Designation: D 3451 – 01

Standard Guide for Testing Coating Powders and Powder Coatings[1]

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1. Scope

1.1 This guide covers the selection and use of procedures for testing coating powders and powder coatings. The test methods included are listed in Table 1. Where more than one test method is listed for the same characteristic, no attempt is made to indicate superiority of one method over another. Selection of the methods to be followed must be governed by experience and the requirements in each individual case, together with agreement between the purchaser and the seller.

1.2 This guide also refers to methods developed specifically for the coating powder industry by the Powder Coating Institute, PCI, and the International Organization for Standards, ISO.

1.3 This guide describes the testing of coating powders as applied by electrostatic spray, fluidized bed, or any other applicable method.

1.4 *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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

B 117 Practice for Operating Salt Spray (Fog) Testing Apparatus[2]

D 522 Test Method for Mandrel Bend Test of Attached Organic Coatings[3]

D 523 Test Method for Specular Gloss[3]

D 609 Practice for Preparation of Cold-Rolled Steel Panels for Testing Paint, Varnish, Conversion Coatings, and Related Coating Products[3]

D 610 Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces[4]

D 658 Test Method for Abrasion Resistance of Organic Coatings by Air Blast Abrasive[5]

D 660 Test Method for Evaluating Degree of Checking of Exterior Paints[3]

D 661 Test Method for Evaluating Degree of Cracking of Exterior Paints[3]

D 662 Test Method for Evaluating Degree of Erosion of Exterior Paints[3]

D 714 Test Method for Evaluating Degree of Blistering of Paints[3]

D 772 Test Method for Evaluating Degree of Flaking (Scaling) of Exterior Paints[3]

D 822 Practice for Conducting Tests on Paint and Related Coatings and Materials Using Filtered Open-Flame Carbon-Arc Exposure Apparatus[3]

D 870 Practice for Testing Water Resistance of Coatings Using Water Immersion[3]

D 968 Practice for Testing Abrasion Resistance of Organic Coatings by Falling Abrasive[3]

D 1005 Test Methods for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers[3]

D 1014 Practice for Conducting Exterior Exposure Tests of Paints on Steel[3]

D 1186 Test Methods for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Base[3]

D 1308 Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes[4]

D 1400 Test Method for Nondestructive Measurement of Dry Film Thickness of Nonconductive Coatings Applied to a Nonferrous Metal Base[3]

D 1474 Test Methods for Indentation Hardness of Organic Coatings[3]

D 1535 Practice for Specifying Color by the Munsel System[3]

D 1654 Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments[3]

D 1729 Practice for Visual Appraisal of Colors and Color Differences of Diffusely Illuminated Opaque Materials[3]

D 1730 Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting[6]

[1] This guide is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.51 on Powder Coatings.

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[2] *Annual Book of ASTM Standards*, Vol 03.02.

[3] *Annual Book of ASTM Standards*, Vol 06.01.

[4] *Annual Book of ASTM Standards*, Vol 06.02.

[5] Discontinued 1996; see *1995 Annual Book of ASTM Standards*, Vol 06.01.

[6] *Annual Book of ASTM Standards*, Vol 02.05.

