Engineering Drawing and Related Documentation Practices

ASME Y14.42-2002

DIGITAL APPROVAL SYSTEMS

An American National Standard



The American Society of Mechanical Engineers

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AN AMERICAN NATIONAL STANDARD

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FOREWORD

Since the first national standard for engineering drawings, Standards for Cross-Sections, was published by ASME in 1914, the field of engineering documentation has steadily become increasingly versatile and sophisticated. Digital approval systems are now part of the new world of engineering documents that includes the use of computers and digital modeling applications and techniques. This is the first standard on digital approval systems for engineering documentation.

The U.S. government and industry are encouraging the active development and use of tools to facilitate electronic commerce, of which a digital approval system is one. In the early 1990s, work on MIL-STD-100 revealed an increasing need to the engineering community for electronic approval systems. To address this need, a proposal was made to the ASME Y14 Main Committee to define the minimum requirements for a digital approval system. After investigating the need for such a standard, ASME Y14 Subcommittee 42 was established in December, 1998. This Standard is the result of their effort.

During this effort, various documents and standards were reviewed [e.g., Federal Information Processing Standards (FIPS), International Organization for Standardization (ISO) standards, and other published standards, both government and industry] for technical content and applicability.

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

This Standard was approved as an American National Standard on November 20, 2002.

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Engineering Drawing and Related Documentation Practices

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ENGINEERING DRAWING AND RELATED DOCUMENTATION PRACTICES

DIGITAL APPROVAL SYSTEMS

1 GENERAL

1.1 Scope

This Standard provides the minimum requirements for the development of a digital approval system for engineering documentation.

1.2 References

When the following American National Standards referred to in this Standard are superceded by a revision approved by the American National Standards Institute, Inc., the revision shall apply.

ASME Y14.1, Decimal Inch Drawing Sheet Size and Format
ASME Y14.1M, Metric Drawing Sheet Size and Format
ASME Y14.35M, Revision of Engineering Drawings and Associated Documents
ASME Y14.100, Engineering Drawing Practices
Publisher: The American Society of Mechanical Engineers (ASME International), Three Park Avenue, New York, NY 10016-5990; Order Department: 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300

1.3 Definitions

approval indicator: any symbol adopted by the design activity to indicate approval.

associated documents: general reference to documentation supportive of and directly related to drawing content, such as Parts Lists, Data Lists, Index Lists, Wiring Lists, and Application Lists (see ASME Y14.35M).

authentication: the process of verifying the claimed identity of a document's author and approver(s).

biometrics: the use of biological properties to identify individuals, e.g., finger prints, a retina scan, voice recognition, etc.

cryptographic key: a string of bits used widely in cryptography, to encrypt and decrypt data.

digital signature: a person's signature transmitted in a coded form (from a computer) by discrete signal elements such that the identity of the signatory and integrity of the data can be verified.

drawing: an engineering document or digital data file(s) that discloses (directly or by reference), by means of graphic or textural presentations, or by combinations of both, the physical or functional requirements of an item (see ASME Y14.100).

signature: one's name as written by oneself.

2 REQUIREMENTS

Digital approval systems shall provide for the administration and digital application of unique approval indicators. These systems shall be amenable to human and machine-readable protocols, provide for accurate data entry, and provide for accountability and traceability.

2.1 Approval Indicator

An approval indicator, as used in this Standard, is a symbol of personal identification with the same authority as a manually applied signature. It shall be unique, verifiable, applicable to, controlled and applied by an individual, and affixed or hyperlinked to the approved data.

2.1.1 Composition of an Approval Indicator. Approval indicators may consist of any symbol(s), letter(s), number(s); grouping or combinations of symbol(s), letter(s), number(s); or a digital signature. Standard and commonly used machine-readable markings (e.g., 2D bar code, matrix code, etc.) may be used as approval indicators.

Trademarks, company logos, etc., shall not be used alone as an approval indicator. However, when combined with the approval indicator, such symbols provide clear association with a specific organization or function.

2.1.2 Approval Indicators for Engineering Data. A mechanism shall be established and maintained to verify and associate approval indicators to an individual. Uniformity of approval indicator placement should be established by company procedures, standards, or policies to enhance visibility and reduce searching.

When engineering data is presented or displayed on an engineering drawing utilizing a drawing sheet format in accordance with ASME Y14.1 or ASME Y14.1M, the approval indicator(s) shall be affixed, or hyperlinked, in the appropriate signature block(s).

When engineering data is presented or displayed without a drawing sheet format, the approval indicator

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shall be affixed or hyperlinked in a manner to be readily visible and accessible without affecting the technical contents of the engineering data.

2.1.3 Manual Drawings. Manually prepared and approved drawings and associated documents may be exempt from the requirements of this Standard. When manually prepared and approved drawings are converted to digital file formats, the use of a digital approval indicator should be considered for future revisions.

