



**GCC of America**

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**MATERIAL CERTIFICATION REPORT**

**Plant:** Pueblo  
**Address:** 3372 Lime Road  
Pueblo, CO 81004  
**Contact:** Urs Fuchs  
**Phone:** (719) 647-6821

**Cement Type:** I/II, Low Alkali, GU  
**Date Issued:** 9-Nov-18  
**Production Period:** 1-Oct-18  
**To:** 31-Oct-18

**STANDARD REQUIREMENTS ASTM C150/AASHTO M85/ASTM C1157**

CHEMICAL			
Item	ASTM Test Method	ASTM C150 Spec. Limit	Test Result
SiO <sub>2</sub> (%)	C114	-	19.8
Al <sub>2</sub> O <sub>3</sub> (%)	C114	6.0 max	4.4
Fe <sub>2</sub> O <sub>3</sub> (%)	C114	6.0 max	3.1
CaO (%)	C114	-	63.8
MgO (%)	C114	6.0 max	1.0
SO <sub>3</sub> (%)	C114	3.0 max <sup>A</sup>	3.5
Loss On Ignition (%) <sup>B</sup>	C114	3.5 max <sup>C</sup>	3.0
Na <sub>2</sub> O (%)	C114	-	0.18
K <sub>2</sub> O (%)	C114	-	0.60
Insoluble Residue (%)	C114	1.5 max	0.6
CO <sub>2</sub> (%) <sup>B</sup>	C114	-	1.5
Limestone (%)	C150	5.0 max	3.9
CaCO <sub>3</sub> in Limestone (%)	C150	70 min	89
Inorganic Processing Addition	C150	5.0 max	-
Potential Phase Composition			
C <sub>3</sub> S (%)	C150	-	60
C <sub>2</sub> S (%)	C150	-	11
C <sub>3</sub> A (%)	C150	8 max	6
C <sub>4</sub> AF (%)	C150	-	9

PHYSICAL				
Item	ASTM Test Method	ASTM C150 Spec. Limit	ASTM C1157 Spec. Limit	Test Result
Air Content (% vol)	C185	12 max	12 max	8
Blaine Fineness (m <sup>2</sup> /kg)	C204	260 min	-	405
Residue 45 μm (No.325) Sieve (%)	C430	-	-	3.3
Autoclave Expansion (%)	C151	0.80 max	0.80 max	-0.04
Compressive Strength				
3 days, MPa (psi)	C109	12.0 (1740) min	13.0 (1890) min	30.6 (4430)
7 days, MPa (psi)	C109	19.0 (2760) min	20.0 (2900) min	36.9 (5360)
28 days, MPa (psi) <sup>D</sup>	C109	-	28.0 (4060) min	46.1 (6690)
Time of Setting, Initial Vicat (min)	C191	45 min / 375 max	45 min / 420 max	113
Mortar Bar Expansion (%)	C1038	0.020 max	0.020 max	0.006

ADDITIONAL DATA					
Type	Limestone	Test Method	Base Phase Composition	ASTM Test Method	Test Result
SiO <sub>2</sub> (%)	5.9	Internal	C <sub>3</sub> S (%)	C150	63
Al <sub>2</sub> O <sub>3</sub> (%)	1.4	Internal	C <sub>2</sub> S (%)	C150	11
Fe <sub>2</sub> O <sub>3</sub> (%)	0.9	Internal	C <sub>3</sub> A (%)	C150	7
CaO (%)	50.4	Internal	C <sub>4</sub> AF (%)	C150	10
SO <sub>3</sub> (%)	0.2	Internal			

**OPTIONAL REQUIREMENTS ASTM C150/AASHTO M85/ASTM C1157**

CHEMICAL			
Item	ASTM Test Method	ASTM C150 Spec. Limit	Test Result
Equivalent Alkalies (%)	C114	0.60 max	0.57

PHYSICAL				
Item	ASTM Test Method	ASTM C150 Spec. Limit	ASTM C1157 Spec. Limit	Test Result
False Set (%)	C451	50 min	50 min	73

<sup>A</sup> It is permissible to exceed the specification limit provided that ASTM C1038 Mortar Bar Expansion does not exceed 0.020 % at 14 days.

<sup>B</sup> This alternative analysis has been qualified in accordance with ASTM C114 and meets requirements of Table 1.

<sup>C</sup> Loss on ignition, max: 3.0 % when limestone is not an ingredient; Loss on ignition, max: 3.5 % when limestone is an ingredient

<sup>D</sup> Test result of prior month

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.