ASME Y14.47-2023
(Revision of ASME Y14.47-2019)

Model Organization Practices

Engineering Product Definition and Related Documentation Practices

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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FOREWORD

The U.S. Department of Defense requested that ASME adapt Appendix B of MIL-STD-31000A, Technical Data Packages (TDP), as a national standard to support broader usage of its concepts. MIL-STD-31000A, Appendix B provides a methodology for organizing the various elements of a product definition data set. The purpose of MIL-STD-31000A, Appendix B is to propose a mechanism for utilizing annotated models in a TDP in a way such that a traditional drawing is not needed.

To address this need for a national standard, the subject of Appendix B, MIL-STD-31000A and the principles defined by the ASME Y14 series of standards formed a basis for the creation of a model organizational framework as outlined in this Standard. The model organizational framework will enable the use of the product definition data by both humans and machines. This capability is also required to support a model-based enterprise (MBE). By supporting an MBE, the product definition data can be readily reused by downstream users throughout the product life cycle.

ASME Y14.47-2023 adds definitions from ASME Y14.41 and a new definition of "metadata elements." The 2023 edition also updates Table 5-2 (formerly Table 6-3), Metadata Elements. Finally, this edition clarifies the purpose of mapping to the base ASME Y14.47 framework and clarifies product definition elements and data set completeness states, specifically expanding on and clarifying both the geometry state and the annotation and attribute state.

Future editions of this Standard will refine and expand the framework and expand support for both TDP and MBE.

This Standard is available for public review on a continuing basis. This provides an opportunity for additional public review input from industry, academia, regulatory agencies, and the public-at-large.

This Standard was approved by the American National Standards Institute on January 20, 2023.

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Engineering Product Definition and Related Documentation Practices

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General. ASME codes and standards are developed and maintained by committees with the intent to represent the consensus of concerned interests. Users of ASME codes and standards may correspond with the committees to propose revisions or cases, report errata, or request interpretations. Correspondence for this Standard should be sent to the staff secretary noted on the committee's web page, accessible at https://go.asme.org/Y14committee.

Revisions and Errata. The committee processes revisions to this Standard on a continuous basis to incorporate changes that appear necessary or desirable as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published in the next edition of the Standard.

In addition, the committee may post errata on the committee web page. Errata become effective on the date posted. Users can register on the committee web page to receive e-mail notifications of posted errata.

This Standard is always open for comment, and the committee welcomes proposals for revisions. Such proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent background information and supporting documentation.

Cases

(a) The most common applications for cases are

(1) to permit early implementation of a revision based on an urgent need

(2) to provide alternative requirements

(3) to allow users to gain experience with alternative or potential additional requirements prior to incorporation directly into the Standard

(4) to permit the use of a new material or process

(b) Users are cautioned that not all jurisdictions or owners automatically accept cases. Cases are not to be considered as approving, recommending, certifying, or endorsing any proprietary or specific design, or as limiting in any way the freedom of manufacturers, constructors, or owners to choose any method of design or any form of construction that conforms to the Standard.

(c) A proposed case shall be written as a question and reply in the same format as existing cases. The proposal shall also include the following information:

(1) a statement of need and background information

(2) the urgency of the case (e.g., the case concerns a project that is underway or imminent)

(3) the Standard and the paragraph, figure, or table number(s)

(4) the edition(s) of the Standard to which the proposed case applies

(d) A case is effective for use when the public review process has been completed and it is approved by the cognizant supervisory board. Approved cases are posted on the committee web page.

Interpretations. The committee does not issue interpretations for this Standard.

Committee Meetings. The Y14 Standards Committee regularly holds meetings that are open to the public. Persons wishing to attend any meeting should contact the secretary of the committee. Information on future committee meetings can be found on the committee web page at https://go.asme.org/Y14committee.

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MODEL ORGANIZATION PRACTICES

1 GENERAL

1.1 Scope

This Standard establishes a framework for organizing a three-dimensional (3D) model and other associated information within the context of a product definition data set, hereafter referred to as data set, for the purpose of conveying a product definition that enables a model-based enterprise (MBE). This Standard contains no requirements pertaining to drawing graphic sheets. The framework defines a common practice to improve design productivity and to deliver consistent data content and structure to consumers of the data to facilitate common exchange interfaces.

1.2 Introduction

This Standard outlines model organization framework practices to support model-based definition (MBD). This Standard provides a set of requirements and guidelines for the computer-aided design (CAD) user. It is intended to be the foundation for design development efforts in an MBE.

Previously, 3D models had an accompanying drawing graphic sheet. Current advances in CAD capabilities allow product definition previously shown on a drawing graphic sheet to be defined and displayed directly in the MBD, which enables the 3D model to be the primary source for obtaining product definition data. Elimination of the drawing graphic sheet can be accomplished by using a combination of annotations and naming conventions to organize the 3D model.

The organization practices defined by this Standard are necessary to establish a common method to facilitate access to the MBD data in the data set. While the focus of this Standard is initially on mechanical items, the intent is to provide a foundation for use in any discipline. The framework is compliant with an annotated model defined in ASME Y14.41.

1.3 ASME Y14 Series Conventions

The conventions in paras. 1.3.1 through 1.3.12 are used in this and other ASME Y14 standards.

1.3.1 Mandatory, Recommended, Guidance, and Optional Words

(a) The word “shall” establishes a requirement.
(b) The word “will” establishes a declaration of purpose on the part of the design activity.
(c) The word “should” establishes a recommended practice.
(d) The word “may” establishes an allowed practice.
(e) The words “typical,” “example,” “for reference,” and the Latin abbreviation “e.g.” indicate suggestions given for guidance only.
(f) The word “or” used in conjunction with a requirement or a recommended practice indicates that there are two or more options for complying with the stated requirement or practice.
(g) The phrase “unless otherwise specified” or the abbreviation “UOS” establishes a default requirement. The phrase is used when the default is a generally applied requirement and an exception may be provided by another document or requirement.

1.3.2 Cross-Reference of Standards. Cross-reference of standards in text with or without a date following the standard designator shall be interpreted as follows:
(a) Reference to other ASME Y14 standards in the text without a date following the standard designator indicates that the edition of the standard identified in the References section (section 2) shall be used to meet the requirement.
(b) Reference to other ASME Y14 standards in the text with a date following the standard designator indicates that only that edition of the standard shall be used to meet the requirement.

1.3.3 Invocation of Referenced Standards. The following examples define the invocation of a standard when specified in section 2 and referenced in the text of this Standard: