Designation: G147 – 17

Standard Practice for Conditioning and Handling of Nonmetallic Materials for Natural and Artificial Weathering Tests[1]

This standard is issued under the fixed designation G147; 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 specimen preparation, identification, packing, shipping, handling, and conditioning before, during, and after natural and artificial weathering testing.

1.2 This practice includes details on the conditioning of specimens after exposure and before examination. This practice also covers long-term storage of file specimens.

1.3 Conditioning in this practice does not refer to the specific act of exposing the specimens to the weathering factors.

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.*

NOTE 1—There is no equivalent ISO standard describing procedures for identification, shipping, conditioning, and handling of specimens intended for natural or artificial weathering tests. ISO 139 and ISO 291 describe procedures used for conditioning specimens prior to and during physical property testing.

1.5 *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]

D618 Practice for Conditioning Plastics for Testing

D1729 Practice for Visual Appraisal of Colors and Color Differences of Diffusely-Illuminated Opaque Materials

D1776 Practice for Conditioning and Testing Textiles

D3924 Specification for Environment for Conditioning and Testing Paint, Varnish, Lacquer, and Related Materials (Withdrawn 2016)[3]

E41 Terminology Relating To Conditioning

G7 Practice for Atmospheric Environmental Exposure Testing of Nonmetallic Materials

G24 Practice for Conducting Exposures to Daylight Filtered Through Glass

G90 Practice for Performing Accelerated Outdoor Weathering of Nonmetallic Materials Using Concentrated Natural Sunlight

G113 Terminology Relating to Natural and Artificial Weathering Tests of Nonmetallic Materials

G151 Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources

G152 Practice for Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials

G153 Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials

G154 Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

G155 Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

2.2 *Other Documents:*[4]

ISO 139 Textiles—Standard Atmosphere for Conditioning and Testing

ISO 291 Plastics—Standard Atmospheres for Conditioning and Testing

3. Terminology

3.1 The definitions given in Terminologies E41 and G113 are applicable to this practice.

[1] This practice is under the jurisdiction of ASTM Committee G03 on Weathering and Durability and is the direct responsibility of Subcommittee G03.01 on Joint Weathering Projects.

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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] The last approved version of this historical standard is referenced on www.astm.org.

[4] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

***A Summary of Changes section appears at the end of this standard**

3.2 Unless otherwise stated, use of the term "specimens" in this practice refers to specimens of the test material and of any applicable reference or control materials included as part of the exposure experiment.

3.3 *Definitions of Terms Specific to This Standard:*

3.3.1 *handling, n*—the management of a specimen between exposure periods, or prior to, or after an exposure test.

4. Significance and Use

4.1 Weathering is an inherently variable science due to the fact that weather itself is variable. In addition, there can be variability in results in artificial accelerated testing even when all devices are running identical exposure cycles. Therefore, it is essential to control all factors as much as possible in order to reduce the overall source of error.

4.2 Proper handling of specimens is extremely important for maintaining the integrity of the material being evaluated. Damage to specimens caused by improper handling and labeling can adversely affect the validity of the testing program, causing loss of money and time. Improper handling can introduce nonstandard procedures into the protocol which may be a significant source of variability, adversely affecting the overall precision of results obtained. Improper handling may also introduce a bias in the results obtained.

4.3 Changes to materials can occur even under a seemingly benign conditioning environment, especially if the specimen has already been exposed. Therefore it is necessary to minimize the number and length of non-testing periods in order that the exposure is the only cause of further changes.

5. General Handling Procedures

5.1 Handle all test specimens with care and attention. Physical damage resulting from improper handling can distort the results from the exposure. Wear clean soft cotton gloves if the specimen will be touched on the exposed surface in order to avoid exposing surfaces to skin oils.

5.1.1 In climates where it is necessary to wear sunscreen, insect repellent, or other skin treatments, take extra precautions that these are not transferred to the test specimen.

