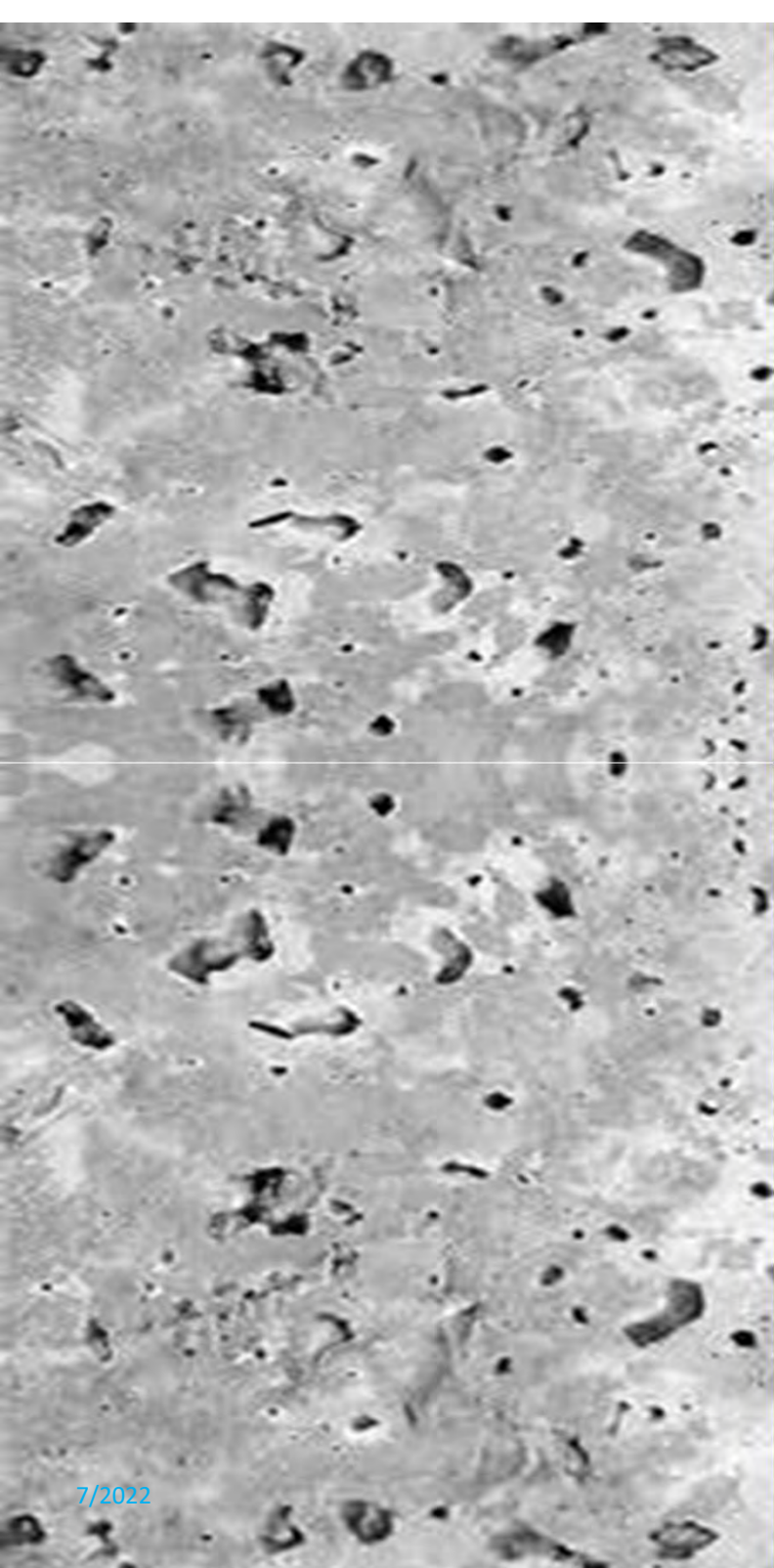


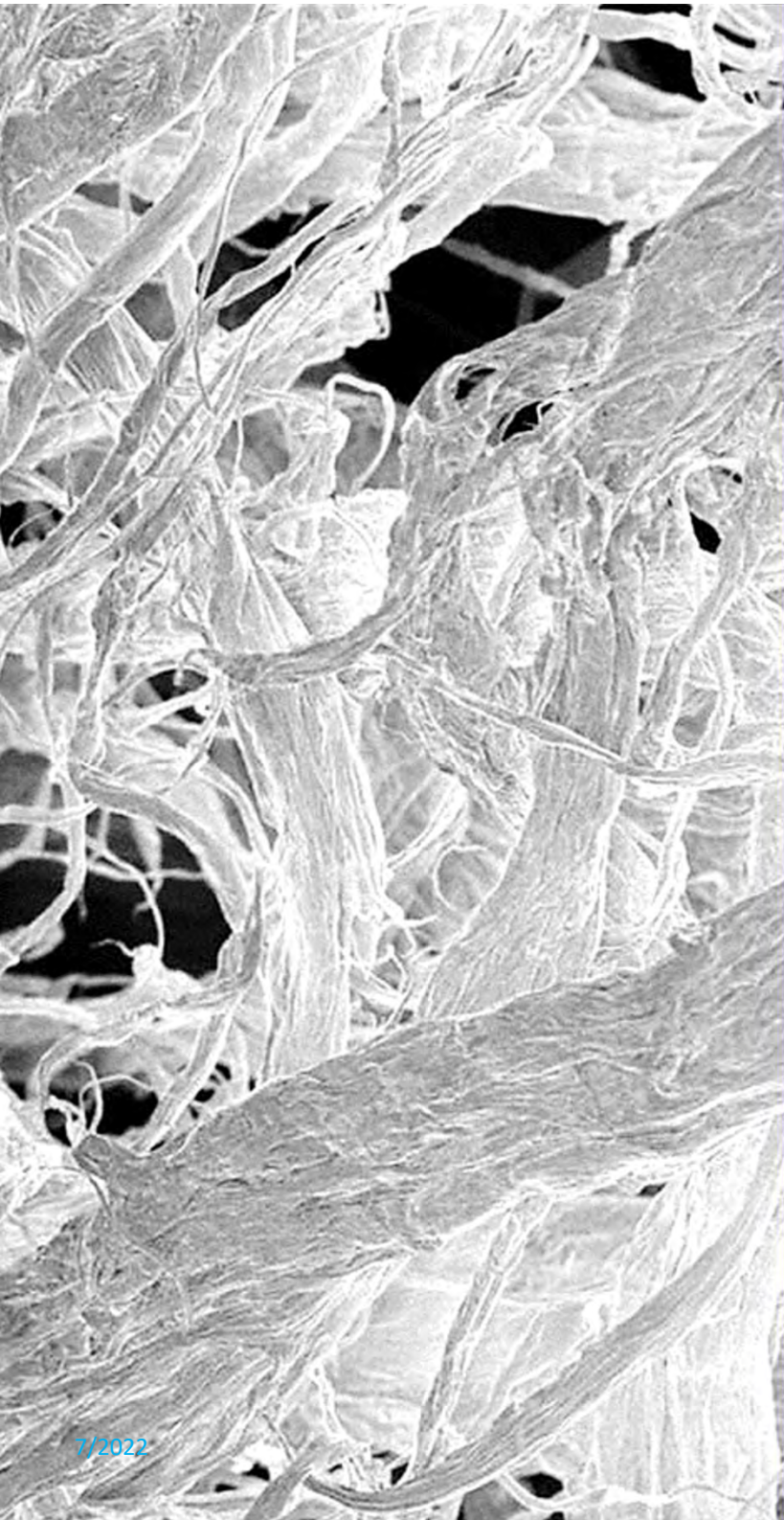
**Improving Cycle Time and
Reducing Bug Holes in
Cast Concrete Applications
With Short Stuff[®] ESS5F**

MINIFIBERS, INC.



