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## **New Construction Gypsum Concrete Floor Underlayment Installation And Moisture Issues**

Gypsum concrete floor underlayment (i.e., Gyp-Crete®, Levelrock® FIRM-FILL® Gypsum Concrete, etc.) – we'll call all of it Gyp-Crete here-- is used extensively in the construction of multi-family apartments and condominium buildings. It is lighter than traditional concrete, which reduces the structural requirements, yet meets the noise control and fire building codes of many municipalities. Gyp-Crete is mixed on-site and pumped onto a structurally sound, broom-clean subfloor, usually OSB or plywood. It self-levels and fills the space where the drywall meets the floor, completely sealing room perimeters and protecting the base plates from the spread of fire. Gyp-Crete also reduces horizontal and vertical sound transmission. It sets up quickly and can be walked on after 90 minutes, allowing other light sub-trades to begin work the next day. Gyp-Crete is considered a green building material, and also meets the stringent volatile organic compound (VOC) requirements of GREENGUARD Gold Certification.

Overall, Gyp-Crete provides a cost-effective means of providing fire and sound barriers, without impacting the project schedule. While it often appears to be the right product for the job, there have been numerous construction defect and product liability claims and losses related to its use. Water damage and mold have been reported on several construction projects using Gyp-Crete, resulting in multi-million dollar losses and schedule delays.

### **Concerns**

The source of losses related to Gyp-Crete installation may be related to the moisture within the product, but also the moisture within the building materials adjacent to, and surrounding, the Gyp-Crete when it is installed. A successful Gyp-Crete installation involves prior monitoring of environmental conditions and moisture content of materials in the building, proper field mixing of the product, continued monitoring after installation of Gyp-Crete, and proper final cleaning of the flooring system.

Typically, drywall is installed prior to gypsum concrete installation. At this stage of construction, the building may be in a dry-in state (roof covering, exterior doors, windows and walls installed), but the HVAC system is usually not being operated. Exterior doors and windows may be left open at this phase to allow ambient air to flow through the facility. If the ambient air has elevated humidity levels, then the installed drywall may absorb ambient moisture until an equilibrium is reached. The increased moisture content within the subfloor and drywall coupled with the moisture from the installation of Gyp-Crete may then result in mold growth.

The humidity inside new construction needs to be as low as possible and should not exceed 60% once the structure is "dried-in." Appropriate measures should be taken BEFORE the Gyp-Crete is installed to be sure that the environmental conditions in the building are such that the subfloor, drywall and other components are very dry - - not on the "edge" of acceptable moisture content. The lower the humidity inside and the lower the moisture content of subfloor and drywall, the faster products like Gyp-Crete will dry. This means lower chances for mold growth.

If the humidity is high (above 60% inside the structure), dehumidification before and after installation of Gyp-Crete is highly recommended to allow the flooring and building materials it contacts to dry out.

As Gyp-Crete dries and cures, the moisture content for the flooring must be below 10% and, in some cases, even lower, before the installation of any semi-porous or porous building materials that are in contact with the Gyp-Crete. Each product manufacturer has recommended moisture content for the Gyp-Crete before their product should come in contact with the flooring. For instance, most wood or wood laminate products want the moisture content of the Gyp-Crete below 7%, vinyl tile manufacturers generally recommend 4% and carpet manufacturers recommend 1%. While one can usually walk on Gyp-Crete within a day after pouring, the total curing process takes no less than 5-7 days, and often longer. The moisture content of the Gyp-Crete and drywall should be measured with an appropriate moisture meter before installing cabinets, baseboards, doors, and other furniture. The higher the relative humidity in the building, the longer the drying process will take. If baseboards, cabinets, and other materials are installed before the gypsum and drywall have completely dried, water damage and mold can result.

Critically important is the field mixing of the Gyp-Crete. The sub-contractor should be advised to mix the Gyp-Crete per the manufacturer's instructions. Some firms will add more water to the mix to allow for better self-leveling of the product, and to be able to pump and spread larger areas at a single time. A more watery-mix creates additional risk for mold in adjacent materials.

Lastly, once Gyp-Crete begins to set up and can be walked on, the flooring product should be vacuumed, not swept, to remove any dust, dirt, sawdust, etc. that may have fallen on the flooring while curing. Gyp-Crete will not support mold growth, but sawdust on wet Gyp-Crete will most certainly result in mold patches on the flooring product.

Some gypsum concrete manufacturers recommend that users follow ASTM F-2170, Standard Test Method for Determining Relative Humidity in Concrete Floor Slab Using in situ Probes. They do not recommend, however, the use of ASTM F-1869, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride, because it may provide erroneous measurements.

**Clarity Environmental** can assist with preventive measures, monitoring and testing to assure that Gyp-Crete installation does not result in water damage, mold growth and project delays. Our staff of industrial hygienists has the technical expertise and experience to insure optimal humidity levels exist before Gyp-Crete installation, guide & monitor the process, and -- if necessary -- develop an appropriate response to moisture concerns that arise.