D 1731 Practices for Preparation of Hot-Dip Aluminum Surfaces for Painting[6]
D 1732 Practices for Preparation of Magnesium Alloy Surfaces for Painting[6]
D 1735 Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus[3]
D 1895 Test Methods for Apparent Density, Bulk Factor, and Pourability of Plastic Materials[7]
D 1898 Practice for Sampling of Plastics[8]
D 1921 Test Method for Particle Size (Sieve Analysis) of Plastic Materials[7]
D 2091 Test Method for Print Resistance of Lacquers[4]
D 2092 Guide for Treatment of Zinc-Coated (Galvanized) Steel Surfaces for Painting[4]
D 2201 Practice for Preparation of Zinc-Coated and Zinc-Alloy-Coated Steel Panels for Testing Paint and Related Coating Products[3]
D 2244 Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates[3]
D 2247 Practice for Testing Water Resistance of Coatings in 100 % Relative Humidity[3]
D 2248 Practice for Detergent Resistance of Organic Finishes[3]
D 2369 Test Method for Volatile Content of Coatings[3]
D 2454 Practice for Determining the Effects of Overbaking on Organic Coatings[3]
D 2616 Test Method for Evaluation of Visual Color Difference with a Gray Scale[3]
D 2793 Test Method for Block Resistance of Organic Coatings on Wood Panel Substrates[4]
D 2794 Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)[3]
D 2803 Guide for Testing Filiform Corrosion Resistance of Organic Coatings on Metal[3]
D 2967 Test Method for Edge Coverage of Coating Powders[4]
D 3003 Test Method for Pressure Mottling and Blocking Resistance of Organic Coatings on Metal Substrates[4]
D 3023 Practice for Determination of Resistance of Factory-Applied Coatings on Wood Products to Stains and Reagents[4]
D 3170 Test Method for Chipping Resistance of Coatings[4]
D 3214 Test Methods for Coating Powders and their Coatings Used for Electrical Insulation[4]
D 3260 Test Method for Acid and Motar Resistance of Factory-Applied Clear Coatings on Extruded Aluminum Products[4]
D 3359 Test Method for Measuring Adhesion by Tape Test[3]
D 3363 Test Method for Film Hardness by Pencil Test[3]
D 3960 Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings[3]
D 4017 Test Method for Water in Paints and Paint Materials by Karl Fischer Method[3]
D 4060 Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser[4]
D 4086 Practice for Visual Evaluation of Metamerism[3]
D 4141 Practice for Conducting Accelerated Outdoor Exposure Tests of Coatings[3]
D 4145 Test Method for Coating Flexibility of Prepainted Sheet[4]
D 4214 Test Methods for Evaluating Degree of Chalking of Exterior Paint Films[3]
D 4217 Test Method for Gel Time of Thermosetting Coating Powders[4]
D 4242 Test Method for Glass Plate Flow for Thermosetting Coating Powders[4]
D 4585 Practice for Testing Water Resistance of Coatings Using Controlled Condensation[3]
D 4587 Practice for Conducting Tests on Paint and Related Coatings and Materials Using Fluorescent UV-Condensation Light-and Water-Exposure Apparatus[3]
D 5031 Practice for Conducting Tests on Paints and Related Coatings and Materials Using Enclosed Carbon-Arc Exposure Apparatus[3]
D 5382 Guide to Evaluation of Optical Properties of Powder Coating[4]
D 5767 Test Method for Instrumental Measurement of Distinctness-of-Image Gloss of Coating Surfaces[3]
D 5861 Guide for Significance of Particle Size Measurements of Coating Powders[4]
D 5965 Test Method for Specific Gravity of Coating Powders[4]
D 6132 Test Method for Nondestructive Measurement of Dry Film Thickness of Applied Organic Coatings Over Concrete Using an Ultrasonic Gage[3]
D 6441 Test Methods for Measuring the Hiding Powder of Powder Coatings[3]
E 11 Specification for Wire-Cloth Sieves for Testing Purposes[9]
E 284 Terminology of Appearance[3]
E 308 Practice for Computing the Colors of Objects By Using the CIE System[3]
E 1164 Practice for Obtaining Spectrophotometric Data for Object-Color Evaluation[3]
E 1331 Test Method for Reflectance Factor and Color by Spectrophotometry Using Hemispherical Geometry[3]
E 1345 Practice for Reducing the Effect of Variability of Color Measurement by the Use of Multiple Measurements
E 1347 Test Method for Color and Color-Difference Measurement by Tristimulus (Filter) Colorimetry[3]
E 1349 Test Method for Reflectance Factor and Color by Spectrophotometry Using Bidirectional Geometry[3]
G 141 Guide for Addressing Variability in Exposure Testing on Nonmetallic Materials[10]
G 147 Practice for Conditioning and Handling of Nonmetallic Materials for Natural and Artificial Weathering Tests[10]
G 151 Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources[10]

[7] *Annual Book of ASTM Standards*, Vol 08.01.
[8] Discontinued 1998; see *1997 Annual Book of ASTM Standards*, Vol 08.01.
[9] *Annual Book of ASTM Standards*, Vol 14.02.
[10] *Annual Book of ASTM Standards*, Vol 14.04.

