

Floor and Deck Solutions TM²S

**CONCRETE SLAB DRYNESS TESTING
FLOOR COVERING FAILURE – FORENSIC ANALYSIS**



TESTING, MATERIALS, MARKETING and SALES CONSULTING
“Mitigate, don’t Litigate.” Anthony Gaffney

Floor and Deck Solutions TM²S
Division of DAG-2 LLC

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FLOORING & COATING

SERVICES OFFERED

- **Concrete Testing**
- **Moisture Testing**
- **Polymer Coating
& Surfacing
Systems Testing**
- **Concrete Design**
- **Document
Review**
- **Failure Analysis**
- **Expert Witness
Services**

**“Testing beforehand
is always an
inexpensive
alternative to testing
and replacement
afterwards.”**

Anthony Gaffney

**One Stop Shop Consulting Firm ...
TM²S Networks across North America with
the leading consultants, designers,
contractors and material suppliers to find
the best solution to resolve your needs.**

Technology at work for you ...

**Floor Coating and Surfacing Systems
Inspection, Testing and Analysis**

- **Unknown Site Conditions**
- **Design Defects**
- **Manufacturing Defects**
- **Installation Defects**
- **Adhesive Failures**
- **Maintenance Damages**
- **Environmental Damages**
- **Mitigation**

CONCRETE SLABS ARE PERMEABLE ...

**Concrete slabs are permeable and they
allow water, water vapor and other soluble
materials to move through it.**

**When moisture sensitive flooring materials
are placed on the concrete slab they are
subject to degradation of their physical
properties and loss of bond if the concrete
slab is not properly installed and prepared.**

**ACI 302.1 and 302.2 address the proper
design and placement of concrete slabs.**

STANDARDS TRADE GROUPS

- ACI – American Concrete Institute
- AIA – Architectural Institute of America
- AIA-CES – Architectural Institute of American Education
- ASTM - American Society of Testing and Materials
- ANCI – American National Standard Institute
- NACE – National Association Corrosion Engineers
- NTMA – National Terrazzo and Mosaic Association
- PCSI – Polymer Coating and Surfacing Institute
- SSPC – Society of Protective Coatings
- TCNA – Tile Council of North America
- WSTA – Western States Terrazzo Associates
- SWR Institute (Sealant, Waterproofing and Restoration Institute)

• PARTIAL LIST OF TESTS

- ASTM F710 (ICRI Certified Tech) Preparing Concrete for Resilient Floors
- ASTM F1869 (ICRI Certified Tech) Calcium Chloride
- ASTM F2170 (ICRI Certified Tech) In situ Probe Relative Humidity
- ASTM F2420 (ICRI Certified Tech) Dome Relative Humidity
- ASTM D2240 Shore D Hardness
- ASTM D4541 Coating Tensile Pull Off
- ASTM D7234 Surfacing Tensile Pull Off
- ASTM C1028 Coef. of Friction (dry and wet)
- ASTM C566 Moisture Content of Aggregate
- ASTM C1583 Tensile Strength of Concrete Surfaces
- ASTM C805 Rebound Hammer Test of Concrete Hardness
- Chemical Testing: ASR, Carbonation, Efflorescence, etc.
- Concrete Slab 1/8 +/- Inch in 10 feet
- ICRI Concrete Surface Profile
- Climate Monitoring – Recording of critical climatic parameters: surface and air temperature; dewpoint temperature, percent relative humidity.
- Expert Witness Services

