Understanding the Mounting Test

The "Understanding the Product Safety Tests" Series

The *Mounting Test*, performed as either the Wall Mounting Test or the Ceiling Mount Test, is conducted on products that have a means to temporarily or permanently mount the product to a wall or ceiling. The test involves mounting the product as intended and overloading the mounting system to determine if the mounting means is damaged or completely fails thereby allowing the product to fall and potentially injure someone.

Test Objective: The objective is to verify that for products mounted to a wall or ceiling, that the mounting hardware and instructions are adequate to insure that the product does not fall and cause injury to the user or other in the vicinity of the product. A 4X safety factor is required (able to withstand 4 times the rated strength without damage).

Test Purpose: Beyond consideration for the strength of the mounting materials over time, the test is also seeking to insure that the product mounting system will not fail from any of these events:

a) For All Mounted Products: During the mounting process, the user is likely to apply additional forces to the mounting system (i.e. a person on a ladder using the mounted product for balance). Subsequent cleaning may also present similar forces being exerted to the mounted product.
b) For Wall Mounted Products: After mounting, the potential for a user to hang, place or stack other items on a mounted product. Some exceptions may apply for products that are protected after mounting.
c) For Ceiling Mounted Products: After mounting, the potential for the user to hang items from ceiling mounted products or otherwise misuse such a manner that adds hang weight to a ceiling mounted product.

Installation Instructions: The first step is to mount the product as intended per the installation instructions. The instructions should be very specific, indicating the suitable mounting surface(s) and minimum thickness of those materials, as well as detailed specifications on the mounting hardware (screws, washers, bolts, nuts, etc.). Many standards require all mounting hardware to be included. The instructions should also address proximity of the product after mounting to other products or sources of heat.

Permanent Mounting vs. Temporary Mounting: Products classified as "moveable" may only be provided with a temporary means of mounting so that the user can remove the product from its mounting without tools. This is typically achieved with protected keyhole slots – slots that allow the product to be secured to screw heads protruding a short distance from the wall and are protected so the screw cannot be tightened after mounting.

Products that are secured by means that require a tool to remove are considered "stationary" or "fixed" equipment depending on the type of product and particular product safety standard. Additional requirements apply to stationary and fixed equipment such that a product manufacturer may want to insure a moveable product classification using keyhole slots. In some cases, for example plug strips (temporary power taps), a product is prohibited from having a permanent means of mounting.

Test Method:

1) Sample Mounting: As discussed above, the product is to be mounted as indicated in the product's installation instructions. You may want to perform all other tests that do not involve applying a force to the product before performing the Wall or Ceiling Mounting Test (i.e. Normal Temperature Test must be performed with the product mounted in the same manner).
2) Test Time: For most standards, the test time is 1 minute with the full load in place.
3) Test Load: The requirement is for the mounting system to withstand 4x the weight of the product. With the product mounted, the person performing the test must then add 3x the weight of the product onto the product under test.
4) Test Load Application: The standards specify applying the load to the center of gravity for the product. This is important to avoid adding unintended leverage and torque forces to the test.

Pass/Fail Criteria: Most standards indicate the following pass fail criteria:

A) During Testing: The product cannot fall or become dislodged or loose in its mounting.
B) After Testing: The product and mounting hardware are to be inspected to insure that no damage was sustained.

Other Considerations:

a) Is it an Unintended Shelf or Step? Make sure your mounting instructions put the product at a sufficient height to limit the likelihood it is used as a step or shelf – especially by a child! When this cannot be avoided, warning markings and instructions should be considered. You may also want to consider increasing the safety factor (the standard requires 4x but the manufacturer is encouraged to design for a higher safety factor when appropriate).
b) Markings Visible? Be careful where the markings are located for wall and ceiling mounted products. The markings must be on a surface that is visible after mounting. You may also want to consider putting the markings in a position that can be viewed without use of a ladder.

Conclusion: As you can see, we don't simply perform the tests because they are in the standard. Each test in the standard has a set of objectives that relate to the 6 Hazards of Product Safety. The Mounting Test is performed as part of the review for Injury hazards. Protecting the user from products that can fall from their mounting is crucial to insuring the product continues to provide protection from a Risk of Injury, or subsequent hazards presented by a product that falls and is damaged but remains operational. It is therefore an extremely important test – another test that directly saves toes, feet, and in some extreme cases, lives.