



Cement Mill Test Report

Date of Issue: December 12, 2022

Plant: Exshaw, AB
 Product: Portland Cement Type I/II/V
 Mill Test Report Number: MTR-I/II/V-2022-11
 Manufactured: November 1-30, 2022

ASTM C 150-21 and AASHTO M 85-18 Standard Requirements

CHEMICAL ANALYSIS			PHYSICAL ANALYSIS		
Item	Spec limit	Test Result	Item	Spec limit	Test Result
Rapid Method, X-Ray (C114)			Air content of mortar (%) (C185)		
SiO ₂ (%)	---	19.7		12 max	6
Al ₂ O ₃ (%)	6.0 max	4.0	Blaine Fineness (m ² /kg) (C204)		
Fe ₂ O ₃ (%)	6.0 max	3.6		260 min	390
CaO (%)	---	62.4	Passing 45 μm (%) (C430)		
MgO (%)	6.0 max	4.7		---	98.6
SO ₃ (%)	2.3 max *	2.9	Autoclave Expansion (%) (C151)*		
Loss on Ignition (%)	3.5 max	2.5		0.80 max	0.14
Insoluble Residue (%)*	1.5 max	0.24	Compressive strength (MPa, [psi]) (C 109)		
CO ₂ (%)	---	1.8			
Limestone (%)	5.0 max	4.3	3 days	12.0 [1740] min	28.3 [4100]
CaCO ₃ in Limestone (%)	70 min	95	7 days	19.0 [2760] min	35.9 [5210]
Inorganic Process Addition (Lafarge Cement Kiln Dust)	5.0 max	-	28 days (Reflects previous month's data)		44.4 [6380]
Adjusted Potential Phase Composition (C 50)			Time of setting (minutes)		
C ₃ S (%)	---	56	Vicat Initial (C191)	45 - 375	112
C ₂ S (%)	---	14	Sulfate Resistance (%) (C452)*		
C ₃ A (%)	5 max	4		0.040 max	0.030
C ₄ AF (%)	---	11	Mortar Bar Expansion (%) (C1038)		
C ₄ AF + 2(C ₃ A)	25 max	19		0.020 max	0.010
C ₃ S+4.75*C ₃ A (%)	100 max	76			
ASTM C 150-17 and AASHTO M 85-17 Optional Requirements:					
NaEq (%)	0.60 max	0.55	False set (%) (C451)	50 min	76

* May exceed the SO₃ maximum based on C 1038 results of <0.020% expansion at 14 days.

** Current Production run not available - most recent provided

We certify that the above described cement, at the time of shipment, meets the chemical and physical requirements of ASTM C 150-21 & AASHTO M 85-18 STANDARD SPECIFICATIONS FOR TYPES I, II & V CEMENTS; and ASTM C 150-21 & AASHTO M 85-18 OPTIONAL CHEMICAL REQUIREMENTS FOR TYPES I, II & V LOW ALKALI CEMENT.

Certified By:

Lorraine Johnson

Lorraine Johnson
Quality Manager

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Additional Data

Item	Test Result	
	Limestone	Inorganic Process Addition Lafarge Cement Kiln Dust
Amount (%)	4.3	-
SiO ₂ (%)	1.2	n/a
Al ₂ O ₃ (%)	0.7	n/a
Fe ₂ O ₃ (%)	0.2	n/a
CaO (%)	50.9	n/a
SO ₃ (%)	0.2	n/a
CO ₂ (%)	41.8	n/a

Base Cement Phase Composition

Item	Test Result
C ₃ S (%)	58
C ₂ S (%)	15
C ₃ A (%)	5
C ₄ AF (%)	11

We certify that the data above reflects the materials used in cement manufacture during the production period indicated.

Note: Specific Gravity for Portland Cements is 3.14

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