Designation: E1434 – 00(Reapproved 2013)

Standard Guide for Recording Mechanical Test Data of Fiber-Reinforced Composite Materials in Databases[1]

This standard is issued under the fixed designation E1434; 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 provides a common format for mechanical test data for composite materials for two purposes: (*1*) to establish data reporting requirements for test methods and (*2*) to provide information for the design of material property databases. This guide should be used in combination with Guide E1309 which provides similar information to identify the composite material tested.

1.2 These guidelines are specific to mechanical tests of high-modulus fiber-reinforced composite materials. Types of tests considered in this guide include tension, compression, shear, flexure, open/filled hole,[2] bearing, fracture toughness, and fatigue. The ASTM standards for which this guide was developed are listed in 2.1. The guidelines may also be useful for additional tests or materials.

1.3 This guide is the second part of a modular approach for which the first part is Guide E1309. Guide E1309 serves to identify the material, and this guide serves to describe mechanical testing procedures and variables and to record results. The interaction of this guide with Guide E1309 is emphasized by the common numbering of data elements. Data Elements A1 through G13 are included in Guide E1309 and numbering data elements in this guide begins with H1.

1.4 This guide with Guide E1309 may be referenced by the data-reporting section of a test method to provide common data-reporting requirements for the types of tests listed in 1.2.

1.5 From this information and Guide E1309, the database designer should be able to construct the data dictionary preparatory to developing a database schema.

1.6 Data elements in this guide are relevant to test data, data as obtained in the test laboratory and historically recorded in lab notebooks. Property data, data which have been analyzed and reviewed, require a different level of data elements. Data elements for property data are provided in Annex A1.

2. Referenced Documents

2.1 *ASTM Standards:*[3]

D790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

D3039/D3039M Test Method for Tensile Properties of Polymer Matrix Composite Materials

D3410/D3410M Test Method for Compressive Properties of Polymer Matrix Composite Materials with Unsupported Gage Section by Shear Loading

D3518/D3518M Test Method for In-Plane Shear Response of Polymer Matrix Composite Materials by Tensile Test of a ±45° Laminate

D3552 Test Method for Tensile Properties of Fiber Reinforced Metal Matrix Composites

D3878 Terminology for Composite Materials

D5229/D5229M Test Method for Moisture Absorption Properties and Equilibrium Conditioning of Polymer Matrix Composite Materials

D5379/D5379M Test Method for Shear Properties of Composite Materials by the V-Notched Beam Method

D5449/D5449M Test Method for Transverse Compressive Properties of Hoop Wound Polymer Matrix Composite Cylinders

D5528 Test Method for Mode I Interlaminar Fracture Toughness of Unidirectional Fiber-Reinforced Polymer Matrix Composites

D5961/D5961M Test Method for Bearing Response of Polymer Matrix Composite Laminates

D6115 Test Method for Mode I Fatigue Delamination Growth Onset of Unidirectional Fiber-Reinforced Polymer Matrix Composites

E6 Terminology Relating to Methods of Mechanical Testing

E111 Test Method for Young's Modulus, Tangent Modulus, and Chord Modulus

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

Current edition approved May 1, 2013. Published May 2013. Originally approved in 1991. Last previous edition approved in 2006 as E1434 – 00 (2006). DOI: 10.1520/E1434-00R13.

[2] Documentation requirements for filled-hole tests were based on open-hole tests with the addition of fastener identification and application information.

[3] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

E1309 Guide for Identification of Fiber-Reinforced Polymer-Matrix Composite Materials in Databases
E1013 Terminology Relating to Computerized Systems (Withdrawn 2000)[4]
E1443 Terminology Relating to Building and Accessing Material and Chemical Databases (Withdrawn 2000)[4]
E1484 Guide for Formatting and Use of Material and Chemical Property Data and Database Quality Indicators (Withdrawn 2000)[4]
IEEE/ASTM SI 10 Standard for Use of the International System of Units (SI): The Modern Metric System

2.2 *Other Standards:*

ANSI X3.172–1996 Information Technology—American National Standard Dictionary of Information Technology (ANSDIT)
CODATA A Glossary of Terms Relating to Data, Data Capture, Data Manipulation, and Databases, *CODATA Bulletin*, Vol 23, Nos. 1–2, Jan.-June 1991[5]
ISO 8601 Data Elements and Interchange Formats—Information Interchange—Representation of Dates and Times[5]
Recommended Method SRM 11R-94 SACMA Recommended Method for Environmental Conditioning of Composite Test Laminates[6]
Recommended Method SRM 1–88 SACMA Recommended Method for Compressive Properties of Oriented Fiber-Resin Composites[6]

3. Terminology

3.1 *Definitions*—Terminology in accordance with Terminologies D3878 and E1443 shall be used where applicable.

