

## **MIGHTY<sup>®</sup> 150** **Superplasticizer (High Range Water Reducing Admixture)** **ASTM C494 Certification Test**

### **INTRODUCTION**

Mighty 150 "superplasticizer", a product of Kao Corporation has been in use in Japan since 1964. It is chemically different from the standard concrete admixtures such as lignosulfonates, hydroxy carboxylates and hydroxylated polymers, and provides much higher rate of water reduction.

The Construction Technology Laboratories of the PORTLAND CEMENT ASSOCIATION certifies that Mighty 150 meets the requirements for a Type A (Water-Reducing) and Type F (Water-Reducing, High Range) chemical admixture as specified in ASTM C494-80.

It should be noted that the 14% water reduction obtained by the ASTM procedure is based on a 5.5 bag mix (cement content 308 kg/m<sup>3</sup>) with 1.2% by weight of Mighty 150 liquid based on the weight of cement. With richer mixes water reductions of 20 to 30% are effected by use of Mighty 150 and much higher strengths are developed.

Listed below are some of the applications for the product.

- allows reduction in cement content while maintaining desired strength.
- accelerates strength development permitting detensioning in 6 to 8 hours and resultant higher frequency in use of forms.
- helps reduce steam curing time thereby reducing energy cost.
- permits reduction in amount of water normally required for a given workability.
- allows producer to switch from Type III (high early) cement to less expensive Type I (ordinary).
- enables development of high strength concrete other than by cement addition.
- provides route to flowable (7 to 8 inch or 18 to 20 cm slump) concrete that does not segregate and sets in normal period of time while maintaining desired water-cement ratio.

**RESULTS**

**Water Content** - percent reduction

Minimum required Type A	5
Minimum required Type F	12
Mighty 150	14

**Compressive Strength** - percent of control

<u>Period</u>	<u>Minimum Requirement</u>		<u>Mighty 150</u>
	<u>Type A</u>	<u>Type F</u>	
1 day	-	140	159
3 days	110	125	143
7 days	110	115	121
28 days	110	110	118
6 months	100	100	113
1 year	100	100	119

**Flexural Strength** - percent of control

<u>Period</u>	<u>Minimum Requirement</u>	
	<u>Type A &amp; Type F</u>	<u>Mighty 150</u>
3 days	100	124
7 days	100	122
28 days	100	111

**Time of Setting** - allowable deviation from control

<u>Initial</u>	<u>Retarding Effect</u> <u>(hours:minutes)</u>
Maximum allowable Type A & Type F	1:30
Mighty 150	0.12 later
<u>Final</u>	
Maximum allowable Type A & Type F	1:30
Mighty 150	0.04 later

**Length Change** (14 days) - shrinkage increase over control

Maximum allowable Type A & Type F	0.010
Mighty 150	0.001

**Durability Test** - relative durability factors

<u>Mighty 150 tested with Air-entraining Agent*</u>	
Minimum allowable	80.0
Mighty 150	96.0

\* Neutralized Vinsol resin, Hercules Inc.

**CONCLUSION**

Mighty 150 exceeds ASTM C494-80 requirements for a Type A (Water-Reducing) and Type F (Water-Reducing, High Range) chemical admixture. ASTM C494 is identical to AASHTO C-194.