

ASME Y14.24-2012
[Revision of ASME Y14.24-1999 (R2009)]

Types and Applications of Engineering Drawings

**Engineering Drawing and Related
Documentation Practices**

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

Copyright © 2013 by the American Society of Mechanical Engineers.
No reproduction may be made of this material without written consent of ASME.



ADOPTION NOTICE

ASME Y14.24, "DRAWINGS TYPES AND APPLICATIONS OF ENGINEERING DRAWINGS", was adopted on 14 February 2000 for use by the Department of Defense (DoD). Proposed changes by DoD activities must be submitted to the DoD Adopting Activity: Commander, U.S. Army ARDEC, ATTN: RDAR-QES-E, Picatinny Arsenal, NJ 07806-5000. Copies of this document may be purchased from the American Society of Mechanical Engineers (ASME), Three Park Avenue New York, New York, United States, 10016-5990. <http://www.asme.org/>

Custodians:

Army — AR
Navy — SA
Air Force — 16
DLA — DH

Adopting Activity:

Army — AR
(Project DRPR-2012-001)

Review Activities:

Army — AV, CR, MI, PT, TE, TM
Navy — AS, CG, CH, MC, NP
Air Force — 04, 13, 99
DLA — IS
OSD — SE
Other — CM, MP, DC2, NS

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at 752839 <http://assist.dla.mil>.

AMSC N/A

AREA DRPR

DISTRIBUTION STATEMENT A. Approved for public release, distribution is unlimited



ASME Y14.24-2012

[Revision of ASME Y14.24-1999 (R2009)]

Types and Applications of Engineering Drawings

**Engineering Drawing and Related
Documentation Practices**

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

Two Park Avenue • New York, NY • 10016 USA

Copyright © 2013 by the American Society of Mechanical Engineers.
No reproduction may be made of this material without written consent of ASME.



Date of Issuance: April 5, 2013

This Standard will be revised when the Society approves the issuance of a new edition. There will be no written interpretations of the requirements of this Standard issued to this edition.

Periodically certain actions of the ASME Y14 Committee may be published as Cases. Cases are published on the ASME Web site under the Committee Pages at <http://cstools.asme.org/> as they are issued.

Errata to codes and standards may be posted on the ASME Web site under the Committee Pages to provide corrections to incorrectly published items, or to correct typographical or grammatical errors in codes and standards. Such errata shall be used on the date posted.

The Committee Pages can be found at <http://cstools.asme.org/>. There is an option available to automatically receive an e-mail notification when errata are posted to a particular code or standard. This option can be found on the appropriate Committee Page after selecting “Errata” in the “Publication Information” section.

ASME is the registered trademark of The American Society of Mechanical Engineers.

This code or standard was developed under procedures accredited as meeting the criteria for American National Standards. The Standards Committee that approved the code or standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed code or standard was made available for public review and comment that provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

ASME does not “approve,” “rate,” or “endorse” any item, construction, proprietary device, or activity.

ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable letters patent, nor assumes any such liability. Users of a code or standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

ASME accepts responsibility for only those interpretations of this document issued in accordance with the established ASME procedures and policies, which precludes the issuance of interpretations by individuals.

No part of this document may be reproduced in any form,
in an electronic retrieval system or otherwise,
without the prior written permission of the publisher.

The American Society of Mechanical Engineers
Two Park Avenue, New York, NY 10016-5990

Copyright © 2013 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
All rights reserved
Printed in U.S.A.



CONTENTS

Foreword	v
Committee Roster	vii
Correspondence With the Y14 Committee	viii
1 General	1
2 References	3
3 Definitions	3
4 Layout Drawing	7
5 Detail Drawing	7
6 Assembly Drawings	8
7 Installation Drawing	8
8 Modifying Drawings	9
9 Arrangement Drawing	10
10 Control Drawings	11
11 Interface Drawing	13
12 Identification Cross-Reference Drawing	13
13 Mechanical Schematic Diagram	14
14 Electrical/Electronic Diagrams	14
15 Special Application Drawings	15
16 Drawing Tree	20
Figures	
4-1 Layout Drawing	22
5-1 Monodetail Drawing	23
5-2 Tabulated Monodetail Drawing	24
5-3 Multidetail Drawing	25
6-1 Assembly Drawing	26
6-2 Detail Assembly Drawing	27
6-3 Inseparable Assembly Drawing	28
7-1 Indentured Relationship of Installation Drawings (Depicting Work Packages)	29
7-2 Installation Drawing	30
8-1 Altered Item Drawing (Mechanical Alteration)	31
8-2 Altered Item Drawing (Electrical Alteration)	32
8-3 Selected Item Drawing (Mechanical Selection)	33
8-4 Selected Item Drawing (Electrical Selection)	34
8-5 Modification Drawing	35
9-1 Arrangement Drawing (Pictorial)	36
10-1 Procurement Control Drawing	37
10-2 Vendor Item Control Drawing	38
10-3 Source Control Drawing	39
10-4 Envelope Drawing	40
11-1 Interface Drawing	41



