PERMEABLE PAVER

MAINTENANCE GUIDE

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This guide is specific to Unilock® permeable pavers as a maintainable system for stormwater runoff and does not cover cleaning concrete pavers themselves. Please see the Unilock Paver Miantenance for Commercial Installations (available for download at www.unilock.com) for information on cleaning concrete pavers. The maintenance information in this guide is intended for Unilock permeable paver systems only and not for other types of permeable pavers or pervious systems.

Maintenance is necessary for any type of permeable pavement system, much like any impervious pavement with catch basins and underground infrastructure. Over the lifetime of the permeable paver system, there will be a need to clean any sediment, soil, dirt and debris from the joint aggregate material to maintain a sufficient infiltration rate. Every project will vary in performance needs, as well as to the frequency in which the joint material must be cleaned. The surface infiltration rate must be greater than the regional 100-year rainfall intensity to adequately ensure no runoff is generated, which is only one goal for using permeable pavers. Unilock suggests establishing a maintenance plan using the techniques in this document to prevent clogging.

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PRECEDING MAINTENANCE

Before providing maintenance on permeable paver systems, proper installation and protection during construction is required. Here are a few conditions to observe, require and prevent for establishing a successful system:

1. Verify correct installation and materials

- Hire contractors with knowledgeable experience installing permeable pavers
- Review and approve all sub-base, base and joint aggregate materials
- Do not allow sand and dense-graded aggregates

2. Prevent construction damage

- Limit sub-grade soil compaction when infiltration is necessary
- Restrict vehicles with muddy tires from driving over newly placed pavers
- Do not mix aggregate materials

3. Refill joint material

- Once, between 3 and 6 months after initial installation
- Repeat as needed - approximately every 5-10 years

4. Avoid stockpiling of materials such as

- Topsoil
- Mulch

The proper materials and installation execution can be found in the Unilock specifications for permeable pavers. Both residential and commercial projects will utilize the same base, setting bed and joint aggregates. Some projects may not require sub-base materials, under drainage or geotextile. It is not necessary to separate the setting bed from the base aggregates with a geotextile.

EXAMPLES OF COMMON MAINTENANCE ISSUES

Below are several warning signs and visual clues of common maintenance issues which must be prevented and addressed or remediated to ensure continued surface infiltration. These common problems can often be easily remedied by maintaining the proper joint aggregate level.

1. SLOW DRAINING/RUNOFF

- Verify with simple infiltration testing or observe after rain storms
- Surface should drain immediately

2. PONDING AND BIRD BATHS

- Rule of thumb: if more than a nickel deep one minute after a rainfall event, maintenance is necessary
- Verify correct materials were installed
- Exceptions at bottom of slopes

3. SURFACE CRUSTING

- Identify if there is a problem such as run-on sediments
- Increase cleaning frequency in troubled areas
- Remove debris immediately

4. WEEDS

- Weeds will not germinate unless there is a collection of soil or moisture
- Remove weeds immediately
- Clean sediment from joint material
- Chemical treatment may be required prior to maintenance removal

5. COVERED JOINT MATERIAL

- Identify problem and correct
- Remove immediately
- Joint material should appear topped up as photo on left

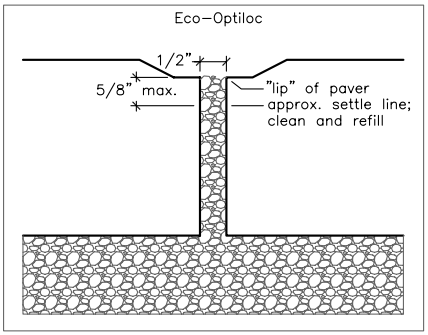
MAINTENANCE TYPES

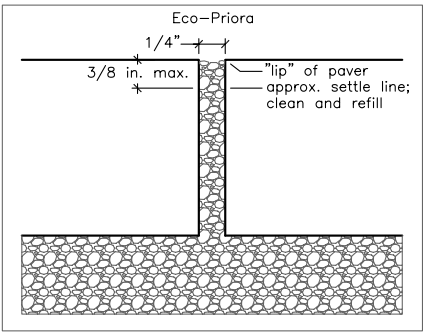
There are two service types for maintaining the integrity of a permeable paver system:

1. **Preventative** – removes most miscellaneous debris before being trapped in the joint aggregate material causing clogging. This usually does not require removal of any joint material to restore infiltration.

