

RUSSTECHNICAL NOTES

SRA-157

APPLICATION PROCEDURES

OVERVIEW:

SRA-157 is a liquid shrinkage-reducing admixture, which can be used in any Portland cement-based product to significantly decrease drying shrinkage. **SRA-157** functions by blocking capillaries of pore water, which is the major mechanism that causes drying shrinkage in concrete. **SRA-157** when added to concrete at a rate of 2 % by weight of cementitious can reduce shrinkage (ASTM C 157) by up to 80% at 28 days of age and by up to 50% at one year of age.

USES:

- Where volume reduction or shrinkage of the concrete or grout mix needs to be reduced
- Where cracking is a durability or aesthetic concern and needs to be greatly reduced or possibly eliminated
- Where a reduction in creep or curling of concrete slabs is desired
- Where the effects of high shrinkage aggregates need to be offset

DOSAGE:

SRA-157 is recommended for use at a dose of 1.0% to 2.5% by weight of cementitious materials. For maximum effectiveness, use 2.5% by weight of cementitious. For example, a mix containing 600 lbs. /yard, 2% equates to 12 lbs. /yard or 1.5 gals. /yard. The shrinkage reduction is generally linear with the dosage within the recommended dosage range, so any dosage within this range can be selected based on the degree of shrinkage reduction desired.

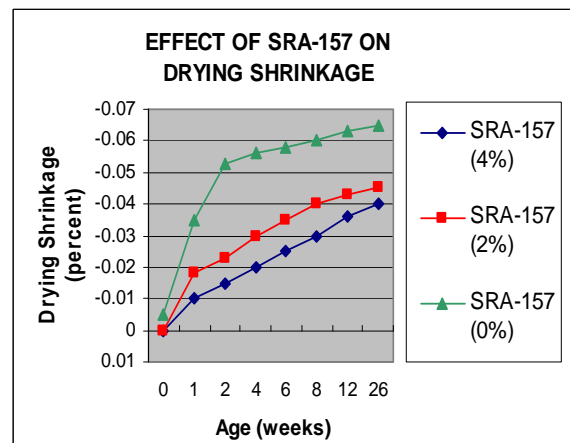
PLASTIC CONCRETE:

If **SRA-157** is substituted in the mix with an equal amount of water reduced, there is little or no effect on the slump.

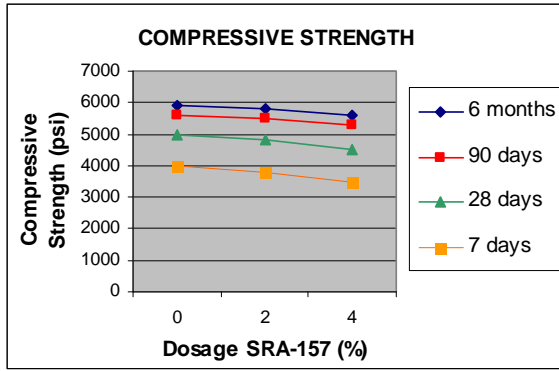
The initial set times typically are retarded by about 1 to 2 hours and will improve slump retention. Air entrainment dosage requirements need to be increased when incorporating **SRA-157** to reach normal air contents. In concrete that will be exposed to freezing and thawing, tighter air content tolerances ($7\% \pm 1\%$) are recommended. **SRA-157** treated concrete will create differences between air meter measurements and actual hardened air contents. This difference usually is 2%-3% lower hardened air content than the meter reading. Also, bleed rates may be increased by approximately 10% over a normal concrete mix design.

MIX PERFORMANCE DATA:

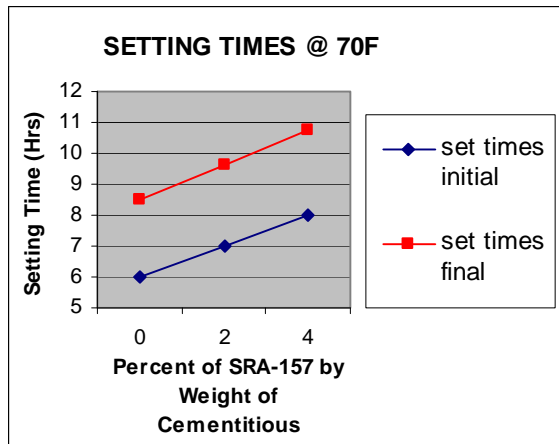
450 lbs. of Type I cement per cubic yard
100 lbs. of Class F flyash per cubic yard
5 ozs./cwt. of **SUPERFLO 2000RM**
Air Content: 6.0%
Slump Plain: 5.0 inches (25.4 mm)
Water/cementitious ratio: 0.44



Mix designs incorporating **SRA-157** will significantly reduce drying shrinkage, consequently reducing or possibly eliminating drying shrinkage cracks.



In mix designs incorporating **SRA-157**, compressive strengths may be slightly less than normal. It is reasonable to expect a 5% - 10% strength loss, but this is usually not an issue. For mixes where strength must be maintained, a mid-range water reducer such as **FINISHEASE-NC** or super plasticizers such as **SUPERFLO 443**, **SUPERFLO 20000RM**, or **SUPERFLO 2000SCC** can be incorporated to control water content and offset any strength reduction.



Mix designs incorporating **SRA-157** will experience a one to two hour extended set time.

MIX RECOMMENDATIONS:

Mix designs achieving reduced shrinkage should follow these parameters:

1. Create a mix design with a low water content utilizing a mid-range water reducer (MRWR) or high range water reducer (HRWR).

2. A water adjustment must be made to allow for the **SRA-157** in the mix. The water in the mix should be *reduced* by as much as the volume added through the addition of the shrinkage-reducing admixture.
3. For best results, **SRA-157** should be added at the end of the batch sequence.
4. Utilize the largest coarse aggregate top size possible.
5. Incorporate a higher percentage of coarse aggregate (62% to 65%). Adding more coarse aggregate will reduce the water and paste contents of the concrete mix.
6. Wet cure the concrete for as long and as soon as possible. If wet curing is not feasible, at the very least, apply two coats of a quality curing compound such as **RUSSTECH CURE & SEAL 300**, **CRETESEAL 30** or **Cure & SEAL 250**.
7. Avoid the use of admixtures such as Calcium Chloride, Granulated Blast Furnace Slag and some pozzolans as *increased* drying shrinkage will occur with their use.

STORAGE TEMPERATURE:

SRA-157 is a potentially combustible material with a flash point of 97C (207F). This is substantially above the upper limit of 60C (140F) for classification as a flammable material, and above the limit of 93C (200F) where DOT requirements would classify this as a combustible material. Nonetheless, this product must be treated with care and protected from excessive heat, open flame, or sparks. For more information consult the Material Safety Data Sheet.

TRIAL MIX REQUIREMENT:

It is strongly recommended that at least one trial mix be run prior to actual placement. This will allow the contractor and producer to determine mix adjustments and amounts of other admixtures to provide a concrete mix that will meet the requirements of the project.



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