GRO CONCRETE PAVERS ON PEDESTAL DECK SUPPORT SYSTEM

A. GENERAL

A.1 SECTION INCLUDES

A. Pedestal Deck Support System

B. Concrete Paver Units

C. Edge Restraints

A.2 RELATED SECTIONS

A. Section 06 50 00 - Structural Plastics

B. Section 06 52 00 - Plastic Structural Assemblies

C. Section 06 53 00 - Plastic Decking

D. Section 07 32 00 - Roof Tiles

E. Section 07 76 16 - Roof Decking Pavers

F. Section 32 10 00 - Bases, Ballasts, and Paving

G. Section 32 13 13 - Concrete Paving

H. Section 32 14 00 - Unit Paving

I. Section 32 14 13.13 - Interlocking Precast Concrete Unit Paving

J. Section: (-) - Curbs and Drains

K. Section: (-) - Aggregate Base

L. Section: (-) - Cement Treated Base

M. Section: (-) - Pavements, Asphalt and Concrete

N. Section: (-) - Roofing Materials

A.3 REFERENCES

A. ASTM D 635: Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position,

B. ASTM D 1929: Standard Test Method for Determining Ignition Temperature of Plastics

C. ASTM D 2843: Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics

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C. ASTM D 2843: Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics

D. ASTM D3161: Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method)

E. ASTM E 108: Spread of Flame Requirements for Class A Roof Coverings on Non-Combustile Decks

F. ASTM C 33, Specification for Concrete Aggregates

G. ASTM C 136, Method for Sieve Analysis for Fine and Coarse Aggregate

H. ASTM C 140, Sampling and Testing Concrete Masonry Units

I. ASTM C 144, Standard Specification for Aggregate for Masonry Mortar

J. ASTM C 936, Specification for Solid Interlocking Concrete Paving Units

K. ASTM C 979, Specification for Pigments for Integrally Colored Concrete

L. ASTM D 698, Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 5.5-lb Rammer and 12 in. (drop.

M. ASTM D 1557, Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 10-lb Rammer and 18 in.drop

A.4 DESIGN / PERFORMANCE REQUIREMENTS

A. General:
1. Provide a complete deck pedestal support system as indicated on the Drawings.
2. Deck pedestals specified are to be for used with pedestrian traffic only. Decks shall not be exposed to any wheeled motorized or equipment traffic.
3. Decks must be restrained by perimeter blocking or walls on all sides. Lateral movement greater than one-tab width is unacceptable and will be rejected.
4. Installation or anticipated installation of additional items on top of the deck, (such as planters, concrete benches, sculptures, hot tubs, grills, or industrial equipment) shall be supported directly by additional pedestals in addition to the main deck paver/tile pedestal system.
5. Include special consideration when installing equipment that vibrates.
6. Calculate total weights and dispersed evenly over the number of pedestals needed to carry the expected weight.
7. To avoid point loading, the use of planters or architectural features with 'feet' is not allowed.
8. Failure to adequately support the additional weight of any such features or items may cause significant damage to the deck, underlying structure, or waterproofing system.
9. All decks shall be designed to not exceed the design capacity of the pedestal.
10. Substrate immediately below the pedestals shall have slope and provide positive and adequate drainage in accordance with good building practice and applicable building codes.

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B. Decks over roofing and waterproofing:
   1. Roof systems must meet local building code and be in accordance with the NRCA recommended good construction practices. Only roofing manufacturer approved systems shall be used.
   2. If high density closed cell extruded 60 psi polystyrene insulation is installed on top of the membrane in a protected membrane system, GRO Pedestals may be installed directly on top of this type of insulation.
   3. Do not use GRO Pedestals over any insulation less than 20 psi or with low density polystyrene (bead board) insulation.

C. Decks over roofing and waterproofing:
   1. Any substrate that is to receive pedestals shall be adequately compacted and have positive drainage slope.
   2. Provide a wall or perimeter containment on all open sides. Install structural perimeter containment that restrains the entire decking system.

