



## Permeable Interlocking Concrete Pavers



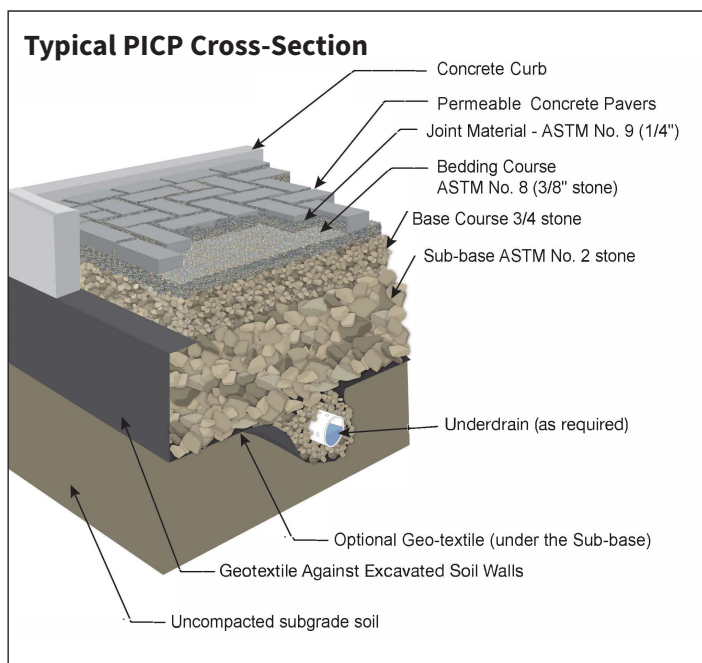


Aqua-Bric - Beacon Hill Blend

## IDEAL - A COMPANY YOU CAN RELY ON

Ideal is a 4th generation family-owned business manufacturing concrete products since 1923. In 1975, Ideal became one of the first companies in United States to produce concrete pavers and a decade later, segmental retaining walls. Since then Ideal has sold well over 100 million square feet of pavers and countless walls for residential, commercial, municipal and industrial projects throughout New England.

We actively participate in leading industry associations and offer years of experience and sound advice you can rely on to provide you with products of the finest quality. Ideal was the first company in New England to manufacture permeable interlocking pavers in 1989. As the popularity of permeable pavements increased over the years, we added Aqua-Bric,® Aqua-Bric® 8, Andover 5511™ and Andover Collection,™ Portsmouth Cobble,™ and BrookStone™ to our product line.



## STORMWATER & PERMEABLE PAVERS

Stormwater is rain and snowmelt that runs off impervious surfaces. When it does, what was once clean rain and snow now has picked up and transports pollutants off of surfaces and runs into catch-basins where the contaminants go untreated into receiving bodies of water – our streams, wetlands, ponds, lakes, rivers and oceans – and these pollutants impact human health and safety as well as fish, wildlife habitat, and natural resources.

### Permeable Pavement - Built-in Technology

Permeable pavements hold great promise for mitigating stormwater runoff and treating the pollutants it carries. As a Low Impact Development (LID) component, permeable pavers transform pavement into an efficient stormwater treatment system in a cost effective and efficient manner. Pavement is included with every structure that is built, and on commercial property, pavements constitute a significant area. By simply replacing a conventional impervious asphalt surface and a dense-graded base with permeable pavers and an open-graded stone base, the pavement acts as a built-in stormwater treatment system that infiltrates, captures, and filters stormwater.

### Permeable Pavers

Permeable paver units are not porous or pervious. They are comprised of the same cement-rich mixture used to produce our high-density, solid ASTM C 936 pavers, possessing a strengths in excess of 8500 psi. Our Aqua-Bric and Aqua-Bric 8 permeable pavers are molded with a notched configuration, and Andover 5511, Andover Collection, Portsmouth Cobble and BrookStone pavers feature wide joints, creating openings across the pavement surface. The openings are capable of infiltrating hundreds of inches of water per hour when initially installed. While infiltration will decrease over time depending on the level of traffic and maintenance, 10 inches per hour is a realistic infiltration rate over a 30+ year pavement life – more than sufficient to infiltrate most rainstorms. Higher rates are attainable when regular maintenance is performed.

