ALASKA
BASIC
INDUSTRIES

SUBSIDIARIES:
ANCHORAGE SAND & GRAVEL CO., INC.
FAIRBANKS MATERIALS, INC.

Manufacturer's Certification

Report Date: 5/20/2024

We hereby certify that CalPortland Type I/II Cement meets the standard requirements of ASTM C150 and AASHTO M85 specification for Type I and Type II cements. Reported are the average chemical and physical data for the lot.

Lot #: 24-121 **Type I / II Cement**

Source: SsangYong, So. Korea

	ASTM C150 and AASHTO M85 Requirements		Analysis	Limestone
Chemical Properties	**Type I**	**Type II**	**Results**	**Analysis**
Silicon dioxide (SiO_2), %	---	---	**20.1**	**8.4**
Aluminum oxide (Al_2O_3), max, %	---	6.0	**4.7**	**4.2**
Ferric oxide (Fe_2O_3), max, %	---	6.0	**3.1**	**1.5**
Calcium oxide (CaO), %	---	---	**62.4**	**44.1**
Magnesium oxide (MgO), max, %	6.0	6.0	**3.9**	**3.4**
Sulfur trioxide (SO_3), max, %	3.0	3.0	**2.6**	**0.1**
Loss on ignition (LOI), max, %	3.5	3.5	**1.8**	
Insoluble residue (IR), max, %	1.5	1.5	**0.3**	**Base**
Alkalies ($Na_2O+0.658*K_2O$), %	---	---	**0.54**	**Cement**
Tricalcium silicate (C_3S), %	---	---	**56**	**57**
Dicalcium silicate (C_2S), %	---	---	**15**	**15**
Tricalcium aluminate (C_3A), max, %	---	8	**7**	**7**
Tetracalcium aluminoferrite (C_4AF), %	---	---	**9**	**10**
CO_2, %	---	---	**0.8**	
Limestone addition, max, %	5.0	5.0	**2.2**	
$CaCO_3$ in Limestone, min, %	70	70	**85**	
Physical Properties				
Air content of mortar, max, volume %	12	12	**6**	
Blaine Fineness, min, m^2/kg	260	260	**399**	
Autoclave expansion, max, %	0.80	0.80	**0.10**	
Compressive Strength, min				
1 Day, psi	---	---	**2120**	
3 Day, MPa	12.0	10.0	**28.5**	
3 Day, psi	1740	1450	**4130**	
7 Day, MPa	19.0	17.0	**30.8**	
7 Day, psi	2760	2470	**4470**	
28 Day (from previous lot), MPa	---	---	**45.6**	
28 Day (from previous lot), psi	---	---	**6620**	
Vicat Setting Time, min-max, minutes	45 - 375	45 - 375	**135**	

Apparatus and methods used in this laboratory have been checked by the Cement and Concrete Reference Laboratory of the National Institute of Standards and Technology. A copy of the report detailing their findings is available upon request. Major oxides are analyzed in accordance with ASTM C114.

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