

SECTION 077600

ROOF PAVERS AND PEDESTALS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide labor, materials and equipment necessary to complete the work of this Section, including the following:
 - 1. Wood decking, deck tiles, pedestals and accessories.
- B. Related Work: The following items are not included in this Section and will be performed under the designated Sections.
 - 1. Section 071300 - SHEET WATERPROOFING for substrate.
 - 2. Section 075000 - MEMBRANE ROOFING for substrate.
 - 3. Section 06150 – Wood Decking
 - 4. Section 07720 – Roof Walkways
 - 5. Section 07760 – Roof Pavers
 - 6. Section 09690 – Access Flooring
 - 7. Section 02780 – Unit Pavers
- C. Reference Standards: Comply with applicable requirements of the following:
 - 1. ASTM D143 – Standard Test Methods for Small Clear Specimens of Timber.
 - 2. ASTM E84-16 – Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 3. CSFM 12-7A-4 Materials and Construction Materials for Exterior Wildlife Exposure: Decking
 - 4. ANSI B101.1 – Test method for Measuring Wet Static Coefficient of Friction (SCOF) of Common Hard-Surface Floor Materials.
 - 5. ANSI A137.1 section 9.6 – Testing Method for Wet Dynamic Coefficient of Friction (DCOF) of Common Hard Surface Floor Materials.
 - 6. U.S. Lacey Act.
 - 7. U.S. Buy American Act.
 - 8. U.S. Foreign Corrupt Practices Act
 - 9. FSC STD-01-001

1.2 SUBMITTALS

- A. Submittals: Submit under provisions of Division 01.
- B. Product Literature: Manufacturer's product literature describing all components. Include installation recommendations and instructions.
- C. Verification Samples: For each type of pedestal component and deck tile.
- D. Shop Drawings: Detail paver and pedestal assemblies. Include plan drawings showing layout of pavers. Include pattern, grid layout, starting point and finish elevations.

- E. Certificates of Compliance: Submit documentation of certifications and agency approvals listed in Paragraphs 2.3G and 2.3H.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Products covered under this Section shall be produced by a single manufacturer unless otherwise specified with a minimum of fifteen years proven production experience.
- B. Installer Qualifications: Installer shall have a minimum of three years proven construction experience and be capable of estimating and building from drawings and details, determining elevations, in addition to proper material handling.
- C. Special Consideration: The installer and or subcontractor must assume the responsibility for and take into consideration the structural capability and adequacy of the structure to carry the dead and live load weights involved, and that the density of any insulation is satisfactory to resist crushing and damaging of the roof pavers and pedestals.
- D. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect pavers and pedestal system during shipment, storage and construction against damage.
- B. Store a minimum of 4 inches off the ground in a dry location and cover with polyethylene to protect from contact with materials which would cause staining or discoloration.

1.5 WARRANTY

- A. Manufacturer's Warranty Pedestals: Provide manufacturer's standard 10-year limited warranty. Provide installer's 2-year warranty against defects in installation.
- B. Manufacturer's Warranty Deck Tiles or Decking: Provide manufacturer's standard 10-year limited warranty. Provide installer's 2-year warranty against defects in installation.

1.6 EXTRA MATERIALS

- A. Extra Materials: Deliver supply of maintenance materials to the Owner. Furnish not less than 1 percent maintenance materials from same lot as materials installed, and enclosed in protective packaging with appropriate identifying labels.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis-of-Design: Iron Woods® Roof Deck Tile, Decking and Pedestal System by Timber Holdings USA LLC, Tel 888-932-9663, www.ironwoods.com.
- B. Pedestal systems equal in appearance and function and meeting these specifications, will be considered when the specified submittals are approved in writing by the Architect prior to bid.