### Permeable Interlocking Concrete Pavement

Permeable interlocking concrete pavements (PICPs) are comprised of a layer of permeable concrete pavers placed into an interlocking pattern. The voids and joints between the paving units funnel water into a bedding layer of clean, crushed stone and the base below. The base is typically comprised of open-graded crushed stone that has a void ratio in the range of 30%-40%. This layer provides structural support for the pavement, as well as storage and treatment of stormwater over a 24-48 hour period before slowly releasing it into a permeable subgrade or with poorly draining soils, into drainage pipes. Even with little to no perviousness of existing subgrade soils, the PICP treats pollutants and reduces peak flows before discharging into wetlands or a supplement drain, thereby reducing impacts on the sewer systems and nearby water bodies. The curve number for PICP can range from 45-80 and coefficient of runoff (C value) ranges from 0.00-0.30 based on research to date.





Aqua-Bric - Vineyard Blend, Herringbone Pattern

## PICP BENEFITS & ADVANTAGES

- Appearance: Shape, pattern and a choice of attractive colors. Can be installed with traditional pavers used as accent courses, borders, etc.
- Can be used in all types of applications: Residential, commercial, municipal, institutional and industrial.
- Strength and durability: Stronger than porous asphalt and pervious concrete.
- All natural ingredients: Cement, sand, stone, iron oxide pigments and water. Pavers have no petroleum based materials that can leach into the soil.
- Factory made and delivered in ready-to-use or use-when-ready condition. There is no curing time; pavers are ready for traffic immediately after installation. Installation of PICP is not weather dependent; it can be installed in cold temperatures, during rainfall, and hot weather.
- If a deicer is needed, we recommend a NaCl sodium chloride. Deicers can be applied immediately after installation. No cure time is required. Note: Studies have shown that less deicer is needed with permeable pavements.
- Can be mechanically installed making it economically competitive with pervious concrete and porous asphalt on large projects.
- Can be made in light colors to increase surface reflection, or albedo, and helping to reduce surface temperatures.
- Provides 100% stormwater infiltration – regardless of size aperture or opening.

## PICP BENEFITS & ADVANTAGES

- Ability to handle any type of traffic loading, including heavy vehicles such as garbage and fire trucks.
- Porous asphalt and pervious concrete are monolithic materials, so their original structural capacity is reduced after pavement repairs. PICP units will not crack and can easily be taken up for base or utility repairs, then seamlessly reinstated with no loss of structural strength. Unlike asphalt and concrete, PICP does not leave visible patches where reinstated.
- Low maintenance: Unlike porous asphalt and pervious concrete, PICP does not require regular thorough vacuuming. Periodic sweeping is all that is needed to clean sediment that is trapped at the surface in the aggregate-filled joints and openings. In the event clogging does occur, the aggregate can be removed by vacuum systems and the openings refilled with clean stone to restore infiltration.
- Snow plow safe; plow blades will not dislodge pavers when properly installed. Note: The embossed Andover StoneCleft finish will require the blade height to be adjusted or use of a poly blade on the plow edge to avoid scuffing the clefted surface.
- Winter friendly: Snow and ice melt drain through the openings, which means less slip hazard for pedestrians and vehicles.
- ADA friendly: Firm, stable and slip-resistant surface for handicap accessibility.
- Durability: PICP withstands turning movements from tires without undue wear and pavement degradation seen in porous asphalt and pervious concrete.
- Oil drippings from vehicles adsorb, or cling to stone, aggregate and biodegrade safely over time and large spills are contained on-site where contaminated soils can be removed with minimal environmental impact.
- PICPs answer the call to limit impervious cover and runoff into storm drains working at capacity or when sites have limited space for detention ponds.
- Environmentally friendly: Both the EPA and DEP encourage on-site infiltration practices in lieu of conventional catch basin and end-of-pipe systems.
- Overall sense of enjoyment and pride every time you drive and walk on it!
- PICPs are cost competitive: They do not require expensive catch basin and sub-surface pipe conveyance and are similar or lower cost to porous asphalt and pervious concrete on residential projects.

## AQUA-BRIC®

Aqua-Bric is a pedestrian friendly, ADA-compliant permeable interlocking concrete paver. Properly installed, Aqua-Bric's flat surface accommodates foot traffic, high heels, rolling scooters and wheelchairs, while allowing rainwater to drain through the pavement and infiltrate into the soil below. Aqua-Bric is ideal for patios, walkways, plazas, entrances and pavements subject to passenger vehicles. The drainage openings in the four corners of Aqua-Bric facilitate cleaning to maintain infiltration.



