR may be mixed using 3.5 to 5 quarts of water per 70-lb bag.** Use less water to achieve higher strengths. For cold weather applications, use warm water. **CAUTION: Do not add portland cement, lime, fly ash or any other admixtures unless approved by CTS.**

COLD WEATHER: Environmental and material temperatures below 70ºF (21ºC) 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.

WARM WEATHER: Environmental and material temperatures above 70ºF (21ºC) 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. The use of Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy® will help offset the effects of high temperatures.

YIELD & PACKAGING: LOW-P REPAIR MORTAR is available nationwide in 70-lb bags. One 70-lb bag of LOW-P REPAIR MORTAR will yield approximately 0.7 ft^3. When extended with 50 lbs of 3/8" aggregate yields approximately 0.9 ft^3.

SHELF LIFE: LOW-P REPAIR MORTAR has 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.

OVERVIEW

Highlights:
Low Permeability: Less than 1000 coulombs
Fast: Minimizes downtime; ready for traffic in 1 to 3 hours
Durable: Non-metallic, no added chlorides, sulfate resistant, ASR resistant, and freeze-thaw resistant
Ease of Use: Easy to place, high slump, non-segregating formula
Corrosion Protection: Integral corrosion inhibitor to protect embedded metals

MasterFormat® 2016	
03 01 30	Maintenance of Cast-in-Place Concrete
03 01 50	Maintenance of Cast Decks and Underlayment
03 01 70	Maintenance of Mass Concrete

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

LOW-P™ REPAIR MORTAR Rapid-Setting Repair Mortar for Low Permeability Applications

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Set Time, ASTM C191 Mod.	
Initial set	20 – 25 minutes
Final set	30 – 40 minutes

Compressive Strength	
ASTM C109 Mod.: Neat	ASTM C39: Extended
3 hours 4000 psi (26.6 MPa)	3 hours 3500 psi (24.1 MPa)
24 hours 5000 psi (34.5 MPa)	24 hours 4500 psi (31.0 MPa)
7 days 6500 psi (44.8 MPa)	7 days 6000 psi (41.4 MPa)
28 days 7500 psi (51.7 MPa)	28 days 7000 psi (48.3 MPa)

Bond Strength, ASTM C882 per C928	
Neat	Extended
24 hours 200 psi (8.3 MPa)	24 hours 1500 psi (10.3 MPa)
7 days 1400 psi (9.7 MPa)	7 days 1700 psi (11.7 MPa)
28 days 1500 psi (10.3 MPa)	28 days 2100 psi (14.5 MPa)

Rapid Chloride Permeability, ASTM C1202	
28 days	< 1000 coulombs

Shrinkage, ASTM C157 per C928	
28 days	< 0.03%

Freeze-Thaw, ASTM C666 (Procedure A)	
300 cycles	Dynamic modulus: 111.9%

All data produced at 70°F (21°C). Performance will vary based on actual aggregate properties and project variables. Complete trial batches to verify performance.

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

STUCCO

DATASHEETS

- Eisenwall®
- Stucco Mix
- Stucco Patch

EISENWALL®

Premium Cement For Exterior Plastering

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® EISENWALL® Cement is a premium blend of Rapid Set® Cement and high-performance additives for use in exterior plastering and stucco applications. EISENWALL is ideal where fast turnaround, high strength, superior durability, minimal shrinkage, and reduced cracking are desired. The appearance is similar to portland cement-based plaster and may be applied using like methods. EISENWALL carries a current ICC-ES Evaluation Report (ESR-2671).

USES: Use EISENWALL for installation over masonry, concrete, fiberboard, gypsum, wood or cement-based sheathing. EISENWALL may be used as the scratch and brown coats in conventional 3-coat applications, or as the base coat in one-coat applications.

ENVIRONMENTAL ADVANTAGES: Use EISENWALL to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set Cement emits far less CO_2 than portland cement. Contact your representative for LEED values and environmental information.

APPLICATION: Apply EISENWALL using traditional means and methods. EISENWALL can be applied from 3/8" to 2" (0.95 cm to 5.1 cm) in thickness. Apply by hand (trowel) or by machine. Projects using EISENWALL must follow conventional methods, comply with applicable building codes and ICC-ES Report ESR-2671. See CTS specification and application guidelines available at www.CTScement.com.

SURFACE PREPARATION: For repair projects, application surface shall be clean, sound and free from any materials that may inhibit bond, such as oil, curing compound, acid, dirt and loose debris. Roughen surface and remove all unsound material. The repair surface must be thoroughly Saturated Surface Dry (SSD) with water.

MIXING: Rapid Set® EISENWALL can be mixed in a mortar mixer or with a drill-mounted mixer. To determine the correct mix proportions, refer to chart on reverse side. A 3-to-1 sand to cement ratio is recommended.

PLACEMENT: Organize work so that all personnel and equipment are ready before placement. Apply and finish using traditional tools and techniques. The working time of EISENWALL is approximately 45 minutes at 70°F (21°C). Complete installation of mixed materials before stopping work. The working time may be extended by using cold materials or by adding Rapid Set® Eisenwall® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy®.

CURING: Water cure EISENWALL by misting the surface with clean water to maintain its wet sheen until the material is hard and cannot be easily scratched with a nail (minimum 90 minutes). Cold weather or extended setting times will increase the required curing time. The objective of water curing is to maintain a continuously wet surface until the product has achieved sufficient strength.

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 by using heated mix water. Rapid Set® EISENWALL® should not be applied if surface, material, or ambient temperature is below 45°F (7°C).

OVERVIEW

Highlights:

- Fast: Ready for color in 1 hour after moist curing
- Crack Resistant: High strength, low-shrink formula
- Efficient: Full thickness in a single application
- Easy To Use: Just add sand and water
- Saves Time: Scratch, brown and apply color coat the same day

Conforms to:

ASTM: C1328, ESR-2671, UBC 25-1,
L.A. Research and Report 25358
State and Local Approvals

MasterFormat® 2016

03 37 13	Shotcrete
03 37 16	Pumped Concrete
03 37 19	Pneumatically Placed Concrete
09 24 23	Cement Stucco

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

EISENWALL® Premium Cement For Exterior Plastering

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 or use chilled mix water. The use of Rapid Set® Eisenwall® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy® will help offset the effects of high temperatures.

YIELD & PACKAGING: Rapid Set® EISENWALL Cement is available in 88-lb (40-kg) polyethylene lined bags. One 88-lb (40-kg) bag will yield approximately 5 yd^2 (4.18 m^2) at 3/4" (1.9 cm) thickness using the recommended mix design.

SHELF LIFE: EISENWALL has 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.

APPROVED APPLICATOR: Contact 800-929-3030 or ApprovedAP@CTScement.com to become an approved applicator.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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, within one year from date of sale, will replace material proven defective or refund purchase price thereof, and such replacement or refund shall be the limit of CTS's 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.

TYPICAL PHYSICAL DATA

Compressive Strength, ASTM C109 Mod.	
6 hours	1500 psi (10.3 MPa)
24 hours	2500 psi (17.2 MPa)
28 days	3500 psi (24.1 MPa)

Set Time, ASTM C266 Mod.	
Initial set*	75 minutes

All data produced at 70°F (21°C)
*This product is not a portland cement and may have less than 90 minutes set time

Mixing Proportions

Material	Small Jobs	Large Jobs
Eisenwall cement	1 shovel	1 88-lb (40-kg) bag
Plaster sand	3 shovels	18-24 shovels, about 264 lb (120 kg)
Water	3 quarts	4-6 gallons (15-23 L)

Note: For above, use shovel size number 2. Water demand will vary depending on the moisture in the sand. Use enough water to achieve the desired working consistency. Mix approximately 3 to 5 minutes. CAUTION: DO NOT RETEMPER OR OVER-MIX. Do not add portland cement, lime, or any other admixtures unless approved by CTS Cement.

STUCCO MIX

Premium Pre-Mixed Stucco

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® STUCCO MIX is a premium blend of Rapid Set® Cement, quality plaster sand, and high performance additives for use in exterior plastering and stucco applications. STUCCO MIX is ideal where fast turnaround, high strength, superior durability, minimal shrinkage, and reduced cracking are desired. The appearance is similar to portland cement-based plaster and may be applied using like methods. Just add water. STUCCO MIX carries a current ICC-ES Evaluation Report (ESR-2671).

USES: Use STUCCO MIX for installation over masonry, concrete, fiberboard, gypsum, wood or cement-based sheathing. STUCCO MIX may be used as the scratch and brown coats in conventional 3-coat applications, or as the base coat in one-coat applications.

ENVIRONMENTAL ADVANTAGES: Use STUCCO MIX to reduce your carbon footprint and lower the environmental impact of a project. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your representative for LEED values and environmental information.

APPLICATION: Apply STUCCO MIX using traditional means and methods. STUCCO MIX can be applied from 3/8" to 2" (1.0 cm to 5.1 cm) in thickness. Apply by hand (trowel) or by machine. Projects using STUCCO MIX must follow conventional methods, comply with applicable building codes and ICC-ES Report ESR-2671. See CTS specification and application guidelines available at www.CTScement.com.

SURFACE PREPARATION: For repair projects, application surface shall be clean, sound and free from any materials that may inhibit bond, such as oil, curing compound, acid, dirt and loose debris. Roughen surface and remove all unsound material. The repair surface must be thoroughly Saturated Surface Dry (SSD) with water.

MIXING: STUCCO MIX can be mixed in a mortar mixer or with a drill mounted mixer. Use 2.0 to 3.5 quarts (1.9 L to 3.3 L) of water per 50-lb (22.7-kg) bag. Place the desired quantity of mix water into the mixing container. While the mixer is running, add STUCCO MIX. Mix for 3 to 5 minutes, or until a uniform, lump-free consistency is achieved. **CAUTION:** DO NOT RETEMPER OR OVER-MIX. DO NOT ADD PORTLAND CEMENT, LIME, OR ANY OTHER ADMIXTURES UNLESS APPROVED BY CTS CEMENT.

PLACEMENT: Organize work so that all personnel and equipment are ready before placement. Apply and finish using traditional tools and techniques. The working time of STUCCO MIX is approximately 60 minutes at 70°F (21°C). Complete installation of mixed materials before stopping work. The working time may be extended by using cold materials or by adding Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy®.

CURING: Water cure STUCCO MIX by misting the surface with clean water to maintain its wet sheen until the material is hard and cannot be easily scratched with a nail (minimum 90 minutes). Cold weather or extended setting times will increase the required curing time. The objective of water curing is to maintain a continuously wet surface until the product has achieved sufficient strength.

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

OVERVIEW

Highlights:

- Fast: Ready for color in 1 hour after moist curing
- Crack Resistant: High strength, low-shrink formula
- Efficient: Full thickness in a single application
- Easy to Use: Just add water
- Save Time: Scratch, brown & apply color coat the same day

Conforms to:

ASTM C1328*, ESR-2671, UBC 25-1*

MasterFormat® 2016

09 24 23 Cement Stucco

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

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.

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. The use of Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmac® will help offset the effects of high temperatures.

YIELD & PACKAGING: One 50-lb (22.7-kg) bag of STUCCO MIX will cover approximately 7.0 ft^2 (0.65 m^2) at 3/4" (1.9 cm) thickness. Yields 0.45 ft^3 (0.013 m^3) per 50-lb (22.7-kg) bag.

SHELF LIFE: Rapid Set® STUCCO MIX has 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.

APPROVED APPLICATOR FOR PROFESSIONALS: Contact 800-929-3030 or ApprovedAP@CTScement.com to become an approved applicator.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Set Time, ASTM C266 Mod.	
Initial set	75 minutes

Compressive Strength, ASTM C109 Mod.	
6 hours	1500 psi (10.3 MPa)
24 hours	2500 psi (17.2 MPa)
28 days	3500 psi (24.1 MPa)

Note: This product is not a portland cement and may have less than 90 minutes set time

STUCCO PATCH

Patch & Paint in 2 Hours

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® STUCCO PATCH is a premium, fast-setting stucco repair material, formulated with Rapid Set hydraulic cement, advanced polymers and high quality aggregates. Mix STUCCO PATCH with water to produce a rich, easy to apply mixture with excellent bonding characteristics. STUCCO PATCH can be applied full-depth in a single application and textured to match a variety of stucco surfaces. STUCCO PATCH has a 20-minute working time and can be primed and painted in 2 hours. The advanced technology in STUCCO PATCH provides a high-strength and low-shrinkage repair.

