

 **MITSUBISHI CEMENT CORPORATION**
CERTIFICATE OF TEST

Source: Cushenbury Plant

Portland Cement – Type III

Date: 12/10/2019

ASTM designation: C 150 – 16 for Type III low alkali Cement.

Production Period

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

From: 11/07/2019

NDOT Specification: Section 701 – 3.01 for Type III.

To: 11/10/2019

AZDOT Specifications Subsection 1006-2.01 for Type III.

Chemical Composition:

	ASTM C-150 Limits Type III		Test Results
Silicon Dioxide (SiO ₂), %	----		20.5
Aluminum Oxide (Al ₂ O ₃), %	----		5.4
Ferric Oxide (Fe ₂ O ₃), %	----		1.2
Calcium Oxide (CaO), %	----		63.7
Magnesium Oxide (MgO), %	6.0	Max.	2.0
Sulfur Trioxide (SO ₃), %	4.5	Max.	3.5
Loss on Ignition, %	3.0	Max.	1.5
Insoluble Residue, %	1.5	Max.	0.10
Total Alkali (%Na ₂ O + 0.658 * %K ₂ O), %	0.60	Max.	0.37
Tricalcium Silicate (C ₃ S), %	----		55
Tricalcium Aluminate (C ₃ A), %	15	Max.	12
Limestone, %	5.0	Max.	0.0
Free Lime, %	----		1.4

PHYSICAL RESULTS:

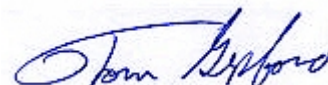
Blaine Fineness Average (m ² /kg)	----		559
325 Mesh (% Passing)	----		98.7
Autoclave Expansion (%)	0.80	Max.	0.14
Time of Set Initial Vicat (minutes)	45 / 375	Min. / Max.	58
Air Entrainment (% by Volume)	12	Max.	7.1
C-1702 Heat of Hydration at 7 Days (J/g)	----		417
False Set (%)	50	Min.	97
Color (L value)	----		77

Compressive Strength Test:

	Type III		MPA	PSI
	MPA	psi		
1 Day	12.0	1740	Min.	23.3 3385
3 Day	24.0	3480	Min.	29.5 4280
7 Day	----	----		35.0 5075
28 Day	----	----		46.3 6710

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. The MCC laboratory is AASHTO accredited. (a) For information only.

MITSUBISHI CEMENT CORPORATION
 Cushenbury plant



Tom Gepford
 Quality Control Manager