



# Cement Mill Test Report

Date of Issue: March 12, 2021

Plant: Exshaw AB  
 Product: Portland Cement Type I/II/V  
 Mill Test Report Number: MTR-I/II/V-2021-02  
 Manufactured: February 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 <sub>2</sub> (%)	---	19.8	Blaine Fineness (m <sup>2</sup> /kg) (C204)	280 - 430	425
Al <sub>2</sub> O <sub>3</sub> (%)	6.0 max	4.0	Passing 45 μm (%) (C430)	---	99.4
Fe <sub>2</sub> O <sub>3</sub> (%)	6.0 max	3.7	Autoclave Expansion (%) (C151)**	0.80 max	0.09
CaO (%)	---	62.2	Compressive strength (MPa, [psi]) (C 109)		
MgO (%)	6.0 max	4.7	3 days	12.0 [1740] min	30.5 [4430]
SO <sub>3</sub> (%)	2.3 max *	2.8	7 days	19.0 [2760] min	36.2 [5240]
Loss on Ignition (%)	3.5 max	2.3	28 days (Reflects previous month's data)		43.1 [6250]
Insoluble Residue (%)	1.5 max	0.16	Time of setting (minutes)		
CO <sub>2</sub> (%)	---	1.7	Vicat Initial (C191)	45 - 375	118
Limestone (%)	5.0 max	4.0	Sulfate Resistance (%) (C452)**	0.040 max	0.034
CaCO <sub>3</sub> 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 <sub>3</sub> S (%)	---	54			
C <sub>2</sub> S (%)	---	16			
C <sub>3</sub> A (%)	5 max	4			
C <sub>4</sub> AF (%)	---	11			
C <sub>4</sub> AF + 2(C <sub>3</sub> A)	25 max	19			
C <sub>3</sub> S+4.75*C <sub>3</sub> A (%)	100 max	73			
ASTM C 150-17 and AASHTO M 85-17 Optional Requirements:					
NaEq (%)	0.60 max	0.58	False set (%) (C451)	50 min	81

\* May exceed the SO<sub>3</sub> 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:

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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 (%)	4.0	-
SiO <sub>2</sub> (%)	1.4	n/a
Al <sub>2</sub> O <sub>3</sub> (%)	0.7	n/a
Fe <sub>2</sub> O <sub>3</sub> (%)	0.3	n/a
CaO (%)	52.4	n/a
SO <sub>3</sub> (%)	0.2	n/a
CO <sub>2</sub> (%)	42.1	n/a

#### Base Cement Phase Composition

Item	Test Result
C <sub>3</sub> S (%)	57
C <sub>2</sub> S (%)	16
C <sub>3</sub> A (%)	4
C <sub>4</sub> AF (%)	12

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 3.15

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