5.2 The front surface (that is, the side to be oriented towards the light source) is the primary surface of a test specimen. However, some three dimensional specimens may have more than one primary surface. The primary surface(s) must remain free of marks or damage not caused by the weathering elements. Handle test specimens by the edges whenever possible.

5.3 It is recommended that the test specimens be separated during shipment or storage. This ensures that the specimen surface will not be damaged by abrasion or by interaction with other specimens. For flat specimens, this can be accomplished using slotted containers or racks. If specimens are to be stacked, use of a smooth liner film or paper between adjacent specimens is recommended. Non-textured paper, coated papers such as release liners, or unstabilized polyethylene or polyester films are suitable protective layers. Any material placed against the face of the test specimens shall not contaminate or have other interaction with the specimen that affects durability or appearance. For some materials, specimens can be stacked face-to-face. However, this is not recommended because of the damage which can be caused by abrasion or interaction between the surfaces of adjacent specimens.

NOTE 2—Textured paper may leave surface impressions, and additives such as antioxidants, UV absorbers, or plasticizers can migrate from a film onto the test specimen. Suppliers of polymer films can be found in the Thomas Register.

5.4 Never rest the test specimen on its primary surface without protection. Care should be taken not to mar the surface when specimens are placed on measurement equipment, on test frames used for outdoor exposures, or in specimen holders used in laboratory-accelerated exposure devices.

5.5 In the event that it is necessary to handle wet specimens, take extra care to ensure that nothing contacts the primary surface until it has dried completely.

6. Specimen Identification

6.1 Each specimen shall be uniquely coded, and the test laboratory shall maintain records which allow the following information to be determined:

6.1.1 Laboratory I.D. code number.
6.1.2 Exposure location.
6.1.3 Exposure type:
6.1.3.1 Exposure angle (when applicable),
6.1.3.2 Orientation,
6.1.3.3 Backing type,
6.1.3.4 Device type (when applicable), and
6.1.3.5 Exposure cycle (when applicable).
6.1.4 Intended duration of exposure.
6.1.5 Individual specimen identification:
6.1.5.1 Series,
6.1.5.2 Formula code, or
6.1.5.3 Consecutive numbering.
6.1.6 Replicate Number.

6.2 The identifying mark for a specimen shall be made in such a manner that it does not affect the test results for the specimen during the exposure.

6.3 Typically, most marking is made on the back or nonexposed side of the test specimen. Do not label the top of the exposed surface with any marking system (inks) that may degrade, run down, and contaminate the specimen.

6.3.1 When using an ink or any other liquid as a marker, make sure that it has fully dried before stacking specimens.

6.4 Typical methods for marking specimens are:

6.4.1 Scribing,
6.4.2 Permanent ink marker pen,
6.4.3 Paint pen,
6.4.4 Grease crayon
6.4.5 Tag attached to the specimen, and
6.4.6 Bar code labels.

NOTE 3—The following items have been found to be useful for marking specimens: permanent marker pen, (broad tip, black only), paint pen, and grease crayon. If the durability of the marking made by a marker pen, grease crayon, or paint pen is not known, experiments to evaluate durability should be conducted prior to use for identifying specimens.

6.5 Do not scribe on the exposed side of the specimen when oxidation of the specimen or substrate will cause unwanted specimen damage or when the information will become obscured.

6.6 When test specimens must be marked on the front side, place the marking away from the center portion of the specimen, preferably in a corner. The marking on the front surface will be affected by the same weathering factors as the specimen, and therefore, extra attention must be given to the durability of the marking.

6.7 The frame to which specimens are attached may also be marked provided that the frame and specimens remain together throughout the exposure.

7. Shipping Specimens

7.1 Incorrect shipping methods can have a deleterious effect on test materials and is an often overlooked source of error in exposure tests. Specimens damaged during shipment can result in postponement or cancellation of exposures or may result in only partial completion of critical experiments. Shipping is an inherently rigorous process, but damage can be minimized with care.