G 152 Practice for Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials[10]
G 153 Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials[10]
G 154 Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials[10]
G 155 Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials[10]
G 166 Guide for Statistical Analysis of Service Life Data[10]

2.2 *ISO Standards:*[11]

ISO 8130-1 Determination of particle size distribution by sieving
ISO 8130-2 Determination of density by gas comparison pykometer (referee method)
ISO 8130-3 Determination of density by liquid displacement pykometer
ISO 8130-4 Calculation of lower explosion limit
ISO 8130-5 Determination of flow properties of a powder/air mixture
ISO 8130-6 Determination of gel time of thermosetting coating powders at a given temperature
ISO 8130-7 Determination of loss of mass on stoving
ISO 8130-8 Assessment of the storage stability of thermosetting powders
ISO 8130-9 Sampling
ISO 8130-10 Deposition efficiency of coating powders
ISO 8130-11 Inclined-plane flow test
ISO 8130-12 Determination of compatibility

2.3 *PCI Recommended Procedures:*[12]

PCI #1 Accelerated Stability Test - Powder Coatings
PCI #2 Compatibility of Powder Coatings
PCI #3 Contrast Ratio - Powder Coatings
PCI #4 Density of Powder Coating Materials
PCI #6 Gel Time Reactivity
PCI #7 Inclined Plate Flow
PCI #9 Cured Weight Loss for Thermosetting Coating Powders

[11] ISO standards are available from the American National Standard Institute (ANSI), 13th Floor, 11 West 42nd St., New York, NY 10036. Telephone: 212-642-4900. Website: www.ansi.org

[12] The PCI Recommended Procedures are available from the Powder Coating Institute (PCI), 2121 Eisenhower Avenue, Suite 401, Alexandria, VA 22314. Telephone: 703-684-1770. Website: www.powdercoating.org

TABLE 1 List of Test Methods

	Section	ASTM Method	PCI Procedure	ISO
Coating Powder Properties:				
Sampling	6	D 1898		8130-9
Compatibility	9		#2	8130-12
Lower explosion limit	10			8130-4
Particle size and distribution	11.2	D 5861		
Multiple sieve and analysis	11.2.1	D 1921, E 11		8130-1
Accelerated storage stability	12			
Glass vial method	12.2		#1	8130-8
Pourability	13	D 1895		8130-5
Fluidity	14			
Cured weight loss for thermosetting coating powders	15		#9	8130-7
Gel time (stroke cure)	16	D 4217	#6	8130-6
Flow test (incline method)	17	D 4242	#7	8130-11
Specific gravity	18	D 5965	#4	8130-2; 8130-3
Melting point determination	19			
Application Properties:				
Deposition/transfer efficiency of powder coating process	20			8130-10
Powder Coating Properties:				
Abrasion resistance	22			
Air blast abrasion tester	22.2	D 658		
Falling sand method	22.2	D 968		
Taber abraser	22.2	D 4060		
Adhesion	23			
Tape adhesion	23.2	D 3359		
Chemical resistance	24			
Household chemical resistance	24.2	D 1308		
Detergent resistance	24.3	D 2248		
Acid resistance	24.4	D 3260		
Stains or reagents on wood substrates	24.5	D 3023		
Chip resistance	25			
Gravelmeter	25.2	D 3170		
Edge coverage	26.2	D 2967		
Electrical insulation	27.2	D 3214		
Elongation (flexibility)	28			
Conical/cylindrical mandrel	28.2	D 522		
T-Bend	28.2	D 4145		
Film thickness	21.5			
On nonmagnetic metal base		D 1400		
On magnetic metal base		D 1186		
On nonmetal base		D 6132		
Destructive method		D 1005		

