



Designation: E 1313 – 95a (Reapproved 1999)

Standard Guide for Recommended Formats for Data Records Used in Computerization of Mechanical Test Data for Metals¹

This standard is issued under the fixed designation E 1313; 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 guide covers recommended formats for the recording of mechanical test data for metals for inclusion in computerized material property databases. From this information, the database designer should be able to construct the data dictionary preparatory to developing a database schema. Not covered within the scope of this standard are guidelines for the identification of the materials themselves, or descriptions of the materials, or both. Those guidelines are covered in separate documents, such as Guides E 1338 and E 1339.

1.2 The recommended format specified in this guide is suggested for use in recording data in a database, which is different from contractual reporting of actual test results for a specific lot of material. The latter type of information is specified in materials specifications shown in business transactions and is subject to agreement between vendor and purchaser.

1.3 This guide is specific to tension testing by Test Methods E 8 and E 8M, compression testing by Test Methods E 9, notched bar impact testing by Test Methods E 23, and pin-type bearing testing by Test Method E 238.

2. Referenced Documents

2.1 ASTM Standards:

- E 6 Terminology Related to Methods of Mechanical Testing²
- E 8 Test Methods for Tension Testing of Metallic Materials²
- E 8M Test Methods for Tension Testing of Metallic Materials [Metric]²
- E 9 Test Methods of Compression Testing of Metallic Materials at Room Temperature²
- E 23 Test Methods for Notched Bar Impact Testing of Metallic Materials²
- E 83 Practice for Verification and Classification of Extensometers²
- E 238 Test Method for Pin-Type Bearing Test of Metallic Materials²

¹ This guide is under the jurisdiction of ASTM Committee E-49 on Computerized Systems and Chemical and Material Information and is the direct responsibility of Subcommittee E49.01 on Materials Identification and Data Recording. This guide was developed in cooperation with Committee E-28 on Mechanical Testing.

Current edition approved Aug. 15, 1995. Published October 1995. Originally published as E 1313 – 90. Last previous edition E 1313 – 95.

² Annual Book of ASTM Standards, Vol 03.01.

E 399 Test Method for Plane-Strain Fracture Toughness of Metallic Materials²

E 1013 Terminology Relating to Computerized Systems³

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

E 1339 Guide for the Aluminum Alloys and Parts in Computerized Material Property Databases³

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

3. Terminology

3.1 Computer-related technical terms in this guide are defined in Terminologies E 1443, E 1013, and other standards referenced in those standards.

3.2 Technical terms related to mechanical testing and mechanical procedures are defined in Terminology E 6.

4. Significance and Use

4.1 Because of the intense activity in building computerized materials databases and the desire to encourage uniformity and ease data comparison and data interchange, these recommended formats provide for the inclusion of specific elements of test data in such databases.

4.2 This guide defines the principal data elements that are considered important and worth recording and storing permanently in computerized data storage systems from which machine-readable databases will be developed. These data elements are not intended to be requirements of any specific or single database, but if available, are likely to be valuable for building databases for various applications and so should be recorded and stored in the primary data storage file.

4.3 This guide has no implication on data required for materials production or purchase. Reporting of actual test results shall be as described in the actual material specification or as agreed to by the vendor and purchaser as shown on the purchase order and acknowledgment.

4.4 This guide is designed to encourage the builders of databases to include sufficiently complete information so that comparisons among individual sources may be made with assurance that similarities and differences in the test procedures and conditions may be determined. Comparisons of data from

³ Annual Book of ASTM Standards, Vol 14.01.

various sources will be most meaningful if all of the elements are available.

4.5 The guide is designed to provide sufficient detail so that every testing variable that influences a test result is recorded.

4.6 The data elements included in this guide are presented recommended formats. These data elements provide sufficiently complete information that users may be confident of their ability to compare sets of data from individual databases and to make the database useful to a relatively broad range of users.

4.6.1 The data elements in the recommended formats are designed to be used in constructing the data dictionary preparatory for developing a database or other data storage system. Use of these data elements will facilitate comparisons among data in different databases.

4.6.2 Many databases are prepared for specific applications, and individual database builders may elect to omit certain data elements considered to be of no value for that specific application.

