



MATERIAL CERTIFICATION REPORT

Plant: Rapid City
Address: 501 N. St Onge Street
 Rapid City, South Dakota
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Cement Type: I/II, I/II(MH), Low Alkali, GU
Date Issued: 02-Jan-19
Production Period: 1-Dec-18
To: 31-Dec-18

STANDARD REQUIREMENTS ASTM C150/AASHTO M85/ASTM C1157

CHEMICAL		
Item	ASTM C150 Spec. Limit	Test Result
SiO ₂ (%)	A	20.3
Al ₂ O ₃ (%)	6.0 max	4.7
Fe ₂ O ₃ (%)	6.0 max	3.4
CaO (%)	A	64.1
MgO (%)	6.0 max	1.1
SO ₃ (%)	3.5 max ^B	2.9
Loss on Ignition (%)	3.5 max	2.2
Na ₂ O (%)	A	0.11
K ₂ O (%)	A	0.67
Insoluble Residue (%)	1.5 max	0.46
CO ₂ (%)	A	1.4
Limestone (%)	5.0 max	3.6
CaCO ₃ in Limestone (%)	70 min	95
Potential Phase Composition ^C		
C ₃ S (%)	A	58
C ₂ S (%)	A	14
C ₃ A (%)	8 max	7
C ₄ AF (%)	A	10
C ₃ S + 4.75C ₃ A (%)	100 max	90

PHYSICAL			
Item	ASTM C150 Spec. Limit	ASTM C1157 Spec. Limit	Test Result
Air Content (volume %)	12 max	12 max	9
Blaine Fineness (cm ² /g)	2600-4300	A	4180
Residue 45 μm (No. 325) Sieve (%)	A	D	3.4
Autoclave Expansion (%)	0.80 max	0.80 max	-0.01
Compressive Strength			
1 day, MPa (psi)	A	A	14.1 (2040)
3 days, MPa (psi)	12.0 (1741) min	13 (1890) min	25.2 (3650)
7 days, MPa (psi)	19.0 (2760) Min	20.0 (2900) min	33.6 (4870)
28 days, MPa (psi) ^E	A	28.0 (4160) min	42.9 (6220)
Time of Setting, Initial Vicat (minutes)	45-375	45-420	108
Heat of Hydration, 7 days, kJ/kg (cal/g)	F	A	355
Mortar Bar Expansion C-1038 (%)	B	0.020 max	0.005

INORGANIC PROCESSING ADDITION (If Applicable)			
Type	None	Base Phase Cement Composition	
SiO ₂ (%)	NA	C ₃ S (%)	59
Al ₂ O ₃ (%)	NA	C ₂ S (%)	15
Fe ₂ O ₃ (%)	NA	C ₃ A (%)	7
CaO (%)	NA	C ₄ AF (%)	11
SO ₃ (%)	NA		

OPTIONAL REQUIREMENTS ASTM C150/AASHTO M85/ASTM C1157

CHEMICAL		
Item	ASTM C150 Spec. Limit	Test Result
Equivalent Alkalies (%)	0.60 max	0.55

PHYSICAL			
Item	ASTM C150 Spec. Limit	ASTM C1157 Spec. Limit	Test Result
False Set (%)	50 min	50 min	73

^A Not applicable
^B It is permissible to exceed the specification limit provided that ASTM C1038 Mortar Bar Expansion does not exceed 0.020 % at 14 days.
^C Adjusted per Annex A1.6
^D No limit specified, data reported for information purpose only
^E Test result of prior month
^F Test result represents most recent value. Heat of hydration test has been carried out by CTL , Skokie, Illinois.

GCC of America Cement is warranted to conform at the time of shipment with current ASTM C150/AASHTO M85/ASTM C1157. No other warranty is made or implied. Having no control over the use of its cements, GCC of America does not guarantee finished work. GCC is not responsible for any additives not stated in the Certificate of Compliance. GCC of America certifies that the data described above under "Processing Addition" represents the materials in the cement manufactured during the production period indicated.