**DIMENSIONS:** 4" x 8" (100 x 200mm)  
**COVERAGE:** 4.5 pcs/sf • **THICKNESS:** 2 3/8" (6 cm)  
**PERCENTAGE OF OPEN AREA:** 9.5%

## AQUA-BRIC® 8

Aqua-Bric 8 offers the pedestrian-friendly features of our 6 cm thick Aqua-Bric in a larger 4 1/2" x 9" unit with an 8 cm thickness suited to heavy-duty traffic loads. Aqua-Bric 8 is manufactured in a herringbone layout designed to take advantage of the economy of mechanical installation. It features full stones and full with half stones, creating an attractive and durable permeable pavement that suits a variety of applications. Like Aqua-Bric, primary infiltration occurs in the four corners where it is easier to clean and maintain.



**DIMENSIONS:** 4 1/2" x 9" (114 x 228 mm)  
**COVERAGE:** 3.55 pcs/sf • **THICKNESS:** 3 1/8" (8 cm)  
**PERCENTAGE OF OPEN AREA:** 10.5%

## ANDOVER 5511™ & ANDOVER COLLECTION™ featuring Color with 4D Technology

Andover 5511 pavers offer a traditional shape scaled to complement the trend for larger paving units. Available in two styles, Andover 5511 is suitable for pedestrian and vehicular pavements limited to personal vehicles in residential, commercial and municipal applications.

**DIMENSIONS:** 5 1/2" x 11" (140 x 280mm)  
**THICKNESS:** 2 3/4" (7 cm)  
**COVERAGE:** 2.38 pcs/sf  
**PERCENTAGE OF OPEN AREA:** 7.5%



5511 StoneCleft



5511 Smooth

The Andover Collection, which features a square, large and small rectangles, and GrandStone (sold separately), in a Smooth or StoneCleft finish, also may be installed as a permeable pavement. Ask for our Andover Collection architectural sheet or Come Home to Style catalog for product specification details.

**PERCENTAGE OF OPEN AREA:** 5.5%



Andover Collection  
StoneCleft

## PORTSMOUTH COBBLE™

Comprised as a 4-piece set, Portsmouth Cobble features the charm of time-honored paving stones enhanced with our Color with 4D Technology. It is suitable for pedestrian and vehicular applications.



**DIMENSIONS:** 5.5" x 5.5" • 5.5" x 6.65" • 5.5" x 7.64" • 5.5" x 8.8"  
**THICKNESS:** 2 3/4" (7 cm)  
**COVERAGE:** 1.09 sf/set  
**PERCENTAGE OF OPEN AREA:** ± 8%



## BROOKSTONE™

BrookStone Pavers feature 11 different shapes and sizes sold by the 12sf layer. BrookStone can be used alone or as an inset with other pavers to create striking banding and accents.



**DIMENSIONS:** 11 shapes per set - Various sizes  
**THICKNESS:** 2 3/4" (7 cm)  
**COVERAGE:** 12 sf/set per layer • Approx. 5.5 pcs/sf  
**PERCENTAGE OF OPEN AREA:** Variable

## TURFSTONE™

Turfstone grid pavers offer "greenspace" pavement design with the structural performance of high-strength concrete. A lattice-style paver, Turfstone units form a continuous surface grid with a 60% surface area. The apertures are typically filled with soil and grass or crushed stone. A structural green pavement, Turfstone is typically used for emergency access drives and low volume parking areas, erosion control on slopes and stream banks, and soil stabilization. Ideal manufactures Turfstone to meet ASTM Specification 1319-95 in both 8 cm and 10 cm thickness. Both thicknesses are capable of supporting H20 loading over a properly designed and compacted base. For information on the design and installation of Turfstone, please ask for our Turfstone architectural sheet.