TABLE 1 *Continued*

	Section	ASTM Method	PCI Procedure	ISO
Hardness	29			
Pencil	29.2	D 3363		
Knoop Indention	29.3	D 1474		
Impact resistance	30	D 2794		
Molting/blocking resistance	31	D 3003		
On Metal substrates	31.2	D 3063		
In Wood substrates	31.3	D 2793		
Print resistance	32	D 2091		
Optical properties	33			
Guide To:	33.1	D 5382		
Color pigmented coatings	33.2			
Visual	33.2.2	D 1535		
Instrumental	33.2.3	D 2244, E 308, E 1164, E 1331, E 1345, E 1347, E 1349		
Color difference	33.3			
Visual	33.3.2	D 1535, D 1729, D 2244		
Instrumental	33.3.3	D 2244, E 308, E 1164, E 1331, E 1345, E 1347, E 1349		
Metamerism (visual)	33.4.1	D 4086		
Distinction of image (DOI)	33.5.1	D 5767		
Hiding power/opacity	33.6.2	D 6441	#3	
Gloss	33.7.2	D 523		
Surface profile (orange peel)	33.8.2			
Outdoor exposure (natural)	34	D 1014		
Adhesion	34.2.1	D 3359		
Blistering	34.2.2	D 714		
Chalking	34.2.3	D 4214		
Checking	32.2.4	D 660		
Cracking	34.2.5	D 661		
Rusting	34.2.6	D 610		
Errosion	34.2.7	D 662		
Flaking	34.2.8	D 772		
Gloss	34.2.9	D 523		
Color	34.2.10	D 1729, D 2244, D 4086		
Accelerated artificial weathering	35	D 822, D 4141, D 4587, D 5031, G 141, G 147, G 151, G 152, G 153, G 154, G 155		
Accelerated environmental exposures	36			
Filiform corrosion	36.2.1	D 2803		
Salt spray	36.2.2	B 117		
SCAB corrosion	36.2.3			
Water resistance	36.2.4			
High humidity/100 % humidity	36.2.5.1	D 1735, D 2247		
Condensation	36.2.5.2	D 4585		
Water immersion	36.2.5.3	D 870		

3. Terminology

3.1 *Definitions:*

3.1.1 *contrast ratio*, *n*—a value related to the hiding powder of a coating.

3.1.1.1 *Discussion*—The ratio of the reflectance of the coating over black and white backgrounds at equal film thickness. In the coatings industry 98 % contrast ratio is by convention characterized as being visually opaque, for hiding power measurement purposes, although it is recognized that visually (just as photometrically) the opacity is actually somewhat less than complete. For the reported hiding power to be significant, the contrast ratio value must be reported at a specific film thickness.

3.1.2 *hiding power*, *n*—the spreading rate of a coating at a specified level of hiding, which is conventionally 0.98 contrast ratio representing photometric "complete hiding".

3.1.2.1 *Discussion*—Practically speaking, hiding power is the extent to which a powder coating masks the color and pattern of the substrate at a given film thickness.

3.1.3 *minimum explosive concentration (MEC)*, *n*—the lower point for a range of concentrations of organic particles suspended in air that can be ignited by a sufficient energy source.

3.1.3.1 *Discussion*—Also referred to as *LEL or Lower Explosive Level*.

3.1.4 *orange peel*, *n*—the appearance of irregularity of a surface resembling the skin of an orange.

3.1.5 *pourability*, *n*—the ability of a dry coating to flow uniformly or to be continuously poured from a container at a steady rate.

3.1.6 *specific gravity*, *n*—an expression of ratio of the density of a material to that of water at a given temperature and pressure.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 Many of the following definitions specific to this guide were taken from the Powder Coating Institute's Publication, "Powder Coating Terms & Definitions", and are indicated as such by the initials, PCI[13].

3.2.2 *bulk density*, *n*—mass per unit volume in powder form including the air trapped between particles. **(PCI)**

3.2.3 *coating powder*, *n*—finely divided particles of organic polymer, either thermoplastic or thermosetting, which generally contain pigments, fillers, and additives and which remain finely divided during storage under suitable conditions. **(PCI)**

3.2.4 *coverage rate*, *n*—the area covered per unit quantity of coating at a specified film thickness, typically expressed in ft^2/lb./mil.

3.2.4.1 *Discussion*—The term coverage rate is similar to "spreading rate" as often used in liquid technologies.

3.2.5 *electrostatic deposition*, *n*—technique of moving and charging coating powder so that it is deposited onto a grounded substrate by one of the following methods: **(PCI)**

3.2.5.1 *cloud chamber technique, n*—method of moving a charged or uncharged object through a charged or uncharged cloud of coating powder in an enclosed chamber.

