



P20230222

CERTIFICATE NUMBER

February 22, 2023

DATE

# Laboratory Test Certificate

## PORTLAND CEMENT - TYPE I

Source: Asia Cement-Hualein Plant, Taiwan

### Chemical (C114)

Item (%)	Value	Limit
Silicon Dioxide (SiO <sub>2</sub> ) . . . . .	20.1	
Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> ) . . . . .	3.96	
Ferric Oxide (Fe <sub>2</sub> O <sub>3</sub> ) . . . . .	3.0	
Calcium Oxide (CaO) . . . . .	62.4	
Magnesium Oxide (MgO) . . . . .	3.5	6.0 Max
Sulfur Trioxide (SO <sub>3</sub> ) . . . . .	2.8	3.0 Max
Sodium Oxide (Na <sub>2</sub> O) . . . . .	0.16	
Potassium Oxide (K <sub>2</sub> O) . . . . .	0.55	
Loss on Ignition (LOI) . . . . .	2.45	3.5 Max
Insoluble Residue . . . . .	0.84	1.50 Max

### Physical Properties

Comp. Strength	Value	(Min.)
3 Days	4050 psi	1740 psi
	(27.9 MPa)	(12.0 MPa)
7 Days	5190 psi	2760 psi
	(35.8 MPa)	(19.0 MPa)
28 Days**	6960 psi	4060*psi
	(47.9 MPa)	(28.0*MPa)
Blaine Fineness:	3920 cm <sup>2</sup> /g	2600 min.
Air Content:	7.5 %	12.0 %Max
Vicat C191 Init. Set:	160	min. 45 Min
Vicat C191 Final Set:	225	min. 375 Max
Paste False Set:	85 %	50*% Min

Potential phase composition (%)

C <sub>3</sub> S . . . . .	62.5
C <sub>2</sub> S . . . . .	10.5
C <sub>3</sub> A . . . . .	5.5
C <sub>4</sub> AF . . . . .	9.1
Alkali Equivalent (NaEq) . . . . .	0.52

\* - 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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