USES: Use STUCCO PATCH for the repair of cracks, holes and voids in stucco surfaces. Excellent for use in window and door installations. STUCCO PATCH can be used for exterior and interior stucco surfaces. Most primers, paints, and topcoats are compatible with STUCCO PATCH.

ENVIRONMENTAL ADVANTAGES: Use STUCCO PATCH to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your representative for LEED values and environmental information.

APPLICATION: Apply STUCCO PATCH in a single application thicknesses from 1/8" to 1" (3 mm to 25 mm).

SURFACE PREPARATION: For repairs, application surface shall be clean, sound and free from any materials that may inhibit bond, such as oil, asphalt, curing compound, acid, dirt and loose debris. Roughen surface and remove all unsound material. Open cracks to minimum 1/4" (6 mm) width. In hot, dry, or windy environmental conditions pre-wetting of the surface to be patched may be necessary.

COLOR: [Off-White]. The final color of STUCCO PATCH and other cementitious materials may vary due to application techniques and environmental conditions.

MIXING: STUCCO PATCH can be mixed by hand or power-driven mechanical mixer. Organize work so that all personnel and equipment are in place before mixing. **Use 1 part clean potable water to 4 parts STUCCO PATCH or 2 quarts (1.9 L) per 25-lb (11.3-kg) bag.** Add STUCCO PATCH into the mix water while mixing. Mix to achieve a uniform, lump-free consistency. Clean mixing bucket and tools between batches. Do not retemper.

INSTALLATION: Apply STUCCO PATCH with a trowel or putty knife. Place quickly to allow for maximum finishing time. Use a trowel, float or sponge to match the texture with the surrounding area. STUCCO PATCH may be primed and painted after approximately 2 hours.

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 and/or use heated mix water.

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 and/or use chilled mix water. The use of Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy® will help offset the effects of high temperatures.

OVERVIEW

Highlights:

- Fast: Paint the same day
- Easy: Great workability, excellent bond
- Efficient: Full thickness single application
- Advanced: Polymer modified, reduced cracks, maintains paint gloss and color
- Textured: 16 to 20 grit sand

MasterFormat® 2016

09 24 23 Cement Stucco

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

STUCCO PATCH Patch & Paint in 2 Hours

CURING: Rapid Set® STUCCO PATCH does not require water curing or curing compound under moderate conditions at 70°F (21°C). In dry, windy or hot conditions, mist with water to maintain a continuously wet surface until the product has achieved sufficient strength.

YIELD & PACKAGING: STUCCO PATCH is available in 50-lb (22.7-kg), 25-lb (11.3-kg) and 10-lb (4.5-kg) sizes. One 25-lb (11.3-kg) bag of STUCCO PATCH will yield approximately 0.20 ft^3 (5700 cm^3).

SHELF LIFE: STUCCO PATCH has 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.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Compressive Strength, ASTM C109 Mod.	
24 hours	2500 psi (17.23 MPa)

All data produced at 70°F (21°C)

SHOTCRETE & FILL

DATASHEETS

- Low-P™ Shotcrete
- HTF Shotcrete
- Pipe Liner
- Flowable Fill
- FPP Concrete Mix

LOW-P™ SHOTCRETE

Low Permeability Dry Process Shotcrete

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® LOW-P™ SHOTCRETE is a low permeability, corrosion resistant, low-alkali, fast-setting shotcrete formulation based on polymer-modified cement technology. LOW-P SHOTCRETE produces shotcrete mixtures with unparalleled performance and ease of use without the need for an accelerator. Finished LOW-P SHOTCRETE exhibits exceptional durability in harsh freeze-thaw environments.

APPLICATION: LOW-P SHOTCRETE is ideal for tunnel interiors, underneath bridge decks, and other vertical and overhead shotcrete applications where low chloride ion permeability, corrosion resistance, and fast strength gain are desired. LOW-P SHOTCRETE sets fast without an accelerator. LOW-P SHOTCRETE can be applied anywhere conventional shotcrete is used.

ADVANTAGES:

- Low Permeability: Improved resistance to attack from chlorides and de-icing salts
- Convenient: Single-component, pre-blended formula
- Fast: Sets quickly to minimize dropout and gain strength with no accelerator
- Safe: Hydraulic cement based formula contains 0 g/L of VOCs
- Excellent freeze-thaw resistance
- Provides corrosion protection
- High sulfate resistance
- Green: Contains up to 10% recycled materials, smaller carbon footprint than conventional shotcrete

FIELD TESTING: Conduct field test panels at the jobsite using the prepared bonding surface and the Low-P Shotcrete to determine actual field performance and suitability for intended use.

SURFACE PREPARATION: Concrete bonding surfaces should be clean, sound, and free from any materials that may inhibit bond such as oil, asphalt, curing compounds, acids, dirt and loose debris. Surface should be prepared in accordance with ICRI Guidelines for surface preparation and project specifications.

Before placement of LOW-P SHOTCRETE, the repair surface should be thoroughly saturated with water just before placement.

PACKAGING: LOW-P SHOTCRETE is packaged in 55-lb. 3-ply polyethylene lined bags, 50 per pallet.

SHELF LIFE: LOW-P SHOTCRETE has 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.

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

OVERVIEW

Highlights:

Low permeability

Corrosion protection

High early strength for fast and durable shotcrete applications

MasterFormat® 2016

03 37 13 Shotcrete

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

LOW-P™ SHOTCRETE Low Permeability Dry Process Shotcrete

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Compressive Strength, ASTM C1604, C39	
1 hour*	1500 psi (10.3 MPa)
3 hours	2500 psi (17.2 MPa)
24 hours	4000 psi (27.5 MPa)
28 days	5000 psi (34.5 MPa)

Approx.	
Yield	0.5 cu.ft. per bag
Set time	30 minutes
Working time	15 minutes

Hang Thickness	
Up to 10 inches	Varies with water content

Slant-Shear Bond Strength, ASTM C882	
28 days	750 psi (5.17 MPa)

Rapid Chloride Ion Penetration, ASTM C1202 / AASHTO T-277	
28 days	<500 Coulombs

Freeze-Thaw Resistance, ASTM C666	
Durability factor	> 90 after 300 cycles

*After final set
All data produced at 72°F (22°C)

HTF SHOTCRETE

Fast-Setting, Fiber-Reinforced Dry Process Shotcrete

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® HTF SHOTCRETE is a fast-setting, fiber-reinforced shotcrete formulation based on advanced CSA cement technology. HTF SHOTCRETE produces shotcrete mixtures with unparalleled performance and ease of use without the need for an accelerator. Finished HTF SHOTCRETE exhibits exceptional durability for mining and tunneling environments.

APPLICATIONS: HTF SHOTCRETE is ideal for tunnel interiors, mine ribs, highwalls, and other vertical and overhead shotcrete applications where fast strength gain and long-term durability are desired. HTF SHOTCRETE sets fast without an accelerator. HTF SHOTCRETE can be applied anywhere conventional dry processed shotcrete is used.

ADVANTAGES:

- **CONVENIENT:** Single-component, pre-blended formula
- **FAST:** Sets quickly to minimize dropout and gain strength with no accelerator, reducing cycle times
- **SAFE:** Hydraulic cement based formula contains 0 g/L of VOCs
- **EFFICIENCY:** Reduced rebound saves material and minimizes clean-up
- **HIGH SULFATE RESISTANCE**
- **GREEN:** Rapid Set cement is manufactured using recycled materials, smaller carbon footprint than conventional shotcrete

FIELD TESTING: Conduct field test panels at the jobsite using the prepared bonding surface and the HTF SHOTCRETE to determine actual field performance and suitability for intended use.

SURFACE PREPARATION: Concrete bonding surfaces should be clean, sound, and free from any materials that may inhibit bond such as oil, asphalt, curing compounds, acids, dirt and loose debris. Surface should be prepared in accordance with ICRI Guidelines for surface preparation and project specifications.

Before placement of HTF SHOTCRETE, the repair surface should be thoroughly saturated with water just before placement.

PACKAGING: HTF SHOTCRETE is packaged in 3000-lb woven polypropylene bulk bags.

SHELF LIFE: HTF SHOTCRETE has 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.

OVERVIEW

Highlights:

High Early Strength: Long term performance

For fast and durable shotcrete applications

MasterFormat® 2016

03 37 13 Shotcrete

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

HTF SHOTCRETE Fast-Setting, Fiber-Reinforced Dry Process Shotcrete

USER RESPONSIBILITY: Before using Rapid Set products, read current technical data sheet, bulletins, product label and material safety data sheet at www.CTScement.com. It is the user's responsibility to review instructions and warnings for any Rapid Set product in current technical data sheet, bulletins, product label and material safety data sheet prior to use.

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the MSDS and 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's 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.

TYPICAL PHYSICAL DATA

Yield	Approximately 0.8 cu. yd. per 3000-lb bulk bag
Set time	30 minutes
Working time	15 minutes

Compressive Strength, ASTM C1604, C39	
1 hour*	1000 psi (6.89 MPa)
3 hours	3000 psi (20.7 MPa)
24 hours	4500 psi (31.0 MPa)
28 days	8000 psi (55.2 MPa)

*After final set
All data produced at 72°F (22°C)

PIPE LINER

High Performance Cement Mortar for Re-Lining of Sewers,
Storm Drains & Wastewater Applications

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® PIPE LINER is made with advanced nano-ceramic technology, providing a low-shrink, sulfate-resistant, durable repair material. PIPE LINER is a pre-blended, polymer-modified hydraulic structural cement mortar lining specially designed and formulated for structural rehabilitation of pipes in situ. PIPE LINER is shear-thinning for easy pumping and thixotropic to reduce dropout or sag.

USES: PIPE LINER is a specially formulated high performance cement mortar for re-lining of damaged sewers, storm drains, wastewater pipes and culverts, providing a structural cementitious liner for infrastructure rehabilitation.

APPLICATIONS: PIPE LINER is designed to be applied pneumatically or by hand for smaller applications.

SURFACE PREPARATION: For repairs, application surface shall be clean, sound and free from any materials that may inhibit bond, such as oil, asphalt, curing compound, acid, dirt and loose debris. Roughen surface and remove all unsound material. Apply PIPE LINER to a surface that is thoroughly saturated with no standing water.

MIXING: The use of a power driven mechanical mixer, such as a mortar mixer or a drill mounted mixer, is highly recommended. Use potable water. **PIPE LINER may be mixed with 4 to 4.5 quarts (3.8 L to 4.2 L) of water per 55-lb (25-kg) bag.** Use less water to achieve higher strengths and increased adhesion. Mix for one to three minutes to achieve a lump-free, uniform consistency. Do not retemper.

PLACEMENT: PIPE LINER may be placed using traditional construction methods. Organize work so that all personnel and equipment are ready before placement. Place, consolidate and screed quickly to allow for maximum finishing time. Do not wait for bleed water; apply final finish as soon as possible. PIPE LINER may be troweled, floated or broom finished. Do not install on frozen surfaces. To extend working time, use Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy® or cold mix water. PIPE LINER may be applied in temperatures ranging from 45°F to 90°F (7°C to 32°C).

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.

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. The use of SET Control retarding admixture from the Concrete Pharmacy will help offset the effects of high temperatures.

YIELD & PACKAGING: Rapid Set® PIPE LINER is available in 55-lb (25-kg) 3-ply polyethylene lined bags. One 55-lb (25-kg) bag of PIPE LINER will yield approximately 0.5 ft^3.

SHELF LIFE: PIPE LINER has 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.

