

MIL-T-4782C  
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SUPERSEDING  
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## MILITARY SPECIFICATION

### TRANSPARENCIES, TECHNICAL TRAINING, GENERAL SPECIFICATION FOR

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

#### 1. SCOPE

1.1 Scope. This specification covers the general requirements for the preparation of technical training transparencies to be used with an overhead, daylight-type projector.

- \* 1.2 Classification. Transparencies covered by this specification shall be of the following types and classes, as specified herein and in the end item specification (see 6.2, 6.3, and 6.4):

Type I - Static

Type II - Dynamic

Type IV - Animated

Class 1 - Polarized projection

Class 2 - Projectable demonstrator

Class 3 - Polarized projectable demonstrator

#### 2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

#### SPECIFICATIONS

##### Federal

UU-M-650	Mount, Film Slide, Photographic (Overhead Projector)
PPP-B-585	Boxes, Wood, Wirebound
PPP-B-591	Boxes, Shipping, Fiberboard, Wood-Cleated

FSC 6910

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PPP-B-601 Boxes, Wood, Cleated-Plywood  
 PPP-B-621 Boxes, Wood, Nailed and Lock-Corner  
 PPP-B-636 Box, Fiberboard  
 PPP-T-60 Tape: Pressure-Sensitive Adhesive, Waterproof, for Packaging

**Military**

MIL-P-116 Preservation, Methods of  
 MIL-B-117 Bag, Sleeves and Tubing, - Interior Packaging  
 MIL-P-8184 Plastic Sheet, Acrylic, Modified  
 MIL-L-10547 Liners, Case, and Sheet, Overwrap; Water-Vaporproof or Waterproof, Flexible

**STANDARDS****Federal**

FED-STD-255 Mount, Film Slide, Photographic (Overhead Projector)

**Military**

MIL-STD-12 Abbreviations for Use on Drawings, Specifications, Standards and in Technical Documents  
 MIL-STD-17 Mechanical Symbols  
 MIL-STD-129 Marking for Shipment and Storage  
 MIL-STD-1186 Cushioning, Anchoring, Bracing, Blocking, and Waterproofing; with Appropriate Test Methods

**PUBLICATIONS****Department of Defense Manual**

DOD 5220.22-M Industrial Security Manual for Safeguarding Classified Information

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

- \* **2.2 Other publications.** The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

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American National Standards Institute, Inc. Publications

ANSI Y14.15-1966 and Supplement Y14.15a-1970	Electrical and Electronics Diagrams
ANSI Y32.2-1970	Graphical Symbols for Electrical and Electronics Diagrams
ANSI Y32.16-1968 and Supplement Y32.16a-1970	Reference Designations for Electrical and Electronic Parts and Equipment

(Applications for copies should be addressed to the American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018.)

**3. REQUIREMENTS****3.1 Design and construction**

- \* **3.1.1 Scope of transparencies.** According to the nature of the system, equipment, or procedure to be shown, the transparencies shall portray clearly and simply the operation of the system, construction or function of the equipment, necessary adjustment details, or steps of the procedure. Dynamic transparencies shall normally be applied to present a sequence of related operations or procedures. Animated transparencies shall normally be used to show complex progressive actions; i.e., gas or fluid flow, mechanical motion of linkages and gear trains, lever actions, et cetera.
- 3.1.2 Presentation.** Illustrations for transparencies shall be planned as visual aids and, as such, shall supplement and not replace the spoken word. A transparency designed for training purposes should focus rather than divert attention. To focus attention, the transparency shall present one central idea with maximum clarity and simplicity in order to enable immediate and thorough comprehension of the subject. Every effort shall be made to avoid a cluttered view caused by including too much on one transparency. If necessary, complex systems or adjustment procedures shall be presented on several transparencies.
- \* **3.1.3 Schematic diagrams.** Flow schematics and electrical schematics shall illustrate a sufficient number of operating conditions to insure adequate coverage of the systems involved. The internal working principles of all major components (one for each typical situation) shall be shown schematically. In all cases, the major units shall be shown as large as possible.
- \* **3.1.4 Adjustment details.** Components of a system requiring adjustments shall be clearly illustrated and accurately located. Linear-dimensional guidelines for a specific adjustment shall be shown without actual dimensions or tolerances. All adjustment views shall correspond to the comparable illustrations in existing applicable technical orders/manuals.

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- \* 3.1.5 Forms of types I and II transparencies. Static and dynamic transparencies shall be in either of two forms, projection transparencies or master reproducible transparencies or both, as specified in the end item specification or by the procuring activity (see 6.2).

3.1.6 Transparency arrangement. All transparencies shall be grouped in logical sequence by subject matter.

3.1.7 Type I - static transparencies. A static transparency shall be attached to a transparency mount (see 3.1.7.3) for projection on an overhead-type projector and shall be made up of one or more transparent diazo-type films fastened securely to the transparency mount on all edges.

- \* 3.1.7.1 Film positives. Each transparency shall be a film positive. Photographic film positives containing silver halides shall not be used as projection transparencies. Full-color transparencies on a single photographic color film shall not be used.

- \* 3.1.7.1.1 Full-color transparencies. A full-color transparency shall be a black, cyan, magenta, and yellow diazo-type film overlaid in register on the transparency mount. Where applicable, color coding shall be compatible with technical order/manual color coding.

3.1.7.2 Diazo-type films. A static transparency prepared by the ammonia developing, dry duplication process shall be a single blackline diazo-type film or one or more color overlay diazo-type films added in register.  
(Note: Diazo-type films are also referred to under the trade names of "chromes" or "foils.")

- \* 3.1.7.3 Transparency mounts. Mounts shall conform to the applicable provisions of UU-M-650 and FED-STD-255, as specified herein (see 6.2).

- \* 3.1.7.3.1 Mounting of projection transparencies. Static diazo-type film transparencies shall be taped securely on all four edges to the back of the transparency mount. When mounted, the transparency shall present a reasonably taut surface to insure overall sharp focus when projected.

3.1.7.4 Artwork. Artwork shall be prepared in a bold, simple style suitable for presentation as an effective visual communication device on an overhead projector. The subject matter shall determine the type of drawing necessary: two-dimensional composition or diagram, schematic diagram, orthographic or isometric drawing, or complete perspective rendering. Transparency artwork shall be prepared for horizontal format only. Extremely narrow vertical shapes shall be centered on the image area and the unrelated blank areas blocked off with black to reduce screen glare.

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3.1.7.4.1 Size. All artwork for transparencies shall be prepared for a horizontal 7- by 9-inch image area, 7-1/2- by 9-1/2-inch total aperture area (see figure 1). Drawings may be made in any practical proportion of these sizes depending upon the complexity of the subject matter and reproduction facilities.

- \* 3.1.7.4.2 Line weights. Line weights shall be based on the 7- by 9-inch image area standard and shall be no finer than standard drafting line weight. All line weights of larger originals shall be proportionally heavy to hold to these specified weights when reduced to standard size. (See figure 2.)
- \* 3.1.7.4.3 Photographs. Transparencies prepared from continuous-tone photographs or from airbrush or washtone artwork shall be reproduced on the following types of photographic film: low-fog-density continuous-tone film, autoscreen ortho (113 line halftone screen) film or a repro lith-type film with photo-mechanical halftone screen (approximately 120 to 133 line), or equivalent. High quality photographic standards shall be followed with clear definition of tonal graduations and sharp contrast in detail areas. Note: The photographic film positive (containing silver halides) shall be used as a master reproducible transparency only; it shall not be mounted as the projection transparency (see 3.1.7.1).

3.1.7.4.4 Typeset. Copy shall be typeset, or office machine copy may be used if within the requirements of 3.1.7.4.5, except in those instances where mechanical or other types of lettering are approved by the procuring activity.

3.1.7.4.5 Type size and style. Typeset copy shall be set in a legible, modern, sans serif style of type face similar to Spartan or Futura Medium (or any face approved by the procuring activity). The size of type shall be such that it will provide a maximum classroom legibility. Examples of line and type sizes for artwork are shown on figure 2. Type sizes on the standard 7- by 9-inch image area and 7-1/2- by 9-1/2-inch aperture area shall be as specified in table I.

TABLE I. Transparency Type Sizes

Description	Type Size
Main titles	12-point bold
Supplementary title information	12-point demibold italic or 10-point heavy
Subtitles	10-point bold italic or heavy
Unit callouts	10-point medium or demibold
Color codes or legend	10- or 12-point medium or demibold
Explanatory text	10-point medium or demibold
Security classification	8- or 10-point bold or medium bold

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- \* 3.1.7.4.6 Mechanical lettering. When approved, Leroy, Wrico, electric type-writer, photo-lettering device such as Headliner, transfer-type lettering material such as instatype or Deca-dry, or equivalent lettering shall be used. Size and line weights shall be similar to the corresponding type face. Exceptions to the preceding may be made where original artwork prepared for other presentational medium may be utilized. However, when artwork prepared for printed text publication (or other medium) is used, line weights, format proportions, and other factors shall be checked to insure that the illustration is adaptable for projection as visual communication material. (See figure 2.)

- \* 3.1.7.4.7 Registration. Artwork for all transparencies that consist of more than one overlay (whether static or dynamic) shall have a positive means of registration. Crosshairs at the center of the 8-inch sides outside the aperture area shall be used. See figures 1, 3, and 4 for registry marking.

3.1.7.4.8 Title. The positioning of the title shall follow the rules of good composition depending upon the shape and placement of the subject matter. Often an arbitrary requirement of placement at top or bottom may result in small detail in the critical image area or a crowded, cluttered layout. Titles shall be consistently positioned and easily identified to maintain a continuity of thought through a series of transparencies. The weapon system designation is not required in the title.

3.1.7.5 Transparency folder. Each projection transparency shall be enclosed in a 10-1/2- by 12-inch manila (or equivalent) folder. The inner tab of the folder shall be shortened to permit the transparency identification to be visible when the transparency is placed in the folder. (See figure 5.)

