



Designation: D 1828 – 01

# Standard Practice for Atmospheric Exposure of Adhesive-Bonded Joints and Structures<sup>1</sup>

This standard is issued under the fixed designation D 1828; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This practice defines the procedure for the direct exposure of adhesive bonded joints and structures to natural atmospheric environments.

1.2 The procedure for sheltered atmospheric exposure, such as a Stevenson screen (1),<sup>2</sup> of adhesive-bonded joints and specimens is the same except for the requirements of facing south and measurement of solar radiation.

1.3 This practice is limited to the procedure by which samples are exposed and does not cover the tests that may be used to evaluate the effects of atmospheric exposure on these adhesive-bonded joints and structures. These samples could be any one of several varieties.

1.3.1 A complete structure for test,

1.3.2 A section of a structure for test,

1.3.3 A complete structure or section with strength observations on specimens cut therefrom,

1.3.4 Test specimens themselves, or

1.3.5 Any of the above, mounted under stress.

1.4 Suitable test methods for evaluation of the effects of exposure include nondestructive qualitative or quantitative observations on the same sample at prescribed intervals, or destructive tests on separate sets of specimens in accordance with such tests as Test Method D 1002.

NOTE 1—See Test Methods D 896 and D 897.

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

1.6 *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:

D 896 Test Method for Resistance of Adhesive Bonds to Chemical Reagents<sup>3</sup>

D 897 Test Method for Tensile Properties of Adhesive Bonds<sup>3</sup>

D 907 Terminology of Adhesives<sup>3</sup>

D 1002 Test Method for Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-To-Metal)<sup>3</sup>

## 3. Terminology

### 3.1 Definitions:

3.1.1 Many terms used in this practice are defined in Terminology D 907.

## 4. Significance and Use

4.1 The atmospheric exposure tests described in this practice will evaluate the stability of the adhesive bond only in terms of a particular natural atmosphere. Since the atmospheric conditions vary greatly from year to year, these results will not be as reproducible as those derived from laboratory aging procedures. Considerable research has shown that laboratory artificial weathering tests will not give consistently good correlation with outdoor test exposures (2, 3, 4).

## 5. Exposure Sites

5.1 The choice of exposure sites is dependent upon the objective of the particular test program.

5.2 In the cases of both metallic and nonmetallic adherends, choose exposure sites to include variations in average temperature (and temperature range), relative humidity, and precipitation.

## 6. Apparatus

6.1 *Racks*—Expose the sample on racks<sup>4</sup> which are so positioned that the exposed surfaces are at an angle of 45° to the horizontal and facing true south. Exceptions to the direction that the specimens face will be permitted in the case of beach exposures, where the specimens usually face parallel to the

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee D14 on Adhesives and is the direct responsibility of Subcommittee D14.40 on Adhesives for Plastics.

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<sup>2</sup> The boldface numbers in parentheses refer to the list of references at the end of this practice.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 15.06.

<sup>4</sup> Blueprints of ASTM standard racks and pipe frames may be obtained from ASTM Headquarters, 100 Barr Harbor Drive, West Conshohocken, PA 19428. Request Adjunct No. ADJD1828.