



P20230822

CERTIFICATE NUMBER

August 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> ) . . . . .	20.8	
Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> ) . . . . .	3.91	
Ferric Oxide (Fe <sub>2</sub> O <sub>3</sub> ) . . . . .	2.9	
Calcium Oxide (CaO) . . . . .	63.7	
Magnesium Oxide (MgO) . . . . .	2.8	6.0 Max
Sulfur Trioxide (SO <sub>3</sub> ) . . . . .	2.9	3.0 Max
Sodium Oxide (Na <sub>2</sub> O) . . . . .	0.18	
Potassium Oxide (K <sub>2</sub> O) . . . . .	0.59	
Loss on Ignition (LOI) . . . . .	2.42	3.5 Max
Insoluble Residue . . . . .	0.64	1.50 Max
Limestone %	4.2	5.0 Max
Potential phase composition (%)		
C <sub>3</sub> S . . . . .	62.5	
C <sub>2</sub> S . . . . .	12.4	
C <sub>3</sub> A . . . . .	5.5	
C <sub>4</sub> AF . . . . .	8.8	
Alkali Equivalent (NaEq) . . . . .	0.57	

### Physical Properties

Comp. Strength	Value	(Min.)
3 Days	4540 psi	1740 psi
	(31.3 MPa)	(12.0 MPa)
7 Days	5670 psi	2760 psi
	(39.1 MPa)	(19.0 MPa)
28 Days**	7020 psi	4060*psi
	(48.4 MPa)	(28.0*MPa)
Blaine Fineness:	3920 cm <sup>2</sup> /g	2600 min.
Air Content:	7.7 %	12.0 %Max
Vicat C191 Init. Set:	165	min. 45 Min
Vicat C191 Final Set:	270	min. 375 Max
Paste False Set:	85 %	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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