



PORTLAND LIMESTONE CEMENT TYPE II

ASTM C595
AASHTO M 240

A PRODUCT THAT MAINTAINS THE PERFORMANCE CHARACTERISTICS OF TYPICAL PORTLAND CEMENT WHILE REDUCING CARBON EMISSIONS FOR EVERY TON OF CEMENT PRODUCED. ECOSTRONG PLC, A STRONG SOLUTION TO BUILD A MORE SUSTAINABLE WORLD TOGETHER.

PRODUCT DESCRIPTION

Argos EcoStrong PLC (Portland Limestone Cement - Type II) is an eco-friendly high-quality blended hydraulic cement that is used as a 1:1 replacement of Type I/II portland cement.

EcoStrong PLC - Type II is engineered to decrease the harmful effects to the environment by reducing carbon emissions up to 10% compared to the production of original Type I/II cement. Furthermore, EcoStrong PLC is designed to perform similar to or better than OPC (portland cement) for all applications.

Argos EcoStrong PLC is manufactured with the same raw materials and quality control measures as our Type I/II. This product has undergone years of extensive testing to assure that "EcoStrong PLC concrete" will have the same resilience, performance, and durability aspects as concrete produced with portland cement.

EcoStrong PLC empowers our customers, specifiers, architects, and engineers to design and execute their projects with resilience and sustainability.



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APPLICATIONS

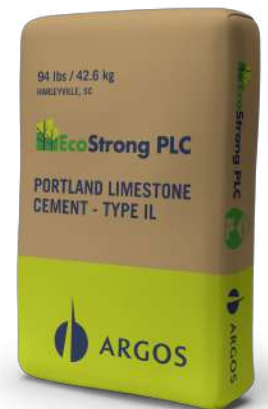


PLC can be used in any Type I/II cement-based application, including ready-mix concrete, precast concrete products, mortars, soil stabilization, full depth reclamation, masonry, and other applications for sustainable building of civil infrastructure projects, residential and commercial construction. Replacement of Type I/II portland cement.

USE

Use EcoStrong PLC Type II as a one-to-one substitution for Type I/II portland cement.

EcoStrong PLC is produced in bulk and bags at all of our cement plants and is available at our terminals throughout the US. US cement plants are located in Newberry, FL., Harleyville, SC., and Martinsburg, WV., and Calera, AL. EcoStrong PLC bags are 94 lb / 42.6 kg.



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CONCRETE MIXES PERFORMANCE WITH ECOSTRONG PLC TYPE IL

Table 1 compares concrete mixes prepared with EcoStrong PLC Type IL and water adjusted to constant slump.

Concrete Mixes Performance by Cement Type, Table 1		4000 psi		4000 psi fly ash mix		4000 psi ternary mix	
PARAMETER	UNITS	TYPE I/II	PLC TYPE IL	TYPE I/II	PLC TYPE IL	TYPE I/II	PLC TYPE IL
Cement	lb/cy	550	550	440	440	275	275
Fly ash (Class F)	lb/cy	-	-	110	110	110	110
Slag cement (Grade 120)	lb/cy	-	-	-	-	165	165
Water	gal/cy	35.0	35.0	34.0	34.0	35.0	35.0
Type A Water Reducer	oz/cwt	4	4	4	4	4	4
Slump	in	4.5	4.25	4	4.75	4	4.5
Air		1.9	2.2	1.6	1.2	1.5	1.3
1-day strength	psi	2430	2430	1910	1740	1260	1410
3-day strength	psi	4020	4020	3230	3180	2660	2920
7-day strength	psi	4510	4440	3670	3700	3590	3650
28-day strength	psi	5860	5880	5430	5360	6160	6170

Note: Cement and water weights adjusted to proper yield. No retarder used.

CEMENT PROPERTIES OF ECOSTRONG PLC TYPE IL

Cement properties by parameter and method for PLC Type IL and portland Type I/II are compared in Table 2.

Cement Type Typical Properties by Parameters and Methods, Table 2

PARAMETER	METHOD	UNITS	TYPE I/II	TYPE IL*
1-day strength	C109	psi	2000 - 2400	2000 - 2400
3-day strength	C109	psi	3700 - 4200	3700 - 4200
7-day strength	C109	psi	4600 - 5200	4600 - 5200
28-day strength	C109	psi	5800 - 6900	5800 - 6900
Percent limestone	-	%	0-4	10 - 14
CaCO ₃ in limestone	C114	%	91 - 99	91 - 99
Fineness (Blaine)	C204	m ² /kg	370 - 410	450 - 550
Fineness (#325 residue)	C430	%	1.0 - 4.0	0.5 - 3.0
Loss on ignition	C114	%	2.0 - 3.0	5.5 - 6.5
SO ₃	-	%	2.6 - 3.3	2.5 - 3.4
Equivalent alkalies, as Na ₂ O	-	%	See mill test	See mill test
Setting time, initial (Vicat)	C191	Min	110 - 150	120 - 150
Air content in mortar	C185	%	5 - 9	4 - 8
Heat of hydration, 3 days	C1702	cal/g	66 - 75	68 - 77

Note: Please refer to local mill test for additional detail.

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PLC TYPE II ACCEPTANCE

EcoStrong PLC - Type II exceeds ASTM C595 and AASHTO M 240.

The use of this cement type is allowed in the following codes and specifications:

- US Department of Transportation (DOT), in all states of Argos footprint
- ACI 318 Building Code Requirements for Structural Concrete
- ACI 301 Specifications for Structural Concrete
- ASTM C94 Standard Specification for Ready Mixed Concrete
- ASTM C90, Standard Specification for Loadbearing Concrete Masonry Units
- Building codes of the International Codes Council (ICC).
- US Army Corps of Engineers (USACE), in specification UFGS 03 30 00 Cast-in-Place Concrete, including:
 - US Naval Facilities Engineering Systems Command (NAVFAC)
 - US Air Force Civil Engineer Center (AFCEC)
 - The National Aeronautics and Space Administration (NASA)
- Federal Aviation Administration (FAA)
- The American Institute of Architects' (AIA) MasterSpec
- ACI 350.5 Specifications for Environmental Concrete Structures

LIMITED WARRANTY

Argos warrants that this product meets applicable ASTM requirements. Seller may either replace nonconforming product or refund Buyer's purchase price if claim is presented within seven days of purchase and unused product is returned to Seller. Argos makes no other warranty or representation, expressed or implied, including, without limitation, any warranty of merchantability or fitness for a particular purpose, all of which are expressly disclaimed. Argos makes no guarantee of finished work whatsoever. Argos shall have no other obligation or liability for damages to buyer or any other person of any type, including, but not limited to, incidental, special or consequential damages, loss of profits or other commercial loss, or any other loss, damage or expense.

TECHNICAL DATA AND SPECIFICATIONS

To aid in fulfilling all of your specification and submittal needs, Argos provides our **Certificates of Compliance, Mill Certificates, LEED letters, EPDs, and Safety Data Sheets** for our cement products at www.argos-us.com under the **Cement Technical Data and Specifications**.

PRECAUTIONS

The **Argos Safety Data Sheet** (SDS) should be consulted prior to the use of this product by clicking this link, or accessing www.argos-us.com, under the **Cement Technical Data and Specifications, Safety Data Sheet** section.



FOR MORE INFORMATION

Contact your local Argos
Cement Representative



CALL THE CUSTOMER VALUE CENTER AT

1-800-331-0022



www.argos-us.com/cement

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