



# Cement Mill Test Report

Date of Issue: January 12, 2022

Plant: Exshaw AB  
 Product: Portland Cement Type GUL  
 Manufactured: December 1-31, 2021

| CHEMICAL ANALYSIS   |            |             | PHYSICAL ANALYSIS                      |            |             |
|---|------------|-------------|--|------------|-------------|
| Item  | Spec limit | Test Result | Item                                   | Spec limit | Test Result |
| Rapid Method, X-Ray   |            |             |  |            |             |
| SiO <sub>2</sub> (%)  | ---        | 18.6        | Blaine Fineness (m <sup>2</sup> /kg)   | ---        | 489         |
| Al <sub>2</sub> O <sub>3</sub> (%)                                  | ---        | 3.8         | Retained 45 um (%)                     | 28 max     | 0.6         |
| Fe <sub>2</sub> O <sub>3</sub> (%)                                  | ---        | 3.5         | Autoclave expansion (%)                | 1.0 max    | 0.05        |
| CaO (%)   | ---        | 61.4        | Compressive strength (MPa)             |            |             |
| MgO (%)   | ---        | 4.3         | 1 Day                                  |            | 23.7        |
| SO <sub>3</sub> (%)   | 3.0 max ** | 3.2         | 3 day                                  | 14.5 min   | 35.7        |
| Loss on ignition @ 950 (%)  | 10.0 max   | 4.7         | 7 day                                  | 20.0 min   | 40.5        |
| Loss on ignition @ 550(%)   |            | 0.8         | 28 day (November 2021 Results)         | 26.5 min   | 42.8        |
| Insoluble residue (%)   | 1.5 max    | 0.36        | Time of setting (minutes)              |            |             |
| Specific Gravity  |            | 3.11        | Vicat Initial                          | 45 - 375   | 112         |
| Limestone Addition  |            | 9.5         | Mortar Bar Expansion (%) (C5)*         | 0.020 max  | 0.005       |
| <i>Clinker chemistry used in the manufacture of above Type GUL.</i> |            |             | Colour (For Information Purposes Only) |            | 33          |
| <i>(For information purposes only.)</i>                             |            |             |  |            |             |
| C3S (%)   | ---        | 62.2        |  |            |             |
| C2S (%)   | ---        | 14.9        |  |            |             |
| C3A (%)   | ---        | 4.6         |  |            |             |
| C4AF (%)  | ---        | 12.2        |  |            |             |

**Other Chemical Information:**

NaEq (%) Weekly Averages

Week Ending: 12/04 0.50 12/11 0.53 12/18 0.51 12/25 0.53

\* Latest available value

\*\* May exceed 3.0% SO<sub>3</sub> maximum based on A3004-C5 results of <0.020% expansion at 14 days.

We certify that the above described cement, at the time of shipment, meets the chemical and physical requirements of the applicable specification for Type GUL.

CSA A3001-18 STANDARD SPECIFICATIONS FOR TYPE GUL CEMENT.

Certified By: *Lorraine Richards*

Lafarge Canada Inc. - Exshaw Plant  
 P.O. Box 160, Highway 1A, Exshaw AB T0L 2C0  
 Phone: 403-673-3815

Lorraine Richards  
 Quality Control Coordinator