

NOT MEASUREMENT
SENSITIVE

MIL-PRF-5480H
17 December 2015

SUPERSEDING
MIL-PRF-5480G
1 July 1998

PERFORMANCE SPECIFICATION DATA, ENGINEERING AND TECHNICAL: REPRODUCTION



This specification is approved for use by the Department of the Air Force and is available for use by all Departments and Agencies of the Department of Defense.

Comments, suggestions, or questions on this document should be addressed to AFLCMC/HIAM Technical Data Section, 4170 Hebble Creek Road, Bldg. 280, Door 15, Area A, Wright-Patterson AFB, OH 45433-5653 or emailed to SGMLsupport@us.af.mil. Since contact information can change, the currency of this address information should be verified using the ASSIST Online database at <https://assist.dla.mil/>.

AMSC N/A

AREA DRPR

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

MIL-PRF-5480H**1 SCOPE**

1.1 Scope. This specification covers the requirements for the production, preparation for delivery, and shipment of non-digital reproducible and nonreproducible reproductions of drawings, associated lists, and related engineering and technical data. The original documents from which these reproductions are produced may be manually or computer generated and are not addressed by this specification. For the purposes of this specification, the direct output from a digital source is considered the original from which non-digital reproductions meeting the requirements herein are produced.

1.2 Classification.

1.2.1 Size. Reproductions are of the following types (see 6.2b).

- a. Nonreproducible (opaque) reproductions.
- b. Unscaled reproducible (translucent or transparent) reproductions. This class applies to reproducibles of dimensioned, schematic, pictorial, and other drawings which do not require accurate scale of reproduction.
- c. Scaled reproducible (translucent or transparent) reproductions. This class applies to undimensioned drawings which require accurate scale reproduction.
- d. Reproduced data are further designated as full size or reduced size reproductions.

1.2.1.1 Types.

- a. Type A Full size reproductions
- b. Type B Reduced size reproductions

1.2.1.2 Media. Data reproductions are accomplished using standard materials and processes which will provide reproductions meeting the performance requirements of this specification.

2 APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-129

Military Marking for Shipment and Storage

(Copies of these documents are available online at <http://quicksearch.dla.mil/> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation. (see 6.2c)

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME Y14.1

Decimal Inch Drawing Size and Format

ASME Y14.24

Types and Applications of Engineering Drawings

ASME Y14.31

Undimensioned Drawings

ASME Y14.34

Associated Lists

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ASME Y14.35	Revision of Engineering Drawings and Associated Documents
ASME Y14.35M	Engineering Drawings and Associated Documents
ASME Y14.100	Engineering Drawing Practices

(Application for copies should be addressed to the American Society of Mechanical Engineers, Two Park Avenue, New York, NY 10016-5990, <https://www.asme.org/>)

2.4 Order of preference. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3 REQUIREMENTS

3.1 General. All drawing and data reproductions shall meet the following requirements. Materials and processes shall be of a commercial quality suitable for the intended purpose.

3.2 Detail Requirements.

3.2.1 Legibility and contrast. Legibility and contrast of reproductions shall be such that every line, number, letter, and character is clearly legible and readable. Specific detailed information is found in ASME Y14.31 for the care of drawings.

3.2.2 Reproductive quality. Reproductions shall be of such clarity as to produce fourth generation reproducibles (see 6.3.2) which will meet the legibility requirements specified herein.

Reproductions shall be of high-contrast, transparent or translucent material, having allowable tolerance and stability characteristics within the following limits.

3.2.2.1 Stability. Changes in linear dimensions shall not exceed 0.00001 inch per inch (0.00001mm per mm) per degree Fahrenheit (.6 degree Celsius) when the material, conditioned at 80 degrees Fahrenheit (26.7 degrees Celsius), is exposed to 220 degrees Fahrenheit (104 degrees Celsius) for one hour and returned to the original condition temperature. Changes in linear dimensions shall not exceed 0.00001 inch per inch (0.00001mm per mm) per percent relative humidity when the material, conditioned at 10% relative humidity, is exposed to 98% relative humidity for twenty four hours and returned to the original conditioning relative humidity.

3.2.2.2 Allowable tolerance. The thermal and hygroscopic coefficients of linear expansion shall be such that the allowable overall tolerance between check points at extremities of the sheet (length or width direction) shall not exceed +0.015 inch (in 144 inches) or +0.38 mm (in 3650 mm) when exposed to a 7 degree Fahrenheit or 3.8 degree Celsius rise or drop in temperature, or a 7% rise or drop in relative humidity under normal room conditions. Reproducibles shall be marked in the right-hand corner, adjacent to or above the title block, per the example shown in figure 1, and the atmospheric conditions shall be recorded at the time of reproduction.

REPRODUCTION CONDITIONS	
Relative Humidity:	Date:
Temperature:	Checked By:

3.2.2.3 Care and Handling. In order to maintain the stability requirements defined above, reproducibles shall be rolled to a minimum diameter of 3 inches (76mm).