2.1.4 Printouts of Digital Documents. Hard copy printouts of digital drawings shall contain dated indication that the document has been approved.

2.1.5 Digital Copies of Digital Documents. When approval indicators reside in separate documents and are hyperlinked to the digital drawing, the approval indicators shall be affixed to the digital copy of the document.

2.2 Authentication and Verification of Approval Indicators

Authentication applies to the validation of the approval indicator. Verification of an approval indicator applies to the validation of the approval process.

2.2.1 Authentication. A system of authentication shall be developed to ensure the accuracy of the approval indicator. The authentication of an approval indicator is the process that validates the unique association of the owner of the indicator to the indicator. Methods for user authentication may be extended to provide approval indicators by combining them with cryptographic techniques of various kinds. Examples of technologies that have been developed for user authentication include: password systems, cryptographic systems, and biometrics identification methods.

2.2.2 Verification. Approval indicator verification is a process whereby all users of a document are assured that an authentic approval indicator has been used. In general, the document, the approval indicator, and other information, such as cryptographic keys or biometrics templates, may be used.

2.3 Security

The digital approval system shall be protected with a security system that protects both the system and the data within the system from unauthorized access or modification.

2.3.1 Integrity. The digital approval system shall identify valid approvals of the data. The approval indicator shall not be applied without authorization. The system shall also identify what is approved. Alteration of either the approved document or the approval indicator should be detectable by the digital approval system.

2.3.2 Non-Repudiation. The digital approval system shall provide the necessary integrity and ability to authenticate the signature(s) such that the signature(s) cannot be repudiated. When documents are transported to another system(s), the integrity of the document, including its contents, approval indicators, approval indicator attributes, and document attributes, shall be maintained.

2.3.3 Authority. The system shall have a verifiable authority to create and distribute approval indicators. A unique authorization identity is issued to each approver.

2.3.4 Protecting Approval Indicator Information. Protection and control of approval indicator information, and the media or device in which it is contained, shall be a key ingredient of the system's security.

2.3.4.1 Active Documents. Approval indicator information shall be maintained current, accessible, and fully functional as long as the document to which it is applied is considered active. This also applies when media or device systems protocols migrate (i.e., as systems update or change).

2.3.4.2 Inactive Documents. Approval indicator information that has been applied to documents no longer active should be fully accessible. Migration of active media or device systems should retain the capability to recognize and validate approval indicator information applied to archived documents. This may be achieved through either continuous protocol updates to archived documents or "backward compatible" capabilities of migrated active media or device systems.

2.3.5 User Authentication With Passwords. For the purposes of this Standard, when a password system is used, the user shall control the password.

2.3.5.1 Password Over a Network. When a password is communicated over a network, the password shall be encrypted or physical appliances used, or both, to prevent unauthorized interception.

2.3.5.2 Password Criteria. Systems using passwords shall establish criteria that will ensure security of the system and its data. The following factors should be considered:

(a) the range of values from which each character of the password may be chosen;

(b) the total number of characters that make up the password;

(c) password duration for specific time intervals;

(d) limitations on use of previous passwords; and

(e) storage of passwords for use in the authentication process.

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2.3.5.3 Password Generation. The password generation system has a major impact on the security of that system. When passwords are automatically generated, care shall be taken for secure distribution to users. Users shall have the ability to change passwords themselves, or have a means of requesting a new password.

2.4 Revisions

Revisions to drawings and associated documents require appropriate approvals and approval indicators. However, approvals applied to initial issues and previous revisions shall remain in effect. Revisions are prepared in accordance with ASME Y14.35M.

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RELATED DOCUMENTS

Engineering Drawing and Related Documentation Practices
- Decimal Inch Drawing Sheet Size and Format ..... Y14.1-1995(R2002)
- Metric Drawing Sheet Size and Format ..... Y14.1M-1995(R2002)
- Line Conventions and Lettering ..... Y14.2M-1992(R1998)
- Multiview and Sectional View Drawings ..... Y14.3M-1994(R1999)
- Pictorial Drawings ..... Y14.4M-1989(R1999)
- Dimensioning and Tolerancing ..... Y14.5M-1994(R1999)
- Mathematical Definition of Dimensioning and Tolerancing Principles ..... Y14.5.1M-1994(R1999)
- Certification of Geometric Dimensioning and Tolerancing Professionals Y14.5.2-2000
- Screw Thread Representation Y14.6-2001
- Gears and Splines
  - Spur, Helical, Double Helical and Racks ..... Y14.7.1-1971(R1998)
  - Bevel and Hypoid Gears ..... Y14.7.2-1978(R1999)
- Castings and Forgings ..... Y14.8M-1996(R2002)
- Mechanical Spring Representation ..... Y14.13M-1981(R1998)
- Optical Parts ..... Y14.18M-1986(R1998)
- Types and Applications of Engineering Drawings Y14.24-1999
- Chassis Frames — Passenger Car and Light Truck — Ground Vehicle Practices ..... Y14.32.1M-1994(R1999)
- Associated Lists ..... Y14.34M-1996(R2002)
- Revision of Engineering Drawings and Associated Documents Y14.35M-1997
- Surface Texture Symbols ..... Y14.36M-1996(R2002)
- Abbreviations and Acronyms Y14.38-1999
- Basic Rules for the Design of Graphical Symbols for Use in the Technical Documentation of Products Y14.40.0-2002
- Digital Approval Systems Y14.42-2002
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A Structural Language Format for Basic Shape Description ..... Y14 Technical Report 4-1989