2.2 PEDESTALS

- A. EPDM-80 Pedestals: Iron Woods® EPDM Pedestals fabricated of EPDM-80 rubber. Each pedestal shall provide 1/4" of height and 0 percent slope.
- B. Stackable Pedestals: Iron Woods® Star T Self Adjusting Pedestal will accommodate height of 3/8" to 9/16", combine with Star B 3/16" Extensions to accommodate heights from 3/8" to 1.25". and 0 percent slope.
- C. Screw Jack Pedestals: Iron Woods® SE and SEWJ Self Leveling Screw Jack Pedestal fabricated of recycled and flame resistant high density polypropylene. Assembly shall consist of bases, collars, caps and Shims to accommodate various height adjustments from 1.25" to 22 inches. Additional precise height adjustment of up to .75 inches with the use of Key which can adjust pedestals up or down while loaded (Deck Tile Installations Only). Base diameter of 6 inches.
- D. Head Options: SE and SEWJ Screw Jack Pedestals Only.
 - A. Iron Woods® SE Self-Leveling Head with Deck Tile Connector Pins. Caps are self-leveling and slope compensated and can tilt in any direction to a level plane to accommodate slope adjustments from 0 to 5 percent.
 - B. Iron Woods® SEWJ Fixed Joist Head with Stainless Steel Pan Head Attachment Screws
- E. Shims: Iron Woods® Shims, 1/8 inch and 1/16 inch thick, which can be used whole or broken into halves or quarters and can be stacked up to 1 inches high. For use on top or under stackable or screw jack pedestals for fine leveling of pedestals and or individual pavers.

2.3 DECK TILES/DECKING

- A. Deck Tiles: Iron Woods® Deck Tiles manufactured of Naturally Durable Hardwood, Iron Woods™ Ipe, Tabebuia spp. Lapacho Group / Non FSC Certified) or Itauba / FSC Certified) and corrosion resistant fasteners.
 - 1. Moisture Content: KD, moisture content of 12 to 18%
 - 2. Surface: Deck Tiles/Decking to be manufactured from components which are S4S (surfaced four sides), E4E (eased four edges). Edges shall be eased to a radius of 1/8 inch.
 - 3. Dimensional Tolerance:
 - a. Deck Tiles shall be specified in actual or net dimensions.
 - a.1 net 1.5 inch thick x 23-7/8 inches (600mm) wide x 23-7/8 inches (600mm) long.
 - a.2 net 1.5 inch thick x 23-7/8 inches (600mm) wide 47-7/8" Inches (800mm) long.
 - a.3 net 1.5 inch thick x 23-7/8 inches (600mm) wide 71 -7/8" (1200mm) long.Dimensions shall be plus or minus 0.125 inch in width and length and 0.0625 inch in thickness, measured at 12 to 18 percent moisture content.
 - b. Decking shall be specified in actual net dimensions

b.1 S4S E4E net 1inch thick x 3-1/2" wide measured at 18% moisture content with 2-1/4" T305 Heat Treated (Self Drilling) or T316 Stainless (pre-drilling) Finish Head Screws. *Option of Wood Plugs.

b.2 S4S E4E Grooved net 1inch thick x 3-1/2" wide measured at 18% moisture content with Ipe Clip Extreme 4 Hidden Fasteners and Screws

c. Decking Stringers shall be structural Southern Yellow Pine CCA or ACG Treated to a retention of .40