3.2.2.4 Clarity. Lettering and linework shall be clear, legible, and suitable for reproduction.

3.3 Nonreproducible reproductions. Reproductions shall be direct reading and shall conform to 3.2.1.

3.4 Reproducible reproductions. Reproductions shall be direct reading and shall conform to 3.2.1. They shall be prepared on translucent or transparent material and permit a minimum of 150 acceptable direct reading reproductions to be made from them. These reproductions shall be capable of being reproduced on continuous reproduction equipment without sorting for machine or printing speed to secure satisfactory reproduction. The processes and materials used shall insure reproductions can be kept for a minimum of two years without deterioration.

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3.5 Reduced size reproductions. Reduced size reproductions (Type B) shall be direct reading (see 6.2d). Reduction shall be to one-half the size of the original drawing but no smaller than "A" size (8-1/2 by 11 inches) or A4 size (210 by 297 mm). Reduced size reproducibles shall meet the requirements of 3.4 and shall not exceed 24 by 24 inches or 610 by 610 mm. Drawings exceeding approximately 90 inches or 2280 mm shall be photographed in sections from right to left, allowing for an overlap of 1 inch or 25mm on each section. When drawings are reproduced in sections, the drawing and section number shall appear on each section.

3.5.1 Size identification. Reduced size reproductions and related shipping lists shall be clearly marked to indicate the original and reduced sizes. The regular size letter of the drawing shall be indicated, followed by a slant and the letter designating the reduced size drawing (e.g. "D/B" where "D" is the original size of the drawing, and "B" is the reduced size or "A1/A3" where "A1" is the original size of the drawing and "A3" is the reduced size). On the reproduction a supplemental block shall contain the marking and be located as close as practicable to the original size designator in the title block without obscuring any aspect of the drawing content. Shipping lists shall include the marking in the size column.

3.5.2 Flat or basic sizes. Flat size drawings B thru F, and basic size drawings A3 thru A0, shall be reduced only to the sizes indicated in ASME Y14.1, or ASME Y14.31 respectively. In no case will the drawing be reduced to less than A size for decimal inch drawing sizes, or A4 size for metric drawing sizes.

3.5.3 Roll, elongated, or extra elongated sizes. Reduced roll, elongated, or extra elongated size drawings shall be identified by the nearest applicable size designation. However, if the original roll size drawing is not, or cannot be, reduced to a flat size for decimal inch drawings or basic size for metric size drawings due to loss of legibility, the reduced size of the drawing will be denoted as "R" (e.g. "J/R" or "A1X3/R" where "J" or "A1X3" is the original size of the drawing, and "R" is the roll or elongated size reduction).

3.6 Preparation. Reproducible reproductions shall be made by any commercial method (tracing, X-ray, contact, photographic, etc.) providing all requirements of this specification are met.

3.6.1 Type A. Full size reproducibles shall not exceed 60 by 144 inches or 1525 by 3650mm including margin space. Drawings exceeding these dimensions shall be furnished in sectioned reproducibles, reading from right to left, allowing for a minimum 2 inch or 50mm overlap on each section. When drawings are reproduced in sections, each section shall include the drawing and section numbers.

3.6.2 Type B. When reduced size reproductions are made through the use of photographic techniques, the negatives produced shall be sufficiently accurate to permit making full-scale reproduction material within manufacturing tolerances.

3.7 Reproduction accuracy verification. All reproducibles shall utilize one of the following methods to provide for reproduction accuracy verification.

3.7.1 Trammel points. Each negative or reproduced drawing section shall include a minimum of four trammel points rectangularly located so that trammels may be applied vertically and horizontally. Dimensions from trammel point to trammel point shall be indicated.

3.7.2 Control dimensions. Each negative or reproduced drawing section shall include suitable control dimensions provided by means of grid lines, check points, or other identifying information, so located that size may be checked vertically, horizontally, and diagonally.

4 VERIFICATION

4.1 Inspection. The reproductions shall be inspected for the following:

- a. Compliance with the requirements of this specification;
- b. Legibility and reproducibility;
- c. Size identification marking for reduced sizes;
- d. Reproduction accuracy for Class 3 reproductions;
- e. Verification and reproductions.

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4.2 Material inspection. The packaging, packing, and marking of the reproducible and nonreproducible material shall be inspected to verify conformance to the requirements herein.

5 PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contact or order (see 6.2.1). when actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6 NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. This specification is to be applied to contracts which acquire non-digital reproductions of drawings and related data.

6.2 Acquisition Documents. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Types as applicable of reproductions required (see 1.2.1).
- c. Issue to be cited in the solicitation and, if required, the specific issue of individual documents referenced (see 2.3).
- d. Reduced size reproductions, when specified (see 3.5).
- e. Any other desired options offered herein.