3.2 *Definitions of Terms Specific to This Standard:*

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

3.2.1.1 *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. The constituents of a composite retain their identities; they do not dissolve or otherwise merge completely into each other, although they act in concert.

3.2.2 *data dictionary*—a collection of the names of all data items used in a software system together with relevant properties of those items; for example, length of data item, mode of representation, and so forth. **(CODATA)**

3.2.3 *data element*—one individual piece of information used in describing a material or to record test results, for example, a variable name, test parameter, and so forth.

3.2.4 *database schema*—in a conceptual schema language, the definition of the representation forms and structure of a database for the possible collection of all sentences that are in the conceptual schema and in the information base, including manipulation aspects of these forms. **(ANSI X3.172)**

3.2.5 *essential data element*—a data element in a record that must be completed to make the record meaningful in accordance with the pertinent guidelines or standard. **(E1443)**

3.2.5.1 *Discussion*—Data elements are considered essential if they are required to make a comparison of property data from different sources meaningful. 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.

3.2.6 *value set*—an open listing of representative acceptable strings that could be included in a particular field of a record. **(E1443)**

3.2.6.1 *Discussion*—A closed listing of such strings is called a domain or category set.

3.3 Other relevant terminology can be found in Terminologies E6 and E1013.

4. Significance and Use

4.1 This guide provides recommended standard formats for the computerization of mechanical test data for a range of test methods for high-modulus fiber-reinforced composite materials. The types of mechanical tests considered are tension, compression, shear, flexure, open/filled hole, bearing, fracture toughness, and fatigue. The ASTM standards for which this guide was developed are listed in 2.1. The recommended formats are not limited in use to these test methods. There are other test methods for which these recommended formats may be useful.

4.2 Comparison of data from various sources will be most meaningful if all of the elements are available.

4.3 The intent is to provide sufficient detail that values are known for the testing variables that may influence the results. The motivation for this guide is the steadily increasing use of computerized databases. However, this guide is equally appropriate for data stored in a hard-copy form.

4.4 This format is for mechanical test data for high-modulus fiber-reinforced composites only. It does not include the recommended material description or the presentation of other specific types of test data (such as fracture toughness test results). These items are covered by separate formats to be referenced in material specifications or other test standards.

5. Data Reporting

5.1 This guide is intended to provide common data-reporting requirements for the documents listed in 1.2. Each document will reference this guide and identify any usage specific to that document in the data-reporting section. For example, Test Method D3410/D3410M requires that the transition strain be reported as the progressive damage parameter. These requirements do not mean that the information must be reported separately for each specimen. Any data elements that are the same for a series of specimens may be reported once for the entire series, as long as it is clearly indicated that they apply to all specimens.

[4] The last approved version of this historical standard is referenced on www.astm.org.
[5] Available from American National Standards Institute, 25 W. 43rd St., 4th Floor, New York, NY 10036.
[6] Suppliers of Advanced Composite Materials, 1600 Wilson Blvd., Suite 901, Arlington, VA 22209.

TABLE 1 Data Elements for Mechanical Test Data of Fiber-Reinforced Composite Materials

NOTE 1—ET = Essential for Test validation,
EM = Essential for Material traceability,
RT = Recommended for Test validity,
RM = Recommended for Material traceability, and
O = Optional.

