HANOVER® GUARDIAN®

HYDROTECH®

Tech Data

1. Product Name

Hanover Guardian® Roof Paver System marketed by American Hydrotech, Inc.

2. Product Description

Basic Use

The Guardian Roof Paver System combines a specially designed hydraulically pressed concrete paver and lock-down pedestal assembly that work together to prevent horizontal and vertical movement of the roof pavers while maintaining an open joint assembly allowing free drainage of water below. By locking the pavers together, the Guardian System allows all the pavers to work together providing a maximum wind uplift resistance of 81 pounds per square foot.

Advantages

- Locks all the pavers together providing a "monolithic" paver assembly for high wind uplift resistance.
- Pedestal-installed, open joint paver assembly allows free drainage of water and air circulation below the paver surface.
- Lock-down pedestal assembly can be combined with all other Hanover pedestal types to allow elevation and slope adjustments.
- Specially designed pavers available in a variety of Hanover Architectural Product's typical colors and textures.
- Protects the underlying, fully bonded American Hydrotech Monolithic Membrane 6125® (MM 6125) roof membrane and optional Hydrotech supplied loose laid STYROFOAM® brand insulation from mechanical damage and wind blow-off.

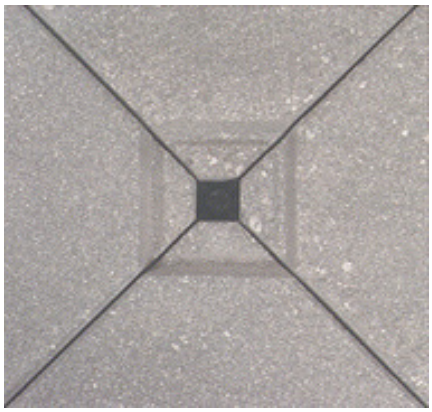


Fig. 1

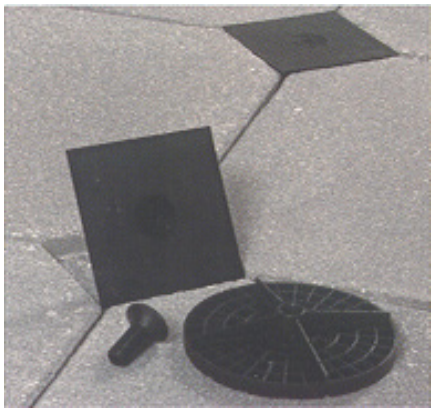


Fig. 2

Composition and Materials

Guardian Paver (Fig. 1)
Architecturally finished, hydraulically pressed Hanover concrete paver with recessed grooves at all four corners designed to receive the Guardian Pedestal Top Plate. Pavers are nominally sized 23 ½ inches X 23 ½ inches X 2 inches thick. Paver thicknesses of 2 ½ and 3 inches are also available.

Oversized pavers are available, nominally sized 23 ½ inches X 35 3/8 inches, scored with a false joint at the 23 ½ inch dimension. This paver should be used in situations where a smaller piece would be required (i.e., where cuts are necessary at terminations).

Guardian Pedestal (Fig. 2)
Pedestal Base, Top Plate, and Bolt are made of high density polyethylene. The Guardian Pedestal assembly is available in all Hanover standard paver colors (including glacier white and black).

The Pedestal Base measures 7 ½ inches in diameter, 5/8 inch thick/high, and has integral spacer tabs that provide a 1/8 inch joint space between pavers. A threaded hole in the center of the Base is sized to receive the Pedestal Bolt.

The Pedestal Top Plate is 6 inches square with a countersunk hole to allow the Pedestal Bolt to sit flush with the surface.

The Pedestal Bolt is ¾ inch in diameter and its length can vary to accommodate the thickness of the Guardian Paver.