6.2.1 Packaging requirements. Government Buying Activities should consider the following.

- a. Separate by sets or models with shipments containing more than one set of data, or data for more than one model of aircraft, engine, tank, etc., segregated by sets or models and arranged numerically by size. Reflect groupings of data on shipping lists (see 6.2.1.2).
- b. Reproductions may be folded for ease of shipment to size A for decimal inch size drawings and size A4 for metric size drawings.
- c. Segregate reproducible reproductions of the same size, in sizes D or smaller, or A1 or smaller, by size in flat packs. Sizes larger than D or A1 should be rolled to a minimum diameter of 3 inches, or 75mm respectively, and enclosed in a suitable container.
- d. Enclose reproducible photographic negatives in individual standard size envelopes suitable for permanent files and include the drawing number on the outside in the upper right-hand corner. Negatives must not be rolled or folded.

6.2.1.1 Classified and export controlled data.

- a. Separate shipments of classified data from those of unclassified data. For safeguarding of classified information and marking of shipping containers, utilize the guidance of DOD 5220.22-M and MIL-STD-129 respectively.
- b. Unclassified data subject to export control comprises a separate shipment and should not be interfiled with other unclassified data. Apply the shipping container marking criteria of MIL-STD-129.

6.2.1.2 Shipping lists. Shipping lists, when specified, must identify all data being furnished in each shipment with one copy in each shipment and an additional copy forwarded with the letter of transmittal. Shipping lists provide the model/type designator, item name, contract number(s), and commercial and government entity (CAGE) code. Shipments incorporating engineering data for more than one model of aircraft, engine,

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etc. (see 6.2.1.a), should be identified by separate shipping lists for each model. For multi-sheet drawings, specify the total number of sheets when all sheets of that drawing are included in the shipment. However, if all sheets of a drawing are not included in the shipment, identify only the specific sheets that are included.

- a. Identify all vendor data sent through the prime contractor on the prime contractor's shipping list following the prime contractor's data. Segregate vendor data alphabetically by vendor, including the street address, city, state, and ZIP code for each. List the data individually for each vendor in the data list numerical arrangement of ASME Y14.34, including the applicable CAGE Code.
- b. List document and drawing numbers including revision level on the shipping list numerically arranged as shown in ASME Y14.34 for data lists. Further identify drawing numbers by showing drawing part name (noun first) and drawing size.
- c. Use the guidance of 3.5.1 to distinguish reduced size reproductions of drawings from full size drawings by indication in the size column of the shipping lists.

NOTE: The use of contractor designed forms and formats is encouraged when they contain the information noted here.

6.2.1.3 Marking of shipments. Utilize the guidance of MIL-STD-129 for marking interior packages and exterior shipping containers. Interior package markings should not be damaged when opening the package. Recommended minimum nomenclature for interior packages and exterior shipping containers is: Drawings and Data List(s) For (name of item), Specification (as applicable), Name of Manufacturer, Name of Contractor (if different from manufacturer), Contract or Order No.

6.3 Definitions. The following definitions pertain to words or phrases used in this specification.

6.3.1 Direct Reading. Term to describe an image which is directly readable as opposed to a mirror image.

6.3.2 Fourth generation reproduction. A fourth generation reproduction is defined as the last copy of a series made as follows:

- 1st generation made from reproduction furnished the procuring activity.
- 2nd generation made from 1st generation reproduction.
- 3rd generation made from 2nd generation reproduction.
- 4th generation made from 3rd generation reproduction.

6.3.3 Negative. An image, usually on film or translucent base stock, in which the light and dark areas are reversed from those of the original.

6.3.4 Original. The current design activity's full size reproducible drawing or digital file(s) on which is kept the revision record recognized as official.

6.3.5 Photographic prints. Photographic prints are products of the silver halide sensitizing or photographic materials process. They may be referred to as photo reproduction.

6.3.6 Reproducible. Capable of use as a master for actinic printing.

6.3.7 Reproduction. A copy that duplicates the original. Reproductions may be either reproducible or non-reproducible, depending on the media.

6.3.8 Translucent. Semi-transparent not clear, but capable of transmitting diffuse light.

6.3.9 Transparent. Capable of transmitting light without noticeable distortion so that images are clearly visible.

6.3.10 Vendor. A source from whom a purchased item is obtained; used synonymously in this standard with the term supplier. (ASME Y14.1, ASME Y14.24, ASME Y14.31, ASME Y14.34, ASME Y14.35, ASME Y14.35M, and ASME Y14.100)

6.4 Subject term (keyword) listing.

- Drawing
- Negative
- Non-digital data
- Photographic negative

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6.5 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

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CONCLUDING MATERIAL

Custodians:

Army - AR

Navy - AS

Air Force - 16

Preparing activity:

Air Force - 16

(Project DRPR-2015-002)

Review activities:

Navy - MC, OS, SH, YD

Air Force - 11, 68, 71, 99

DLA - CC

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 <https://assist.dla.mil>.