



## **Polyurethane & Hydrolysis Testing**

With the popularity of polyurethane (PU) growing in the upholstery marketplace, end-users are discovering that not all PUs are created equal. In high traffic seating areas, and under hot and humid weather conditions, PUs that are formulated with inexpensive resin systems will prematurely break down. The breakdown is a delaminating of the PU film layer from the backing substrate in the form of cracking and peeling, and is caused by heat and humidity.

Currently, two tests are considered acceptable to determine the integrity of a polyurethane upholstery product - an ISO test and an ASTM test. Both tests are conducted by placing the PU material in a heat and humidity chamber at 158 degrees Fahrenheit and 95% relative humidity for a period of time. A brief description of each test is as follows:

### **ISO 1419: 1995(E)**

This is the most well-known test in the upholstery marketplace and is sometimes referred to as the "Jungle Test." In this test, the PU material is put into the test chamber and visually examined against a control sample at the end of each one week period for a pre-determined number of weeks, or until the product breaks down and fails. By design of the test, each week is supposed to represent one year in the field, so 3 weeks in the chamber without failure is supposed to equal 3 years in the field, 5 weeks is supposed to equal 5 years, etc. Failure against the control sample would be in the form of surface cracking, delaminating of the PU film layer from the backing substrate, or extreme changes in color and gloss level. The test proclaims no minimum specification for failure, but it is generally understood in the marketplace that a product designed for residential upholstery should withstand at least 3 weeks in the test chamber, and that a product designed for commercial upholstery applications should withstand 5 weeks.

### **ASTM D 3690 - 02**

This test is not as widely known as the Jungle Test, and incorporates physical testing after a set period of 15 days in the test chamber. The test results are strictly pass/fail and do not correlate to any period of time in the field. Before the material is put into the test chamber it is tested for adhesion in both the warp and fill directions, and the results are documented. After 15 days the material is removed from the test chamber and allowed to recondition at a controlled room temperature for 24 hours, then tested for adhesion, abrasion, and flex resistance. Adhesion results must maintain at least 75% of the documented values of the material before it was put into the test chamber. It must show no signs of cracking or delaminating after 25,000 Wyzenbeek cycles, with 4 pounds of tension and 3 pounds of compression, using a 100% cotton sateen fabric as the abrader. For flex resistance the ASTM D 2097 Newark Flex test is performed on the material; after 15,000 cycles, there can be no breaks in the PU coating. The criteria of all three of these tests must be met for the PU material to get a passing grade.

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