**DIMENSIONS:** 23 5/8" x 15 3/4"  
**COVERAGE:** 2.6 sf/unit • **THICKNESS:** 3 1/8" (8 cm) • 4" (10 cm)  
**PERCENTAGE OF OPEN AREA:** 40%

### PHYSICAL CHARACTERISTICS

#### Aqua-Bric, Andover, Portsmouth Cobble, BrookStone

<b>Compressive Strength:</b>	8500 psi minimum
<b>Water Absorption:</b>	5% maximum
<b>Freeze Thaw :</b>	No Effect
<b>Slip Resistance:</b>	Excellent to ADA
<b>Load Capacity:</b>	H20 (Aqua Bric 8)

### PHYSICAL CHARACTERISTICS - Turfstone

<b>Compressive Strength:</b>	5000 psi minimum
<b>Water Absorption:</b>	10 lb/ft³ maximum
<b>Freeze Thaw:</b>	No effect as demonstrated through field performance
<b>Load Capacity:</b>	H20



# PERMEABLE PAVEMENT COMPARISON CHART

Permeable Surface				
	PICP	Porous Asphalt	Pervious Concrete	Gravel/Crushed Stone
Appearance	Available in a variety of colors; can be installed in an array of patterns to complement architecture & landscaping	Black or shades of gray; no shapes or patterns	A limited range of colors; surface texture may be varied; no shapes or patterns	Available in a variety of colors & aggregate size; no shapes or patterns; loose aggregate & uneven surface
Water Volume Reduction	High initial surface infiltration; can receive most design storms; runoff storage capacity dependent on base reservoir & subgrade soil infiltration rates	High initial surface infiltration; can receive most design storms; runoff storage capacity dependent on base reservoir & subgrade soil infiltration rates	High initial surface infiltration; can receive most design storms; runoff storage capacity dependent on base reservoir & subgrade soil infiltration rates	High initial surface infiltration if designed with a base reservoir & pervious subgrade soils; can be subject to densification & reduced permeability under load
Water Quality Improvements	Reduces TSS, nutrients, phosphorous, and metals; does not release asphaltic oils or cement into water	Reduces TSS, nutrients, phosphorous, and metals; does not release cement into water; initially releases asphaltic oils into water	Reduces TSS, nutrients, metals, & phosphorous; does not release asphaltic oils into water; can initially release high pH flows	Reduces TSS, nutrients, phosphorous, and metals
Urban Heat Island Reduction	Medium to high albedo values; can achieve Solar Reflectance Index (SRI) > 29 with selected aggregate colors & cements	Low albedo values; cannot achieve SRI > 29	Medium to high albedo values; can achieve Solar Reflectance Index (SRI) > 29 with selected aggregate colors & cements	Medium to high albedo values; can achieve Solar Reflectance Index (SRI) > 29 with selected aggregate colors
Durability	High-strength 8500 psi units support heavy vehicular traffic; withstands turning movements of tires without undue wear or degradation	Not recommended for heavier traffic loading; testing has demonstrated degradation under wheel turns	2500-4000 psi; not recommended for heavier traffic loading; testing has demonstrated degradation under wheel turns	Not recommended for heavier traffic loading; gravel displaced by foot/vehicular traffic; subject to rutting; compacts/densifies over time
Seasonal Effects	In winter, high freeze-thaw and deicing salt resistance, water in base does not freeze & heave, saturation when frozen will not damage pavement, snow melts & drains through surface reducing icing hazards, less deicers needed, can be plowed, limited sanding; in summer, unaffected by heat and no binder drain-down	In winter, resists freeze-thaw, water in base does not freeze & heave, saturation when frozen may damage asphalt, snow melts & drains through surface reducing icing hazards, less deicers needed, can be plowed, sanding prohibited; in summer, can soften in high temperatures, subject to binder drain-down without additives	In winter, resists freeze-thaw, water in base does not freeze & heave, saturation when frozen may damage concrete, snow melts & drains through surface reducing icing hazards, use of deicers not recommended, can be plowed, sanding prohibited; in summer, unaffected by heat and no binder drain-down	Difficult to snow plow & stones can become projectiles with the use of a snow blower
Surface Cleaning	Sweep with conventional or regenerative-air sweepers; stones in openings trap majority of sediment at surface; Vacuum if completely clogged & replenish with fresh aggregate	Vacuum clean minimum of two to four times per year to prevent blockage; difficult to restore if clogged	Vacuum clean minimum of two to four times per year to prevent blockage; difficult to restore if clogged	Surface cannot be cleaned
Construction Aspects	Factory-made units are consistent in quality & are delivered to site ready for installation in any season; requires no form work; can be mechanically-installed; pavement is ready for use immediately after completion	Requires no form work; maintaining mix temperature on site critical to lifetime performance; requires 24-hour cure prior to traffic	Requires form work; cast-in-place construction may yield varying quality & on site control of water/cement content critical to lifetime performance; requires 7-day cure prior to traffic; cannot install during winter	Requires no form work; can be trafficked immediately after completion
Repairs	Units can be taken up & reinstated for repairs to base or underground utilities; leaves no ugly patches, repair matches surrounding surface & is fully permeable	Limited repair potential, patch with impervious asphalt up to 10% of pervious area; cuts weaken pavement; repaired area will not match surrounding surface	Pavement can be cut out and replaced with pervious concrete; requires cure time; repaired area will not match surrounding surface	Can access area underneath gravel for repairs; does not leave a patch
ADA Compliance	Complies; narrower joint styles or traditional interlocking pavers can be used if desired	Complies	Complies	Does not comply
Cost	Less expensive than conventional pavements with catch basins & pipe; lowest life-cycle cost	Less expensive than conventional pavements with catch basins & pipe	Less expensive than conventional pavements with catch basins & pipe	Initially least expensive
Recycled Content & Reuse	Pavers can accommodate cement substitutes such as fly ash, slag, or silica fume; pavers can be crushed & recycled	Generally not manufactured with recycled asphalt or aggregate; asphalt can be recycled	Generally not manufactured with recycled aggregate or cement substitutes; concrete can be crushed & recycled	Can be recycled

