

FIELD REPORT # 0704-b

RE: Concrete Tile

Next to water, concrete is the most used material in the world. It could also be classified as one of the most versatile of materials as it is cast, formed, molded, colored, and textured into every conceivable use man can think of. Thought to be a product of the modern world, the ancient Egyptians employed a primitive concrete in their pyramids and the Romans built the Coliseum with it. Today, perhaps because it is so widely used, it is taken for granted; however, without concrete our world would be considerably different.

Concrete takes on many forms; however, we wish to focus this article on one, **precast concrete tiles!** They are available today in myriads of shapes, sizes, thicknesses, textures and colors. Annually in the United States, millions of square feet of concrete tiles are installed on interior and exterior floors and walls of both commercial and residential structures. One of the largest recent installations has concrete tiles covering the lobby floors of the 'high traffic' Washington, D.C. airport in our nation's capital. Concrete tiles can duplicate any texture or color developed by man or nature. Their surfaces can be left natural, polished like stone, colored and textured like tiles, shot blasted to expose a variety of different aggregates, inlaid with fossils and semiprecious stone or different mementos. With the use of sealers, the finished appearance can be either matt, semi-gloss or high gloss.

An example of concrete's versatility was an August 29, 2003 article in USA Today entitled, "**Concrete Countertops pouring into kitchens.**" It said in part, "*After years of granite dominance in the high-end countertop market, concrete is coming on strong. Kitchen & Bath Design News reports it's the source of the most buzz in the industry. Concrete is lighter than granite but not always cheaper. The high end stuff can cost \$80 to \$150 a square foot; granite typically costs \$60 to \$110.*" The options in concrete tiles are only limited by the imagination of the designers!

MANUFACTURING / TYPES:

Concrete tiles are usually cast, extruded or ram pressed during their manufacturing process. Manufacturing plants vary from hand casting to the most modern of automated production, where the tiles are not touched by humans from the raw material stage, through manufacturing and curing until they are inspected prior to packaging. Available sizes run through the spectrum from panelized 4"x 4" units up to 30"x 30" units. All the standard shapes available in other types of tiles are also available in the various types of concrete tiles. In addition to the above, custom shapes, sizes and colors are available at a far more competitive price than any other material.

SPECIFYING:

The CTMA (Concrete Tile Manufacturers Association) whose address is listed below, can provide a free twelve-page 'Handbook for Concrete Tiles' that contains complete specifications for the tiles and the complete tile assembly. These specifications also conform to both ANSI and the TCNA Handbook. Both 'Product' and 'Tile Assembly' test procedures were according to ASTM standards with a special additional severe test procedures developed through the joint efforts of Smith-Emery and the CTMA.* Staying current with the changing world of concrete as we move through the 21st century, is the never-ending goal of the CTMA member manufacturers.

* For complete details regarding the test procedures used to develop these specifications, see CTMA's newsletter, *Concrete Tile Tales*, volume II, Issue 2. Copies are freely available upon request from the CTMA.

'Q-TILE' TESTING PROGRAM:

This is an ongoing testing program to assure the end user of CTMA approved concrete tiles meet all the 'Product Specifications' listed on page five of their 'Handbook.'

SUBSTRATES:

Any substrate that can accept ceramic or natural stone tiles is an acceptable substrate for concrete tiles. Like all tile

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products, they must be installed to meet both industry and the manufacturer's recommendations. When membranes are specified or used, they must be either approved 'cleavage' membranes under a reinforced mortar bed, or an approved 'direct bond, load bearing, anti-fracture' membrane conforming to ANSI A118.10, without waterproofing, unless also required. Concrete tiles can be installed interior and/or exterior in both horizontal and vertical applications.

MOVEMENT JOINTS:

They must conform to the recommendations in the current TCNA 'Handbook for the Installation of Ceramic Tile.' Like many other products, concrete tiles are affected by changes in temperature and excessive moisture, similar to quarry and Saltillo tiles. The CTMA has test reports on file that prove that when concrete tiles are installed to meet industry and manufacturer's recommendations, temperature and moisture do not affect its proper installation.

SETTING ADHESIVES:

As recommended in the CTMA's installation specifications, industry approved thin-set or mortar-set are recommended. Exterior applications must be back-buttered.

GROUTING:

Concrete tiles are normally installed with a wider grout joint than other tile and it is recommended to use a 'quarry grade' (Saltillo) of sanded grout. The coarser aggregate in these grouts will prevent shrinkage cracks in the grout joints. Like all grouting materials, carefully follow the grout manufacturer's instructions and do not add too much water to the mix.

INSTALLATION TECHNIQUES:

See the CTMA 'Installation Specification' for complete details which are in concert with the TCNA Handbook.

SPECIAL CONSIDERATIONS:

- 1- Like a number of other ceramic tile products (quarry tile, Saltillo, etc.), excessive heat or moisture will cause concrete tiles to expand and/or shrink a degree depending how they were installed and sealed. The CTMA developed two *new* severe testing procedures (see their newsletter, *Concrete Tile Tales* Vol. II, Issue 3 for details).* These tests subjected members' concrete tiles to a 41-day moisture and drying cycle before shear testing their remaining 'Bond Strength' according to ASTM C-482. The results of these tests established a basic fact based on the following two stipulations; when (1) concrete tiles are properly installed according to the CTMA and TCNA specifications and (2) the appropriate 'movement joints' are in place as recommended by the TCNA Handbook, **MINOR MOVEMENT WILL NOT COMPROMISE THE TILE'S BOND TO THE SUBSTRATE**. Subject understood, the substrate and/or the membrane must be an approved system as per the CTIOA and ANSI.
*See 'Results of Smith Emery's Concrete tile Tests' in chart form at the bottom of page three.
- 2- A loose thin piece of concrete, such as a concrete tile when it is not installed, can curl when subjected to excessive heat or moisture. However, when that same tile is properly installed by the steps outlined in item one above, this tendency is offset by the proper bonding of the tile to the substrate
- 3- Sometimes a question comes up regarding curing. CTMA manufacturers of concrete tiles stamp on each carton the date they are produced to assure the ultimate consumer that the tiles are properly cured.

IMPORTANT REMINDER CONCERNING FREE PUBLICATIONS AVAILABLE FROM THE CTMA:

'HANDBOOK FOR CONCRETE TILES' – A 12-page booklet completely covers concrete tiles.

The 'Handbooks are available in both English and Spanish.

'Concrete Tile Tales' newsletter, volume II, Issue 2. – A 6-page newsletter details all test procedures.

Like all other ceramic and natural stone tiles, proper installation will provide a trouble free tile assembly!