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AGGREGATES FOR USE WITH PICP

Industry recommends the following aggregate gradations for use with permeable interlocking concrete pavements. The aggregate's number reference is from ASTM D448, *Standard Classification for Sizes of Aggregate for Road and Bridge Construction*.

Table 1: No. 8 Bedding Aggregate – Grading Requirements:

Sieve Size	Percent Passing
1/2 inch (12.5 mm)	100
3/8 inch (9.5 mm)	85 to 100
No. 4 (4.75 mm)	10 to 30
No. 8 (2.36 mm)	0 to 10
No. 16 (1.18 mm)	0 to 5

Table 2: No. 57 Base Aggregate – Grading Requirements:

Sieve Size	Percent Passing
1 1/2 inch (37.5 mm)	100
1 inch (25 mm)	95 to 100
1/2 inch (12.5 mm)	25 to 60
No. 4 (4.75 mm)	0 to 10
No. 8 (2.36 mm)	0 to 5

Table 3: No. 2 Subbase Aggregate – Grading Requirements:

Sieve Size	Percent Passing
3 inch (75 mm)	100
2 1/2 inch (63 mm)	90 to 100
2 inch (50 mm)	35 to 70
1 1/2 inch (37.5 mm)	0 to 15
3/4 inch (19 mm)	0 to 5

Aggregates must also meet the following criteria:

A. Crushed stone with 90% fractured faces, LA Abrasion < 40 per ASTM C131, minimum CBR of 80% per ASTM D1883. ***Do not use rounded river gravel.***
B. All stone materials shall be washed with less than 2% passing the No. 200 sieve.

Paver Joint fill:

Paver joint or opening fill aggregate shall use the No. 8 material as described above, or smaller aggregate (Nos. 89, 9 or 10, per ASTM D448) may be substituted if required to fill narrower joints or openings.

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"Non-conforming" aggregates

When recommended aggregates are not available, or specific project conditions do not allow the use of the No.8, No. 57 and/or No. 2 material, industry provides criteria as noted in Table 3-5, below. D_x is the particle size at which x percent of the particles are finer. For example, D_{15} is the particle size of the aggregate for which 15% of the particles are smaller and 85% are larger. This data is obtained from the sieve analysis.

Table 3-5. Filter criteria for PICP bedding, base and subbase aggregates

Permeability	D_{15} Base/D_{15} Bedding layer >5
Choke	D_{50} Base/D_{50} Bedding layer <25
	D_{15} Base/D_{85} Bedding layer <5

Permeability	D_{15} Subbase/D_{15} Base >5
Choke	D_{50} Subbase/D_{50} Base <25
	D_{15} Subbase/D_{85} Base <5

Source: David R. Smith, *Permeable Interlocking Concrete Pavements*, 4th edition, pg. 41

Experience from North American permeable interlocking concrete pavement installations over the past 10 years have indicated that the ASTM D448 No. 8 bedding stone chokes well into the No. 57 base, and this material chokes well into the No. 2 subbase aggregate. When compacted together, water easily moves through each layer to the soil subgrade. When used together, these aggregate gradations offer high permeability, but this characteristic should not be viewed as a contributing factor to *structural* stability. Structural performance of the permeable system under vehicular traffic is best influenced by using sufficient layer thicknesses of hard, durable crushed stone aggregates that are compacted adequately for the use intended. The use of a qualified engineering professional is always recommended for all vehicular pavement applications.

References:

1. David R. Smith, *Permeable Interlocking Concrete Pavements*, 4th edition (2011)
2. Uni-Group USA website: www.uni-groupusa.org