



The Monarch Cement Company

449 1200 Street · PO Box 1000 · Humboldt, KS 66748
Phone: 620-473-2222 · Fax: 620-473-2447

Certified Mill Test Report - Type III

Production Period: November 2023

The following is based on average test data during the production period. The data is typical of cement produced at The Monarch Cement Company, Humboldt, KS. Individual shipments may vary.

PHYSICAL

	<u>Reported</u>	<u>Spec Limit</u>		<u>Reported</u>	<u>Spec Limit</u>
325 Sieve, % Passing	99.8	-	Air Content of Mortar (volume %)	8.4	12.0 max
Blaine fineness, specific surface					
Air Permeability (cm ² /g)	5870	-	Compressive Strength (psi)		
Time of Setting, Vicat test:			1 Day	3586	1740 min
Initial (minutes)	65	45 min	3 Days	4853	3480 min
Final (minutes)	115	375 max	7 Days	6213	-
			28 Days	8320	-
Specific Gravity	3.13				

CHEMICAL

	<u>Reported</u>	<u>Spec Limit</u>		<u>Reported</u>	<u>Spec Limit</u>
SiO ₂ - Silicon dioxide (%)	21.43	-	Loss on ignition (%)	1.10	3.0 max
Fe ₂ O ₃ - Ferric oxide (%)	2.90	6.0 max	Insoluble residue (%)	0.20	1.50 max
Al ₂ O ₃ - Aluminum oxide (%)	4.22	6.0 max	Free lime (%)	0.80	-
CaO - Calcium oxide (%)	64.51	-	Na ₂ O - Sodium oxide (%)	0.18	-
MgO - Magnesium oxide (%)	1.70	6.0 max	K ₂ O - Potassium oxide (%)	0.54	-
SO ₃ - Sulphur trioxide (%)	3.23	3.5 max	Equivalent Alkalies (%)	0.57	-

POTENTIAL CALCULATED COMPOUNDS

C ₃ S - Tricalcium silicate (%)	59.6	-
C ₂ S - Dicalcium silicate (%)	14.6	-
C ₃ A - Tricalcium aluminate (%)	5.4	15 max
C ₄ AF - Tetracalcium aluminoferrite (%)	7.5	-

The cement in this shipment meets standard requirements in the current specifications of the Federal Government and the American Society for Testing and Materials for Type III Portland Cement. All tests conform to AASHTO M-85 and ASTM Test Methods: Chemical C-114, Blaine C-204, Soundness C-151, Gillmore C-266, Compressive Strength C-109, Air Content C-185, and C-150.

Date: 4/23/2024

Mitchell R. King
Quality Control Manager