- \* 3.1.7.6 Master reproducible transparencies. Master reproducible transparencies for the ammonia developing, dry duplication process shall be furnished in the form of a diazo-type reproducible film or other intermediate, either brown, sepia, orange, or black line. One master reproducible is required for each color of a registered set. The reproducible dimensions shall be 8 by 10 inches. Photographic film positives used as intermediate masters shall be 8 by 10 inches. Each set of master reproducible transparencies related to the same projection transparency shall be submitted in an 8-3/4- by 11-inch manila (or equivalent) folder.

- \* 3.1.7.6.1 Projection transparency size. Diazo-type films, designed to be attached to the transparency mount, shall have external dimensions of 8 by 10 inches. (See figure 1.)

### 3.1.8 Type II - dynamic transparencies

- \* 3.1.8.1 Basic static film. The basic film shall be a static film prepared and attached securely on the topside of the transparency mount in accordance with the requirements specified herein.

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- \* 3.1.8.2 Overlay films. Integral parts of the transparency shall be reproduced on separate overlay films processed in the same manner as the basic static film so they may be added to or subtracted from the basic film for varied presentation of the subject matter. For maximum brilliance of projection colors utilized in overlays, the number shall not exceed four colors per transparency.
- \* 3.1.8.2.1 Fixed sequence overlay films. Where overlay films are presented in a fixed sequence, as in assembly or disassembly, they shall be hinged from the left side only. No transparency mounts shall be used for the overlays. The unmounted film overlays shall be affixed by cloth tape or plastic hinges stapled to the mount as illustrated on figure 6.
- 3.1.8.2.2 Variable sequence overlay films. Where overlay films are presented in either-or sequence, these overlays shall be hinged from a different side of the basic static film to provide independent sequencing (see figure 7).
- 3.1.8.2.3 Register. When in the projection position, the overlay films shall be in register with the basic static film as illustrated on figure 8.
- 3.1.8.3 Hinged and sliding masks. Where a variation in the data presented on a single film is required, this variation shall be accomplished by hinged or sliding masks which shall reveal or conceal the variations.
- 3.1.8.4 Master reproducibles (type II). Master reproducibles for the basic static film and overlays shall be prepared in the same manner as those for the type I transparency.
- 3.1.8.5 Folders. Each set of dynamic transparencies shall be submitted in a manila (or equivalent) folder as specified in 3.1.7.5. Master reproducible transparencies shall be submitted in a manila (or equivalent) folder as specified in 3.1.7.6.
- \* 3.1.9 Type IV - animated transparencies
- \* 3.1.9.1 Class 1 - polarized projection transparencies. Polarized transparencies shall not be used except upon specific approval of each transparency by the procuring activity. When approved by the procuring activity, polarized transparencies shall be used to show continuous motion effects, such as fluid flow, rotating mechanical parts, gas turbulence, radiation, on and off blink, et cetera. The motion effects shall be achieved through the utilization of polarized light. Polarized material shall be applied to static or dynamic transparencies. Polarized materials are polarized screens attached to adhesive

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backing (and other stress materials). Transparencies with black negative space (background) shall be used as the basic static film for polarization effects. Lines that represent wires, tubes, et cetera, shall be of sufficient width to allow adequate projection of light. When approved by the procuring activity, transparencies with clear space (background) may be used. Polarized projection transparencies shall be covered with a protective sheet of nonstressed transparent acetate or other material with equivalent strength and light-transmitting properties.

**3.1.9.2 Class 2 - projectable demonstrators.** Animated transparencies in accordance with figure 9 shall consist of an operable presentation on transparent material suitable for projection in an overhead-type transparency projector and shall have parts which can be moved to show kinematic or progressive action or fluid flow under various conditions. This makes a movable image possible. Elements of a static transparency may be employed or plastic parts substituted to depict the movable components or element. Projectable demonstrators may be either manually or power operated as specified by the procuring activity (see 6.2).

**3.1.9.2.1 Size of projectable demonstrators.** Manually operated transparencies shall have external dimensions of 12 by 12 inches. Power-operated transparencies shall have external dimensions of 12 by 14-1/2 inches. The maximum usable area shall not exceed 9-1/2 by 9-1/2 inches, and all matter intended to be projected shall be within this area. The various layers of the transparencies shall be mounted on a base sheet of clear, acrylic plastic in accordance with MIL-P-8184, finish A, and not less than 1/8 inch thick (see figure 9) or material with equivalent strength and light-transmitting properties.

**3.1.9.3 Class 3 - polarized projectable demonstrator.** A polarized projectable demonstrator shall be a combination transparency with mechanical movements and polarized motion effects on one animated transparency. The size shall be as specified in 3.1.9.2.1.

**3.1.9.4 Nomenclature and title.** The nomenclature and title for class 2 and 3 transparencies shall be applied by means of stripping film, exposure on sensitized base plate, or any method which will provide a high quality projection image. The type size and style shall be the same as for type I static transparencies.

- \* **3.1.9.5 Construction (class 2 and 3 transparencies).** Material used for construction of class 2 and 3 transparencies shall be durable, and all moving parts shall be sturdy enough to withstand normal field use. A minimum of 1/16-inch, clear, dyed, or tinted plastic shall be used for the moving parts. The top and bottom surfaces of transparent moving parts shall not contact any other surface in such a manner as to mar the projected image. Bearing surfaces shall, wherever

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practicable, be on the sides of these parts, and sufficient tolerance shall be provided to minimize strain when the moving part is operated. The maximum overall thickness of this type of transparency shall not exceed 1 inch except for control knobs, handles, et cetera, required to operate the moving part. Such knobs, control handles, et cetera, shall not extend beyond the external dimensions of the base plate when the slide is stored. Animated transparencies shall be constructed in such a manner as to be easily disassembled with simple hand tools for servicing. Each animated transparency shall be assembled and ready for projection in accordance with figure 9.

3.1.9.6 Storage container. Each class 2 and 3 animated transparency shall be submitted in a protective storage container constructed of wood or other durable material. The class 1 transparency shall be submitted in a manila (or equivalent) folder as specified in 3.1.7.5.

- \* 3.2 Security markings. Applicable security classification markings shall appear at the top and bottom of the artwork within the projection area of each illustration (see figure 4). All classified transparencies, folders, and containers shall bear the same security classification, markings, and notations as classified documents in accordance with DOD 5220.22-M; i.e., (1) security classification, (2) downgrading notation, (3) office of origin or responsibility, and (4) date of origin. (See 6.2.e.)

### 3.3 Identification

- \* 3.3.1 Numbering. Each transparency shall be assigned a number which identifies its content and groups the transparencies in logical sequence. The numbering system for transparencies shall parallel the technical order/manual index (see figures 10 and 11).
  - \* 3.3.1.1 Weapon system. Transparencies related to a specific weapon system shall be numbered with a code that parallels the applicable technical order/manual maintenance handbook (see figure 12).
  - \* 3.3.1.2 Nonweapon system. Transparencies for accessories and ground support equipment not related to a specific weapon system shall be numbered with a code that parallels the technical order/manual index for the applicable equipment category (see figure 13).
- \* 3.3.2 Marginal data. Each piece of artwork shall be labeled with the identification number in the lower, left-hand corner and the film color designation in the lower, right-hand corner outside of the projection area. The applicable mount number for overlay films shall be entered in the lower center margin outside the projection area. The date of origin shall be entered in the lower, right portion of the margin. (See figure 4.)

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**3.3.3 Index.** An index shall be prepared and furnished with each set of training transparencies. The index supplied with the projection transparencies shall be on 8- by 10-inch vellum. A reproducible vellum index shall also be supplied with the reproducible master transparencies. The index shall contain an identifying title and shall list consecutively all transparencies in the applicable set.

**3.3.3.1 Index title.** The title shall appear across the top of each index sheet. The title shall describe the scope of the set of transparencies and include the date of issue.

- \* **3.3.3.2 Listing.** Each transparency index shall include a column for identification number, title, purpose, type, and reflectivity. (See figure 14.)
  - \* **3.3.3.2.1 Identification of revised transparencies.** When a basic transparency is revised, the letter "A" shall be placed after the identification number, the letter "B" shall replace the "A" on the second revision, et cetera (see figure 12).
  - \* **3.3.3.2.2 Title.** A list of the titles of the individual transparencies within their subject breakdown shall be included in this column (see figure 14).
  - \* **3.3.3.2.3 Purpose.** The type of training each transparency provides shall be identified in this column. Entries shall consist of one of the following abbreviations: RECOG - recognition, LOC - location, OPR - operation, INSP - inspection, SERV - servicing, ASSY - assembly, INSTL - installation.
  - \* **3.3.3.2.4 Type.** The graphic presentation used in the configuration of each transparency shall be identified in this column. Entries shall consist of the following abbreviations: PICT - pictorial, SCHEM - schematic, FUNCT DIAG - functional diagram, CTWY - cutaway, BLK DIAG - block diagram, CHART - chart.
  - \* **3.3.3.2.5 Reflectivity.** This column shall show the model number of the prime equipment (A, B, C, et cetera) or the serial number of the weapon system, whichever is most applicable. If the serial number is used, a separate page shall be included to show relationship between the model and the serial number. If equipment covered by transparencies has no serial or model number, the letter "X" shall be placed in this column to indicate that the transparency is available.
  - \* **3.3.3.2.6 Explanation of index usage.** An explanation of the use shall be inserted in front of the index (behind the cover page if used). This shall be the same as specified in 3.3.3.2.1 through 3.3.3.2.5, or equivalent.
- 3.3.3.3 Revised index.** The index shall be revised through the use of index change notices (see figure 15). The index change notice shall contain all information to be changed on the revised index page and the authority for the

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change. Subsequent index change notices required for previously changed index pages shall contain all the information shown on previous revisions. The index page shall be reissued when a significant number of changes have occurred.

- \* 3.3.4 Title block. Title blocks shall be in accordance with figure 5. The title block for static (type I), dynamic (type II), and polarized projection (type IV, class 1) transparencies shall be located on the front of the transparency mount as shown on figure 5. The containers for the projectable demonstrator and polarized projectable demonstrator transparencies (type IV, classes 2 and 3) shall be titled on the topside and one edge. Manila (or equivalent) folders for master reproducibles shall be titled on the outside in the upper left-hand corner.

3.4 Nomenclature. Nomenclature shall be held to a minimum and shall be arranged to permit rapid identification of parts without cluttering the layout of the transparency.