1.1 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods and instructions.
   4. Cleaning and maintenance instructions.

C. Shop Drawings: Submit shop drawings showing all components required for the pedestal systems, structural grate, and artificial turf requirements. Include plan drawings showing layout and detail drawings showing how the various components of the system fit together. Show deck materials used, pattern, grid layout, starting point, and finished elevation.

D. Structural Analysis: Provide confirmation of the structural capability and adequacy of the structure to carry the dead and live load weight(s) required, to be provided by Structural Engineer.

E. Verification Samples: For each finish product specified, a sample representing actual product, color, and patterns.

F. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic cleaning, adjustments and maintenance of components

1.2 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum of 10 years’ experience manufacturing deck supports and tile systems.

B. Installer Qualifications: Installer must have a minimum of 2 years proven construction experience for projects of a similar type and scale. All work must comply with the manufacturer's installation instructions and procedures for deck support work specified herein.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and installation workmanship.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
   3. Refinish mock-up area as required to produce acceptable work.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging with labels intact and legible. Concrete Pavers should be delivered in steel banded, plastic banded, or plastic wrapped cubes on wooden pallets capable of transfer by fork lift. Inspect all delivered materials to insure they are undamaged and in good condition.

B. Store products under cover in manufacturer's unopened packaging until ready for installation.

C. Store concrete pavers out of direct sunlight, rain, or snow. Kept clean, dry, and off the ground prior to installation. A moisture barrier should be placed on the ground under the pavers to prevent water cycle inside the packaging while stored on site.

D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.4 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Do not install sand or pavers during heavy rain or snowfall, nor over frozen base materials.

1.5 SEQUENCING AND SCHEDULING

A. Conference: Convene a pre-installation conference to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

1.6 WARRANTY

A. Pedestal system manufacturer and structural grate manufacturer shall warrant the materials to remain free from defects for a period of three years. Concrete paver manufacturer shall warrant the materials to remain free from defects for a period of twenty years.

B. Contractor shall warrant the work remain free from defects of labor and materials in conjunction with his work in accordance with the General Condition for this Project for a maximum of two years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Greenrise Technologies, which is located at: 1500 Medical Center Pkwy Murfreesboro, TN 37129; (615)-907-67460; Email: info@greenroofoutfitters.com; Web: www.greenrisetech.com

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 APPLICATIONS/SCOPE

A. GRO Pedestals support a maximum cavity height of 39 inches with additional bracing. Pedestal supports are not designed for supporting decks that carry vehicular traffic or equipment including but not limited to snow removal equipment, ATV's, forklifts, or any motorized vehicles. Consult the Manufacturer and the Project Engineer regarding the following conditions:
   1. When spacer tab condition or design requires spacing between decking tiles other than the standard spacing required by the manufacturer.
   2. When considering use for other than a raised deck (e.g. interior floors, stairs, etc.).
   3. When the required pedestal height exceeds the safe limits as determined by the Manufacturer.
   4. When pedestal load capacity exceeds the maximum listed.
   5. When anticipating installation of any items with excess weight on top of the deck.
   6. When using GRO's Supports on grade (soil).
   7. When greater pedestal load capacity is required.

2.3 PEDESTAL SUPPORT SYSTEM

A. GRO Adjustable Pedestals with Fixed Head:
   1. Material: Mineral Filled High Density Copolymer Polypropylene. Contains 99%percent post-industrial recycled material
   2. Weight Bearing Design Capacity: > 3000 lbs. per pedestal.
   3. Supporting Base:
      a. Surface Area: 49 square inches
      b. Four holes for drainage and/or mechanical attachment
   4. Model/Adjustable Height Range:
      a. Model GRO 1: 1.25 inch - 1.75 inch
      b. Model GRO 2: 1.875 inch - 2.875 inch
      c. Model GRO 3: 2.625 inch – 4.25 inch
      d. Model GRO 4: 3.75 inch - 6.625 inch
      e. Model GRO 5: 6.125 inch – 11.125 inch
      f. Model GRO Extension: 5 inch – 5.7 inch
      g. Model GRO Slope Compensator: Compensates 0 - 1 percent Slope