Accessories

Hanover Fixed-Height Pedestals – octagonal shaped pedestals made of high-density polyethylene. The pedestals measure 7 inches across the flats and are 5/8 inch thick with integral spacer tabs that provide a 1/8 inch joint space

PHYSICAL PROPERTIES (Table 1)

Attribute	Value	Test Method
Hanover Guardian Pavers (relative strengths* @ 2 inch thickness)		
Compressive Strength	8,500 psi	
Absorption	< 5%	
Flexural Strength	1,100 psi	
Guardian Pedestal Assembly (high-density polyethylene properties)		
Tensile Strength	8,600 psi	ASTM D638
Tensile Elongation	3	ASTM D638
Flexural Strength	11,200	ASTM D790
Flexural Modulus	1,200,000	ASTM D790
Color Shift	< 1%	
UV Stabilized	Yes	

* Physical properties are based on standard mix design and can vary for custom mixes.

between pavers. These spacer tabs fit into the drainage grooves in the bottom of the Guardian Pedestal Base. The fixed-height pedestals may be used singularly or stacked together to elevate the Guardian Pedestal assembly beyond the 5/8 inch thickness of the Pedestal Base.
Hanover Leveling Shims – octagonal shaped shims made of high-density polyethylene. The shims are available in 1/8 inch and 1/16 inch thicknesses and may be used singularly or stacked to provide fine leveling adjustments of the pavers. The shims can be separated into halves or quarters.

Hanover Compensator – specially designed, circular base plate of high-density polyethylene. Each Compensator is tapered and can be used singularly or stacked together to provide slope adjustments from 1/8 inch to 1/2 inch in 12 inches. Compensators are placed beneath Hanover Fixed-Height or Guardian Pedestal assemblies.

Perimeter Metal Flashing – bent 0.080 gauge shop- or factory-fabricated aluminum flashing to be used as perimeter restraint of the Guardian Pavers. The metal flashing must be sized with vertical legs appropriate for the project conditions so that mechanical securement into the structure can be attained. Horizontal legs must be sized to provide minimum 3 inches coverage of the paver edges around the perimeter of the roof area (Fig. 4). The metal restraint must be installed along the outside perimeter of the roof, along interior building walls, and around penetrations larger than 4 feet in any one direction

3. Technical Data

Typical physical properties of Hanover Guardian Pavers and Pedestals can be found in Table 1.

4. Installation

Pre-Installation

Prior to the start of any project or placement of a material order, the project conditions must be evaluated to verify proper installation procedures. This evaluation will be required regardless of whether a special wind warranty will be provided.

A Building Wind Design Criteria Form must be completed by the installing contractor, project architect, engineer or consultant and submitted to American Hydrotech along with any additional project information requested – i.e., roof plans, section details, etc. This information will be submitted to Hanover Architectural Products and their wind consultants/engineers for evaluation of the paver design and any special installation requirements.

Pedestal and Paver Placement

Starting Point

Once approval/verification of the design is obtained, the installation of the Guardian Roof Paver System is essentially the same as a typical loose laid, open joint, pedestal installation of concrete pavers. The starting point and final elevation of the pavers will be determined by the desired paver layout. Finished elevation of the paver surface, slope of the deck, and all fixed points must be determined prior to beginning the layout. Review of the architectural drawings and design of the area should be accomplished by the installing the contractor to develop shop drawings that specifically layout the job locating all non-movable termination points, areas of cut pavers and the location of the starting point.

Just before the start of work, several items should be verified since as-built conditions can, and often do, vary from what is depicted on the drawings. Check all doorways, steps, curbs and all other fixed height termination points to verify that the finished paver surface meets each elevation as it should. Check the location of all drains or other items that will be hidden by the finished surface (i.e. conduits, ridges, valleys) to be sure they won't interfere with the placement of pedestals.

Centerline Layout

The first paver joint centerline should be established with a chalk line and then a second line running perpendicular to the first. The intersection of these "control lines" will be the starting point for the layout of the pavers. These two control lines, and any other important centerlines established throughout the course of work should be sprayed with a clear coat sealer to prevent them from being washed away.

From these control lines the centerlines for the joints of every row of pavers can be established, depending on the size of the pavers to be installed. The intersections of these lines will indicate the locations of paver pedestals.

