



MATERIAL CERTIFICATION REPORT

Plant: Trident
 Address: 4070 Trident Road
 Three Forks, MT 59752
 Contact: Zach Gill
 Phone: (406)285-3988

Cement Type: III, Low Alkali, HE
 Date Issued: 3-Jan-19
 Production Period: 1-Dec-19
 To: 31-Dec-19

STANDARD REQUIREMENTS ASTM C150/ASTM C1157/CSA A3001-13

Trident Plant is an ISO 9001:2015 Certified Facility

CHEMICAL			
Item	ASTM Test Method	ASTM C150 Spec. Limit	Test Result
SiO ₂ (%)	C114	-	20.7
Al ₂ O ₃ (%)	C114	-	3.8
Fe ₂ O ₃ (%)	C114	-	2.9
CaO (%)	C114	-	65.1
MgO (%)	C114	6.0 max	1.8
SO ₃ (%)	C114	3.5 max ^A	2.5
Loss On Ignition (%)	C114	3.5 max ^B	2.6
Na ₂ O (%)	C114	-	NA2O_AVG
K ₂ O (%)	C114	-	K2O_AVG
Insoluble Residue (%)	C114	1.5 max	0.3
CO ₂ (%)	C114	-	
Limestone (%)	C150	5.0 max	5.0
CaCO ₃ in Limestone (%)	C150	70 min	99
Inorganic Processing Addition	C150	5.0 max	-
Potential Phase Composition			
C ₃ S (%)	C150	-	59
C ₂ S (%)	C150	-	11
C ₃ A (%)	C150	15 max	5
C ₄ AF (%)	C150	-	9

PHYSICAL				
Item	ASTM Test Method	ASTM C150 Spec. Limit	ASTM C1157 Spec. Limit	Test Result
Air Content (%)	C185	12 max	12 max	6
Blaine Fineness (%)	C204	-	-	592
Residue 45 µm (No.325) Sieve (%)	C430	-	-	#VALUE!
Autoclave Expansion (%) CSA A3004-B4	C151	0.80 max	0.80 max	-0.04
Compressive Strength				
3 days, MPa (psi)	C109	12.0 (1740) min	12.0 (1740) min	37.9 (5490)
7 days, MPa (psi)	C109	24.0 (3480) min	24.0 (3480) min	45.6 (6620)
Time of Setting, Initial Vicat (%)	C191	45 min / 375 max	45 min / 420 max	107
Mortar Bar Expansion (%) CSA A3004-C5	C1038	0.020 max	0.020 max	--

ADDITIONAL DATA					
Type	Limestone	Test Method	Base Phase Composition	ASTM Test Method	Test Result
SiO ₂ (%)	0.7	Internal	C ₃ S (%)	C150	62
Al ₂ O ₃ (%)	0.1	Internal	C ₂ S (%)	C150	12
Fe ₂ O ₃ (%)	0.2	Internal	C ₃ A (%)	C150	5
CaO (%)	59.8	Internal	C ₄ AF (%)	C150	9
SO ₃ (%)	0.3	Internal			

OPTIONAL REQUIREMENTS ASTM C150/ASTM C1157

CHEMICAL			
Item	ASTM Test Method	ASTM C150 Spec. Limit	Test Result
Equivalent Alkalies (%)	C114	0.60 max	0.32

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

^A It is permissible to exceed the specification limit provided that ASTM C1038 Mortar Bar Expansion does not exceed 0.020 % at 14 days.
^B Loss on ignition, max: 3.0 % when limestone is not an ingredient; Loss on ignition, max: 3.5 % when limestone is an ingredient
^C 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.