

## **Technical Specification - Gravelpave2 Porous Paving with Integrated Geotextile Fabric and Anchors**

### **CSI Master Format 32 12 43 Flexible Porous Pavement** (Section 02795 Porous Pavement)

#### **PART 1 - GENERAL**

##### **1.01 General Provisions**

- A. The Conditions of the Contract and all Sections of Division 1 are hereby made a part of this Section.

##### **1.02 Description of Work**

###### **A. Work Included:**

1. Provide and install sandy gravel road base as per Geotechnical Engineer's recommendations and/or as shown on drawings, to provide adequate support for project designs loads. See 2.02 Materials.
2. Provide Gravelpave2 Paving products including Gravelpave2 units, anchors and installation per the manufacturer's instructions furnished under this section.
3. Provide and install fine decorative gravel to fill the Gravelpave2 units.

###### **B. Related Work:**

1. Subgrade preparation under Section 31 20 00 Earth Moving (02200 – Earthwork).
2. Utilities and subsurface drainage - Section 33 40 00 Storm Drainage Utilities (02700 – Subsurface Drainage and Structures), as needed.

##### **1.03 Quality Assurance**

- A. Follow Section 01 33 23 Shop Drawings, Product Data, and Samples (01340 Shop Drawings, Product Data, and Samples) requirements.
- B. Installation: Performed only by skilled work people with satisfactory record of performance on landscaping or paving projects of comparable size and quality.

##### **1.04 Submittals**

- A. Submit manufacturer's product data and installation instructions.
- B. Submit a 10" x 10" section of Gravelpave2 product for review. Reviewed and accepted samples will be returned to the Contractor.
- C. Submit material certificates for base course and sand fill materials.

##### **1.05 Delivery, Storage, and Handling**

- A. Protect Gravelpave2 material units from damage during delivery and store under tarp when time from delivery to installation exceeds one week.

##### **1.06 Project Conditions**

- A. Review installation procedures and coordinate Gravelpave2 work with other work affected.
- B. All hard surface paving adjacent to Gravelpave2 areas, including concrete walks and asphalt paving, must be completed prior to installation of Gravelpave2.
- C. Cold weather:

1. Do not use frozen materials or materials mixed or coated with ice or frost.
2. Do not build on frozen work or wet, saturated or muddy subgrade.
- D. Protect partially completed paving against damage from other construction traffic when work is in progress.
- E. Protect adjacent work from damage during Gravelpave2 installation.

## **PART 2 - PRODUCTS**

### **2.01 Availability**

- A. Manufacturer: (Gravelpave2) Invisible Structures, Inc., 1600 Jackson Street., Suite 310, Golden, CO 80401. Call from USA and Canada 800-233-1510 toll free, (International 303-233-8383), Fax 800-233-1522 (International 303-233-8282).
- B. Local Sales Representative (CO, WY, MT): Stevens Corporation, Ph (303) 233-3226, Fax (303) 957-5755, info@stevenscorp.com

### **2.02 Materials**

- A. Base Course: Sandy Gravel material from local sources commonly used for road base construction, passing the following sieve analysis.

<u>Sieve</u>	<u>%Passing</u>
1"	100
3/4"	90-100
3/8"	70-80
#4	55-70
#10	45-55
#40	25-35
#200	3-8

1. Sources of the material can include either "pit run" or "crusher run". Crusher run material will generally require course, well-draining sand (AASHTO M6 or ASTM C-33) to be added to mixture (25 to 35% by volume) to ensure long-term porosity.
2. Alternative materials such as crushed shell, limerock, and/or crushed lava may be considered for base course use, provided they are mixed with course, well draining sand (25 - 35%) to ensure long-term porosity, and are brought to proper compaction.

(Crushed shell and limerock alone can set up like concrete unless sand is added.)

- B. Gravelpave2 Paving Units:

1. Lightweight injection-molded plastic units 0.5x0.5x0.025m (20"x20"x1" high, 2.7 ft<sup>2</sup> each) with hollow rings rising from a strong open grid and a geotextile fabric heat fused to the bottom of the grid.
2. Unit weight = 535 g (19 oz.), volume = 8% solid.
3. The plastic shall be 100% post-industrial recycled HDPE plastic resins, with minimum 3% carbon black concentrate added for UV protection.
4. Loading capability is equal to 402 kg/cm<sup>2</sup> (5721 psi, 823,824 psf, 7.4 million psy, 39,273 kPA, 3707 tons/sq.yd.) when filled with gravel, over an appropriate depth of base.
5. Units are shipped in pre-assembled rolls that vary from 10 square meters (108 sf) to 50 square meters (538 sf).

