

**TECHNICAL SPECIFICATION**

**TITLE: SHIP ALTERATION DRAWINGS PREPARATION**

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**Naval Sea Systems Command  
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Washington, D.C. 20376**

**Ship Alteration Drawing Preparation**

1. This specification is published to establish minimum requirements for preparation of Ship Alteration (SHIPALT) Drawings (SIDs). This specification should also be complied with, as practical, for other Alteration drawings.
2. Recommended corrections, additions, or deletions should be addressed to Commander, Puget Sound Naval Shipyard, 1400 Farragut Ave, Bremerton, WA 98314-5001, Attn: Code 270

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## SHIP ALTERATION DRAWING PREPARATION

### 1. SCOPE

1.1 General. This specification provides minimum requirements for the uniform preparation of non-nuclear Ship Alteration (SHIPALT) Drawings (hereafter referred to as *drawings*) used for the accomplishment of all non-nuclear SHIPALTs except as noted herein (see 1.3).

1.2 Applicability. This specification is applicable to surface ship and submarine engineering drawings and associated lists and shall be utilized by all Hull Planning Yards/Design Agents (hereafter referred to as *Planning Yards*) for preparation of all working drawings prepared for accomplishment of SHIPALT work except as noted herein (see 1.3).

1.3 Exceptions. This specification shall not be utilized for preparation of the following:

- a. Drawings prepared for Nuclear Propulsion Plant SHIPALTs under the cognizance of the Deputy Commander for Nuclear Propulsion, NAVSEA 08.
- b. Drawings prepared for installation of Special Project Alterations (SPALTs) issued by the Director, Special Strategic Project Office, NAVMAT PM-1.
- c. Drawings concerning aircraft launch and recovery equipment that are under the cognizance of the Commander, Naval Air Systems Command.
- d. Ship's Selected Record Drawings (SRDs).

### 2. APPLICABLE DOCUMENTS

2.1 General. The following documents, of the issue in effect on the date of invitation for bids or request for proposals (for private Planning Yards) or on the date of the tasking documentation (for public Planning Yards), or as specified in the data of the tasking correspondence, form a part of this specification to the extent specified herein.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks of the exact revision listed below form a part of this document to the extent specified herein.

### SPECIFICATIONS

#### **Federal**

L-P-519	Plastic Sheet, Tracing, Glazed and Matte Finish
CCC-C-531	Cloth, Tracing

#### **Military**

MIL-DTL-31000	Technical Data Packages, General Specifications for
MIL-PRF-5480	Data, Engineering and Technical, Reproduction Requirements for

MIL-D-23140 Drawings, Installation Control for  
Shipboard Electronics Equipment

### **NAVSEA**

Technical Specification 9090-100 SHIPALT Technical Liaison Services, Waivers and  
Deviations

Technical Specification 9090-500 Ship Alteration Record Preparation

## **STANDARDS**

### **Military**

DOD-STD-2003-5 Electric Plant Installation Standard Methods for  
Surface Ships and Submarines (Connectors)

MIL-STD-22 Welded Joint Design

MIL-STD-25 Ship Structural Symbols for Use on Ship Drawings

DOD-STD-100 Engineering Drawing Practices

MIL-STD-129 Marking for Shipment and Storage

MIL-STD-196 Joint Electronics Type Designation System

## **HANDBOOKS**

MIL-HDBK-505 Definitions of Item Levels, Item Exchangeability,  
Modules and Related Terms

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications of the exact revision level shown form a part of this document to the extent specified herein.

## **PUBLICATIONS**

### **DEPARTMENT OF DEFENSE**

H4-1/H4-2 - Cataloging Handbook CAGE Code for Manufacturers and  
Government, Name to Code and Code to Name

### **NAVAL SEA SYSTEMS COMMAND**

0900-LP-001-7000 Fabrication and Inspection on Brazed Piping Systems

0902-018-2010 General Overhaul

0902-LP-041-2010 Specification for Deep Diving Submarine

0948-LP-045-7010 Standard Specifications for U.S. Navy Craft

Material Control-Standard

S9040-AA-IDX-010/SWBS5D S9074-AQ-GIB-010/278	Ship Work Breakdown Structure Requirements for Fabrication Welding and Inspection, and Casting Inspection and Repair for Machinery, Piping, and Pressure Vessels
S9AA0-AA-SPN-010/GEN-SPEC	General Specifications for Ships of the United States Navy [Last revision 1995 for internal NAVSEA use only]
S9AA0-AB-GOS-010	General Specifications for Overhaul of Surface Ships (GSO) Including the Aegis Supplement
S0005-AE-PRO-010/EDM	NAVSEA Engineering Drawing Life-Cycle Management Process Manual
SL720-AA-MAN-010	Fleet Modernization Program Management and Operations Manual
SECNAVINST 5510.30 SECNAVINST 5510.36	Department of the Navy Personnel Security Program Department of the Navy (DON), Information Security Program (ISP)
NAVSEAINST 9085.2	Engineering Drawing Acquisition and Life-Cycle Management Policy and Responsibilities
NAVSEA Drawing No. 53711-803-5001049	Piping System Symbols and abbreviations

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 the date of the invitation for bids or request for proposal (for private Planning Yards) or the date of the tasking documentation (for public Planning Yards) shall apply.

#### **AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)**

ANSI/AWS A2.4	Symbols for Welding and Nondestructive Testing
ANSI / ASME Y14.1	Drawing Sheet Size and Format
ANSI / ASME Y14.2	Line Conventions and Lettering
ANSI / ASME Y14.3	Multi and Sectional View Drawings
ANSI / ASME Y14.5	Dimensioning and Tolerancing
ANSI Y14.15	Electrical and Electronic Diagrams
ANSI Y14.15a	Interconnection Diagrams
ANSI Y14.17	Fluid Power Diagrams
ANSI / ASME Y32.2	Graphic Symbols for Electrical and Electronics Diagrams
ANSI / ASME Y32.10	Graphic Symbols for Fluid Power Diagrams
ANSI Y32.16	Reference Designations for Electrical and Electronics Parts and Equipment
ANSI Y32.2.4	Redesignation of Graphic Symbols for Heating, Ventilating and Air Conditioning

(Application for copies should be addressed to the American National Standard Institute, 1430 Broadway, New York, New York 10018.)

#### AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME Y14.38

Abbreviations and Acronyms

ASME Y14.100

Engineering Drawing Practices

### 3. REQUIREMENTS

3.1 Precedence. In the event of conflict between the requirements of this specification and the documents referenced herein, the requirements of this specification shall apply except in the event of conflict between the requirement of this specification and the requirement of NAVSEA 0902-018-2010, NAVSEA 0902-LP-041-2010, NAVSEA S9AAO-AB-GOS-010, or NAVSEA S9AAO-AA-SPN-010/GEN-SPEC. In these cases, the requirements of those documents shall apply.