4. End Coating: Deck Tiles are to be supplied with the ends sealed with Anchorseal, Paraffin or approved wax end sealer. All lumber must be resealed after cutting to reduce end splits.
 5. Fabrication: Deck Tiles shall be fabricated using Decay Resistant Screws as per fabrication shop drawing supplied by Timber Holdings USA.
- B. Mechanical Properties of Deck Tiles/Decking: Meet or exceed the following when tested in accordance with ASTM D143:
1. Bending Strength: 22,445 psi
 2. Modulus of Elasticity: 3,145,000 psi/
 3. Compression Parallel to Grain: 13,140 psi.
 4. Compression Perpendicular to Grain: 3,595 psi.
 5. Average Air-Dry Density: Ranges from 56.7 to 59.3pcf.
 6. Basic Specific Gravity: Ranges from 0.85-0.97.
- C. Coefficient of Friction: Meet or exceed the Static Coefficient of Friction in accordance with ANSI B101.1 and Dynamic Coefficient of Friction in accordance with ANSI A137.1 section 9.6.
1. Dynamic: Wet .455 FP.
 2. Static: Wet .615 FP.
- D. Fire Rating Requirements: Meet or exceed the following.
1. Lumber supplied shall be naturally fire resistant without the use of any fire resistant treatments to meet NFPA Class A, 1989 -16 edition, NFPA Class A, 2007 edition.
 2. Lumber supplied shall be approved by CalFire Wildlife Urban Interface Areas – Materials and Construction Methods, Exterior Wildlife Exposure: Decking Code Section Chapter 7A (CSFM 12-7A-4).
- E. Grade Requirements: Iron Woods Premium Select Architectural Grade. Graded on 4 faces and 4 Edges. Source "Iron Woods Tropical Hardwood Decking - Grading Rules and Definitions". Grading Face, Back Face, and Edges – Clear All Heart.
1. Include - Appearance characteristics.
 2. Include - Physical characteristics which can be removed using normal installation methods, tools, or sanding.
 3. Exclude - Sound defects.
 4. Exclude - Unsound defects.
 5. Exclude - Milling defects.

- F. Packaging Requirements: Units shall be individually strapped to wood pallets or blocking of a minimum thickness to allow the egress of lift forks using high strength strapping with a minimum of 4 straps per crate.
- G. Certificates of Compliance Deck Tiles/Decking: Provide deck tiles that comply with the following. Documentation shall be submitted with bid as verification of vendor ability to comply. Original submittals shall be supplied upon delivery.
1. Certificate of Compliance "Inspection" - A vendor certificate confirming product compliance with specified grade.
 2. Certificate of Compliance "Technical" – A vendor certificate confirming product compliance with minimum specified Mechanical, Fire Resistance, Coefficient of Friction Technical Performance requirements.
 3. MSDS (Material Safety Data Sheet) – Submit a Material Safety and Data Sheet for the wood products supplied on the project.
- H. Compliance with Environmental Requirements: Provide deck tiles or Decking that comply with the following. Documentation shall be submitted with bid as verification of vendor ability to comply. Original submittals shall be supplied upon delivery.
1. Green by Nature Compliance: All lumber shall meet minimum environmental requirements as defined under Green By Nature...Build With Conscience™ Controlled Wood, Chain of Custody, Life Cycle Impact and Due Care – Environmental Compliance Standards, Policies and Procedures confirming that:
 - a. All Iron Woods products have been verified of legal origin and compliance as being, legally harvested, transported, exported, imported and documented in compliance with all country of origin, international and domestic laws, rules, regulations and treaties pertaining to the fair and legal trade of forest products including but not limited to the U.S. Department of Agriculture Lacey Act, ITTA (International Tropical Timber Trade Agreement), CITES (Convention On The International Trade of Endangered Species), and U.S. Buy American Act.
 - b. All Iron Woods products are derived from forests which are naturally occurring, renewable and sustainable and are not harvested from forests or forest plantations where traditional or civil rights have been violated, forests having high conservation values which are threatened, forests that have been genetically modified or forests which have been converted to non-forest use. All Iron Woods and their packaging materials have been kiln dried and or fumigated and are free from live and or invasive insect, plant or animal species.
 - c. All Iron Woods products are 100 percent organic and grown without the use of chemical fertilization and are regenerated naturally or by seeding and replanting. The natural service life of Iron Woods®, exceed their natural growth cycle, trap and store carbon and are able to be reclaimed, reused or recycled. Iron Woods® do not require for service any petroleum based or inorganic chemical treatments adhesives or coatings. Iron Woods® do not require for service any specialized handling storage or disposal procedures and generate zero post-industrial or post-consumer non-biodegradable waste. Iron Woods are also safe for human and animal contact, meet Low VOC emission standards and meet International Building Code and International Residential Code requirements for naturally durable wood.
 2. USGBC LEED Compliance Requirement Only: Certified Wood: Materials shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

