



Standard Guide for Development of Material and Chemical Property Database Descriptions¹

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1. Scope

1.1 This guide provides a recommended format and guidelines for the description of the nature and content of material and chemical databases.

1.2 The principal content of this guide is the itemization of the key elements used to describe material and chemical property databases for the purpose of enabling potential users to judge their utility.

2. Referenced Documents

2.1 ASTM Standards:

E 1407 Guide for Materials Database Management²

E 1443 Terminology Relating to Building and Accessing Material and Chemical Databases²

E 1484 Guide for Formatting and Use of Material and Chemical Property Data and Database Quality Indicators²

3. Terminology

3.1 Terminology used in this document is defined in Guide E 1407 and E 1443.

4. Significance and Use

4.1 The utility of material and chemical property databases may be judged by information about their scope of content, and facts about the data source, reliability, validity, recommended usage, traceability, and currency of the database. With this information, users should be able to make an assessment of the potential applicability of the database for their needs.

5. Elements of Database Description

5.1 The recommended standard format is composed of twenty-three fields containing the specific data elements used to describe a database, as summarized below.

5.1.1 The field numbers below have no significance except as references within this guide. There is no intent that they be used in the particular sequence presented, nor that all will be used in any application.

5.1.2 There is no requirement that every field in the format in Table 1 be used in every case.

5.1.3 There is recognition that users of the standard may wish to add additional fields for their own applications.

5.1.4 The field values listed in Table 1 are representative of the types of information expected to be presented therein. They should not be considered closed or limited lists in any manner.

5.2 *Data Quality Descriptions*—See Table 1.

6. Explanation of Certain Descriptive Fields

6.1 Most of the descriptive fields in Table 1 are obvious from their names or from the examples given. Explanations for those which are not obvious are provided as follows.

6.2 *Field No. 6—Type(s) of Data*—This field refers to the statistical or arithmetic basis of the data. This may range from an individual test result to the mean, average, or some statistical result from analysis of a set of individual test results. It may also be estimated, predicted, interpolated, or extrapolated data from knowledgeable individuals in the field. If the database contains more than one type of data, this field may have multiple entries.

6.3 *Field No. 7—Chemical Substance or Material Class(es) Included in the Database*—This is an open-ended field designed to cover the class or classes of materials included in the database. The level of specificity utilized will probably depend upon the scope of the individual database; one covering one narrow group of ceramics should probably state the name of that subgroup as clearly as possible, but one covering many types of ceramics may simply be identified by the one word ceramics. This field may be repeated as many times as the developer chooses.

6.4 *Field No. 9—Property Class(es) Included in the Database*—This is an open-ended field designed to cover the class or classes of properties included in the database. The level of specificity utilized will probably depend upon the scope of the individual database; a database covering a narrow group of fracture toughness data should probably state the name of that subgroup as clearly as possible, but a database covering many types of mechanical property data may simply be identified by that term. This field may be repeated as many times as the developer chooses.

6.5 *Field No. 10—Independent Variable(s) Included in the Database*—This is an open-ended field designed to cover the class or classes of independent material or property variables, or both, represented in the database. Material variables are those which cover some variation in the composition, fabrication practice, condition or temper, product, form or dimensions of the material, for example. Property variables are those such as temperature, specimen orientation, specimen type, gage length, or measurement scale which were varied during the series of tests for which data are included in the database. This field may be repeated as many times as the developer chooses.

¹ This guide is under the jurisdiction of ASTM Committee E-49 on Computerization of Material and Chemical Property Data and is the direct responsibility of Subcommittee E49.05 on Data and Database Quality.

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² *Annual Book of ASTM Standards*, Vol 14.01.

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6.6 Field No. 12—Evaluator of Data in the Database—This is an open-ended field designed to identify the group or individual who provided an evaluation of the database. It may be a committee associated with a technical society, a certification agency of some type, or a university, or private consultant.

6.7 Field No. 13—Evaluation Procedure—This is an open-ended field designed to cover the nature of the evaluation process. This may include a validation process strictly in accordance with an ASTM standard test method, a certification process by a committee of experts on data for a specific design purpose, or a detailed quantitative statistical or parametric analysis based upon theoretical or empirical premises.

6.8 Field No. 14—Quality Indicator—If a quality indicator has been generated in accordance with E 1484 for the database being described, it should be included here.

7. Applications of Database Descriptions

7.1 The most common use of database descriptions is for directory compilations of descriptions of a group of databases for the purpose of guiding users to the appropriate database for their search.

7.2 Database descriptions may themselves be computerized and made searchable for the stated purpose.

8. Keywords

8.1 chemical; computerized database; database description; material; property

TABLE 1 Data Quality Descriptions

Field Number	Field Name or Description	Representative Field Values
1	Database name/acronym	
2	Full database title	
3	Name of database producer	
4	Address of database producer	
5	Telephone number of database producer	
6	Type(s) of data	statistically derived values specification values typical/average/nominal values theoretically derived predicted values interpolated values extrapolated values estimated values producer/manufacture data unprocessed single point data (raw data)
7	Chemical substance or material class(es) or subclass(s) included in the database:	pure chemicals mixtures organic substances inorganic substances ferrous metals nonferrous metals polymers plastics rubbers ceramics (or glasses, refractories, for example) metal matrix composites polymer matrix composites ceramic matrix composites fibers wood joints (welded joints; adhesive-bonded joints)
8	Number of distinct substances represented	
9	Property class(es) included in the database	chemical molecular nuclear crystallographic structural mechanical fatigue/fracture durability physical electrical electronic chemical electrochemical thermal thermochemical thermophysical corrosion