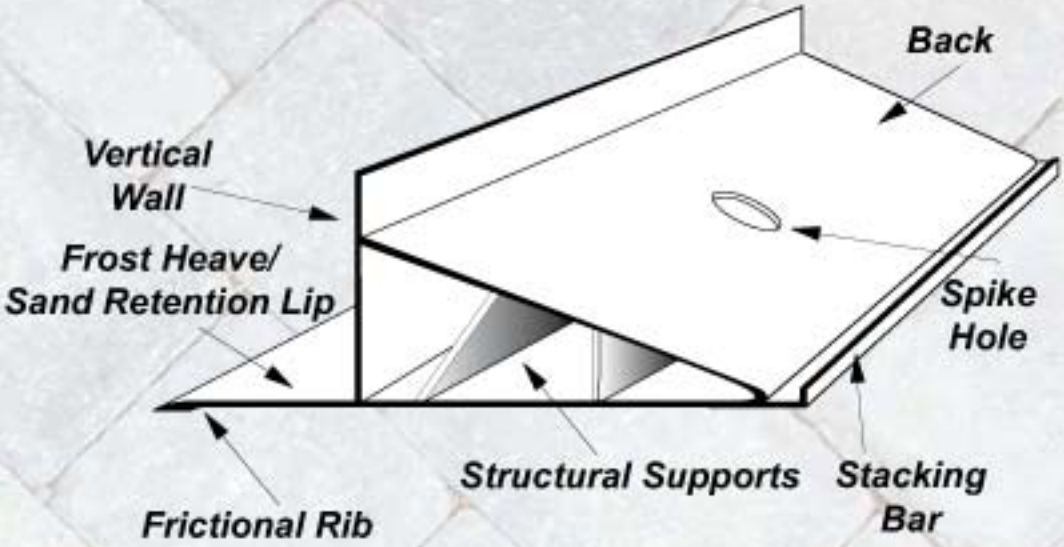
Can *your* Edge Restraint hold up to this?

MATERIALS & DESIGN



Polyvinyl Chloride (PVC)

- Superior strength
- Has "memory", as it moves under load it returns to its original shape

Triangular, Reinforced, Hollow Core Design

- Engineered to ensure vertical wall stays perpendicular to the pavement
- Provides the best structural support
- Ties into the pavement system
- Allows for truly straight edges and smooth curves

Frost Heave / Sand Retention Lip

- Utilizes the downward pressure of load and the weight of the pavers to tie the edging to the pavement
- Guarantees edging will move as part of the pavement system under normal conditions and also during frost heave cycles
- Bedding sand will not migrate from under the edging

Frictional Rib

- Provides lateral load resistance by 'biting' into the aggregate base

Pre-Drilled Spike Holes

- Accommodates ⅝" diameter steel landscape spikes
- Spaced evenly every 12" on ***RIGID***, if further strength is needed, spikes can be driven through the PVC anywhere
- ***FLEXIBLE*** has one hole per back support to provide the most efficient support

Connector

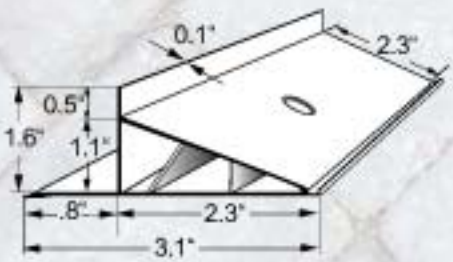
- Connector tubes are inserted into the ends of ***PAVE EDGE*** for seamless connections
- This type of connection provides unrivaled strength
- Without manufactured connection points, ***PAVE EDGE RIGID*** & ***FLEXIBLE*** connect together at any point in any length

PAVE EDGE PROFILES

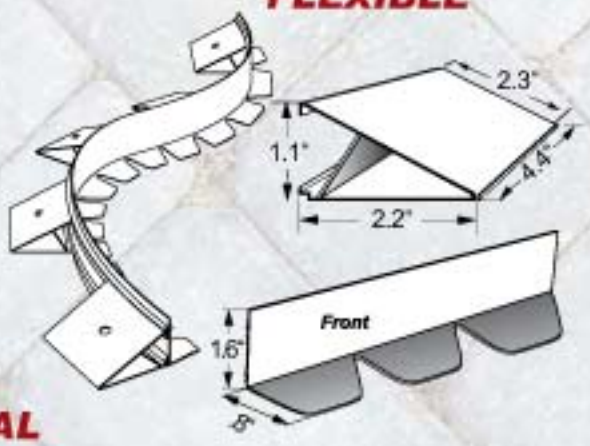
Multiple profiles provide best performance for varying application needs

Because no one product can meet the needs of all pavement applications, ***PAVE EDGE*** is available in three profiles: ***RIGID***, ***FLEXIBLE*** and ***INDUSTRIAL***. ***RIGID*** and ***FLEXIBLE*** work best when using pavers 6 to 8 cm. Pavers 8 cm or thicker, may require a larger profile such as ***PAVE EDGE INDUSTRIAL***. ***INDUSTRIAL*** was developed to meet demanding needs of commercial and industrial applications.