NOTE 4—Care should be taken to minimize exposure of specimens to extremely high or low temperatures or to conditions that might result in thermal shock during shipping.

7.2 When transporting or shipping specimens from one location to another, care should be taken to use sturdy shipping containers for all specimens.

7.3 It is recommended that specimens be isolated from one another during shipping.

7.3.1 For flat specimens such as metal panels with a coating, a slotted box is the best form of shipping container. The panels are placed in a wooden box with slots at opposite sides to hold the top and bottom of the panel. There should be adequate spacing between each slot to prevent contact between neighboring panels.

7.3.2 As an alternative to using a container with precut slots, the specimens may be maintained separately by placing a spacer at each end. Use a wood dowel or extruded polystyrene foam block wrapped in a smooth film or paper, and ensure that the box is completely filled. Use bulk packing material to fill in any excess space in the box.

7.4 If specimens are to be stacked and bundled during shipment, use the following procedure:

7.4.1 Place a smooth film or paper meeting the requirements of 5.3 between adjacent specimens.

7.4.2 Bundle specimens using paper or other wrapping material and pressure-sensitive adhesive tape. The paper or other wrapping material used shall not contaminate or interact with the specimens in any way that will affect the results from exposure tests or property measurements.

7.4.3 Place bundled specimens in a box or container and use bulk packaging material to isolate the bundles. It is recommended that the volume of the container be at least 50 % greater than the total volume of bundles placed in the container. Expanded polystyrene foam chips, poly bubble liner, and shredded paper (except newsprint) have been found acceptable as bulk packing material. Pack the container as tightly as possible to avoid damage caused by movement during shipping.

7.5 For irregularly shaped specimens, it is recommended that each be wrapped in a smooth film or paper. Use bulk packing material to separate specimens during shipment. Pack specimens as tightly as possible to avoid damage during shipping. The smooth film or paper and bulk packing material shall not interact with, cause abrasion, or otherwise adversely affect the specimens. The volume of the container used for shipping should be 50 % greater than the total volume of the specimens it will hold.

7.6 Large specimens that require crating should be securely fastened to the crating base. Frame the sides and top of the crate with solid material.

7.7 Place any special handling instructions for the panels being shipped in a clearly marked envelope or packet on the outside of the container. Place “fragile” labels on all shipments that are easily damaged.

7.8 Keep a complete record of all shipments to facilitate tracing in the event that they are lost. These records include the shipping method employed, shipment date, and any tracing or tracking numbers provided by the shipper.

8. Initial Receipt of Specimens

8.1 Upon initial receipt of specimens to be exposed, read any special handling instructions attached to the packaging before the package is opened. Inspect the packaging material for signs of damage. If any signs of damage are found, they shall be noted and reported to the originator.

NOTE 5—Signs of package damage could indicate adverse effects on the specimens enclosed.

8.2 Open the specimen package as soon as possible after arrival in the laboratory. Process the specimens in the fastest possible manner so that a minimum amount of time passes before exposure begins.

NOTE 6—In some cases, preconditioning of the specimen may be required before exposure.

8.2.1 Make sure each specimen has an identifying mark which can be used to distinguish it from other similar specimens. See Section 6 for further details.

8.3 Review the instructions for testing that are included with the specimens for accuracy and to ensure that the testing laboratory has all of the necessary facilities to conduct the test. Use a log sheet or computerized data base, or both, to keep track of the following information:

8.3.1 Test identification number,

8.3.2 Name and address of originator,

8.3.3 Description of specimens, and

8.3.4 Test specification.

8.4 Check the arriving specimens for defects which are present prior to exposure, and note any that are found on the exposure log so that these defects will not be counted as weathering failures. Damage to specimens caused during

shipping shall be noted, reported to the originator, and described in the report of test results.

NOTE 7—Whenever possible, provide photographic documentation of any noticeable defects.