12-1	Identification Cross-Reference Drawing	42
13-1	Mechanical Schematic Diagram	43
14-1	Functional Block Diagram	44
14-2	Single-Line Schematic Diagram	45
14-3	Schematic Diagram	46
14-4	Connection Diagram	47
14-5	Interconnection Diagram (Point-to-Point, Simple)	48
14-6	Interconnection Diagram (Point-to-Point, Complex)	49
14-7	Interconnection Diagram (Cabling Type)	50
14-8	Logic Circuit Diagram	51
15-1	Wiring Harness Drawing	52
15-2	Cable Assembly Drawing	53
15-3	Indented Relationships of Printed and Discrete Wiring Board Documentation (Typical)	54
15-4	Kit Drawing	55
15-5	Tube Bend Drawing (Pictorial/Coordinate)	56
15-6	Tube Bend Drawing (Tabular)	57
15-7	Matched Set Drawing	58
15-8	Contour Definition Drawing (Index)	59
15-9	Contour Definition Drawing (Pictorial)	60
15-10	Contour Definition Drawing	61
15-11	Software Installation Drawing	62
15-12	Alternate Parts Drawing (Cover Sheet Not Shown)	63
16-1	Drawing Tree	64
16-2	Block Entry Example (Mandatory Entries)	65
16-3	Block Entry Example (Includes Optional Entries)	65
Nonmandatory Appendix		
A	Selection of Drawing Types	67



FOREWORD

Subcommittee 24, Types and Applications of Engineering Drawings, was formed in June 1973 as a subcommittee of the American Society of Mechanical Engineers (ASME) Committee Y14, Standards for Engineering Drawings and Related Documentation Practices. The Subcommittee was formed to prepare a standard that defined the accepted drawing types used to establish engineering requirements in the production and procurement of hardware.

The basis for this Standard was Chapter 200 of the military standard MIL-STD-100, Engineering Drawing Practices. Work on this Standard considered the types of engineering drawings most frequently used by business, industry, and government communities in the United States. This Standard attempts to serve the individual and combined needs of these communities and ensure consistency of application and interpretation.

On this basis, a series of meetings were held to identify, select, and prepare proposed text and illustrations. At each stage of development, the Subcommittee considered the selection of requirements best suited for a national standard. Members of the Y14.24 Subcommittee represented a cross-section of American industry and the Department of Defense (DoD). Liaison with technical societies such as the National Defense Industrial Association (NDIA), Aerospace Industries Association (AIA), Electronic Industries of America (EIA), and the Society of Automotive Engineers (SAE International) provided technical support.

Drawing definitions are intended to permit preparation by any suitable method (manual, computer-aided, photographic, etc.); therefore, preparation techniques or methods of reproduction are not described.

The original edition of ASME Y14.24M was approved as an American National Standard on November 3, 1989. It was adopted and approved for use by the DoD on March 30, 1990. It was reaffirmed in 1996 without change.

Upon release of the original edition, it was referenced by the DoD as a replacement of the majority of Chapter 200 of MIL-STD-100E, which was released September 30, 1991. Input received from the DoD user community indicated that additional detail and clarification were needed to ensure understanding and application of the requirements when this Standard is invoked on government contracts.

Subcommittee 24 was reformed and began work on revising the Standard at a meeting in Garland, Texas from October 8 through October 10, 1991. ASME Y14.24 was approved as an American National Standard on June 24, 1999. It was reaffirmed in 2004 without change. Work on this revision began in September 2002.

The following is a summary of the significant changes incorporated in this revision:

(a) Definitions were relocated to section 3, para. 1.2 was added, and section 1 was redesignated accordingly.

