

Laboratory Results: Effects on Compressive Strength and Shrinkage of the Addition of Easy Spread Admixture to SPEC-JOINT 46 Type N Repointing Mortar

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The following are results of laboratory tests performed at the State University of New York at Amherst, Ellicott Complex repointing project. The project ultimately involved approximately 1,500,000 square feet of masonry repointing using Edison Coatings SPEC-JOINT 46 Type N Lime-Cement custom prepackaged repointing mortar. Over 27,000 50-lb. bags were used over a three year period. The mortar was custom matched to the existing and was designated as formula 963. It was formulated to meet the requirements of ASTM C270 Type N. Laboratory work was performed by CME Associates, Inc. of Buffalo, NY, an independent Construction Materials Evaluation Laboratory. Comments, background information and descriptions are by provided by [Edison Coatings, Inc.](#)

Mix Design & Variations

Proportions of cement, hydrated lime, color additives and aggregates were rigidly controlled by weight at the factory, throughout the mortar batching and packaging process. Mortar was packaged in 55-lb. bags. The EZ Spred admixture was measured using a measuring cup (volume) and was added to the mixing water prior to mortar mix addition to a mechanical mortar mixer. The rate of addition was 3.5 ounces of EZ Spred per 55-lb. bag of SPEC JOINT 46 mortar. Mortar was then placed using a Thin Line pump, in two "lifts". Weather during the project's execution in May through August 1999 was generally hot, and some variations in retempering water addition levels were reported, which may correspond with variations in the reported 28-day strengths. All reported strengths are the average for 3 specimens.

Date Moulded	Day Tested	Avg. (3) @ 7-Days	Day Tested	Avg (3) @ 28 Days	Remarks
5/19/99	5/26/99	1839 psi	6/16/99	2213 psi	Fargo Test Panel, Spec-Joint 46
5/19/99	5/26/99	445	6/16/99	501	Test panel at Fargo w/Spec-Joint 46 & easy spread*
5/21/99	5/28/99	1390	6/18/99	1990	Fargo- Elevation 3 - Level 2
5/25/99	6/1/99	2028	6/22/99	1770	Porter- West Wall - Level 2
5/26/99	6/2/99	1243	6/23/99	1663	Fargo #1- North Wall - Level 2
5/27/99	6/3/99	1783	6/24/99	2317	Porter- East wall -Level 2
5/28/99	6/4/99	1520	6/25/99	2447	Fargo - Bldg. 1 - Level 2
6/1/99	6/8/99	1263	6/29/99	1479	Porter - Bldg. 1 - Level 3
6/1/99	6/8/99	933	6/29/99	1046	Test panel @ Fargo w/Spec-Joint & Easy Spread

Compressive Strength (ASTM C109)

* E Z S pred was used at a higher rate in this specimen

Comments:

The first test panel with EZ Spread utilized a higher level of addition and mortar failed to meet the 28 day strength requirement of 750 psi minimum. The second panel was at the 3.5 oz. per 55 lbs.level. Overall, the admixture appears to reduce compressive strength by approximately 50% at this level, but meets the ASTM C270 requirements.

Shrinkage (ASTM C1148)

SPEC JOINT 46 SPECIMENS

Batched & Molded 6/14/99

Date Tested (Age)	Avg. (5), % Shrinkage
6/17 (3 days)	-
6/18 (4)	0.076
6/25 (11)	0.124
7/2 (18)	0.128
7/9 (25)	0.128

Batched & Molded 6/16/99

Date Tested (Age)	Avg. (5), % Shrinkage
6/19 (3 days)	-
6/21 (5)	0.066
6/27 (11)	0.136
7/03 (17)	0.136
7/10 (24)	0.136

Batched & Molded 6/21/99

Date Tested (Age)	Avg. (5), % Shrinkage
6/24 (3 days)	-
6/25 (4)	0.027
7/02 (11)	0.080
7/09 (18)	0.092
7/16 (25)	0.098

SPEC-JOINT 46 w/EZ Spred

Batched & Molded 6/23/99

Date Tested (Age)	Avg. (5), % Shrinkage
6/26 (3 days)	-
6/27 (4)	0.081
7/03 (10)	0.149
7/10 (17)	0.173
7/19 (26)	0.187

Batched & Molded 6/30/99

Date Tested (Age)	Avg. (5), % Shrinkage
7/03 (3 days)	-
7/06 (6)	0.089
7/10 (10)	0.083
7/26 (26)	0.133

Batched & Molded 7/7/99

Date Tested (Age)	Avg. (5), % Shrinkage
7/10 (3 days)	-
7/12 (6)	0.023
7/17 (11)	0.081
7/26 (20)	0.112

Comments:

All reported data are for average of 5 specimens. Overall the EZ-Spred/Spec-Joint 46 mortars appear to exhibit approximately 15% higher shrinkage, but all reported shrinkages may be considered typical for Type N mortars.

Update: Phases 2 & 3 (May 2000, June 2001)

Phase 2 of this project began in May of 2000. Spec Joint 46 Type N, Color #963, was used, once again. But EZ-Spred additive was not used on this phase due to uncertainty regarding long-term performance. The phase 2 work was similar in size and scope to Phase 1.

Phase 3 was begun in June 2001 and was of similar scope and size to the previous phases. The contractor was able to efficiently place thousands of units of mortar using electric pointing guns and without the addition of any additional admixtures.