2. **Restorative** – requires some removal or complete removal of the joint material to renew infiltration. Occurs after miscellaneous debris has been captured and lodged in the joint aggregate.

Note: *Both maintenance types will be most effective when the joint aggregate material is filled to the "lip" of the paver. If the joint material has settled more than the joint width, plus 1/8 inch below the paver lip, the maintenance equipment is significantly less effective and potentially more expensive.*





MAINTENANCE EQUIPMENT

Maintenance equipment requirements will vary according to project size, age and product type.

PROJECT TYPE 1: For smaller pedestrian type areas such as sidewalks, driveways, plazas, patios or similar:

PREVENTATIVE

1. HAND-HELD BRISTLE BROOM

- Available at any hardware store
- Sweep as needed to keep the surface clear of debris
- Approximate cost: $15

2. LEAF BLOWER

- Electric or gas powered
- Minimum air speed of 120 mph
- Joint aggregate material will remain in place while removing debris from paver surface
- Approximate cost: $50 to $300

3. ROTARY BRUSH

- Poly bristles only
- Flips debris from joint
- Will require slight refilling of the joint aggregate material
- Approximate cost: varies depending on attachment vehicle

RESTORATIVE

1. WET/DRY SHOP VACUUM

- Minimum 4 HP (peak) motor with 130 cubic feet per minute suction
- Will remove some joint aggregate material
- Replenish removed joint aggregate material to “lip” of paver
- Approximate cost: $50 to $150

2. RIDING LITTER VACUUM

- Tennant ATLV 4300
- 48 inch wide vacuum head
- 110 gallon capacity
- Can also be used as a preventative technique
- Will evacuate most debris from joint except for aggregate material
- Approximate cost: $25K new

3. POWER WASHER

- Capable of spraying 1,400 to 1,800 psi
- Spray at a 30 degree angle approximately 18 to 24 inches from the surface
- Will evacuate joint material
- Replenish removed joint aggregate material to “lip” of paver
- Approximate cost: $125 to $500

PROJECT TYPE 2: For larger vehicular areas such as roads, parking lots, alleys, plazas or similar that can support vehicles:

PREVENTATIVE

1. ROTARY BRUSH

- Poly bristles only
- Flips debris from joint
- Will require slight refilling of the joint aggregate material
- Approximate cost: varies depending on attachment vehicle

2. BROOM SWEEPERS

- Typical “street sweeper” type
- Rotating curb brushes with center pickup
- Poly bristles only
- Do not utilize water to clean the surface as this can have detrimental effects on the cleaning
- Approximate cost: $100 to $120 per hour from a service company

3. REGENERATIVE AIR SWEEPERS

- Light duty suction cleaning
- Utilizes stream of air blowing horizontally across surface and vacuuming
- No rotating brushes
- Approximate cost: $45 to $65 per hour from a service company

RESTORATIVE

Vacall® Dynamic Multi-Purpose Vacuum

Elgin® Whirlwind

1. VACUUM SWEEPERS

- Heavy duty cleaning
- Minimum suction of 14,000 cubic feet per minute
- Complete evacuation of joint aggregate material
- Replenish removed joint aggregate material to “lip” of paver
- Approximate cost: $2.50 to $4.50 per parking space

2. POWER WASHERS

- Capable of spraying 1,400 to 1,800 psi
- Spray at a 30 degree angle approximately 18 to 24 inches from the surface
- Will evacuate joint aggregate material
- Replenish removed joint aggregate material to “lip” of paver

STRATEGIC PROCEDURES FOR MAINTAINING INFILTRATION

Observe and implement the following habitual procedures to ensure longevity of the system:

1. WEEKLY

Prevent contamination from routine landscape maintenance such as grass clippings from mowing, hedge trimming, mulching plant beds, etc., by implementing the following joint-opening cleaning procedures immediately after contamination occurs:

- Hand broom debris from the paver surface
- Blow debris from the paver surface with backpack blower type device, collect and dispose
- Mechanically sweep paver surface

2. MONTHLY

Observe any collection areas of debris, dirt, topsoil, mulch, etc., after seasonal events such as snowfall, rain storms, leaf litter, etc., and investigate if clogging is occurring. Immediately restore infiltration using the following cleaning options:

- Break up any crust covering the joint aggregate material with hand broom for smaller areas, or mechanically with a rotary sweeper for larger areas. Remove debris material.
- When necessary, restore infiltration using wet/dry shop-vacuum for small areas or vacuum truck for larger areas by removing debris from joint aggregate material.
- Replenish joint aggregate material to “lip” of paver