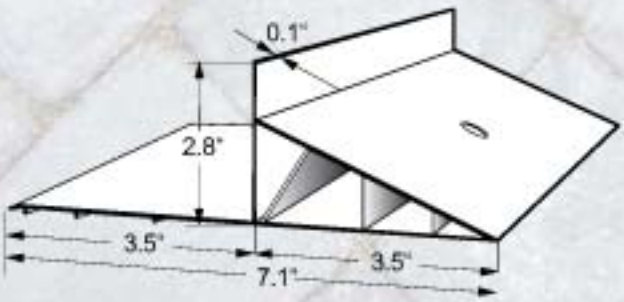
RIGID



FLEXIBLE



INDUSTRIAL



CONNECTOR

RIGID

- Straight one piece sections
- Designed for straight runs and gradual curves
- Engineered to withstand vehicular traffic
- Requires fewer spikes
- No restriction on spike placement, they can be driven through the back at any location
- Can be made flexible, if necessary, by cutting v-shape notches in the back

FLEXIBLE

- Pre-assembled 2 piece flexible sections
- Utilizes the same engineered profile as **RIGID**
- Flexible enough to create a radius as small as 24 inches

INDUSTRIAL

- Straight one piece sections
- Developed to meet the demanding needs of commercial and industrial applications
- Larger profile with thicker walls and an extended lip with additional frictional ribs
- Most economical and best alternative to concrete and granite curbing

__PAVE EDGE__ should be stored flat and out of direct sunlight. Cartons should be covered against rain.

COMPONENTS

Currently there is no industry specification for an important component of a flexible paver system... the edge restraint.

The edge restraint's responsibility is to ensure the pavement stays as tight, strong and good looking as the day it was created by withstanding loads created by pavement energy. Pavement energy is the constant pressure of pavers against each other. Traffic loads are the momentary dynamic forces imparted by traffic.

Components of a Segmental Pavement System

- Sub-base
- Base
- Bedding & Joint Sand
- Pavers
- Bond Pattern
- Edge Restraints

Common Reasons Flexible Paver Systems Fail

- Base not thick enough for type of traffic load
- Poor base compaction
- Insufficient base extension
- Bedding sand layer too thick or uneven
- Improper paver aspect ratio for the type of traffic load
- Edge restraint failure

Edge Restraint Failure

- Horizontal shifting occurs
- There is permanent deformation of the edge restraint under load
- Effects interlock, which is critical to life performance
- It is during initial compaction when most residential and pedestrian pavements receive their greatest load

COMPARISONS

Engineered pavement systems have been perfected over many decades. Manufactured plastic edge restraints are a recent evolution to an already proven system. Unfortunately, many edge restraints do a poor job of creating pavement energy and maintaining system interlock.

How much does it cost to go back and repair a job that is already completed? Besides the loss of revenue from not working on a paying job, valuable man hours are wasted, along with excessive wear and tear on trucks and equipment. Not only is customers confidence lost, but damage is done to your company's reputation.

PAVE EDGE Features

- Least amount of deformation after compaction
- It is the only patented paver edge restraint system in the world designed by a contractor for exclusive use with pavers
- Designed for pedestrian, vehicular and commercial applications
- Contains up to 60% more material by weight than other paver edgings
- Environmentally Safe; Non-reactive to all plantings and grass
- Allows at least 2" of top soil or sod from ***PAVE EDGE*** to top of paver. Industry experts recommend a minimum 1" of top soil for healthy grass growth
- Hollow core design does not act as a heat sink in summer and will not dry out the soil and plantings above
- Only edging with patented frost heave sand retention lip
- **PAVE TECH** offers the strongest technical support in the industry including installation brochures and DVDs, marketing materials, training products, and a trained and knowledgeable staff

Alternative Edge Restraints

- **"L" Shaped Plastic edge restraints** – are made of lower quality plastic, "L" shape doesn't tie pavement together, strength is compromised without the back support, requires greater spiking frequency, connections are often inflexible and makes flat spots in curves
- **Steel & Aluminum** – bends easily, once bent it cannot be used, naturally corrosive in nature which shortens life expectancy, and the same problems experienced with plastic "L" shaped edging occur with steel and aluminum. Average height inadequate for retaining sand and pavers
- **Concrete Toe** – much higher overall per foot cost to install, inconsistent quality doesn't tie the pavement together and has a much shorter life expectancy. Creates a non-flexible edging around a flexible pavement.