No.	Data Element Name of Description	Data Type or Standard Data Element Set	Tension	Compression	Shear	Flexure	Open/Filled Hole	Bearing	Fracture Toughness	Fatigue	Value Sets or Units
					H. Test Method Block						
H1	Test property class	STRING					— O —				Table 2
H2	Test method	[Test_Method]					— ET —				
H3	Test personnel	[Person]					— ET —				
H4	Test facility	[Organization]					— ET —				
H5	Test facility address	[Address]					— ET —				
H6	Type of test	STRING					— RT —				Table 3
H7	Property form type	STRING					— O —				Table 4
					I. Specimen Preparation Block						
					Specimen Preparation Subblock						
I1	Specimen orientation	REAL	ET	ET	ET	ET	ET	ET	ET	ET	degrees
I2	Specimen labeling scheme	STRING	ET	ET	ET	ET	ET	ET	ET	ET	
I3	Specimen extraction technique	STRING	ET	ET	ET	ET	ET	ET	ET	ET	Table 5
I4	Coupon layout cutting plan reference	STRING	RM	RM	RM	RM	RM	RM	RM	RM	
I5	Specimen labeling method	STRING	RM	RM	RM	RM	RM	RM	RM	RM	
I6	Material sampling method	STRING	EM	EM	EM	EM	EM	EM	EM	EM	Table 6
I7	Ply count	INTEGER	RM	RM	RM	RM	RM	RM	RM	RM	
I8	Specimen geometry	STRING	RT	RT	RT	RT	RT	RT	RT	RT	Table 7
I9	Nominal specimen thickness	REAL	RT	RT	RT	RT	RT	RT	RT	RT	mm (in.)
I10	Nominal specimen width	REAL	RT	RT	RT	RT	RT	RT	RT	RT	mm (in.)
I11	Nominal specimen overall length	REAL	RT	RT	RT	RT	RT	RT	RT	RT	mm (in.)
I12	Nominal specimen gage length	REAL	RT	RT	RT	RT	-	-	-	RT	mm (in.)
I13	Nominal specimen outer diameter	REAL	ET	ET	ET	.	.	.	.	.	mm (in.)
I14	Nominal specimen inner diameter	REAL	ET	ET	ET	.	.	.	.	.	mm (in.)
I15	Nominal wall thickness	REAL	ET	ET	ET	.	.	.	.	.	mm (in.)
I16	Nominal specimen cross-sectional area	REAL	RT	RT	RT	RT	.	.	.	.	mm^2 ($in.^2$)
I17	Nominal specimen notch radius (V-notch shear)	REAL	-	-	ET	-	-	-	-	-	mm (in.)
I18	Nominal specimen notch angle (V-notch shear)	REAL	-	-	ET	-	-	-	-	-	degrees
I19	Nominal specimen gage section width (V-notch shear)	REAL	-	-	ET	-	-	-	-	-	mm (in.)
I20	Nominal hole diameter	REAL	-	-	-	-	ET	ET	-	-	mm (in.)
I21	Nominal width to diameter ratio	REAL	-	-	-	-	ET	-	-	-	
I22	Nominal thickness to diameter ratio	REAL	-	-	-	-	ET	ET	-	-	
I23	Nominal edge distance ratio	REAL	-	-	-	-	-	ET	-	-	
I24	Nominal pitch distance ratio	REAL	-	-	-	-	-	ET	-	-	
I25	Nominal bypass ratio	REAL	-	-	-	-	-	ET	-	-	
I26	Sandwich core common name	STRING	-	ET	-	-	-	-	-	-	Table 8
I27	Sandwich core type	STRING	-	ET	-	-	-	-	-	-	
I28	Sandwich core material	STRING	-	ET	-	-	-	-	-	-	
I29	Sandwich core manufacturer	STRING	-	ET	-	-	-	-	-	-	
I30	Sandwich core lot number	STRING	-	RT	-	-	-	-	-	-	
I31	Sandwich core cell size	REAL	-	ET	-	-	-	-	-	-	mm (in.)
I32	Sandwich core nominal density	REAL	-	ET	-	-	-	-	-	-	g/cm^3
I33	Sandwich core ribbon thickness	REAL	-	RT	-	-	-	-	-	-	mm (in.)
I34	Adhesive common name	STRING	-	ET	-	-	-	-	-	-	
I35	Adhesive chemical family	STRING	-	ET	-	-	-	-	-	-	
I36	Adhesive manufacturer	STRING	-	ET	-	-	-	-	-	-	
I37	Adhesive lot number	STRING	-	RT	-	-	-	-	-	-	
I38	Adhesive date of manufacture	STRING	-	RT	-	-	-	-	-	-	
I39	Adhesive scrim common name	STRING	-	RT	-	-	-	-	-	-	
I40	Adhesive scrim fabric style	STRING	-	RT	-	-	-	-	-	-	
I41	Adhesive scrim sizing	STRING	-	RT	-	-	-	-	-	-	
I42	Adhesive surface preparation	STRING	-	RT	-	-	-	-	-	-	
					NDE Subblock						
I43	NDE technique	STRING					— RM —				Table 9
I44	NDE material form	STRING					— RM —				Table 10
I45	NDE results	STRING					— RM —				Table 11
I46	NDE criteria reference	STRING					— RM —				
I47	NDE report	STRING					— RM —				
					Tab/Hinge/Loading-Block Subblock						
I48	Tab/hinge/loading-block material	STRING	ET	ET	ET	-	RT	ET	ET	ET	
I49	Tab/hinge/loading-block adhesive	STRING	ET	ET	ET	-	RT	ET	ET	ET	
I50	Nominal tab orientation	REAL	ET	ET	ET	-	RT	ET	-	ET	degrees
I51	Nominal tab thickness	REAL	ET	ET	ET	-	RT	ET	-	ET	mm (in.)