Elevated Pedestals

The final height of the Guardian Pedestal assembly is determined by subtracting the paver thickness from the final finished elevation required. Hanover Fixed-Height Pedestals can be stacked together to accommodate up to 2 inches in height and placed underneath the Guardian Pedestal Base.

Hanover Leveling Shims, which can be cut into halves or quarters, can be placed underneath the pedestals or pavers for making minor elevation and leveling adjustments.

Note: Blocks of Dow STYROFOAM® PD, HI-60 or HI-100, minimum 8 inches square, can also be used underneath fixed-height or adjustable pedestals to provide further elevation of the pavers off the deck. Only whole manufactured thicknesses should be used. Never slice or trim STYROFOAM® blocks through in thickness that will be used as pedestals. (However, it is important to note that extruded polystyrene material, such as Dow STYROFOAM® brand insulation is made with various compressive strengths (i.e., PD & HI-60 = 60 psi; HI-100 = 100 psi). The design professional should review the use of extruded polystyrene, whether as whole-deck insulation or elevation blocks, where the in-service impact loads may exceed the compressive strength of the product. Vertical compressive strength is measured at 5% deformation or at yield, whichever occurs first. Since STYROFOAM® brand insulation is a visco-elastic material, adequate design safety factors should be used to prevent long-term creep. For static loads, a safety factor of 3:1 should be used. For dynamic loads, a safety factor of 5:1 should be used. The bearing area of the paver pedestal being used to set the pavers on the foam must be considered when reviewing the loads imposed on the Dow STYROFOAM®.

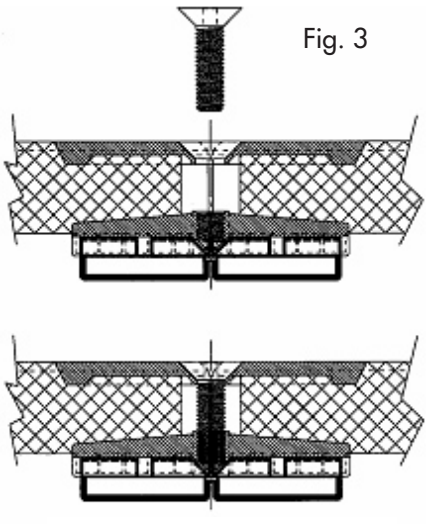
Slope Compensation

When a level paver installation on a sloped substrate is desired, the Hanover Compensator should be considered. Substrate slopes of 1/8 inch per foot can be leveled with one Compensator. For slopes 5/32 inch to 1/2 inch per foot, two or more Compensators will be required. Contact a Hydrotech representative for further information.

The Guardian Pedestal Base may be placed directly on the adjusted Compensator(s) or on stacked Hanover Fixed-Height Pedestals placed on top of the Compensator if additional elevation is necessary.

Guardian Pedestal Placement

Fig. 3



Place the Guardian Pedestal Base at the intersection of all guidelines and place pavers maintaining tight joints and a tight paver array. Once enough pavers have been set in an area, Guardian Top Plates can be set into the grooves in the corners of the pavers, one Top Plate at each corner. Thread a Guardian Bolt into each hole, tightening the Bolt just until "snug". (Fig. 3)