- I. Protection Course, provided by installer if detailed on the Drawings: Protection board (required over insulated BUR systems, and when specified for use over bituminous asphalt-based waterproofing): W.R. Meadows Vibraflex or equal, minimum 3/8 inch thick asphaltic composition protection board.
- J. Insulation, provided by installer if detailed on the Drawings: Dow Styrofoam Highload 100 or equal, minimum compressive strength of 100 psi recommended for foam plastic insulation placed beneath Pedestal System to prevent damage to the waterproofing membrane.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Prior to starting work inspect the substrate to ensure that it has been properly prepared to accept the roof pavers and pedestals. Verify all elevations, required pedestal heights and deck dimensions. Commencement of work shall imply acceptance of surfaces and deck conditions.
 - 1. Verify roof pavers and pedestals will be used with pedestrian traffic only.
 - 2. Verify perimeter construction will prevent lateral movement in excess of 1/8 inch, including seismic and wind loads.
 - 3. Verify substrates are broom clean, frost free, and free of dirt, oil or any rough foreign matter, which may impair the substrate manufacturer's guarantee or protection requirements.
 - 4. Verify substrate that is to receive pedestals is sloped to provide positive and adequate drainage.
 - 5. Review drawings for items such as planters, hot tubs, sculptures or equipment that will be installed on top of roof pavers and pedestals. Verify with manufacturer whether additional pedestals or supports are required.
 - 6. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.
 - 7. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Substrate shall be clean and free of any projections and debris which may impair the performance of the pedestal and or the deck system.
 - 1. Installations on Grade: Well compacted or structurally capable of carrying the dead and live loads anticipated.
 - 2. Installations on Substrate with Insulation Over Membrane: Insulation protection board shall be applied over the waterproofing substrate or specified drainage mat. Install the system according to the membrane manufacturer's recommendations and specifications.
 - 3. Installations on Substrate with Insulation Under Membrane: Insulation required to be installed within a roofing system below deck supports shall meet the roofing membrane manufacturers' specifications and shall have a minimum core density of 60 psi. Do not install on insulation with less than 60 psi compressive strength.
 - 4. Installation on Full Coverage Protection Board (for asphalt type systems used over waterproofing): Verify full coverage 1/8-inch asphaltic composition protection board.
 - 5. Installation on Partial Coverage Protection Board (for asphalt type systems used over waterproofing): When protection is specified only under the pedestal, cut protection board pads to extend beyond the outside perimeter of the pedestal system base or buffer pad by a minimum of two inches.

3.3 INSTALLATION

A. General: Install in accordance with manufacturer's instructions and approved submittals.

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 inserting and rotating, from the top, a T-handle hex key in to the Insert of the pedestal assembly. Clockwise rotation of the Insert will raise the bearing surface and the deck. Counter-clockwise rotation will lower the top 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". Complete deck and grid layout as specified. Stack no more than five fixed height stackable pedestals together and place in lieu of screw jack 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. Screw jack pedestals can provide both slope and height compensation from 0 to 5 percent to maintain a level decking surface over sloping substrates by selecting the appropriate pedestal combination of base, extension and self leveling head to meet general height requirements.

3. 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. Final height adjustment or maintenance is easily made by using a T-handle hex key that allows adjustment of the pedestals without removing the pavers. Insert T-handle hex key between the four paver corners to engage Insert portion and is adjusted clockwise or counter clockwise to level as needed.
4. 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.

3.4 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.

3.5 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.
 1. 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.
 2. Confirm that deck pedestal height excess of sixteen inches have been braced in accordance with manufacturer's written instructions.

3.6 REPAIRING AND CLEANING

- A. Inspect pavers for rocking and secure and adjust to prevent tripping hazard. Realign pavers as required.
- B. Remove and replace pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Provide new units to match adjoining units and install in same manner as original units, with no evidence of replacement.
- C. Clean stains and soiling from exposed paver surfaces.

END OF SECTION