TABLE 1 *Continued*

No.	Data Element Name of Description	Data Type or Standard Data Element Set	Tension	Compression	Shear	Flexure	Open/Filled Hole	Bearing	Fracture Toughness	Fatigue	Value Sets or Units
I52	Nominal tab bevel angle	REAL	ET	ET	ET	-	RT	ET	-	ET	degrees
I53	Nominal tab length	REAL	RT	RT	RT	-	RT	RT	-	RT	mm (in.)
I54	Tab adhesive curing temperature	REAL	RT	RT	RT	-	RT	RT	-	RT	C (F)
I55	Tab adhesive curing time	REAL	RT	RT	RT	-	RT	RT	-	RT	min
	J. Specimen Conditioning Block										
J1	Specimen conditioning method	[Test_Method]					— ET —				
J2	(Number of conditioning steps)	INTEGER					— ET —				
J3	Conditioning temperature	REAL					— ET —				C (F)
J4	Conditioning parameter	STRING					— ET —				
J5	Conditioning parameter value	REAL					— ET —				
J6	Conditioning time	REAL					— ET —				h
J7	Conditioning environment	STRING					— ET —				Table 12
J8	Traveler geometry	STRING					— ET —				
J9	Equilibrium condition	STRING					— ET —				Table 13
	K. Test Equipment Block Test Machine Subblock										
K1	Type of fixture (grips)	STRING	ET	ET	ET	ET	ET	ET	ET	ET	Table 14
K2	Test machine identification	[Test_Equipment]	RT	RT	RT	RT	RT	RT	RT	RT	
K3	Actuator type	STRING	RT	RT	RT	RT	RT	RT	RT	RT	Table 15
K4	Fixture identification	STRING	RT	RT	RT	RT	RT	RT	RT	RT	
K5	Grip length	REAL	RT	RT	RT	-	RT	RT	RT	RT	mm (in.)
K6	Wedge angle	REAL	RT	RT	RT	-	RT	RT	RT	RT	degrees
K7	Gripping surface	STRING	RT	RT	RT	-	RT	RT	RT	RT	Table 16
K8	Potting material identification	STRING	ET	ET	ET	-	-	-	-	-	
K9	Radius of potting material bead	REAL	ET	ET	ET	-	-	-	-	-	mm (in.)
K10	Potting material cure temperature	REAL	ET	ET	ET	-	-	-	-	-	C (F)
K11	Span-to-depth ratio	REAL	-	-	ET	ET	-	-	-	-	
K12	Load-span to support-span ratio, nominal	STRING	-	-	-	ET	-	-	-	-	
K13	Radius of supports	REAL	-	-	-	ET	-	-	-	-	mm (in.)
K14	Radius of loading noses	REAL	-	-	-	ET	-	-	-	-	mm (in.)
K15	Equipment description	STRING	RT	RT	RT	RT	RT	RT	RT	RT	
K16	Test machine calibration	[Calibration]	RT	RT	RT	RT	RT	RT	RT	RT	
K17	Fastener or pin type	STRING	-	-	-	-	ET	ET	-	-	
K18	Fastener or pin material	STRING	-	-	-	-	ET	ET	-	-	
K19	Fastener or pin diameter	REAL	-	-	-	-	ET	ET	-	-	mm (in.)
