

## Section \_\_\_\_\_ Flexible Porous Paving

**1. GENERAL**

- 1.1. The Flexible Porous Paving shall be KBI Flexi-Pave HD2000 made from recycled passenger tires, crushed stone and a urethane binding agent as manufactured by K.B. Industries, Inc. (KBI), 4600 140<sup>th</sup> Ave. N, Suite 200, Clearwater, FL 33762. Tel 727 723 3300.
- 1.2. All components, materials and compounds shall be 100% sourced and manufactured in the USA.
- 1.3. The Flexible Porous Paving shall be supplied by a manufacturer with at least 10 years experience that can supply references for similar applications and installations in the USA.

**2. SUBMITTALS**

- 2.1. The Flexible Porous Paving manufacturer shall submit;
  - 2.1.1. Certificates stating that materials meet or exceed the specified contract requirements.
  - 2.1.2. Site handling and storage instructions.
  - 2.1.3. Mixing and installation instructions.
  - 2.1.4. A sample that reflects the characteristics of the material to be installed. The sample, upon approval, shall be maintained as the standard of minimum quality for all the proposed surfacing and paving work required for the project.

**3. CONTRACTOR**

- 3.1. The Contractor's craftsmen or crew chief, installing the Flexible Porous Paving shall attend a training webinar and an on-site installation training session prior to installing KBI Flexi-Pave HD2000.
- 3.2. Contractors bidding on the installation of KBI Flexi-Pave HD2000 may start the training process by contacting KBI and attending a training webinar prior to contract award. On-site installation training may occur after the contract is awarded.
- 3.3. The Contractor shall;
  - 3.3.1. Furnish all labor, materials, tools, equipment, and incidentals required to install KBI Flexi-Pave HD2000.
  - 3.3.2. Provide an adequate number of skilled workers who are trained and experienced with installing KBI Flexi-Pave HD2000 and are familiar with the specified contract requirements and the methods needed for its installation.
  - 3.3.3. Install the crushed stone sub-base as described in the specifications and shown on the contract drawing unless the sub-base is installed/provided.
  - 3.3.4. Install the KBI Flexi-Pave HD2000 to depth and width as described in the specifications and shown in the contract drawings.
  - 3.3.5. Reduce the risk of damage to the Flexible Porous Paving surface by not allowing track vehicles (metal or rubber), forklifts (warehouse-variable reach), main lifts (booms or scissors), and/or dumpsters or roll-off containers on the KBI Flexi-Pave HD 2000 either during or following installation. Any explicit or implied warranty is voided through failure to comply with this section.

**4. PRODUCTS**

- 4.1. Recommended sub-base shall be either; crushed stone or for KBI Flexi-Pave HD2000 Titan Series use UltraBaseSystems Pro interlocking panels. KBI will provide advice on appropriate sub base for each installation and the materials based on the application and project location.
- 4.2. Crushed Stone;
  - 4.2.1. For load bearing applications KBI Flexi-Pave HD2000 shall be installed over a minimum of 4" (100mm) of compacted crushed concrete or crushed stone aggregate to a density of 95% minimum.
  - 4.2.2. The sizing of the stone and base soil will directly represent the desired "Curve Number" (percolation rate) required.

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- 4.3. UltraBaseSystems Pro interlocking panels shall;
  - 4.3.1. Measure 28" x 28" by 1¼" deep manufactured from recycled post industrial polymeric materials.
  - 4.3.2. Have a vertical drainage rating of 341" per hour and a horizontal flow rate of 96.4" per hour and each panel shall store up to 3.58 gallons of water.
  - 4.3.3. Have a static load capacity of 1664 psi.
  - 4.3.4. Be suitable for installation over properly prepared earth sub base without the need for compacted rock, concrete or asphalt.
  
- 4.4. KBI Flexi-Pave HD2000.
  - 4.4.1. The KBI Flexi-Pave HD2000 shall be installed in accordance with the manufacturers written instructions to an average depth of 1.5 inches over the prepared sub-base.
  - 4.4.2. The KBI Flexi-Pave HD2000 shall be Natural colors; Cypress / Redwood / Bark Brown / Green / Granite or Black in color.
  - 4.4.3. The KBI Flexi-Pave HD2000 shall be mixed with a urethane binding agent based on MDI Polyether Polyols and shall be free of extender oils to prevent leaching over time. Binders that use extender oils will not be acceptable.
  - 4.4.4. The KBI Flexi-Pave HD2000 shall be cured and fit for use within 24 hours of installation.
  - 4.4.5. The KBI Flexi-Pave HD2000 shall have a composition of 50% stone aggregate and 50% chipped rubber tires by weight for trails, carts paths, sidewalks and tree surrounds. For vehicular applications, such as driveways and parking lots, the composition shall be 50% stone aggregate and 50% chipped rubber tires by volume.

