

# Concrete Property Suite of Tests

## Level A Suite of Tests (recommended)



Urban freeways with the highest AADT (minimum 100,000). Limited or no alternative routes. Primary freight routes that would have significant economic impact if disrupted for prolonged periods. Complex projects that would require an extended time for maintenance or replacement.

Mixture Property			Project Stage		
Test Name	Test Procedure(s)	Proposed Testing Frequency (minimum 1 per day)	Mixture Design/Proportioning	Pre-Construction Mixture Verification	Quality Control
<b>Workability</b>					
Combined Grading: Coarseness and Workability Factors, 0.45 Power Curve, and Percent Retained on Individual Sieves	ASTM C 136 / AASHTO T 27	every 1,500 yd <sup>3</sup>	✓	✓	✓
Aggregate Moisture Content	ASTM C 566 / AASHTO T 255	every 1,000 yd <sup>3</sup>	✓	✓	✓
Slump and Loss of Workability	ASTM C 143 / AASHTO T 119	every 500 yd <sup>3</sup>	✓	✓	✓
Mortar Flow	ASTM C 1437	each project stage noted	✓	✓	
Vibrator Monitoring	manufacturer's recommendations	continuous automated monitoring			✓
Cementitious Heat Generation (coffee cup)	<i>MCO Testing Guide</i> pages 59-61	every 1,500 yd <sup>3</sup>	✓	✓	✓
False Set	ASTM C 359 / AASHTO T 136	only when early stiffening is detrimental			✓
<b>Strength Development</b>					
Microwave Water Content	AASHTO T 318	every 500 yd <sup>3</sup>	✓	✓	(optional) AASHTO T 318 or strength testing
Heat Signature (calorimetry)	<i>MCO Testing Guide</i> pages 67-69	1 per day	✓	✓	✓
Set Time	ASTM C 403	each project stage noted	✓	✓	
Concrete Strength (3 and 7 day)	ASTM C 39 / AASHTO T 22 ASTM C 78 / AASHTO T 97 ASTM C 293 / AASHTO T 177	every 500 yd <sup>3</sup>	✓	✓	(optional) AASHTO T 318 or strength testing
<b>Air Entrainment</b>					
Unit Weight	ASTM C 138 / AASHTO T 121	every 500 yd <sup>3</sup>	✓	✓	✓

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**FOR MORE INFORMATION**

Mixture Property			Project Stage		
Test Name	Test Procedure(s)	Proposed Testing Frequency (minimum 1 per day)	Mixture Design/ Proportioning	Pre-Construction Mixture Verification	Quality Control
Air Content	ASTM C 231 / AASHTO T 152 ASTM C 173 / AASHTO T 196	every 500 yd <sup>3</sup>	✓	✓	✓
Air-Void Analyzer	<i>MCO Illustrated Test Procedure Hyperdocument</i>	every 1,500 yd <sup>3</sup>	✓	✓	✓
Hardened Air Properties	ASTM C 457 or equivalent image analysis procedure	only when AVA results indicate potential durability issues	✓	✓	✓
<b>Permeability</b>					
Rapid Chloride Penetration	ASTM C 1202 / AASHTO T 277	each project stage noted	✓		
Permeable Voids (boil test)	ASTM C 642	each project stage noted	✓	✓	
<b>Shrinkage</b>					
Coefficient of Thermal Expansion	AASHTO TP 60	each project stage noted	✓		
HIPERPAV	<i>MCO Testing Guide</i> page 93	two stress-strength analyses per day (a.m. & p.m.)	✓	✓	✓
<b>Other Properties</b>					
Strength-Maturity Relationship for Early Opening to Traffic (optional)	ASTM C 1074 / AASHTO T 325	(optional) place two sensors every day (a.m. & p.m.)		✓ (optional) develop strength-maturity relationship	✓ (optional)
Material Incompatibilities	<i>Identifying Incompatible Combinations of Concrete Materials: Volume II-Test Protocol</i>	each project stage noted	✓	✓	whenever air-void property or early stiffening issues arise
Alkali-Silica Reactivity	agency material prequalification ASTM C 1260 ASTM C 1293 ASTM C 1567 / AASHTO T 303	n/a			
Aggregate Durability	agency material prequalification ASTM C 666 / AASHTO T 161	n/a			

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