3. YEARLY

Establish a seasonal maintenance schedule that includes the following:

- Sweep entire permeable paving surface with appropriate preventative sweeping devices
- Replenish joint aggregate material to “lip” of paver

4. TEN YEARS PLUS

Plan long-term maintenance to rejuvenate infiltration rates:

- Complete restoration of the joint aggregate material
- Replenish joint with cleaned or new aggregate material to “lip” of paver

RECOMMENDED SEASONAL

MAINTENANCE SCHEDULE

Unilock® suggests establishing a best practices maintenance program to ensure longevity of the systems before restorative action is required. Biannual preventative maintenance is suggested as shown in the schedule below. This includes sweeping once in the early spring and once again in the late fall. Below is a preventative maintenance timeline that includes four maintenance suggestions:

1. AFTER THE SNOW MELT – MARCH 1 THROUGH APRIL 15

- Broom, blow, rotary brush or sweep entire surface
- Clean debris from paver surface in location of snow stockpile area
- Replenish joint aggregate material after cleaning
- Every fifth year, vacuum or power wash problem areas and refill joint material

2. LATE SPRING – APRIL 1 THROUGH MAY 15

- Broom, blow, rotary brush or sweep flowers from trees and shrubs
- Collect any additional debris from areas mulched or planted with annual flowers
- Replenish joint aggregate material as necessary

3. LATE SUMMER – JULY 15 THROUGH AUGUST 30

- Broom, blow, rotary brush or sweep lawn and shrub clippings or tree fruits
- Collect any additional debris from summer activities such as charcoal coals inadvertently dumped on the permeable surface, beach sand, etc.
- Replenish joint aggregate material as necessary

4. LATE FALL – OCTOBER 15 THROUGH NOVEMBER 30

- Broom, blow, rotary brush or sweep plant leaves
- Replenish joint aggregate material as necessary

Various factors will affect each project's preventative maintenance timeline and must be reviewed individually.

Recommended Seasonal Maintenance Schedule Chart

Recommended Maintenance Schedule		Seasonal BMP			
		After Snow Melt	Late Spring	Late Summer	Late Fall
Techniques	**Project Type 1: Preventative - choose one**		1x per season	optional	1x per season
	Bristle Broom	**	*	*/**	*
	Leaf Blower	**	*	*/**	*
	Rotary Brush		*	*/**	*
	Project Type 1: Restorative		**		**
	Wet-Dry Vacuum	**	**	**	**
	Riding Litter Vacuum		*	**1x every 5 yrs.	*
	Power Washer	**	**	**	**
	Project Type 2: Preventative - choose one		1x per season	optional	1x per season
	Rotary Brush		*	*	*
	Broom Sweepers		*		*
	Regenerative Air Sweepers		*		*
	Project Type 2: Restorative				
	Vacuum Sweepers			** 1x every 10 yrs.	
	Power Washer	**	**	**	**

* recommended

** as needed per Strategic Procedures

WINTER MAINTENANCE AND DE-ICING

DEALING WITH SNOW

Equip plow scrapers and blades with shoes or high-density plastic blades to reduce the risk of damaging paver joints and the surface of the pavement. While scraping the surface without this protection will not compromise the structural integrity of Unilock pavers, it may affect the aesthetics of the surface by leaving behind rust marks and further damage the finish.

In contrast, a rotational snow broom (non-metal) can be used to remove snow safely from the paver surface.

Snow Broom for snow removal

Over salted pavers

DEALING WITH ICE

Rock Salt - Sodium Chloride (NaCl) for temperatures as low as 20°F (-7°C)
Calcium Chloride ($CaCl_2$) only when necessary when temperatures are below 20°F (-7°C) to -2°F (-19°C)

Follow the directions listed on the deicing product bag but use sparingly. Only apply the minimum amount necessary to melt the snow and ice. Over applying the product can still result in damage to concrete. Sweep and remove any excess deicing chemical after the ice and snow melts. After the winter season, thoroughly wash the paver surface to remove any excess deicing chemical remaining.

DO NOT USE:

- Magnesium Chloride (MgCl2)
- Calcium Magnesium Acetate (CMA)
- Potassium Chloride (KCl)
- Potassium Acetate (KA)
- Fertilizers containing Ammonium Nitrate and Ammonium Sulfate

These chemicals rapidly attack and disintegrate concrete.

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