**5. QUALITY ASSURANCE**

- 5.1. The Contractor is responsible for supplying and installing a warranted material that meets, or exceeds, the manufacturer's specifications and testing:
  - 5.1.1. ASTM C 666/C/666M- Freeze-Thaw testing with no cracks or breaks through 300 cycles of testing.
  - 5.1.2. Designated as "Highly Permeable" under FL DOT FM 5-565 permeability testing.
  - 5.1.3. Independent testing showing a perk rate of 2400 gph (40 gpm) per sq. ft. or higher.
  - 5.1.4. Scuff/Power Steering Resistance in accordance with ISSA TB 100 / ISSA TB 139.
  - 5.1.5. Accelerated Weathering using ASTM 4798.
  - 5.1.6. Hamburg Loaded Wheel Testing TX DOT 242-F, must be equivalent or better than 2.3 rut depth at 8,000 cycles and full recovery within 24 hours.
  - 5.1.7. Static Creep Testing TX DOT 231-F, shall be equivalent to or better than total strain +2.703% and permanent strain equal to 0.514%.
  - 5.1.8. Resilient Modulus Testing in accordance with ASTM D 4123 shall be equivalent or better than 68,495 pounds.
  - 5.1.9. Slip resistant and ADA compliant, in accordance with ASTM D 2047 testing.
  - 5.1.10. Heat resilient to 400 degrees in accordance with ASTM D 4123 testing.
  - 5.1.11. Sound absorbent, in accordance with ASTN C423-09a / E795-05 testing.
  - 5.1.12. Compression tested and be able to withstand 250 psi without permanent deformation or damage.
  - 5.1.13. Has a leachate less than 6 parts per billion and containing no organic compounds or heavy metals.
  - 5.1.14. The material shall be resistant to the following elements: transmission, hydraulic, and brake fluids, gasoline, diesel, saltwater, oil, chlorine, ozone, bromine, and muriatic acid.

**6. PROJECT CONDITIONS**

- 6.1. The Contractor shall provide appropriate and adequate protection to adjacent areas including but not limited to:
  - 6.1.1. Protection of adjacent work space from splashing of Flexible Porous Paving materials.
  - 6.1.2. Remove all stains from exposed surfaces of paving, structures, and grounds.
  - 6.1.3. Remove all waste and spillage.
  - 6.1.4. Provide suitable protection to assure no damage or disturbance to existing improvements or vegetation before starting work and maintain protection throughout the course of the work

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6.1.5. Restore and repair areas, at no additional cost to the owner, that have been damaged as a result of construction work, including existing paving on or adjacent to the site, to their original condition or repair as directed to the satisfaction of the Owner's Representative.

**7. WEATHER**

- 7.1. KBI Flexi-Pave HD2000 urethane binder is engineered based on the geographical location of the project and climate expectations during installation. KBI will provide the appropriate binder for each installation and the materials delivered will be based on project location and seasonality.
- 7.2. KBI Flexi-Pave HD2000 shall not be installed when the ambient air temperature in the shade near the installation site is above 95° F or below 32° F. Temperatures below 50° F can extend the curing time and would fall outside of normal "use ready in 24 hours" guidelines.
- 7.3. The urethane binder shall be stored on site at between 40°- 77° F and used within 12 months of delivery.
- 7.4. The Contractor shall not pave on days when rain or snow is forecast, unless a change in the weather results in favorable paving conditions as determined by the Owner's Representative.
- 7.5. In the event of rain on days prior to installation, the sub base must be dry and not contain any standing or moving water.

**8. SAFETY AND TRAFFIC CONTROL**

- 8.1. When construction work will interfere with existing, traffic and sidewalks the Contractor shall notify and cooperate with local authorities, and other jurisdictional organizations, and provide temporary barriers, signs, warning lights, flaggers, and other protections as required by the authorities to assure the safety of pedestrians and vehicles around the construction area and to organize the smooth flow of traffic.

**9. MAINTENANCE**

- 9.1. KBI Flexi-Pave HD 2000 installations are designed to operate and function trouble free with only minimal routine maintenance over the lifetime of the product.
- 9.2. The frequency and scope of the routine maintenance required will largely be dependent on the application and project location. The key objective will be to keep the surface clean and clear of debris to maintain the hydraulic conveyance capacity of KBI Flexi- Pave over time as well as maintaining the aesthetic appeal of the surface.
- 9.3. Prior to undertaking routine maintenance of KBI Flexi- Pave it is recommended that an annual inspection be completed to evaluate the condition of the surface. The following are suggested annual maintenance inspection points:
  - 9.3.1. Inspect the surface of the KBI Flexi- Pave for evidence of sediment deposition, organic debris, staining or ponding. If any signs of clogging are noted, schedule a vacuum sweeper (no brooms or water spray) to remove deposited material. Cleaned sections may then be tested by pouring water from a five-gallon bucket to ensure full hydraulic conveyance capacity has been restored.
  - 9.3.2. Inspect the structural integrity of the KBI Flexi- Pave surface, looking for signs of damage or surface deterioration, such as raveling, slumping, cracking, etc. Replace or repair affected areas, as necessary.
  - 9.3.3. Check for potential need to overspray/roll with urethane binder after 4-6 years.
- 9.4. If in doubt or should any unexpected situations or observations occur during the maintenance inspection, please contact KBI for consultation and advice.

**10. WARRANTY**

- 10.1. The KBI Flexi- Pave HD2000 shall have a material warranty of 1 year from the date of installation (extended warranties are available with the addition of a maintenance program)
- 10.2. The Manufacturers' warranty shall be issued on completion of the installation and final inspection.
- 10.3. The Manufactures' warranty is based on the installation completed by an on-site installation trained and qualified team of tradesmen. Faulty workmanship by tradesmen will be cause to void the warranty.