Challenges for Cast Concrete

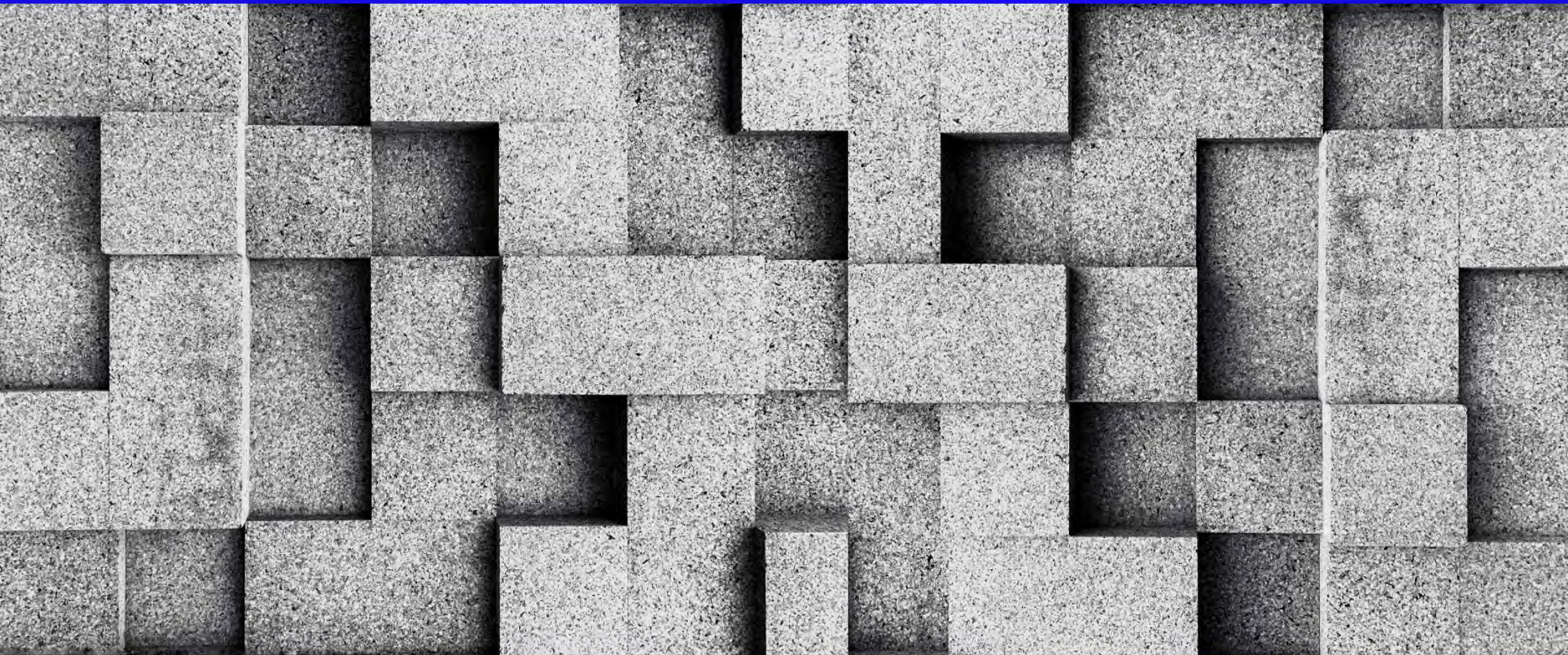
- Cure Rate
 - Determines production rate
- Surface blemishes
 - Bug Holes