When the pavement shifts outwards, the joints open and interlock along the perimeter deteriorates. As the edge continues to shift out, this deterioration will continue to work into the pavement at an accelerating rate.

SPECIALIZED APPLICATIONS

Visit paveedge.com for complete installation instructions for all Specialty Applications.

Retaining Walls

- Cost Savings – does not require a full layer of buried wall block
- Time Savings – labor efficient, does not require working in a ditch
- Visual Footprint, allows changes to be made to the design before laying a single wall block
- Recommended for residential walls that do not require engineering

Pavement Overlays

- Segmental pavement installation over concrete or asphalt surface
- Overlays rehabilitate old pavements
- Pavement area can remain the same size or can be enlarged

Natural Stone

- Pathways and patios made with natural stone, such as flagstone, marble, and granite have become popular
- Installation is similar to segmental pavements

Permeable Pavements

Specially designed concrete pavers are installed in a way that allows rain and other water to percolate into the ground rather than dispersing water away from the pavement. This reduces or eliminates the need for retention ponds. **Two Methods of Installation:**

- **Berm Method** – Utilizes a berm of dense graded aggregate base compacted around the outside of the permeable pavement. The berm allows spikes to be used to anchor the edge restraint. This is the contractor preferred method.
- **Geo-Grid Method** – This type of installation allows edging to tie the pavement together without spiking, such as with ***PAVE EDGE*** Industrial over open-graded aggregate and where soil conditions prohibit the use of spikes.

SPECIFICATIONS

for SEGMENTAL PAVER EDGE RESTRAINTS

This architectural specification for edge restraints is based on proven performance of properly constructed segmental pavements using current industry installation standards.

Part 1 – GENERAL

1.1 Scope of Work

A. Installation of plastic paver edge restraints on dense-graded aggregate base.

Note: Separate plastic paver edge restraint installation specifications are available for specialty applications

1. Geo/Bedding Wrap Method for open-graded base (permeable)
2. Geo/Bedding Wrap Method for other flexible base

1.2 System Description

A. Segmental paver systems installed over compacted dense-graded aggregate base material with a nominal 1" (25 mm) layer of bedding sand using a plastic edge restraint.

1.3 Submittals

A. 3' (90 cm) samples of edgings to be used, properly marked and identified by manufacturer and distributor with accompanying manufacturer MSDS.

B. Products submitted should incorporate the following features and components identified in a drawing with submittal. (See Section 2.1)

1.4 Tests

A. Submit a STORK METHOD engineering test report showing Deformation and Load performance data meeting minimum requirements, as defined in Section 2.2

1.5 Storage Conditions

A. Always store edgings flat and out of direct sunlight. Leave boxed or bundled until used.

Part 2 – PRODUCT

2.1 Edging Properties

A. **PROFILE** – Should incorporate the following components

1. Edge restraint footprint surface must be solid and uniform containing voids no larger than 50%.
2. Frost heave/sand retention lip, extending a minimum ½" (13 mm) under the bedding layer with a minimum of 75% coverage along the length of the edging.
3. Frictional resistance rib(s) having a minimum of one rib under the lip.

B. **COMPOSITION** – Polyvinyl Chloride (PVC)

C. **MATERIALS**

1. Rigid style edging for straight runs and gradual curves.
2. Flexible style edging for sweeping and tight radius curves with the flexibility to create a radius as small as 24" (600 mm).
3. Height minimum of 1 ⅝" (41.3 mm)
4. Connection piece shall provide complete end to end contact on all pavement facing edges without piece to piece lippage. Connection device shall extend beyond splice at least 2" (51 mm) in each direction from splice.
5. Anchoring to be completed with 10" (25 cm) long x ⅜" (1 cm) diameter steel landscape spikes
   - Maximum spike spacing for rigid style edging = 24" (600 mm)
   - Maximum spike spacing for flexible style edging = 12" (300 mm)

2.2 Edging Performance

A. Edging performance must meet minimum requirements based on the STORK METHOD (see Appendix A for STORK METHOD definition).

