

Standard Specification For Installation of ARMOROC® For Floors

9/1/17

SECTION 06100

1. GENERAL

1.01 SUMMARY OF WORK

- A. Materials shall be ARMOROC™ Cement Bonded Particle Board (CBPB)
- B. All ARMOROC™ shall be selected from the manufacturer's load tables to carry the project live load design over a maximum of 16' on center support spacing while limiting deflection to a maximum of L/360 as determined by project architect & engineer.
- C. ARMOROC™ to be of minimum thickness ¾" (19mm) and 4' x 8' (1220mm x 2440mm) dimension. Product will be factory sealed and fabricated with tongue & groove edges on 8' long dimensions of the panel.
- D. **Note: 25mm (1") thick ARMOROC™ with T&G edges may span up to 24' on center, refer to load tables for limitations.**
- E. Comply with applicable building codes for wind, seismic, vibration, snow, concentrated, impact and uniformly distributed live-loads and other loading requirements as determined by the project architect and engineer.
- F. Questions regarding a fire-rated or diaphragm assembly and how they relate to these ARMOROC™ specifications should be directed to an Armoroc technical rep before proceeding with any specification or installation.
- G. ARMOROC™ shall have the following minimum mechanical properties:
 - 1. Density: Minimum 62.4 lbs/ft³ per ISO 8335
 - 2. Modulus of Elasticity: Minimum 435,000 psi per ISO 8335
 - 3. Shear Strength: Minimum 1305 psi per ISO 8335

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 05200, Metal Joists
- B. Section 05400, Cold-Formed Metal Framing
- C. Section 06100, Rough Carpentry
- D. Section 09100, Metal Support Assemblies
- E. Section 09300, Tile
- F. Section 09600, Flooring

1.03 DESCRIPTION OF ARMOROC™

- A. ARMOROC™ is a structural cement bonded particle board (CBPB) sub-floor mechanically fastened to the top of floor framing members.
- B. ARMOROC™ is load-bearing and shall have underlayments, toppings and floor finishes applied over it.

1.04 SUBMITTALS

- A. Submit to the project architect or design professional a copy of ARMOROC™ product and installation specifications and one product sample measuring 3" x 3" minimum.

1.05 QUALITY ASSURANCE

- A. Contractor shall have successfully installed floor-sheathing products of a similar type as this project. These past projects shall have resulted in construction with a record of successful in-service performance.
- B. At frequent intervals during construction, the job site will be visited by the owner's representative, general contractor or construction manager to confirm that ARMOROC™ is being installed per this specification.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. ARMOROC™ is typically delivered to site on factory pallets bound with plastic sheet protection, edge protection, and wooden dunnage to facilitate forklift handling.
- B. ARMOROC™ must be stored above 32° F, and on leveled dunnage not exceeding 32" on centers at all times. ARMOROC™ shall be stored indoors. If temporarily stored outdoors boards must be kept dry. Elevate above ground and protect from the weather with waterproof covering. Stacking of pallets should always be on a solid stable base and never be stacked higher than 5 pallets high. Acclimatize ARMOROC™ by storing on site not less than three days prior to installation.
- C. All materials supplied by others shall be delivered and stored according to their instructions.
- D. Upon delivery, inspect materials for signs of damage during transportation and mark paperwork accordingly at time of delivery. Failure to note damages during delivery will result in the rejection of any claims for damage after delivery.
- E. Deliver, store & handle materials to prevent breakage, warping or damage caused by moisture.
 - 1. When transporting loose ARMOROC™ panels by truck they must be laid flat and fully protected against edge damage and protected from weather with waterproof covering.
 - 2. When hand carrying single ARMOROC™ panels they must be carried on edge with the short side held vertically.
 - 3. **Handle ARMOROC™ with care, gently laying onto cutting stations, and gently laying into place during installation. Do not handle these boards like wood-based panels such as plywood or OSB.** ARMOROC™ is composed of portland cement which by nature is not ductile. Improper handling can damage and crack ARMOROC™, compromising the structural integrity of the panel.
- F. Damaged or deteriorated materials shall be removed from the premises.
- G. Material Safety Data Sheets shall be available for all materials.