OVERVIEW

Highlights:

Convenient: Single-component; pre-blended formula

Durable: Advanced cement technology, polymer-modified formula designed to provide long service life

Fast: Sets quickly to minimize dropout and gain strength rapidly

Safe: Hydraulic cement based formula contains 0 g/L of VOCs

MasterFormat® 2016

03 37 13 Shotcrete

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

PIPE LINER

High Performance Cement Mortar for Re-Lining of Sewers, Storm Drains & Wastewater Applications

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Working/Pumping Time	
40 minutes at 72°F (22°C)	

Compressive Strength, ASTM C39	
6 hour*	3500 psi (24.1 MPa)
24 hours	4500 psi (31.0 MPa)
28 days	8000 psi (55.2 MPa)

Modulus of Elasticity, ASTM C469	
28 days	3.30 x 10^6 psi (22.75 GPa)

Tensile, ASTM C496	
14 days	900 psi (6.20 MPa)
28 days	1100 psi (7.58 MPa)

Bond Strength by Slant Shear, ASTM C882	
28 days	3000 psi (20.7 MPa)

*After final set
All data produced at 70°F (21°C)

FLOWABLE FILL

High Performance Backfill

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® FLOWABLE FILL is an easy-to-produce, high performance subbase for fill applications requiring fast turnaround. Flowable Fill is a mixture of Rapid Set hydraulic cement, aggregate, and water designed for soil replacement or reinforcement. Flowable Fill is a self-compacting material suitable in applications requiring Controlled Low Strength Material (CLSM) or Controlled Density Fill (CDF). FLOWABLE FILL sets in 45 minutes allowing early load application.

USES: Use FLOWABLE FILL for filling utility cuts, pipe bedding, runway and pavement subbase, and backfilling foundations. FLOWABLE FILL is ideal for airport, highway, industrial, and other civil applications.

ENVIRONMENTAL ADVANTAGES: Use FLOWABLE FILL to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set® Cement emits far less CO_2 than portland cement. Contact your local representative for LEED values and environmental information.

APPLICATION: Pour in place typically delivered to the jobsite in a concrete mixing truck or batched onsite by a volumetric mixer.

PREPARATION: Organize work so that all personnel and equipment are in place before mixing.

COMPOSITION: Rapid Set® FLOWABLE FILL mix designs normally contain 80 to 100 lbs of cement per cubic yard (48 kg to 60 kg per cubic meter). More cement may be added to increase strength.

A sand mix is best suited for use in trenches where high flow and future diggability are important.

SAND MIX:	Rapid Set Cement	l00 lbs (45.4 kg)
	Sand (ssd)	2900 lbs (1315.4 kg)
	Water	480 lbs (217.7 kg)

A rock mix is suitable for structural applications such as pavement base and foundation backfill.

ROCK MIX:	Rapid Set Cement	88 lbs (40 kg)
	Coarse Aggregate	1800 lbs (816.4 kg)
	Sand (ssd)	1700 lbs (771.1 kg)
	Water	400 lbs (181.4 kg)

MIXING: The use of a power-driven mechanical mixer, such as a mortar mixer or a mobile volumetric concrete mixer, is recommended. Mix and place material quickly.

OVERVIEW

Highlights:

Fast: Hardens quickly for rapid foot traffic access and pavement overlay

Controlled: Easily removed by conventional digging tools

Effective: Little to no subsidence

Easy to Use: Pour into place.
No compaction needed

Subsidence of Backfill Materials:

Other dip | Rapid Set stays flat

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

FLOWABLE FILL High Performance Backfill

PLACEMENT: Rapid Set® FLOWABLE FILL may be placed using traditional construction methods. Organize work so that all personnel and equipment are ready before placement.

Do not install on frozen surfaces. To extend working time, use cold mix water or a CTS approved admixture. FLOWABLE FILL may be applied in temperatures ranging from 45°F to 90°F (7°C to 32°C). No curing is necessary.

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.

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.

AVAILABILITY: Rapid Set® Cement is available in 50-lb and 88-lb (23-kg and 40-kg) bags, 2000-lb super sack and bulk tankers.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Typical Compressive Strength (ASTM D4832) of Rapid Set® Flowable Fill*	
1 hour	3 psi (0.02 MPa)
3 hours	10 psi (0.07 MPa)
24 hours	20 psi (0.14 MPa)
1 year	75 psi (0.52 MPa)

*Humidity, ambient and water temperature will vary your results. All data produced at 70°F (21°C).

FPP CONCRETE MIX

Form, Pour & Pumpable Concrete Mix

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® FPP CONCRETE MIX is a high-performance, form and pour, pumpable, self-consolidating concrete repair material. Durable in wet environments, FPP CONCRETE MIX is a blend of Rapid Set hydraulic cement, high performance additives and quality aggregates. FPP CONCRETE MIX is non-metallic and no chlorides are added. Mix FPP CONCRETE MIX with water to produce a workable, pumpable concrete material that is ideal where high durability and low shrinkage are desired. Integral Rapid Set® Corrosion Inhibitor is already added to increase protection of embedded reinforcement.

USES: Use FPP CONCRETE MIX for general and structural concrete repair, construction of pavements, formed work, footings, balconies, tunnels, roadways, elevated concrete slabs, parking decks and industrial floors.

ENVIRONMENTAL ADVANTAGES: Use FPP CONCRETE MIX to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO_2 than portland cement. Contact your representative for LEED values and environmental information.

APPLICATION: Apply FPP CONCRETE MIX in thicknesses from 1" to 24" (2.5 cm to 61 cm).

SURFACE PREPARATION: For repairs, application surface must be clean, sound and free from any materials that may inhibit bond, such as oil, asphalt, curing compound, acid, dirt and loose debris. Mechanically abrade surface and remove all unsound material. If applicable, apply FPP CONCRETE MIX to a thoroughly saturated surface with no standing water.

MIXING: The use of a power-driven mechanical mixer, such as a mortar mixer or a drill-mounted mixer, is recommended. Organize work so that all personnel and equipment are in place before mixing. Use clean, potable water. **FPP CONCRETE MIX may be mixed using 3.25 to 3.75 quarts (3.08 L to 3.55 L) of water per 60-lb (27.2-kg) bag. Use less water to reduce slump for sloped applications and to achieve higher strengths. Do not exceed 3.75 quarts (3.55 L) of water per bag.** Place the desired quantity of mix water into the mixing container. While the mixer is running, add FPP CONCRETE MIX. Mix for the minimum amount of time required to achieve a lump-free, uniform consistency (usually 1 to 3 minutes). Do not retemper.

PLACEMENT: FPP CONCRETE MIX may be placed using traditional construction methods. When placing with a concrete pump, pump continuously and clean out equipment immediately after completion. Organize work so that all personnel and equipment are ready before placement. Place, consolidate and screed quickly to allow for maximum finishing time. FPP CONCRETE MIX is a self-consolidating concrete, so traditional methods of consolidation such as vibration are not necessary. The mix may appear to have reached a plastic consistency within the first 30 minutes, but rodding or stirring will return the mix to a fluid and highly workable consistency. Do not wait for bleed water; apply final finish as soon as possible. FPP CONCRETE MIX may be troweled, floated or broom finished. On flatwork, do not install in layers. Install full-depth sections and progress horizontally. To extend working time, use cold mix water or Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy®. Do not install on frozen surfaces. FPP CONCRETE MIX may be applied in temperatures ranging from 45°F to 90°F (7°C to 32°C). Under dry conditions, water based coatings such as paint can be applied in 6 hours. Solvent based and impermeable coatings such as oil based paint and epoxy can be applied in 16 hours. Follow the coating manufacturer's recommendations for surface condition.

CURING: Placements must be protected from loss of moisture until material has reached structural strength. For exposed surfaces, apply a curing compound that conforms to ASTM C309, or water cure until structural strength is achieved. For formed work, keep forms in place to protect from moisture loss. When experiencing extended setting time due to cold temperature or the use of retarder, longer curing times may be required.

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

OVERVIEW

Highlights:

- Self-Consolidating: Surrounds reinforcement and fills formwork
- Pumpable: Extended working time for maximum flow life
- Fast: Structural strength in 4 hours
- Polymer Modified
- Low Permeability: Resistant to chloride ion penetration
- Integral Corrosion Inhibitor: Corrosion resistance for embedded reinforcement
- Durable: Formulated for long life in critical applications
- Structural: For repair and new construction
- Multi-Purpose: General and structural concrete repair, formed work, and more

MasterFormat® 2016

03 01 30	Maintenance of Cast-in-Place Concrete
03 01 40	Maintenance of Precast Concrete
03 01 70	Maintenance of Mass Concrete
03 33 00	Architectural Concrete - Cast-In-Place Concrete

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

FPP CONCRETE MIX Form, Pour & Pumpable Concrete Mix

for cold temperatures, keep material warm, use heated mix water, and follow ACI 306 Procedures for Cold Weather Concreting.

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. The use of Rapid Set® SET Control® retarding admixture from the Rapid Set® Concrete Pharmacy® will help offset the effects of high temperatures.

YIELD & PACKAGING: Rapid Set® FPP CONCRETE MIX is available in 60-lb (27.2-kg) bags. One 60-lb (27.2-kg) bag of FPP CONCRETE MIX will yield approximately 0.44 ft^3.

SHELF LIFE: FPP CONCRETE MIX has 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.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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, within one year from date of sale, will replace material proven defective or refund purchase price thereof, and such replacement or refund shall be the limit of CTS's 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.

TYPICAL PHYSICAL DATA

Slump Spread, ASTM C1611	
Slump spread	27 in to 33 in
Spread after 30 min	>15 in

Compressive Strength, ASTM C39	
4 hours	2500 psi (17.2 MPa)
24 hours	3500 psi (20.7 MPa)
7 days	6000 psi (41.4 MPa)
28 days	6500 psi (44.8 MPa)

Data obtained using 3.75 quarts at 70°F (21°C). Results may vary depending on jobsite and environmental conditions.

SHRINKAGE COMPENSATING CEMENT

DATASHEETS

- Type K Cement
- Komponent®

KOMPONENT TECHNICAL GUIDE

SYSTEM-K™ DATASHEET

TYPE K CEMENT

Pre-Blended Shrinkage-Compensating Cement

KOMPONENT™

PRODUCT DATASHEET

DESCRIPTION: TYPE K CEMENT (ASTM C845) is a pre-blended cement consisting of Komponent® cement additive and Type II portland cement used to create shrinkage-compensating concrete, topping slabs, low shrinkage concrete, and non-shrink grout materials. Pre-blended units ensure consistency in cement content mix-to-mix and offer an ideal solution for projects where consistent quality is critical. TYPE K CEMENT is engineered to minimize or eliminate drying shrinkage cracking by creating controlled expansion during placement and cure that overcomes the inherent shrinkage of portland cement and aggregates. TYPE K CEMENT reduces permeability, provides up to 40% increased abrasion resistance, prevents slab curling, spalling and corner breaks, and helps maintain dimensional stability and long-term floor flatness and floor levelness. Design and construction are simplified by increasing placement sizes, reducing mobilizations, and minimizing or eliminating control joints, waterstops and pour strips. Thinner slabs and walls are also viable. TYPE K CEMENT also helps improve sulfate resistance when elevated sulfate conditions exist. TYPE K CEMENT has a proven, unsurpassed track record of use since the 1960s improving concrete durability, minimizing maintenance costs, and maximizing asset life.

USES: TYPE K CEMENT is used to create Type K and System-K™ Shrinkage-Compensating Concrete, low shrinkage concrete and non-shrink grouts. It is ideal for use in industrial slabs-on-grade, concrete containment structures, parking structures, bridge decks, topping slabs, deck pan applications, post-tensioned and chemically pre-stressed slabs, architectural concrete, polished concrete, tilt-up and precast concrete. Use in any concrete or grouting applications where eliminating shrinkage cracking, reducing control joints, preventing curling and warping, improving sulfate resistance, or improving aesthetics is desirable.

ENVIRONMENTAL ADVANTAGES: Use TYPE K CEMENT to reduce the carbon footprint of concrete materials and lower environmental impact of a project. Production of TYPE K CEMENT emits less CO_2 than portland cement. Contact your CTS Engineering Representative for LEED values and environmental information.