B. GRO Adjustable Low Clearance Pedestals:
   1. Material: Mineral Filled High Density Copolymer Polypropylene. Contains 99% post-industrial recycled material
   2. Weight Bearing Design Capacity: 2,505 lbs. per pedestal.
   3. Supporting Base:
      a. Surface Area: 49 square inches
      b. Four holes for drainage and/or mechanical attachment
   4. Model/Adjustable Height Range:
      a. Model: GRO Low Clearance Pedestal 3/8 inch - 9/16 inch
      b. Model: GRO Low Clearance Riser: 3/16 inch (as ext. for Low Clear Ped.)

C. GRO Fixed Low Clearance Pedestals:
Material: SBS recyclable rubber
a. Model: Low Clearance 1/16 inch tall Rubber Stackable (Maximum qty 2 allowed)
b. Model: Low Clearance 1/4 inch tall Rubber Stackable (Maximum qty 2 allowed)
c. Model: Low Clearance 3/8 inch tall Rubber Stackable (Maximum qty 2 allowed)

2. Material: Polypropylene. Contains 99% post-industrial recycled material.
a. Model: Low Clearance Fixed 1/2 inch tall Fixed Head Stackable (Maximum qty 2 allowed)
b. Model: Low Clearance Fixed 5/8 inch tall Fixed Head Stackable (Maximum qty 2 allowed)
c. Model: Low Clearance Fixed 3/4 inch tall Fixed Head Stackable (Maximum qty 2 allowed)

C. GRO Pedestal Shims:
a. Model: 1/16 inch thick, 4 inch diameter
b. Model: 1/8 inch thick, 4 inch diameter
c. Model: 1/8 inch thick Leveling Disc, 6 inch diameter

2.4 CONCRETE PAVER UNITS

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B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

D. Product: name(s)
shape(s),
color(s),
overall dimensions of the paver(s)

E. Furnish pavers meeting the following requirements:
a. Compressive Strength: Average compressive strength of 55 MPa (8,500 psi) with no individual unit under 50 MPa
b. Absorption: Average absorption of less than 5% - tested in accordance with ASTM C 140
c. Flexural Strength: The paver stones have an average flexural strength of 870 PSI - tested in accordance with NCMA testing procedures min. required strength 650 psi
d. Freeze-Thaw Durability: Less than 1% weight loss – ASTM C 1262
e. Weight: 24.5 lbs./sq. ft. based 2” on standard thickness
f. Cement: Portland Cement conforming to ASTM C 150
g. Pigments: Use pigment conforming to ASTM C 979

2.5 EDGE RESTRAINTS

Note: Edge Restraints of various types.

A. Concrete, plastic, wood, ans/or metal. Any that will restrain the pavers from moving laterally.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Substrate must be clean and free of projections and debris that could impair the performance of the pedestals or the total deck system.

C. Verify all elevations, required pedestal heights and deck dimensions before commencing work.

D. Verify that aggregate base materials, thickness, compaction, surface tolerances, and elevations conform to the specifications.

E. Verify that geotextiles, if applicable, have been place according to specifications.

F. Note: For installation on a compacted aggregate base and soil subgrade, the specifier should be aware that the top surface of the pavers may be 3 mm (1/8") above the final elevations after installation. This difference in initial and final elevation is to compensate for possible minor settling.

G. Verify that subgrade preparation, compacted density and elevations conform to the specifications. Note: Compaction of the soil subgrade to at least 95% Standard Proctor Density per ASTM D 698 is recommended. Stabilization of the subgrade and/or base material may be necessary with weak or saturated subgrade soils.

H. The Architect/Engineer should inspect subgrade preparation, elevations, and conduct density tests ir conformance to specifications.

