



**CERAMIC TILE INSTITUTE OF AMERICA, INC.**

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## **CTIOA Field Report 83-12-2 (R-96)**

**SUBJECT: CEMENTITIOUS BACKER UNITS**

### **HISTORY INTO INDUSTRY STANDARDS**

Concrete backer board defined as glass fiber mesh reinforced concrete backer board was first listed in method F144-81, installation in accordance with manufacturer's literature. Intended purpose for light weight construction and allowed to be installed over 1h inch exterior grade plywood on joists at 16 inches on center maximum spacing. Definition included in the 1981 Handbook for Ceramic Tile Installation states "a backer board designed for use with ceramic tile in wet areas . . . it can be used in place of metal lath, portland cement scratch coat and mortar bed for walls and floors."

Glass mesh mortar unit assembly method W244-82 and RF511-82 were included in the 1982 Handbook for Ceramic Tile Installation. The last sentence in the definition listed above in 1981 Handbook for Ceramic Tile Installation was deleted. Glass mesh mortar units were included in assembly method RW522-84 for fired rated wall assemblies. In the definition in the 1984 Handbook for Ceramic Tile Installation a note was added: "NOTE: The handbook conference acknowledges other cementitious units that are on the market for use as a backing and underlayment for ceramic tile. However, the conferees felt there was insufficient experience and test data available to consider specific comment as to their use. Follow manufacturer's recommendations." The definition of exterior ceramic tile panels was added in 1984 to the 1984 Handbook for Ceramic Tile Installation. This definition includes a reference to method W244.

The 1986 Installation Handbook included assembly methods B412, B415, and C513. This included specific application to address showers and countertops. Assembly method RW800 makes a change to identify 7/16 inch thick glass mesh mortar units as different from 1h inch thick glass mesh mortar units.

The 1988 Handbook for Ceramic Tile Installation recognized method F144 as suitable for exterior usage when appropriate precautions are taken, including expansion joint placement, proper slope to drain, waterproof membrane sloped ( $\frac{1}{8}$ " per foot) to drain, and consideration for the particular climatic conditions and exposure.

The 1991 Handbook for Ceramic Tile Installation changed the name from glass fiber mesh reinforced concrete backer board to cementitious backer unit (CBU). Assembly method B412-91 added the term membrane behind the cementitious backer unit in the shower wall assembly. Membrane was defined as "membrane (when required) - 15 pound roofing felt or 4 mil polyethylene film, moisture resistant, not waterproof."

Assembly method F144-91 changed the requirement of the sub floor from 1 inch to  $\frac{5}{8}$  inch exterior grade plywood on joists at 16" on center. ANSI A108.11 was referred to in the assemblies in the 1991 Handbook for Ceramic Tile Installation. The first publication of ANSI A108.11 occurred in the 1992 American National Standard Specifications for The Installation of Ceramic Tile. ANSI A118.9-92 American National Standard for Test Methods and Specification for Cementitious Backer Units is included in the same publication. A108.11 is installation and A118.9 is material requirements of product.

The notes for exterior walls included on page 20 and 22 of the 1991 Handbook for Ceramic Tile Installation added assembly method W244 as also suitable for exterior use when appropriate precautions are taken including flashing, expansion joint placement, and consideration for the particular climatic conditions and exposure. Exterior application may require solid backing, certified by manufacturer as suitable for intended use, between studs and membranes. Backer buttering of tile is mandatory. Along with this addition, "membrane in wet areas" was added to the W24491 assembly method to accommodate the method to be used in exterior and wet area construction. In 1995 "back buttering of tile is mandatory" was changed to read "back buttering of key back, lug back and other anchor back tile is necessary to achieve the maximum bonding benefit of the key, lug, or anchor."

The 1992 and previous assemblies of B415 include the cementitious backer units installed at the shower walls down to the shower pan membrane in the Handbook for Ceramic Tile Installation. The 1993 assembly changes the location of the cementitious backer unit as abutting the mortar bed at a location above the height of the tile installed at the tile lined shower receptor. The 1995 edition relocates the board somewhere between that of the 1992 and 1993 editions.

A new definition is added under special products following the cementitious backer unit definition in the 1993 (31st) edition Handbook for Ceramic Tile Installation: "glass mat water-resistant gypsum backer board: a backer board conforming to ASTM C1178. Designed for use on walls and ceilings in wet or dry areas, this material is applied directly to wood or metal studs. Follow the manufacturer's instructions of installation and joint finishing. Ceramic tile can be bonded to it with dry-set or latex portland cement mortar or organic adhesive by following the backer board

manufacturer's instructions."

In 1995, the Handbook added the following:

### **Fiber-Cement Underlayment's**

A dispersed fiber reinforced cement backer and underlayment designed for use with ceramic tile, in wet or dry areas. Available in various lengths, widths and thickness, this material can be applied over studs on walls and over code complying sub flooring. Ceramic tile can be bonded to it with latex Portland cement mortar or organic adhesives. General interior installation and material specifications are contained in ANSI A108.11 and ASTM C-1186. Consult the manufacturer's written literature for specific application details.