APPLICATION: Shrinkage-compensating concrete and other concrete materials made with TYPE K CEMENT are produced by conventional production equipment and installation practices. Actual mix designs vary depending on application, regional aggregate characteristics, supplementary cementitious materials, admixtures, and concrete performance requirements. 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 CTS Cement 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: TYPE K CEMENT is added at the central batch plant. Typical mix designs use 560 lbs of pre-blended Type K Cement per cubic yard of concrete. For System-K™ Microfiber Reinforced mix designs, K-Fibers™ are added at a rate of one (1) pre-packaged 2.2 lb unit per cubic yard. For batching and mixing instructions, refer to the CTS Shrinkage-Compensating Concrete Reference Guide for details.

WATER/CEMENT RATIO: Due to the efficient consumption of mix water in TYPE K CEMENT, the following water/cement ratios are recommended: Interior placements – 0.45; Exterior placements – 0.50; Dry shake applications – 0.55. Ensure thorough mixing and dispersion throughout the load after all components have been added in 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, seven (7) days wet curing is required. Refer to CTS Cement's Shrinkage-Compensating Concrete Reference Guide and ACI 223 for additional details.

OVERVIEW

Highlights:
Prevent drying shrinkage cracking
Reduce control joints by 90-95%
Increase abrasion resistance 30-40%
Increase durability and lower permeability
Improve sulfate resistance
Protect against corrosion and deterioration
Increase pour 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)

Tested in accordance with:
ASTM: C845, C806, C878

MasterFormat® 2016	
03 01 30	Maintenance of Cast-in-Place Concrete
03 01 50	Maintenance of Cast Decks and Underlayment
03 01 60	Maintenance of Grouting
03 01 70	Maintenance of Mass Concrete
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 37 16	Pumped Concrete
03 37 19	Pneumatically Placed Concrete
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:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

TYPE K Pre-Blended Shrinkage-Compensating Cement

COLD WEATHER: Environmental and material temperatures below 70ºF (21ºC) 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 40ºF (4.4ºC) 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 70ºF (21ºC) 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: TYPE K CEMENT is available in 94-lb (42.7-kg) polyethylene-lined bags and 2000-lb (909-kg) bulk bags. It is also available in bulk tanker trucks and railcars.

SHELF LIFE: TYPE K CEMENT bagged units have a shelf life of 6 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 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. 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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

TYPE K Shrinkage-Compensating Concrete, low shrinkage concrete, and non-shrink grout can be made using pre-blended TYPE K CEMENT or using Komponent® cement additive mixed on site with local portland cement.

Listed below are typical mix designs using pre-blended TYPE K CEMENT. For mix designs using Komponent cement additive, refer to the Komponent data sheet. 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.

TYPE K CONCRETE made with TYPE K CEMENT	
Type K Cement	560 lb
Fine aggregate, ASTM C33	1800 lb
Coarse Aggregate, ASTM C33	1095 lb
Water	37 gal
Water Reducer, ASTM C949	24 oz

PERFORMANCE	
Slump	5.75 in
Expansion, 7 days (minimum)	0.045%
Compressive Strength, 7 days (minimum)	3400 psi (23.4 MPa)
Compressive Strength, 28 days (minimum)	4500 psi (31.0 MPa)
Specific Gravity, Komponent	2.87 g/cm^3

NON-SHRINK GROUT made with TYPE K CEMENT	
Type K Cement	946 lb
Fine Aggregate ASTM C33	2640 lb
Water	52 gal
Water Reducer, ASTM C949	24 oz

PERFORMANCE	
Expansion, 7 days (minimum)	0.045%
Compressive Strength, 7 days (minimum)	4800 psi (33.1 MPa)
Compressive Strength, 28 days (minimum)	7250 psi (49.6 MPa)
Specific Gravity, Komponent	2.87 g/cm^3

KOMPONENT®

Shrinkage-Compensating Cement Additive

PRODUCT DATASHEET

DESCRIPTION: KOMPONENT® is a calcium sulfoaluminate (CSA) cement based additive used to create shrinkage-compensating concrete, toppings, low shrinkage concrete, and non-shrink grouts. It is engineered to minimize or eliminate drying shrinkage cracking by creating controlled expansion during placement and cure that overcomes the inherent shrinkage of the portland cement and aggregates. KOMPONENT is combined with regional portland cement to produce an ASTM C845 - Type K shrinkage-compensating cement. Type K cement made with KOMPONENT reduces permeability, provides up to 40% increased abrasion resistance, prevents slab curling, spalling and corner breaks, and helps maintain dimensional stability, helps maintain dimensional stability, and long-term floor flatness and floor levelness. Design and construction are simplified by significantly increasing placement sizes, reducing mobilizations, and minimizing or eliminating control joints, waterstops and pour strips. When combined with Type V portland cement, KOMPONENT contributes to high sulfate resistance for placements where high sulfate conditions exist. KOMPONENT has a proven, unsurpassed track record of use since the 1960s improving concrete durability and dimensional stability, minimizing maintenance costs, and maximizing asset life.

USES: Use KOMPONENT to make Type K and System-K™ shrinkage-compensating concrete, low shrinkage concrete and non-shrink grouts. KOMPONENT shrinkage-compensating concrete is ideal for use in industrial slabs, concrete containment structures, parking structures, bridge decks, topping slabs, deck pan applications, post-tensioned and chemically prestressed structures, architectural concrete, polished concrete, tilt-up and precast concrete. Use in any concrete or grouting application where eliminating shrinkage cracking, reducing control joints, preventing curling and warping, improving abrasion resistance, or improving aesthetics is desirable.

ENVIRONMENTAL ADVANTAGES: Use KOMPONENT to reduce the carbon footprint and lower the environmental impact of a project. Production of KOMPONENT emits significantly less CO_2 than portland cement. Contact a CTS Engineering representative for LEED values, environmental, and sustainability information.

APPLICATION: Use KOMPONENT to replace approximately 15% of the portland cement material in the concrete mix design to create shrinkage-compensating concrete. Actual mix designs vary depending on application, regional portland cement characteristics, regional aggregate characteristics, supplementary cementitious materials, admixtures, and concrete performance requirements. Shrinkage-compensated materials made with KOMPONENT are produced by conventional concrete and grout production equipment and installation practices. 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 CTS Cement 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: KOMPONENT is added at the batch plant or on-site using common bulk cement equipment and incorporation methods. When using bagged units for smaller projects, or portable silos on-site, a high pressure, high shear colloidal slurry machine is used for ease of production and to ensure effective mixing. (Contact CTS Cement for slurry machine support.) Typical mix designs use 90 lbs to 100 lbs (41 kg to 45 kg) of KOMPONENT to replace an equivalent weight of portland cement per cubic yard of concrete. Bulk KOMPONENT should be weighed before the portland cement to ensure proper dosage. For System-K™ Microfiber Reinforced mix designs, K-Fibers™ are added at a rate of one (1) pre-packaged 2.2 lb unit per cubic yard. For batching and mixing instructions, refer to the CTS Shrinkage-Compensating Concrete Reference Guide for details.

WATER/CEMENT RATIO: Due to KOMPONENT's efficient consumption of mix water during hydration, the following water/cement ratios are recommended: Interior placements – 0.45; Exterior placements – 0.50; Dry shake applications – 0.55. Ensure thourough 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.

OVERVIEW

Highlights:

- Prevent drying shrinkage cracking
- Reduce control joints by 90-95%
- Increase abrasion resistance 30-40%
- Increase durability and lower permeability
- Improve sulfate resistance
- Protect against corrosion and deterioration
- Increase pour 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)

Tested in accordance with:

ASTM: C845, C806, C878

MasterFormat® 2016

03 01 30	Maintenance of Cast-in-Place Concrete
03 01 50	Maintenance of Cast Decks and Underlayment
03 01 60	Maintenance of Grouting
03 01 70	Maintenance of Mass Concrete
03 05 00	Concrete Bonding Agents, Admixtures and Adhesives
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 37 16	Pumped Concrete
03 37 19	Pneumatically Placed Concrete
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:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

KOMPONENT® Shrinkage-Compensating Cement Additive

CURING: For general applications, seven (7) days of wet curing is required. Refer to the CTS Shrinkage-Compensating Concrete Reference Guide and ACI 223 for additional details.

COLD WEATHER: Environmental and material temperatures below 70ºF (21ºC) 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 40ºF (4.4ºC) 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 70ºF (21ºC) 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® is available in 90-lb (40.8-kg) polyethylene-lined bags and 2000-lb (907-kg) bulk bags. It is also available in bulk tanker trucks and railcars.

SHELF LIFE: KOMPONENT bagged units have a shelf life of 6 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.

USER RESPONSIBILITY: Before using CTS products, read current technical data sheets, bulletins, product labels and safety data sheets at 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 professional technical services on any KOMPONENT application. For detailed information on use and applications of Komponent, refer to the CTS Shrinkage Compensating Concrete Reference Guide or 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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

Type K Shrinkage-Compensating Concrete, low shrinkage concrete, and non-shrink grout can be made using KOMPONENT® mixed with local portland cement or on site using pre-blended Type K Cement.

Listed below are typical mix designs using KOMPONENT. For mix designs using pre-blended Type K Cement, refer to the Type K Cement data sheet. 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.

TYPE K CONCRETE made with KOMPONENT	
Portland Cement	470 lb
Komponent	90 lb
Fine Aggregate, ASTM C33	1095 lb
Coarse Aggregate, ASTM C33	1800 lb
Water	37 gal
Water Reducer, ASTM C949	24 oz

PERFORMANCE	
Slump +/-1.5"	5.75 in
Expansion, 7 days (minimum)	0.045%
Compressive Strength, 7 days (minimum)	3400 psi (23.4 MPa)
Compressive Strength, 28 days (minimum)	4500 psi (31.0 MPa)
Specific Gravity, Komponent	2.87 g/cm^3

NON-SHRINK GROUT made with KOMPONENT	
Portland Cement	846 lb
KOMPONENT	100 lb
Fine Aggregate ASTM C33	2640 lb
Water	52 gal
Water Reducer, ASTM C949	24 oz

PERFORMANCE	
Expansion, 7 days (minimum)	0.045%
Compressive Strength, 7 days (minimum)	4800 psi (33.1 MPa)
Compressive Strength, 28 days (minimum)	7250 psi (49.6 MPa)
Specific Gravity, Komponent	2.87 g/cm^3

Shrinkage-Compensating Cement Technology

ADVANCING CEMENT TECHNOLOGY

KOMPONENT®

KOMPONENT®

At CTS Cement, shrinkage-compensating cement and concrete materials are at the core of what we do.

HISTORY

Type K shrinkage-compensating cement technology is what our company was founded on over 50 years ago

SHRINKAGE-COMPENSATING CEMENT has a long and established history, renowned for its ability to overcome drying shrinkage cracking in concrete and other cementitious materials. For design and engineering teams, it offers proven performance and peace of mind. For owners, property managers and facility management teams, it is the material of choice for its ability to prevent costly deterioration and common maintenance issues related to drying shrinkage.

At CTS Cement, shrinkage-compensating cement and concrete materials are at the core of what we do. Type K shrinkage-compensating cement technology is what our company was founded on over 50 years ago, with technology developed at the University of California, Berkeley, by Professor Alexander Klein and Edward K. Rice, P.E., our founder.

Edward K. Rice, P.E. – Founder

Komponent technology reduces detrimental tensile stresses that lead to shrinkage cracking

Minimize cracking

KOMPONENT® TECHNOLOGY offers an effective and economical way to minimize cracking caused by drying shrinkage. Komponent technology eliminates detrimental tensile stresses that lead to shrinkage cracking and is used to prevent drying shrinkage and edge curling in slabs and toppings. It also helps eliminate repair and maintenance costs, and addresses costly challenges related to restraint-to-shortening in post-tensioned structures.

PRODUCTS

Komponent®

is an expansive mineral additive. It is blended with portland cement to create Type K shrinkage-compensating cement that is used to make Type K shrinkage-compensating concrete, low shrinkage concrete, and non-shrink grout materials. Komponent can be added at the production plant or on the job site in proportions that achieve the specified amount of shrinkage compensation.