Graphic Symbols for:
- Plumbing Fixtures for Diagrams Used in Architecture and Building Construction ..... Y32.4-1977(R1999)
- Railroad Maps and Profiles ..... Y32.7-1972(R1999)
- Mechanical and Acoustical Elements as Used in Schematic Diagrams ..... Y32.18-1972(R1998)

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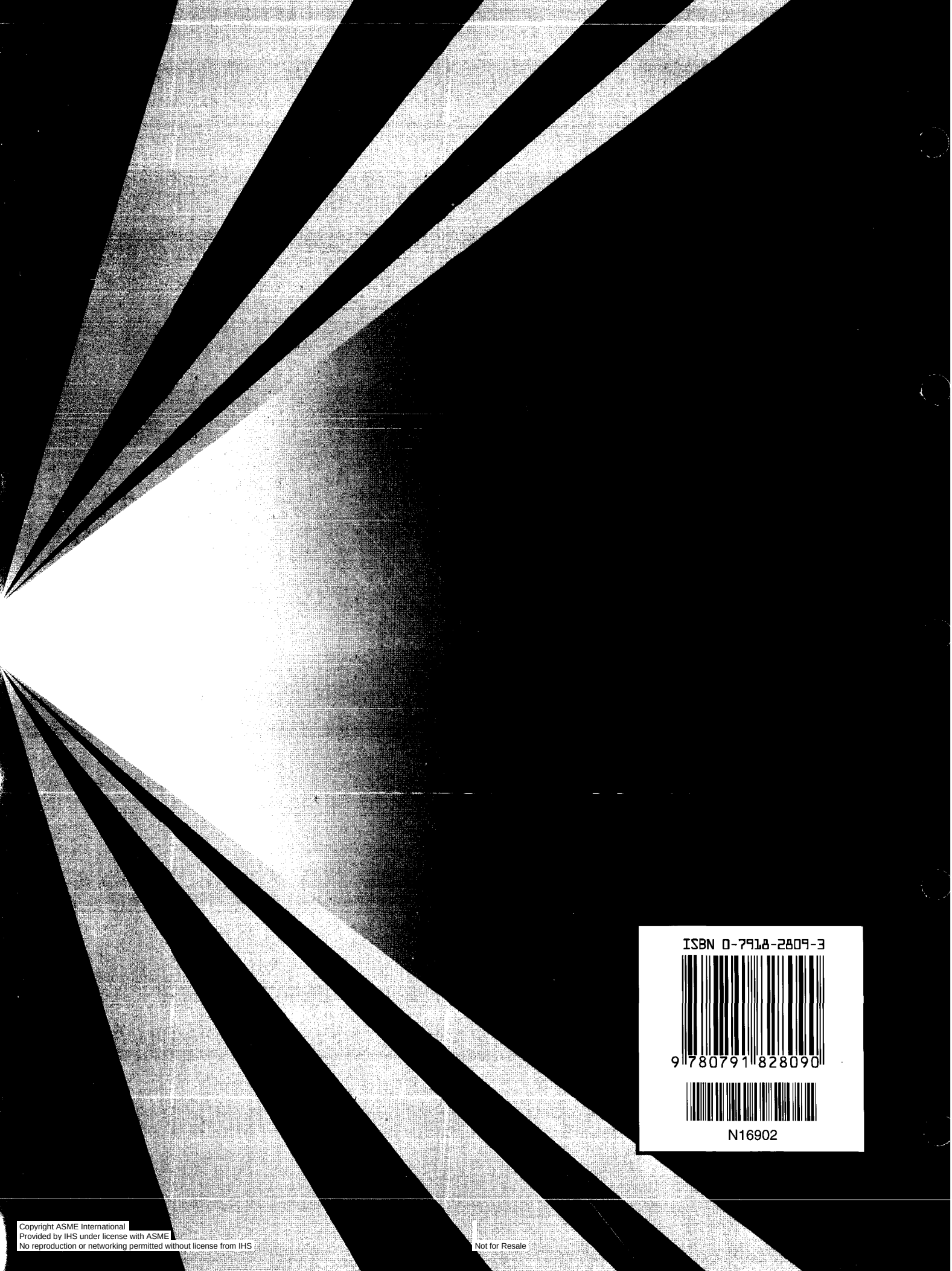
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