

TEST RESULTS:

Compressive Strength



...makes ordinary concrete
EXTRAordinary

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Summary: Concrete cylinders were tested for compressive strength with and without fibers in accordance with ASTM C39. Test results indicate the addition of polypropylene fibers does not adversely effect concrete in compression.

Background: Compressive strength tests were performed on cylinders with no fiber and cylinders with 1.5 pounds of polypropylene fiber per cubic yard of concrete. The tests began September 15, 1999 using the applicable portion of ICBO Acceptance Criteria AC32 (Section 5. Test Program) and the comparative test programs outlined in ASTM:C494 Sections 11 through 15. The mix design is shown overleaf. Data below represent the average of three individual tests control and fiber samples.

Data:	Control	Fiber
Age of Samples	28 Days	28 Days
Load at Failure, lb.	139,033	139,200
Strength, psi	4,920	4,920

Compressive strength testing was done by :

Twin City Testing Corporation
662 Cromwell Avenue
St. Paul, MN 55114-1776

Test Supervisor:
Mr. John D. Lee, PE
Senior Staff Engineer
Construction Materials Department.

Testing began on September 15, 1999. The results were published as Project 99-09552 on October 28, 1999. Mr. Lee can be reached at 651.659.7340.

The goal of the test was to determine if the addition of ABC Fibers to a concrete mix adversely affected the compressive strength. The tests were performed in accordance with ASTM C-39 and C-192. ICBO Acceptance Criteria for Synthetic Fiber-Reinforced Concrete were used. The condition of acceptance of the test is that the addition of fibers does not adversely affect the strength of the concrete. Additionally, the average compressive strength of the fiber-reinforced concrete cannot be less than the specified compressive strength of the mix design.

Three identical concrete cylinders, 6 inches in diameter and 12 inches long, were prepared without the addition of fibers. ABC Fibers were added to the original mix at the rate of 1.5 pounds per cubic yard, and three more identical cylinders were poured. The cylinders were aged 28 days before testing.

In summary, the test results indicate the addition of ABC fibers does not adversely affect the compressive strength of concrete.

Materials:

Cement: Type I Portland Cement (ASTM:C150)
Fine Aggregate: Shiely Aggregates Inc. Meeting the grading requirements of ASTM: C494 and C33.

Coarse Aggregate: Shiely Aggregates Inc. Meeting the grading requirements of ASTM:C494 and C33.

Admixtures: DARAVAIR by W.R. Grace (ASTM: C260) ABC Fibers. (Fibers not in control.)

Mix Design:

Mix Number:	1 and 2
Mixture Type	Control and Fiber
Portland Cement, Lb.:	517
Fine Aggregate, Lb.:	1,365
Coarse Aggregate, Lb.:	1,750
Net Water, Lb.:	257
Admixtures:	
DARAVAIR, Oz.	4.1
ABC Fibers, Lb./cu.yd.	1.5 (not in control)

Concrete Test Data: Control		Fiber
Slump, Inches	3-3/4	2-1/4
Air Content, %	6.5	5.9
Temperature, Deg F.	76	75
Unit Weight, Lb./cf	147.0	147.3

Diameter, in.	6.0
Height, in.	12.0
Area, Sq.In.	28.27
Days Cured	27
Age of Sample	28
Type of fracture	Shear

	Control	Failure
Load at Failure, lb.	139,033	139,170
Strength, PSI (avg.)	4,920	4,920
Strength, Max	4,960	5,010
Strength, min	4,840	4,850

Sulfur capping compound was used on all samples.

IMPORTANT: Polypropylene fibers should not be used as primary reinforcement, or as an additive to enhance compressive strength.