

MILL TEST REPORT

Cement Type: **ASTM Type III, AASHTO Type III, CSA Type HE**
High Early Strength, Low Alkali Portland Cement

Plant: **Bellingham, WA**

Certificate #: **B3-146**

Production Period:	Jul 01 2010	Jul 31 2010	Test Result	ASTM / AASHTO C150 / M85 Specification	CSA A3001 Specification
SiO2 (%)	ASTM C114	CSA A3003	20.6	-	-
Al2O3 (%)	ASTM C114	CSA A3003	4.99	-	-
Fe2O3 (%)	ASTM C114	CSA A3003	3.69	-	-
CaO (%)	ASTM C114	CSA A3003	64.1	-	-
MgO (%)	ASTM C114	CSA A3003	0.98	max. 6.0	max. 5.0
SO3 (%)	ASTM C114	CSA A3003	3.08	max. 3.5	max. 3.5
Na2O (%)	ASTM C114	CSA A3003	0.32	-	-
K2O (%)	ASTM C114	CSA A3003	0.38	-	-
TiO2 (%)	ASTM C114	CSA A3003	0.25	-	-
C3S (%)	ASTM C150	ASTM C150	55	-	-
C2S (%)	ASTM C150	ASTM C150	18	-	-
C3A (%)	ASTM C150	CSA A3003	7.0	max. 15	-
C4AF (%)	ASTM C150	ASTM C150	11.2	-	-
Total Alkalis (%)	ASTM C114	CSA A3003	0.57	max. 0.60	-
Loss on Ignition (%)	ASTM C114	CSA A3003	1.39	max. 3.0	max. 3.0
Insoluble Residue (%)	ASTM C114	CSA A3003	0.13	max. 0.75	max. 1.5
Free Calcium Oxide (%)	ASTM C114	CSA A3003	0.30	-	-
CO2 in Cement (%)	ASTM C114		0.50	-	-
CaCO3 in Limestone (%)	ASTM C114		94	min. 70	
Limestone in Cement (%)	ASTM C150		1.2	max. 5.0	
Blaine Fineness (m2/kg)	ASTM C204	ASTM C204	526	-	-
+325 mesh	ASTM C430	CSA A3004-A3	0.08	-	-
Vicat Setting Time					
Initial (minutes)	ASTM C191	CSA A3004-B2	93	min. 45 max. 375	min. 45 max. 250
Final (minutes)	ASTM C191	CSA A3004-B2	195	-	-
Air Content (%)	ASTM C185	CSA A3004-C4	7.51	max. 12	-
Autoclave Expansion (%)	ASTM C151	CSA A3004-B5	-0.05	max. 0.80	max. 1.0
Compressive Strength			MPa / psi		
1 Day	ASTM C109/109M	CSA A3004-C2	24.0 / 3480	min. 12.0	min. 13.5
3 Day	ASTM C109/109M	CSA A3004-C2	37.1 / 5380	min. 24.0	min. 24.0
28 Day (previous month)	ASTM C109/109M	CSA A3004-C2	49.8 / 7226	-	-

This will certify that the above described cement meets the standard requirements and optional Low Alkali chemical requirements of ASTM Specification C-150 and AASHTO Specification M-85 for Type III Portland Cement, and CSA Specification A3001 and A5 for Type HE Portland Cement.

Note that CSA Specification A3001 superseded CSA Specification A5 in December 2003.

Eileen M. Jang
 Quality Control Manager/Mill Engineer



August 13, 2010