

LEHIGH

HEIDELBERGCEMENT Group

TECHNICAL SERVICES

SALES & MARKETING

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CEMENT TEST REPORT

Cement: AASHTO M85 Type I, Low Alkali

ASTM C150-09 Type I-II, Low Alkali

Report Date: 8/17/2011

Date Shipped: July 2011

Lot #1247

STANDARD CHEMICAL REQUIREMENTS ASTM C 114	TEST RESULTS	ASTM C 150		AASHTO
		TYPE I	TYPE II	TYPE I
Silicon Dioxide (SiO ₂), %	19.9	----	20.0 Min	----
Aluminum Oxide (Al ₂ O ₃), %	4.5	----	6.0 Max	----
Ferric Oxide (Fe ₂ O ₃), %	4.1	----	6.0 Max	----
Calcium Oxide (CaO), %	64.0	----	----	----
Magnesium Oxide (MgO), %	1.7	6.0 Max	6.0 Max	6.0 Max
Sulfur Trioxide (SO ₃), %	2.8	3.0 Max	3.0 Max	3.0 Max
Loss on Ignition (LOI), %	2.3	3.0 Max	3.0 Max	3.0 Max
Insoluble Residue, %	0.31	0.75 Max	0.75 Max	0.75 Max
Alkalies (Na ₂ O equivalent), %	0.32	0.60 Max	0.60 Max	0.60 Max
Tricalcium Silicate (C ₃ S), % ^a	56	----	----	----
Dicalcium Silicate (C ₂ S), % ^a	15	----	----	----
Tricalcium Aluminate (C ₃ A), % ^a	5	----	8 Max	----
Tetracalcium Aluminoferrite (C ₄ AF), % ^a	12	----	----	----
C ₃ S + 4.75*C ₃ A, %	80	----	100 Max	----
2 (C ₃ A) + C ₄ AF, %	22	----	25 Max	----
PHYSICAL REQUIREMENTS				
(ASTM C 1038) Expansion @ 14 days, %	0.005	0.020 Max	0.020 Max	0.020 Max
(ASTM C 204) Blaine Fineness, m ² /kg	415	280 Min	280 Min	400 Max
(ASTM C 430) -325 Mesh, %	94.2	----	----	----
(ASTM C 114) CO ₂ , %	1.8	----	----	----
(ASTM C 114) Limestone, %	4.0	5.0 Max	5.0 Max	5.0 Max
(ASTM C 114) CaCO ₃ in limestone, %	97	70 Min	70 Min	70 Min
(ASTM C 191) Time of Setting - Initial (Vicat)	83	45 Min	45 Min	45 Min
(ASTM C 191) Time of Setting - Final (Vicat)	175	375 Max	375 Max	375 Max
(ASTM C 451) False Set, %	83	50 Min	50 Min	50 Min
(ASTM C 185) Air Content, %	7.1	12 Max	12 Max	12 Max
(ASTM C 151) Autoclave Expansion, %	0.01	0.80 Max	0.80 Max	0.80 Max
(ASTM C 187) Normal Consistency, %	25.2	----	----	----
(ASTM C 109) Compressive Strength, psi (MPa)				
1 Day	2115 (14.6)	----	----	----
3 Day	3637 (25.1)	1800 (12.4) Min	1500 (10.3) Min	1800 (12.4) Min
7 Day	4447 (30.6)	2800 (19.3) Min	2500 (17.2) Min	2800 (19.3) Min
28 Day (Previous Month)	6228 (42.9)	----	----	----

This cement meets the requirements of specification:

Albert J. Cornibe, Jr.

Albert J. Cornibe
 Quality Manager

ASTM C150-09 Type I-II, Low Alkali

AASHTO M85 - Type I

ASTM C 1157 Portland Cement Type HS

^a per ASTM C-150-09 Section A1.6

AASHTO Practice R18 accredited laboratory