System-K™

is a fiber reinforced, shrinkage-compensated concrete system for creating Type K Shrinkage-Compensating Concrete floor slabs with minimal or no reinforcing steel. It includes engineered 1/4" synthetic monofilament K-Fiber™ and Komponent. These short, synthetic fibers provide sufficient restraint and improve the durability of the finished concrete. System-K offers a cost effective alternative to typical steel reinforced concrete floor slabs.

Type K

is a pre-blended cement consisting of 15% Komponent and 85% portland cement. Type K Cement is used to make ASTM C845 Type K shrinkage-compensating concrete, low shrinkage concrete and non-shrink grout materials.

These versatile materials provide solutions for concrete and other concrete materials in a wide range of applications, from new construction and renovation to maintenance and repair.

Eliminate the most common type of concrete cracking

Industry Standards

Industry standards, test methods, and specifications used to define the performance requirements and parameters of use for shrinkage-compensating concrete, non-shrink, and low-shrinkage cementitious materials include:

ASTM C845	Standard Specification for Expansive Hydraulic Cement
ASTM C806	Standard Test Method for Restrained Expansion of Expansive Cement Mortar
ASTM C878	Standard Test Method for Restrained Expansion of Shrinkage-Compensating Concrete
ASTM C1107	Standard Specification for Packaged, Dry, Hydraulic-Cement Grout (Non-Shrink)
ASTM C596	Standard Test Method for Drying Shrinkage of Mortar Containing Hydraulic Cement
ASTM C157	Standard test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
ACI 223	Guide for the Use of Shrinkage-Compensating Concrete
CRD-C 621	U.S. Army Corps of Engineers Specification for Non-Shrink Grout
Other	Department of the Army, Corps of Engineers Manual EM1110-2-2000, Engineering and Design Standard Practice for Concrete

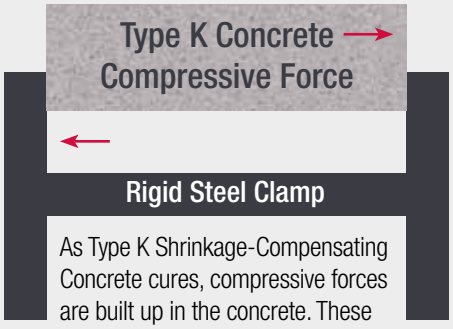
How It Works

Shrinkage-compensating cement is engineered to create controlled expansive forces which create controlled compressive stresses that keep concrete in compression throughout its service life. Though concrete may crack or fail from other causes, such as structural overloading, settlement, or plastic shrinkage, Type K Shrinkage-Compensating Cement can eliminate the most common type of cracking – drying shrinkage cracking.

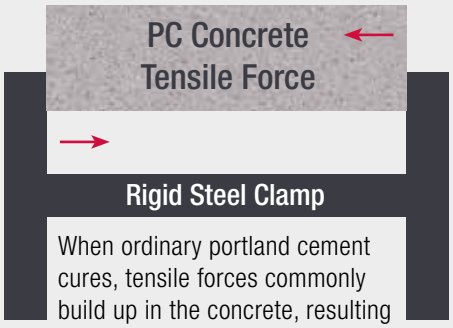
Shrinkage-compensation is similar to placing a concrete bar in a very strong clamp, in which the length of the bar fits tightly within the perimeter limits of the clamp. When the bar is heated, the bar attempts to expand but is unable due to the restraint of the clamp. The bar is now in compression.

Drying shrinkage in concrete is similar to cooling the concrete bar. As the bar cools, the compression is reduced until the bar reaches its original temperature and length. Further cooling of the concrete bar would result in additional shortening, creating a gap between the ends of the bar and the clamp. In concrete, shortening often results in drying shrinkage cracking.

With shrinkage-compensating cement, expansion is caused by the creation of expansive ettringite crystals during hydration which, when restrained, places the concrete in compression. By reducing the detrimental tensile stresses that lead to shrinkage cracking, shrinkage-compensating cement overcomes the challenges drying shrinkage presents and produces a more durable concrete solution with lower life-cycle costs.



As Type K Shrinkage-Compensating Concrete cures, compressive forces are built up in the concrete. These compressive forces make a more durable, crack-free concrete possible.



When ordinary portland cement cures, tensile forces commonly build up in the concrete, resulting in cracking, curling, and shrinking.

Type K Shrinkage-Compensating Cement Technology

TYPE K SHRINKAGE-COMPENSATING CONCRETE is based on expansive, hydraulic, calcium sulfoaluminate (CSA) cement technology. It is a modified derivative of portland cement developed in the 1950s by Professor Alexander Klein and named in his honor as Klein Cement, with CSA known as the Klien Compound. It is now known as Type K Cement (ASTM C845).

Type K Cement is engineered to achieve a higher quality cement that overcomes the shortcomings of traditional portland cement, namely excessive shrinkage, susceptibility to sulfate attack, and destructive reactions with certain aggregates. Type K Cement is used in all types of structures and concrete elements to counteract drying-shrinkage cracking.

Type K Shrinkage-Compensating Concrete is produced by using approximately 15% Komponent and 85% portland cement by weight of cement

Its primary uses are in post-tensioned structures, chemically pre-stressed concrete applications, slab on grade applications, concrete containment, and any concrete use where fewer joints are desired.

Tensile & Compressive Stresses

In shrinkage-compensating concrete, the cement expands during the first week after it is cast, which slightly compresses the concrete. Later, as the concrete dries, it shrinks back to its original size reducing the compression in the concrete. By keeping the concrete in mild compression, and keeping tensile stresses within the concrete lower than its tensile strength, drying shrinkage cracks are prevented. Expansion against restraint causes compressive stress in the concrete that compensates for tensile forces in the concrete due to drying shrinkage.

Restraint

Generally, required restraint for shrinkage-compensating concrete is provided by reinforcing steel, or in the case of System-K floor slabs, non-metallic K-Fibers™.

Steel reinforcement (approximately 0.15%) or two (2) pounds of System-K Fibers per cubic yard are sufficient to provide restraint for Type K concrete. There is no upper limit to the amount of restraint to make Type K Shrinkage-Compensating Concrete work. “Infinite” (100%) restraint, such as casting a slab against an adjacent slab, will induce a compression in concrete of about 100 psi, which reduces drying shrinkage to approximately zero.

Mix Designs

Type K Shrinkage-Compensating Concrete is produced by using approximately 15% Komponent and 85% portland cement by weight of cement. The amount of expansive energy in the concrete is determined by the amount of expansive compound in the cementitious material. The amount of Komponent used in the concrete mix is generally about 60 to 120 pounds per cubic yard. This is determined by design and job requirements. Non-shrink grouts can also be produced using Komponent.

Komponent is sometimes added to high shrinkage aggregate mixes to achieve the same shrinkage level as low shrinkage aggregates. The use of lower levels of Komponent (less than 15%) produces the effects of a shrinkage reducing admixture but does not produce the engineered

performance of Type K shrinkage-compensating concrete. Stress risers in the concrete, such as splicing of the reinforcing bars, re-entrant corners, etc. will sometimes overcome the effects of shrinkage-compensation and small cracks can occur at these locations. Recommended reinforcement detailing and mix designs are provided in the CTS Type K Shrinkage-Compensating Concrete Reference Guide.

Placement & Curing

Type K Shrinkage-Compensating Concrete can be installed using traditional methods and tools. Super flat floor profiles may be obtained using laser screeds and proper finishing techniques.

For best results, Type K Shrinkage-Compensating Concrete must be properly cured, ideally wet cured, for 7 days. This ensures full hydration and designed expansion of the Type K Cement compounds.

Due to the absence of bleed water, finishing of the Type K concrete can begin earlier than the finishing of a traditional concrete slab, saving valuable time on-site.

Joint Spacing

Type K Shrinkage-Compensating Concrete can be installed in large placements, up to 25,000 square feet, without control joints. Crack-free floor slabs have been constructed with Type K Shrinkage-Compensating Concrete with joint spacing up to 150 feet. Significant savings is realized both during installation and in long-term maintenance costs by eliminating saw cut joints and sealing. Curling of floor slabs at joints is also significantly reduced or eliminated, greatly reducing corner breaks and spall repairs.

Engineered to achieve a higher quality cement

ADVANTAGES

Type K Shrinkage-Compensating Cement provides many advantages that make it an attractive solution for the Integrated Project Team

1. **ELIMINATE** restraint-to-shortening challenges in post-tensioned applications
2. **REDUCE** support column movement and shear wall stresses in post-tensioned structures and reduce reinforcing steel
3. **ELIMINATE** pour strips
4. **INCREASE** length between expansion joints (up to a maximum 500 feet with a 3:1 length to width ratio)
5. **REDUCE** waterstops and minimize leakage and seepage points in containment structures
6. **REDUCE** construction joints by 90-95%
7. **IMPROVE** installation efficiency by eliminating control joints and staggered placement patterns
8. **ELIMINATE** slab on grade early-age post-tensioning
9. **INCREASE** durability with less cracking and lower permeability

Common Applications

Endless possibilities

Type K Shrinkage-Compensating Cement technology can be used in any application where regular portland cement concrete is used, including but not limited to reinforced and post tensioned structural slabs, slabs on grade, walls, post-tensioned structures, toppings, grouts and pre-cast elements. It is also used wherever drying shrinkage cracks are not desirable.

Common applications include:

WAREHOUSES
Distribution Centers, Automated Fulfillment Centers, Data Storage

PARKING STRUCTURES
Above and Below Ground

STRUCTURAL CONCRETE

HANGARS

Runways, Taxiways

BRIDGES & VIADUCTS

MULTI-USE BUILDINGS

Retail, Hospitality, Recreational, Business, Residential

MANUFACTURING

Food, Pharmaceutical, Heavy Equipment, Industrial

MASS ELEMENTS

WATER/WASTE CONTAINMENT
Treatment, Storage, Containment

TILT-UP & PRE-CAST
Pre-Formed, Pre-Stressed

RECREATIONAL
Ice Rinks, Tennis Courts, Skate Parks, Swimming Pools

MARINE ENVIRONMENTS
Piers, Wharves, Seawalls

ROOF DECKS
Monolithic, Formed

STRUCTURAL GROUT

And more...

Case Studies

Notable projects

Special K

Durable flooring solutions free of joints, cracks and seams are a top priority in food manufacturing environments. Preventing spaces where bacteria and other microbes can grow is paramount to maintaining hygiene standards and cleanliness in these facilities. Due to the reduced-joint and joint-free options provided by Type K Shrinkage-Compensating Concrete and its proven performance in all types of food manufacturing, processing, cold storage and distribution facilities.

"I've been in this business over 40 years and I've never seen anything so crack-free." *-Don Skundrick, Vice President, LMT, Inc.*

Amy's Kitchen chose Type K concrete floors for a 180,000 sq. ft. facility in Medford, OR to maximize the benefits of Type K Shrinkage-Compensating Concrete. By minimizing joints in the slab, reducing joint placement and treatment costs, reducing shrinkage reinforcement requirements, and speeding time to completion, savings were realized during construction. By preventing shrinkage cracking, edge curling, spalling, joint raveling, and minimizing on-going joint maintenance, significant savings are realized annually in lower maintenance costs. The exceptional outcome, despite the complex sloping and drainage designs and stringent concrete requirements, prompted Don Skundrick, Operations Vice President at LTM Inc., to voice his satisfaction: "I've been in this business over 40 years and I've never seen anything so crack-free."

Efficient Production

Warehouse and distribution center managers face daily challenges to efficiently utilize space and reduce costs. Efficiency in material handling and minimizing maintenance, repair and downtime costs assist in maximizing product throughput and enhancing productivity.

Toyota Motor Corporation chose Type K Shrinkage-Compensating Concrete for its 760,000 sq. ft. distribution and warehousing center located in Ontario, CA to do just that. Floor repairs in various other Toyota facilities due to joint damaged by forklifts and other transport equipment averaged $100,000 annually. Type K allowed the floor slabs to be designed with 90% fewer control joints than traditional slabs and 30-40% greater abrasion resistance, delivering savings in reduced installation costs, floor and joint maintenance, and equipment maintenance. The dimensional stability of Type K enabled super-flat floor designs at 6" and 8" thicknesses, with a surface deviation of less than 1/10" in 10 feet that remain within exceptional super-flat tolerances year-to-year.