3.2.5.2 *fluidized bed technique, n*—method of moving a ground objective over or through a charged fluidized coating powder.

3.2.5.3 *spray technique, n*—method of spraying and charging coating powder so that it is deposited onto a grounded charged substrate.

3.2.6 *film formation of a coating powder*, *n*—the forming of a continuous film by melting coating powder particles and coalescing them by the application of energy. **(PCI)**

3.2.6.1 *Discussion*—For thermosetting materials, a chemical reaction, either condensation or addition, also takes place. For thermoplastic materials, no chemical reaction takes place. Thermoplastic materials flow when heat is applied and develop performance properties when cooled. Flow will re-occur if re-heated. Both thermoset and thermoplastic films have uniformity of color, toughness, and other properties associated with protective and decorative coatings.

3.2.7 *fluidity*, *n*—the ability of a powder to move freely, uniformly, and continuously (somewhat like a liquid) when subjected to certain conditions of pressure, temperature, and velocity of a carrier gas.

3.2.8 *gel time*, *n*—the time interval (measured in seconds) required for a coating powder to be transformed from a dry solid to a gel-like state at a given temperature. **(PCI)**

3.2.9 *glass plate flow, (GPF)*, *n*—the measurement (in millimetres) of flow-out on an inclined smooth glass surface when powder is in a molten state at a given temperature. **(PCI)**

3.2.10 *impact fusion*, *n*—the tendency of finely divided powders to fuse with other particles in the application equipment during the application process. **(PCI)**

3.2.11 *nonelectrostatic deposition*, *n*—technique of moving coating powder onto a substrate, which may be heated above the melt point of the coating powder material. **(PCI)**

3.2.11.1 *Discussion*—The actual application could be the spray or fluidized bed technique as with electrostatic deposition.

3.2.12 *particle size*, *n*—average diameter of particles having irregular boundaries that can be determined by various test methods. **(PCI)**

3.2.13 *particle-size distribution*, *n*—arrangement of particle size measurements on a coating powder in groups of specified diameters. **(PCI)**

3.2.14 *powder coatings*, *n*—coatings that are protective, decorative, or both, formed by the application of a coating powder (3.1.1) to a substrate and fused into a film by the application of heat or radiant energy. **(PCI)**

3.2.15 *storage stability*, *n*—the ability of coating powders to maintain physical and chemical properties during specific storage conditions. **(PCI)**

3.2.16 *tribocharging*, *n*—the process of creating a static electric charge on powder particles by friction against a nonconductive material. **(PCI)**

3.2.17 *volatile content*, *n*—the quantity expressed as weight percent of the coating powder, which is lost under specified conditions of temperature and time. **(PCI)**

4. Significance and Use

4.1 This guide provides a useful summary to the selection and use of procedures for testing coating powders and powder coatings. It is applicable to both thermoplastic and thermoset coatings, unless indicated otherwise. By design this guide does not purport to address test methods or procedures developed specifically for the functional powder coating market, those coating powders for application to pipe or reinforced steel bars (rebar). Information on current test procedures for pipe and reinforced steel bar coating powders and powder coatings can be obtained through their respective ASTM Subcommittees, A01.05 and D01.48.

4.2 Selection of the methods to be followed and the interpretation of results must be governed by experience and the requirements in each individual case, together with agreement between the purchaser and seller. It should be noted that many of the methods used for characterizing a coating powder, such as gel time (Section 16) and inclined flow (Section 17), are primarily meant for the relative comparison of two coating powders, rather than to give a test value that can be interpreted as good or bad. Interpretation of the test results will depend on the specific application in question and will also often depend on the chemistry of the coating powder used.

[13] The PCI publication, "Powder Coating Terms & Definitions" is available from the Powder Coating Institute (PCI),

5. General Requirements

5.1 Ideally, all tests shall be conducted under the same conditions as to light source, sample age, temperature, and humidity. These conditions may be indicated by the individual test procedure used or agreed upon between the purchaser and seller. In the absence of other guidance, test conditions of 23 ± 2°C, 50 ± 5 % relative humidity, and a relatively consistent sample (panel) conditioning time, (sample to sample), are recommended.