K20	Pin hardness	STRING	-	-	-	-	-	RT	-	-	
K21	Pin surface roughness	REAL	-	-	-	-	-	RT	-	-	
K22	Hole clearance	REAL	-	-	-	-	ET	ET	-	-	mm (in.)
K23	Countersink angle	REAL	-	-	-	-	ET	ET	-	-	degrees
K24	Countersink depth	REAL	-	-	-	-	ET	ET	-	-	mm (in.)
K25	Grommet	STRING	-	-	-	-	-	ET	-	-	
K26	Mating material identification	STRING	-	-	-	-	-	ET	-	-	
K27	Mating material width	REAL	-	-	-	-	-	ET	-	-	mm (in.)
K28	Mating material thickness	REAL	-	-	-	-	-	ET	-	-	mm (in.)
K29	Mating material lay-up	STRING	-	-	-	-	-	ET	-	-	
K30	Number of fasteners	INTEGER	-	-	-	-	-	ET	-	-	
K31	Fastener or pin and coupon cleaning method	STRING	-	-	-	-	-	ET	-	-	
	L. Transducer Block										
L1	Transducer type	STRING	ET	ET	ET	-	-	ET	-	ET	Table 17
L2	Transducer location on specimen	STRING	ET	ET	ET	-	-	ET	-	ET	Table 18
L3	Extensometer class	STRING	ET	ET	ET	-	-	RT	-	ET	
L4	Transducer manufacturer	STRING	RT	RT	RT	-	-	RT	-	RT	
L5	Transducer model number	STRING	RT	RT	RT	-	-	RT	-	RT	
L6	Timing of transducer application	STRING	O	O	O	-	-	RT	-	0	
L7	Transducer cure temperature	REAL	RT	RT	RT	-	-	RT	-	RT	C (F)
L8	Transducer cure time	REAL	RT	RT	RT	-	-	RT	-	RT	min
L9	Transducer calibration	[Calibration]	RT	RT	RT	-	-	RT	-	RT	
L10	Transducer lead-wire resistance correction	REAL	RT	RT	RT	-	-	RT	-	RT	
L11	Measured extensometer gage length	REAL	RT	RT	RT	-	-	RT	-	RT	mm (in.)
	M. Specimen Geometry Block										
M1	Number of specimens	INTEGER	ET	ET	ET	ET	ET	ET	ET	ET	
M2	Specimen label	STRING	ET	ET	ET	ET	ET	ET	ET	ET	
M3	Coupons meets test method requirements?	LOGICAL	ET	ET	ET	ET	ET	ET	ET	ET	
M4	Measured specimen thickness	REAL	ET	ET	ET	ET	ET	ET	ET	ET	mm (in.)
M5	Maximum thickness variation	REAL	-	-	-	-	-	-	ET	ET	mm (in.)
M6	Measured specimen width	REAL	ET	ET	ET	ET	ET	ET	ET	ET	mm (in.)
M7	Measured specimen reinforcement volume	REAL	O	O	-	-	O	-	-	-	vol%
M8	Measured specimen overall length	REAL	RT	RT	RT	RT	RT	ET	-	RT	mm (in.)
M9	Measured specimen gage (span) length	REAL	ET	RT	RT	RT	-	-	-	ET	mm (in.)
M10	Measured specimen outer diameter	REAL	ET	ET	ET	-	-	-	-	-	mm (in.)
M11	Measured specimen inner diameter	REAL	ET	ET	ET	-	-	-	-	-	mm (in.)
M12	Measured wall thickness	REAL	ET	ET	ET	-	-	-	-	-	mm (in.)

