



# SPECIFICATION

### PART 1 GENERAL

#### 1. Related Documents

- A. Drawings, technical specifications, and general provisions of the Contract as modified herein apply to this section.

#### 2. Description of the Work Included

- A. Provide excavation and base preparation per geotechnical engineer's recommendations and/or as shown on the design drawings.
- B. Provide and install PowerBlock® and all related products including base materials, geotextiles, and geogrids per the manufacturer's installation guidelines provided in this section.
- C. Perform post-installation testing.
- D. Protect PowerBlock® system from contamination due to construction traffic and construction sedimentation after installation until the site is completely stabilized.

#### 3. Quality Assurance

- A. Installation Contractor shall demonstrate the following experience:
  - 1. A minimum of three permeable pavement projects completed within the last 2 years of a similar or larger size and complexity.
  - 2. A minimum of 25,000 square feet of permeable pavement installed within the last 2 years.
  - 3. Installation Contractor experience requirement may be waived if the manufacturer's representative provides on-site training and review during construction.
- B. Installation Personnel: Performed only by skilled workers with a satisfactory record of performance on permeable pavement construction projects of comparable size and complexity.
- C. Contractor must have the manufacturer's representative available for site review if requested by the Owner.

#### 4. Submittals

- A. Submit proposed PowerBlock® layout drawings.
- B. Submit manufacturer's product data, including all requirements detailed in this specification.
- C. Submit material specifications for all geotextiles and geogrids.
- D. Submit material specification for base stone and aggregates.
- E. Any proposed equal alternative product substitution to this specification must be submitted for review and approved prior to the bid opening. The review package should include third party performance data that meets or exceeds the criteria in Table 2.1A.

## 5. Storage and Handling

- A. Protect concrete pavers during shipment, storage, and installation against staining, chipping, cracking, and other damage.
- B. Coordinate delivery and paving schedule with other construction activities.

## 6. Preinstallation Conference

- A. Prior to the start of the installation, a preinstallation conference shall occur with Owner representatives, the general contractor, the installation contractor, and the manufacturer's representative.
- B. Coordinate installation for the PowerBlock® system with other on-site activities to minimize sedimentation and contamination of the permeable pavement during construction. All non-installation related construction traffic, particularly equipment used for earthwork, should be routed around the permeable pavement. Stabilize denuded soils contributing runoff to the permeable pavement prior to commissioning the system.

## PART 2: PRODUCTS

### 1. Permeable Paver

- A. Permeable pavement shall be constructed from pre-manufactured, interlocking concrete blocks that do not require stone or sand filler between the blocks, leaving the joints open to allow rapid infiltration of runoff through the joints. The blocks and completed permeable pavement shall meet the following properties:

Table 2.1A

PROPERTY	DESCRIPTION	VALUE
Dimensions	Length x Width x Height	11.75" x 13.70" x 4.5" (+/- 1/8")
Block Weight	Pounds	44 lbs. Minimum
Loading Capability	Traffic Rating	HS-20 / HS-25
Open Joint Width	Inches	0.25" (+/- 0.02")
Joint Filler Between Blocks	Material Used	NONE ALLOWED <sup>1</sup>
Post-Installation, Field-Verified Surface Infiltration Rate <sup>3</sup>	ASTM C-1701 / C-1701-M09 / ASTM C-1781 / C-140	1,000 inches / hour average (Minimum 3 tests)
Compressive Strength	ASTM D-6684 / C-140	4,000 psi (average) 3,500 psi (minimum)
Freeze / Thaw Resistance <sup>2</sup>	ASTM C-67 / C-1645 / C-936	COMPLIANT
Abrasion Resistance <sup>2</sup>	C-418 <sup>2</sup>	COMPLIANT

**NOTE 1:** No filler material is allowed to be used between the blocks. Use ONLY blocks that do not require stabilizing stone/sand between the units.

**NOTE 2:** Testing by the National Concrete Masonry Association (NCMA) will be made available for freeze/thaw and abrasion resistance upon request.

**NOTE 3:** The completed permeable pavement system must be tested in-situ after installation and will only be accepted when required performance value shown in Table 2.1A has been documented by a third party. Final test report must be submitted to the Owner prior to acceptance.

B. Visual Inspection

1. All blocks shall be sound and free of defects that would interfere with the proper placing of the units or impair the strength or performance of the permeable pavement system.
2. Surface cracks incidental to the usual methods of manufacture, or surface chipping resulting from customary methods of handling in shipment and delivery, shall not be deemed grounds for rejection.
3. Cracks exceeding 0.25 inches in width and/or 1.0 inches in depth or larger shall be deemed grounds for rejection.
4. Ensure the PowerBlock delivered to the site matches the color requirements on plans.

