



P20231122

CERTIFICATE NUMBER

November 22, 2023

DATE

Laboratory Test Certificate

PORTLAND CEMENT - TYPE I

Source: Asia Cement-Hualein Plant, Taiwan

Chemical (C114)

Item (%)	Value	Limit
Silicon Dioxide (SiO ₂)	20.8	
Aluminum Oxide (Al ₂ O ₃)	3.96	
Ferric Oxide (Fe ₂ O ₃)	2.84	
Calcium Oxide (CaO)	63.5	
Magnesium Oxide (MgO)	3.3	6.0 Max
Sulfur Trioxide (SO ₃)	2.7	3.0 Max
Sodium Oxide (Na ₂ O)	0.18	
Potassium Oxide (K ₂ O)	0.53	
Loss on Ignition (LOI)	2.76	3.5 Max
Insoluble Residue	0.77	1.50 Max
Limestone %	4.5	5.0 Max
Potential phase composition (%)		
C ₃ S	61.7	
C ₂ S	13.0	
C ₃ A	5.7	
C ₄ AF	8.6	
Alkali Equivalent (NaEq)	0.53	

Physical Properties

Comp. Strength	Value	(Min.)
3 Days	4000 psi	1740 psi
	(27.6 MPa)	(12.0 MPa)
7 Days	5110 psi	2760 psi
	(35.2 MPa)	(19.0 MPa)
28 Days**	6700 psi	4060*psi
	(46.2 MPa)	(28.0*MPa)
Blaine Fineness:	3960 cm ² /g	2600 min.
Air Content:	8.3 %	12.0 %Max
Vicat C191 Init. Set:	190	min. 45 Min
Vicat C191 Final Set:	270	min. 375 Max
Paste False Set:	87 %	50*% Min

* - optional requirements , Table 4.

** - 28 Days Compressive Strength from previous month.

We certify that the above described cement, at the time of shipment, meets the standard chemical and physical requirements of ASTM C150-22 and AASHTO M85-22, Type I, low alkali (Table 1).

Cement Division

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