




American Concrete Institute®
Advancing concrete knowledge

Shrinkage-Compensating Concrete—Past, Present, and Future, Part 2

ACI Fall 2012 Convention
October 21 – 24, Toronto, ON

ACI
WEB SESSIONS



Jason Barnes, President, Green Umbrella,
Sheridan, AR

ACI
WEB SESSIONS

REVOLUTION

- PRESENTERS
- Larry Valentine
 - ShrinkageComp Plus
- Jason Barnes
 - Green Umbrella

LATEST EDITION



ACI 223R-10
Guide for the Use of
Shrinkage-Compensating Concrete
Reported by ACI Committee 223



American Concrete Institute®

REVOLUTIONS

- REVOLUTION #1
TYPE G SHRINKAGE-COMPENSATING CONCRETE
- REVOLUTION #2
COMPONENTS

TYPE G

- A NEW SHRINKAGE-COMPENSATING CONCRETE DESIGNATION
- USER FRIENDLY
- ECONOMICAL

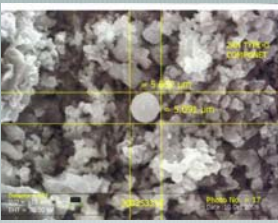
COMPONENTS

- NOT A CEMENT
- NOT AN ADDITIVE
- USER FRIENDLY
- ECONOMICAL

COMPONENTS

- Mineral based
- Cementitious
- Dry
- User Friendly
- Economical

TYPE G PLATELET



LENGTH CHANGE COMPARISON

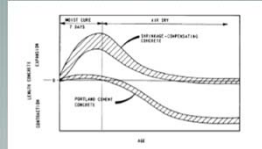


Fig. 4.1—Typical length change characteristics of shrinkage-compensating concrete and portland-cement concretes (ACI 222-98).

CONCRETE GROWTH

- STARTS WITH MIXING
- PLASTIC STAGE - PLACEMENT
- INITIAL SET
 - CONCRETE STARTS TO SET/HARDEN
 - BONDING BEGINS
 - RESTRAINT STARTS TO FORM

CONCRETE GROWTH

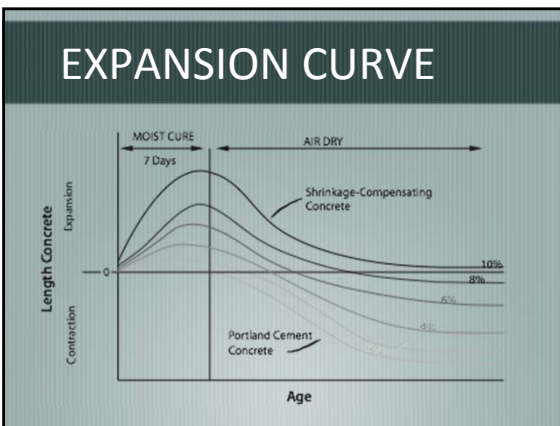
- COMPRESSIVE STRESS INCREASES
- MAXIMUM EXPANSION REACHED
- MAXIMUM RESTRAINT REACHED
- RELAXATION STARTS
- RETURNS TO AS CAST VOLUME

PRIMARY ADVANTAGES

- SHRINKAGE CRACKS ELIMINATED
- CONTRACTION JOINTS ELIMINATED
- EDGE CURLING ELIMINATED

SECONDARY ADVANTAGES

- INCREASED DURABILITY
- INCREASED SUSTAINABILITY
- GREENER CONSTRUCTION
- ECONOMICAL CONSTRUCTION



DOSAGE RATES

Recommend trial dosage rates

- 10% Structural Reinforcing
- 8% Temperature Reinforcing
- 4% SRA results
- 0% Shrinkage Cracking

W/CM RATIO

TYPE G

- As specified standard
- Include Type G in total cementitious

TYPE K

- Increase – Table 6.1 ACI 223R-10
- 0.60 to 0.63 for 4000psi
- 7 day water cure
- Ettringite formulation

TYPE COMPARISONS

Design

- Type G & Type K Identical

Construction

- Type G – Standard
- Type K – Special techniques & procedures

Structure

- Type G & Type K Identical

TYPE K CONSTRUCTION

- Requires water for ettringite formation
 - Higher w/cm ratio
 - Keep moist - fog misters
 - 7 day water cure
- Chemically reactive
 - Mix design varies
 - Mix design constant

TYPE K CONSTRUCTION - 2

ACI 223R-10, Section 7.1.4

- 90°F Concrete temperature limitation
- Mix time limitations

TYPE G CONSTRUCTION

TRANSPARENT

COST ADVANTAGES

- Components vs Cements
- Lower production costs
- Lower transportation costs
- No dedicated silo

REVOLUTION CONCLUSIONS

- Component economy
 - As compared to cements
- Type G vs. Type K
 - Lower dosage
 - Cheaper shipping
 - User friendly
- Economical construction cost

REVOLUTION CONCLUSIONS

- Lowest life cycle costs
 - Less concrete maintenance
 - Less joint maintenance
 - Greater durability
- Greener Construction
- Sustainability

QUESTIONS

