



Designation: D4800 – 94 (Reapproved 2023)

## Standard Guide for Classifying and Specifying Adhesives<sup>1</sup>

This standard is issued under the fixed designation D4800; 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 guide provides a classification system for tabulating the properties of adhesives suitable for holding parts or assemblies together. The use of this guide also provides information necessary for the development of standard specifications for adhesives.

NOTE 1—This classification system may serve many of the needs of industries using adhesives. This guide is subject to revision as the need requires; therefore, the latest revision should always be used.

1.2 *Limitations*—This classification system is intended to be a means of identifying adhesives. It is not intended for the selection of materials. Material selection should be made by those having expertise in the adhesives field after careful consideration of the design and the performance required of the part, the environment to which it will be exposed, the attachment process to be employed, the inherent properties of the material not covered in this document, and the economic factors.

1.3 This classification system is based on the premise that adhesives can be arranged into broad generic families using basic properties to arrange the materials into groups, classes, and grades.

1.4 In all cases where the provisions of this classification system would conflict with the referenced ASTM specification for a particular material, the latter shall take precedence.

1.5 The values stated in SI units, as detailed in **IEEE/ASTM SI 10**, are to be regarded as the standard.

1.6 *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.*

<sup>1</sup> This guide is under the jurisdiction of ASTM Committee **D14** on Adhesives and is the direct responsibility of Subcommittee **D14.60** on Adhesive Material Classification System.

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### 2. Referenced Documents

#### 2.1 *ASTM Standards*:<sup>2</sup>

**D907** Terminology of Adhesives

**D1084** Test Methods for Viscosity of Adhesives

**D1298** Test Method for Density, Relative Density, or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method

**D1310** Test Method for Flash Point and Fire Point of Liquids by Tag Open-Cup Apparatus

**D2240** Test Method for Rubber Property—Durometer Hardness

**D2583** Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor (Withdrawn 2022)<sup>3</sup>

**D2834** Test Method for Nonvolatile Matter (Total Solids) in Water-Emulsion Floor Polishes, Solvent-Based Floor Polishes, and Polymer-Emulsion Floor Polishes

**D3278** Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus

**D4562** Test Method for Shear Strength of Adhesives Using Pin-and-Collar Specimen

**D5363** Specification for Anaerobic Single-Component Adhesives (AN)

**IEEE/ASTM SI 10** Standard for Use of the International System of Units (SI): The Modern Metric System

#### 2.2 *Military Standards*:

**MIL-STD-105** Sampling Procedures and Tables for Inspection by Attributes<sup>4</sup>

**MIL-A-46146** Adhesive, Silicone, RTV, Noncorrosive (for Use with Sensitive Metals and Equipment)<sup>4</sup>

### 3. Terminology

3.1 The terms used in this guide are in accordance with Terminology **D907**.

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

<sup>3</sup> The last approved version of this historical standard is referenced on [www.astm.org](http://www.astm.org).

<sup>4</sup> Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, <http://dodssp.daps.dla.mil>.

4. Significance and Use

4.1 The purpose of this classification system is to provide a method of identifying adhesives in order to give industry a system that can be used universally for materials. It further provides a means for specifying these materials by the use of the standards that are developed using this guide.

4.2 This classification system was developed to permit the addition of future adhesives.

5. Classification

5.1 Fig. 1 summarizes the classification system as detailed in this guide.

5.2 Adhesives shall be classified on the basis of their broad generic family. The generic family is identified by letter designations as found in Table 1.

NOTE 2—For example: CA = Cyanoacrylate.

5.2.1 The generic family is based on the broad chemical makeup of the base materials. By its designation, certain inherent properties are specified.

5.3 The generic family is classified into groups according, in general, to the chemical composition. These groups are further subdivided into classes and grades, as shown in the basic property table that applies. The letter designation applicable is followed by a four-digit number indicating group, class, and grade.

5.3.1 The basic property tables have been developed to identify the commercially available adhesives into groups, classes, and grades. These tables are found in the standards listed in Table 1.

5.3.1.1 Where a standard does not exist for this classification system the letter designation for the generic family will be followed by four 0's and the use of the suffixes as needed (see 7.1).

NOTE 3—Example: SI0000 indicates a Silicone (SI) from Table 1, with 0000 indicating no basic property table.

5.4 To facilitate the identification of new or special materials where basic property tables are not provided in a material specification, cell tables will be used. These tables shall appear in the material specifications. (See example of cell table in Fig. 2.)

TABLE 1 Standard Symbols for Generic Families

Standard Symbol <sup>A</sup>	Family Name	ASTM Standard <sup>B</sup>
AN	Anaerobic (dimethacrylate) <sup>B</sup>	D5363
CA	Cyanoacrylate	
CS	Casein	C
EP	Epoxy	
HM	Hot melt	
MF	Melamine-Formaldehyde	
PF	Phenol-Formaldehyde (phenolic)	
PMMA	Acrylic (other than AN or CA)	
PUR	Polyurethane	
SI	Silicone	C

<sup>A</sup> Additional symbols will be added to this classification system as they are requested or developed.

<sup>B</sup> The standards listed are those in accordance with this classification system.

