



**NRDCA 600 - GUIDELINE FOR APPLICATION OF**  
**CEMENTITIOUS WOOD FIBER ROOF DECK SYSTEMS**

**The National Roof Deck Contractors Association (NRDCA) has prepared this document to provide, customers and installers, information that the industry believes is important to proper application of cementitious wood fiber roof deck systems. Procedural differences do exist between various suppliers to accommodate their product and testing agency approvals. If questions arise on specific points, contact the contractor, material manufacturer or Approval Agency for clarification.**

**1. Approved Material and Reference Documents**

**1.1 Approved Materials:**

- 1.1.1. ASTM C-150 "Specification for Portland Cement"
- 1.1.2. ASTM C-317 "Specification for Gypsum Concrete"

**1.2 Reference Documents:**

- 1.2.1. AGF-01 Now ASTM D-3498 "Standard Specification for Adhesives for File-Gluing Plywood to Lumber Framing for Floor Systems"
- 1.2.2. BOCA National Building Code
- 1.2.3. Southern Building Code
- 1.2.4. Uniform Building Code
- 1.2.5. International Building Code
- 1.2.6. Factory Mutual Research Corporation, "Approval Guide"

**2. Jobsite Storage**

**2.1.** Cementitious roof deck should be unloaded and stored on the site or in a building under construction on a stacking platform. The platform is to be raised at least 6" from the ground or floor level. The cementitious roof deck should be covered with a tarpaulin, waterproof paper or plastic film and secured. Waterproof coverings must be ultraviolet (UV) light resistant. The deck

will be stacked so that the protective cover will shed water. If the cementitious roof deck is to be stored for a long period, the platform will be covered with a moisture resistant material before the deck is stacked on the platform. Allow for air circulation under the waterproof cover to prevent condensation.

### **3. General Installation Procedures**

#### **3.1 Safety**

**3.1.1.** All pertinent health and safety rules and regulations for the project must be followed.

#### **3.2 Roof Top Loading**

**3.2.1.** For transferring cementitious roof deck from the storage or staging area to the roof, a forklift hoist or crane may be used. A level platform for temporary storage on the deck is recommended. The platform must spread the load to the underlying structure. For moving cementitious roof deck panels across a low slope roof, the use of light roller conveyors (roller skate type) is recommended. Dollies (four wheel, rubber tire) can be used. Planking should be used to prevent concentrated loading from stacks or piles of construction material and wheeled vehicles.

#### **3.3 Application Tools**

**3.3.1.** Different cementitious roof deck systems will require special tools; however, most jobs will require cutting, fasteners and a slide hammer to drive the panels tightly together.

**3.3.1.1. Cutting.** Use a circular saw for most applications. For thick panels use a Linearlink VCS12. **CAUTION:** Cutting should be done on a level surface. Dust on a sloped roof will create a hazard.

### **4. Installation of Bulb Tee Systems**

#### **4.1. Description of Systems**

Roof deck tile is an adaptation of any of the roof deck system panels to make them suitable for use on tees or concrete joists. The rabbeted edges of tile rest on tee flanges or on top of concrete joists. Spaces between tile and tees, or tile and anchors in concrete joists, are filled with grout, giving excellent anchorage and uplift resistance. Tile's custom lengths allow roof design with no exposed end joints. These products are applicable to flat and pitched deck roof construction.

#### **4.2. Installation of Bulb Tees**

**4.2.1.** Bulb tees should be spaced accurately according to specifications (plus or minus 1/16") and securely positioned by means of templates. The tees should be welded at every point of

crossing over the main framing members by means of fillet weld on alternate sides of the tee flanges at intermediate supports for spans of less than 8' (both sides on spans over 8') and on both sides of the tees at the ends. Fillet welds should be a minimum of 3/4" in length. Allow expansion joints as directed by the structural engineer. Attachment must meet the uplift requirements of the local building code.

**4.2.2.** Ends of bulb tees should fall on the main framing members and have a minimum bearing of 1". At this point, a fillet weld should be made on both sides of the tee flange. Where tee ends bear on masonry, they should be secured by suitable means. Typically a welding plate is attached to the masonry.

**4.2.3.** When laying tees on a wood purlin, welding plates spaced at 24" or 32" o.c. are nailed or screwed to the purlin and the tees welded to the plates. When a concrete purlin is used, steel inserts should be installed.

**4.2.4.** On sloped decks, when tees are placed parallel with the ridge, the tile spacing must be carefully checked since the cementitious roof deck will naturally bear more on the lower bulb tee. This will require temporary shimming of the tile to insure equal grouting on both sides of the tiles.

## **5. Installation of Cementitious Roof Tiles**

### **5.1 Laying Panels**

**5.1.1.** Cementitious roof tile is laid with the long dimension parallel to bulb tee sub purlins. Each tile should be spaced evenly between the bulb tees to provide a minimum edge bearing of 1/2".

**5.1.2.** When laying roof tile with ends T & G, all joints running perpendicular to the bulb tees are broken by starting with a full tile, then a half tile, in alternate rows. When square end special length tile is applied, the ends should fall over the bulb tee supports. Tile lengths should be staggered where practical.

**5.1.3.** The unsupported tongue and groove ends should be butted tightly.

**5.1.4.** Tile is cut to fit at ridges, hips, valleys, parapets, curbs, walls, around vents, pipes, etc. Where it is necessary to cut and fit standard pieces, use a power saw with carbide tipped blades.

