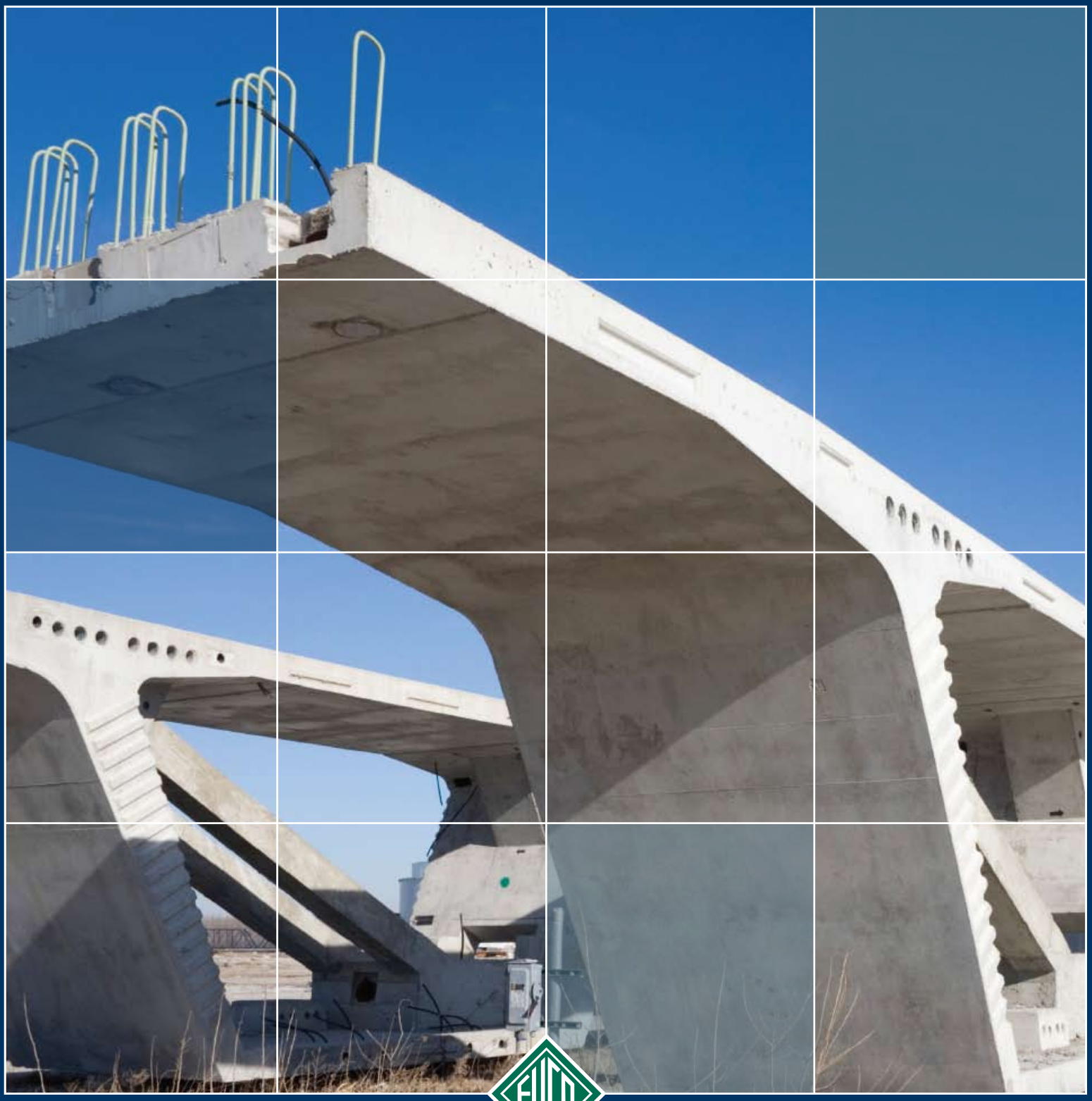
The Euclid Chemical Company

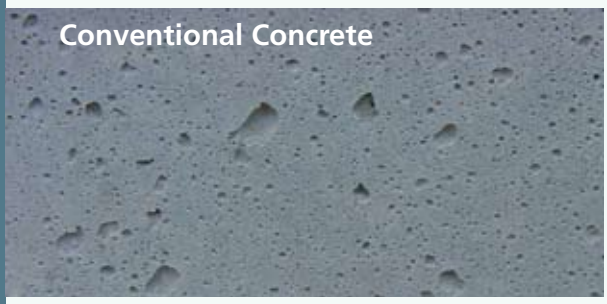


Self-Consolidating Concrete

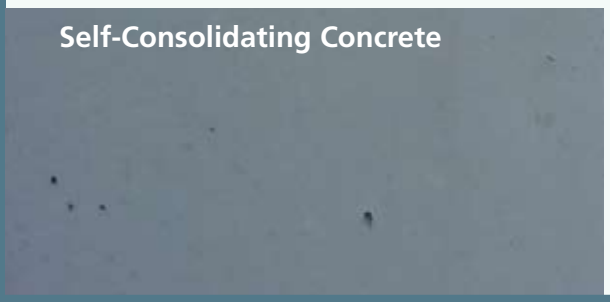
What is Self-Consolidating Concrete (SCC)

Self Consolidating Concrete (SCC) is defined as a concrete mixture that can be placed purely by means of its own weight with little or no vibration while providing a smooth surface finish. Since its inception, the use of SCC in the construction industry has grown tremendously. The development of high performance polycarboxylate admixtures make it possible to create "flowing" concrete without compromising compressive strength or long term durability.