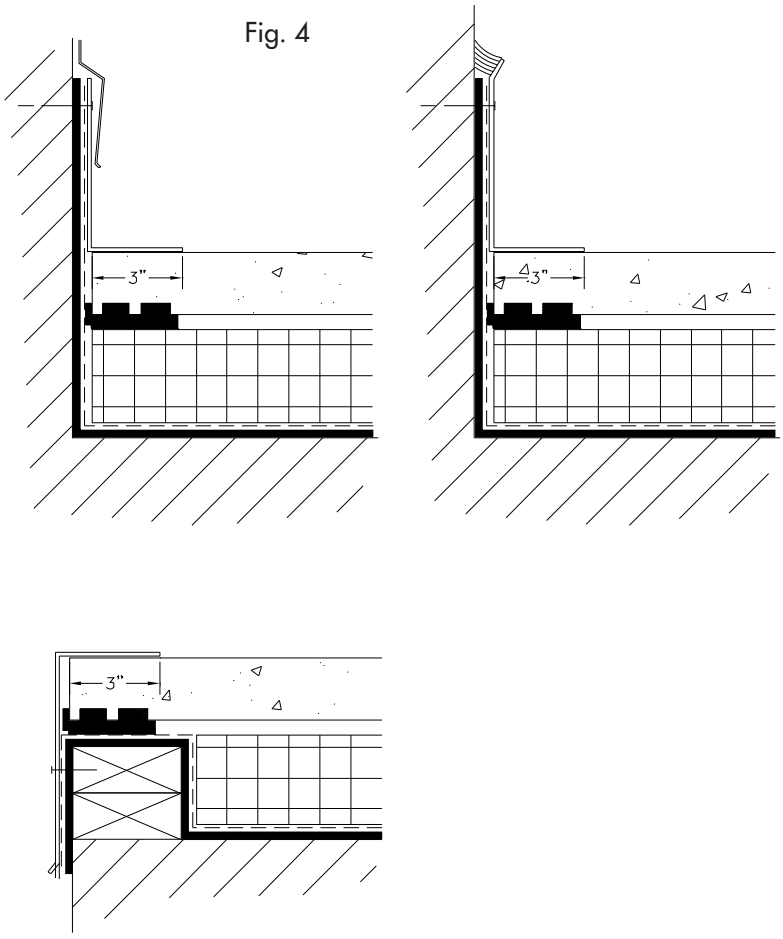
DO NOT OVERTIGHTEN the Bolt! Pavers may be cut to fit around the perimeters, penetrations, and other termination points.

Whether or not the pavers need to be cut at termination points, it will not be possible to install the Guardian Pedestal assembly at the paver termination points around the roof perimeter and at penetrations. Hanover Fixed-Height Pedestals should therefore be used to place the pavers and maintain the open joint assembly.

Perimeter Restraint (Fig. 4)
Since the Guardian Pedestal assembly cannot be installed unless four complete paver corners come together, the installed paver assembly must be covered/ restrained at all perimeters and around any penetration with at least one side measuring greater than 4 feet. The metal restraint flashing must restrain any potential vertical movement of the pavers around the perimeter.

The metal restraint flashing should be sized to allow securement of the vertical leg to the structure and the horizontal leg to cover the paver edge a minimum 3 inches. The vertical leg of the flashing can be fashioned such that it also acts as a termination bar for the termination of the roof membrane flashing. In lieu of this, a separate counterflashing should be installed to extend down over any fastener that penetrates the flashing.

Fig. 4



5. Availability and Cost
Information on the Guardian Roof Paver System is available through American Hydrotech's nationwide network of representatives. Cost quotations are only available after submission of the project parameters – size and location of the project, selected finish and color of pavers, etc. – to American Hydrotech.

Guardian Pedestal Base, Top Plates, and Bolts are available separately in 100 piece cartons.

6. Guarantees
When the Guardian Roof Paver System is supplied through American Hydrotech and used in conjunction with Hydrotech's Monolithic Membrane 6125® rubberized asphalt roofing membrane assembly a single-source warranty can be offered for the entire assembly. Hydrotech's Ultimate Warranties can include watertightness of the membrane, thermal integrity of the STYROFOAM® brand insulation, material integrity of the Hanover Guardian Pavers, and wind resistance of the paver assembly. Wind warranties are based upon evaluation of project parameters and Havover Building Wind Design Criteria Form.

7. Maintenance
Properly installed, the Guardian Paver System requires no maintenance. As a condition of the warranty, inspection of the roof system by the owner is required every six months to determine if repairs or other routine maintenance are necessary to ensure integrity of the system and perimeter restraint. Backed out or missing Pedestal Bolts, missing or damaged Top Plates or perimeter metal restraint, and/or damage to exposed roof flashing are some of the items that should be monitored.

8. Technical Services
Technical support is provided by a trained network of sales representatives and Hydrotech's Technical Services Department.

American Hydrotech, Inc.
303 East Ohio Street, Chicago, Illinois 60611
800.877.6125; 312.337.4998
312.661.0731 (fax)
www.hydrotechusa.com