



CEMENT MILL TEST REPORT

Source: Kosmos Cement Plant, Louisville, KY

Date of Report: 06/11/2022

Kosmos Cement Customers

Sample Receiving and Testing: May 1-31

Product Type: I,II Portland cement with Eq. Alkali Content <0.60%

Production: May 2023

Standard Chemical Requirements (ASTM C114)	Specifications	ASTM C150 / AASHTO M-85		Test Results
		Type I	Type II	
Silicon Dioxide (SiO ₂), %		----	---	18.2
Aluminum Oxide (Al ₂ O ₃), %	Maximum	----	6	4.3
Ferric Oxide (Fe ₂ O ₃), %	Maximum	----	6	2.9
Calcium Oxide (CaO), %		----	----	62.0
Magnesium Oxide (MgO), %	Maximum	6.0	6.0	3.6
Sulfur Trioxide (SO ₃), % **	Maximum	3.0	3.0	3.69 ^A
Loss on Ignition (LOI), %**	Maximum	3.5	3.5	2.9 ^B
Insoluble Residue (IR), %	Maximum	1.50	1.50	0.52
Equivalent Alkali Content (Na ₂ O+0.658 K ₂ O), Reported %				0.48
Tricalcium Silicate (C ₃ S), %		----	----	66.9
Dicalcium Silicate (C ₂ S), %		----	----	0.0
Tricalcium Aluminate (C ₃ A), %	Maximum	----	8	6.3
Sum of C ₃ S + 4.75 C ₃ A, %**	Maximum	----	100	97 ^C
Limestone content of cement, %	Maximum	5.0	5.0	4.5
CO ₂ in finished cement, %				1.90
CaCO ₃ content of Limestone, %	Minimum	70	70	82

Standard Physical Requirements

(ASTM C204) Blaine Fineness, m ² /kg	Minimum	260	260	417
(ASTM C430) Passing No. 325 Sieve, %		----	----	95.0
(ASTM C191) Time of Setting; Vicat test:				
Initial Set, minutes	Minimum	45	45	120
Final Set, minutes	Maximum	375	375	240
(ASTM C1702) Calorimetry: 3 days, kJ/kg (cal/g)**		----	----	315 (69) ^C
(ASTM C451) False Set, % (Optional)	Minimum	50	50	85
(ASTM C185) Air Content of Mortar, %	Maximum	12	12	7.7
(ASTM C187) Normal Consistency, %		----	----	27.0
(ASTM C109) Compressive Strength:		<u>MPa</u> (<u>psi</u>)	<u>MPa</u> (<u>psi</u>)	<u>MPa</u> (<u>psi</u>)
3 Days	Minimum	12.0 (1740)	10.0 (1450)	30.4 (4401)
7 Days	Minimum	19.0 (2760)	17.0 (2470)	40.4 (5853)
28 Days (Optional)		----	----	----

^A Kosmos Type I,II cement has successfully demonstrated by Test Method C1038 that cement with values exceeding the limits in ASTM C150, Table 1 for SO₃ content has not developed expansion exceeding 0.020% at 14 days. Supporting data is available upon request.

^B When limestone is an ingredient added in the finish mill, the maximum specification limit for the Loss on Ignition value is 3.5%.

^C In addition to the Table I calculation, the three-day test for Heat of Hydration using Calorimetry per C1702 was performed at the required frequency, and is reported for informational purposes.

Kosmos Cement Company, LLC hereby certifies that this cement meets or exceeds the chemical and physical specifications of ASTM C150 and AASHTO M-85 for the type identified.

Kosmos Cement Company, LLC is not responsible for the improper use or workmanship that may be associated with the use of this cement.

Tom Kyser

Tom Kyser Quality Control Manager



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Additional Data				Test Results
Limestone				
Silicon Dioxide (SiO ₂), %				5.6
Aluminum Oxide (Al ₂ O ₃), %				0.80
Ferric Oxide (Fe ₂ O ₃), %				0.40
Calcium Oxide (CaO), %				45.7
Sulfur Trioxide (SO ₃), %				0.15

Base Cement Composition:

Tricalcium Silicate (C ₃ S), %				70.00
Dicalcium Silicate (C ₂ S), %				0.00
Tricalcium Aluminate (C ₃ A), %				6.60
Tetracalcium Aluminoferrite (C ₄ AF), %				8.80
Inorganic Processing Addition				None

Kosmos Cement Company, LLC hereby certifies that the above data represents the materials used in the cement manufactured during the production period indicated.

By: Tom Kyser
Tom Kyser Quality
Control Manager