8.4.1 Conduct any initial instrumental property measurements at this time. Follow the conditioning procedures required in the relevant standard describing the procedure for measuring the property or properties of interest.

8.5 During the period between initial measurements and the start of the exposure, maintain the specimens in a condition that minimizes exposure to light under one of the room temperature conditions of temperature and humidity as described in 9.1.

8.6 Unless damaged, save any unusual, specialized, or customized shipping containers in order that the specimens may be returned in the same manner in which they arrived.

8.7 Upon completion of all necessary initial evaluations and property measurements, begin the specimen exposure as soon as possible. Initiate mounting procedures as necessary for the particular test method.

9. Atmospheres for Conditioning

9.1 Two sets of conditions are used for conditioning during weathering testing. These conditions apply only to the laboratory area used for conditioning, inspection of specimens, and for measurement of specimen properties.

9.1.1 *Room Temperature*—As defined in Terminology E41, the room temperature is used for routine measurements or evaluation. This temperature will be 20 to 30°C. In addition, the relative humidity ideally shall be less than 60 %. Use room temperature conditions for conditioning, inspection of specimens, and for measurement of specimen properties, unless otherwise specified,

9.1.2 *Standard Atmosphere*—The atmosphere will be maintained in a closed room with a minimum of air movement. The room must be free from direct sunlight and the effects of vapors, gases, or any other contaminant. The temperature and humidity as defined in Terminology E41 will be controlled at 23 ± 2°C and 50 ± 10 % relative humidity.

9.2 Specimen evaluations performed indoors shall be conducted at the preceding room temperature conditions.

9.3 Maintain all reference materials, file specimens, and long-term interrupted specimens in the dark at room temperature, unless otherwise specified. In damp climates, the relative humidity of the room used for specimen storage should not exceed 60 %. If specimens are known to be greatly affected by moisture, they shall be stored at the standard atmosphere conditions described in 9.1.1, unless otherwise specified. If specimens require special storage conditions, the originator shall provide the test laboratory with all necessary information to ensure proper conditions during storage.

9.4 If storage is required at standard atmosphere conditions, continuously monitor the temperature and humidity. Use of a recording device is recommended. If one is not available, keep a log of the conditions at regular time intervals.

9.5 Any deviation from the prescribed conditioning atmosphere shall be included in the test exposure report.

9.6 Conditioning atmospheres other than the standard atmosphere and room temperature may be called for in other specific material standards such as those described in Practices D618 and D1776, and Specification D3924, or as agreed upon between the contractual parties. When there is doubt or disagreement between the contractual parties, measurements and evaluations shall be conducted at the preceding room temperature condition.

9.7 It may not be possible to use the conditioning atmospheres previously described for large specimens. For example, it is not possible to remove a complete auto assembly from exposure and store in a room at standard atmosphere. In these cases, the conditioning atmospheres used shall be agreed upon by all interested parties and shall be described in the report of test results.

10. General Mounting Procedures

10.1 Unless otherwise desired, mount the specimen in an exposure frame such that there is no unintended stress or unnatural force on the specimen. The exposure frame must securely hold the specimen and prevent it from moving, and being accidentally dislodged from its position.

10.2 The primary surface will normally face the light source. In certain cases, the primary surface is intentionally exposed facing away from the light source. The originator of the specimens shall indicate which is the primary surface and whether it is to face towards or away from the light source.

10.3 When interim reports are scheduled and there are no file specimens to be used for comparison, a masked area can be used for comparison during visual evaluation for color changes as described in Practice D1729 or other defects. A masked area is not the same as an unexposed area, as the portion of the specimen under the mask will be exposed to temperature and humidity factors.

10.3.1 It is recommended that visual color change comparisons be made relative to unexposed file specimens. Alternatively, an instrumental measurement of color can be made on test specimens before exposure and after the desired exposure period. The color change or difference can be calculated from the data recorded. The same colorimeter should be used for all measurements on a test specimen. When making instrumental measurements of color, the same area of the test specimen should be measured before and after each period of exposure.