#### 3.2 General.

3.2.1 SHIPALT Drawings. SHIPALT drawings are those drawings which are utilized by a shipyard or other activity (including Ship's Force) for the accomplishment of all non-nuclear SHIPALT work. These drawings also provide a record of ship configuration after SHIPALT accomplishment, are used by Ship's Force in maintenance and casualty control, are used by material support activities in determining support requirements, and are used by NAVSEA to maintain system and compartment configuration control. These drawings include, as required, system drawings and diagrams, arrangement drawings, structural drawings, manufacturing drawings, assembly and detail drawings, removal drawings, temporary access/egress drawings, cabling sheets and special drawings and shall meet the following general criteria:

- a. Drawings shall be prepared to meet the requirements of this specification.
- b. Drawings shall be as complete as practicable; i.e., drawings should not rely on references to other drawings or other sources of technical data to provide information which would be more easily utilized by the installing activity if presented on the drawing. When reference to other data sources (technical manuals, specifications, standards, drawings, etc.) is required, the drawings shall not reference restrictive data (3.2.4) that would not be available at all installing activities.
- c. Unless otherwise approved by NAVSEA, drawings shall contain complete ordering information for all required parts, material and equipment. Any Standards referenced for manufacturing must be readily available.
- d. SHIPALT engineering design shall be applied to drawings either as revisions to existing drawings (see 3.4.16 (a)) or by creation of new drawings. New drawings can be in the form of modification drawings (see 3.4.16 (b)), superseding drawings (see 3.4.16 (c)), or *stand-alone* drawings (drawings which do not change or supersede information shown on other drawings, usually providing a new design or capability to the ship). If SHIPALT design is applied to an existing drawing, the revisions which applies to the design shall clearly indicate the changes caused by the SHIPALT without loss of essential information which describes ships which have not completed the SHIPALT or are not applicable to the SHIPALT. If the application of SHIPALT

design data by revision will cause confusion or changes more than 25% of the data on an existing drawing, a new drawing shall be prepared either modifying or superseding the existing drawing.

**3.2.2 Non-Expanded Planning Yard SHIPALT Drawings.** Planning Yards not designated as Expanded Planning Yards by NAVSEA SL720-AA-MAN-010 shall prepare SHIPALT drawings to support accomplishment of individual SHIPALTs. There are two types of SHIPALT drawings to support this effort, Basic Alteration Class Drawings (BACDs) and Supplemental Alteration Drawings (SADs).

- a. **Basic Alteration Class Drawings (BACDs).** BACDs are the first complete set of drawings developed for accomplishment of a SHIPALT that requires drawings. The drawings for accomplishment of an individual SHIPALT shall form a complete drawing package or set and shall be prepared based on conditions found during a shipcheck of the first ship scheduled to receive the SHIPALT. The drawings shall be generally applicable to the other ships of the class. If the shipchecks of follow ships reveal significant differences (less than 75% of a drawing is applicable) on a follow ship or series of follow ships, the Planning Yard may prepare a new drawing for that ship or series of ships. The cognizant NAVSEA Ship Logistic Manager (SLM) or Ship Acquisition Project Manager (SPM) must authorize preparing of the new drawing(s). If the differences found on follow ships are not significant (more than 75% of the BACD is applicable), Supplemental Alteration Drawings (SADs) may be prepared to adapt the design of the BACD to the specific ship or series of ships or the BACD may be revised to indicate the differences.
- b. **Supplemental Alteration Drawings (SADs).** SADs are drawings that adapt the design details developed on BACDs to provide applicability to follow ships of class. SADs do not modify the requirements or scope of a SHIPALT and shall only be prepared to the extent necessary to tailor the BACD design to a specific hull or series of hulls. (Departure from the technical requirements indicated on the parent BACD or changes which affect component selection, material specifications, stress levels, stress distribution (especially on structural and piping drawings), system integration and/or functional configuration, system operational and/or maintenance characteristics, structural integrity, or compartment/topside arrangements shall require cognizant NAVSEA Engineering Directorate approval and cognizant SLM or SPM authorization. They will normally be prepared as modification drawings (see 3.4.16 (b)) and the level of detail shall be equal to that of the BACD being modified. The area(s) of the BACD being modified shall be clearly identified. In cases where a shipcheck reveals significant differences (less than 75% of a BACD is applicable) on a ship, a new drawing shall be prepared for that ship. The new drawing shall have all of the BACD design details, including the engineering data (see 3.5.10.7), adapted for that ship that the BACD has for the other ships of the class.

**3.2.3 Expanded Planning Yard SHIPALT Drawings.** Expanded Planning Yards (as designated by NAVSEA SL720-AA-MAN-010) shall prepare complete drawing packages, SHIPALT Installation Drawings (SIDs), to support all non-nuclear SHIPALT work scheduled to be accomplished on specific ships during specific availabilities. The drawings, as a package shall provide complete design data for all non-nuclear SHIPALTs scheduled for specific availabilities.

The drawing package may include modification drawings, superseding drawings, stand-alone drawings and revised existing drawings which provide design data for individual SHIPALTs, and may also include integrated design drawings. Integrated design drawings represent work required by two or more SHIPALTs, usually to be accomplished in the same space or area of the ship and would be scheduled to be accomplished at the same time. These drawings may include rip-out drawings (see 3.5.10), temporary access/egress drawings, and arrangement drawings (see 3.5.9) and are generally applicable to only one ship. (Integrated design drawings shall not be prepared unless it is clearly advantageous to do so and the drawings shall clearly indicate the extent of work for each SHIPALT included on the drawing.)

3.2.4 Restrictive Data. Unless otherwise specified by NAVSEA, individual drawings in a drawing package shall not include the following:

- a. SHIPALT drawings shall invoke only Government or other universally accepted procedures, standards or specifications such as those specified in NAVSEA 0902-018-2010 or NAVSEA S9AA0-AB-GOS-010. Planning Yard or other local procedures, standards or specifications may be invoked in conjunction with the applicable government specifications (such as in parenthesis following the government specification) only when all requirements of the government specification are invoked in the local specification. (Until such time as NAVSEA Standard and Type Drawings can be updated, the use of Planning Yard Standard Drawings shall be permitted as references on SHIPALT drawings, if they are listed as required references in the applicable Planning Yard-prepared Ship's Availability Drawing Schedule.)
- b. Original builder's specifications, contract drawings, and contract guidance drawings. These are not available at most activities and shall not be referenced directly on SHIPALT drawings.
- c. Reference to any specific availability or overhaul.
- d. Reference to the shipyard assignment for any ship.
- e. Reference to any miscellaneous information or Notes relating to operations or procedures peculiar to a specific shipyard or activity unless it is clearly delineated that the information pertains only to a specific activity. For example, following the miscellaneous information or Notes with '(for PSNS only)'.
- f. Material specifications based on the material's availability in the Planning Yard's shipyard stock. To the maximum extent possible, material shall be selected on the basis of its suitability and of its general availability, according to the best information held by the Planning Yard, to all installing activities.
- g. Specification of proprietary material, unless the Planning Yard determines that there is no generic equivalent. If proprietary material is required, complete ordering information shall be provided on the drawing.
- h. References to proprietary vendor drawings unless required for ordering information (see 3.2.4 (g)).
- i. Material part numbers or stock numbers which are peculiar to a given activity's stock system unless handled in a manner similar to e. above.

3.2.5 Computer Aided Design (CAD). In nearly all instances, SIDs will be developed using a CAD application. This provides significant benefits in efficiency and accuracy, as well as

reusability. When CAD files are generated they must follow a consistent set of CAD Standards with regards to layers, line weights, line fonts, and standard library parts inserted. Specific CAD Standards are not mandated as long as the CAD drawings are developed in a consistent manner. (The Planning Yards at PSNS, NNSY and NGNN have published a CAD Standard which is available for other activities to use.) The electronic drawing files must be backed-up and archived in accordance with NAVSEA requirements.