4.6.3 A number of data elements are considered essential to any database and need to exist in the database. These data elements shall be completed to make the record meaningful according to the pertinent guidelines or standard. Data elements are considered essential if they are required for the user to have sufficient information to interpret the data and to make a comparison of data from different sources meaningful. A comparison of data from different sources may be possible if essential information is missing, but the value of the comparison may be greatly reduced. In the recommended formats, these data elements are marked with asterisks. Note that situations do arise where essential data are not available. For example, failure strain cannot be provided if the strain-measuring device is not functioning when the test specimen fails. The database design and the engineer recording test data shall use their judgment for such cases.

4.6.4 These recommended formats do not represent a requirement that all the data elements shall be included in every database. Rather these recommended formats are guides as to those data elements that are likely to be useful to at least some users of most databases.

4.6.5 Not all of the data elements recommended for inclusion will be available for all databases; this fact should not discourage database builders and users from proceeding as long as the essential data elements are included (the items noted by the asterisks).

4.6.6 In some cases, additional data elements of value to users of a database may be available. In those cases, database builders are encouraged to include them with the data elements in the recommended formats.

4.7 The recommended data recording formats do not include the recommended material description or the presentation of other specific types of test data. This information is covered by other recommended formats, including Guides E 1338 and E 1339.

5. Recording of Test Data

5.1 The following types of data elements are included in the recommended format for each test method; multiple data

elements may be required to cover some categories satisfactorily:

- 5.1.1 Test identification,
- 5.1.2 Specimen information,
- 5.1.3 Test parameters and procedures,
- 5.1.4 Test results and analysis, and
- 5.1.5 Test validation.

5.2 The linkage of a data record for one or more test results with a data record for a material is done during the development of a database schema using these recommended formats for test results in this guide and guides with recommended formats specific to the identification and description of materials in Guides E 1338 and E 1339.

5.2.1 A database builder has considerable flexibility in developing the database schema, and the recommended formats contained in this guide are intended to support that flexibility.

6. Recommended Formats for Standard Data Records

6.1 The recommended formats for recording test data are listed in Appendixes X1 through X5 that follow and include four columns of information: Data Element Number, Data Element Descriptive Name, Data Type, and Category Sets, Value Sets, or Units as listed.

6.1.1 *Data Element Number*—A reference number for ease of dealing with the individual data elements in this guide. The data element number has no permanent value and does not become part of a database itself.

6.1.2 *Data Element Descriptive Name*—The complete and unambiguous name, descriptive of the data element and descriptive of the data element being identified in the data format.

6.1.3 *Data Type*—The kind of data to be included in the data element, such as the type of numbers, character strings, logical values, date, and time.

6.1.4 *Category Sets, Value Sets, or Units*—A listing of the types of information that would be included in the data element or, in the case of properties or other numeric data elements, the units in which numbers are expressed.

6.1.4.1 A category set is a closed set listing all possible values the data element may take. Category sets are usually given in separate tables in the recommended format.

6.1.4.2 A value set is a representative set listing sample, but not necessarily all, acceptable values that the data element may take. Value sets may be given as separate tables in the recommended format.

6.1.4.3 The units listed are SI, according to Practice E 380, followed by U.S. customary units in parentheses (except for test methods that have both a metric and U.S. version).

6.2 *Worksheets*—Worksheet versions may be desirable for various purposes, such as for use in a testing laboratory for recording original test data. The worksheet set-up is not critical if all of the available data elements are recorded.

7. Summary Tables

7.1 Though this guide primarily is concerned with the recording and storage of test data upon generation, the analysis and presentation of data are also of concern. Often this takes the form of summary tables for compiling results of many tests. Depending on the design of the database system, summary



tables might also be used to enable correlations between test data from a particular test method and other related properties.

7.2 Such summary tables are likely to require space for derived values, such as averages, or for statistically or parametrically generated property values.

7.3 Since the recommended formats used in summarizing, compiling, and presenting multiple test results will vary greatly with the specific application, guidelines for such tabulations are not presented herein.

APPENDIXES

(Nonmandatory Information)

X1. RECOMMENDED FORMAT FOR COMPUTERIZATION OF TENSILE TEST DATA BASED ON TEST METHODS E 8M

X1.1 This recommended format is for tensile test data generated by Test Method E 8M. The recommended format does not include the recommended material description or the presentation of other specific types of test data. These items are covered by separate formats to be referenced in material specifications or recommended formats for other test methods.