Guide Specifications for the Construction of Porcelain Pavers on Roof Top Decks
Section 077616

This guide specification is for manually installed porcelain paver application on both fixed height and fully adjustable pedestals in the U/S. and Canada. This document should be edited to fit project conditions and geographic climatic conditions. Brackets [ ] indicate text for editing. Coordinate all Sections with the General Conditions of the Contract.

Part 1: General

1.01 Section Includes

A. Porcelain pavers
B. Deck pedestals

1.02 Related Sections

A. Section 042200 - Concrete Unit Masonry
B. Section 044000 - Stone Assemblies
C. Section 061500 - Wood Decking
D. Section 065000 - Structural Plastics
E. Section 067300 - Structural Composites
F. Section 075000 - Membrane Roofing
G. Section 077246 - Roof Walkways
I. Section 077600 - Roof Pavers
H. Section 093013 – Ceramic Tiling
J. Section 096900 - Access Flooring

1.03 References

A. ASTM C 1161 - Flexural Strength of Advanced Ceramics
B. ASTM C 650 - Resistance of Ceramic Tile to Chemical Substances
C. ASTM C 1026 - Resistance of Ceramic and Glass Tile to Freeze-Thaw Cycling
D. ASTM C 373 - Water Absorption
E. ASTM E303 - British Pendulum Skid Resistance
F. ANSI A326.3 – Dynamic Coefficient of Friction (previously referenced as ANSI A137.1)

1.04 Submittals

A. Submit in accordance with Contract and Division 1 Submittal Procedures Section 013000
    1. Shop drawings showing layouts, color, sizes and sections
    2. Manufactures product data and description sheets
    3. [Four] representative samples
    4. Delivery, storage and handling requirements and recommendations
    5. Manufactures installation instructions and applicable details
    6. Applicable warranties
    7. Test results from an accredited independent test facility
        i. ASTM C373 – Absorption
        ii. ASTM C650 – Chemical Resistance
        iii. ASTM C1026 – Freeze / Thaw Resistance
        iv. ASTM C1161 – Flexural Strength
        v. ASTM E303 – British Pendulum Skid Resistance
        vi. ANSI A326.3 – Dynamic Coefficient of Friction (previously referenced as ANSI A137.1)

1.05 Quality Assurance

A. Installer Qualifications
    1. Must show successful completion of similar sized projects
    2. Must be capable of estimating and installing from blueprint plans and details
    3. Must know how to properly handle and store materials being used
    4. Must conform to all local and state licensing and bonding requirements

B. Mock-Ups
1. Install a 4 ft. by 4 ft. paving area
2. This area will be used as the standard by which the work will be judged and accepted
3. Subject to the acceptance of the owner, mock-up area may be retained as part of finished work.
4. If mock-up is not retained, mock-up material is to be removed.

Note: A site visit and approval by the owner's representative during the first day of installation may substitute for a mock-up

1.06 Delivery, Storage and Handling
A. Deliver materials to project site in the original packaging with the manufacture's labels intact and legible
B. Inspect all materials to ensure they are undamaged and in good condition
C. Store materials in a clean, dry and protected location
D. Ensure waterproofing membrane is not damaged while delivering, storing or handling material

1.07 Project Conditions
A. Do not install during heavy rain or snowfall
B. Do not install over frozen base material
C. Deck supports specified are to be for used with pedestrian traffic only.
D. Pedestrian 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.
E. Installation or anticipated installation of additional items on top of the deck, (such as planters, concrete benches, sculptures, hot tubs, grills, or industrial equipment) must be properly supported. Special consideration must be also given when installing equipment that vibrates. Total weights must be calculated and dispersed evenly to carry the expected weight. To avoid point loading, the use of planters or architectural features with 'feet' is not allowed. Failure to adequately support the additional weight of any such features or items may cause significant damage to the deck, underlying structure, and /or waterproofing system.
F. All decks shall be designed to not exceed the design capacity of the pedestal.
G. The substrate immediately below the pedestals shall provide positive drainage.
H. In the case of decks over roofing substrates, 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.
I. Decks over roofing and waterproofing:
1. If integral roof insulation is installed immediately below the membrane, the type and density of the insulation is of utmost importance. Roofing systems having "common" insulations with a medium density of 20 psi must also use either a recovery board or Bison Floating Insulation Bases (FIB). FIB's are installed immediately below the ScrewJack Pedestals to disperse the deck load.
2. If high density closed cell extruded (40 psi minimum) polystyrene insulation is installed on top of the membrane in a protected membrane system, ScrewJack Pedestals may be installed directly on top of this type of insulation.
3. Do not use ScrewJack Pedestals over any insulation less than 20 psi or with low density polystyrene (bead board) insulation.