Essential Containment

Controlling cracks is always a top priority in concrete structures, but when the structure is a containment tank, it is critical. ASTM C845 Type K Shrinkage-Compensating Concrete was specified by consulting engineering firm Crawford Murphy & Tilly (CMT) for the Springfield Wastewater Treatment Facility Expansion in Springfield, IL to mitigate shrinkage-related cracks, provide improved sulfate resistance, and higher abrasion resistance. Type K also permitted extended joint spacing, larger placements, and consolidated pour sequencing, which helped reduce both the schedule and construction costs. Fewer expansion joints saves construction time, reduces the use of costly joint materials/sealants, eliminates leakage points, and minimizes maintenance over the life of the structure.

The exceptional performance of this project resulted in two additional Springfield treatment plant projects specifying the use of Type K Shrinkage-Compensating Concrete to ensure maximum value and long-term performance of the City's vital wastewater infrastructure.


KOMPONENT®

Contact us

WHETHER YOU'RE BUILDING a new structure, engineering infrastructure, or renovating, restoring or repairing existing concrete elements, CTS Cement's Komponent technology can provide a wide variety of high-performance concrete and concrete repair solutions.

Contact us for assistance with product selection, specifications, samples, mix designs, and other project support needs. CTS Cement's experienced team of engineers, material scientists, technical experts and sales representatives are available to support your next project.

Advancing cement technology

Contact us for assistance with product selection, specifications, samples, mix designs, and other project support needs

CTS CEMENT MANUFACTURING CORPORATION

11065 Knott Avenue, Suite A
Cypress CA 90630

www.CTScement.com
info@CTScement.com
800-929-3030

KOMPONENT®

SYSTEM-K™

Microfiber Reinforced Shrinkage-Compensating Cement Concrete

KOMPONENT™

PRODUCT DATASHEET

DESCRIPTION: SYSTEM-K™ is a microfiber reinforced option for creating high-performance shrinkage-compensating cement concrete for non-structural slabs-on-grade, topping slabs, pan deck applications, and low shrinkage concrete slab-on-grade designs. It incorporates 1/4" synthetic K-Fiber™ and Komponent® that are added to locally sourced portland cement on the job site. 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 floor slab or topping slab. SYSTEM-K minimizes or eliminates drying shrinkage cracking, reduces permeability, provides up to 40% increased abrasion resistance, prevents slab curling, spalling and corner breaks, and helps maintain dimensional stability, and 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. Use K-Fiber and Komponent with Type V portland cement to maximize sulfate resistance performance.

USES: SYSTEM-K™ Microfiber Reinforced Shrinkage-Compensating Cement 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 lowers environmental impact. Production of Komponent® used in SYSTEM-K emits significantly less CO_2 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, deck pan applications, 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 CTS Cement 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 central batch plant or on-site using common bulk cement equiment and incorporation methods. When using bagged units for smaller projects, or portable silos on-site, a high pressure, high shear colloidal slurry machine is used for ease of production and to ensure effective mixing. (Contact CTS Cement for slurry machine support.) Typical mix designs use 90 lbs to 100 lbs of Komponent to replace an equivalent weight of portland cement 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 unit per cubic yard. They disperse easily and will not produce “hairy” concrete. For batching and mixing instructions, refer to the CTS Shrinkage-Compensating Concrete Reference Guide for details.

WATER/CEMENT RATIO: Due to Komponent’s efficient consumption of mix water during hydration, the following water/cement ratios are recommended: Interior placements – 0.45; Exterior placements – 0.50; Dry shake applications – 0.55. 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.

OVERVIEW

Highlights:

- Prevent drying shrinkage cracking
- Reduce control joints up to 90%
- Increase abrasion resistance 30-40%
- Increase durability and lower permeability
- Improve sulfate resistance
- Protect against corrosion and deterioration
- Increase pour 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 Groutinge

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

CURING: For general applications, seven (7) days wet curing is required. For complete production, batching, mixing and curing instructions, refer to the CTS Type K Shrinkage-Compensating Concrete Reference Guide and ACI 223 for details.

COLD WEATHER: Environmental and material temperatures below 70ºF (21ºC) 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 40ºF (4.4ºC) 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 70ºF (21ºC) 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® used in SYSTEM-K™ Microfiber Reinforced Shrinkage-Compensating Cement is available in 90-lb (41-kg) polyethylene-lined bags and 2000-lb (909-kg) bulk bags. It is also available in bulk tanker trucks and railcars. K-Fibers™ are provided separately in pre-packaged, dissolvable bag, 2.2 lb units.

SHELF LIFE: Komponent bagged units used in SYSTEM-K Microfiber Reinforced Shrinkage-Compensating Cement have a shelf life of 6 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. 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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

SYSTEM-K™ Microfiber Reinforced Shrinkage-Compensating Concrete and low shrinkage concrete is made using Komponent® with K-Fibers™ mixed on site with local portland cement.

Listed below are typical mix designs 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	470 lb
Komponent	90 lb
K-Fibers	2.2 lbs
Fine Aggregate, ASTM C33	1095 lb
Coarse Aggregate, ASTM C33	1800 lb
Water	37 gal
Water Reducer, ASTM C949	24 oz

PERFORMANCE	
Slump	5.75 in
Expansion, 7 days (minimum)	0.045%
Compressive Strength, 7 days (minimum)	3400 psi (23.4 MPa)
Compressive Strength, 28 days (minimum)	4500 psi (31.0 MPa)
Specific Gravity, Komponent	2.87 g/cm^3

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

ADDITIVES

DATASHEETS

- SET Control®
- FLOW Control®
- Corrosion Inhibitor
- Bond
- Dark
- Fast
- Fiber
- Light
- Eisenwall® SET® Control

SET CONTROL®

Set Retarding Admixture

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® SET CONTROL® is a retarding admixture that extends the working time when placing and finishing Rapid Set products.

USES: Use SET CONTROL with Rapid Set cement products ONLY. SET CONTROL is ideal when additional working time is needed or to compensate for warm temperatures. One packet of SET CONTROL will extend the initial working time by approximately 10 to 20 minutes in normal conditions and does not reduce the long-term strength. SET CONTROL may be used in combination with other Rapid Set® Concrete Pharmacy® admixtures.

DIRECTIONS: Dissolve SET CONTROL into the mixing water. Use 1 to 4 packets per 50-lb to 70-lb bag of Rapid Set cement products to achieve the desired working time. A trial batch is recommended to fine-tune the working time to match job-site conditions.

SHELF LIFE: SET CONTROL has a shelf life of 12 months when stored properly in a dry location, protected from moisture, out of direct sunlight, and in an undamaged packet.

USER RESPONSIBILITY: Before using Rapid Set products, read current technical data sheet, bulletins, product label and safety data sheet at www.CTScement.com. It is the user's responsibility to review instructions and warnings for any Rapid Set product in current technical data sheet, bulletins, product label and safety data sheet prior to use.

WARNING: CAUSES MILD SKIN IRRITATION. MAY BE HARMFUL IN CONTACT WITH SKIN. CAUSES SERIOUS EYE IRRITATION. 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, immediately wash with soap and water. In case of eye contact, flush immediately and repeatedly with clean water, and consult a physician. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

OVERVIEW

Highlights:

For use with Rapid Set® cement products

Extends working time

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

FLOW CONTROL®

Additive to Increase Strength and Fluidity

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® FLOW CONTROL® is a flow enhancing additive that allows higher fluidity or lower water requirement. Reducing water content by adding FLOW CONTROL will increase the final strength and durability.

USES: Use FLOW CONTROL with Rapid Set cement products. Add 1 to 4 packets of FLOW CONTROL to increase fluidity, and/or increase strength to satisfy jobsite requirements. A trial batch is recommended to fine-tune the dosage. FLOW CONTROL may be used in combination with all other products of the Rapid Set® Concrete Pharmacy®.

DIRECTIONS: Place desired amount of potable water into mixing container. Add half cement product into mixing container and mix with mechanical drill/mixer. Continue mixing while adding FLOW CONTROL 2.1-oz (60-grams) powder to mixing container. Add remaining cement product into mixing container. Follow product mixing instructions and maximum water requirements described on the package of the cement product. Mix to a workable, lump-free consistency. Do NOT exceed 4 packets per 50-lb to 70-lb bag of Rapid Set branded cement product. Too much water in the mixture may cause aggregate segregation, which can reduce strengths.

SHELF LIFE: FLOW CONTROL has 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.

USER RESPONSIBILITY: Before using Rapid Set products, read current technical data sheet, bulletins, product label and safety data sheet at www.CTScement.com. It is the user's responsibility to review instructions and warnings for any Rapid Set product in current technical data sheet, bulletins, product label and safety data sheet prior to use.

WARNING: CAUSES MILD SKIN IRRITATION. MAY BE HARMFUL IN CONTACT WITH SKIN. CAUSES SERIOUS EYE IRRITATION. 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, immediately wash with soap and water. In case of eye contact, flush immediately and repeatedly with clean water, and consult a physician. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

OVERVIEW

Highlights:

- For use with Rapid Set® cement products
- Water reducing additive
- Increases fluidity
- Increases compressive strength

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

CORROSION INHIBITOR

Triple Protection Against Corrosion

PRODUCT DATASHEET

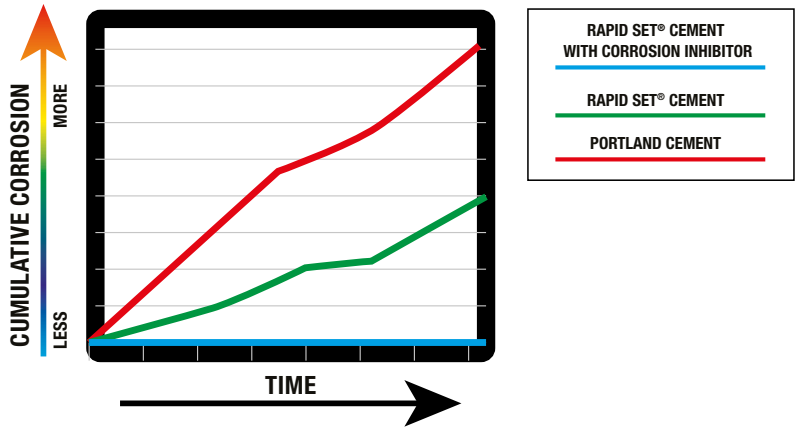
DESCRIPTION: Rapid Set® CORROSION INHIBITOR is a high performance additive designed to extend the life of reinforced concrete structures. Available in individual use packets, CORROSION INHIBITOR is a specialty powder additive that is combined with Rapid Set concrete repair materials during mixing. CORROSION INHIBITOR provides triple protection against corrosion by creating a protective barrier on embedded steel, repelling water and reducing chloride ion permeability.

USES: Use CORROSION INHIBITOR in corrosive environments such as marine applications, high humidity, roadways subject to deicing salt, and severe weathering. CORROSION INHIBITOR may be used in combination with all other products of the Rapid Set® Concrete Pharmacy®.

ENVIRONMENTAL ADVANTAGE: CORROSION INHIBITOR improves construction sustainability by increasing the life of your structure.

DIRECTIONS: Use one 1.7-oz (50-grams) packet of CORROSION INHIBITOR per 50-lb to 70-lb bag of Rapid Set pre-blended concrete repair product. For severe conditions, up to 2 packets may be added. Use only with approved Rapid Set products. Place water into the mixing container. While mixing, add half the dry cement product. While continuing to mix, add CORROSION INHIBITOR packet(s) followed by the remainder of the cement product. Combine with other Concrete Pharmacy products for added performance.

CORROSION POTENTIAL:



OVERVIEW

Highlights:

- Creates a protective barrier on embedded steel
- Acts as a water repellent
- Reduces chloride permeability

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

CORROSION INHIBITOR Triple Protection Against Corrosion

SHELF LIFE: CORROSION INHIBITOR has 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.

