



# MITSUBISHI CEMENT CORPORATION

## CERTIFICATE OF TEST

Source: Cushenbury Plant

Portland Cement – Type III

Date: 11/9/2015

ASTM designation: C 150 – 12 for Type III low alkali Cement.

Production Period

CALTRANS Specification: Section 90 – 1.02B(2) for Type III.

From: 10/1/ 2015

NDOT Specification: Section 701 – 3.01 for Type III.

To: 10/5/ 2015

AZDOT Specifications Subsection 1006-2.01 for Type III.

### Chemical Composition:

	ASTM C-150 Limits Type III	Test Results
Silicon Dioxide (SiO <sub>2</sub> ), %	----	20.5
Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> ), %	----	5.5
Ferric Oxide (Fe <sub>2</sub> O <sub>3</sub> ), %	----	1.2
Calcium Oxide (CaO), %	----	63.4
Magnesium Oxide (MgO), %	6.0 Max.	2.6
Sulfur Trioxide (SO <sub>3</sub> ), %	4.5 Max.	3.3
Loss on Ignition, %	3.0 Max.	1.2
Insoluble Residue, %	0.75 Max.	0.10
Total Alkali (%Na <sub>2</sub> O + 0.658 * %K <sub>2</sub> O), %	0.60 Max.	0.40
Tricalcium Silicate (C <sub>3</sub> S), %	----	54
Tricalcium Aluminate (C <sub>3</sub> A), %	15 Max.	13
Limestone, %	5.0 Max.	0.0
Free Lime, %	----	0.9

### PHYSICAL RESULTS:

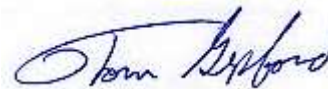
Blaine Fineness Average (m <sup>2</sup> /kg)	----	549
325 Mesh (% Passing)	----	98.4
Autoclave Expansion (%)	0.80 Max.	0.08
Time of Set Initial Vicat (minutes)	45 / 375 Min. / Max.	80
Air Entrainment (% by Volume)	12 Max.	7.8
Heat of Hydration (kJ/kg)	---- (a)	428
False Set (%)	50 Min.	69
Color (L value)	---- (a)	76

### Compressive Strength Test:

	Type III			MPA	PSI
	MPA	psi			
1 Day	12.0	1740	Min.	25.0	3630
3 Day	24.0	3480	Min.	33.6	4880
7 Day	----	----		37.1	5390
28 Day	----	----		42.9	6220

This cement has been sampled and tested in accordance with ASTM standard methods and procedures. All tests results are certified to comply with the type specification designated above. No other warranty is made or implied. We are not responsible for improper use or workmanship. (a) For information only.

MITSUBISHI CEMENT CORPORATION  
Cushenbury plant



Tom Gepford  
Quality Control Manager