

 **MITSUBISHI CEMENT CORPORATION**  
**CERTIFICATE OF TEST**

Source: Cushenbury Plant

Date: 02/14/2022

ASTM designation: C – 150 for Type I, II & V low alkali Cement

CALTRANS Specification: Section 90 – 2.01 for Type II modified and V. Lot #: 1 & 4 - Silo 8 & 12

NDOT Specification: Section 701 – 3.01 for Type II and V

**Chemical Composition:**

	ASTM C-150 Limits				Test Results
	Type I	Type II	Type V		
Silicon Dioxide (SiO <sub>2</sub> ), %	----	20.0	----	Min.	20.4
Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> ), %	----	6.0	----	Max.	4.3
Ferric Oxide (Fe <sub>2</sub> O <sub>3</sub> ), %	----	6.0	----	Max.	4.2
Calcium Oxide (CaO), %	----	----	----		62.7
Magnesium Oxide (MgO), %	6.0	6.0	6.0	Max.	2.9
Sulfur Trioxide (SO <sub>3</sub> ), %	3.0	3.0	2.3	Max.	2.0
Loss on Ignition, %	3.0	3.0	3.0	Max.	0.7
Insoluble Residue, %	0.75	0.75	0.75	Max.	0.10
Total Alkali (%Na <sub>2</sub> O + 0.658 * %K <sub>2</sub> O), %	0.60	0.60	0.60	Max.	0.59
Tricalcium Silicate (C <sub>3</sub> S), %	----	----	----		60
Tricalcium Aluminate (C <sub>3</sub> A), %	----	8	5	Max.	4
C <sub>4</sub> AF + 2*C <sub>3</sub> A	----	----	25	Max.	21
C <sub>3</sub> S + 4.75*C <sub>3</sub> A	----	100	----	Max.	80
Limestone, %	5.0	5.0	5.0	Max.	0.0
Free Lime, %	----	----	----		0.8

**PHYSICAL RESULTS:**


Blaine Fineness (m <sup>2</sup> /kg)	280	280	280	Min.	331
325 Mesh (% Passing)	----	----	----		86.2
Autoclave Expansion (%) Dec 2021	0.80	0.80	0.80	Max.	0.40
Time of Set Initial Vicat (minutes)	45 / 375	45 / 375	45 / 375	Min. / Max.	135
Air Entrainment (% by Volume)	12	12	12	Max.	7.5
C1702 Heat of Hydration at 7 Days (kJ/kg)	----	----	----	(a)	285
Early Stiffening (Final Penetration %)	50	50	50	Min.	165

**Compressive Strength Test:**

	Type I		Type II		Type V		MPA	PSI
	MPA	psi	MPA	psi	MPA	psi		
1 Day	----	----	----	----	----	----	7.8	1140
3 Day	12.0	1740	10.0	1450	8.0	1160	Min.	15.8 2290
7 Day	19.0	2760	17.0	2470	15.0	2180	Min.	22.8 3310
28 Day Jan 2021	----	----	----	----	21.0	3050	Min.	35.6 5165

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.

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Cushenbury plant



Evan Coss  
Quality Control Superintendent