(b) Paragraph 1.3 (former para. 1.4) was revised to separate preparation methods from formats and to clarify the relationship between ASME Y14.24 and ASME Y14.41.

(c) Paragraph 1.10 was added to address drawing hierarchy.

(d) Definitions of *drawing tree*, *type designation*, and *Design Activity Identification (DAI)* were added.

(e) The definition and use of the term "FAA-PMA" were deleted.

(f) The term "unique identifier" and all variables of it used with the term "identifier" were deleted.

(g) The term "descriptive identifier" was deleted to agree with changes to ASME Y14.100-2012, clarifying that a descriptive identifier may be used as a PIN.

(h) Former para. 13.11 and former Figs. 43 and 44 were deleted.

(i) Section 16 and Figs. 16-1, 16-2, and 16-3 were added.

(j) Paragraph 15.5 (former para. 13.5) was revised to add reference to ASME Y14.31, to delete requirements located in ASME Y14.31, and to delete former Fig. 34.



(k) Figure A-1 Notes were revised to replace the terms “contractor” and “subcontractor” with the terms “design activity” and “subdesign activity,” respectively.

Commendation is extended to the companies and the DoD departments and agencies for sponsoring participants in this activity and to those whose earlier efforts provided the basis for this Standard. The success of this effort can be attributed to their demonstrated interest, cooperation, and support.

Coordination of this Standard with the International Organization for Standardization (ISO/TC10/SC1) is intended to help enhance world understanding of the various types of drawings in use within the United States.

Suggestions for the improvement of this Standard are welcome. They should be sent to The American Society of Mechanical Engineers, Attn.: Secretary, Y14 Standards Committee, Two Park Avenue, New York, NY 10016-5990.

This revision was approved as an American National Standard on November 14, 2012.



ASME Y14 COMMITTEE

Engineering Drawing and Related Documentation Practices

(The following is the roster of the Committee at the time of approval of this Standard.)

STANDARDS COMMITTEE OFFICERS

F. Bakos, *Chair*
W. A. Kaba, *Vice Chair*
F. Constantino, *Secretary*

STANDARDS COMMITTEE PERSONNEL

A. R. Anderson , Dimensional Dynamics, LLC	E. F. McCarthy , Raytheon Missile Systems
F. Bakos , Consultant	P. J. McCuiston , Ohio University
J. V. Burleigh , Consultant	J. D. Meadows , James D. Meadows & Associates, Inc.
F. Constantino , The American Society of Mechanical Engineers	M. E. Mero , Northrop Grumman Corp.
D. E. Day , Tec-Ease, Inc.	H. W. Oakes , United States Air Force
K. Dobert , Siemens PLM Software	N. H. Smith , Spirit AeroSystems, Inc.
B. A. Harding , Purdue University	M. J. Stahl , Caterpillar, Inc.
D. H. Honsinger , Consultant	N. Stern , United States Army
W. A. Kaba , Spirit AeroSystems, Inc.	K. E. Wiegandt , Sandia National Laboratories
A. Krulikowski , Effective Training, Inc.	R. G. Wilhelm , University of North Carolina
	B. A. Wilson , The Boeing Co.

SUBCOMMITTEE 24 — TYPES AND APPLICATIONS OF ENGINEERING DRAWINGS

R. D. Green , <i>Chair</i> , The Boeing Co.	C. N. Markt , Lockheed Martin
L. G. Davis , Consultant	G. M. Nelson , Consultant
J. A. Gagnon , Hamilton Sundstrand Corp.	H. W. Oakes , United States Air Force
B. Germany , Raytheon Co.	J. H. Sena , Lockheed Martin Space System Co.
W. Gold , The Boeing Co.	R. H. Settle , Naval Surface Warfare Center, Dahlgren Division
D. M. Hagler , L-3 Communications, Integrated Systems	N. Stern , United States Army
J. B. Hoskins , The Boeing Co.	M. W. Woodworth , Consultant
W. A. Kaba , Spirit AeroSystems, Inc.	E. F. Zwettler , Rolls-Royce Corp.



CORRESPONDENCE WITH THE Y14 COMMITTEE

General. ASME Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by proposing revisions and attending Committee meetings. Correspondence should be addressed to:

Secretary, Y14 Standards Committee
The American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990
<http://go.asme.org/Inquiry>

Proposing Revisions. Revisions are made periodically to the Standard 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 periodically.