3.5 Abbreviations. Abbreviations shall be used only where absolutely necessary to conserve space. Abbreviations, when used, shall be in accordance with MIL-STD-12.

- \* 3.6 Symbols and reference designations. Electrical and electronic reference designations, when used, shall be in accordance with ANSI Y32.16. Electrical and electronic symbols shall be in accordance with ANSI Y32.2. Mechanical symbols shall be in accordance with MIL-STD-17. Electrical and electronic diagrams shall be in accordance with ANSI Y14.15.

3.7 Workmanship. The transparencies shall be fabricated and finished in a workmanlike manner. Particular attention shall be given to freedom from blemishes and defects, accuracy of dimensions, marking and mounting of parts, and registry of transparencies.

- \* 3.7.1 Photographic colored transparencies. Where approved by the procuring activity, colored transparencies prepared by photographic means shall be sharply and correctly exposed. The subject shall be evenly illuminated in light of the correct color temperature for which the film is balanced. The color achieved shall closely duplicate that of the subject in hue and intensity. Color shall be used only to serve an essential functional requirement and shall not be used for decoration purposes. Colored transparencies shall require separate films for each color.
- \* 3.7.2 Reproducible diazo-type masters, photographic film positives, and photo or diazo prints. Diazo-type reproducibles and prints and photographic film positives and prints shall be free of overall colorations, local off-color areas, thin high-light areas, dark shadows, and transparent streaks. They shall be free

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of reticulation, scratches, stains, surface deposits, mechanical defects, and damage. Prints, when specified, shall be sharp and show good detail. Black and white transparencies shall be sharp, of even density, and free of fog, spots, markings, stains, discolorations, surface deposits, mechanical defects, and damage.

## 4. QUALITY ASSURANCE PROVISIONS

- \* 4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

- \* 4.2 Quality conformance inspection. Each transparency shall be subjected to the examination specified in 4.2.1.

4.2.1 Examination of product. Each transparency shall be inspected to determine compliance with the requirements specified herein with respect to materials, workmanship, dimensions, and marking.

## 5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging

- \* 5.1.1 Level A. The master reproducibles for the types I and II transparencies, after being placed in a manila (or equivalent) folder as specified herein shall be enclosed in a waterproof bag conforming to MIL-B-117. The types I, II, and class 1 (type IV) transparencies or films, after being mounted on the mounting base and placed in a manila (or equivalent folder) as specified herein, shall be enclosed in a waterproof bag conforming to MIL-B-117. The class 2 and 3 (type IV) animated transparencies shall be adequately cushioned to protect control knobs, handles, et cetera, and to prevent movement of animated parts. They shall be enclosed in a fiberboard container conforming to PPP-B-636.
- \* 5.1.2 Level C. Transparencies shall be preserved and packaged to a degree which will afford protection against corrosion, deterioration, and physical damage during shipment from the supply source to the first receiving activity. This level, in general, shall conform to applicable carrier rules and regulations. Suppliers' commercial practices may be used when they comply with the requirements of this level.

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## 5.2 Packing

5.2.1 Level A. Transparencies preserved and packaged as specified in 5.1.1 shall be packed in exterior-type shipping containers conforming to PPP-B-585, PPP-B-591, PPP-B-601, PPP-B-621, or PPP-B-636. Insofar as practicable, exterior containers shall be of uniform shape and size, of minimum cube and tare consistent with the protection required, and shall contain identical quantities. The gross weight of each pack shall be limited to approximately 200 pounds. Containers shall be closed and strapped in accordance with the applicable container specification or appendix thereto. Containers shall be provided with a case liner conforming to MIL-L-10547 and shall be sealed in accordance with the appendix thereto. The case liner will not be required when the unit, intermediate or exterior container conforms to PPP-B-636 and is sealed at all joints and seams, including manufacturer's joint, with tape conforming to PPP-T-60.

5.2.2 Level B. Transparencies preserved and packaged as specified in 5.1.1 shall be packed in domestic-type exterior containers conforming to PPP-B-585, PPP-B-591, PPP-B-601, or PPP-B-621. Exterior containers shall be of minimum cube and tare consistent with the protection required. Insofar as practicable, exterior containers shall be of uniform shape and size and shall contain identical quantities. The gross weight of each pack shall be limited to approximately 500 pounds. Containers shall be closed and strapped in accordance with the applicable container specification or appendix thereto.

5.2.3 Level C. Packages which require overpacking for acceptance by the carrier shall be packed in exterior-type shipping containers in a manner that will insure safe transportation at the lowest rate to the point of delivery. Containers shall meet Consolidated Freight Classification Rules or regulations of other common carriers as applicable to the mode of transportation.

5.3 Physical protection. Cushioning, blocking, bracing, and bolting, as required, shall be in accordance with MIL-STD-1186 except that waterproofing requirements for cushioning materials and containers shall be waived for domestic shipments. The drop tests of MIL-STD-1186 shall be waived when the item is preserved, packaged, and packed for immediate use or when the drop tests of MIL-P-116 are applicable.

5.4 Marking. Interior and exterior containers shall be marked in accordance with MIL-STD-129.

## 6. NOTES

6.1 Intended use. The transparencies covered by this specification are intended to be used in an overhead, daylight-type projector and will be used to instruct operational and maintenance personnel in the operation, use, and servicing of military equipment.

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6.2 Ordering data. Procurement documents should specify the following:

- a. Title, number, and date of this specification
- b. Type and class required (see 1.2)
- \* c. Whether projection or master reproducible transparencies, or both, should be furnished for the types I and II transparencies (see 3.1.5)
- d. Whether class 2 projectable demonstrator transparencies shall be manually or power operated (see 3.1.9.2)
- \* e. All applicable security markings on transparencies, folders, containers, et cetera, should be in accordance with DOD-5220.22-M.
- f. All original artwork will be retained by the contractor during the life of the contract unless otherwise specified. At the conclusion of the contract, the artwork will be delivered to, and become the property of the procuring activity upon request.
- g. Transparencies prepared in accordance with this specification are furnished as complete sets. Quantities required and shipping destination will be as specified in the end item specification or as otherwise specified by the procuring activity.
- h. Quantities and types of transparencies required due to a modification to an existing system through an approved Engineering Change Proposal (ECP) should be determined in coordination with the user, procuring activity, and the contractor.
- \* i. Style, mask aperture, and type of mount required (see 3.1.7.3).

### 6.3 Definitions

- \* 6.3.1 Static transparency. A static transparency is a projectable instructional aid that has no moving parts. It may consist of one diazo-type film or several diazo-type films mounted in register and projected as a single positive. A static transparency may be a single photographic color film positive limited to four colors. (See figure 16.)

6.3.2 Dynamic transparency. A dynamic transparency differs from a static transparency in that the diazo-type film overlays are hinged in fixed or variable sequence which makes parts of the information contained additive or subtractive to the static diazo-type film base. The hinging arrangements are so devised as to keep all overlay films in register with the base film when in

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projection position. Note: Fixed sequence overlay films should be in register with the base and with each other -- variable sequence overlay films should be in register with the base film, but need not necessarily be in register with each other (see figure 7).

**6.3.3 Animated transparency.** An animated transparency is a projectable instructional aid devised to show progressive action, various states of operation, fluid flow, gas turbulence, rotations of moving parts, et cetera.

**6.3.3.1 Polarized projection transparency.** A polarized transparency is a static or dynamic transparency with added strips of polarized filter material, and which, when in projection position, has a second polarized filter moved over it, interrupting the projection beam, and creating the illusion of various types of continuous motion. (See figure 17.)

**6.3.3.2 Projectable demonstrators.** A projectable demonstrator is a transparency constructed mainly of translucent plastic parts which may be moved while the demonstrator is in projection position to show progressive action or various states of operation, et cetera. (See figure 9.)

\* **6.4** Requirements for type III roll transparencies were deleted from this specification since there is no longer a requirement for this type of transparency.

**6.5 Identification of changes.** The margins of this specification are marked with an asterisk to indicate where changes from the previous issue were made. This was done as a convenience only, and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:  
Air Force - 11  
Navy - AS

