



Procedures for High Humidity Test

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. This procedure describes two options of high humidity testing (water fog and wet-bottom) which are typically used to evaluate the influence of high humidity environments to coated substrates. This influence is usually measured by testing physical and mechanical properties before and after exposure.

1.2 Applicability. Not applicable.

1.3 Remarks. None.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

ASTM B117

ASTM D1193

ASTM D2247

ISO 6270-2

2.2 GM Standards/Specifications.

None

2.3 Additional References.

- Product or Material Specifications.
- Subsystem Technical Specifications.
- Component Technical Specification.
- Part Drawings.

3 Resources

3.1 Facilities.

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.2 Equipment.

3.2.1 Option A: Water Fog. The apparatus for fogging humidity exposure shall consist of:

3.2.1.1 A fog/environmental chamber.

3.2.1.2 Suitable water supply conforming to ASTM D1193 Type IV.

3.2.1.3 A supply of suitably conditioned compressed air.

3.2.1.4 One or more atomizing nozzles.

3.2.1.5 Provisions for heating the chamber and the necessary means of control (refer to ASTM B117, Appendix X.1, for further details regarding the construction of the apparatus).

3.2.2 Option B: Wet Bottom. The apparatus shall consist of the chamber design as defined in ISO 6270-2, Section 5.1, Climatic Chamber.

Note: During “wet-bottom” generated humidity cycles, ensure that visible water droplets are found on the samples to verify proper wetness.

3.2.3 Option C: Non-Condensing Humidity. Typically, a Mechanical Climatic Chamber utilizing an external water vapor (steam) humidity system (boiler) to provide vapor to the test chamber for testing of interior trim. Non-condensing humidity is a vapor that will leave a random droplet inconsistent wet film on the surface as opposed to a condensing humidity which will leave a consistent wet film on the surface with persistent water droplets. Reference ASTM D2247 for apparatus description, water and air quality, and specimen racking, placement, handling and rating. The Relative Humidity, Temperature, Duration and Requirements shall be described in the Material Specification.

Note: Only use Option C when specifically required in the referencing Material Specification. If no Option is noted in the Material Specification, use Option A or B. Consult the approving Materials Engineering for direction.

3.3 Test Vehicle/Test Piece. Test specimen preparation shall be per the applicable product or material specification, or per agreement between the requester and the test analyst.

3.4 Test Time. Test exposure and coordination time varies based on Material Specification and/or test request submitted.

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Not applicable.

4 Procedure

4.1 Preparation. Humidity test environment and duration of test shall be per the applicable product or material specification, or per agreement between the requester and tester.

4.2 Conditions.

4.2.1 Environmental Conditions. The apparatus for humidity exposure shall be installed in a room with an ambient atmosphere where room temperature is $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and $< 75\%$ relative humidity (RH).

4.2.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

4.3 Instructions.

4.3.1 Option A: Water Fog. Test temperature and humidity within the exposure zone shall be:

- Temperature: $38\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$
- Humidity: Approximately 100% RH

4.3.2 Option B: Wet-Bottom. Test temperature and humidity within the exposure zone shall be:

- Temperature: $40\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$
- Humidity: Approximately 100% RH

4.3.3 Option C: Non-Condensing (random droplet inconsistent wet film). Test temperature and humidity shall be defined in the material specification. If no conditions are specified, the exposure zone shall be:

- Temperature: $40\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$
- Humidity: Approximately 100% RH (95% to approximately 100% RH)

5 Data

5.1 Calculations. Not applicable.

5.2 Interpretation of Results. Evaluations (pre-test and post-test), rating methods, and acceptance criteria shall be specified within engineering documentation which includes: Material Specifications, Subsystem Technical Specifications, Component Technical Specification, and Part Drawings.

5.3 Test Documentation. Test documentation must include Type of used equipment (Option A or B).