6. Male/Female Fastener Tensile Strength, determined using a Pull Test, is equal to 80,208 N/m (450 lbf/in.)

7. Colors are black, gray, terra cotta, and tan with custom colors available.

*Any products failing to meet these standards will be rejected.*

C. Gravel Fill: Obtain clean, washed, fine decorative gravel, must be sharp and angular (not rounded) stone, granite hardness, to fill the 25 mm (1") high rings and spaces between the rings, not to be overfilled more than 1/4" (6 mm). Maximum Size of stone should be: 3/16" to 3/8" (5 mm to 10 mm) and uniform in size - not graded.

D. Anchors: Typical anchors shall be 8" long nails with "fender" type washers 7 x 30 mm od (5/16" id x 1.25" ) od, all galvanized metal or similar corrosion resistant coating. Supplied anchors may vary in size and type based on source and availability.

## **PART 3 - EXECUTION**

### **3.01 Inspection**

A. Examine subgrade and base course installed conditions. Do not start Gravelpave2 installation until unsatisfactory conditions are corrected. Check for poor drainage, improperly compacted trenches, debris, and improper gradients.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance. If existing conditions are found unsatisfactory, contact Project Manager for resolution.

### **3.02 Preparation**

*(Ensure that subbase materials are structurally adequate to receive designed base course, wearing course, and designed loads. Ensure that grading and soil porosity of the subbase will provide adequate subsurface drainage.)*

A. Place base course material over prepared subbase to grades shown on plans, in lifts not to exceed 150 mm (6"), compacting each lift separately to 95% Modified Proctor. Leave 25 mm (1.0") for Gravelpave2 unit and gravel fill to Final Grade.

### **3.03 Installation of Gravelpave2 Units**

A. Install the Gravelpave2 units by placing units with rings facing up, and using small male/female connectors provided along each edge to maintain proper spacing and interlock the units. Cutting can be performed with pruning shears and knife, or portable power saw. Units shall be anchored to the base course, using anchors described above, as required to secure units in place from movement by traffic, at an average rate of 6 pins per square meter (high speed, heavy vehicles, fast turning movement will require additional anchors). Tops of rings shall be flush with the surface of adjacent hard surfaced pavements.

B. Install gravel into rings after the units are anchored by "backdumping" directly from a dump truck, or from buckets mounted on tractors, with a minimum depth of 6", then exit the site by driving forward over rings already filled. Sharp turning of vehicles on bare rings must be avoided. The gravel is then spread laterally from the pile using power brooms, blades, flat bottomed shovels and/or wide "asphalt rakes" to fill the rings. A stiff bristled broom should be used for final "finishing".

The gravel should be "compacted", if necessary, by using a vibrating plate or small roller, with the finish grade no less than the top of rings and no more than 6 mm (0.25") above top of rings.

- C. If a binder for fill stone is desired (due to traffic speed, concentrated water flow, or other reason), use Portland cement, mixed dry at 10% by weight with fill stone,. Place into rings after thoroughly wetting the base, then lightly mist the surface after fill and compaction. Then, cover with a water resistant tarp, or plastic sheeting material for a minimum period of 3 days, or until the mixture has bonded.

### **3.06 Cleaning**

- A. Remove and replace segments of Gravelpave2 units where three or more adjacent rings are broken or damaged, reinstalling as specified, with no evidence of replacement.
- B. Perform cleaning during the installation of work and upon completion of the work. Remove all excess materials, debris, and equipment from site. Repair any damage to adjacent materials and surfaces resulting from installation of this work.

END OF SECTION

If you have any questions regarding this specification, please call Invisible Structures, Inc. 1-800-233-1510, overseas call 303-233-8383.

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## ATTACHMENT #1:

### Gravel Fill (Wearing Course/Surface Gravel):

Obtain clean, washed, fine decorative gravel, must be sharp and angular (not rounded) stone, granite hardness, to fill the 25 mm (1") high rings and spaces between the rings, not to be overfilled more than 1/4" (6 mm) after compaction.

Maximum Size of stone should be: 3/16" to 3/8" (5 mm to 10 mm) and uniform in size - not graded. This creates a highly porous yet very durable and even wearing surface that will both compact and contain within the plastic rings while simultaneously protecting the plastic ring and grid structure of the Gravelpave2 system.



See page 10 of manufacturer's Grasspave2/Gravelpave2 Brochure for install photos and acceptable gravel. Call Stevens Corporation (303) 233-3226 for a list of gravel suppliers with acceptable gravel fill.