



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: 9-Aug-19
Production Period: 1-Jul-19
To: 31-Jul-19

STANDARD REQUIREMENTS ASTM C150/ASTM C1157

Trident Plant is an ISO 9001:2015 Certified Facility

CHEMICAL			
Item	ASTM Test Method	ASTM C150 Spec. Limit	Test Result
SiO ₂ (%)	C114	-	20.2
Al ₂ O ₃ (%)	C114	-	4.0
Fe ₂ O ₃ (%)	C114	-	3.2
CaO (%)	C114	-	64.1
MgO (%)	C114	6.0 max	2.9
SO ₃ (%)	C114	3.5 max ^A	2.4
Loss On Ignition (%)	C114	3.5 max ^B	2.7
Na ₂ O (%)	C114	-	0.07
K ₂ O (%)	C114	-	0.38
Insoluble Residue (%)	C114	1.5 max	0.5
CO ₂ (%)	C114	-	2.0
Limestone (%)	C150	5.0 max	4.5
CaCO ₃ in Limestone (%)	C150	70 min	99
Inorganic Processing Addition	C150	5.0 max	-
Potential Phase Composition			
C ₃ S (%)	C150	-	66
C ₂ S (%)	C150	-	6
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 (m ² /kg)	C204	-	-	562
Residue 45 μm (No.325) Sieve (%)	C430	-	-	0.1
Autoclave Expansion (%)	C151	0.80 max	0.80 max	0.03
Compressive Strength				
1 day, MPa (psi)	C109	12.0 (1740) min	12.0 (1740) min	24.1 (3500)
3 days, MPa (psi)	C109	24.0 (3480) min	24.0 (3480) min	42.0 (6090)
Time of Setting, Initial Vicat (min)	C191	45 min / 375 max	45 min / 420 max	100
Mortar Bar Expansion (%)	C1038	0.020 max	0.020 max	0.007

ADDITIONAL DATA					
Type	Limestone	Test Method	Base Phase Composition	ASTM Test Method	Test Result
SiO ₂ (%)	0.7	Internal	C ₃ S (%)	C150	69
Al ₂ O ₃ (%)	0.1	Internal	C ₂ S (%)	C150	6
Fe ₂ O ₃ (%)	0.2	Internal	C ₃ A (%)	C150	5
CaO (%)	59.8	Internal	C ₄ AF (%)	C150	10
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	0.33

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.