### 3.3 Responsibilities.

3.3.1 Planning Yard. The Planning Yard for each ship class, as designated by NAVSEA SL720-AA-MAN-010, is the engineering design agent for assigned specific classes of ships. Responsibilities assigned to the Planning Yard (both Expanded and Non-Expanded) in support of SHIPALT drawings include the following:

- a. Developing basic SHIPALT engineering design
- b. Developing detail design drawings for accomplishment of SHIPALTs as described in 3.2.2 and 3.2.3.
- c. Performing shipchecks, as required, to accomplish the following:
  1. Determine lead ship design (performed prior to or after actual drawing preparation, but must be conducted on applicable ships prior to issuance of the drawing) to support specific availabilities.
  2. Determine drawing adequacy and applicability to follow ships of a class (performed prior to or after actual drawing preparation, but must be conducted on applicable ships prior to issuance of the drawing) to support specific availabilities.
  3. Conduct proofing (Validation) of SHIPALT drawings (performed as part of proofing of SHIPALT design for SHIPALT records (SARs) which require proofing after SHIPALT accomplishment on the first ship to receive the SHIPALT).
  4. Verify the design and applicability of high risk or complex SHIPALT drawings. This is to be limited to those alterations that are high risk and where the Planning Yard has reason to believe that the drawings or the design presented on the drawings may be inadequate. The NAVSEA SLM/SPM is to be notified in advance of the shipcheck. This shipcheck may also be conducted by the installing activity/SUPSHIP when approved by the Planning Yard.
- d. Approve drawings.
- e. Providing resolution to problems with SHIPALT drawings encountered by overhaul yards via the liaison action record (LAR) procedure in accordance with NAVSEA Technical Specification 9090-100.
- f. Maintaining a central drawing file of all Master File Drawings, including CAD files, applicable to the ships for which the Planning Yard is responsible.
- g. Developing SHIPALT man-day and material cost estimates as part of BACD or SID preparation. A SHIPALT cost Estimate Record Sheet, Figure S4-4 of Section 4.6.3.3 of NAVSEA SL720-AA-MAN-010, shall be appropriately completed by the Planning Yard and submitted to the cognizant SLM or SPM within 30 days of completion of BACDs or SIDs.
- h. Maintain configuration control.

3.3.2 NAVSEA Engineering Directorate. NAVSEA Engineering Directorate (NAVSEA 05) is the activities responsible for the SHIPALT technical products. This includes:

- a. SHIPALT review and approval requirements will be established by the NAVSEA Engineering Directorate Office responsible for each SHIPALT, on a case basis or the requirements of NAVSEA 0902-018-2010 or NAVSEA S9AA0-AB-GOS-010 shall be specified. Requirements will be specified in the SHIPALT Record (SAR) (see NAVSEA Technical Specification 9090-500).
- b. Conducting in-process reviews during the development of the technical products of major SHIPALTs. In-process reviews will be conducted when either the Engineering Directorate or the cognizant SLM/SPM determine such a review is required for a particular SHIPALT. Review requirements will be specified in the SAR.
- c. Performing technical review and approval of major changes, waivers and deviations to SHIPALT documentation in accordance with procedures for controlling engineering changes to SHIPALTs, NAVSEA Technical Specification 9090-100.

3.4 Drawing Preparation Requirements. Drawings and associated lists shall be prepared as engineering drawings in accordance with the general drafting practices outlined in DOD-STD-100, as defined herein, and as modified by NAVSEA 0902-018-2010 or NAVSEA S9AA0-AB-GOS-010, as specified in the contract or tasking documentation.

#### 3.4.1 General.

3.4.1.1 Quality. Within the requirements of DOD-STD-100, MIL-DTL-31000, and the direction contained herein. Planning Yards shall provide drawings for SHIPALT accomplishment, as tasked, which are timely, accurate, and as suitable for direct use as a stand-alone drawing package by installing activities as possible. Installing activities are to use these drawings with a minimum of departure to promote standardization and reduce ship differences in a given class.

3.4.1.2 Quantity. When the SHIPALT design affects the configuration of other systems, compartments, or spaces adjacent to the system or area directly affected by the SHIPALT, sufficient drawings shall be prepared to reflect the rearrangement and reconfiguration of such systems, compartments or spaces. (For submarines only - For SHIPALTs included on approved Baseline Arrangement Drawings, arrangement drawings shall reflect the approved baseline or the Planning Yard shall request departures in accordance with NAVSEA 0902-018-2010. For SHIPALTs not included on baseline drawings, NAVSEA approval of arrangements drawings shall be as specified in the SAR.)

#### 3.4.2 Drawing Sheet Sizes and Format.

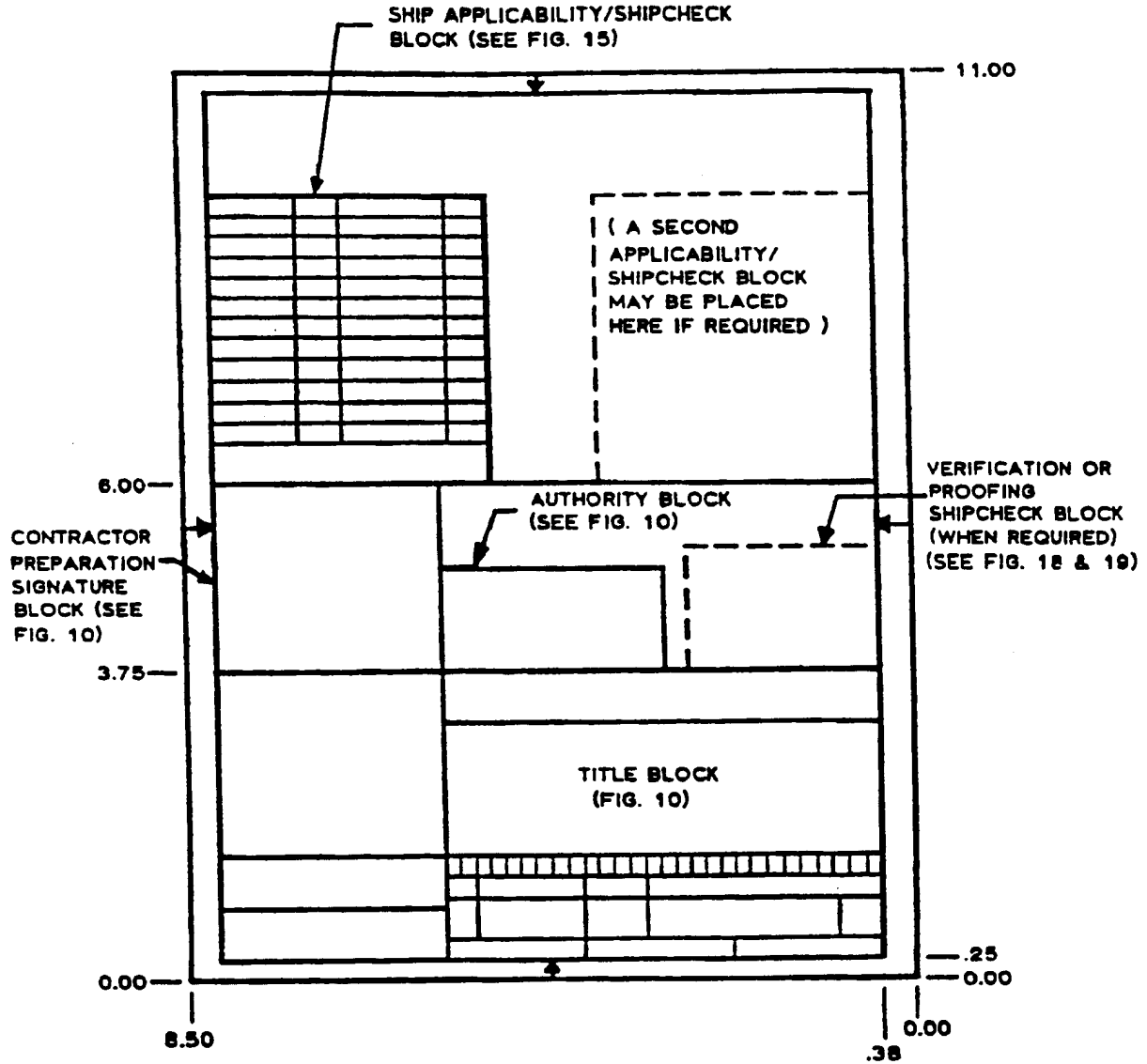
3.4.2.1 Drawing Sheet Sizes. Drawing sheet sizes shall be size "A", "B", "C", "D", or "F" as indicated in ANSI/ASME Y14.1. For specific drawings, such as some system diagrams which must be shown as one continuous drawing and will thereby exceed the length of a single size "F" sheet, "H" roll size sheets shall be utilized as described herein.