B. **SPECIFICATIONS**

1. **Deformation**
   Rigid style:
   Maximum Deformation = 0.0044" (0.112 mm)
   Flexible style:
   Maximum Deformation = 0.0154" (0.4 mm)

2. **Load**
   Rigid style: Minimum Load = 252 lbf* (1.1214 kN)
   Flexible style: Minimum Load = 230 lbf* (1.0235 kN)
   *lbf = pounds force, kN = kilonewton

Part 3 – EXECUTION

3.1 Base Preparation

A. Follow project engineer's specifications for dense-graded base and base extension. Refer to ICPI and BIA base guidelines in absence of sufficient project specifications regarding base and base extension preparation.

3.2 Edging Installation

A. **Installing edging BEFORE bedding sand and pavers**

1. Per industry recommendations, place edging on compacted base. Never allow edging to be installed on top of the bedding layer.
2. Spike rigid style edging using pre drilled holes, with a maximum spacing of 24" (600 mm) between spikes. If holes do not meet spike placement requirements drive spike through the back at required location. When installing flexible style edging with a maximum spacing between spikes of 12" (300 mm).
3. Connect additional sections of edging as needed (See Section 2.1, C-4 for connection)

B. **Installing edging AFTER sand & pavers**

1. Using a trowel or flat head shovel, cut down along the back of the paver, pulling away the excess bedding sand without disturbing the base material.
2. Connect sections together (See Section 2.1, C-4 for connection).
3. Place edging directly on the base material. Slide the retention lip under the bedding layer. Never allow edging to be installed on top of the bedding layer.
4. Spike into place following the same spike placement specifications as in section 3.2, A-2. When installing after bedding layer and pavers, nail the spike at an angle with the point driven inward toward the pavement (toe-nailing). This is a preferred practice to keep edging tight to the pavement.

3.3 Installation of sand and pavers

A. Install bedding sand and pavers following project specifications.

3.4 Landscaping

A. Soil backfill and remedial landscaping to be completed per contract by others.

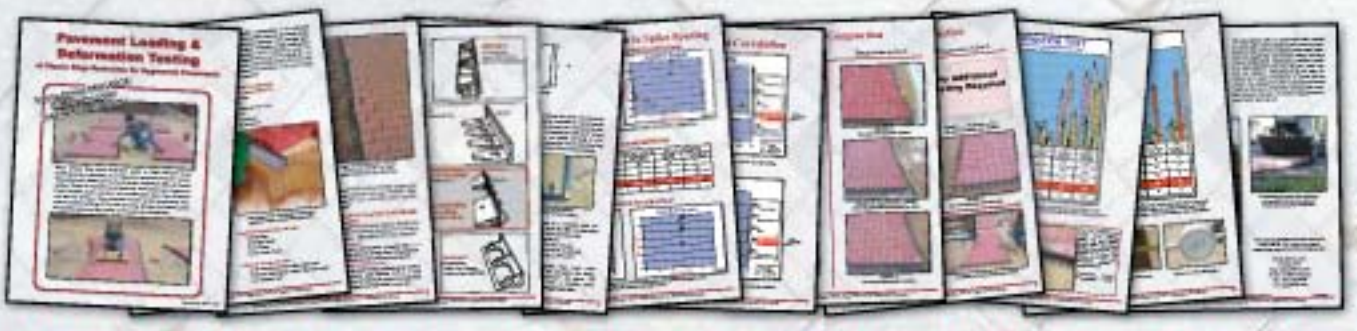
PDF, text and image downloads available at paveedge.com

ENGINEERING TESTS

Independent Engineering Tests Prove PAVE EDGE Outperforms Other Leading Edge Restraints.

THIS REPORT SHOWS:

- ✓ Which Edging Designs were Tested
- ✓ What are the Properties of Plastics
- ✓ When Edge Restraints Fail
- ✓ Why Flexible Pavement Systems Fail
- ✓ How Test Areas were Prepared to ICPI / BIA Installation Specifications
- ✓ Why this Testing is Important to the Paver Industry
- ✓ Photos and Graphs to Support Findings



Excerpts from the 'Pavement Loading & Deformation Testing' Report

Segmental pavement system interlock is critical to the performance and life of the pavement. Edge restraint failure effects interlock. **PAVE TECH, INC.** engaged Stork Twin City Testing Corporation (Stork), an engineering and testing company located in St. Paul, Minnesota, to design a test that could measure comparable performance of the most common manufactured plastic paver edge restraints (edge restraints) on the market.

TO RECEIVE YOUR COPY OF THIS REPORT

Call: 800-728-3832 Email: sales@paveedge.com

Online: www.paveedge.com

PAVE EDGE INDUSTRIAL was installed by **PAVE TECH** in 1989 at an aggregate pit in Minnesota. The estimated weight of the loaded trucks going out since installed is in excess of 10,000,000 tons! The original outward shift of the spikes was ¾" in the first month after installation and has never shifted again.