NOTE 8—It has been found that certain materials undergo more change in the area that is under the mask, than the area that is exposed. These changes may negate the use of the masked area for comparison.

10.3.2 A masked area of the specimen may be accomplished in direct weathering, and black box exposure as described in Practice G7 using a shield which is typically an integral part of the exposure frame. The shield is hinged and covers the top portion of the specimen preventing direct sunlight and rainfall from impinging on the specimen. This type of shield does not touch the specimen directly except for a linear section where

the shield has a vinyl strip to protect the specimen. For more details see Practice G7.

10.3.3 In accelerated testing a shaded area is created by the specimen holder frame. The frame normally allows for an exposure area which is smaller than the whole specimen. This is not a masked area. There are several holders which each have their own specimen sizes and requirements. Holders used for accelerated exposures normally are in direct contact with the specimen. Masking of any kind is not recommended for laboratory accelerated weathering exposures because of the close proximity of the specimen to the influencing conditions. See Practices G90, G151, G152, G153, G154, and G155 for more details on the accelerated exposure specimen holders.

10.3.4 If use of a masked area is required, it can be made by covering a portion of the specimen during exposure. In some applications, heavy-duty aluminum foil has been found to be successful. For behind glass and accelerated exposure without water, white cardboard (as described in Practice G24) or aluminum foil have been used successfully. Materials used for masking shall not discolor, contaminate, or adhere to the specimens. Masking is of generally little use for direct exposure of formed specimens and should be avoided if possible.

10.4 Nothing should be allowed to touch the primary surface of the test specimen while on exposure other than the minimum amount required by the masking. Care should be taken to ensure that the masking material does not capture water from rain or liquid sprayed on the specimen or trap condensation.

11. Test Interruptions

11.1 Interruptions to the continuous exposure of the test specimens other than the time required for scheduled reporting may cause variability. Ensure that the time that the specimens are out of the exposure is kept to a minimum.

11.2 If the interruption is expected to be more than 24 h, store the test specimens at room temperature shielded from exposure to daylight. For longer interruptions (more than one week), treat the specimens similarly to stored reference materials and file specimens. In the event of interruptions of outdoor exposures caused by severe weather, it may not be possible to store the specimens at room temperature, but specimens should not be exposed to daylight whenever possible.

11.2.1 During an interruption to a laboratory accelerated exposure test, the specimens may remain in the test device. Removal and storage of the specimens may cause more damage than having the specimens remain. In this situation, adjust the test chamber to remove unwanted exposure factors. Drain any water in the chamber, and leave the door closed.

11.3 Some materials, especially organics, can continue to degrade even when maintained under standard atmosphere away from light. Color reversals can also occur in dark storage. Any interruption to the exposure of more than five days shall be noted as part of the test report.

11.4 If the possibility of continued degradation during intervals between exposure periods is of concern, it is recommended that separate sets of test specimens be used for each exposure interval.

12. Specimen Storage

12.1 *File Specimens or Reference Materials:*

12.1.1 Long-term storage of file specimens or reference materials is important because these items will be used as a means of comparing the changes that have occurred to the exposed specimens.

12.1.2 When long-term storage is required, place the specimens in a closed, light-tight container which is maintained in an area at room temperature.

12.1.3 File specimens and reference materials should only be disturbed or removed from their storage area when needed for comparison. Keep other handling of file specimens or reference materials to a minimum.

12.1.4 Specimens which may show changes under room temperature or standard atmosphere conditions, such as color chips, should be stored under refrigeration.

NOTE 9—Refrigerators can provide cold damp conditions and may, therefore, affect materials that are sensitive to moisture.