Part 2: Products

2.01 Supplied By
A. Oldcastle Architectural Products Group
400 Perimeter Center Terrace NE
Suite 1000
Atlanta, GA 30319
(844) 495-8210

B. Substitutions: Not permitted

2.02 Porcelain Paver

A. Product name(s) and overall dimensions. Note to specifier; select specific color(s)

- Ardesie [Shore], [Island], [African Stone], [Black Reef], [Vulcan]
  - 23.62” x 23.62” x .75” (60cm x 60cm x 2cm)
- Esprit [Cremo Delicato], [Pietra Piasentina], [Lagos Grey], [Crema Luna]
  - 23.62” x 23.62” x .75” (60cm x 60cm x 2cm)
  - 23.62” x 47.24” x .75” (60cm x 120cm x 2cm)
- Na.Me [Jura Beige], [Bourgogne], [Ocean Grey], [Swiss Grey], [Lumnezia], [Noir Belge], [Gris Belge], [Noisette Belge]
  - 23.62” x 23.62” x .75” (60cm x 60cm x 2cm)
  - 23.62” x 47.24” x .75” (60cm x 120cm x 2cm)
  - 11.81” x 47.24” x .75” (30cm x 120cm x 2cm)
  - 17.71” x 35.35” x .75” (45cm x 90cm x 2cm)
- Norr [Vit], [Gra], [Svart]
  - 23.62” x 23.62” x .75” (60cm x 60cm x 2cm)
  - 35.43” x 35.43” x .75” (90cm x 90cm x 2cm)
- Officine [Acid], [Romantic], [Dark], [Gothic]
  - 23.62” x 23.62” x .75” (60cm x 60cm x 2cm)
- Quartziti 2.0 [Glacier], [Mountains], [Waterfall], [River], [Mantle]
  - 23.62” x 23.62” x .75” (60cm x 60cm x 2cm)
  - 11.81” x 47.24” x .75” (30cm x 120cm x 2cm)
  - 23.62” x 47.24” x .75” (60cm x 120cm x 2cm)
- Stones 2.0 [Chambrod], [Pierre Bleue], [Pierre Bleue Sablee]
  - 23.62” x 23.62” x .75” (60cm x 60cm x 2cm)
  - 23.62” x 47.24” x .75” (60cm x 120cm x 2cm)
  - 35.43” x 35.43” x .75” (90cm x 90cm x 2cm)
- Nau 2.0 [Fado], [Indie], [Zen]
  - 23.62” x 23.62” x .75” (60cm x 60cm x 2cm)
  - 11.81” x 47.24” x .75” (30cm x 120cm x 2cm)
- Signature [Artico], [Havana], [Dakota]
  - 11.81” x 47.24” x .75” (30cm x 120cm x 2cm)
- Sundeck [Orgin], [Classic], [Spirit]
  - 23.62” x 23.62” x .75” (60cm x 60cm x 2cm)
  - 11.81” x 47.24” x .75” (30cm x 120cm x 2cm)

B. Porcelain paver products must meet the following technical standards as verified by an accredited independent test facility:

1. Chemical resistant as tested in accordance with ASTM C650
2. Minimum BPN of 42 as tested in accordance with ASTM E303
3. Minimum DCOF of 0.42 as tested in accordance with ANSI A326.3 (previously referenced as ANSI A137.1)
4. Water absorption shall not exceed 0.05% as tested in accordance with ASTM C373
5. Freeze thaw resistant in accordance with ASTM C1026
6. Breaking strength to be minimum 3,000 lbf in accordance with ASTM C648
7. Flexural strength to be minimum 6,000 psi in accordance with ASTM C1161