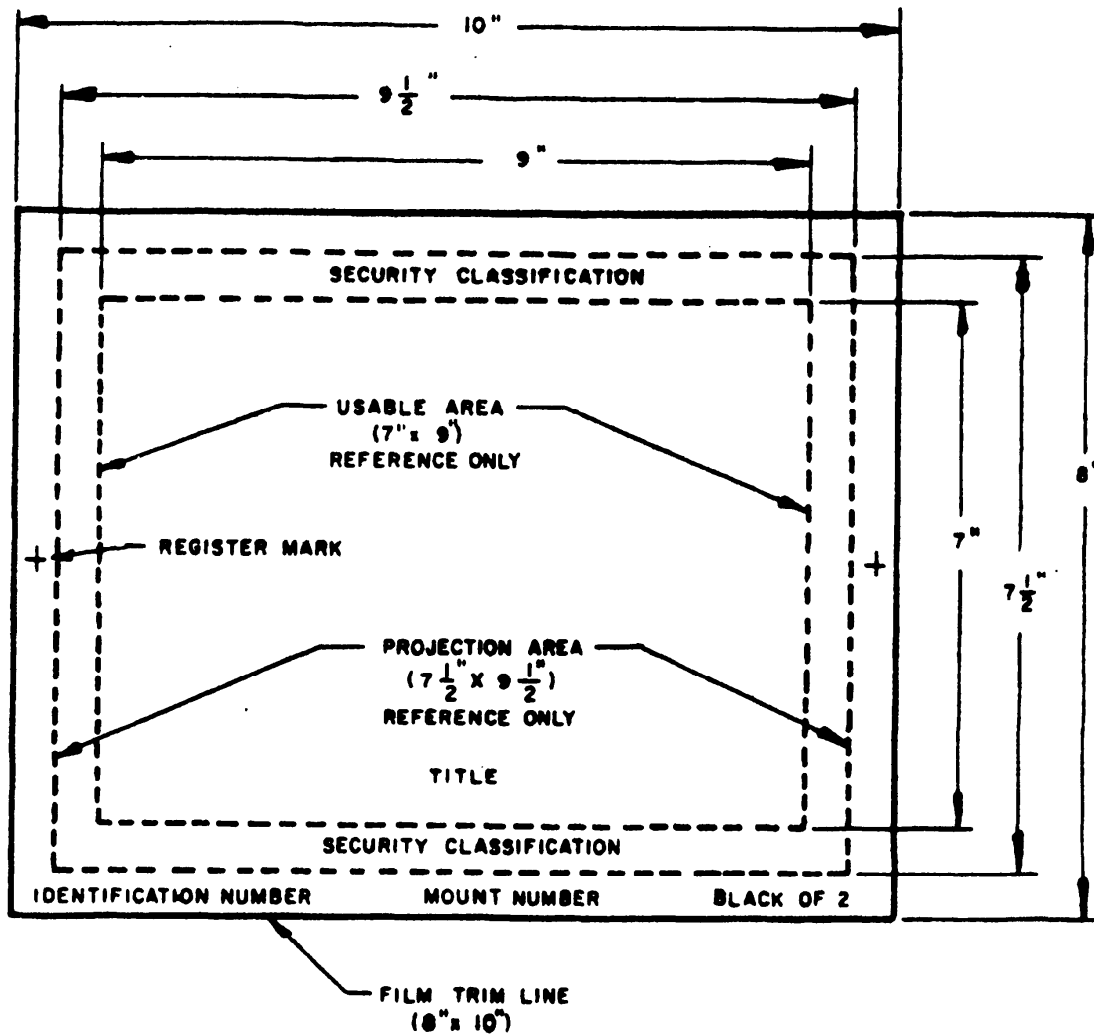
Preparing activity:  
Air Force - 11

Review activities:  
Air Force - 70  
Navy - AS

Project No. 6910-0281

User activities:  
Army - AV, WC

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NOTE: DIMENSIONAL TOLERANCES  $\pm \frac{1}{32}$ "

FIGURE 1. Transparency Film (Ref 3.1.7.4.1, 3.1.7.4.7, and 3.1.7.6.1)

MIL-T-4782C

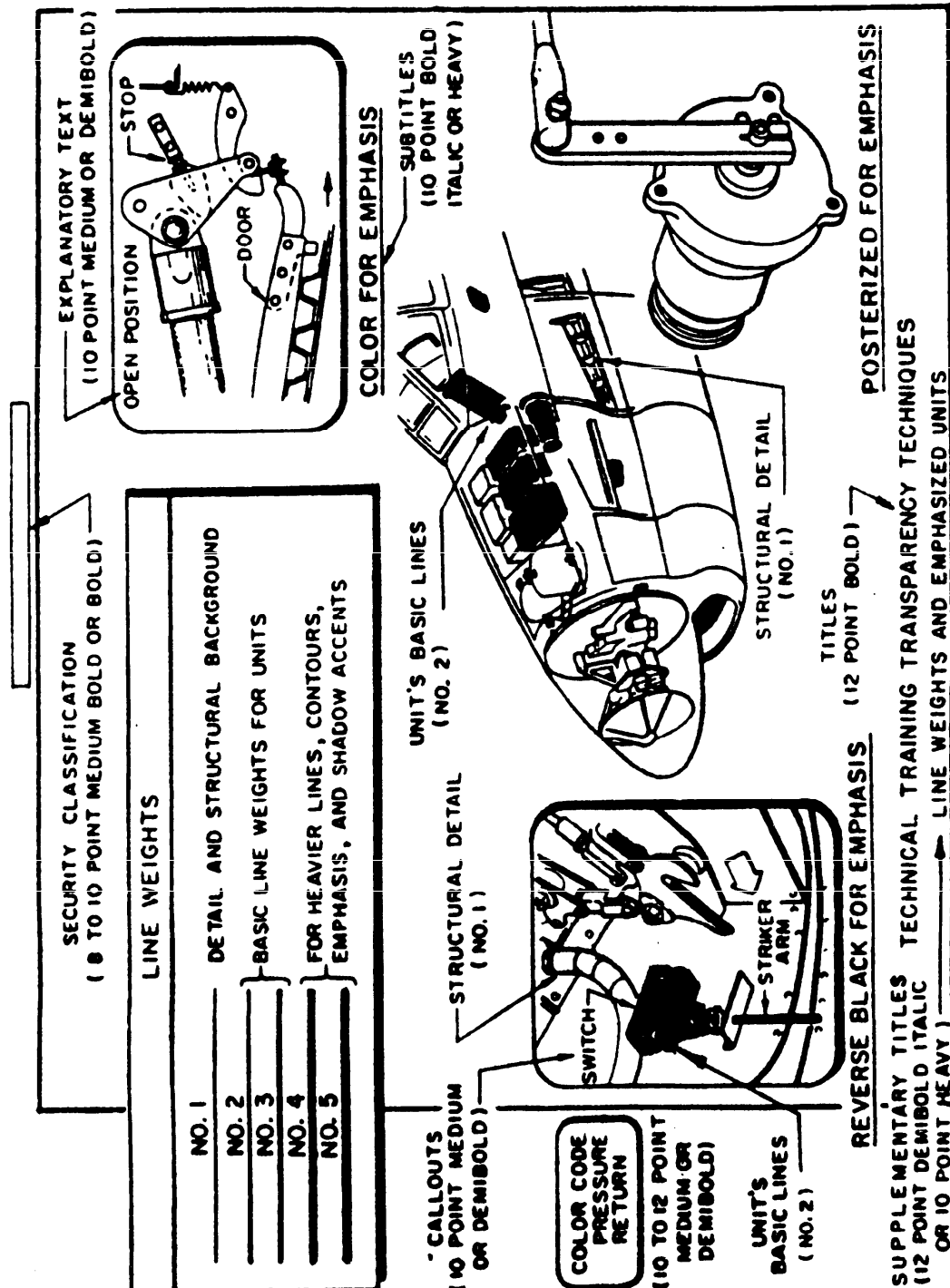


FIGURE 2. Transparency Line and Type Size (Ref 3.1.7.4.2, 3.1.7.4.5, and 3.1.7.4.6)

MIL-T-4782C

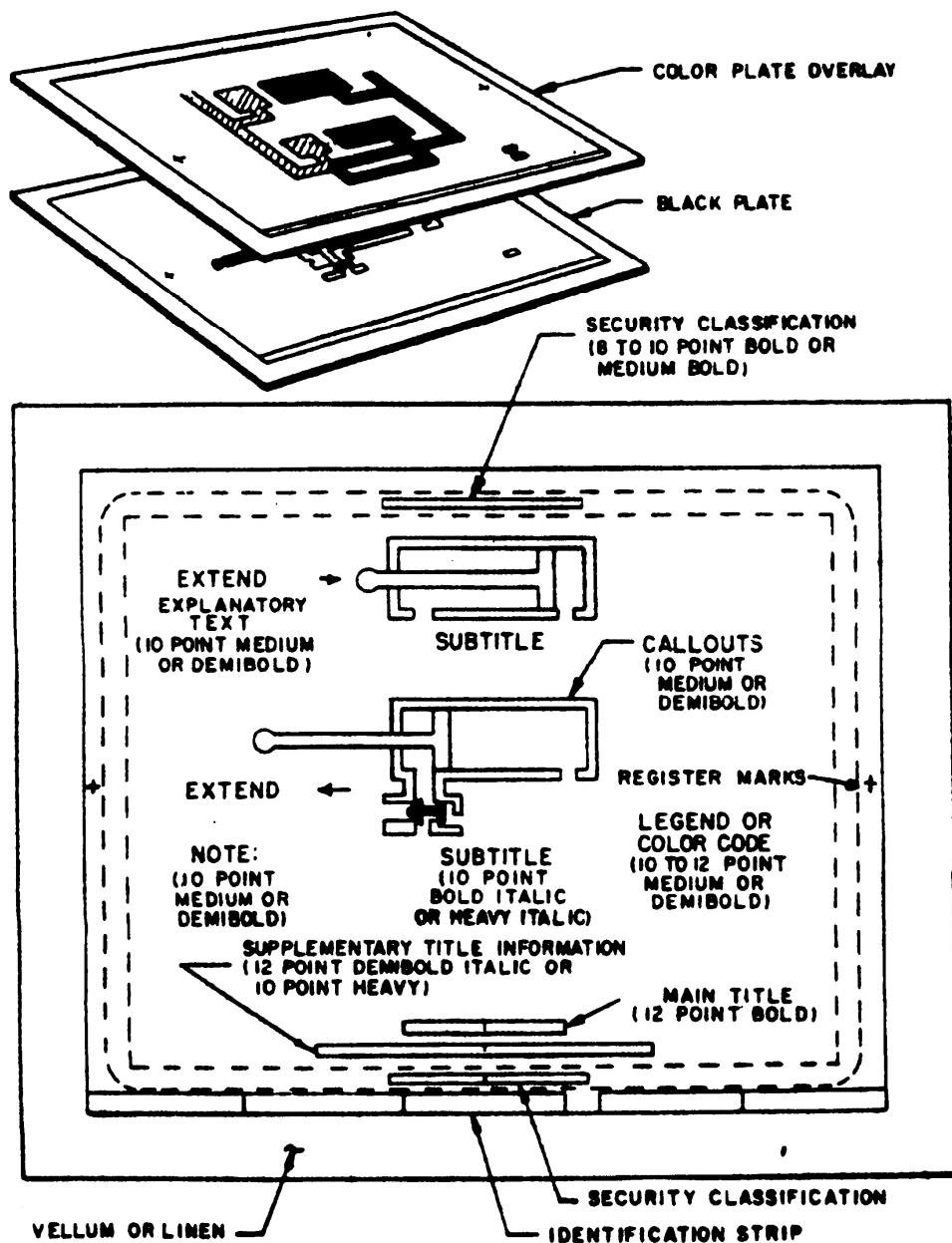


FIGURE 3. Registration Marking of Transparencies (Ref 3.1.7.4.7)