I. If substrate preparation is the responsibility of another \nstaller, notify Architect of unsatisfactory preparation before proceeding.

Note: Local aggregate base materials typical to those used for flexible pavements are recommended, or those conforming to ASTM D 2940. Compaction to not less than 95% Proctor Density in accordance with ASTM D 698 is recommended for pedestrian areas. The aggregate base should be spread and compacted in uniform layers not exceeding 150 mm (6 in.) thickness. Recommended base surface tolerance should be plus or minus 10 mm (3/8 in.) over a 3 m (10 ft.) straight edge.

Note: Mechanical tampers are recommended for compaction of soil subgrade and aggregate base around lamp standards, utility structures, building edges, curbs, tree wells and other protrusions. In areas not accessible to roller compaction equipment, compact to specified density with mechanical tampers.

Note: Mechanical plate compactors are not to be used on architectural paving stones.

3.2 PREPARATION

A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

B. Clean surfaces thoroughly prior to installation

C. Establish accurate lines, levels, and patterns.

D. Verify that substrate to receive deck supports is structurally capable of carrying the dead and live loads anticipated.

E. Verify location, type, installation of edge restraints around elevations of edge restraints around the perimeter area to be paved.

F. Install edge restraints per the drawings [and manufacturer's recommendations at the indicated elevations.

G. Verify that base is dry, uniform, even, and ready to support sand, pavers, and imposed loads.

H. Beginning of bedding sand and paver installation means acceptance of base and edge restraints.

3.3 INSTALLATION, PEDESTALS

A. Install in accordance with manufacturer's instructions.

B. Grid Layout and Elevations:

1. Once the starting point and the finished elevation of the deck surface have been determined, the "Top of Pedestal Elevation" (finished elevation less decking paver or tile thickness) shall be established and marked around the perimeter using a transit water level or laser leveling device.
2. Precise measurements shall be taken, and deck area should be accurately defined. Mark off and square up all outside edges with control lines using snapped chalk lines. Mark two lines that are perpendicular to each other across the deck area. Continue to mark a grid of lines in both directions marking the location of each pedestal. Use the control lines as references to periodically check and assure a square layout during installation.
3. Pedestals shall be placed where each measured grid line meets the perimeter. Remove two spacer tabs in line with one another atop each pedestal system placed around the perimeter. Remove all four spacer tabs at corners.
4. Adjust each pedestal height to the top of pedestal elevation marked on the perimeter. Position the pedestal as close to the edge of the perimeter as possible, with the two remaining spacer tabs aligned with the grid line. Using the elevation marked on the perimeter, stretch a mason's line along and slightly ahead of the second row of pedestals. A laser leveling device may also be used for this purpose.
5. On larger decks, it is recommended that pedestal system be pre-assembled and pre-set to the proper elevation and placed in position prior to the installation of decking paver or tile.
6. As the pedestals located along the grid lines are loaded with pavers or tiles, fine vertical height adjustment can be made by turning. Clockwise rotation of the base will raise the bearing surface and the deck. Counter-clockwise rotation of the base will lower the bearing surface and deck.
7. Maintain adequate thread engagement. Pedestal inserts contain a screw block system that indicates when units have safely reached their maximum height adjustment. If the height required goes beyond the insert limit, select the appropriate pedestal configuration to facilitate height adjustment within safety limits.
8. Slight irregularities in decking paver or tile thickness shall be compensated for by using one to two shim segments. Place on top of the pedestal, under the corners of the decking paver or tile. Use no more than two shims on top of the pedestal and always adhere quartered wedges with construction adhesive.
9. Stackable pedestals may be used for limited and or fixed height requirements up to 1.25 inch. Complete deck and grid layout as specified. Stack no more than two fixed height stackable pedestals together and place in lieu of adjustable pedestals where needed. Spacer tabs can be removed, or pedestals can be segmented to accommodate perimeter and corner support locations.