The Committee welcomes proposals for revisions to this Standard. 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 documentation.

Proposing a Case. Cases may be issued for the purpose of providing alternative rules when justified, to permit early implementation of an approved revision when the need is urgent, or to provide rules not covered by existing provisions. Cases are effective immediately upon ASME approval and shall be posted on the ASME Committee Web page.

Requests for Cases shall provide a Statement of Need and Background Information. The request should identify the standard, the paragraph, figure or table number(s), and be written as a Question and Reply in the same format as existing Cases. Requests for Cases should also indicate the applicable edition(s) of the standard to which the proposed Case applies.

Attending Committee Meetings. The Y14 Standards Committee regularly holds meetings or telephone conferences, which are open to the public. Persons wishing to attend any meeting or telephone conference should contact the Secretary of the Y14 Standards Committee or check our Web site at <http://cstools.asme.org/csconnect/>.



TYPES AND APPLICATIONS OF ENGINEERING DRAWINGS

1 GENERAL

1.1 Scope

This Standard defines the types of engineering drawings most frequently used to establish engineering requirements. It describes typical applications and minimum content requirements. Drawings for specialized engineering disciplines (e.g., marine, civil, construction, optics, etc.) are not included in this Standard. It is essential that this Standard be used in close conjunction with ASME Y14.34, ASME Y14.35M, ASME Y14.41, and ASME Y14.100.

1.2 Conventions

The following conventions are guidance used in this and other ASME Y14 standards.

1.2.1 Mandatory, Nonmandatory, Guidance, and Optional Words

(a) The words “shall” and “will” establish a mandatory requirement.

(b) The words “should” and “may” establish a recommended practice.

(c) The words “typical,” “example,” “for reference,” or the Latin abbreviation “e.g.” indicate suggestions given for guidance only.

(d) The word “or” used in conjunction with a mandatory requirement or a recommended practice indicates that there are two or more options for complying with the stated requirement or practice.

1.2.2 Cross-Reference of Standards. Cross-reference of standards in the text with or without a date following the standard identity is interpreted as follows:

(a) Reference to other ASME Y14 standards in the text without a date following the standard identity indicates the issue of the standard as identified in the References section shall be used to meet the requirement.

(b) Reference to other ASME Y14 standards in the text with a date following the standard identity indicates that only that issue of the standard shall be used to meet the requirement.

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

(a) When a referenced standard is cited in the text with no limitations to a specific subject or paragraph(s)

of the standard, the entire standard is invoked. For example, “dimensioning and tolerancing shall be in accordance with ASME Y14.5” is invoking the complete standard because the subject of the standard is dimensioning and tolerancing and no specific subject or paragraph(s) within the standard are invoked.

(b) When a referenced standard is cited in the text with limitations to a specific subject or paragraph(s) of the standard, only the paragraph(s) on that subject is invoked. For example, “assign part or identifying numbers in accordance with ASME Y14.100” is only invoking the paragraph(s) on part or identifying numbers because the subject of the standard is engineering drawing practices and part or identifying numbers is a specific subject within the standard.

(c) When a referenced standard is cited in the text without an invoking statement such as “in accordance with,” the standard is for guidance only. For example, “for gaging principles, see ASME Y14.43” is only for guidance and no portion of the standard is invoked.

1.2.4 Parentheses Following a Definition. When a definition is followed by a standard referenced in parentheses, the referenced standard is the controlling standard for the definition.

1.2.5 Notes. Notes depicted in this Standard in ALL UPPERCASE letters are intended to reflect actual drawing entries. Notes depicted in Initial Uppercase or lowercase letters are to be considered supporting data to the contents of this Standard and are not intended for literal entry on drawings. A statement requiring the addition of a note with the qualifier “such as” is a requirement to add a note, and the content of the text is allowed to vary to suit the application.

1.2.6 Acronyms or Abbreviations. Acronyms and abbreviations are spelled out the first time they are used in this Standard, followed by the acronym or abbreviation in parentheses. The acronym is used thereafter throughout the text.

1.2.7 Units. The International System of Units (SI) is featured in this Standard. It should be understood that U.S. Customary units could equally have been used without prejudice to the principles established.

1.2.8 Figures. The figures in this Standard are intended only as illustrations to aid the user in understanding the practices described in the text. In some