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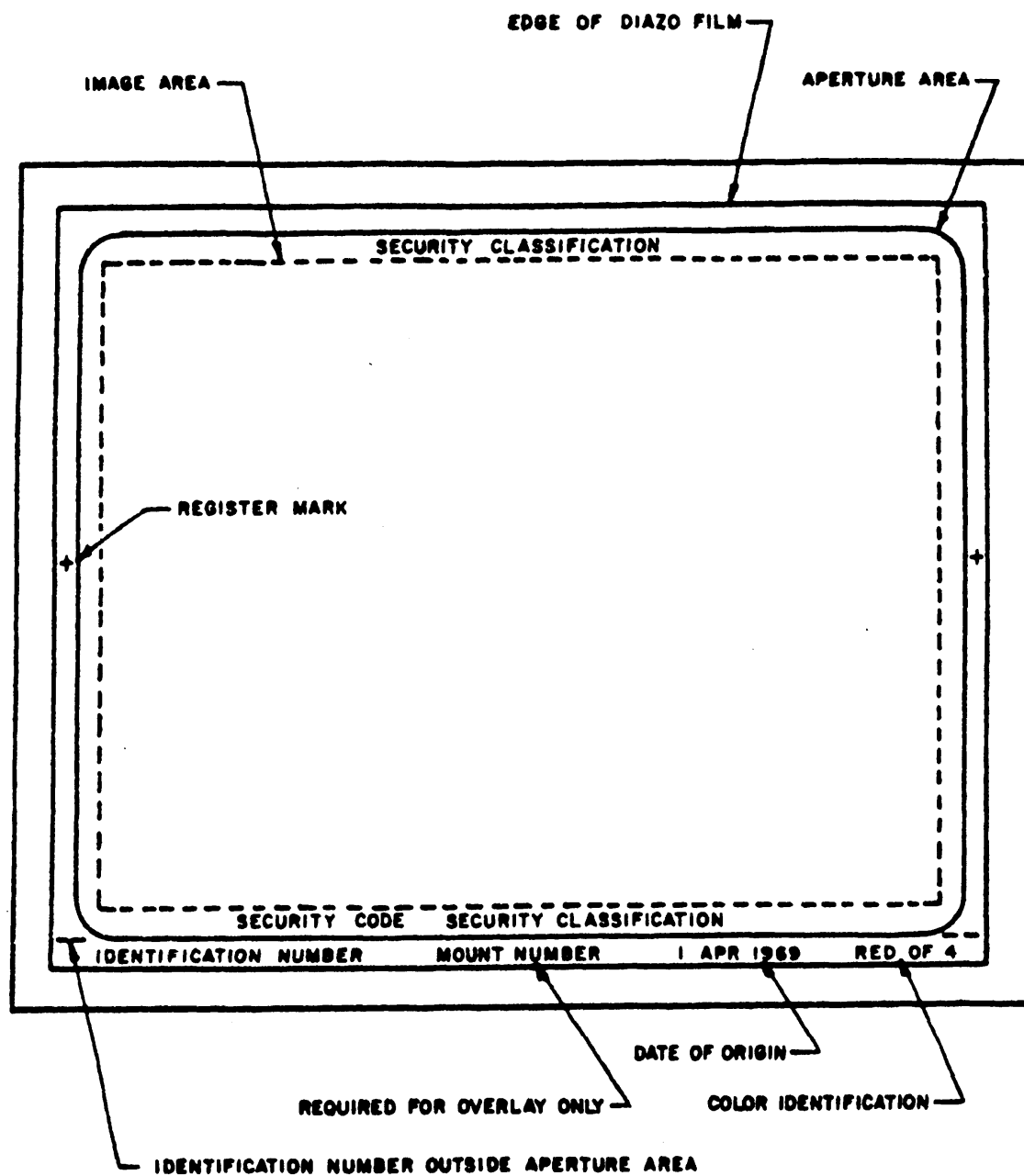


FIGURE 4. Marginal Data and Security Markings (Reference 3.1.7.4.7, 3.2, and 3.3.2)

MIL-T-4782C

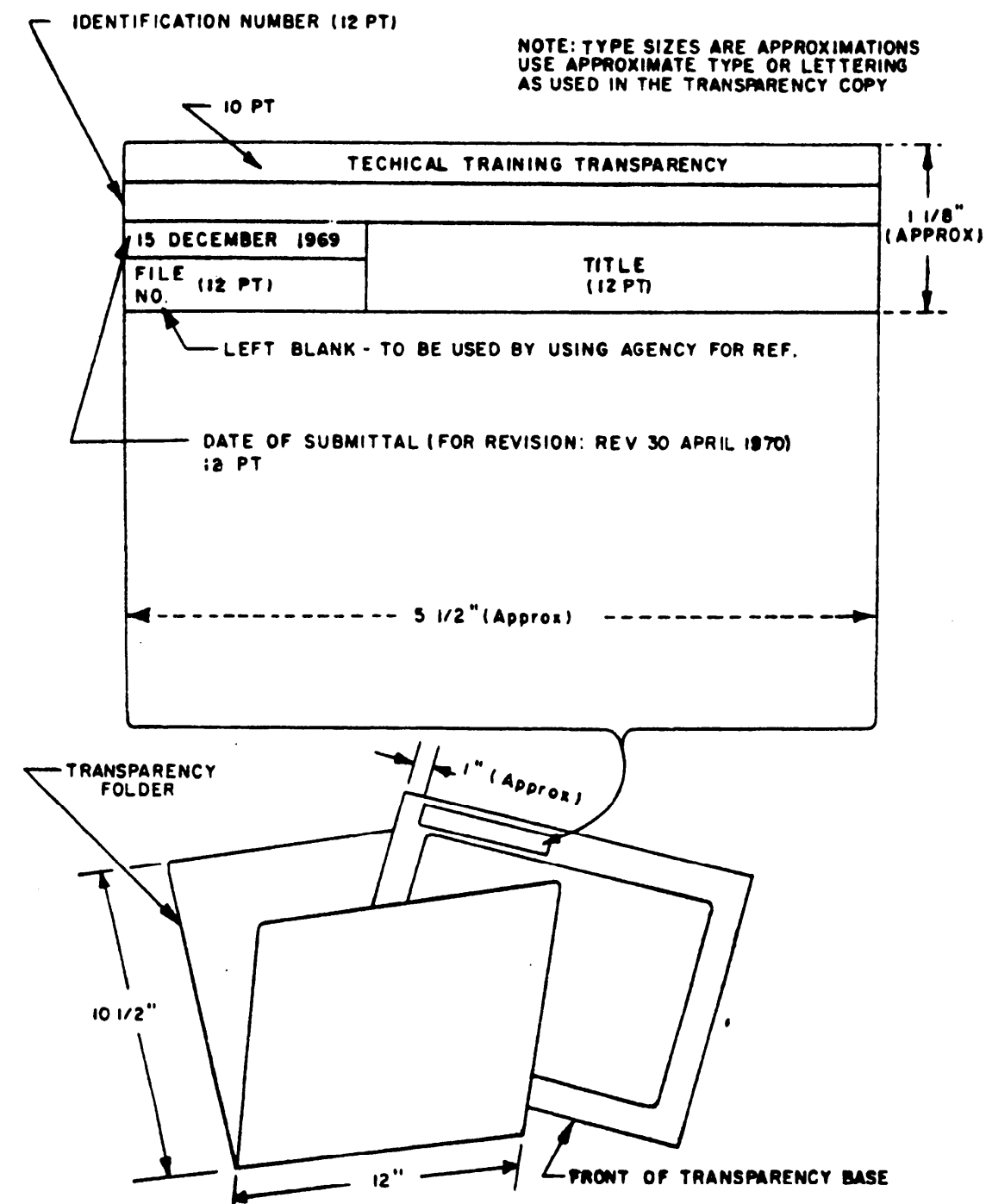


FIGURE 5. Transparency Identification and Transparency Folder  
(Ref 3.1.7.5 and 3.3.4)

