



Manufacturer's Certification

Report Date: 12/17/2021

We hereby certify that CalPortland Type GU cement, sourced as indicated below, meets the standard requirements of CSA A3001 specification for Type GU cement. Reported are the average chemical and physical data for the Lot # indicated below.

Lot #: 21-341

Type GU Cement

Source: SsangYong, So. Korea Kodiak Island

Chemical Properties	CSA A3001 Requirements	Analysis	Limestone
	Type GU	Results	Analysis
Silicon dioxide (SiO ₂), %	---	19.8	8.2
Aluminum oxide (Al ₂ O ₃), max, %	---	4.7	3.1
Ferric oxide (Fe ₂ O ₃), max, %	---	3.1	1.5
Calcium oxide (CaO), %	---	62.0	45.9
Magnesium oxide (MgO), max, %	5.0	4.0	3.1
Sulfur trioxide (SO ₃), max, %	3.0	2.7	0.0
Loss on ignition (LOI), max, %	3.0	1.5	
Insoluble residue (IR), max, %	1.5	0.55	Base
Alkalies (Na ₂ O+0.658*K ₂ O), max, %	---	0.58	Cement
Tricalcium silicate (C ₃ S), %	---	55	56
Dicalcium silicate (C ₂ S), %	---	15	15
Tricalcium aluminate (C ₃ A), max, %	---	7	7
Tetracalcium aluminoferrite (C ₄ AF), %	---	9	10
CO ₂ , %	---	1.1	
Limestone addition, max, %	5	3.0	
CaCO ₃ in Limestone, min, %	---	85	
Physical Properties			
Air content of mortar, max, volume %	---	9	
Retained 45um (#325) sieve, max %	28	2.9	
Blaine Fineness, min, m ² /kg	---	431	
Autoclave expansion, max, %	1.0	0.09	
Compressive Strength, min			
3 Day, MPa	10	25.3	
7 Day, MPa	17	33.1	
28 Day (from previous lot), MPa	---	42.5	
Vicat Setting Time, min-max, minutes	45 - 375	135	

Kevin Wolf - Director of Technical Services