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

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 concrete, 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 concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

TYPICAL PHYSICAL DATA

CTS 714 Water Absorption Test Method	
37% reduction in absorbed water*	

ASTM C1202/AASHTO T-277 Chloride Permeability	
28 days	400 to 900 coulombs

*As compared to a sample with no corrosion inhibitors

BOND

Vinyl Polymer Additive

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® BOND is a free-flowing redispersable polymer powder used in a variety of construction applications to improve bond strength and impact resistance.

USES: Use BOND with Rapid Set cement products ONLY. Add 1 to 4 packets of BOND to increase workability, bond strength and impact resistance. A trial batch is recommended to fine-tune the dosage. BOND may be used in combination with all other products of the Rapid Set® Concrete Pharmacy®.

DIRECTIONS: For best results, dry blend BOND packets uniformly into cementitious Rapid Set product. **Use 1 to 4 packets of BOND per 50-lb to 70-lb bag of Rapid Set product.** Follow the mixing instructions described on Rapid Set product packaging.

SHELF LIFE: BOND has 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.

USER RESPONSIBILITY: Before using Rapid Set products, read current technical data sheet, bulletins, product label and safety data sheet at www.CTScement.com. It is the user's responsibility to review instructions and warnings for any Rapid Set product in current technical data sheet, bulletins, product label and safety data sheet prior to use.

WARNING: CAUSES MILD SKIN IRRITATION. MAY BE HARMFUL IN CONTACT WITH SKIN. CAUSES SERIOUS EYE IRRITATION. 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, immediately wash with soap and water. In case of eye contact, flush immediately and repeatedly with clean water, and consult a physician. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

OVERVIEW

Highlights:

- For use with Rapid Set® cement products
- Increase bond strength
- Add vinyl fortifier to any concrete, mortar or grout

MasterFormat® 2016

03 05 00	Concrete Bonding Agents, Admixtures and Adhesives

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

DARK

Gray Pigment Admixture

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® DARK is a pigment additive that darkens the color. Use varying amounts of achieve desired shades of gray.

USES: Use DARK with Rapid Set cement products ONLY. Add packets of DARK to achieve desired shade of gray. A trial batch is recommended to fine-tune the dosage. DARK may be used in combination with other Rapid Set® Concrete Pharmacy® products.

DIRECTIONS: Dry blend DARK packets uniformly into cementitious Rapid Set product. Add as many packets as needed to achieve desired tinting. Follow the mixing instructions described on Rapid Set product packaging.

SHELF LIFE: DARK has 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.

USER RESPONSIBILITY: Before using Rapid Set products, read current technical data sheet, bulletins, product label and safety data sheet at www.CTScement.com. It is the user's responsibility to review instructions and warnings for any Rapid Set product in current technical data sheet, bulletins, product label and safety data sheet prior to use.

WARNING: CAUSES MILD SKIN IRRITATION. MAY BE HARMFUL IN CONTACT WITH SKIN. CAUSES SERIOUS EYE IRRITATION. 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, immediately wash with soap and water. In case of eye contact, flush immediately and repeatedly with clean water, and consult a physician. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

OVERVIEW

Highlights:

For use with Rapid Set® cement products

Darken the color of your mixture

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

FAST

Accelerating Additive

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® FAST is an admixture designed to accelerate the hardening of Rapid Set products in low temperatures.

USES: Use FAST with Rapid Set cement products ONLY. FAST is ideal when accelerated strength is needed due to lower temperatures. FAST may be used in combination with other Rapid Set® Concrete Pharmacy® admixtures.

DIRECTIONS: Dissolve FAST into the mixing water. Use 1 to 5 packets per 50-lb to 70-lb bag of Rapid Set product to achieve the desired acceleration. Mechanically mix to complete dispersion (1 to 2 minutes). Add Rapid Set product to accelerated mix water. Cement will harden quickly while mixing.

SHELF LIFE: FAST has a shelf life of 12 months when stored properly in a dry location, protected from moisture, out of direct sunlight, and in an undamaged packet.

USER RESPONSIBILITY: Before using Rapid Set products, read current technical data sheet, bulletins, product label and safety data sheet at www.CTScement.com. It is the user's responsibility to review instructions and warnings for any Rapid Set product in current technical data sheet, bulletins, product label and safety data sheet prior to use.

WARNING: CAUSES MILD SKIN IRRITATION. MAY BE HARMFUL IN CONTACT WITH SKIN. CAUSES SERIOUS EYE IRRITATION. 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, immediately wash with soap and water. In case of eye contact, flush immediately and repeatedly with clean water, and consult a physician. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

OVERVIEW

Highlights:

- For use with Rapid Set® products
- Designed for applications in low temperatures

MasterFormat® 2016

03 05 00	Concrete Bonding Agents, Admixtures and Adhesives

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

FIBER

Synthetic Fiber Reinforcement

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® FIBER is a 100% pure 1/2" polypropylene multifilament fiber containing no reprocessed materials. FIBER increases impact resistance and helps prevent shrinkage cracking in concrete, mortar, and grout mixes.

USES: FIBER is designed for use with Rapid Set products. Multiple FIBER packets may be used to achieve the required reinforcement. FIBER may be used in combination with all other Rapid Set Concrete Pharmacy® products.

DIRECTIONS: For best results, dry blend FIBER packets uniformly into cementitious Rapid Set product. Add FIBER packets as required to concrete, mortar, and grout mixtures. Follow the mixing instructions described on Rapid Set product packaging.

SHELF LIFE: FIBER has a shelf life of 12 months when stored properly in a dry location, protected from moisture, out of direct sunlight, and in an undamaged packet.

USER RESPONSIBILITY: Before using Rapid Set products, read current technical data sheet, bulletins, product label and safety data sheet at www.CTScement.com. It is the user's responsibility to review instructions and warnings for any Rapid Set product in current technical data sheet, bulletins, product label and safety data sheet prior to use.

WARNING: CAUSES MILD SKIN IRRITATION. MAY BE HARMFUL IN CONTACT WITH SKIN. CAUSES SERIOUS EYE IRRITATION. 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, immediately wash with soap and water. In case of eye contact, flush immediately and repeatedly with clean water, and consult a physician. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

OVERVIEW

Highlights:

- Designed exclusively for Rapid Set® products
- Increase abrasion and crack resistance

MasterFormat® 2016

03 24 00 Fibrous Reinforcing

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

LIGHT

White Pigment Admixture

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® LIGHT is a pigment additive that lightens the color of the mixture. Use varying amounts of achieve a desired tint.

USES: Use LIGHT with Rapid Set cement products ONLY. Add packets of LIGHT to achieve a desired tint. A trial batch is recommended to fine-tune the dosage. LIGHT may be used in combination with other Rapid Set® Concrete Pharmacy® products.

DIRECTIONS: Dry blend LIGHT packets uniformly into cementitious Rapid Set product. Add as many packets as needed to achieve a desired tint. Follow the mixing instructions described on Rapid Set product packaging.

SHELF LIFE: LIGHT has 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.

USER RESPONSIBILITY: Before using Rapid Set products, read current technical data sheet, bulletins, product label and safety data sheet at www.CTScement.com. It is the user's responsibility to review instructions and warnings for any Rapid Set product in current technical data sheet, bulletins, product label and safety data sheet prior to use.

WARNING: CAUSES MILD SKIN IRRITATION. MAY BE HARMFUL IN CONTACT WITH SKIN. CAUSES SERIOUS EYE IRRITATION. 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, immediately wash with soap and water. In case of eye contact, flush immediately and repeatedly with clean water, and consult a physician. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

OVERVIEW

Highlights:

- Designed exclusively for Rapid Set® products
- Lighten the color of your mixture

Manufacturer:

CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

EISENWALL® SET CONTROL®

Set Retarding Admixture

PRODUCT DATASHEET

DESCRIPTION: Rapid Set® EISENWALL® SET CONTROL® is a retarding admixture that extends the working time when placing and finishing Rapid Set EISENWALL branded products.

USES: Use EISENWALL SET CONTROL with Rapid Set EISENWALL branded cement products ONLY. EISENWALL SET CONTROL is ideal when additional working time is needed or to compensate for warm temperatures. One packet of EISENWALL SET CONTROL will extend the initial working time by approximately 10 to 20 minutes in normal conditions and does not reduce the long-term strength. EISENWALL SET CONTROL may be used in combination with other Rapid Set® Concrete Pharmacy® admixtures.

DIRECTIONS: Dissolve EISENWALL SET CONTROL into the mixing water. Add up to 2 packets as needed to achieve the desired hardening results. Each packet is designed to add 30 to 60 minutes of working time to each 88-lb bag of Rapid Set EISENWALL.

SHELF LIFE: EISENWALL SET CONTROL has a shelf life of 12 months when stored properly in a dry location, protected from moisture, out of direct sunlight, and in an undamaged packet.

USER RESPONSIBILITY: Before using Rapid Set products, read current technical data sheet, bulletins, product label and safety data sheet at www.CTScement.com. It is the user's responsibility to review instructions and warnings for any Rapid Set product in current technical data sheet, bulletins, product label and safety data sheet prior to use.

WARNING: CAUSES MILD SKIN IRRITATION. MAY BE HARMFUL IN CONTACT WITH SKIN. CAUSES SERIOUS EYE IRRITATION. 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, immediately wash with soap and water. In case of eye contact, flush immediately and repeatedly with clean water, and consult a physician. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Please refer to the SDS and 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's 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.

OVERVIEW

Highlights:

Retarder additive designed for use with Rapid Set® Eisenwall®

Extends working time

Manufacturer:

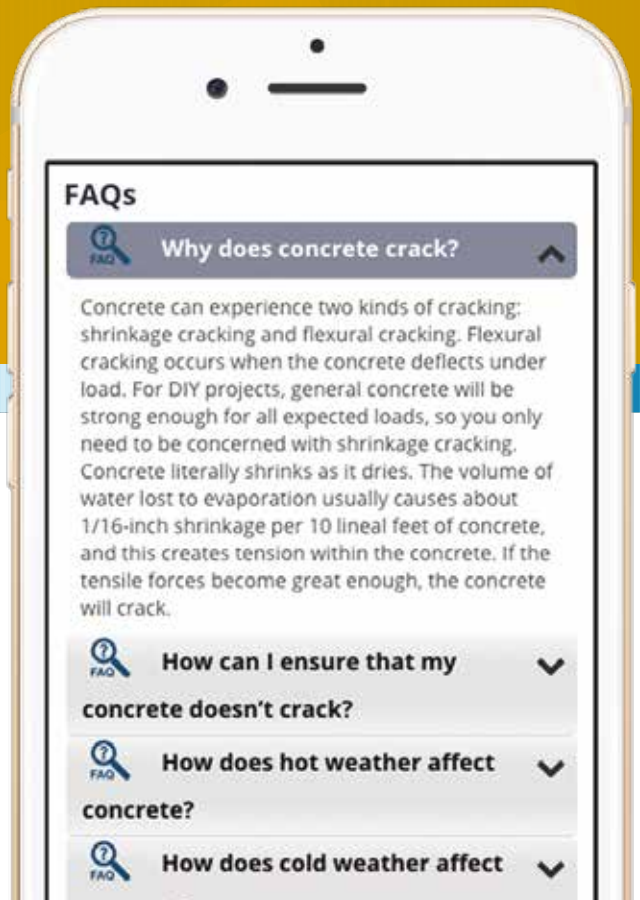
CTS Cement Manufacturing Corp.
11065 Knott Ave., Suite A
Cypress, CA 90630
Tel: 800-929-3030 | Fax: 714-379-8270
Web: www.CTScement.com
E-mail: info@CTScement.com

RESOURCES & SUPPORT

STILL HAVE QUESTIONS?

We are here for you! CTS Cement Manufacturing offers a large amount of resources that are available 24 hours a day on our website. Visit www.CTScement.com to find information on:

- Frequently Asked Questions
- SDS Sheets
- Product Specifications
- Technical Bulletins



DID YOU KNOW?

