

Testing For Mold Resistance

Standard Methods and Limitations

USG tests its products for mold resistance under ASTM D3273-00(2005), "Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber." This is a laboratory test procedure that involves suspending the product to be tested in a chamber over soil which has been inoculated with the spores of three types of mold organisms. Temperature and humidity in the chamber are controlled.

A second standard, ASTM D3274 "Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Microbial (Fungal or Algal) Growth or Soil and Dirt Accumulation," sets out the procedure for ranking the visible growth on a 0-10 scale with "10" being the best score, i.e., no growth visible to the naked eye. Over a period of four weeks, photographs at 50 and 100 magnifications are taken and a record is made of whether mold has started to grow on the test material and, if so, how much is visible.

D3273 is intended for "interior coatings" products such as paint and varnish. It grew out of a Department of Defense specification for materials going to southeast Asia in the 1960s. USG customers should be aware that the test has many limitations, including the following:

1. The test only measures *comparative* resistance to mold under controlled, accelerated laboratory conditions that represent only one combination of temperature and humidity. Field conditions—that is, actual installations in buildings—almost always are different from the "controlled" laboratory setting indicated in D3273.
2. The range of environmental conditions in the actual installed products can vary tremendously from the controlled laboratory conditions. Temperatures in buildings can be higher or lower than the test chamber used in D3273. Relative humidity also can be higher or lower. And, of course, in the real world, building materials are subjected to storage, handling and installation conditions which deposit dirt on the surface which itself can support mold and mildew growth. For example, tile and glass surfaces in a shower grow mold if not cleaned regularly.
3. D3273 uses only three fungi, but other, unclassified organisms are in the soil at the bottom of the test chamber. However, real buildings are subject to hundreds, even thousands, of different species of mold and mildew fungi. The three organisms used in the test are commonly found throughout the United States, but even so they are not fully representative of the kinds of mold found in all areas of the country. In addition, the vigor of the mold growth can be another significant variable.
4. D3273 was originally designed to test coatings such as paint for mold resistance, but USG and other manufacturers use it to test products such as wallboard before the wallboard is painted. The application of paint with or without its own fungicide can change results.
5. It is very difficult if not impossible to make predictions of mold resistance over the long term (years and decades) based on the D3273 test which only covers four weeks under a single set of accelerated growth conditions. The test provides a useful comparative measure of mold resistance but does not predict absolutely how a product will perform in any particular job application for an extended period of time.
6. Because so many factors which affect mold growth are not controlled for by the test procedure, it is difficult to get consistently reproducible results when the D3273 test is repeated in different laboratories or even in the same laboratory at different times. For example, the soil composition is not defined in this method and the population of naturally occurring fungal organisms present in the soil varies. This variability can have a significant impact on the test results.

7. USG is not alone in recognizing the limitations of D3273. There are two ASTM committees, D01.28 and G03, working cooperatively to write new test methods for both coated and uncoated building products. Participating in this process are many of the major building product manufacturers. These committees are working specifically to address some of the areas contributing to the variability seen using the D3273 test method. To ensure fairness, ASTM is open to any producers, users, ultimate consumers, representatives of government and academia interested in participating. Because of the wide range of participation, the process of writing a new test method can be very slow.

If you have any further questions, please do not hesitate to call your USG representative.