C. The permeable paver shall be PowerBlock® or pre-approved equal (as noted in Part 1, Section 4.E), as represented and distributed by:

Ferguson Waterworks

12500 Jefferson Avenue, Newport News, VA

Branch Locator: <https://www.ferguson.com/searchBranch>

D. When PowerBlock® installation may be exposed to de-icing salts or salt air in coastal climates, blocks should be sealed after installation with optional Prossoco Saltguard WB or equivalent. If specified, the coating shall be applied per manufacturer's recommendations.

2. Stone Base

- A. Permeable pavements require site specific design based on both structural and hydrologic requirements of the pavement. Depths shown on typical drawings must be evaluated and modified as necessary by the engineer of record.
- B. All aggregate shall be clean and angular on all sides, with no less than 90% fractured faces. Do not use rounded river gravel or fractured river gravel for any application.
- C. If more than 6" of base stone is required, use AASHTO #2 Stone or similar for the lower layers.

**ASTM No. 2 Subbase**

Grading Requirements

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

D. AASHTO #57 Stone shall be used as a leveling course for the upper 4" to 6" of the base layer.

**ASTM No. 57 Base**

Grading Requirements

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

### 3. Geotextiles

- A. Use a woven monofilament geotextile, such as ACF (Ferguson) M200, or as specified in the contract documents.

### 4. Edge Restraint

- A. **Perimeter:** Edges of the PowerBlock area shall be finished with a Standing Curb with a vertical face, or as shown on plans
- B. **Internal Edges:** Edges of the PowerBlock area where traffic access is required shall be finished with a flush Ribbon Curb, or as shown on plans.

## PART 3: FOUNDATION PREPARATION AND BLOCK INSTALLATION

### 1. Foundation & Preparation

- A. Prepare subgrade as noted on plans. Typically, compaction of underlying subgrade soil should be avoided or minimized to encourage infiltration of stormwater. Subgrade should be uniform, level, and free of lumps and debris. All questions about the adequacy of the subgrade should be directed to the owner's engineer, who will approve the subgrade conditions prior to placement of the stone base.
- B. Place a woven monofilament geotextile, such as ACF (Ferguson) M200, on the subgrade base and sides of the excavation to prevent contamination of the clean aggregate base or as specified in the contract documents. Overlap seams a minimum of 12" in all directions, or as shown on plans.
- C. Install base materials in layers uniformly spread and compacted in 6" - 8" lifts or as noted on plans. When final layer of base stone is installed, compact first with a roller and finish with a 10,000-psi plate compactor in both the perpendicular and parallel directions. Compaction is complete when no movement of base materials is observed. Base shall be a smooth, plane surface, firm and non-yielding prior to placement of the PowerBlock®.
- D. Confirm finished elevations of the base match plan requirements.
- E. Completed base shall be proof rolled and inspected and approved by engineer or record. Reconstruct areas where deflection exceeds acceptable limits as determined by engineer.

### 2. Pavers

- A. Ensure PowerBlock® units are free of foreign material before installation.
- B. Set PowerBlock® pavers as shown on plans, within the specified lines and grades shown on plans. Units shall be installed straight and true to the required lines. Ensure joint widths are consistent throughout installation.
  - 1. Installation shall proceed by adding blocks adjacent to previously installed units.
  - 2. On sloped areas, work from lower areas toward the higher elevations.
- C. Cut PowerBlock® units as needed to accommodate field conditions and to achieve a consistent pattern.
- D. When a substantial area of PowerBlock® units has been installed, the pavers shall be static rolled to ensure a consistent top elevation.
- E. Replace pavers that are broken, substantially chipped, or stained during construction.
- F. The joints between the blocks shall not be backfilled with smaller aggregates or sand to function properly. The joints shall be always left open, including following maintenance of the permeable pavement.
- G. Within 60 days of completion of the installation, the surface infiltration rate of the pavement shall be field verified to confirm the required infiltration rate of the pavement (per Table 2.1A). If the system fails to perform as required, it shall be removed and replaced at no cost to the Owner.

## **PART 4: INSPECTION AND MAINTENANCE**

### **1. Inspection**

- A. Inspect the permeable pavement, noting areas of standing water or significant accumulation of joint debris.
- B. If joints are excessively filled with debris or sediment, a surface infiltration test may be performed per Table 2.1A to determine the capabilities of the system.

### **2. Maintenance**

- A. Maintenance shall be performed when either:
  - 1. The surface infiltration rates of more than 75% of the surface area fall below 10% of the rate required per Table 2.1A.
  - 2. Surface ponding remains for 24 hours in an area larger than 10 square feet.
  - 3. Other desired maintenance at the Owner's discretion to optimize performance.
- B. Maintenance shall be performed with a vacuum device, not a mechanical sweeper, to remove accumulated debris from joints. This may be accomplished with smaller hand-held devices or with vacuum trucks such as the Elgin Whirlwind. Adjust device settings to avoid movement or lifting of block, or removal of the base stone underneath the blocks.