- a. Size "A" sheets shall be used where information is primarily text or is limited to notes and small sketches. Except for tabular type drawings (e.g. cable running sheets or

- engineering calculations), size "A" drawings will be generally limited to ten data sheets or less. All size "A" drawings exceeding ten sheets shall also include an index sheet.
- b. Size "B", "C" and "D" sheets shall be used for intermediate size drawings where the data is not appropriate for size "A" sheets and has insufficient information to justify size "F" sheets.
  - c. Size "F" drawings shall be used for most large drawings. Drawings which must be prepared as a single continuous drawing (not multiple sheets) such as some system drawings and deck drawings of large ships and will therefore exceed the length of size "F" sheets, shall be prepared as size "H" drawings.
  - d. Size "H" drawings shall only be used for drawings which must display information on one continuous sheet which would exceed the length of a single size "F" sheet or would be confusing if prepared as a multiple sheet drawing. This would include complex piping and wiring system diagrams, arrangements of flight and hanger decks, arrangements of antennas and deck machinery, power and lighting wiring deck plans for large ships, etc. Size "H" drawings shall be prepared as single, continuous, multi-frame drawings with no single frame exceeding 44 inches in length. The final frame shall be 11, 23, 33 or 44 inches in length. There shall be no second sheets for "H" size drawings: the title block shall always indicate the sheet number as "SHEET 1 OF 1".

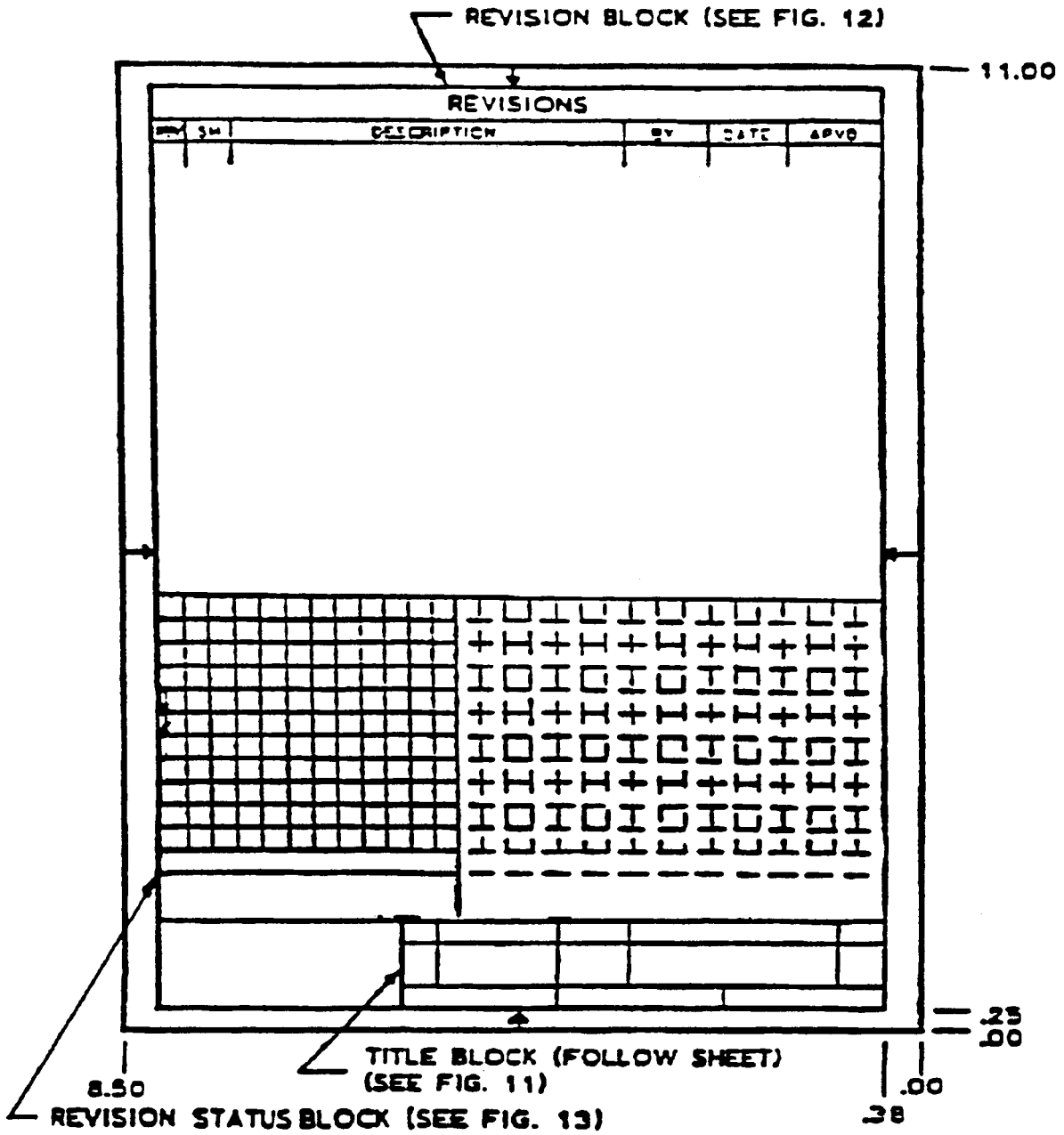
3.4.2.2 Drawing Sheet Formats. Figures 1 through 9 provide the basic drawing sheet formats to be used for non-nuclear NAVSEA drawings. In preparation of these formats, especially as reproducible format masters, the following guidance shall be utilized:

- a. **Margins.** The margin sizes shall be selected to permit reproduction of drawings on sheets that conform to this specification or international paper sizes.
- b. **Zoning.** Except for size "A" and "B" formats, all NAVSEA drawings shall include zones for reference purposes. Where used, zones are indicated by alphabetical and numerical entries in the format margins as indicated in figures 6, 7, 8 and 9. Horizontal zones on continuation sheets shall be lined in but not numbered as part of the format. (The numbering of zones on continuation sheets is provided as part of drawing preparation.)
- c. **Format Lettering.** The size and style of lettering printed on drawing formats shall be in accordance with ANSI/ASME Y14.2.
- d. **Format Lines.** Width of lines in format features shall conform to the following:
  1. Thick (approximately 0.030 in.) lines shall be utilized for borderlines, outlines of principal blocks and main division blocks.
  2. Thin (approximately 0.015 in.) lines shall be utilized for divisions of parts, material and equipment lists and revision and reference blocks, minor subdivisions of title blocks and supplementary blocks, and zone markers.