MIL-T-4782C

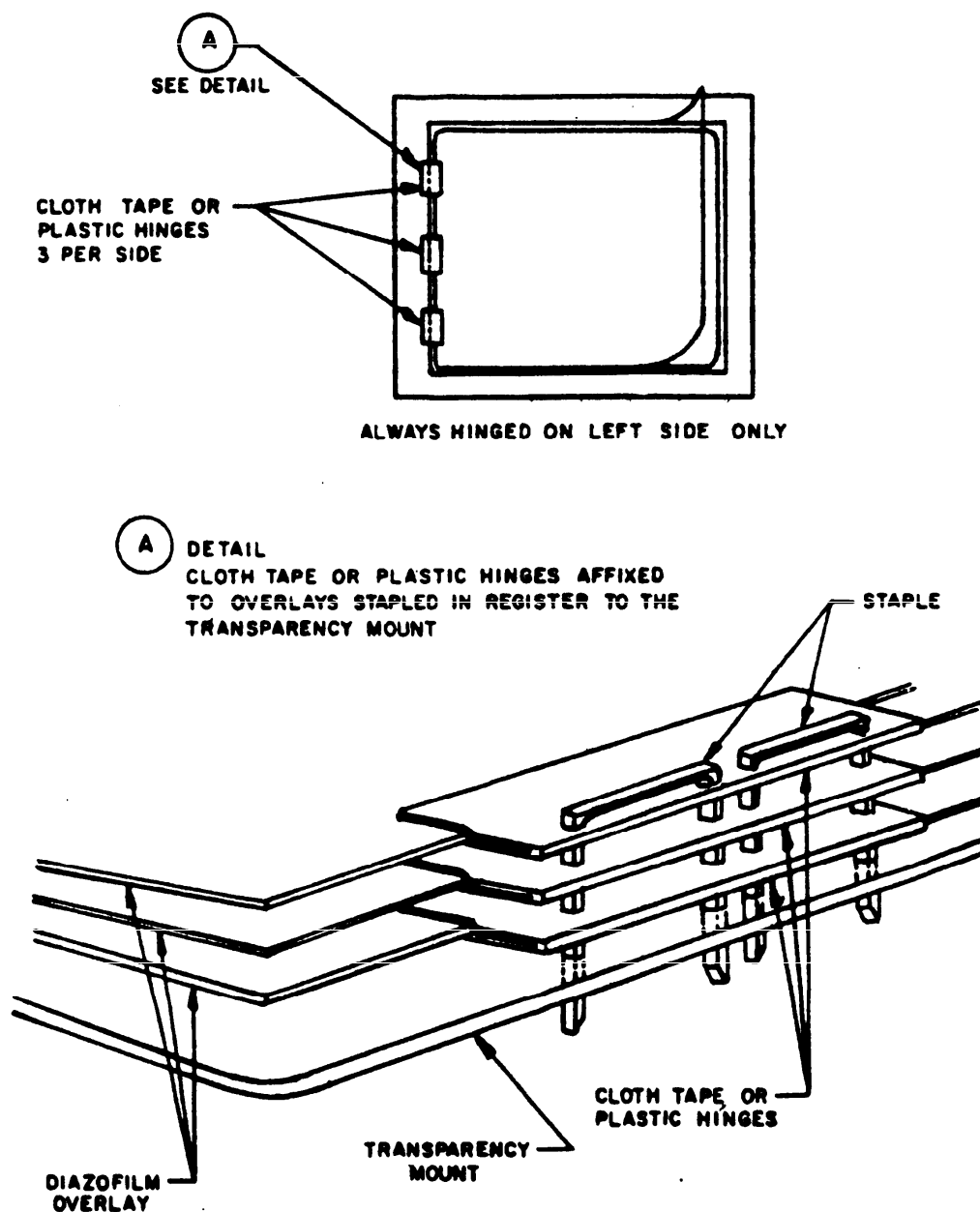
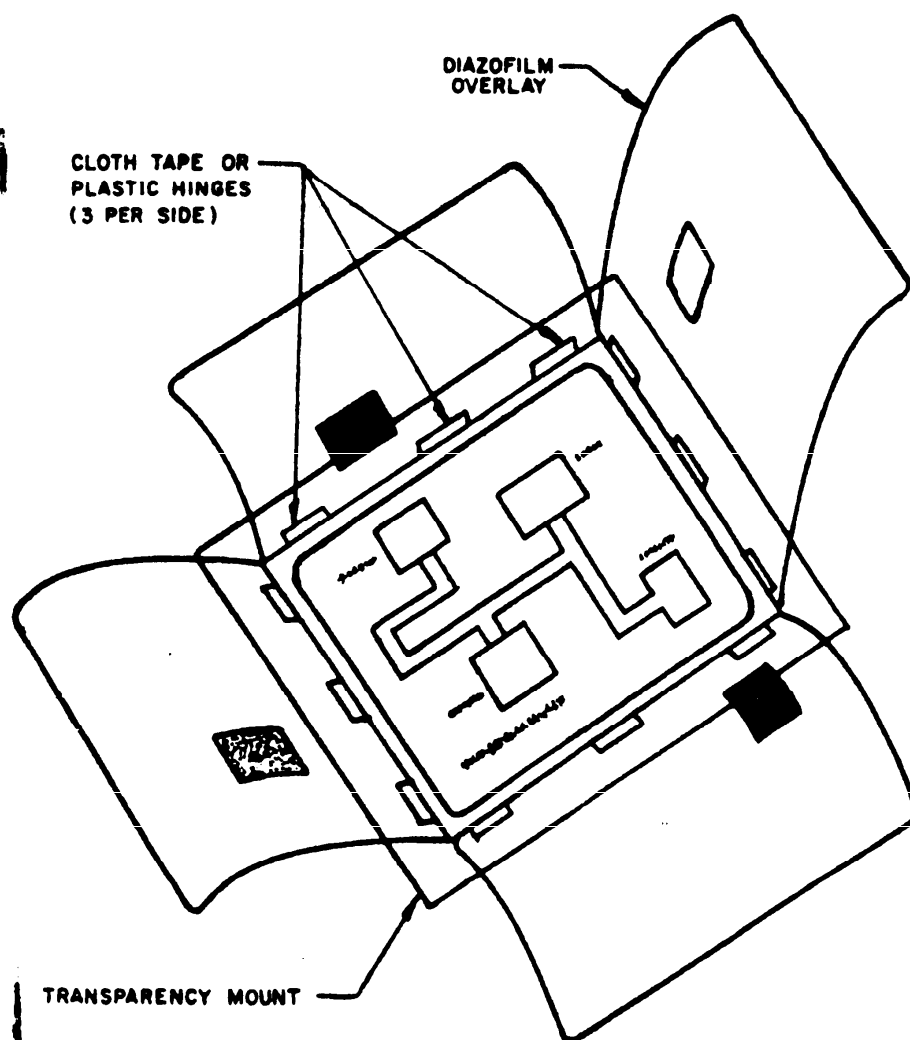


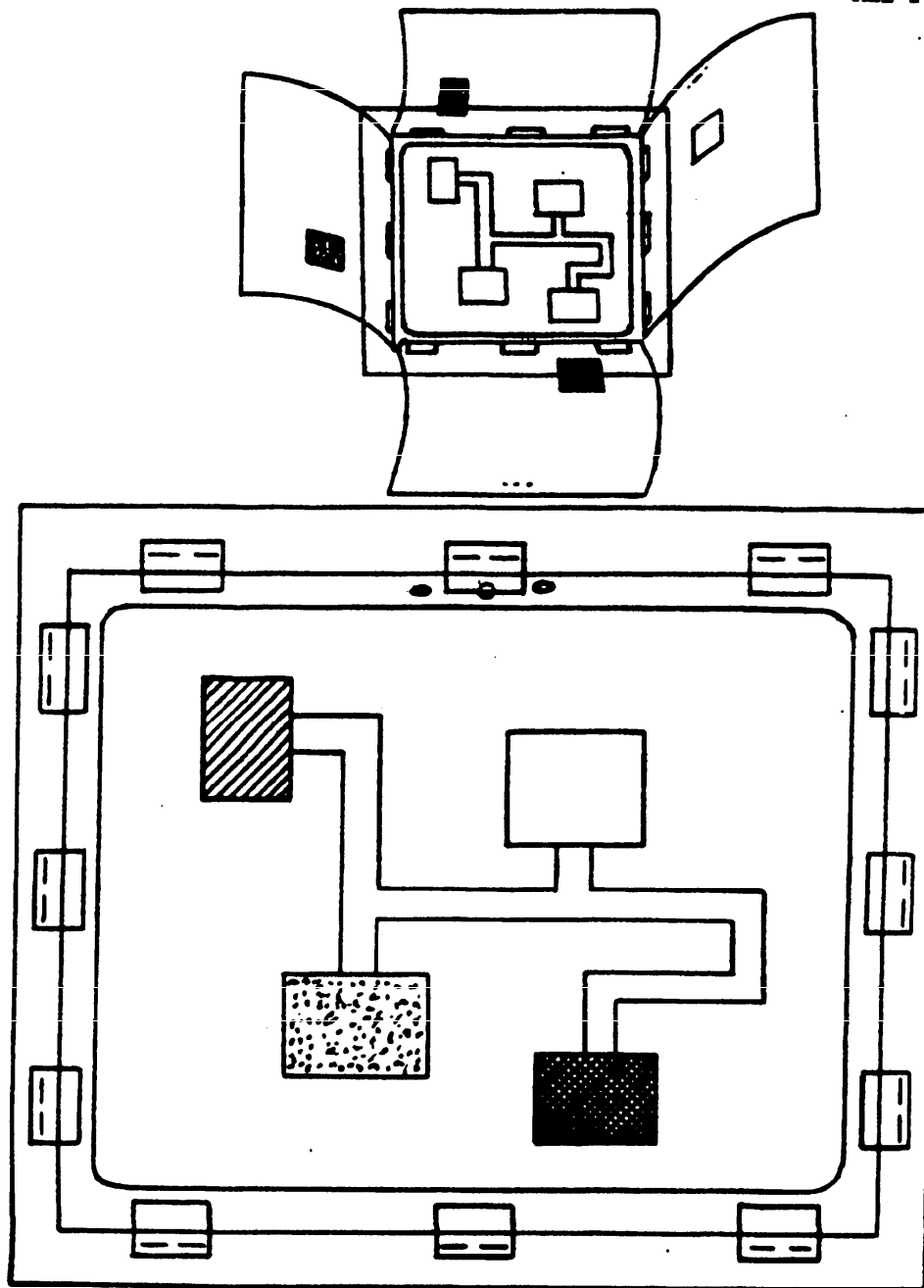
FIGURE 6. Fixed Sequence Overlay Transparency (Ref 3.1.8.2.1)

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**FIGURE 7. Variable Sequence Overlay Transparency**  
(Ref 3.1.8.2.2 and 6.3.2)

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OVERLAYS REGISTERED IN PROJECTION POSITION

FIGURE 8. Registration for Dynamic Transparencies (Ref 3.1.8.2.3)