12.2 *Test Specimens*

12.2.1 *Prior to Exposure*—Unless otherwise specified, test specimens shall be placed out of direct sunlight or placed in a container at room temperature. If the specimens are sensitive, and the procedures for storage or conditioning specified in this practice are not appropriate, they should be marked as sensitive by the originator and the appropriate procedures supplied to the testing laboratory.

12.2.2 *During Exposure:*

12.2.2.1 For short-duration storage, treat the specimens in accordance with the instructions on test interruption.

12.2.2.2 Long-term storage of specimens that will be returned to exposure is not recommended.

12.2.3 *After Exposure*—In some cases, test specimens are retained for long periods after the completion of the exposure to act as visual proof of exposure or as a demonstration. Such specimens shall be stored in a condition that will not allow for the continuation of degradation.

13. Partial Removals

13.1 When an exposure is proceeding under normal circumstances, there may be several test series exposed in the same frame or artificial testing device at the same time. When one of those test series is scheduled to be evaluated and will be re-exposed as part of the original test series, stop the exposure in order that the specimens may be removed. This interruption should be kept to a minimum, as all the other specimens in the same exposure position may be affected.

13.2 For natural testing on the outdoor racks there is no need for special attention to the remaining exposed specimens. Although the specimens will be off exposure, the other specimens are not affected by the removal. In the case of black box exposure, however, spaces created on the top surface by removing any specimens shall be filled with black, rigid, blank "dummy" panels. For normal reporting, the down time is not reported, and no adjustment is made to the exposure log. Any interruption of the exposure greater than five days shall be noted in the test report.

13.3 For accelerated tests, the typical interruption is on the order of a few hours rather than days. When laboratory accelerated exposure tests are interrupted, use one of the following approaches for exposure of specimens not removed from the device.

13.3.1 Hold the exposure until the specimens which have been removed are returned to the exposure device, then continue the exposure from the same point. No corrections need to be made to the log for recording exposure times.

13.3.2 Continue the exposure to the remaining specimens. When the specimens which have been removed are ready to be returned to the test device, their exposure should be restarted at the same point in the test cycle as when they were removed. Records used to monitor the exposure time of the specimens which were removed, evaluated, tested, and re-exposed, shall be corrected for the break in the exposure.

14. Scheduled Interim Reports

14.1 During an exposure program, the test specimens may be scheduled for removal from exposure in order to conduct an inspection or evaluation. Keep the time interval of removal from exposure to a minimum.

14.2 Removing a specimen from exposure while it is wet is not recommended. A wet surface is more easily affected by handling than a dry surface. Wet surfaces will also affect instrumental measurements of surface properties such as color and gloss. If a specimen must be removed while wet, allow the specimen to dry in room-temperature conditions for at least 1 h after all surface moisture has dissipated. Never place wet surfaces together.

14.3 Specimen preparation required before inspection may include dusting, washing, and polishing. Follow the procedures outlined in the particular standard describing the exposure or evaluation procedure used for the specimens being tested, or both. In whatever specimen preparation procedure is used, great care must be taken not to damage the specimen during handling.

14.3.1 Many industry standards have specific requirements for washing specimens after exposure. Check with the applicable material specifications or industry standard prior to washing. Unless otherwise specified, wash the test specimen using deionized water. If specimens will be allowed to dry by standing in air, deionized water should be used for washing in order to prevent water spotting. Gently wash the area to be tested with a soft sponge. In some cases, it may be necessary to use a dilute solution of mild detergent (0.05 % by weight in water, maximum concentration). Field rinses can be performed using clean tap water in accordance with various specifications. Touch-dry the test specimen using a soft cloth or paper towel. After washing, condition the specimens at room temperature for at least 1 h prior to testing.

14.3.1.1 Clean pressurized air can also be used to dry the specimens. If used, compressed air used for drying specimens shall be filtered or otherwise treated to remove oil or other agents that might contaminate the specimen surface.