If you still have questions, you can give us a call at our corporate office from 8:00am-5:00pm PST

1(800) 929-3030

CTS CEMENT

CUSTOMER SUPPORT

CTS Customer Support helps you reach your goals! We are consistantly recognized for providing superior service. We offer extensive support, training, and programs to help our customers reach their goals. Sell, use, or specify our products, and gain the following benefits:

- Educational Services
- Website Tools
- Technical Support
- Jobsite Support
- Displays & Point of Sale Signs
- Brochures & Catalogs
- Joint Sales / Business Calls
- Job Leads
- Store Service
- Vendor Events
- Product Knowledge Classes

EDUCATIONAL SEMINARS

We offer educational sessions for contractors, engineers, architects, and municipalities so they have a better understanding and more options to make better choices. The educational sessions focus on industry information, product knowledge, and technical training.

WEBSITE TOOLS

An extensive knowledge base is accessible at www.CTScement.com. CTS has built an online community for specialty cement products. Product specifications, datasheets, and MSDS are all available for easy and convenient download.

TECHNICAL SUPPORT

Call us with your questions and our Technical Support Team will be glad to help. Call 1-800- 929-3030, press “0” and ask for Tech. Support between the hours of 7:30 a.m. to 4:30 p.m. PST.

JOBSITE SUPPORT

Our team of experts is available to assist contractors and engineers with jobs. We can help get crews up to speed so that the finished results are satisfactory, and answer any questions.

DISPLAYS & POINT OF SALE SIGNS

We produce standard and custom displays, and point of sale signs for all merchandising solutions. Our merchandising and product packaging is clean, easy to understand, and shopper friendly.

BROCHURES & CATALOGS

We supply complimentary product literature that shows the advantages, benefits, and applications of our products. The literature works as an effective selling tool for your sales team and provides answers to your customers' technical questions.

JOINT SALES / BUSINESS CALLS

We will partner with your sales team to generate new business. Once you find new business, our sales team is always available for further support.

JOB LEADS

We provide job leads and product support for your sales team. Our advertising and promotions plan, direct mail program, and trade shows generate leads that we share with our dealers, retailers, and contractors.

STORE SERVICE

Our team thoroughly services your stores so that they are maintained on a consistent basis. We clean fixtures, organize and stock product, build displays, and install point of sale signs. We work with you to maintain adequate inventory levels within appropriate delivery times.

VENDOR EVENTS

We participate in a wide range of vendor events from trade shows and contractor events, to kids' clinics and grand openings, and much more. Our demonstrations and hands-on activity are proven to generate interest from attendees and bring positive exposure to our retailers and dealers.

PRODUCT KNOWLEDGE CLASSES

We provide training and hands-on demonstrations to make sure our retailers have a well-trained staff. Store employees who have participated in Product Knowledge Classes are more confident and competent, and generate significant sales increases.


MORTAR MIX
SKIMCOAT

CEU COURSES

CEU COURSES

13 AIA approved sessions are available to meet your educational needs related to concrete and concrete repair materials, overlays and toppings, decorative overlays, polished concrete, and geotechnical solutions. To learn more about using CSA advanced cement technologies to get exceptional results on your projects, review our index of CEU Programs on the following pages, or online at www.CTScement.com

DID YOU KNOW?

For your convenience, on site presentations are available to maximize the time invested for your entire design team. Contact us today to schedule your next learning opportunity!

CEU Course Index

Presented by CTS Cement Mfg. Corp. | AIA Provider: H931

CTS Cement is proud to be a recognized Provider of CEU courses for the Design & Construction community. Our program offers valuable information on a variety of topics related to concrete and concrete repair materials. We offer Learning Units related to:

- Calcium Sulfoaluminate (CSA) Cement Technology
- Type-K Shrinkage Compensating Concrete
- Polished Concrete
- Rapid Hardening Hydraulic Cement Materials

For your convenience, on site presentations are available to maximize the time invested for your entire design team. Contact us today to schedule your next learning opportunity!

www.ctscement.com (800) 929-3030

TYPE-K SHRINKAGE COMPENSATING CONCRETE

Design with Confidence Using Type-K Shrinkage Compensating Concrete in Commercial Project Designs

This session provides an overview of Type-K Shrinkage Compensating Concrete (SCC) and its use in common commercial applications. Its ability to minimize key challenges in concrete applications, like cracking, curling and drying shrinkage are discussed, as well as the advantages it offers in joint placement design and reduced in-service operations and maintenance costs. Guidelines for designing and specifying Type-K are reviewed, as well as specification and installation "best practices" to ensure durable, long-term performance. ***KSCC0615 (1 LU)***

Design with Confidence Using Type-K Shrinkage Compensating Concrete in Industrial Project Designs

This course provides an overview of Type-K Shrinkage Compensating Concrete (SCC) and its use in common industrial applications. Its ability to minimize key challenges in concrete applications, like cracking, curling and drying shrinkage are discussed, as well as the advantages it offers in joint placement design and reduced in-service operations and maintenance costs. Guidelines for designing and specifying Type-K are reviewed, as well as specification and installation "best practices" to ensure durable, long-term performance. ***KSCC0515 (1 LU)***

Understanding Type-K Shrinkage Compensating Concrete in Bridge & Highway Design

This session reviews the fundamentals of Type-K Shrinkage Compensating Concrete technology and its use in Bridge & Highway construction projects. A review of key performance advantages of Type-K is provided, along with common industry applications, key design considerations, specification recommendations, and best practices to ensure maximum long-term performance and successful installations. ***BSCC0315 (1 LU/HSW)***

Understanding Type-K Shrinkage Compensating Concrete in Water Management & Wastewater Treatment Facility Designs

This course reviews the fundamentals of Type-K Shrinkage Compensating Concrete technology and its use in Water Management and Wastewater Treatment construction projects. A review of key performance advantages of Type-K is provided, along with common industry applications, key design considerations, specification recommendations, and best practices to ensure maximum long-term performance and successful installations.

WWSCC0515 (1 LU)

RAPID HARDENING HYDRAULIC CEMENT MATERIALS

Designing Performance & Project Efficiencies into Concrete Structures Using Rapid Hardening Hydraulic CSA Cement

This session reviews basic calcium sulfoaluminate (CSA) cement technology and how it differs from standard cement materials. Performance advantages of Rapid Hardening Hydraulic Cement Materials (ASTM C1600) based on CSA compounds are reviewed, as well as project efficiencies that can be achieved when using CSA cement based concrete and concrete repair materials. Common products readily available in the marketplace for commercial, industrial and infrastructure applications use are reviewed, as well as design, installation and specification considerations. An overview of CSA's sustainability aspects and LEED credit potential is also provided. ***RS0615 (1 LU)***

Maximizing Efficiency & Long-Term Performance with Rapid Hardening Hydraulic Cement Materials for Concrete Rehabilitation & Repair Projects

This course discusses key challenges related to durability and compatibility of repair materials in concrete rehabilitation & repair projects. The performance advantages of Rapid Hardening Hydraulic Cement Materials (ASTM C1600) based on calcium sulfoaluminate (CSA) compounds are reviewed, along with the various materials available for concrete rehabilitation and repair in industrial, institutional, and commercial projects. Sustainability advantages are discussed, as well as design, installation and specification recommendations to ensure maximum long-term performance. ***RS0515 (1 LU)***

Understanding the Advantages of High-Performance, Fast Setting, Calcium Sulfoaluminate (CSA) Cement Materials for Tunneling & Mining Applications

This session reviews basic calcium sulfoaluminate (CSA) cement technology and how it differs from standard cement materials. Performance advantages of Rapid Hardening Hydraulic Cement Materials (ASTM C1600) based on CSA compounds are reviewed, as well as project efficiencies that can be achieved when using CSA cement based shotcrete, structural grouts, flowable fill and other common industry materials. Underground mining, construction, excavation and tunneling applications are reviewed, along with design, installation and specification considerations. An overview of CSA's sustainability aspects and LEED credit potential is also provided. ***RSTM0615 (1 LU)***

Maximizing the Advantages of Rapid Hardening, Calcium Sulfoaluminate (CSA) Cement Materials for Commercial & Recreational Shotcrete Applications

This session reviews basic calcium sulfoaluminate (CSA) cement technology and the performance advantages of Rapid Hardening Hydraulic Cement Materials (ASTM C1600). Project efficiencies that can be achieved when using CSA cement based shotcrete, structural grouts, flowable fill and other common industry materials in commercial and recreational applications are reviewed, along with installation and specification considerations. An overview of CSA's sustainability aspects and LEED credit potential is also provided.

RSSHTC0715 (1 LU)

POLISHED CONCRETE

Maximize Durability, Design Versatility & Installation Efficiency in Polished Concrete Designs

This course reviews the key aspects of designing, specifying and installing beautiful, resilient, polished concrete floors & polished overlayments. Essential substrate preparation considerations and joint treatment are reviewed, as well as material options engineered to maximize durability and installation efficiency for new and rehabilitation/repair projects. You'll discover the design versatility polished concrete finishes offer, as well as important specification recommendations and best practices to ensure successful installations and long-term performance. ***PCTRU0415 (1 LU)***

CALCIUM SULFOALUMINATE (CSA) CEMENT TECHNOLOGY

Designing for Maximum Durability, Service-Life and Minimal Maintenance in New Concrete Structures and Concrete Repair & Renovation Projects with CSA (Calcium Sulfoaluminate) Cement

This course discusses key durability, longevity and maintenance challenges faced in concrete structures and concrete repair & renovation projects and reviews the science, technology and performance advantages calcium sulfoaluminate (CSA) cement offers in today's built environment. Common materials and practical applications of use in infrastructure, industrial, institutional, and commercial market segments are reviewed. Participants will understand how this high-performance cement technology achieves durable, low maintenance, long-life concrete solutions, and maximizes design versatility. Industry standards and best practices are reviewed, as well as specification recommendations to ensure successful installations and long-term performance.

CSAT0415 (1 LU)

Using Advanced Concrete & Concrete Repair Solutions in Commercial Project Designs

This course provides an overview of concrete and concrete repair solutions for commercial projects engineered with calcium sulfoaluminate (CSA) cement technology. An overview of key performance advantages in commercial project design is provided, with a focus on durability, installation efficiencies, reduced operations and maintenance costs, and design versatility. Common products used in commercial, hospitality, recreational, and retail projects will be reviewed, as well as an overview of the sustainability advantages of CSA cement. Participants will gain an understanding of how CSA cement contributes to long-term durability, extended asset life, and reduced life-cycle costs. ***CSACOMM0515 (1 LU)***

Using High-Performance Concrete & Concrete Repair Materials for Civil & Military Aviation Projects

This course reviews common challenges related to concrete and concrete repair within the aviation industry. An overview of calcium sulfoaluminate (CSA) cement technology is provided, along with detailed discussion regarding the key performance advantages of CSA cement based materials. Long-term durability, extended service life, installation efficiencies, reduced downtime, and reduced operations and maintenance costs are discussed. Common CSA-cement based products used within the industry are reviewed, as well as the sustainability advantages of CSA cement technology.

CSAAV0615 (1 LU)

CTS Cement Manufacturing Corp. is proud to be a recognized Provider of CEU courses for the Design, Engineering & Construction communities. Our program offers valuable information on a wide variety of topics related to CSA cement, concrete, and concrete repair for commercial, industrial, institutional, infrastructure, aviation, and tunneling and mining applications, including architectural overlays and polished concrete, for new and renovation/rehabilitation projects.

CTS Cement Manufacturing Corp. ● (800) 929-3030 ● info@ctscement.com

TAKE THE POLISHED CONCRETE OVERLAYMENTS COURSE

and receive Continuing Education Units (CEUs)

Visit www.CTScement.com/afsb

Learning Objectives

- Identify and recognize the characteristics of low moisture, fast curing self-leveling overlayments that can be polished to create a final finish.
- Investigate the design potential and innovative opportunities in using polished concrete overlayments in a variety of commercial, industrial, and residential buildings.
- Assess the functional contributions of polished concrete overlayments for their contributions to green and sustainable building design.
- Specify polished concrete overlayments with a variety of properties and formulate appropriate selections related to specific applications.

Credits: 1.00 HSW
Price: FREE

NOTES

NOTES

NOTES

CTS Cement Manufacturing Corp. | 11065 Knott Avenue, Cypress, CA 90630 | www.CTScement.com