6. Sampling

6.1 Sample the coating powder in accordance with Practice D 1898 or ISO 8130-9.

6.2 Prepare specimens as required for the specific tests on the coating.

7. Equipment

7.1 Use the equipment as specified in each test method.

8. Conditions Affecting Coating Powder or Powder Coatings, or Both

8.1 The performance of a coating powder can be affected by damage to container, size of container, storage time, excessive temperature, excessive humidity and temperature fluctuations, which may cause settling, caking, or chemical change.

8.2 The performance of powder coatings may be affected by:

8.2.1 Substrate type, substrate age, substrate condition, and the type, quality, and suitability of the metal treatment or primer used under the powder coating.

8.2.2 Application conditions such as temperature, humidity, voltage, part grounding, and gun to part distance.

COATING POWDER PROPERTIES

9. Compatibility

9.1 The need for compatibility arises when working with coating powders of varying color or chemical composition. Problems such as changes in gloss, surface appearance, physical properties, and color contamination may occur if incompatible powders are mixed. Rather than discover these problems on the production coating line, it is recommended that the compatibility of powders be checked prior to their use.

9.2 Test compatibility of coating powders in accordance with PCI Procedure #2 or ISO 8130-12.

10. Minimum Explosive Concentration (Lower Explosive Level (LEL))

10.1 The minimum explosive concentration (MEC) as defined in 3.1.3 is a value that is critical in the proper design of coating powder application and collection systems. To obtain precise and reliable LEL results, it is best to employ the service of an independent laboratory, which has the special apparatus needed. However, a quick calculation method, as listed below, has been proved in practice to be satisfactory when applied to coating application plants.

10.2 Calculate the MEL (or LEL) of a coating powder in accordance with ISO 8130-4.

11. Particle Size and Distribution

11.1 A coating powder's particle size distribution (P.S.D.) and the resulting median particle size can have a significant affect on the coating powder's application properties and the appearance of the cured powder coating. There is unfortunately, no one optimum P.S.D. or median particle size. The optimum P.S.D. and median particle size for each application will be influenced by the part configuration being coated, the desired film thickness range, the desired film appearance, the powder chemistry, and the application equipment.

11.2 Guide D 5861 references a number of commonly used methods for the measurement of particle size.

11.3 *Multiple Sieve Analysis*:

11.3.1 Run multiple sieve analysis in accordance with Test Method D 1921 or ISO 8130-1.

11.3.2 Specification E 11 can be used in specifying the required sieves.

12. Accelerated Storage Stability

12.1 For the recommended useful life of a coating powder, the coating powder must be easily fluidized and free-flowing in order to be properly applied. In addition, the coating powder has to melt, flow out, and cure (thermoset coating powders), to form a powder coating possessing the aesthetic and protective properties desired. In the case of a thermoset coating powder, an accelerated storage stability test can allow a powder user to predict the physical and chemical stability of a coating powder in order to determine its long term usability as a function of time and temperature. The physical stability of a thermoplastic coating powder can also be predicted.

12.2 Run accelerated storage stability in accordance with PCI Procedure #1 or ISO 8130-8.

13. Pourability

13.1 Test for pourability in accordance with Test Method D 1895.

14. Fluidity

14.1 A coating powder's transport and spraying characteristics are, among other things, highly dependent on it's fluidity, defined as the ability to move freely, uniformly, and continuously (somewhat like a liquid), when subjected to certain conditions of pressure, temperature, and velocity of a carrier gas (air).

14.2 Test fluidity in accordance with ISO 8130-5.

15. Cured Weight Loss for Thermosetting Coating Powders

15.1 In comparison to liquid coatings, coating powders will have a relatively small cured weight loss as a result of the cure cycle. Typically, the cured weight loss from a coating powder will consist of water and low molecular weight organic compounds or blocking agents, or both. The cured weight loss may be requested in order to properly determine the exhaust requirements of a bake oven or to comply with state or federal reporting guidelines. At this time, there is not a recognized ASTM standard test method for determining the cured weight loss for a coating powder; however, the following procedure