C. Slope and Height Compensation:
   1. Stackable pedestals can be used to provide limited slope and height compensation to maintain a level decking surface over sloping substrates using a combination of pedestals and shims.
   2. Pedestals shall be designed to be rotated for final precise adjustment when they are fully loaded. Pedestals shall be leveled in each succeeding row as the installation proceeds.
   3. Use shims in multiples, whole or quarters, and placed under the pedestal base or on top the pedestal cap to level pedestals. Use a small amount of construction adhesive to adhere sections of shims and/or whole shims to each other or to the pedestal. Do not use construction adhesive to adhere pedestal or shims to insulation, roofing, or waterproofing membrane. Additional sections of shims may be used and should be available for regular maintenance.

3. 2 PERIMETER CONTAINMENT

A. Areas of the pedestal deck that is not restrained by a parapet or foundation wall shall be boxed-in and contained to prevent movement. Install perimeter framing and edging boards at the outside of the deck perimeter to provide restraint. Movement at the perimeter of the deck system greater than one tab width is not allowed.

3.3. FIELD QUALITY CONTROL

A. Inspect often during installation to assure that grid spacer lines are being maintained in a straight and consistent pattern and that deck pavers or tiles are level and not rocking. Unless otherwise specified in writing to allow for expansion, inspect to assure that all paver spacing between tiles and at perimeter walls does not exceed a tab width.
B. Assure that all pedestrian entry or access points to the deck are level and that the deck surface tiles are not randomly raised or uneven creating a tripping or safety hazard.
C. Confirm that deck pedestal height excess of sixteen inches have been braced in accordance with manufacturer's written instructions.

3.4 INSTALLATION: CONCRETE PAVER UNITS

SAND SET PAVERS

A. Spread the sand evenly over the base course and screed to a nominal 25 mm (1 in.) thickness, not exceeding 40 mm (1.5 in.) thickness. The screened sand should not be disturbed. Place sufficient sand to stay ahead of the laid pavers. Do not use the bedding sand to fill depressions in the base surface.
B. Ensure that pavers are free of foreign material before installation.
C. Lay the pavers in the pattern(s) as shown on the drawings.
D. Maintain straight pattern lines.
E. Pavers shall be laid hand tight.
F. A rubber mallet shall be used to adjust the pavers into final position
G. Fill gaps at the edges of the paved area with cut pavers.
H. Cut pavers to be placed along the edge with a masonry saw.
I. The final surface elevations shall not deviate more than 10 mm (3/8 in.) under a 3 m (10 ft.) long straightedge.
J. The surface elevation of pavers shall be 3 to 6 mm (1/8 to 1/4 in.) above adjacent drainage inlets, concrete collars or channels

Note: Do not use a plate or any other compactor on the pavers all adjustments are to be made by hand or a rubber mallet only.

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PORTLAND / MORTAR SET PAVERS

A. It is recommended that the pavers should have a concrete subbase of 4” minimum. The top elevation of the concrete subbase shall be no more than 2 ½” from final paver elevation.
B. Portland and bedding sand mixed at a ratio of 3 parts sand to 1 part Portland. This shall mixed with water to form a mix typical of that which is used in laying brick.
C. Place the pavers hand tight on the wet mortar and tamp into place.

Note: It may be necessary to pre-wet the back of the paver prior to installing it. Consult manufacturer for further information in installation.

PEDESTAL SET PAVERS

A. Pavers set on pedestal or otherwise corner/edge supported should have a minimum of 2" support. If a paving unit has a crack present it not be replaced. These pavers are designed to support pedestrian traffic. They are not designed to handle any type of vehicular traffic. Pedestal must be provided by Greenrise Technologies. No substitutions acceptable.

TOLERANCES

These paver stones are hydraulically pressed to create a high density concrete unit and are manufactured to 1/8” tolerance in any direction.

FINISH

Our “Antique” finish is design to give the paver stones a look and feel of natural stone for an architectural appearance.

This finish exposes the stone showing the natural matrix of the paver. All paver stones have beveled edges.

END OF SECTION