



Testing Answers Material Performance Questions

Why Testing?

The Tile Council of North America (TCNA) receives hundreds of questions each month from architects, building designers, contractors, etc. The questions address material properties and selection, mechanical performance, coefficient of friction requirements, chemical compatibilities and many other topics. Often the answer received by the caller indicates a need for testing materials and designs under simulated jobsite conditions. Testing of samples (often smaller than the actual materials) can give reliable predictions of how the materials will behave over time. Therefore, one can gain confidence that the final structure and its aesthetics will give many years of trouble-free service. Testing—that is where TCNA's Product Performance Testing Laboratory comes into the action.

Why are more Materials Manufacturers, Contractors, and

Architects asking for Robinson-Type Floor Tests?

The demand for Robinson-type floor testing run by TCNA has grown steadily during 2006. Over the past eight months, the number of tests run has risen five-fold. This increase in test demand appears to be driven largely by new or

modified materials, fresh concepts for combining materials to give robust constructions, and a significant increase in improvements of membranes toward combined duty in crack arresting and in reducing noise transmission through tiled floors in multi-storied buildings.

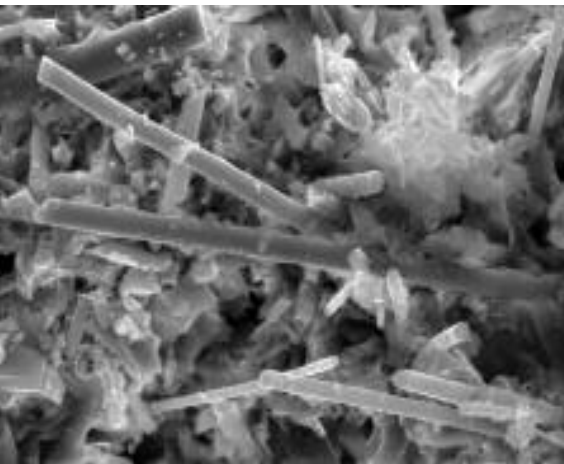
Why? The Robinson-type floor test (an ASTM C-627 defined test apparatus) provides a standardized procedure for evaluating performance of ceramic floor tile installations that simulate actual usages.

Is the TCNA Laboratory Expanding Its Capabilities Beyond Standardized Tests?

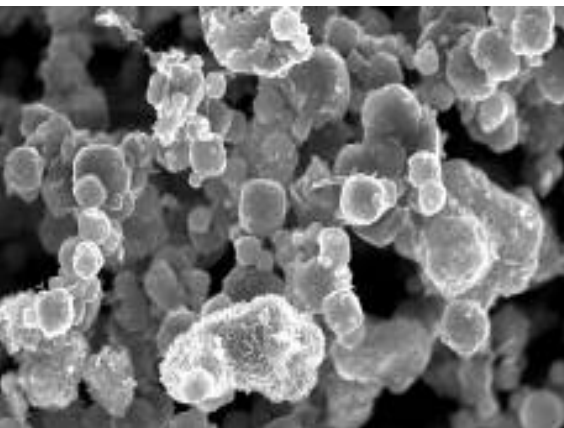
TCNA's testing laboratory is moving toward testing "outside the box" in order to provide high-technology testing capabilities to augment tile, adhesive, grout, and membrane testing to ASTM, ANSI and ISO standards.



Right: The Robinson-type floor test provides data that determines a floor's rating. Photo courtesy of TCNA Lab.



Top: Photograph of ceramic fiber reinforced lightweight refractory ceramic firing setter. Photograph taken by the National Brick Research Center.



Above: Photograph of ceramic tile raw material at 10,000 X magnification. Photograph taken by the National Brick Research Center.

TCNA's location in the Clemson University Research Park near Anderson, SC provides ample opportunities for collaboration among technical personnel of TCNA, the National Brick Research Center (NBRC) and Clemson University.

Such collaboration adds significant testing capabilities for TCNA's consumers. Clemson University's impressive array of electron microscopes combined with NBRC's facilities for X-ray diffraction, X-ray fluorescence and mass spectrographic gas analysis expands TCNA's testing capabilities. An immensely valuable scientific support community composed of Clemson University's staff members is available to provide guidance and to active-

ly participate in testing programs.

Examples of recent applications of such equipment include:

- Analysis of ceramic raw material morphology and distribution of chemical constituents (see photo above)
- Examination of crazed glass, crazed ceramic tiles and natural stone at high magnifications
- Chemical constituents resulting from deterioration of tile installation materials by swimming pool chemicals
- Microstructures of lightweight ceramic refractory firing plates after repeated cycling (see photo above)
- Examination of glazed ceramic tile surface characteristics that possibly determine slipperiness of tiles

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What are TCNA's plans for meeting the growing demand for more product performance information?

Plans are being formulated for the continued expansion of services supplied by TCNA.

It is likely that during 2007 the following capabilities will be added:

- Automated high-cycle freeze-thaw

testing of tile and stone. This will make it practical and cost effective to test tile and stone to hundreds of cycles rather than the present 15 cycles required by ASTM C-1026. Cooperation with NBRC will combine equipment designs and test results from studies of the behavior of brick, tile and stone.

- Measurement of light reflectivity and color differences of tile and other materials. This testing will be used with glass tiles, adhesives and glazed ceramic tiles.
- Sound measurements to evaluate effectiveness of design parameters of materials and construction techniques in reducing noise transmission throughout structures. This complex challenge will be met by teaming TCNA and Clemson University staff members with experienced consultants. Plans are being made for test chambers to be constructed at the TCNA laboratory.

Product performance testing provides the various measurements necessary to assess materials' performance under specified conditions and answers the question: "will it work?" To learn more about the various tests available through TCNA's Product Performance Testing Laboratory, visit www.tileusa.com. **TILE**



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About the Author

Virgil (Sonny) Irick is Director of Laboratory Services for Tile Council of North

Sonny Irick

America's Product Performance Testing Laboratory. He is responsible for testing of tile, stone, adhesives, grouts and membranes to ASTM, ANSI and ISO standards. Additionally he directs development of non-standard tests for solution of raw materials and processing problems, analyses of special chemical and microstructural problems, etc. Dr. Irick earned B.S. and M.S. degrees in ceramic engineering from Clemson University and a Ph.D. in ceramic engineering from The Ohio State University.

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