



P20230522

CERTIFICATE NUMBER

May 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> ) . . . . .	4.0	
Ferric Oxide (Fe <sub>2</sub> O <sub>3</sub> ) . . . . .	3.17	
Calcium Oxide (CaO) . . . . .	63.6	
Magnesium Oxide (MgO) . . . . .	3.1	6.0 Max
Sulfur Trioxide (SO <sub>3</sub> ) . . . . .	2.8	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) . . . . .	2.81	3.5 Max
Insoluble Residue . . . . .	0.76	1.50 Max
Limestone %	4.8	5.0 Max
Potential phase composition (%)		
C <sub>3</sub> S . . . . .	62.0	
C <sub>2</sub> S . . . . .	12.6	
C <sub>3</sub> A . . . . .	5.4	
C <sub>4</sub> AF . . . . .	9.4	
Alkali Equivalent (NaEq) . . . . .	0.56	

### Physical Properties

Comp. Strength	Value	(Min.)
3 Days	4130 psi	1740 psi
	(28.5 MPa)	(12.0 MPa)
7 Days	5340 psi	2760 psi
	(36.8 MPa)	(19.0 MPa)
28 Days**	6900 psi	4060*psi
	(47.5 MPa)	(28.0*MPa)
Blaine Fineness:	3960 cm <sup>2</sup> /g	2600 min.
Air Content:	8.4 %	12.0 %Max
Vicat C191 Init. Set:	175	min. 45 Min
Vicat C191 Final Set:	260	min. 375 Max
Paste False Set:	86 %	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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