TABLE 1 *Continued*

No.	Data Element Name of Description	Data Type or Standard Data Element Set	Tension	Compression	Shear	Flexure	Open/Filled Hole	Bearing	Fracture Toughness	Fatigue	Value Sets or Units
M13	Specimen minimum cross-sectional area	REAL	-	RT	RT	RT	-	-	-	RT	mm^2 ($in.^2$)
M14	Method of finding minimum cross-sectional area	STRING	-	RT	RT	RT	-	-	-	RT	Table 19
M15	Specimen notch radius (V-notch shear)	REAL	-	-	O	-	-	-	-	-	mm (in.)
M16	Specimen notch angle (V-notch shear)	REAL	-	-	O	-	-	-	-	-	degrees
M17	Specimen gage section width (V-notch shear)	REAL	-	-	O	-	-	-	-	-	mm (in.)
M18	Measured sandwich thickness	REAL	-	ET	-	-	-	-	-	-	mm (in.)
M19	Measured core thickness	REAL	-	ET	-	-	-	-	-	-	mm (in.)
M20	Measured opposite facesheet thickness	REAL	-	ET	-	-	-	-	-	-	mm (in.)
M21	Specimen hole diameter	REAL	-	-	-	-	ET	ET	-	-	mm (in.)
M22	Specimen width to diameter ratio	REAL	-	-	-	-	ET	-	-	-	
M23	Specimen thickness to diameter ratio	REAL	-	-	-	-	ET	ET	-	-	
M24	Specimen edge distance ratio	REAL	-	-	-	-	-	ET	-	-	
M25	Specimen pitch distance ratio	REAL	-	-	-	-	-	ET	-	-	
M26	Measured fastener or pin diameter	REAL	-	-	-	-	-	ET	-	-	mm (in.)
M27	Insert type	STRING	-	-	-	-	-	-	ET	ET	
M28	Insert thickness	REAL	-	-	-	-	-	-	ET	ET	mm (in.)
M29	Initial delamination length	REAL	-	-	-	-	-	-	-	ET	mm (in.)
	N. Test Environment Block										
N1	Date of test	DATE					— ET —				
N2	Test environment	STRING					— ET —				Table 20
N3	Test temperature	REAL					— ET —				C (F)
N4	Test humidity	REAL					— ET —				%
N5	Temperature of testing laboratory	REAL					— RT—				C (F)
N6	Relative humidity of testing laboratory	REAL					— RT—				%
N7	Soak time at test conditions	REAL					— RT —				min
N8	Moisture content before test	REAL					— RT —				%
N9	Moisture content after test	REAL					— RT —				%
N10	Nominal moisture state	STRING					— O —				Table 21
	O. Loading Block										
O1	Procedure for displacement/strain application	REAL	ET	ET	ET	ET	ET	ET	ET	ET	Table 22
O2	Rate of displacement/strain application	REAL	ET	ET	ET	ET	ET	ET	ET	-	
O3	Fixture torque-up	REAL	-	ET	-	-	-	-	-	-	(in.-lb)
O4	Jaw pressure	REAL	RT	RT	RT	-	RT	RT	RT	RT	N (lb)
O5	Preload	REAL	RT	RT	RT	RT	RT	RT	-	-	N (lb)
O6	Data acquisition method	STRING	RT	RT	RT	RT	RT	RT	RT	RT	Table 23
O7	Data acquisition sampling rate	REAL	RT	RT	RT	RT	RT	RT	RT	RT	
O8	Fastener torque	REAL	-	-	-	-	ET	ET	-	-	(in.-lb)
O9	Fatigue test control parameter	STRING	-	-	-	-	-	-	-	ET	Table 24
O10	Fatigue frequency	REAL	-	-	-	-	-	-	-	ET	
O11	Fatigue waveform	STRING	-	-	-	-	-	-	-	ET	Table 25
O12	Loading parameter ratio	REAL	-	-	-	-	-	-	-	ET	
O13	Mean load	REAL	-	-	-	-	-	-	-	ET	N (lb)
O14	Mean stress	REAL	-	-	-	-	-	-	-	ET	MPa (ksi)
O15	Mean strain	REAL	-	-	-	-	-	-	-	ET	με
O16	Average number of fatigue transition loading	REAL	-	-	-	-	-	-	-	ET	
O17	Loading procedure	STRING	-	-	-	-	-	-	-	ET	
O18	Strength of control specimens—average	REAL	-	-	-	-	-	-	-	ET	MPa (ksi)
O19	Strength of control specimens—standard deviation	REAL	-	-	-	-	-	-	-	ET	MPa (ksi)
O20	Strength of control specimens—coefficient of variation	REAL	-	-	-	-	-	-	-	ET	%
O21	Strain-to-failure of control specimens—average	REAL	-	-	-	-	-	-	-	ET	με
O22	Strain-to-failure of control specimens—standard deviation	REAL	-	-	-	-	-	-	-	ET	με
O23	Strain-to-failure of control specimens—coefficient of variation	REAL	-	-	-	-	-	-	-	ET	%
O24	Maximum cyclic displacement	REAL	-	-	-	-	-	-	-	ET	mm (in.)
	P. Raw Data Block Failure Subblock										
P1	Strength	REAL	ET	ET	ET	ET	ET	ET	-	-	MPa (ksi)
P2	Strain offset	REAL	-	-	ET	ET	-	ET	-	-	%
P3	Offset strength	REAL	-	-	ET	ET	-	ET	-	-	MPa (ksi)
P4	Method of linear fit for offset strength	STRING	-	-	-	-	-	ET	-	-	
P5	Initial strain for offset fit	REAL	-	-	-	-	-	ET	-	-	με
P6	Final strain for offset fit	REAL	-	-	-	-	-	ET	-	-	με
P7	Initial stress for offset fit	REAL	-	-	-	-	-	ET	-	-	MPa (ksi)
P8	Final stress for offset fit	REAL	-	-	-	-	-	ET	-	-	MPa (ksi)
P9	Initial peak strength	REAL	-	-	-	-	-	ET	-	-	MPa (ksi)