Short Stuff[®] Multi-Dimensional Structure

- Fine fibrils
- Secondary & tertiary fibrils
- High surface area to volume

Compressive Strength Improvement Cast Concrete Formulation



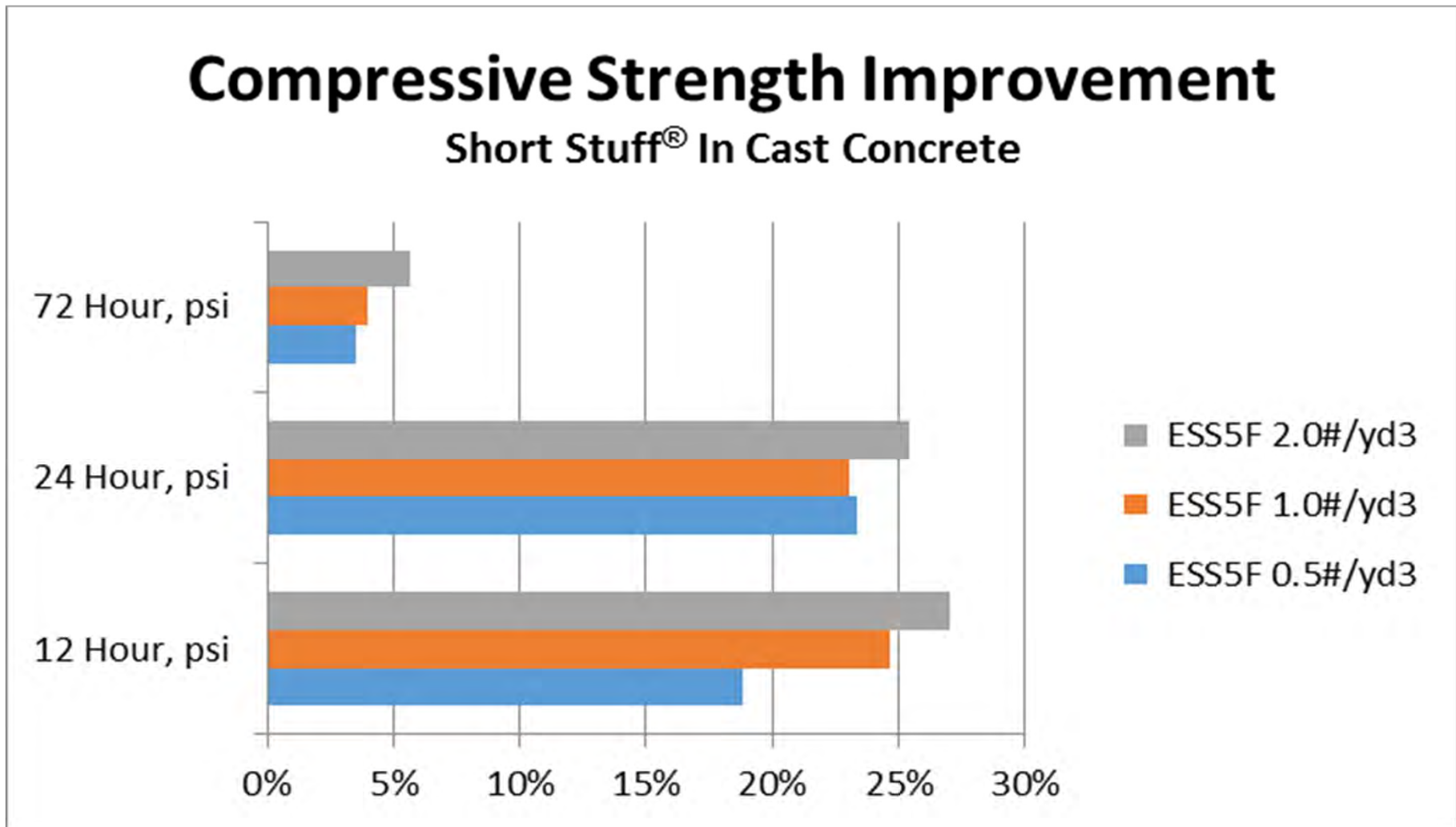
MINIFIBERS.COM

Cast Concrete Formulation

Material	lbs/yd ³
River Sand	900
River Sand	898
1/2" Limestone	1888
Water	316.5
Entrained Air	2%
Unit Weight	148.3 lbs/ft ³
w/c ratio	0.352
Glenium 7500 @	8 fl oz per cwt
MasterSet AC534	@ 40 fl oz per cwt

