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Standard Guide for Identification of Composite Materials in Computerized Material Property Databases¹

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1. Scope

1.1 This guide establishes the essential and desirable elements of data required for the identification of composite materials in computerized material property databases. A recommended format for entry of these fields into a computerized database is also provided. Examples of the application of this guide are included for filament-wound polymer-matrix composites, laminar polymer-matrix composites, and ceramic-matrix composites. An example for metal-matrix composites is planned for the next revision.

1.2 The recommended format described in this document is suggested for use in recording data in a computerized database, which is different from contractual reporting of actual test results. The latter type of information is described in a materials specification or shown on business transactions, and is subject to agreement between vendor and purchaser.

1.3 This guide defines the information which is considered essential to uniquely describe a composite material. A format is recommended for placing these data in fields suitable for a computerized database. Additional fields which are considered desirable, but not essential, are also defined. The purpose is to facilitate efficient storage and retrieval of the information with a computer and to allow meaningful comparison of data from different sources.

2. Referenced Documents

2.1 ASTM Standards:

C 274 Terminology of Structural Sandwich Constructions²
D 3878 Terminology of High-Modulus Reinforcing Fibers and Their Composites²

E 1338 Guide for the Identification of Metals and Alloys in Computerized Material Property Databases³

E 1443 Terminology Relating to Building and Accessing Material and Chemical Databases³

E 1471 Guide for the Identification of Fibers, Fillers, and Core Materials in Computerized Material Property Databases²

3. Terminology

3.1 *Definitions*—Terminology D 3878 and E 1443 shall be used where applicable.

3.2 Descriptions of Terms Specific to This Standard:

3.2.1 *composite material, n*—a material consisting of two or more materials, insoluble in one another, which are combined on a macroscale to form a useful engineering material possessing certain properties not possessed by the constituents.

DISCUSSION—A composite material is inherently inhomogeneous on a microscopic scale but can often be assumed to be homogeneous on a macroscopic scale for certain engineering applications.

3.2.2 *core, n*—a generally, centrally located layer or composite component of a sandwich construction, usually low density, which separates and stabilizes the facings and transmits shear between them and provides most of the shear rigidity of the construction (see Terminology C 274).

3.2.3 *essential field, n*—a field in a record which must be filled in order to meet the requirements of a stated type of database (see Terminology E 1443).

DISCUSSION—Fields are considered essential if they are required to make a meaningful comparison of property data from different sources. A comparison of data from different sources may still be possible if essential information is omitted, but the value of the comparison may be greatly reduced.

3.2.4 *field, n*—an elementary unit of a record that may contain a data item, a data aggregate, a pointer, or a link (see Terminology E 1443).

3.2.5 *field name, n*—a name or code associated with a field and used for identification (see Terminology E 1443).

3.2.6 *gel point, n (or gel time)*—a point in a cure cycle where a thermosetting polymer resin resolidifies after melting.

3.2.7 *isotropic material, n*—a material in which a property of interest, at a given point, possesses an infinite number of planes of material symmetry, yielding the same property value in all directions.

3.2.8 *lay-up, n*—a process of fabrication involving the placement of successive layers of materials.

3.2.9 *lay-up code, n*—an abbreviated form of stacking sequence information.

3.2.10 *matrix, n*—in composite materials, the continuous constituent of a composite material which acts as the load transfer mechanism between the discrete dispersed reinforcement constituent.

DISCUSSION—A composite matrix is a bonding structure which unites, fills, and encloses the composite's reinforcement structures.

3.2.11 *orthotropic material, n*—a material in which a property of interest, at a given point, possesses three mutually perpendicular planes of symmetry, which together define the principal material coordinate system.

¹ This guide is under the jurisdiction of ASTM Committee D-30 on Composite Materials and is the direct responsibility of Subcommittee D30.01 on Editorial and Resource Standards.

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² Annual Book of ASTM Standards, Vol 15.03.

³ Annual Book of ASTM Standards, Vol 14.01.