TABLE 1 *Continued*

No.	Data Element Name of Description	Data Type or Standard Data Element Set	Tension	Compression	Shear	Flexure	Open/Filled Hole	Bearing	Fracture Toughness	Fatigue	Value Sets or Units
P10	Test truncated at 5 % shear strain	LOGICAL	-	-	ET	-	-	-	-	-	
P11	Maximum load	REAL	RT	RT	ET	RT	-	ET	RT	ET	N (lb)
P12	Maximum deflection	REAL	ET	-	-	-	-	-	-	-	mm (in.)
P13	Strain at failure	REAL	ET	ET	ET	ET	-	ET	-	ET	με
P14	Failure location	STRING	ET	ET	ET	ET	ET	ET	-	ET	Table 26
P15	Failure mode	STRING	ET	ET	ET	ET	ET	ET	-	ET	Table 27
	Modulus Subblock										
P16	Modulus/stiffness	REAL	ET	ET	ET	ET	-	ET	-	-	GPa (Msi)
P17	Method of calculating modulus/stiffness	STRING	ET	ET	ET	ET	-	ET	-	-	Table 28
P18	Fitting procedure for modulus/stiffness calculation	STRING	ET	ET	ET	ET	-	ET	-	-	Table 29
P19	Initial strain for modulus/stiffness	REAL	ET	ET	ET	ET	-	ET	-	-	με
P20	Final strain for modulus/stiffness	REAL	ET	ET	ET	ET	-	ET	-	-	με
	Poisson's Ratio Subblock										
P21	Poisson's ratio value	REAL	ET	ET	-	-	-	-	-	-	
P22	Method of calculating Poisson's ratio	STRING	ET	ET	-	-	-	-	-	-	Table 27
P23	Fitting procedure for Poisson's ratio	STRING	ET	ET	-	-	-	-	-	-	Table 28
P24	Initial strain for Poisson's ratio	REAL	ET	ET	-	-	-	-	-	-	με
P25	Final strain for Poisson's ratio	REAL	ET	ET	-	-	-	-	-	-	με
	Bending Subblock (Table 29)										
P26	Was bending strain measured?	LOGICAL	ET	ET	ET	-	-	-	-	ET	
P27	Initial strain for bending	REAL	ET	ET	ET	-	-	-	-	ET	με
P28	Final strain for bending	REAL	ET	ET	ET	-	-	-	-	ET	με
P29	Percent bending strain	REAL	ET	ET	ET	-	-	-	-	ET	%
P30	Satisfies bending strain requirement?	LOGICAL	ET	ET	ET	-	-	-	-	ET	
P31	Percent twist	REAL	-	-	ET	-	-	-	-	-	%
	Fracture Toughness Subblock										
P32	Intercept	REAL	-	-	-	-	-	-	ET	-	mm (in.)
P33	Exponent	REAL	-	-	-	-	-	-	ET	-	
P34	Slope	REAL	-	-	-	-	-	-	ET	-	
P35	Fracture toughness—deviation from linearity	REAL	-	-	-	-	-	-	ET	-	kJ/m^2
P36	Fracture toughness—visual observation	REAL	-	-	-	-	-	-	ET	-	kJ/m^2
P37	Fracture toughness—5 % offset/maximum load	REAL	-	-	-	-	-	-	ET	-	kJ/m^2