1.07 PROJECT CONDITIONS

- A. Framing to receive ARMOROC™ shall be structurally sound, free from bows, twists or other malformations, installed correctly, and in compliance with local building code requirements and project specifications. Damaged or incorrect framing shall be replaced before installation of ARMOROC™. Refer to Section 3.01.
- B. During installation of ARMOROC™ the temperature shall be a minimum 32° F. If adhesive is being used temperature shall be at least 40° F and remain at this temperature or higher for at least 24 hours after installation, unless the adhesive manufacturer will permit the use of its product at a lower temperature.
- C. Prior to the application of toppings, underlayments and finished flooring, ARMOROC™ must be conditioned at the same temperature as required for the topping, underlayment and finished flooring for at least 48 hours. Toppings, underlayments and finishes shall not be applied over ARMOROC™ that is wet, frozen or contains frost.
- D. **Do not use salt or other chemicals for anti or de-icing purposes.**

1.08 SEQUENCE AND SCHEDULING

- A. Sequence the installation of ARMOROC™ with related work specified in other sections to ensure that the floor assemblies are protected against damage or abuse during and after construction.
- B. Provide sufficient labor and equipment to properly install all materials.

1.09 PRODUCT WARRANTY

ARMOROC™ is warranted by the manufacturer for a period of 10-years from date of material purchase to be free from defects in workmanship and materials under normal use. Refer to product warranty for complete terms.

2. PRODUCTS

2.01 MATERIALS

- A. Floor Framing: Cold formed steel with minimum G-60 galvanized coating, minimum 16 gauge, with 2” flange, meeting AISI and ASTM specifications and requirements for use in a structural floor system. Follow manufacturer’s installation instructions.
- B. Floor Framing Alternative: Truss System: Pre-fabricated light gauge steel truss system consisting of cold-formed steel chord and web sections. Minimum G60 galvanized coating, minimum 20g, with minimum 2” flange. Trusses fabricated in various sizes, depths and from various steel thicknesses as determined by project architect and/or engineer’s specifications. Cold formed steel truss system meeting AISI and ASTM specifications and requirements for use in a structural floor system. Loading and deflection criteria are project specific. Deflection criteria per the building designer’s requirements.
- C. Floor Sheathing: Minimum 19mm (3/4") thick ARMOROC™, factory sealed, tongue & groove on 8’ edges unless otherwise noted.
- D. Adhesives: Use PEMCO 5100 non-flammable, solvent free, zero V.O.C., polyurethane adhesive as manufactured by Alpha Systems, Inc., Elkhart, IN (or equal). Follow manufacturer’s installation instructions.
- E. Fasteners: For steel framing members 20g to 12g use corrosion resistant self-countersinking head screws such as Grabber Part No. CGH8158LG, or equal. Fasteners to be minimum #8 diameter with self-boring (winged), self-drilling points. Maximum fastener diameter shall be #10 unless approved by project architect or engineer. Length of fastener to equal 2 to 3 times the board thickness. Follow manufacturer’s installation instructions. For framing members not covered by this section, please contact your sales rep for fastener alternatives.
- F. Sealer: Use alkaline-resistant masonry sealers compatible with PH 11 or greater such as Sherwin Williams Loxon XP, or equal.

3. EXECUTION

3.01 FRAMING

- A. The floor joists and other floor framing components must be designed to meet the strength and deflection criteria as determined by project architect & engineer and specified in the contract documents.
- B. The attachment flange or bearing edge shall be a minimum 2” wide, or doubled up at ARMOROC™ board edges.
- C. Framing members per 2.01.A shall be a minimum 16 gauge. Framing members per 2.01.B (prefabricated floor truss systems) shall be a minimum 20g.

