



# Portland Limestone Cement: Frequently Asked Questions

## Do State Departments of Transportation (DOTs) accept the use of Type IL Portland Limestone Cement (PLC)?

PLC is widely accepted throughout the United States. As of May, 2022, more than 90% of DOTs are currently accepting or planning to accept PLC.

## Who else accepts the use of Portland Limestone Cement?

Besides the State DOT acceptance, PLC is also widely accepted by other building codes such as the International Building Code, ACI 318: Building Code Requirements for Structural Concrete, and ACI 301: Specification for Structural Concrete. PLC is recognized by the International Code Council, the Federal Aviation Authority, Army Corps of Engineers and the American Institute of Architects Master Specs.

## What specification does Portland Limestone Cement fall under?

PLC complies with ASTM C595 / AASHTO M240, *Standard Specification for Blended Hydraulic Cements*.

## What are the cement classifications for Portland Limestone Cement?

Depending on the particular type of PLC, the cement may be classified as moderate sulfate resistant, high sulfate resistant, moderate heat of hydration, or low heat of hydration similar to ASTM C150 portland cement (see **Figure A**, right).

## How much limestone is in Portland Limestone Cement?

PLC may contain anywhere from 5% to 15% limestone. CEMEX Type IL typically contains about 10% to 12% limestone.

**Figure A**

Cement Types & Designations	ASTM C595 Modifiers
ASTM C150/AASHTO M85: Type I Normal	(No Modifier) Normal
Type II Moderate Sulfate Resistance	(LH) Low Heat of Hydration
Type II (MH) Moderate Heat of Hydration & Moderate Sulfate Resistance	(MH) Moderate Heat of Hydration
Type III High Early Strength	(MS) Moderate Sulfate Resistance
Type IV Low Heat Hydration	(HS) High Sulfate Resistance
Type V High Sulfate Resistance	(HS) High Sulfate Resistance

**Example:**

ASTM C150 Type II ≈ ASTM C 595 Type IL (MS) –  
in terms of sulfate resistance



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### How does the naming practice for Type IL work?

The naming practice for Type IL cement adds the percentage of limestone in parenthesis after the name. Example: Type IL (10), for a cement containing 10% limestone.

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### How much will PLC reduce CO<sub>2</sub> compared to OPC?

Portland Limestone Cement lowers the CO<sub>2</sub> by 8-12% per Ton of Cement (see **Figure B**, right).

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### What are the applications of PLC?

PLC has been used in virtually every segment of construction from residential homes to interstate paving and bridges, to high rise construction, parking lots, airport paving and more.

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### Where has PLC been used?

PLC has been widely used to produce concrete in Europe for many years. In North America, there has been a significant increase in the use of PLC in concrete over the last decade. Since its approval in 2012, more than 6 million tons have been produced and sold. This translates to millions of cubic yards of concrete that used PLC across Canada and the United States.

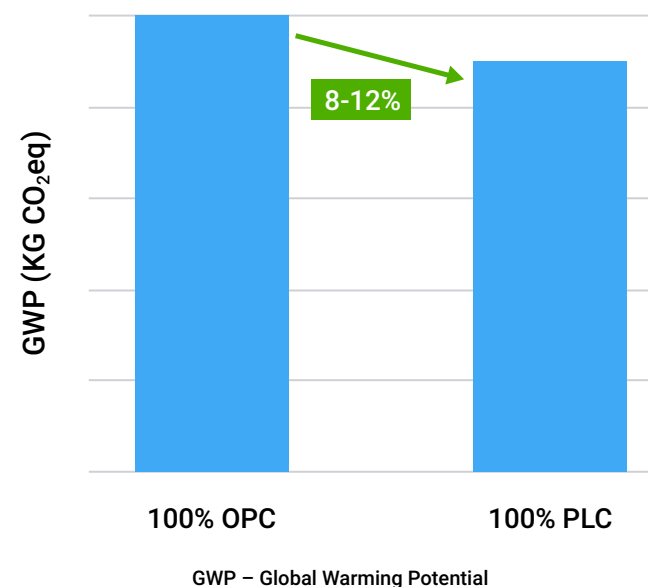
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### What are my options if PLC isn't allowed on a project?

The good news is that most architects and engineers are now including PLC in their project specifications. If they are not, it is usually due to lack of knowledge of what PLC is. If you encounter a project that does not list PLC as an acceptable cement, there is a good chance a simple conversation with the engineer will get it approved for the project. CEMEX can assist you with project acceptance of PLC. We have been successful in meeting with specifiers and getting it approved on many projects throughout the United States.

**Figure B**

**PLC Lowers the CO<sub>2</sub> by 8-12%  
per Ton of Cement**



## How does a ready mix producer transition to PLC from Ordinary Portland Cement (OPC)?

PLC may be used at a 1:1 replacement with OPC, making the transition relatively seamless. Very little adjustment is needed to your mix designs. There will be a slight difference in cement-specific gravity, and small variations in water demand. The compressive strength will be similar to what you are achieving now, with minimal impact to air content, slump and other properties.

PLC is typically slightly lighter in color than OPC due to the lighter color of limestone (see **Figure C**, right). PLC is ground finer. The Blaine is about 5000-5500, as opposed to OPC at about 4000 (cm<sup>2</sup>/g). The higher Blaine is mainly due to the soft limestone grinding very fine.

Ready-mix producers who have transitioned to PLC report that they have seen little or no difference in fresh concrete properties in the field. Concrete produced with PLC should have the same workability, placeability, and pumpability as concrete produced with OPC (see **Figure D**, below).

**Figure C**

### Comparison of Concrete Properties Between OPC & PLC

Early Strength	↔
Later Age Strength	↔
Setting Time	↔
ASR Resistance	↔
Permeability	↔
Freeze-Thaw Resistance	↔
Water Demand	↑

**Figure D**

### Compressive Strength Comparison Between OPC & PLC

#### Typical Compressive Strength Comparisons

