Cement Mill Test Report

Month of Issue: JANUARY 2021

Plant:	**Richmond, British Columbia**
Product:	**Portland Cement Type I/II**
Mill Test Report #	**R-TI-21-01**
Manufactured:	**DECEMBER 2020**

ASTM C 150-19 and AASHTO M 85-19 Standard Requirements

CHEMICAL ANALYSIS

Item	Spec limit	Test Result
Rapid Method, X-Ray (C 114)		
SiO2 (%)	---	20.2
Al2O3 (%)	6.0 max	4.8
Fe2O3 (%)	6.0 max	3.4
CaO (%)	---	63.6
MgO (%)	6.0 max	1.0
SO3 (%)	3.0 max*	3.1
Loss on ignition (%)	3.5 max	2.9
Insoluble residue (%)	1.5 max	---
CO2 (%)	---	1.8
Limestone (%)	5.0 max	4.1
CaCO3 in Limestone (%)	70 min	97
Adjusted Potential Phase Composition	(C 150)	
C3S (%)	---	50
C2S (%)	---	20
C3A (%)	8 max	7
C4AF (%)	---	10
C3S+4.75*C3A (%)	100 max	84

PHYSICAL ANALYSIS

Item	Spec limit	Test Result	
Air content of mortar (%) (C 185)	12 max	5.1	
Blaine Fineness (m2/kg) (C 204)***	260 - 430	395	
Passing 45 um (%) (C 430)	72 min	97.4	
Autoclave expansion (%) (C 151)	0.80 max	0.03	
Compressive strength (MPa, [PSI]) (C 109)			
		Mpa	PSI
3 days	12.0 [1740] min	24.8	3600
7 days	19.0 [2760] min	32.2	4670
28 days (Reflects previous month's data)	28.0 [4060] min	44.6	6460
Time of setting (minutes)			
Vicat Initial (C 191)	45 - 375	91	
False Set (%) (C451)	50 min	90	
Heat of Hydration (C186)** - 28 day (Kj/Kg)		399	
Colour (L*)		57.890	
Mortar Bar Expansion (%) (C 1038)**	0.020 max	0.002	

ASTM C 150 and AASHTO M 85 Optional Chemical Requirements:

NaEq (Alkali) (%)	0.60 max	0.54

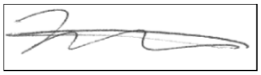
* May exceed 3.0% SO3 maximum based on our C 1038 results of <0.02% expansion at 14 days.

** Current Production run not available - most recent provided, *** Maximum Blaine can be exceeded if C3S + 4.75*C3A(%) meets limit

Note: Specific gravity for Portland cement is considered to be 3.15

We certify that the above described cement, at the time of shipment, meets the chemical and physical requirements of applicable DOT Specifications for Type I and Type II;
ASTM C 150-19 & AASHTO M 85-19 STANDARD SPECIFICATIONS FOR TYPE I AND TYPE II CEMENT;
ASTM C 150-19 & AASHTO M 85-19 OPTIONAL CHEMICAL REQUIREMENTS FOR TYPES I & II LOW ALKALI CEMENT.
Cement complies with NSF 61

Certified By:



Harold Ptachyk B.Sc., PChem
Quality Manager
1/4/2021

Western BU - Richmond
7611 No 9 Rd Richmond, BC
604 244 4300

Questions or enquiries can be directed to Rob Shogren
Rob Shogren, PhD
Lafarge - Technical Director
5400 W Marginal Way SW, Seattle WA
P +1 206 923 9953
E Rob.Shogren@lafargeholcim.com