- D. Metal framing shall be spaced a maximum of 16” on center.
- E. Structural framing support shall be installed under partitions running parallel to the joists.
- F. **Plan framing so that all board edges are supported by structural framing, or interlocking T&G joint.**
- G. Review panel layout, in all cases where panels are less than 24” wide, including stairs, panels shall receive structural framing support such as blocking on all edges. Strapping is not sufficient.
- H. Structural framing support shall be installed around all floor openings.
- I. All blocking or bridging must be installed prior to the installation of ARMOROC™. Bridging must be installed on the bottom and top of the joists prior to installing ARMOROC™.
- J. **All metal framing connections to receive ARMOROC shall use low-profile fastener heads or welding on the top flange. Use of protruding fastener heads in excess of 1/16” can damage the ARMOROC™ panel.** This shall include fasteners coming into contact with Armoroc at all joists, track, girders, beams, bracing, blocking, bridging, etc.
- K. Fasteners shall be driven flush with the framing
- L. Framing system to receive Armoroc shall be in plane, and flat to 1/16” over a 4’ span. Areas where flatness varies greater than 1/16” shall utilize shimming or other methods to maintain this requirement.
- M. Framing must be of good quality, free of bows, twists, sags or other malformations.
- N. Plan accordingly for expansion joints.

3.02 STRUCTURAL PANEL SHEATHING APPLICATION

- A. Before installing Armoroc:
 1. Review installation specifications with the installers so they understand how to handle and install Armoroc correctly, and how to work safely with this product during and after installation.
 2. Plan ahead where to install sacrificial wear surfacing such as plywood in areas of high traffic and abuse to prevent damage to the Armoroc during and after installation.
- B. Inspect for damage to the panels such as cracks, breaks, edge damage, etc that may have occurred during handling. Do not install panels that have been damaged.
- C. Inspect for correct thickness, dimension & finish before installation. Do not install panels that do not match as required by the specifications.
- D. Panels shall be cut to size with a circular saw equipped with carbide tipped or cement cutting blade and a dry dust collection device or a water-dispensing device that limits the amount of airborne dust. Wear safety glasses and a NIOSH approved dust mask when cutting the panel. Collected dust shall be disposed in a safe manner and in compliance with local, state and federal ordinances.
- E. **Do not drop Armoroc into place. Avoid damage by gently laying panels into place during fabrication, distribution and installation.**
- F. ARMOROC™ shall be installed with the long edges perpendicular to the framing. Panels may be installed with either surface against the framing.
- G. Remove all debris from joists, attachment flanges. Check that all fasteners of the framing have been fully driven and flush with the metal framing.
- H. Plan the layout so first and last panel rows are a minimum 24” wide. In all cases where panels are less than 24” wide, including stairs, panels shall be installed onto structural framing support such as blocking on all edges. Strapping is not sufficient.
- I. All board edges must be supported by structural framing or interlocking T&G joint.
- J. Start the first panel with the cut edge or tongue along the rim joist. Place each panel across three or more supports. Cut panel to length as needed to ensure butt ends are centered on the framing member.
- K. Use adhesive at all board joints to enhance the connection strength of adjacent ARMOROC™ panels. Follow adhesive manufacturer’s product and installation instructions. Carefully apply a ¼-3/8" diameter bead of adhesive to the joint of the installed panel. Only apply enough adhesive to bond the edges of the panels being joined.

- L. Fasten each panel to metal framing after it has been placed using the following fastening schedule:
 1. Fastener placement shall be a maximum of 12” on center, and a minimum of 6” on center along all supports at panel joints and edges.
 2. Fastener placement shall be a maximum of 16” on center along all supports in the field of the panel.
 3. Fastener placement shall be a minimum ¾” from all panel edges.
 4. Corner fasteners shall be a minimum 2” from all panel corners.
 5. Do not place one screw in the corner.
 6. Do not place two screws equidistant from the corner (45 degree placement).
 7. Off-set corner fasteners by placing 2” from the corner on one edge, and 4” from the corner on the adjacent edge, while maintaining appropriate edge set-back.
 8. Begin fastening at one end of the panel and fan out across the panel. Do not fasten all the corners first.
 9. Drive fasteners so the heads are flush with the surface of the board.
- M. After installing one complete row of panels begin the next row. Slide panels together so that the tongue of the panel being installed fits into the groove of the installed panel. Install all rows in a running bond pattern so that end joints fall over the center of the framing members and are staggered by at least two supports from where the end joints fall in the adjacent rows. Do not force panels together
- N. Cutouts in the panels should be made before installing the panel whenever possible. If a cutout is required after the panel is installed, set the depth of the saw blade to ensure that the framing is not scored.
- O. **Continuous structural perimeter support such as blocking, bracing and bridging is required at all cutouts and openings.**
- P. Panels are factory sealed for protection from moisture. During installation apply alkaline resistant masonry sealer (compatible with a PH 11 or greater) to all areas where the factory applied sealer has been compromised. Examples or areas requiring resealing include, but are not limited to, sanded areas during floor-leveling, exposed cut-edges not receiving joint adhesive and damage during construction.