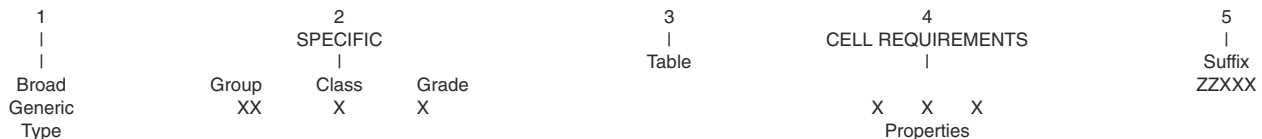
<sup>C</sup> A standard is being developed.

5.4.1 Although the values listed in the cell tables include the range of properties available in existing materials, users should not infer that every possible combination of properties exists or can be obtained.

5.4.2 The requirements for special adhesives will use the classification system, as described, by the addition of a single letter that indicates the proper cell table in which the properties are listed. A specific value is designated by the cell number for each property in the order in which they are listed in the table. When a property is not to be specified, a zero is entered as the cell number. Likewise, when an acceptable value is not available in the cell table, the number 9 should be used and a suffix used indicating the specific value (see 7.1). Thus, the letter designation “A” for cell table and 3400 for property values shall always be written A3400.

NOTE 4—An example of an anaerobic adhesive identified by this classification system is as follows. The designation AN0120A3400 indicates the following with the material requirements from Cell Table A of material specification.

- AN0120 = Anaerobic–Newtonian flow, thread locking
- A = Table A for property requirements
- 3 = Strength ASTM Test Method D4562, 6 MPa min
- 4 = Viscosity ASTM Test Methods D1084, Method B, 900 MPa-s min
- 0 = Unspecified
- 0 = Unspecified



NOTE 1—

- 1 = Two or more letters identify the generic family based on abbreviations from Table 1.
- 2 = Four digits identify the specific type. The first two digits identify the group. The next digit identifies the class and the last digit identifies the grade. A basic property table will provide property values for the specific material (see 5.2).
- 3 = One letter refers to a cell table listing of physical specifications and test methods.
- 4 = Four digits refer to the specific physical parameters listed in the cell table.
- 5 = Suffix codes indicate special requirements based on the application and identify special tests (two letters with three digits).

FIG. 1 Classification System

Designation Order Number	Property	Cell Limits									
		0	1	2	3	4	5	6	7	8	9
1	Shear strength, ASTM D4562 MPa, min <sup>A</sup>	Unspecified	2	4	6	8	12	14	20	35	Specify value
2	Viscosity, ASTM D1084, No. 4 spindle, 20 r/min MPa·s, min <sup>B</sup>	Unspecified	10	26	200	900	6500	10 × 10 <sup>3</sup>	25 × 10 <sup>3</sup>	1 × 10 <sup>6</sup>	Specify value
3	To be determined	Unspecified	...	...	...	...	...	...	...	...	...
4	To be determined	Unspecified	...	...	...	...	...	...	...	...	...

<sup>A</sup> Megapascals × 145 = pounds-force per square inch.

<sup>B</sup> Viscosity must not exceed the value in the next highest cell.

**FIG. 2 Example of Cell Table A Detail Requirements**

## 6. Basic Requirements

6.1 The cell tables included as part of the listed reference standard shall be used to develop a line call-out for the materials listed in **Table 1** covered by a material standard.

6.2 When the existing cell table does not adequately describe the material, then suffixes may be used in place of a cell table designation.

**TABLE 2 Suffix Symbols and Requirements<sup>A</sup>**

Symbol	Characteristic
A	Color (Unless otherwise shown by suffix, color is understood to be the commercially available color for the material.) Second letter A = does not have to match a standard B = must match standard Three-digit number 001 = color and standard number on drawing 002 = color on drawing
F	Flammability, Flash Point, or Fungus Resistance Second letter A = ASTM D1310 (open cup) Three-digit number = minimum value, degrees Celsius B = ASTM D3278 (closed cup) Three-digit number = minimum value, degrees Celsius
G	Specific Gravity Second letter A = ASTM D1298 (tolerance ±0.02) B = ASTM D1298 (tolerance ±0.05) Three-digit number X factor of 0.01 = requirement value
J	Hardness Second letter A = ASTM D2240 (shore A) tolerance ± 5 B = ASTM D2583 (barcol), minimum D = ASTM D2240 (shore D) tolerance ±5
R	Volatile Loss or Solids Second letter A = ASTM D2834 (3 h at 102 ± 3°C)—solids Three-digit number X factor of 0.1 = percent, minimum
V	Viscosity, Flow Rate, or Extrusion Rate Second letter A = MIL-A-46146 (extrusion rate) Three-digit number = value grams per minute, minimum
Z	Other Special Requirements Second letter from existing list of symbols where test or requirement is not available. These characteristics will be spelled out in detail and identified in sequence, that is 01, 02, 03, etc. Example ZV01 Viscosity—ASTM D1084—RVF, No 4 spindle, and 20 r/min, 6000 to 8000 MPa·s

<sup>A</sup> Additional suffixes and requirements will be added to this classification system as test methods or requirements are developed or requested or both.