Section 4117. Class V Aggregate for Portland Cement Concrete

4117.01 DESCRIPTION.
A mixture of fine and coarse particles of feldspathic rocks from an approved source as described in Materials I.M. 409.

4117.02 GRADATION.
Meet the gradation requirements for gradation No. 7 of the Aggregate Gradation Table, Article 4109.02.

4117.03 QUALITY.

A. For the portion retained on the No. 4 (4.75 mm) sieve, meet the requirements of Table 4117.03-1 for coarse aggregate for concrete.

Table 4117.03-1: Aggregate Quality

Aggregate Quality	Maximum Percent Allowed	Test Method
Abrasion	40	AASHTO T 96
A Freeze	6	Office of Materials Test Method No. Iowa 211, Method A
Clay Lumps	0.5	Materials I.M. 368

B. For the portion of Class V aggregate passing the No. 4 (4.75 mm) sieve, meet the requirements of Table 4117.03-2 for fine aggregate for concrete:

Table 4117.03-2: Fine Aggregate Quality

Fine Aggregate Quality	Test Limits	Test Method
Shale and Coal	2.0 % (maximum)	Materials I.M. 344
Mortar Strength	6000 psi (41.4 MPa) (minimum)	Office of Materials Test Method No. Iowa 212

4117.04 COMBINATIONS.
Use Class V aggregate for PC concrete only in combination with limestone as specified in Materials I.M. 529. Acquire limestone from sources meeting the specified coarse aggregate durability for PC concrete.

A. Fine Limestone.
Meet the gradation requirements for gradation No. 8 of the Aggregate Gradation Table, Article 4109.02.

B. Coarse Limestone.
Meet the requirements of Section 4115.

4117.05 CEMENT REQUIREMENTS.
For Interstate and Primary projects, use the cement types and substitutions of Table 4117.05-1 when Class V aggregate is used.

Table 4117.05-1: Cement Types and Substitutions

Cement Type	Min. Required Substitution	Max. Allowable Substitution
Type I, Type II	20% Class F Fly Ash	25% Class F Fly Ash
Type I, Type II	25% GGBFS	35% GGBFS
Type IS, IP	---	20% Class C Fly Ash