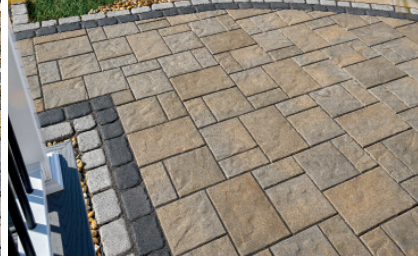




PERMEABLE PAVERS



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 ordinary pavement into an efficient stormwater treatment system in a cost effective and efficient manner. Pavement is a part of 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.



AQUA-BRIC®



Vineyard Blend

Quarry Blend

Beacon Hill Blend

AQUA-BRIC® 8

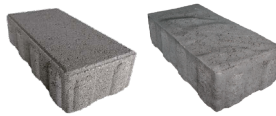


Vineyard Blend

Quarry Blend

Beacon Hill Blend

ANDOVER 5511™



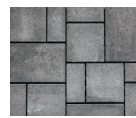
Chatham Blend
(Smooth Only)

Oxford Grey

Graphite

Pewter
(Smooth Only)

ANDOVER COLLECTION™



Chatham Blend

Oxford Grey

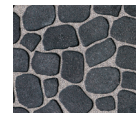
PORTSMOUTH COBBLE™



Quarry Blend

Vineyard Blend

BROOKSTONE™



Quarry Blend

Vineyard Blend

Graphite

TURFSTONE™



Pewter



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PERMEABLE PAVERS

STORMWATER & PERMEABLE PAVERS

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

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 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, Turfstone and BrookStone pavers feature wide joints, creating multiple openings across the pavement 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 pavement, as well as storage and treatment of stormwater over a 24-48 hour period before slowly releasing it into 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. *For more information about PICP, refer to Tech Specs 8, 16, 18, 23 and 24.*

PICP BENEFITS & ADVANTAGES

- ▶ Appearance: Shape, pattern and a choice of attractive colors. Can be installed with traditional pavers used as accent courses, borders, wheelchair paths, etc.
- ▶ Can be used in all types of applications: Residential, commercial, municipal, institutional and industrial including the ability to handle any type of traffic load, including heavy vehicles such as garbage and fire trucks.
- ▶ 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 in hot weather.
- ▶ If a deicer is needed, we recommend a NaCl sodium chloride. Deicer 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 made in light colors to increase surface reflection, or albedo, helping to reduce surface temperatures.
- ▶ Provides 100% stormwater infiltration - regardless of aperture size or opening.
- ▶ 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 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 and Portsmouth Cobble finish will require the blade height to be adjusted or the 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 rutting, undue wear and pavement degradation seen in the porous asphalt and pervious concrete.
- ▶ Oil drippings from vehicles adsorb or cling to stone aggregate and biodegrade safely over time. 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.
- ▶ PICPs are cost competitive: They do not require expensive catch basin and sub-surface pipe conveyance and are similar or lower in cost to porous asphalt and pervious concrete on residential projects.
- ▶ Can be mechanically installed making it economically competitive with pervious concrete and porous asphalt on large projects.

PERMEABLE PAVERS BY IDEAL

Aqua-Bric®

Dimensions	4" x 8"
Coverage	4.5 pcs/sf
Thickness	2 3/8" (6cm)
Percentage of Open Area	7.5%



Aqua-Bric® 8

Dimensions	4 1/2" x 9" (28 units per layer) 4 1/2" x 13 1/2" (8 units per layer)
Coverage	11.25 sf/layer
Thickness	3 1/8" (8cm)
Percentage of Open Area	10.5%



Andover 5511™

Dimensions	5 1/2" x 11"
Coverage	2.38 pcs/sf
Thickness	2 3/4" (7cm)
Percentage of Open Area	7.5%



Andover Collection™

Dimensions	5 Piece Set (2) 5 1/2" x 11" • (2) 11" x 11" • (1) 11" x 16 1/2"
Coverage	3.8 sf/set
Thickness	2 3/4" (7cm)
Percentage of Open Area	5.5%



Portsmouth Cobble™

Dimensions	1 Layer - 9 Each: 5.5" x 5.5" • 5.5" x 6.65" 5.5" x 7.64" • 5.5" x 8.8"
Coverage	1.09 sf/set
Thickness	2 3/4" (7cm)
Percentage of Open Area	±8%



BrookStone™

Dimensions	11 shapes and sizes
Coverage	12 sf/layer
Thickness	2 3/4" (7cm)
Percentage of Open Area	Variable



Turfstone™

Dimensions	2 3 5/8" x 15 3/4"
Coverage	2.6 sf/unit
Thickness	3 1/8" (8cm) • 4" (10cm)
Percentage of Open Area	40%



PERMEABLE

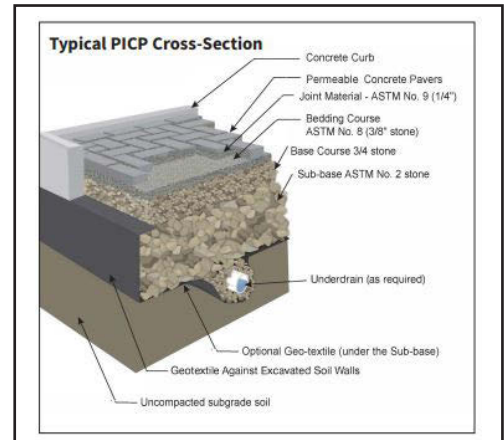
PHYSICAL CHARACTERISTICS

AQUA-BRIC, ANDOVER, PORTSMOUTH COBBLE, BROOKSTONE
ASTM C936

Compressive Strength	8500 psi minimum
Water Absorption	5% maximum
Freeze Thaw	No effect
Slip Resistance	Excellent to ADA
Load Capacity	H20 (Aqua-Bric 8)

TURFSTONE

ASTM C1319	
Compressive Strength	5000 psi minimum
Water Absorption	10 lb/ft ³ maximum
Freeze Thaw	No Effect as demonstrated through field performance
Load Capacity	H20



MAINTENANCE

CLEANING

- ▶ Keep pavement clean of leaves, grass clippings and debris.
- ▶ Sweep on a routine basis - perform in dry weather to remove encrusted sediment.
- ▶ Sweeper types: Conventional broom sweepers are acceptable for removing crust when joints/apertures are accessible to brushes. Regenerative air sweepers are a better option for maintaining permeable pavements. Pure vacuum machines are best for restoration if clogged
- ▶ Do NOT pressure wash pavement as the water jet can drive residue into the setting bed and base below.





SNOW REMOVAL

- ▶ Remove snow promptly with conventional snow removal equipment.
- ▶ To prevent scratches on the paver surface, particularly with our color 4D pavers, use a poly blade on the plow edge when removing snow.
- ▶ Use sand and NaCl deicing chemicals sparingly.
- ▶ Unlike impervious surfaces where puddles refreeze, meltwater 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.

PERMEABLE PAVEMENT COMPARISON CHART

Permeable Surface				
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 and 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 design 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 ice 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 & Resue	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

PERMEABLE

TECHNICAL SERVICES

Please call our sales office or visit our website for complete technical information and literature. We also offer design consultation, specification assistance, and job-site quality review upon request.



PICP



Maintenance



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