



Cement Mill Test Report

Date of Issue: September 15, 2021

Plant: Exshaw AB
 Product: Portland Cement Type I/II/V
 Mill Test Report Number: MTR-I/II/V-2021-08
 Manufactured: August 1-31, 2021

ASTM C 150-20 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)	12 max	6
SiO ₂ (%)	---	19.5	Blaine Fineness (m ² /kg) (C204)	260 min	430
Al ₂ O ₃ (%)	6.0 max	3.9	Passing 45 µm (%) (C430)	---	99.2
Fe ₂ O ₃ (%)	6.0 max	3.6	Autoclave Expansion (%) (C151)**	0.80 max	0.11
CaO (%)	---	62.1	Compressive strength (MPa, [psi]) (C 109)		
MgO (%)	6.0 max	4.6	3 days	12.0 [1740] min	29.6 [4290]
SO ₃ (%)	2.3 max *	2.9	7 days	19.0 [2760] min	34.7 [5030]
Loss on Ignition (%)	3.5 max	2.6	28 days (Reflects previous month's data)		40.1 [5820]
Insoluble Residue (%)	1.5 max	0.27	Time of setting (minutes)		
CO ₂ (%)	---	1.7	Vicat Initial (C191)	45 - 375	96
Limestone (%)	5.0 max	4.2	Sulfate Resistance (%) (C452)**	0.040 max	0.031
CaCO ₃ in Limestone (%)	70 min	95	Mortar Bar Expansion (%) (C1038)**	0.020 max	0.011
Inorganic Process Addition (Lafarge Cement Kiln Dust)	5.0 max	-			
Adjusted Potential Phase Composition (C 50)					
C ₃ S (%)	---	57			
C ₂ S (%)	---	13			
C ₃ A (%)	5 max	4			
C ₄ AF (%)	---	11			
C ₄ AF + 2(C ₃ A)	25 max	19			
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	0.54	False set (%) (C451)	50 min	82

* 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 150-20 & AASHTO M 85-18 STANDARD SPECIFICATIONS FOR TYPES I, II & V CEMENTS; and ASTM C 150-20 & AASHTO M 85-18 OPTIONAL CHEMICAL REQUIREMENTS FOR TYPES I, II & V LOW ALKALI CEMENT.

Certified By:

Lorraine Richards

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Lorraine Richards
 Quality Control Coordinator



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Additional Data

Item	Test Result	
	Limestone	Inorganic Process Addition Lafarge Cement Kiln Dust
Amount (%)	4.2	-
SiO ₂ (%)	2.0	n/a
Al ₂ O ₃ (%)	1	n/a
Fe ₂ O ₃ (%)	0.3	n/a
CaO (%)	51.5	n/a
SO ₃ (%)	0.2	n/a
CO ₂ (%)	41.7	n/a

Base Cement Phase Composition

Item	Test Result
C ₃ S (%)	59
C ₂ S (%)	13
C ₃ A (%)	4
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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