MIL-T-4762C

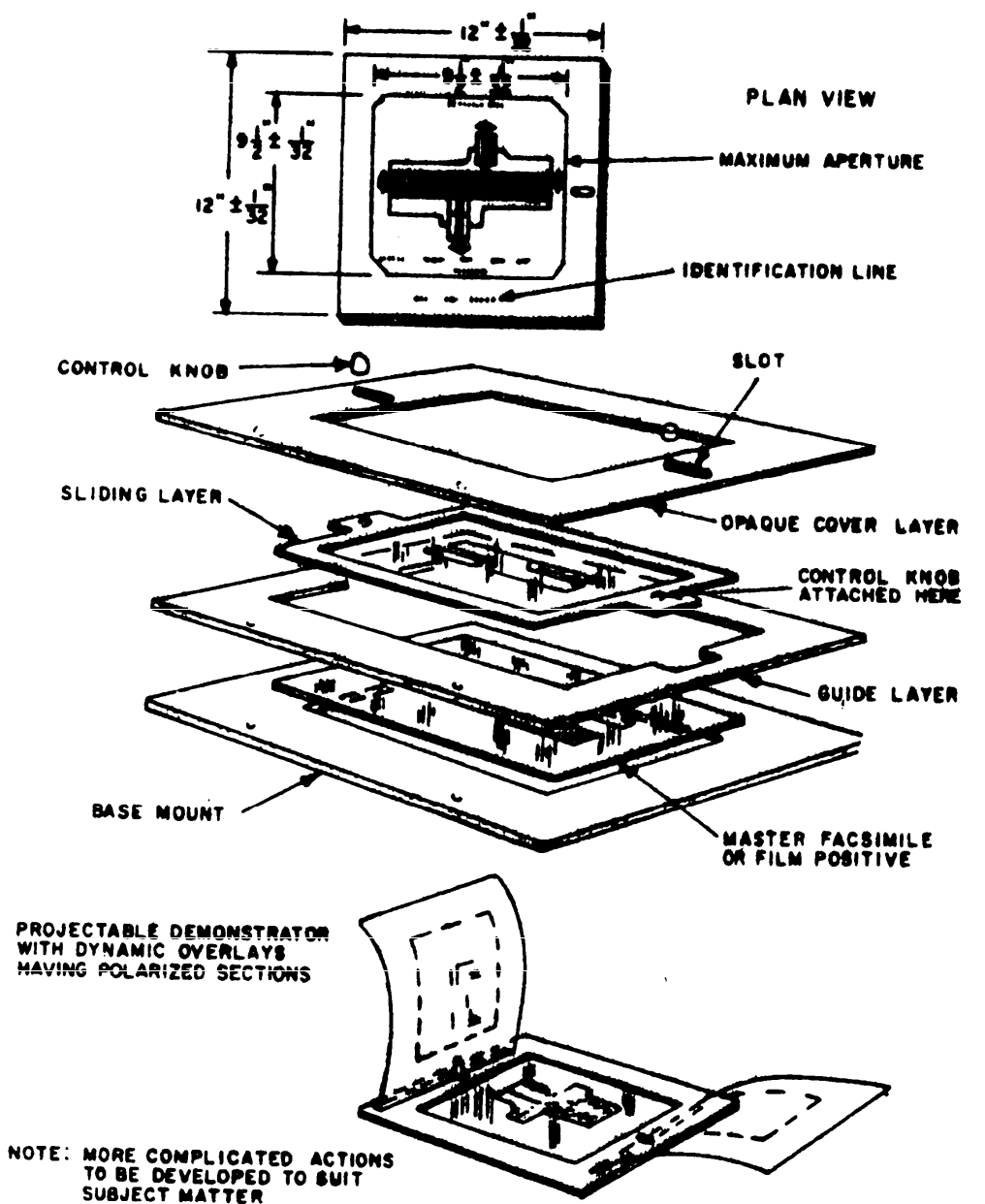


FIGURE 9. Projectable Demonstrator (Typical Manual "Push-Pull" Action)  
(Ref 3.1.9.2, 3.1.9.2.1, 3.1.9.5, and 6.3.3.2)

MIL-T-4782C

- 1 - Aircraft (including Guided Missiles and Helicopters)
- 2 - Engines
- 3 - Aircraft Propellers and Associated Equipment
- 4 - Aircraft Landing Gear, Components, and Associated Equipment
- 5 - Aircraft Instruments
- 6 - Aircraft Fuel Systems and Equipment
- 7 - Aircraft Engine Lubricating Systems
- 8 - Aircraft Electrical Systems
- 9 - Aircraft Hydraulic Pneumatic and Vacuum Systems
- 10 - Photographic Equipment
- 11 - Armament
- 12 - Airborne Electronic Publications
- 13 - Aircraft Furnishing, Inflight Fueling, Cargo Landing, and Aerial Delivery
- 14 - Deceleration Devices, Parachutes, Personal Survival Equipment

(CONTINUES ON THROUGH 50 - SPECIAL SERVICES EQUIPMENT)

FIGURE 10. Major Categories of the Technical Order/Manual Index  
(Ref 3.3.1)

**MIL-T-4782C**

**1 - Aircraft, Helicopters, and Guided Missiles**

**A - Attack Aircraft**

**B - Bomber Aircraft**

**C - Cargo/Transport Aircraft**

**F - Fighter Aircraft**

**H - Helicopter**

**L - Liaison Aircraft**

**M - Missiles**

**M1 - Guided Air Missiles**

**M2 - Guided Air Rockets**

**M3 - Tactical Missiles**

**M4 - Strategic Missiles**

**M5 - Reconnaissance Tactical Missiles**

**M6 - Reconnaissance Strategic Missiles**

**M7 - Interceptor Missiles**

**D - Drone and Target Aircraft**

**T - Trainer Aircraft**

**O - Observation Aircraft**

**U - Utility Aircraft**

**V - VTOL and STOL Aircraft**

**2 - Engines**

**J - Jet Engines**

**F - Turbofan Engines**

**J - Turbojet Engines**

**R - Reciprocating Engines**

**T - Turboprop Engines**

**A - Associated Equipment, General**

**1A - Afterburner Control System**

**(Continues on through A9 - Grip Assemblies)**

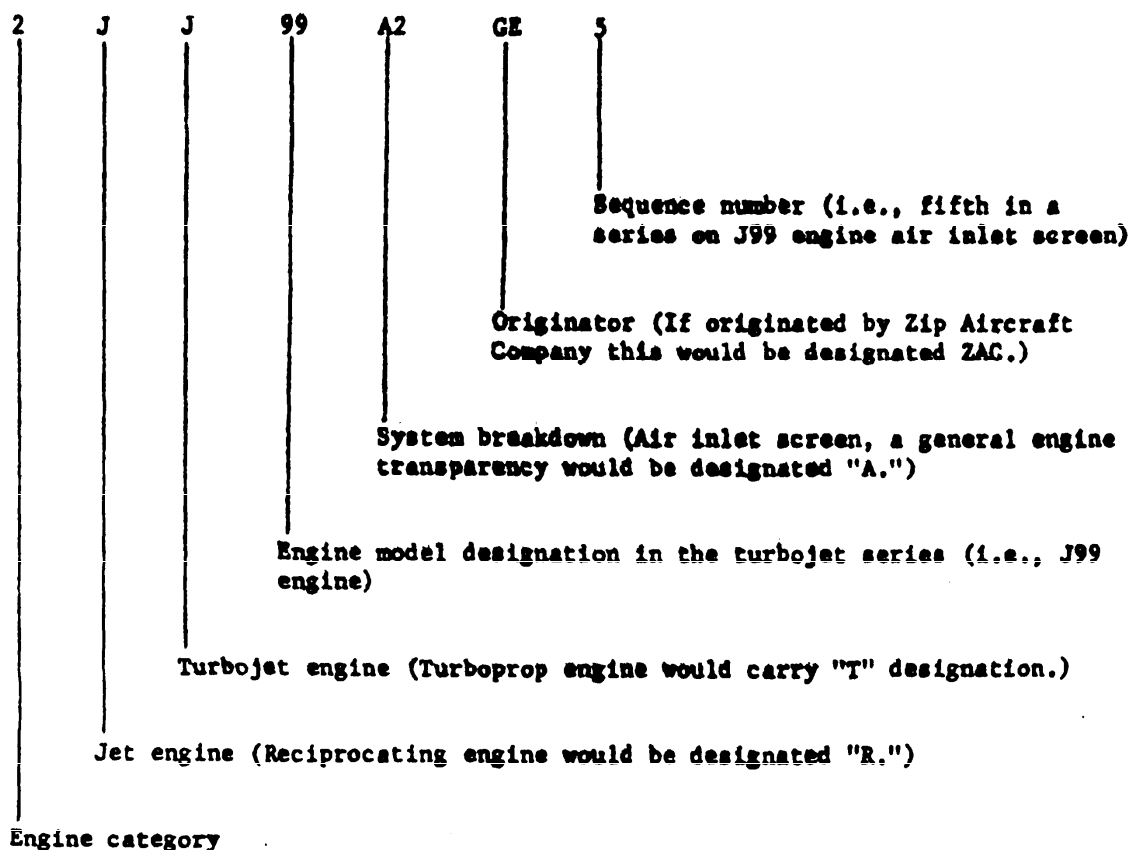
**FIGURE 11. Examples of Technical Order/Technical Manual Index (Ref 3.3.1)**

MIL-T-4782C

1	B	88	WAC	4	6 A	(EXAMPLE: BOMBARDMENT AIRCRAFT SYSTEM)
1	M7	93	ZAC	2-4	6 A	(EXAMPLE: INTERCEPTOR MISSILE SYSTEM)
						(NOTE: Effectivity shall be controlled by originator and noted on index sheet and shall not be reflected in the transparency number.)
						Transparency revision designator (A - first revision, B - second revision, et cetera)
						Sequence number (i.e., #6 in a series originated by [West Aircraft Company] on the applicable [B88] system i.e., fuel, electrical, et cetera )
						System designator 4 is the maintenance handbook subsection for a specific B88 aircraft system (i.e., fuel, electrical, et cetera).
						System designator 2-4 for the IM93 example includes an optional handbook category designator (i.e., 2 - maintenance, 3 - erection, et cetera).
						Two-part designators shall only be used where system complexity and handbook arrangement requires it.
						Transparency originated by [West] Aircraft Company (If this transparency had been originated by the Prime Technical Training Center, the letters KE, CH, LO or SH would replace [WAC] and their sequence number would follow.)
						Aircraft or missile model number
						B designates bomber aircraft and M7 designates interceptor missiles. (H would appear for a helicopter, C for cargo aircraft, et cetera.)
						Indicates aircraft, helicopters, or guided missiles.

FIGURE 12. Typical Weapon System Transparency Numbers  
(Ref 3.3.1.1 and 3.3.3.2.1)

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## NOTE:

1. Other accessory items or systems not related to a specific airplane will be numbered as outlined in the applicable technical order/technical manual index section (i.e., Armament Systems - Category 11, Propellers - Category 3, Aircraft Instruments - Category 5, et cetera).
2. Effectivity is to be controlled by originator and noted on index sheet and shall not be reflected in the transparency number.

