



Cement Mill Test Report

Date of Issue: January 13, 2021

Plant: Exshaw AB
 Product: Portland Cement Type I/II/V
 Mill Test Report Number: MTR-I/II/V-2020-12
 Manufactured: December 2020

ASTM C 150-19 and AASHTO M 85-17 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 (%)	---	20.0		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		280 - 430	421
CaO (%)	---	62.0	Passing 45 μm (%) (C430)		
MgO (%)	6.0 max	4.7		---	98.9
SO ₃ (%)	2.3 max *	2.9	Autoclave Expansion (%) (C151)		
Loss on Ignition (%)	3.5 max	1.9		0.80 max	0.10
Insoluble Residue (%)	1.5 max	0.33	Compressive strength (MPa, [psi]) (C 109)		
CO ₂ (%)	---	1.2			
Limestone (%)	5.0 max	2.8	3 days	12.0 [1740] min	31.3 [4540]
CaCO ₃ in Limestone (%)	70 min	96	7 days	19.0 [2760] min	37.5 [5440]
Inorganic Process Addition (Lafarge Cement Kiln Dust)	5.0 max	-	28 days (Reflects previous month's data)		42.6 [6180]
Adjusted Potential Phase Composition (C 150)			Time of setting (minutes)		
C ₃ S (%)	---	55	Vicat Initial (C191)		
C ₂ S (%)	---	16		45 - 375	114
C ₃ A (%)	5 max	4	Sulfate Resistance (%) (C452)**		
C ₄ AF (%)	---	11		0.040 max	0.034
C ₄ AF + 2(C ₃ A)	25 max	19	Mortar Bar Expansion (%) (C1038)**		
C ₃ S+4.75*C ₃ A (%)	100 max	75		0.020 max	0.011
ASTM C 150-17 and AASHTO M 85-17 Optional Requirements:			False set (%) (C451)		
NaEq (%)	0.60 max	0.58		50 min	77

* 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 (Q4)

We certify that the above described cement, at the time of shipment, meets the chemical and physical requirements of ASTM C 150-19 & AASHTO M 85-17 STANDARD SPECIFICATIONS FOR TYPES I, II & V CEMENTS; and ASTM C 150-17 & AASHTO M 85-17 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 ASTM C 150-19 and AASHTO M 85-17 Standard data

Additional Data

Item	Test Result	
	Limestone	Inorganic Process Addition Lafarge Cement Kiln Dust
Amount (%)	2.8	-
SiO ₂ (%)	1.4	n/a
Al ₂ O ₃ (%)	0.8	n/a
Fe ₂ O ₃ (%)	0.3	n/a
CaO (%)	51.5	n/a
SO ₃ (%)	0.2	n/a
CO ₂ (%)	42.2	n/a

Base Cement Phase Composition

Item	Test Result
C ₃ S (%)	56
C ₂ S (%)	17
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 3.15

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