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## Cement Mill Certificate of Analysis

Alaska Basic Industries hereby certify that cement represented by this analysis complies with the current requirements for Type I and Type II of ASTM C150-11 specifications, and AASHTO M85-11.

Portland Cement: Type I/II Low Alkali

Date Shipped: June 25, 2018

Meets: ASTM C150-11 AASHTO M85-11

Lot # / Ship: #000062518 MV Indigo Lake

<u>Chemical Composition:</u>	<u>Results:</u>	<u>Type I Requirements</u>	<u>Type II Requirements</u>
Silicon Dioxide (SiO <sub>2</sub> ):	20.3%	---	---
Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> ): %Max	4.7%	---	6.0%
Ferric Oxide (Fe <sub>2</sub> O <sub>3</sub> ):% Max	3.2%	---	6.0%
Calcium Oxide (CaO):	62.0%	---	--
Magnesium Oxide (MgO): % Max	3.9%	6.0%	6.0%
Sulfur Trioxide (SO <sub>3</sub> ):	2.9%	3.0%	3.0%
Loss On Ignition% Max:	1.8%	3.0%	3.0%
Insoluble Residue:% Max	0.40%	0.75%	0.75%
Tricalcium Silicate (C <sub>3</sub> S):	51	--	--
Dicalcium Silicate (C <sub>2</sub> S):	19	--	--
Tricalcium Aluminate (C <sub>3</sub> A):% Max	7.0%	--	--
Tetracalcium Aluminoferrite (C <sub>4</sub> AF):	23.00%	--	--
Total Alkali as NaEq:% Max	0.58%	0.60%	0.60%
Limestone, 5 % max	2.5%	5.0%	5.0%
CaCO <sub>3</sub> in Limestone, 70% min	86%	70%	70%

### Physical Properties:

Blaine (min m <sup>2</sup> /kg.):	387	260	260
Vicat, Initial Set (mins.):	100	--	--
Vicat, Final Set (mins.):	245	45-375	45-375
Autoclave Expansion:% Max	0.00%	0.80%	0.80%
False Set:	85%	--	--
Air Content (% Max by vol.):	9.00%	12.00%	12.00%

### Mortar Cube Breaks:

Compressive Strength (PSI):			
1 Day	1880	--	--
3 Days	3610	1740 min	1450 min
7 Days	4870	2760 min	2470 min

### Notes

1. Test Results: This mill test represents typical data.
2. The percent of Limestone is slowly being increased, which has no effect on the performance of concrete
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Patrick Walter

# Type I/II

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