



Cement Mill Test Report

Date of Issue: April 12, 2023

Plant: Exshaw, AB
 Product: Portland Cement Type III
 Mill Test Report Number: MTR-III-2023-03
 Manufactured: March 1-31, 2023

ASTM C 150-21 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 (%) | --- | 19.3 | Blaine Fineness (m ² /kg) (C204) | --- | 518 |
| Al ₂ O ₃ (%) | --- | 4.0 | Passing 45 μm (%) (C430) | --- | 99.3 |
| Fe ₂ O ₃ (%) | --- | 3.5 | Autoclave Expansion (%) (C151)** | 0.80 max | 0.11 |
| CaO (%) | --- | 62.1 | Compressive strength (MPa, [psi]) (C109) | | |
| MgO (%) | 6.0 max | 4.7 | 1 day | 12.0 [1740] min | 24.3 [3520] |
| SO ₃ (%) | 3.5 max | 3.2 | 3 days | 24.0 [3480] min | 34.4 [4990] |
| Loss on Ignition (%) | 3.5 max | 2.6 | 28 days (Reflects previous month's data) | | 50.5 [7320] |
| Insoluble Residue (%)* | 1.5 max | 0.30 | Time of setting (minutes) | | |
| CO ₂ (%) | --- | 2.0 | Vicat Initial (C191) | 45 - 375 | 80 |
| Limestone (%) | 5.0 max | 4.7 | Mortar Expansion (%) (C1038) | 0.02 max | 0.010 |
| CaCO ₃ in Limestone (%) | 70 min | 96 | | | |
| Inorganic Process Addition (Lafarge Cement Kiln Dust) | 5.0 max | - | | | |
| Adjusted Potential Phase Composition (C150) | | | | | |
| C ₃ S (%) | --- | 57 | | | |
| C ₂ S (%) | --- | 12 | | | |
| C ₃ A (%) | 15 max | 5 | | | |
| C ₄ AF (%) | --- | 11 | | | |

ASTM C 150-17 and AASHTO M 85-17 Optional Chemical Requirements:

| | | |
|----------|----------|------|
| NaEq (%) | 0.60 max | 0.58 |
|----------|----------|------|

We certify that the above described cement, at the time of shipment, meets the chemical and physical requirements of ASTM C 150-21 & AASHTO M 85-18 STANDARD SPECIFICATIONS FOR TYPE III CEMENT; and ASTM C 150-21 & AASHTO M 85-18 OPTIONAL CHEMICAL REQUIREMENTS FOR TYPE III LOW ALKALI CEMENT.



Certified to NSF/ANSI/CAN 61

Our laboratory is AASHTO accredited. Grey highlighted tests are not within current Scope of Accreditation.



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Certified By:

Lorraine Johnson

Lorraine Johnson
 Quality Manager



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Additional Data

| Item | Test Result | |
|------------------------------------|-------------|--|
| | Limestone | Inorganic Process Addition Lafarge Cement Kiln Dust |
| Amount (%) | 4.7 | - |
| SiO ₂ (%) | 2.0 | n/a |
| Al ₂ O ₃ (%) | 0.5 | n/a |
| Fe ₂ O ₃ (%) | 0.2 | n/a |
| CaO (%) | 49.5 | n/a |
| SO ₃ (%) | 0.2 | n/a |
| CO ₂ (%) | 42.4 | n/a |

Base Cement Phase Composition

| Item | Test Result |
|-----------------------|-------------|
| C ₃ S (%) | 60 |
| C ₂ S (%) | 13 |
| C ₃ A (%) | 5 |
| 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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