



The Monarch Cement Company

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Certified Mill Test Report - Type IL (12)(MS)(HS)

Production Period: March 2024

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	96.8	-	Air Content of Mortar (volume %)	8.4	12.0 max
Blaine fineness, specific surface					
Air Permeability (cm ² /g)	4640	-	Compressive Strength (psi)		
Time of Setting, Vicat test:			1 Day	2292	-
Initial (minutes)	110	45 min	3 Days	3691	1890 min
Final (minutes)	165	420 max	7 Days	4688	2900 min
			28 Days	6219	3620 min
Specific Gravity	3.08		Sulfate Resistance (%)	0.012	< 0.10¹

CHEMICAL

	<u>Reported</u>	<u>Spec Limit</u>		<u>Reported</u>	<u>Spec Limit</u>
SiO ₂ - Silicon dioxide (%)	19.33	-	Loss on ignition (%)	5.63	10.0 max
Fe ₂ O ₃ - Ferric oxide (%)	2.92	6.0 max	Insoluble residue (%)	1.84	-
Al ₂ O ₃ - Aluminum oxide (%)	4.17	6.0 max	Free lime (%)	0.95	-
CaO - Calcium oxide (%)	63.62	-	Na ₂ O - Sodium oxide (%)	0.21	-
MgO - Magnesium oxide (%)	1.80	6.0 max	K ₂ O - Potassium oxide (%)	0.55	-
SO ₃ - Sulphur trioxide (%)	2.77	3.0 max	Equivalent Alkalies (%)	0.57	-
Limestone (%)	11.96	15.0 max			
CaCO ₃ content of Limestone (%)	84.60	70.0 min			

1. Exhibits Special Properties for Moderate Sulfate Resistance (MS) and High Sulfate Resistance (HS) as demonstrated by ASTM C-1012.

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 IL Blended Hydraulic Cement. All tests conform to AASHTO M-240 and ASTM Test Methods: Compressive Strength C-109, Chemical C-114, Soundness C-151, Air Content C-185, Normal Consistency C-187, Time of Set C-188, Vicat C-191, Blaine C-204, Gillmore C-266, 325 Sieve C-430, Sulfate Resistance C-1012, and C-595 Specification for Blended Hydraulic Cements.

Date: 4/23/2024

Mitchell R. King
Quality Control Manager