Labor and time drive up costs for concrete producers and contractors. SCC saves time and money by reducing wear and tear of equipment and improves the working environment of employees. SCC can achieve very high early stripping strengths and provide a quicker turn around time for formwork. The smooth surface finish minimizes or eliminates the need for time consuming cosmetic repairs.



Conventional concrete that has been placed into a form and vibrated commonly exhibits defects or "bugholes". Concrete producers and contractors spend valuable time and money repairing these surface imperfections.



Self-Consolidating Concrete that has been placed with little or no vibration can achieve a very smooth and consistent appearance.

Applications

Precast Concrete
Architectural Concrete
Pumped Concrete
Residential Structures
Civil Projects

Benefits

SCC Will Increase:
- Early stripping strengths
- Productivity
- Design flexibility
- Pumpability

SCC Will Reduce:
- Overall production costs
- Wear and tear on equipment
- Concrete discharge and placement time
- Noise levels
- Time consuming cosmetic repairs

Quality is in the Mix

SCC looks very different than conventional concrete while mixing. Concrete producers must "re-train their eyes" for this very fluid concrete as it turns corners and fills forms. Traditionally, concrete that had the fluidity of SCC had a very high water-to-cement ratio that lowered compressive strengths and compromised durability. Properly designed SCC can save time and labor without sacrificing performance.

Euclid Chemical Admixtures for Self-Consolidating Concrete

Euclid Chemical's admixtures are designed for the production of quality SCC for projects of all sizes and under the most demanding of conditions. Whatever the application calls for, Euclid Chemical's ability to utilize technology, engineering and service gives you the formula you need to optimize your Self-Consolidating Concrete's function and performance.

Euclid Concrete Admixtures

High Range Water Reducers

All Euclid Chemical High Range Water Reducers meet ASTM C-494, Type F Requirements.

- **Plastol Ultra 109, Plastol 5700, Plastol 6200EXT, Eucon SPJ and Eucon SPC**

Euclid Chemical's family of polycarboxylates utilize state of the art technology to produce consistent quality SCC with high early and ultimate compressive and flexural strengths.

Viscosity Modifiers

- **Visctrol and Eucon ABS**

Viscosity Modifying Admixtures (VMA) are formulated to help control bleeding and segregation of SCC that does not have an optimum gradation of aggregates.

SCC Put to the Test

One way to quantify the flowing characteristics is to conduct a "slump flow" test. Traditionally, a slump test (ASTM C-143) is used to judge plasticity. The unique properties of Self-Consolidating Concrete require some modifications to the slump test. No rodding is required and the subsequent flow of concrete is measured by the diameter of the spread.

Standard Test Methods

- ASTM C1621: Slump Flow of SCC
- ASTM C1621: Passing Ability of SCC by J Ring
- ASTM C1610: Static Segregation of SCC Using Column Technique

This test demonstrates how conventional concrete with an 8.5 inch slump does not find its way through dense rebar.

Self-Consolidating Concrete with a 28" spread (710 mm) flows easily through dense rebar.

The "slump flow" test is used to measure the diameter of the SCC spread.

ASTM C 1621 describes the J-Ring procedure which measures the passibility of SCC.

The "L" box is used to determine the ability of SCC to flow through congested rebar.

The "V" funnel is used to determine how quickly SCC passes through a restricted area.

Self-Consolidating Concrete

Getting Started

SELF CONSOLIDATING CONCRETE must be produced using best practices for quality control and production. These types of concrete mixtures can be particularly sensitive to mixture ingredients, aggregate moisture and admixture dosage rates. Because the most important properties of SCC are flow and stability, Euclid Chemical can provide high range water reducers along with other products to modify the viscosity of the mixture. SCC typically has higher amounts of cementitious materials and fines when compared to conventional concrete and must always have a well-graded aggregate distribution. Hauling distances, weather conditions and mixing equipment can also have an impact on the stability of a quality SCC mixture. Euclid Chemical manufactures and supplies various admixtures and other products to aid in the production, placement and curing of SCC.

Typical Mix Design		
Material	**(lb/yd³)**	**(kg/m³)**
Cement	740	435
Fine Aggregate	1400	830
Coarse Aggregate	1550	915
Water	310	183
w/cm	0.42	0.42
Euclid Admixtures	**(oz/cwt)**	**(mL/100kg)**
Plastol Ultra 109	8	520
Visctrol	2	130

Typical Concrete Properties		
Plastic Properties		
Setting Time	8-10 Hrs	
Slump/Flow	23-28 in.	585-710mm
Hardened Properties	**(psi)**	**(MPa)**
1 Day Compressive Strength	3200 - 3700	22 - 26
7 Day Compressive Strength	4500 - 5000	31 - 35
28 Day Compressive Strength	6000 - 6500	41 - 45

Note: Mix criteria shown is a typical SCC design with hardened property values. Actual results may vary depending on mix conditions and materials.

Applicable Standards and Specifications:
• ACI 237 – Self-Consolidating Concrete

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The Euclid Chemical Company *serves the global building market as an ISO 9001:2000 supplier of specialty products and support services for the concrete and masonry construction industry. Marketed under the Baracade, Dural, Euco, Eucon, Speed Crete and Tamms brands, we offer a full line of admixtures, repair and maintenance products based on the latest technologies. We provide complete specification assistance and laboratory support as well as on-site service for guidance on proper product usage. EUCO materials are warehoused in over 200 locations in the USA and are available world-wide through international affiliates.*