### **5.2 Grouting Panels**

**5.2.1.** The open joints between tile and bulb tees are filled with grout prior to the application of roofing or insulation. Grout must meet ASTM C-317, Class A as a minimum standard. The grout should have compressive strength of 500 psi with a density not to exceed 60 pcf.

5.2.2. After grout has been poured, it should be leveled.

5.2.3. Filler strips may be required for thicker cementitious roof tile. A special hoe or trowel should be used to level the grout and provide the proper depth slot for the filler strips.

5.2.4. Tile used on a slope may require wedges to maintain the proper spacing of the panel in the tee. The wedges are placed between the tee and the panel on the lower side.

5.2.5. Tile installed with tees running up the slope will require an additional mechanical fastener or thrust angles to prevent the tile from moving down the slope.

5.2.6. Grout should fill the entire space between tile and bulb tee. After the grout has taken its initial set, the excess above the top surface of the deck should be scraped off to form a joint flush with the top surface of the deck. The roofing or insulation may then be applied.

## **6. Installation of Cementitious Plank Systems**

### **6.1. Description of Systems**

Cementitious roof planks are manufactured with tongue and groove edges allowing a longer span between structural supports. Some plank products have a tongue and groove edge designed to accept a hot dipped galvanized steel channel for even longer spans. These products are mechanically attached to the structural wood or steel with a variety of screws and washers. These products are suitable for flat and pitched roof deck construction.

### **6.2. Cementitious Plank Installation**

#### **6.2.1. Installing Planks**

6.2.1.1. Verify that the span does not exceed the plank capacity.

6.2.1.2. If necessary, all cementitious plank should be started away from the parapet wall and /or wood blocking in order to maintain a straight row.

6.2.1.3. When laying cementitious plank, the unsupported tongue and groove are butted tightly. This is best accomplished using a slide hammer. This tool reduces the risk of damage to the panels that can occur when using a driving block and sledge. Safety is also increased as the user does not need to be at the edge of the panel swinging a sledge.

6.2.1.4. The end joints on adjacent rows of plank are staggered.

6.2.1.5. All cementitious plank, with the exception of long span when clip attached, should be installed with the tongue leading. This facilitates the application of construction adhesive when required.

## **6.2.2. Anchorage of Cementitious Roof Plank**

**6.2.2.1.** Install cementitious roof plank in accordance with the approved shop drawings.

**6.2.2.2.** Typical methods of installation include attachment with screws and washers, clips, special nails or special screws. Anchorage must be at intervals, which provide uplift meeting the requirement of the local building codes or 30 lbs. per square foot, whichever is greater.

**6.2.2.3.** A minimum of two (2) screws or nails per bearing is required unless clips are used. Screw spacing at perimeters should be 12" on center.

**6.2.2.4.** Screws are required to be of sufficient length to penetrate the steel with full threads. Screws into wood need to be at least 1" longer than the deck thickness. Nails should be of sufficient length to penetrate the nailable members by 1½". Avoid over-torquing screws that will result in a countersink condition.

**6.2.2.5.** Clips, when used, should be placed at each crossing of the plank over supporting members. Typical attachment of the clip is by welding. Screw attachment is also acceptable.

**6.2.2.6.** Special installation methods are required in high humidity areas such as over swimming pools. Contact the manufacturer for proper design and special installation requirements.

## **6.2.3. Adhesive Application**

**6.2.3.1.** Installations may require construction adhesive. The adhesive is placed on structural members and along the tongue. A 3/8" bead is used.

## **7. Roof Penetrations**

**7.1.** Penetrations in roof deck – Openings greater than 8" in diameter or 8" in any dimension shall be framed and tied into the structural framing. Skylights require special care. Adequate drainage for condensation on metal component of openings must be provided.

## **8. Painting**

**8.1.** The exposed underside of cementitious roof decks may be painted after installation with a sprayer using quality paint. Contact cementitious deck manufacturer for recommendations.

## **9. Special Installation Applications**

## **9.1. Diaphragm Construction**

**9.1.1.** Special attachment methods may be required for diaphragm construction. Contact the manufacturer for additional information.

## **9.2. High Humidity Installations**

**9.2.1.** Special installation methods are required in high humidity areas such as over swimming pools. Contact the manufacturer for proper design and special installation requirements.

## **10. Care and Protection Prior to Roofing**

**10.1.** Care must be used in handling cementitious roof deck to prevent damaging edges and exposed surfaces from mechanical damage and staining due to exposure.

**10.2.** All cementitious roof deck laid in a day should be made water tight at the completion of that days work, preferably by the application of the roofing, or at the option of the contractor, by covering with waterproof film such as polyethylene. When sidewalls and roof deck are not erected at the same time, edges and plank ends should be temporarily weather proofed to safeguard against damage.

**10.3.** If uncompleted deck gets wet, dry planks should be placed over it to support any heavy materials stacked on the wet deck area, or to support the weight of wheelbarrows or buggies transporting concentrated loads. If wetting has been ongoing over a period of time, judgment must be used as to whether wet panels need replacement.

## **11. Roofing**

**11.1.** Application of roofing over cementitious roof deck should be in accordance with roofing manufacturer's specifications. Careful job coordination will result in the simultaneous application of the roofing to insure the cementitious roof deck is not exposed to precipitation or condensation, which may cause water staining. Extended exposure to moisture may result in loss of structural strength. If job conditions do not permit prompt application of the roofing, the cementitious roof deck shall be protected from the weather. Sloped roof shall be covered with underlay paper.