The above history is taken from review of the annual Handbook for Ceramic Tile Installation as published by the Tile Council of America and the American National Standard Specifications for the Installation of Ceramic Tile as published by Tile Council of America. This history is intended to be an overview to understand what was adopted, when, and changes that may affect the average contractor, distributor, designer, architect, and consultants. This author encourages your reading each of these areas in the Handbook for Ceramic Tile Installation including: definitions, wall tiling installation guide, floor tiling installation guide, how to use the Handbook, notes on page 12, assembly methods F144, EJ171, notes on page 20, assembly methods W223, including notes on page 21, W244, B412, B415 and notes at bottom of page 25, C513, RW800, and RF900.

The author encourages your reading the following in the American National Standard Specifications for the Installation of Ceramic Tile including: forward, general requirements, standard specifications ANSI A108.11 "Interior Installation of Cementitious Backer Units", and American National Standard for Test Methods and Specifications for Cementitious Backer Units A118.9-1992.

### ***ALL BACKER BOARDS ARE NOT EQUAL***

You are responsible to know about the material you specify, detail, design, sell, purchase, inspect, install or install over the backer board installed by others. Therefore, you should also obtain the International Conference of Building Official Evaluation Report (hereafter referred to as ICBO) or National Evaluation Report (hereafter referred to as NER) for the backer board you are installing or installing over. Ask for and read these approvals. The Uniform Building Code specifies acceptable products for usage. All materials not specifically specified in the Uniform Building Code are required to be approved through ICBO, through the evaluation report process or through the NER. Variation to the approved assembly method is not acceptable and your liability may be exposed where the installations is not in conformance.

### ***PROTECT YOUR LIABILITY***

Field experience has taught this author to remind you of tips on how to stay out of trouble. These tips include: backer board installed over concrete slab does not serve as anti-fracture resistance, concrete slab cracks will transfer through the backer board unless some form of slip sheet or membrane is used between the concrete slab and the backer board, each backer board manufacturer is responsible to include the fire rating of the backer board (this may include fire rating vertically and/or horizontally), and taping of joints is mandatory. *When the installation of the backer board is installed by another trade, you are required to field inspect for minimum Industry Standards including taping of joints, correct expansion joints, correct waterproof membranes or weather resistive barrier papers, V8 inch in 10 feet for horizontal installation and V8 inch in 8 feet for vertical installation. Your liability is exposed unless you inspect and reject all conditions not in conformance. This includes verifying the correct fasteners were used at correct spacing.*

Caution is urged against using 4mil polyethylene sheeting behind tile backers. First of all, 4 mil polyethylene is not a membrane and is subject to deterioration by microorganisms and exposure to sunlight. Water beading can occur with temperature differential between the two sides of the 4 mil polyethylene. At least one manufacturer of backer boards cautions against using the 4 or 6 mil polyethylene. Fifteen pound roofing felt is approved by ICBO and included in the Uniform Building Code as a weather resistive barrier paper only. The 15 pound roofing felt is not an approved waterproof membrane unless it is installed in three layers with five layers of flood coats as defined in the Uniform Plumbing Code section 909. The 15 pound roofing felt may work in a vertical application only.

All exterior and wet area horizontal surfaces require a waterproof membrane separate from the 15 pound roofing felt.

Method F141 in the Handbook for Ceramic Tile Installation includes a wire reinforced mortar bed installation over wood framing. The 2 inch by 2 inch reinforcing wire fabric is not attached through any membrane system and is not attached or even required to be attached in a horizontal application. When F141 is changed to F144, you must verify the manufacturer of the backer board will guarantee the application as being acceptable. There are specific do's and don't's when working on exterior walking decks which include not fastening through any membrane unless the membrane and fastening system is waterproofed or self healing type of membrane.

When installing backer board at a wall in a bathtub or shower pan, note the Uniform Plumbing Code now requires a 1 inch water tight flange on the perimeter of the bathtub where any tile is to be installed. Any caulking used at this location should be a mildew resistant silicone caulk or caulking approved and guaranteed by the manufacturer of the caulk to perform a minimum of 10 years. The caulking should be installed from the tile surface back to the flange. The caulking may cause problems if moisture is allowed to be trapped behind the caulking between the bathtub flange and tile installation.

The professional tile contractor can install a variety of backings. The backer board is chosen for purposes to reduce cost, reduce weight, reduce labor and other purposes. A professional tile contractor will quote more than one method as in using a wire reinforced mortar bed, using a backer board, etc. Quoting more than one method assist to transfer liability to the party that chooses the method based on financial consideration, and if that method may not work, the cost of repair is assigned to the party that chose the method based on cost or aesthetic reasons

The professional tile contractor, distributor, and manufacturer used to give a one year guarantee. The tile contractor was held to a three year guarantee when the Contractor's State License Board in California laws were enforced. In the 1980's the Superior Court in the state of California changed the ruling of construction to being a product. Therefore, all construction materials are held to a 10 year latent defect liability. All manufactured products, including adhesives, setting materials, tile, backer boards, and finished assemblies are subject to minimum 10 year guarantee in the state of California. You are held responsible for being the professional!