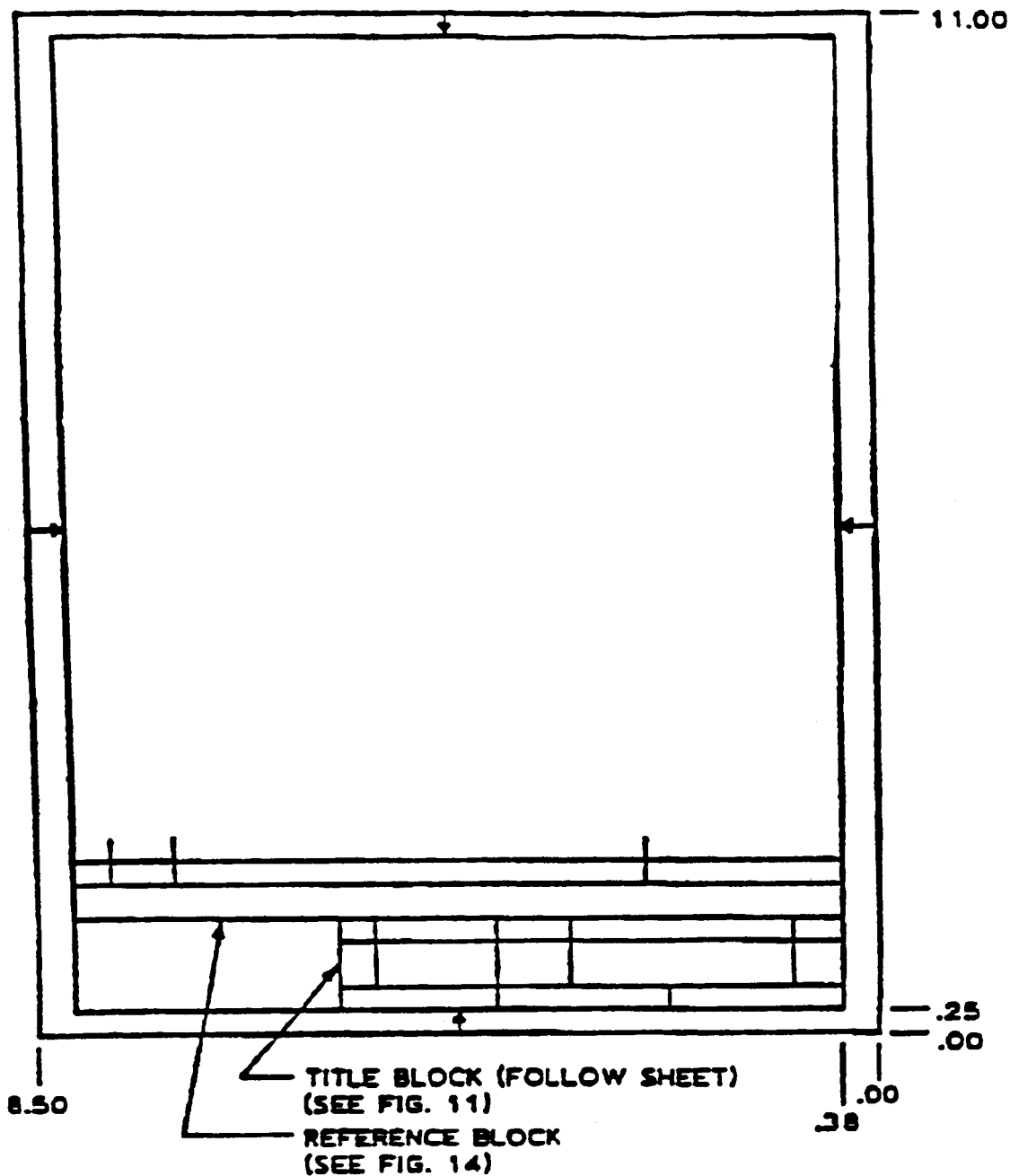
TITLE (FRONT) SHEET  
SIZE "A" FORMAT

FIGURE 1

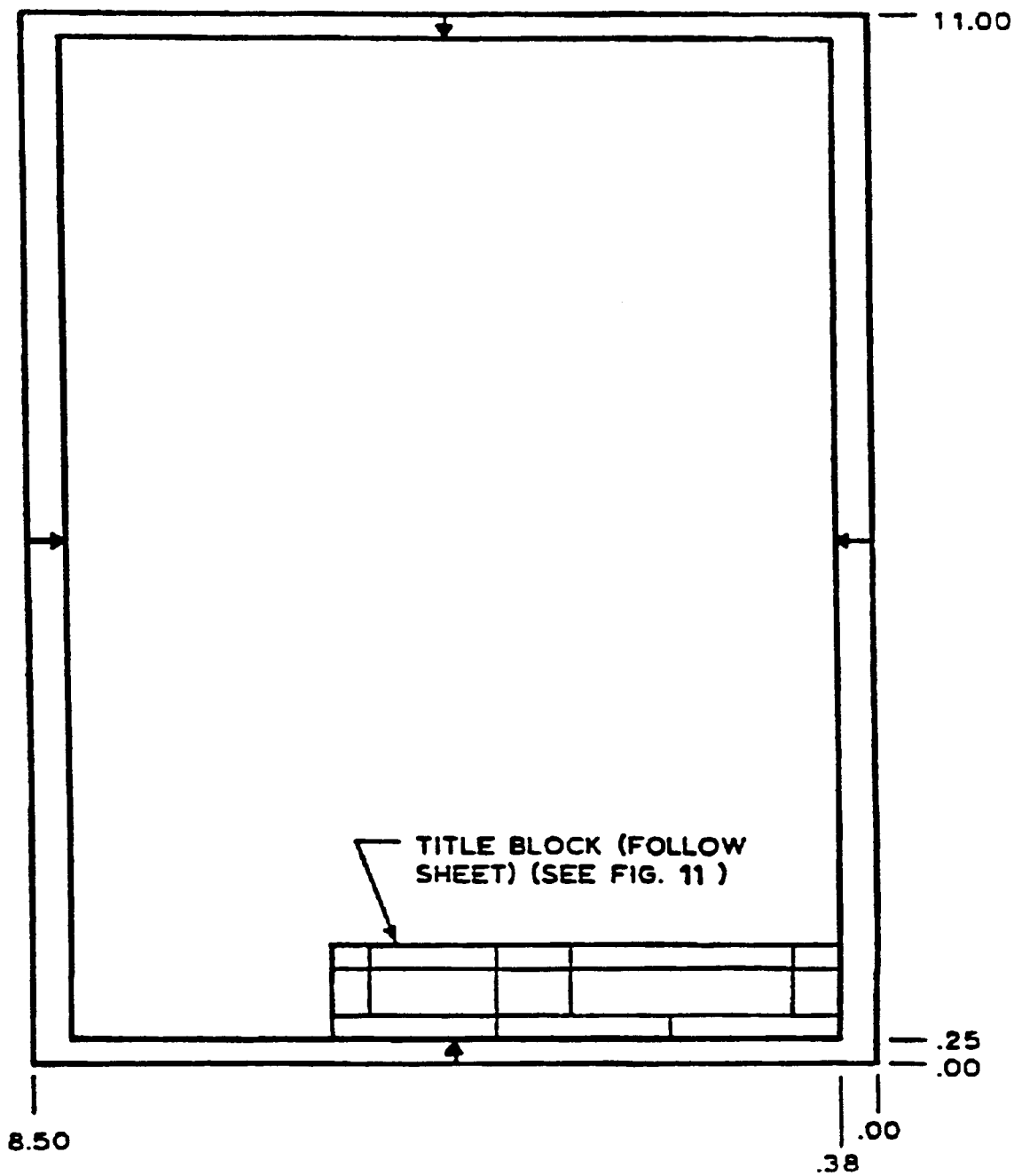


# REVISION DESCRIPTION SHEET SIZE "A" FORMAT

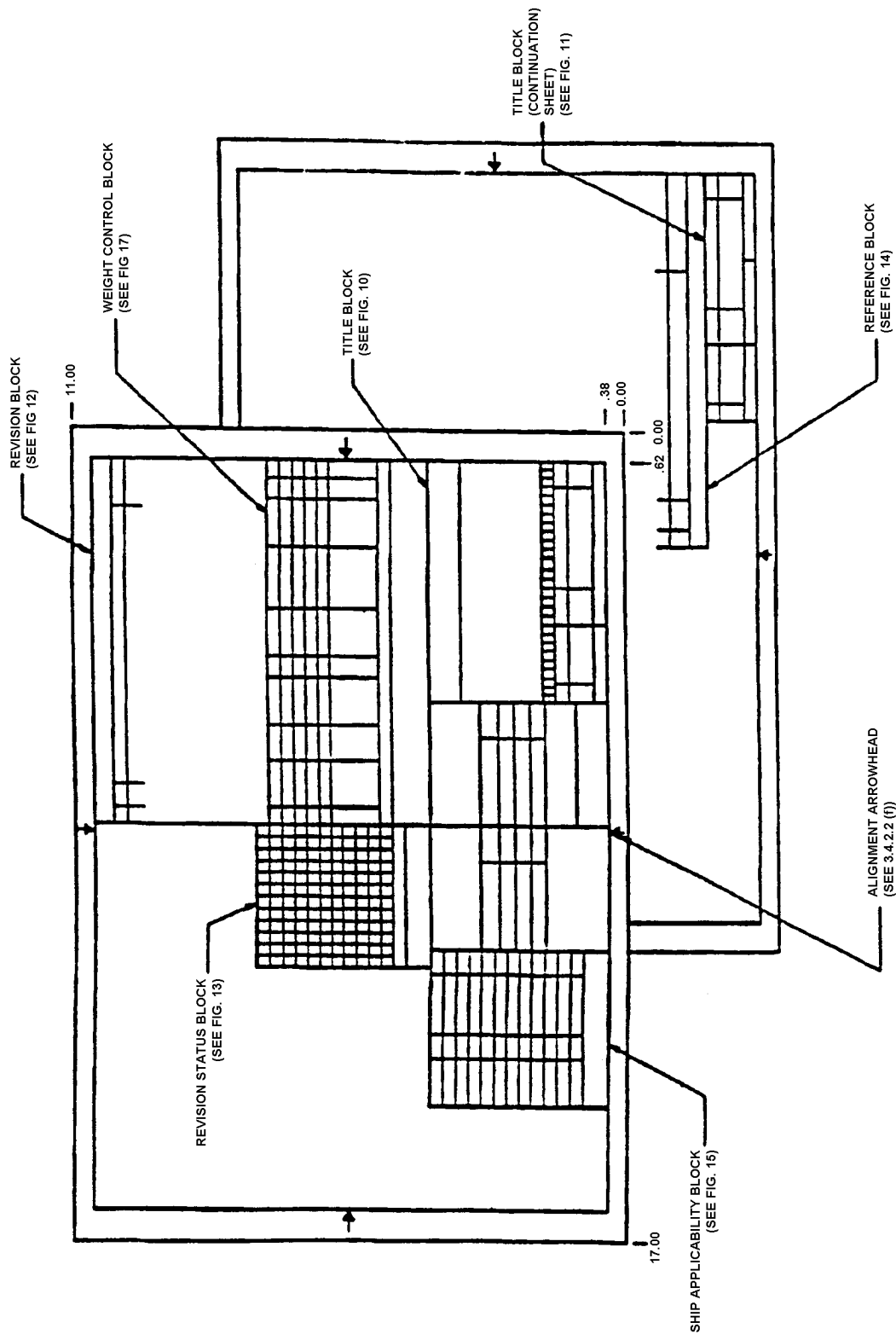
## FIGURE 2



REFERENCE AND REVISION STATUS  
SIZE "A" SHEET FORMAT  
FIGURE 3



INFORMATION SHEET  
SIZE "A" FORMAT  
FIGURE 4



SIZE "B" SHEET FORMAT

FIGURE 5

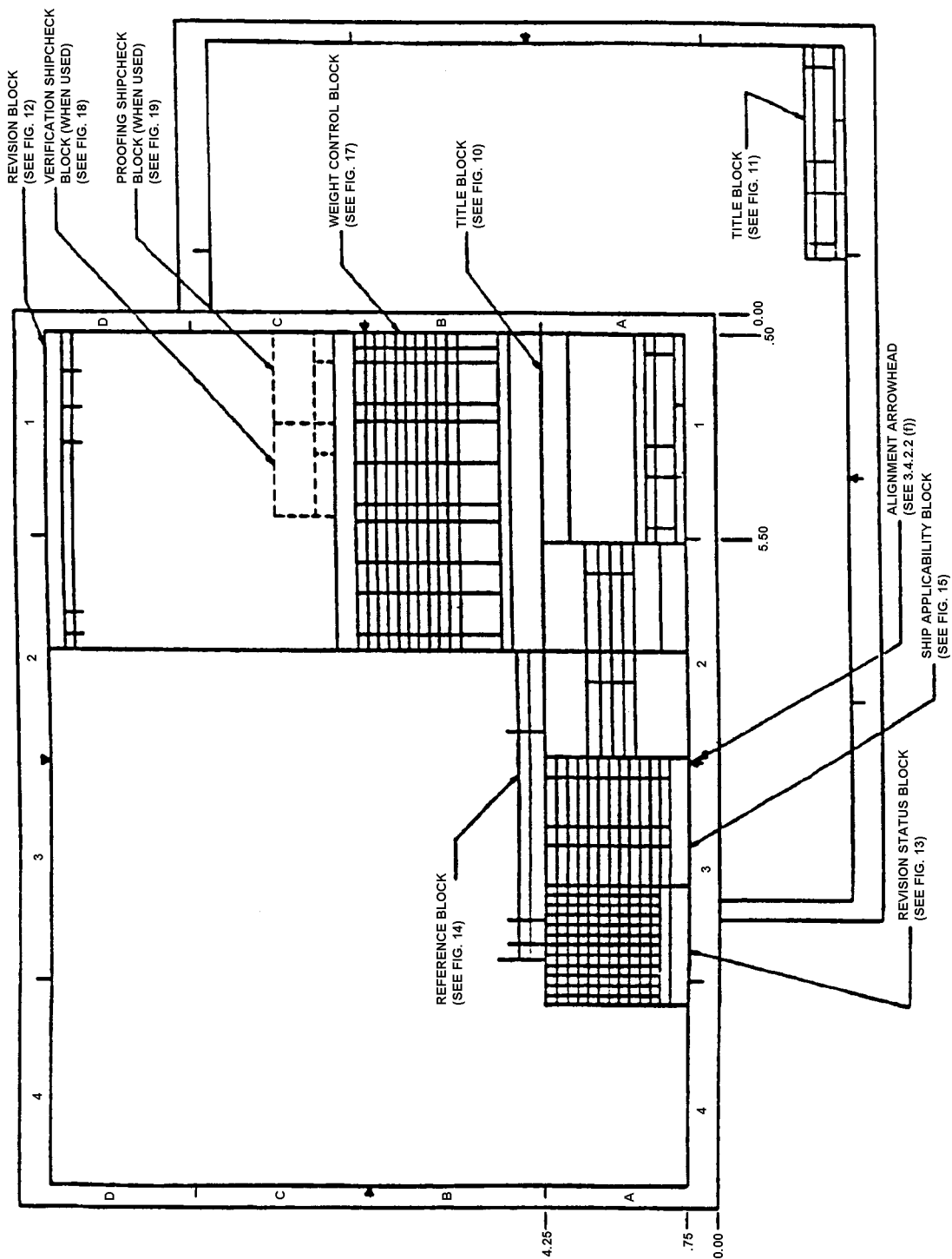


FIGURE 6