3.03 CLEAN-UP

- A. Left over material shall be removed from the job site.
- B. Remove foreign material from floor surface and vacuum all dust from the surface.

3.04 SAFETY

- A. Avoid concentrated point loads and impact loads on ARMOROC™ by referring to concentrated load tables and as determined by project architect & engineer. Pay close attention to staging areas for building materials and/or equipment such as masonry units, hoists, framing members, sheet goods, ladders, scaffolding, etc. **Note: For increased resistance to jobsite abuse, select 25mm (1” thick) ARMOROC™ with T&G edges for your project.**
- B. Measures shall be taken to distribute concentrated and point loads on the deck system during construction such as the utilization of pallets, dunnage, and/or structural building panels such as plywood or OSB laid over multiple spans.
- C. Workers must take extra care to avoid impacts such as dropped masonry units, framing members, scrap material, tools, equipment, etc. Such impacts can cause deforming marks or even penetrations if dropped onto the sheathing surface of these panels and will need repair.
- D. **Areas that are subject to abuse shall be protected with sacrificial panels such as plywood / OSB until these activities have completed.**

3.05 UNDERLAYMENTS & FLOOR FINISH

- A. ARMOROC™ contains 9-12% moisture and will exhibit some natural expansion and contraction during conditioning.
- B. Before the application of floor finish materials, ensure that all panels are properly installed with the fastener head driven flush or slightly below the surface of the panels, and that the system is level and in appropriate condition to apply finishes.
- C. Fill all voids, depressions and gaps at board joints with compatible patching or leveling compounds. Treat any areas of the floor, including joints, as required by the manufacturer of the floor finish or underlayment.
- D. Be sure that floor system has been conditioned for a minimum 48 hours to the required environment of the floor finish materials.
- E. Plan accordingly for expansion joints as required by floor underlayment, topping & finish manufacturers.
- F. Questions arising between manufacturer installation instructions of any floor finish, underlayment, topping or accessory to those of Armoroc should be directed to an Armoroc technical rep before proceeding with any specification or installation.
- G. Underlayments should be installed using adhesive. For extra holding power, mechanical attachment with pneumatically driven divergent point staples may also be used in combination with adhesive. Select the length of the staple so it penetrates ¼” to ½” maximum into Armoroc. Staples shall not penetrate through the Armoroc to minimize spalling. Plan so the staples have a **minimum spacing of 12” on center in all directions (no closer than 12” o.c.)**. Do not use Screws / Nails to install underlayments. Be sure to check underlayment manufacturer’s installation instructions for any conflicts.
- H. For installation of residential carpet & pad over 19mm (¾”) thick ARMOROC™, install a minimum ¼” underlayment in accordance with Section 3.05.G. **Note: Residential carpet & pad may be directly installed over 25mm (1”) thick ARMOROC™ with T&G edges.** Carpet should be installed using tackless strips designed for concrete application for the installation of stretched carpet.
- I. For wood flooring apply a building paper No. 15 felt or equivalent over ARMOROC™ prior to applying the wood flooring. For engineered wood flooring use the moisture barrier recommended for the engineered wood flooring system specified in lieu of the building paper. Follow the wood flooring manufacturer’s installation instructions for applying wood flooring to plywood or OSB floor sheathing. ARMOROC™ must be kept dry and maintained in a conditioned space for a minimum of 30 days prior to the installation of wood flooring.
- J. Vinyl or linoleum flooring, install a minimum ¼” underlayment in accordance with the manufacturer’s installation instructions.
- K. Tile should be installed over a minimum ¼” thick tile backer board, or an approved crack isolation sheet membrane (non-liquid) applied to ARMOROC™. Apply all products in accordance with tile manufacturer’s instructions. Use latex modified thin set mortar that complies with ANSI Standards for application of the tile to the membrane unless the tile or membrane manufacture directs the use of an alternate material that complies with ANSI Standards.

END OF SECTION