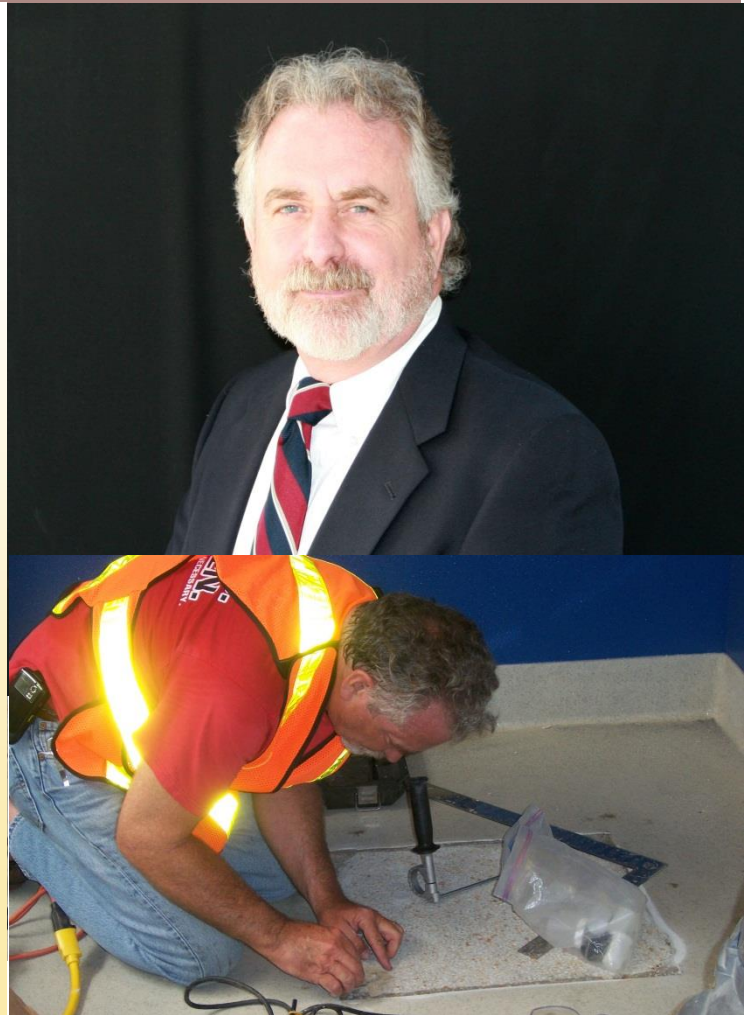
Call for other ACI, ASTM, etc. test procedures that may be available from Floor and Deck Solutions TM²S .

How to Avoid Moisture Induced Problems with Moisture Sensitive Flooring ...

1. **Design new concrete slab per ACI 302.1 and 302.2 requires the concrete slab be placed directly on a moisture barrier, such as one supplied by Raven Industries or Reef Industries or Stego Industries.**
2. **Existing concrete slab requires investigation to determine if they were designed and placed per ACI 302.1 and 302.2. Normally this will require concrete coring and evaluation.**
3. **If the core reveals that the concrete slab was designed and constructed in accordance with ACI 302.1 and ACI 302.2.**
 - a. **If yes, be prepared to install a moisture mitigation system if the job is fast tracked.**
 - b. **If no, be prepared to install a moisture mitigation system.**
4. **Moisture Testing**
 - a. **ASTM F1869 – Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride. Simply put, this test measures the amount of moisture that travels through the concrete. Usually the top inch and is expressed in Pound per thousand square feet for 24 hours.**
 - b. **ASTM F2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes. Simply put, this test measures the moisture potential. The probe is placed at a depth of 40% of the concrete slab. It measures the Relative Humidity.**
 - c. **ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring. Simply put, this standard supports the tests listed in a. and b. above, plus it emphasizes a pH test (pH = potential hydrogen). The pH of the concrete is usually above a pH of 9 (to passivate the reinforcement steel and prevent rust). Some adhesives are sensitive to high or low pH. The concrete slab surface will normally carbonate at the surface and provide a false reading (lower pH) unless the surface is prepared. Testing of the pH should be done at the adhesive supplier's surface profile.**

Anthony Gaffney has over thirty years of professional experience in the concrete and flooring industry, starting with Adhesive Engineering Company as a sales engineer to a General Manager, VP Marketing, Technologies and Sales. Recalling that in 1982 he saw his first moisture vapor emission induced epoxy flooring failure, since that date he has been active in finding the cause(s) and the solution(s) to the moisture related flooring problems.

His extensive back ground in the placement, repair, protection and beautification of concrete and wood has led to over twenty publications or white papers, including Understanding Moisture Vapor Transmission Mitigation Systems in 2004.



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