C. Porcelain paver trays

1. Dimensions: 23.43”L x 23.43”W x 0.35”H (595 x 595 x 9 mm)
2. Paver Size: Fits 595-603 x 595-603 mm pavers
3. Weight: 6.02 lbs (2.73 kg)
4. Component Materials:

- G90 Galvanized 20 ga Sheet Steel – LEED Information--contains approximately: 55.2% Scrap Steel; 41.3% Alloys and other Iron Units; 37.2% Post-Consumer Recycled Content; 18.0% Pre-Consumer Recycled Content
- Polyurethane Adhesive Sealant – Color: Grey; VOC Content: 29.0 g/l; Service Temperature: -40°F-194°F; Specific Gravity: 1.17 g/cm3; Tack-Free Time @73°F and 50% Relative Humidity: 50-90 minutes; Rate of Cure @ 73°F and 50% Relative Humidity: 3/16 in per 24hrs; Shore A Hardness ASTM C661: 45; Tensile Strength ASTM D412: 450 psi; 100% Modulus ASTM D412: 150 psi; Weight: 0.12 lbs

2.03 Edge Restraints

A. Edge restraints shall be timber, plastic, concrete, aluminum, steel or concrete and shall conform to installation details.

2.04 Pedestals

A. Typical Height Range 0-21 + inches
B. Weight Bearing Design Capacity 1000 lbs./pedestal FS:3
C. Integral spacer tabs
D. Material: Mineral Filled High Density Copolymer Polypropylene. Contains 20% Postindustrial recycled material.
E. SE Self-leveling Adjustable Support Deck Pedestals:
1. Material: Mineral Filled High Density Copolymer Polypropylene. Contains 100 percent Post-industrial recycled material.
2. Weight Bearing Design Capacity: 2505 lbs per pedestal.
3. Supporting Base:
    - Surface Area: 49.6 square inches (320 sq. cm.).
    - Four 1/4 inch (6 mm) diameter holes for drainage and / or mechanical attachment.
4. Self-Leveling Head: 5/32 inch (4 mm) thick plate and compensates gradients of up to 5 percent
5. Model / Adjustable Height Range:
6. Model Star T: 3/8 inches to 9/16 inches (10-15mm)
    - Model Start B: 3/16 (5mm) extension for the Star T (Maximum qty 3 allowed)
    - Model SE0: 1.125 inches to 1-1/2 inches (28 mm – 38 mm).
    - Model SE1: 1-1/2” inches to 2 inches (37.5 mm – 50 mm)
    - Model SE2: 2 inches to 3 inches (50 mm – 75 mm).
    - Model SE3: 3 inches to 4-3/4 inches (75 mm – 120 mm).
    - Model SE4: 4-3/4 inches to 6-3/4 inches (120 mm – 170 mm).
    - Model SE5: 6-3/4 inches to 8-1/2 inches (170 mm – 215 mm).
    - Model SE6: 5-1/2 inches to 9 inches (140 mm – 230 mm).
    - Model SE7: 7-1/4 inches to 10-3/4 inches (185 mm – 275 mm).
    - Model SE8: 9-1/4 inches to 12-3/4 inches (235 mm – 325 mm).
    - Model SE9: 8 inches to 13-1/2 inches (205 mm – 345 mm).
    - Model SE10: 9.875 inches to 15 inches (250 mm – 385 mm).
    - Model SE11: 11-3/4 inches to 15-3/4 inches (300 mm – 400 mm).
    - Model SE12: 10-1/2 inches to 18 inches (270 mm – 455 mm).
    - Model SE13: 12.4 inches to 19-3/4 inches (315 mm – 500 mm).
    - Model SE14: 14-1/4 inches to 21-3/4 inches (365 mm – 550 mm).
7. Alternative Head options:
    - Wood Joist Head
    - Locking Piece for Fixed Head
    - Pins for IPE Wood Paver Applications

F. NM Adjustable Supports with Fixed Head
1. Material: Mineral Filled High Density Copolymer Polypropylene. Contains 100 percent Post-industrial recycled material.
2. Weight Bearing Design Capacity: 3300 lbs per pedestal.
3. Supporting Base:

4. Surface Area: 49.6 square inches (320 sq. cm.).
5. Four 1/4 inch (6 mm) diameter holes for drainage and / or mechanical attachment
    - Model NM1: 1 inch – 1.57 inch (25-40 mm)
    - Model NM2: 1.57 inch – 2.75 inch (40-70 mm)
    - Model NM3: 2.36 inch – 3.93 inch (60-100 mm)
    - Model NM4: 3.54 inch – 6.30 inch (90-160 mm)
    - Model NM5: 5.90 inch – 10.63 inch (150-270 mm)
    - Model P NM: NM Extension 5 inch (165 mm)
    - Model Slope Compensator: Compensates 0 – 1 percent Slope
    - Model NM Head: XL 6 inch Fixed Head.

