



Cement Mill Test Report

Date of Issue: January 12, 2022

Plant: Exshaw, AB
 Product: Portland Cement Type III
 Mill Test Report Number: MTR-III-2021-12
 Manufactured: December 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) | | |
| SiO ₂ (%) | --- | 19.7 | | 12 max | 4 |
| Al ₂ O ₃ (%) | --- | 4.0 | Blaine Fineness (m ² /kg) (C204) | | |
| Fe ₂ O ₃ (%) | --- | 3.8 | | --- | 622 |
| CaO (%) | --- | 62.0 | Passing 45 μm (%) (C430) | | |
| MgO (%) | 6.0 max | 4.4 | | --- | 99.1 |
| SO ₃ (%) | 3.5 max | 3.3 | Autoclave Expansion (%) (C151)** | | |
| Loss on Ignition (%) | 3.5 max | 2.4 | | 0.80 max | 0.09 |
| Insoluble Residue (%)** | 1.5 max | 0.26 | Compressive strength (MPa, [psi]) (C109) | | |
| CO ₂ (%) | --- | 1.7 | 1 day | 12.0 [1740] min | 30.7 [4450] |
| Limestone (%) | 5.0 max | 4.2 | 3 days | 24.0 [3480] min | 39.2 [5680] |
| CaCO ₃ in Limestone (%) | 70 min | 94 | 28 days (Reflects previous month's data) | | 49.8 [7220] |
| Inorganic Process Addition (Lafarge Cement Kiln Dust) | 5.0 max | - | Time of setting (minutes) | | |
| Adjusted Potential Phase Composition (C150) | | | Vicat Initial (C191) | 45 - 375 | 65 |
| C ₃ S (%) | --- | 53 | | | |
| C ₂ S (%) | --- | 17 | | | |
| C ₃ A (%) | 15 max | 4 | | | |
| C ₄ AF (%) | --- | 11 | | | |
| ASTM C 150-17 and AASHTO M 85-17 Optional Chemical Requirements: | | | | | |
| NaEq (%) | 0.60 max | 0.54 | | | |

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 TYPE III CEMENT; and ASTM C 150-20 & AASHTO M 85-18 OPTIONAL CHEMICAL REQUIREMENTS FOR TYPE III LOW ALKALI CEMENT.

Certified By:

Lorraine Richards

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 Phone: 403-673-3815

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 (%) | 0.8 | n/a |
| Al ₂ O ₃ (%) | 0.7 | n/a |
| Fe ₂ O ₃ (%) | 0.2 | n/a |
| CaO (%) | 52.1 | n/a |
| SO ₃ (%) | 0.3 | n/a |
| CO ₂ (%) | 41.5 | n/a |

Base Cement Phase Composition

| Item | Test Result |
|-----------------------|-------------|
| C ₃ S (%) | 55 |
| C ₂ S (%) | 17 |
| C ₃ A (%) | 4 |
| C ₄ 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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