FIGURE 13. Typical Accessory Equipment Transparency Number (Ref 3.3.1.2)

MIL-T-4782C

(APPLICABLE WEAPON SYSTEM TITLE) TECHNICAL TRAINING TRANSPARENCIES INDEX				
REV 30 JUN 1970				
IDENTIFICATION NUMBER	TITLE	PURPOSE	TYPE	REFLECTIVITY MODEL/SERIAL NO.
2-11 ARMAMENT SYSTEM				
2-11-1 ARMAMENT SYSTEM GENERAL				
				(Serial No.)
1 F SA/B NOA 2-11-1 1	ARMAMENT SYSTEM FUSELAGE	LOC	PICT	69-6784 thru 69-6815
1 F SA/B NOA 2-11-1 2	ARMAMENT SYSTEM WING	LOC	PICT	69-6784 thru 69-6815
1 F SA NOA 2-11-1 3	ARMAMENT SELECTION PANEL	INSP	PICT	70-535 thru 70-602
1 F SB NOA 2-11-1 4	ARMAMENT SELECTION PANEL	RECOG	PICT	" " "
1 F SA/B NOA 2-11-1 5	ARMAMENT AUXILIARY CONTROL PANEL	RECOG	PICT	" " "
1 F SA/B NOA 2-11-1 6	GAN-83 CONTROL PANEL	ACCESS	PICT	
1 F SA/B NOA 2-11-1 7	ARMAMENT RELAY BOX	RECOG	PICT	
1 F SA/B NOA 2-11-1 8	OPTICAL SIGHT INSTALLATION	RECOG	DYN	
1 F SA/B NOA 2-11-1 9	ARMAMENT CONFIGURATIONS BASIC MISSION	RECOG	PICT	NOTE: When serial no. is used, a separate sheet in front of index will indicate model relationship. A model 69-6784 thru 69-6815
1 F SA/B NOA 2-11-1 10	ARMAMENT CONFIGURATIONS PRIMARY GROUND SUPPORT	SERV	PICT	B model 69-6816 thru 69-6870
1 F SA/B CANCELLED 11	ARMAMENT CONFIGURATIONS PRIMARY GROUND SUPPORT - ALTERNATE	RECOG	PICT	A & B A & C
1 F SA/B NOA 2-11-1 12	ARMAMENT CONFIGURATIONS MAXIMUM GROSS TAKEOFF WEIGHT	RECOG	PICT	
1 F SA/B NOA 2-11-1 13	ARMAMENT CONFIGURATIONS COMBAT AIR PATROL	RECOG	PICT	
1 F SA/B NOA 2-11-1 14	ARMAMENT CONFIGURATIONS COMBAT AIR PATROL - ALTERNATE	RECOG	PICT	NOTE: If no serial no. or model no. is used on equipment, place an "X" in this column to indi- cate that the transparency is available.
1 F SA/B NOA 2-11-1 15	ARMAMENT CONFIGURATIONS COMBAT AIR PATROL - ROCKET POD	RECOG	PICT	
1 F SA/B NOA 2-11-1 16	ARMAMENT CONFIGURATIONS FERRY MISSION	RECOG	PICT	
1 F SA/B CANCELLED 17	UNIT 1 - BALLAST INSTALLATION - TYPICAL	OPR	PICT	
1 F SA/B CANCELLED 17	UNIT 2 - BALLAST INSTALLATION - TYPICAL	OPR	PICT	
1 F SA/B NOA 2-11-1 18	VARIABLE BALLAST INSTALLATION	OPR	PICT	
1 F SA/B NOA 2-11-1 19	ARMAMENT CONFIGURATIONS SUU-20/A TRAINING MISSION	RECOG	PICT	
1 F SA/B NOA 2-11-1 20	ARMAMENT CONFIGURATIONS ROCKET TRAINING MISSION	RECOG	PICT	

\* FIGURE 14. Example of Transparency Index  
(Ref 3.3.3.2)

MIL-T-4782C

(APPLICABLE WEAPON SYSTEM TITLE)  
TECHNICAL TRAINING TRANSPARENCIES

FILE OPP. PAGE NO. \_\_\_\_\_ INDEX ISSUE NO. \_\_\_\_\_  
ISSUED : \_\_\_\_\_ ISSUED : \_\_\_\_\_  
REVISED : \_\_\_\_\_

INDEX CHANGE NOTICE			
THIS CHANGE NOTICE SUPERSEDES ALL PREVIOUS ISSUES.		REFLECTIVITY USE OF THIS COLUMN IS SAME AS SPECIFIED IN 3.3.3.2.5	
KEY	ECP NUMBER	AUTHORITY	KIT NUMBER

FIGURE 15. Example of Index Change Notice (Ref 3.3.3.3)

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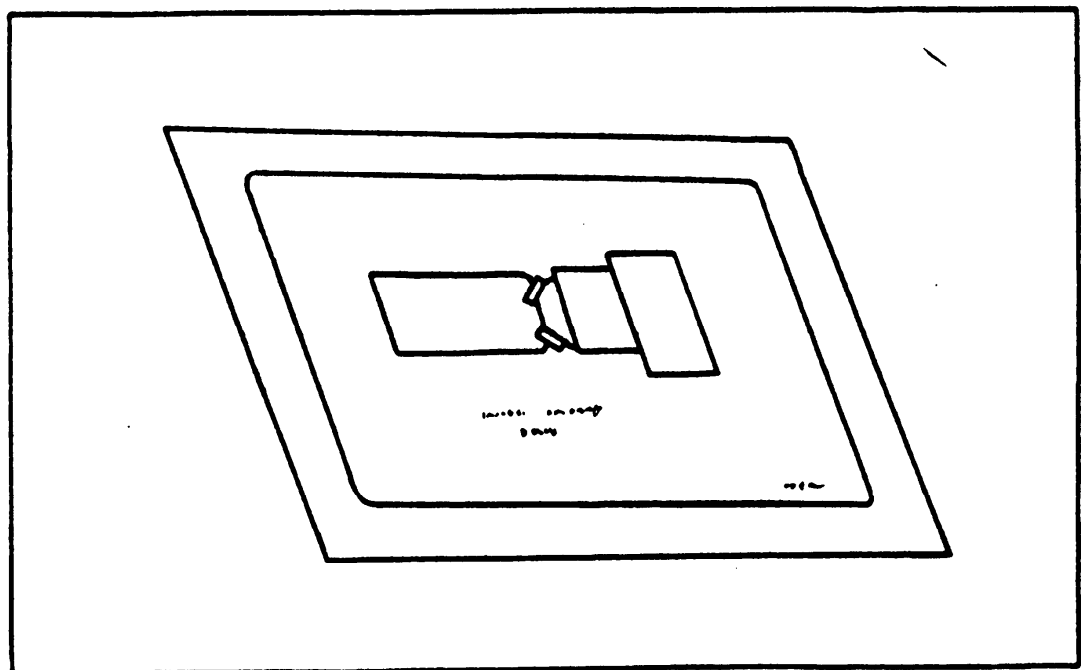


FIGURE 16. Static Transparency (Ref 6.3.1)

MIL-T-4782C

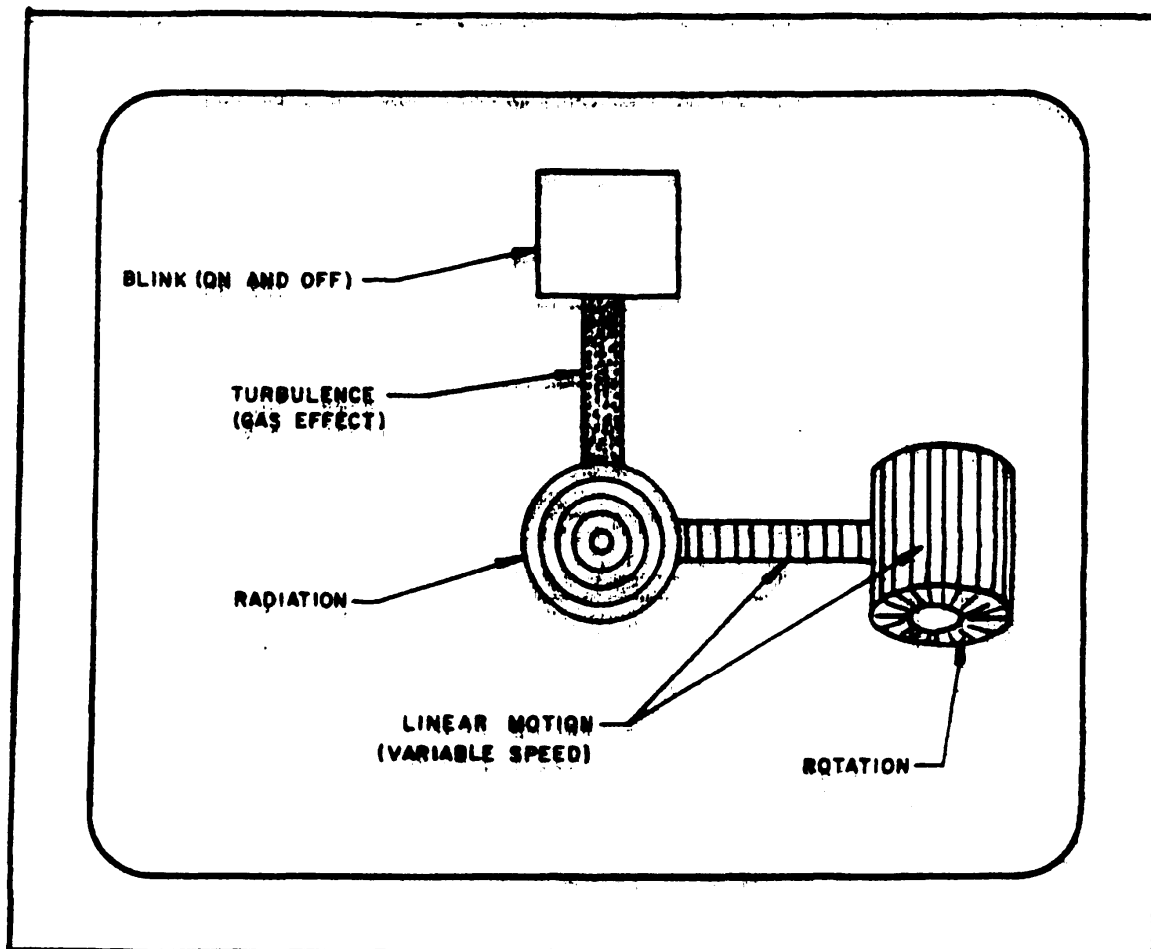


FIGURE 17. Polarized Projectual (Ref 3.1.9.1 and 6.3.3.1)

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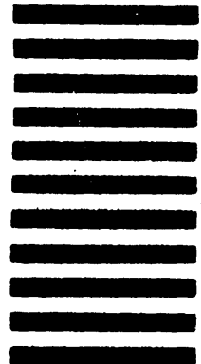
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