G. Fixed Pedestal Supports:

1. Material Mineral Filled High Density Copolymer Polypropylene. Contains 100 percent post-industrial recycled material.
    - Model: EH12 1/2 inch (12 mm) tall Fixed Head Stackable (Maximum qty 2 allowed)
    - Model: EH15 5/8 inch (20 mm) tall Fixed Head Stackable (Maximum qty 2 allowed)
    - Model: EH20 3/4 inch (20 mm) tall Fixed Head Stackable (Maximum qty 2 allowed)
2. Fixed EPDM Rubber Pedestal Supports
3. Material: SBS recyclable rubber
    - Model: RUB14 1/4 inch (6mm) tall Fixed Head Stackable (Maximum qty 2 allowed)
    - Model: RUB38 3/8 inch (10mm) tall Fixed Head Stackable (Maximum qty 2 allowed)
4. Alternative Head Options:
    - Pins for IPE Wood Paver Applications

H. Shims:

1. Model: LGH2 1/16 inch (2 mm) thick, 4 inch diameter
2. Model: LGH3 1/8 inch (3 mm) thick, 4 inch diameter
3. Model: LH3 Leveling Disc 1/8 inch (3 mm) thick, 6 inch diameter

Part 3: Execution

3.01 Inspection

A. Pedestals are smooth, sound, clean and free of irregularities
B. Related work penetrating the plane of the roof is completed (i.e. roof membrane)
C. Verify that the deck will sustain the weight of the paver system
D. Verify dimensions, elevations and pedestal heights before commencing work
E. Verify full perimeter containment is present and secure
F. Do not commence paver application until unsatisfactory conditions are satisfied

3.02 PREPARATION

A. Clean and prepare deck in accordance with manufacturer's instructions.
B. Establish visual pattern with accurate lines and levels.

3.03 INSTALLATION (requirements for installation are dependent upon individual project needs).

A. First, determine a starting point; this will be largely dependent on where less than full size pavers are to be used.
B. If partial paver at perimeter is necessary, begin installation of full pavers at the second row in the roof field.
C. Mark perpendicular guidelines on substrate surface to ensure square layout
D. Establish a grid pattern using chalk lines. If the Level System is used, use a laser leveling device or a mason's line stretched from opposite sides to select the correct model of ScrewJack Adjustable Pedestal.
E. Install initial pavers along guidelines forming a "T" pattern.
F. Fine tune adjustments to the paver surface can be made by using the pedestal shims.
G. Any section of the roof that receives pavers that is not restrained by an abutting wall or parapet must be "boxed in" by some field installed restraint.

1. No movement should be allowed at the perimeter of the paver system greater than 3/16”

3.04 FIELD QUALITY CONTROL

A. The final surface tolerance from grade elevations shall not deviate more than + / - 3/8” over 10’
B. Check final surface elevations for conformance to drawings
C. Lippage shall be no greater than 1/8” difference in height between adjacent porcelain paver

3.05 CLEANING

A. During the course of the work and on completion, remove any cut dust from the surface of the pavers by means of high-pressure water or air; cut dust can and will discolor pavers if left unattended. Extreme care should be taken when using high-pressure water to avoid potential damage when used in a concentrated area.
B. Cleaning agents can be used as long as they are approved by the membrane manufacture. Oldcastle assumes no responsibility for damage caused to the pavers or membrane as a result of cleaners used.
C. Clean surface of paver using a broom or brush
D. Once cleaned, rinse the pavers completely
E. Pavers can be easily removed from their existing locations by using an extractor; this will allow easy access for repairs or cleaning of the substructure.