Compression Strength

Increase at Various Addition Rates

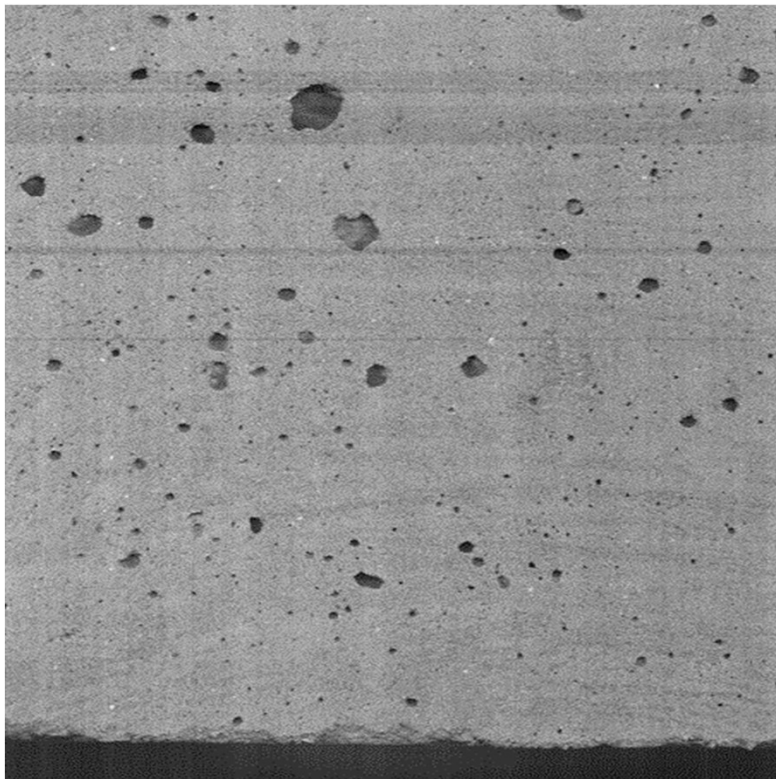


Bug Hole Comparison

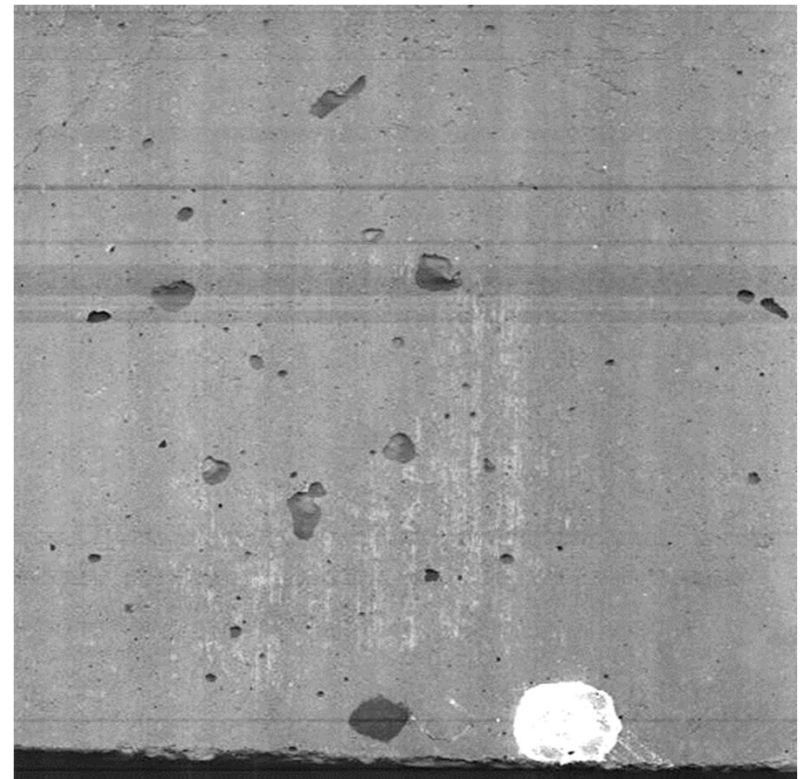


Bug Hole Comparison

- Product: Short Stuff[®] ESS5F
- Load, typical: 0.6 to 1.0 #/yd³



Control (vibrated) 4.4% voids



0.5#/yd³ ESS5F (vibrated) 1.9% voids

Summary

- **Short Stuff[®] ESS5F** improves early compressive strength
- **Short Stuff[®] ESS5F** significantly reduces bug hole formation

