This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

Designation: D3732 – 23

Standard Practice for Reporting Cure Times of Ultraviolet-Cured Coatings[1]

This standard is issued under the fixed designation D3732; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This practice applies to all coatings cured by ultraviolet energy.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D968 Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive

D1474 Test Methods for Indentation Hardness of Organic Coatings

D2197 Test Method for Adhesion of Organic Coatings by Scrape Adhesion

D2793 Test Method for Block Resistance of Organic Coatings on Wood Panel Substrates

D2794 Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)

D3023 Practice for Determination of Resistance of Factory-Applied Coatings on Wood Products to Stains and Reagents

D3359 Test Methods for Rating Adhesion by Tape Test

D3363 Test Method for Film Hardness by Pencil Test

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *cure, n*—the condition of a coating after conversion to the final state of cure as measured by tests generally related to end-use performance and mutually agreeable to supplier and purchaser.

3.1.2 *ultraviolet curing, n*—conversion of a coating from its application state to its final use state by means of a mechanism initiated by ultraviolet radiation generated by equipment designed for that purpose.

4. Significance and Use

4.1 This practice provides a guide whereby all pertinent variables relating to the ultraviolet cure of a coating are described.

5. Procedure

5.1 Apply the coating to be cured to the desired substrate at a film thickness typical to that normally used. After approximately the time delay encountered in production pass the coated substrate through the curing equipment and subsequently test for cure, as defined in 3.1.1, using the appropriate methods listed in 5.1.1 through 5.1.9. The most commonly used test methods are listed in 5.1.1 through 5.1.4.

5.1.1 *Impact Resistance*—Test Method D2794.

5.1.2 *Film Hardness*—Test Method D3363.

5.1.3 *Solvent Rub Test*—Hold a pad of cheesecloth or other cloth saturated with an agreed-upon solvent, usually methyl ethyl ketone, over two adjacent fingers using a protective covering. Rub the wet pad back and forth across a 100 mm portion of the cured film using vigorous pressure, one forward and one backward movement constituting one double rub. Take the end point as the number of double rubs required to soften or penetrate the film. Fully cured films are normally required to resist a specified number of rubs and the result of the test is given as exceeding the limit or failing the test.

5.1.4 *Sandability*—Ultraviolet cured fillers are usually judged by their sandability with an agreed-upon grit of paper. This test is often made immediately after the material leaves the ultraviolet processor.

[1] This practice is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.55 on Factory Applied Coatings on Preformed Products.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

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5.1.5 *Abrasion Resistance*—Test Method D968.
5.1.6 *Indentation Hardness*—Test Methods D1474.
5.1.7 *Adhesion*—Test Methods D2197 and D3359.
5.1.8 *Block Resistance*—Test Method D2793.
5.1.9 *Stain and Reagent Resistance*—Practice D3023.

5.2 Repeat the application, curing, and testing with fresh material on fresh substrates until the shortest time that yields a cured film is obtained.

6. Report

6.1 Ultraviolet curing equipment is available with several design variables. Therefore, include the following information with results where applicable:
6.1.1 Number of bulbs,
6.1.2 Bulb type (intensity, spectral distribution, composition),
6.1.3 Bulb age,
6.1.4 Bulb location (height from work and orientation to workpiece),
6.1.5 Reflector design,
6.1.6 Conveyor speed or exposure time to achieve cure,
6.1.7 Substrate,
6.1.8 Coating identification and age of sample if known,
6.1.9 Wet film thickness,
6.1.10 Temperature conditions in the curing unit,
6.1.11 Curing environment (air, nitrogen, or other atmosphere),
6.1.12 Cure tests used (refer to Section 5), and
6.1.13 Age of cured film when tests were run.

7. Keywords

7.1 cure time; ultraviolet-cured coatings

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