



MATERIAL CERTIFICATION REPORT

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

Cement Type: I-II-V, Low Alkali, GU
Date Issued: 6-Feb-19
Production Period: 1-Jan-19
To: 31-Jan-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	-	20.8
Al ₂ O ₃ (%)	C114	6.0 max	3.8
Fe ₂ O ₃ (%)	C114	6.0 max	2.9
CaO (%)	C114	-	65.0
MgO (%)	C114	6.0 max	2.1
SO ₃ (%)	C114	2.3 max ^A	2.8
Loss On Ignition (%)	C114	3.5 max ^B	2.6
Na ₂ O (%)	C114	-	0.07
K ₂ O (%)	C114	-	0.39
Insoluble Residue (%)	C114	1.5 max	0.3
CO ₂ (%)	C114	-	-
Limestone (%)	C150	5.0 max	4.1
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	-	15
C ₃ A (%)	C150	5 max	5
C ₄ AF (%)	C150	-	9
C ₄ AF + 2 C ₃ A (%)	C150	25 max	19

PHYSICAL				
Item	ASTM Test Method	ASTM C150 Spec. Limit	ASTM C1157 Spec. Limit	Test Result
Air Content (%)	C185	12 max	12 max	7
Blaine Fineness (%)	C204	260 min / 430 max	-	401
Residue 45 µm (No.325) Sieve (%)	C430	-	-	1.6
Autoclave Expansion (%)	C151	0.80 max	0.80 max	-0.03
Compressive Strength				
3 days, MPa (psi)	C109	12.0 (1740) min	13.0 (1890) min	26.5 (4030)
7 days, MPa (psi)	C109	19.0 (2760) min	20.0 (2900) min	35.1 (5090)
28 days, MPa (psi) ^C	C109	28.0 (4060) min	28.0 (4060) min	43.7 (6340)
Time of Setting, Initial Vicat (min)	C191	45 min / 375 max	45 min / 420 max	132
Mortar Bar Expansion (%)	C1038	0.020 max	0.020 max	-0.008

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	16
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	0.33

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/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.