P38	Method of calculating fracture toughness	STRING	-	-	-	-	-	-	ET	-	Table 30
P39	Fracture toughness	REAL	-	-	-	-	-	-	ET	-	kJ/m^2
	Fatigue Subblock										
P40	Number of cycles to 1 % compliance increase	INTEGER	-	-	-	-	-	-	-	ET	
P41	Number of cycles to 5 % compliance increase	INTEGER	-	-	-	-	-	-	-	ET	
P42	Number of cycles to failure	INTEGER	-	-	-	-	-	-	-	ET	
P43	Peak test control parameter	REAL	-	-	-	-	-	-	-	ET	
P44	Valley test control parameter	REAL	-	-	-	-	-	-	-	ET	
P45	Load/strain ratio	REAL	-	-	-	-	-	-	-	ET	
P46	Condition leading to failure	STRING	-	-	-	-	-	-	-	ET	Table 31
P47	Failure criterion	STRING	-	-	-	-	-	-	-	ET	Table 32
	Tabulated/Graphical Data Subblock (see Table 33)										
P48	Tabulated data reference	STRING	ET	ET	ET	ET	-	ET	-	ET	
P49	Tabulated data independent variable	STRING	ET	ET	ET	ET	-	ET	-	ET	Table 34
P50	Tabulated data dependent variable	STRING	ET	ET	ET	ET	-	ET	-	ET	Table 34
P51	Graphical data reference	STRING	ET	ET	ET	ET	-	ET	ET	ET	
P52	Graphical data independent variable	STRING	ET	ET	ET	ET	-	ET	ET	ET	Table 34
P53	Graphical data dependent variable	STRING	ET	ET	ET	ET	-	ET	ET	ET	Table 34
P54	Curve-fitting method	STRING	RT	RT	RT	RT	-	RT	RT	-	
P55	Curve-fitting equation	STRING	RT	RT	RT	RT	-	RT	RT	-	
P56	Curve-fitting parameter	STRING	RT	RT	RT	RT	-	RT	RT	-	
P57	Curve-fitting parameter value	REAL	RT	RT	RT	RT	-	RT	RT	-	
P58	Progressive damage parameter	STRING	RT	-	RT	RT	-	-	-	-	Table 35
P59	Progressive damage parameter value	REAL	S	-	S	S	-	-	-	-	
P60	Progressive damage parameter method of fit	STRING	RT	-	RT	-	-	-	-	-	
P61	Progressive damage parameter initial strain	REAL	RT	-	RT	-	-	-	-	-	με
P62	Progressive damage parameter final strain	REAL	RT	-	RT	-	-	-	-	-	με
P63	Footnotes	STRING	ET	ET	ET	ET	ET	ET	ET	ET	
	Q. Normalized Data Block										
Q1	Data normalization method	STRING	ET	ET	-	-	ET	-	-	-	Table 36
Q2	Baseline cured ply thickness	REAL	ET	ET	-	-	ET	-	-	-	mm (in.)
Q3	Baseline fiber areal weight	REAL	O	O	-	-	O	-	-	-	g/m^2
Q4	Baseline fiber volume	REAL	ET	ET	-	-	ET	-	-	-	vol%
Q5	Normalized strength	REAL	S	S	-	-	S	-	-	-	MPa (ksi)