## MAINTENANCE

Permeable interlocking concrete pavements offer years of structural performance and, with reasonable care and attention, meet hydrological objectives for managing stormwater runoff. Fines and debris naturally accumulate on the surface of walkways, plazas, driveways, parking lots and roadways, and here in New England, sand is routinely used to provide traction and protection against slips and falls. If these particulates are allowed to build up over time, the pavement's ability to infiltrate stormwater diminishes.

To maintain infiltration, cleaning at regular intervals is prescribed to remove sediment. The protocol for monolithic porous pavements, such as asphalt and concrete, calls for vacuuming as much as four times per year. On the other hand, studies have shown that permeable pavers can be easily maintained with routine cleaning using conventional street sweepers because sediment is trapped at the surface



Clean aggregate is shown just below sediment deposited at the surface

of the aggregate in the drainage openings, where it is accessible to sweepers. Unlike permeable pavers that achieve infiltration solely by joint spacing, our Aqua-Bric and Aqua-Bric 8 style pavers are configured to provide the majority of their infiltration capabilities through

non-structural openings (voids) molded into the corners. If a permeable interlocking pavement does become severely clogged, aggregate in the openings can be removed and replenished to restore full infiltration.

We recommend the following for routine cleaning, snow removal and general maintenance.

### Cleaning

- Keep pavement clean of leaves and debris.
- Sweep on routine basis. Perform in dry weather to remove encrusted sediment.
- Sweeper types:
  - Conventional broom sweeper – acceptable for removing crust when joints/apertures are accessible to brushes
  - Regenerative air sweepers – better option for maintaining permeable pavements
  - Pure vacuum machines – best for restoration if clogged

Do NOT pressure wash pavement as water jet can drive residue into the setting bed and base below.

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Andover 5511 - Pewter & Oxford Grey

### Snow Removal

Remove snow promptly with conventional snow removal equipment. (To prevent scratches on the paver surface, particularly with 5511 and Andover Collection, use a poly blade on the plow edge when removing snow.) Use sand and NaCl deicing chemicals sparingly. Unlike impervious surfaces where puddles refreeze at night, melt water from snow and ice drains through the openings, thereby reducing slip and skid hazards.

### General Maintenance

Please contact us or visit our website for guidance on general maintenance of PICP.

### For More Information

- [www.PaversbyIdeal.com](http://www.PaversbyIdeal.com)
- ICPI TechSpecs
- ICPI Detail Drawings
- Case Studies
- Guides and Research Summaries
- Construction of Permeable Base
- Ideal PICP Master Specification
- ICPI Design Pro Software
- Ideal PICP Booklet
  - Maintenance Guide
  - Interlocking Concrete Pavement Distress Summary
  - Glossary & Terms
  - Stone Gradations

*This information is intended to provide guidance on permeable interlocking concrete pavements. Design may vary with local regulations, specifications, environmental conditions and available aggregate materials. Professional engineers and/or landscape architects should be consulted in the design and construction of PICP. Always comply with OSHA requirements when cutting or sawing concrete products.*