

Section 4101. Portland Cement

4101.01 GENERAL REQUIREMENTS.

A. ASTM C 150 Cements.

1. Unless specified otherwise, meet the requirements of ASTM C 150.
2. Limit the alkali content expressed as total equivalent sodium oxide to no more than 0.60% for all cements.

B. ASTM C 595 Cements.

Unless specified otherwise, meet the requirements of ASTM C 595 and the following requirements:

1. Pozzolan constituent of Type IP cement no more than 25 weight (mass) percent of the Portland-pozzolan cement.
2. Slag constituent of Type IS cement no more than 35 weight (mass) percent of the Portland blast-furnace slag cement.
3. No Class C fly ash in Type IP cement.
4. To produce blended cement, use Portland cement meeting the requirements of [Article 4101.01, A](#), but with the alkali content expressed as a total equivalent being no more than 0.75%.

C. Cement Type Usage.

Comply with the following unless specified otherwise:

1. Type I or Type II cement may be used for pavements, structures, and other applications. Type III cement may be used in precast and prestressed concrete only.
2. Type IP or Type IS cement may be furnished at the Contractor's option when Type I or Type II cement is specified. Apply the limitations of the following articles:
 - [2301.02, B](#).
 - [2403.02, B](#).
 - [2407.02](#).
 - [2412.02](#).
 - [2413.02](#).
 - [2424.02](#).
 - [2426.02](#).
 - [2507.02](#).
 - [2513.02](#).
 - [2529.02](#).
 - [2530.02](#).
 - [2539.02](#).
3. Use the same unit volume of Type IP or Type IS cement in the concrete that is specified for Type I or Type II cement.

D. Lumps in Cement.

Cement which contains 5.0% or more of lumps retained on a No. 20 (850 μ m) sieve will be rejected. Cement which contains less than 1.0% of lumps may be used without adjustment in the batch. Cement which contains from 1.0% to 5.0% of lumps, will have the batch weights (mass) of cement used increased by 2.0% of the original value for each 1.0% or fraction of 1.0%.

E. Air Entrainment.

Accomplish by the addition, at the time of mixing, of an approved air entraining admixture specified in [Section 4103](#). Do not use air entraining cement.

4101.02 ACCEPTANCE AND INSPECTION.

Use Portland cement manufactured, inspected, tested, and accepted according to Materials [I.M. 401](#). Use Portland cement according to Materials [I.M. 401](#).

4101.03 LIMITATIONS.

Cement will be tested for lumps before being used if it has been stored:

- At the work site or in local warehouses for more than 60 calendar days, or
- In the producer's silo for more than one year.