NOTE 10—A two-stage filter consisting of a primary filter capable of removing particles down to 25 to 75 μm and a secondary coalescing filter to remove smaller particles and oil droplets has been found to be satisfactory for providing clean air used for drying specimens. The filter system should be installed and maintained in accordance with the instructions provided by the filter supplier or manufacturer.

14.3.2 For specimens exposed to natural weathering, it is recommended that the surface be washed before instrumental measurement of appearance properties such as gloss, distinctness of image, and color. Dirt, mildew, and other surface attachments will adversely interfere with the instrument's ability to read the specimen surface.

14.3.3 Other specimen preparation may be required before inspection. Polishing is used extensively as a technique for automotive exterior materials.

NOTE 11—Polishing is an irreversible change to the exposed surface and is often used to evaluate color changes. Tests for changes in other surface properties should be done prior to polishing.

14.4 When a combination of effects are to be evaluated on a single specimen, including both visual and instrumental reporting, wash only a portion of the specimen. Common practice is to wash a half or quarter of the specimen. If required, the washed area may then be polished. A portion of the washed area may be left unpolished for comparison purposes.

15. Damaged and Broken Specimens

15.1 During the course of the exposure, specimens may become damaged through mishandling or other event. If this occurs, make a note on the log sheet and inform the originator. If the specimen can be repaired so that exposure can continue, the originator has the option of removing the specimen from exposure or continuing.

15.1.1 Repairs should only be made if the specimen will not be compromised and the test can continue without deviation.

15.2 Broken specimens may be repaired by any means which is acceptable to the originator. For most material, epoxy resins have been found satisfactory. After repair, it may be necessary to take special precautions when remounting the specimen in the exposure frame so that the stresses encountered do not cause a repeat of the breakage. Some form of support bracket may be necessary. Any and all damage, repair, or changes to a test specimen shall be described in detail on every test report for the test series starting with the date the damage occurred.

15.3 Unless otherwise specified, the edges of ferrous panels used as a substrate for testing shall be sealed to prevent rust. Rust from unsealed edges will spread to the primary surface and adversely affect the exposure results. Protect the edge by the same material that covers the primary surface, but, if this has not been accomplished, the edge may be sealed with silicone sealant, exterior durable pressure-sensitive adhesive tape, or other method. The method chosen for sealing the edges shall not adversely affect the specimen. Unless otherwise specified, sealing the edges of ferrous panels used as a substrate for testing shall be completed at the time of specimen preparation.

NOTE 12—3M Tapes #838 or #425 (3M Industrial Tape Division, Building 220-8E-04, 3M Center, St. Paul, MN 55144-1000), or equivalent, have been found satisfactory for sealing the edges of ferrous panels to prevent rusting.

NOTE 13—Ferrous panels which are not correctly sealed may also be responsible for contaminating neighboring specimens with rust specks.

15.4 Other specimens which may have defects prior to exposure which have been noted as in 8.3 should be examined to see if the defect will bias the exposure. It may be possible to repair the specimen and continue the exposure. If this is the case, the originator has the option of continuing or canceling the exposure.

16. Discarding or Destroying Specimens

16.1 In certain instances, it may be necessary to discard a test specimen without returning it to the originator. This must only be done at the request of the originator in writing.

16.2 Discard all specimens following local and federal waste regulations. Discard hazardous materials using correct procedures for such materials.

16.3 Remove all specimens to be discarded from the exposure frame as soon as possible.

16.4 Make a note on the test log sheet or computerized data base as to the disposal method used and the date.

17. Keywords

17.1 conditioning; handling; shipping; standard atmosphere; test specimens; weathering

SUMMARY OF CHANGES

Committee G3 has identified the location of selected changes to this standard since the last issue (2009) that may impact the use of this standard.

(1) Clarified reference to Terminology E41 in 9.1.2.
(2) Revised 14.3.1 to give specific guidance on washing specimens after exposure, stressing that ultimate guidance whether and how to was is dependent on the referencing material specification or industry standard.