Designation: D5064 – 16a (Reapproved 2021)

Standard Practice for Conducting a Patch Test to Assess Coating Compatibility[1]

This standard is issued under the fixed designation D5064; 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.

1. Scope

1.1 This practice covers the procedures for assessing coating compatibility when maintenance of an in-place coating system is being contemplated. It does not address procedures for assessing the integrity of the existing coating to determine if it can be repainted, nor does it establish the compatibility of the maintenance coating system with the substrate or corrosion products. The practice is intended for use in the field. SSPC-TU 3 discusses the risks associated with the maintenance painting practice known as overcoating.

NOTE 1—Pass-Fail Criteria (for example, adhesion requirements) are not established by this practice. These should be established by the user or specifier with input from the coating manufacturer.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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]

D16 Terminology for Paint, Related Coatings, Materials, and Applications

D3359 Test Methods for Rating Adhesion by Tape Test

D4138 Practices for Measurement of Dry Film Thickness of Protective Coating Systems by Destructive, Cross-Sectioning Means

D4414 Practice for Measurement of Wet Film Thickness by Notch Gages

D4541 Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers

D6132 Test Method for Nondestructive Measurement of Dry Film Thickness of Applied Organic Coatings Using an Ultrasonic Coating Thickness Gage

D6677 Test Method for Evaluating Adhesion by Knife

D7091 Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals

D7234 Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers

2.2 *SSPC Standards:*[3]

TU 3 Technology Update No. 3 Overcoating

3. Terminology

3.1 *Definitions*—For definitions of terms used in this practice, refer to Terminology D16.

4. Summary of Test Method

4.1 The materials under test are applied to the previously painted surface after surface preparation. After the appropriate time has elapsed, the test patch is examined for visual defects and adhesion is assessed.

5. Significance and Use

5.1 In performing maintenance of a coating system, the new coating being applied must be compatible with the existing coating. While general guides exist which indicate compatibility of different generic types of coatings, differences in manufacturer's formulation and the condition of the in-place coating system may affect compatibility.

6. Procedure

6.1 Select test locations for evaluation that adequately characterize differences in configuration of the structure and

[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 D01.46 on Industrial Protective Coatings.

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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.

[3] Available from Society for Protective Coatings (SSPC), 800 Trumbull Drive, Pittsburgh, PA 15205, http://www.sspc.org.

the exposure environment; that is, vertical versus horizontal surfaces; sheltered versus unsheltered exposure; atmospheric verses splash zone or immersion. Additional factors must be considered for previously immersed areas. For these cases consult the coating manufacturer. A minimum of three test locations with one test patch in each is recommended.

6.2 The size of each test patch is limited by the size and configuration of the test locations. Each test patch shall be as large as possible, with a minimum size of 1.0 m^2 (10.8 ft^2) recommended.

6.3 Prepare the surface of the test areas using the methods specified for the maintenance painting procedure (Note 2). Alternative methods of preparation may also be evaluated in separate, adjacent tests.

NOTE 2—This practice is intended to assess compatibility with the existing coating only and does not apply to areas where the substrate is exposed by the methods of preparation.

6.4 Measure the existing coating thickness in accordance with Test Methods D6132, D4138, or Practice D7091, as appropriate for the type of substrate.

6.5 Measure the air and surface temperatures, the relative humidity and the dew point temperatures and verify that the conditions are within the limits recommended by the coatings manufacturer for the product(s) being tested.

6.6 Apply the test coating to the thickness recommended by the coating manufacturer. Use the application technique as intended for use during production operations. If agreed upon between the purchaser and the seller, the method of coating application may be different from that proposed for use on the job, that is, brush application of the test patch even though spray application is intended to be used on the job. However, this can cause anomalies in the data and is not generally recommended.

6.7 Immediately after application, measure the wet-film thickness in accordance with Practice D4414. Inspect each patch for application defects such as runs, sags, and pinholes. If such defects cannot be corrected as a part of the initial application process, prepare a new test patch.

6.8 After the coating has dried, measure the dry-film thickness in accordance with Test Methods D6132, D4138, or D7091. Make corrections to the application, if necessary, by either applying more material if the dry film thickness is low (build-up coat) or applying another test patch if the dry film thickness is above the recommended maximum.

NOTE 3—When using Test Method D6132 or Practice D7091, the dry film thickness is the difference in average thickness of the coating system less the average thickness of the in-place coating.

6.9 A sufficient test duration and inspection frequency should be agreed upon between the purchaser and seller prior to evaluation. The test duration should be long enough to allow the coating to cure and weather prior to evaluation. Test durations are defined as long term and short term. Long-term test durations provide the most reliable assessment of compatibility. Short-term test durations provide for more rapid evaluation of results, but may not reveal all potential compatibility problems. Test durations longer or shorter than those listed in 6.9.1 and 6.9.2 may be agreed upon between the purchaser and seller.

6.9.1 *Long-Term Test Duration*—Curing and weathering for as long a time as possible, with a minimum of six months preferred. Weathering should span seasonal weather changes.

6.9.2 *Short-Term Test Duration*—Curing and weathering at the following minimum times based on average daily (24 h) temperatures:

10°C (50°F)	21°C (70°F)	32°C (90°F)
14 days	10 days	7 days

6.10 After the test duration is completed (or at the inspection interval), examine the total surface of each test patch for wrinkling, blistering, mudcracking, checking, cracking, peeling, lifting, and disbonding. Measure or rate the adhesion in a minimum of five locations per test patch in accordance with Test Methods D3359 or D6677. If agreed upon between the purchaser and the seller, adhesion testing in accordance with Test Methods D4541 or D7234 may be used.

6.11 Examine the test patches for the defects noted in 6.10 on a regular schedule, discounting rust caused by previous tests such as adhesion measurements and destructive film thickness measurements.

7. Report

7.1 Report the following information:

7.1.1 The identity of the structure tested, the location and size of the test patches, the identity of the test coating, the method and grade of surface preparation, and the method of coating application.

7.1.2 For each test patch, the dry film thickness measurements and average of the in-place coating, the dry film thickness measurements and average of the test coating, the elapsed time for each evaluation, the visual defects noticed, and the results of adhesion tests.

8. Keywords

8.1 coating; coating compatibility; coating test patch; paint; paint compatibility; test patch