SIZE "C" SHEET FORMAT

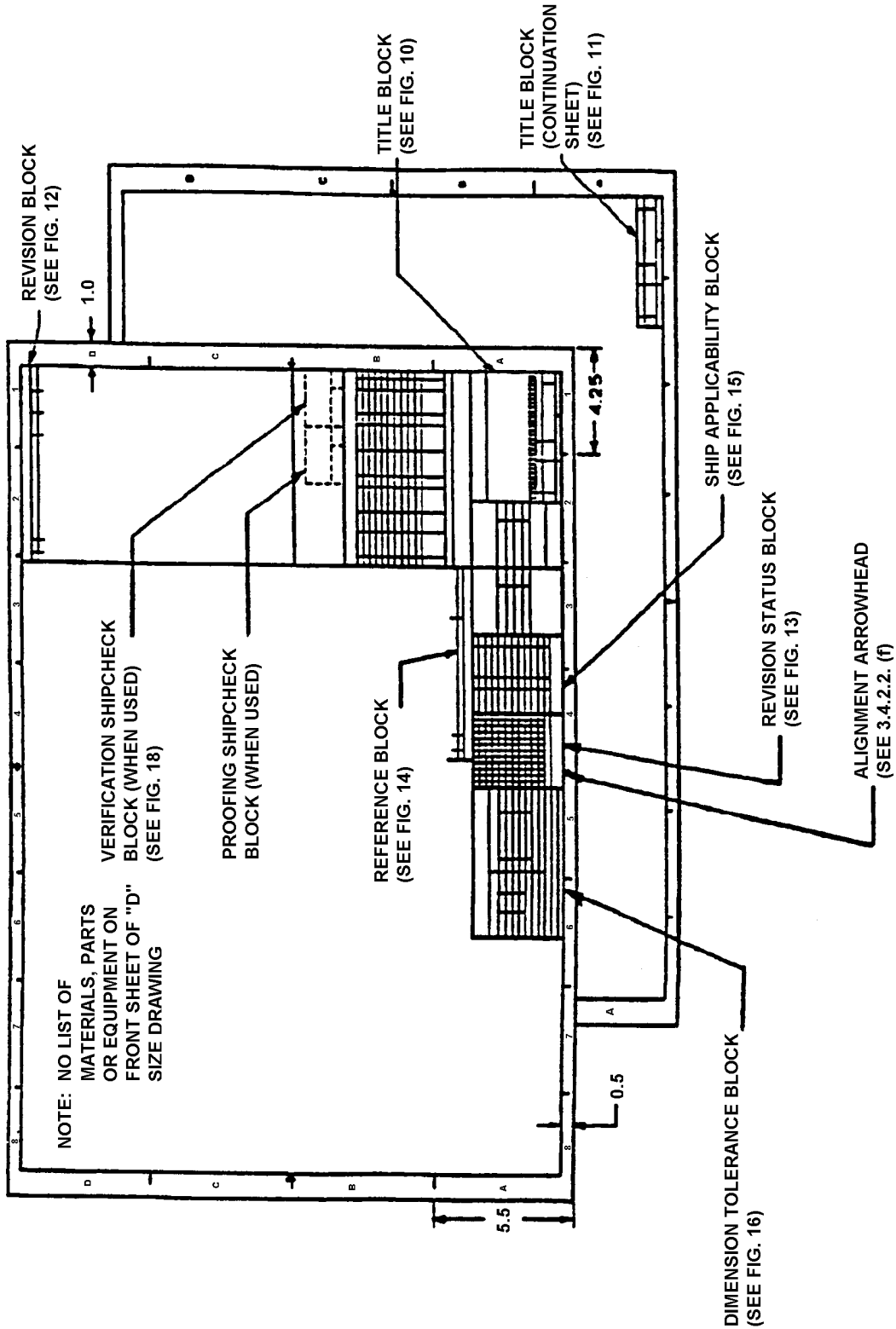


FIGURE 7

SIZE "D" SHEET FORMAT

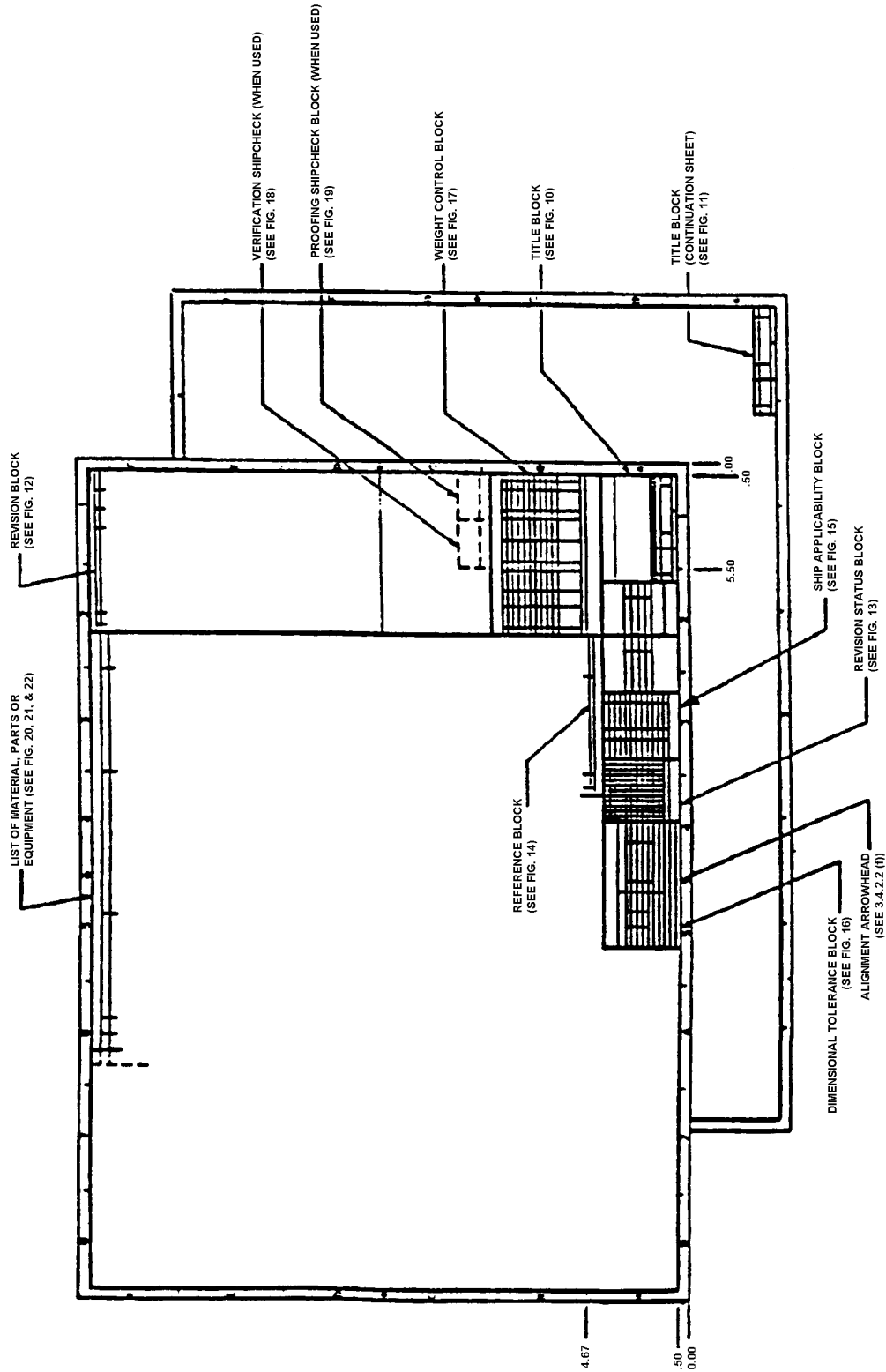


FIGURE 8

SIZE "F" SHEET FORMAT

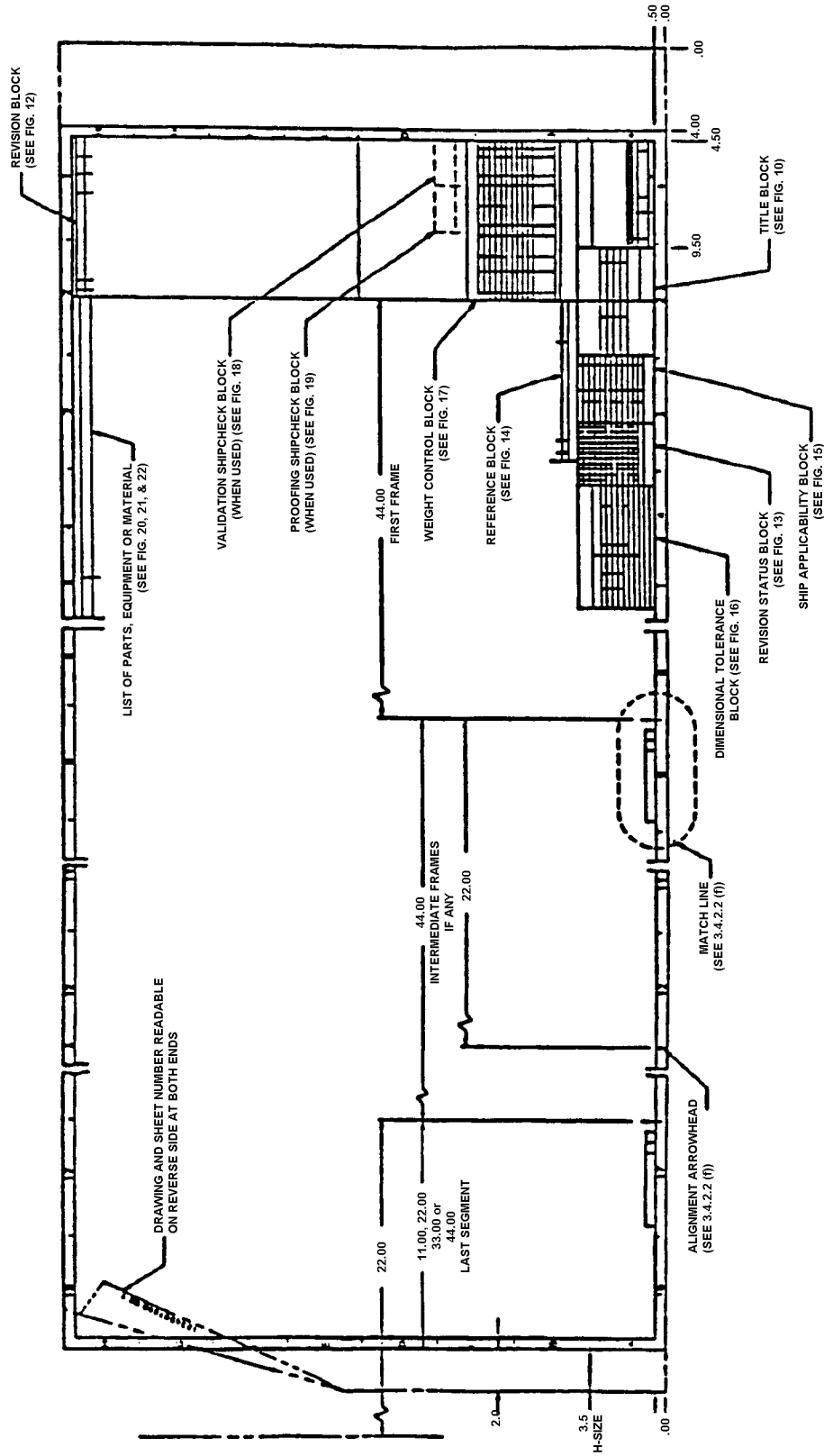
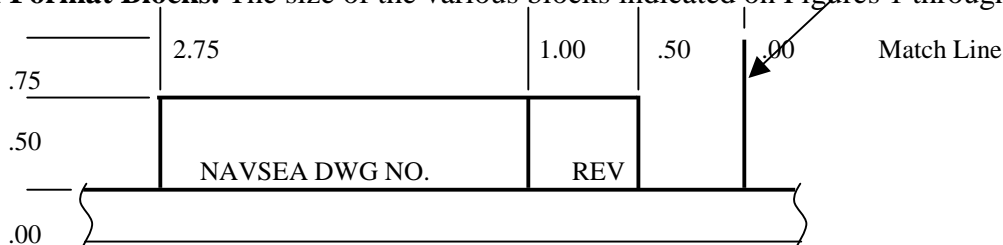


FIGURE 9

SIZE "H" DRAWING FORMAT

**Size of Format Blocks.** The size of the various blocks indicated on Figures 1 through 9 shall be



in accordance with 3.4.3 and Figures 10 through 22.

**3.4.3 Drawing Block Formats.** Drawing block formats shall be in accordance with the appropriate figures as follows:

- a. Title/signature block (front sheet) (Figure 10)
- b. Title block (continuation sheets) (Figure 11)
- c. Revision block (Figure 12)
- d. Revision status block (Figure 13)
- e. Reference list block (Figure 14)
- f. Applicability/shipcheck block (Figure 15)
- g. Dimensional tolerance block (Figure 16)
- h. Weight control block (Figure 17)
- i. Verification Shipcheck block (Figure 18)
- j. Proofing Shipcheck block (Figure 19)
- k. List of Parts block (Figure 20)
- l. List of Material block (Figure 21)
- m. List of Equipment block (Figure 22)

**3.4.4 Line Conventions and Lettering.** Line conventions and lettering shall be in accordance with the ANSI/ASME Y14.2.

**3.4.5 Multi and Sectional View Drawings.** Multi and sectional view drawings shall be in accordance with ANSI/ASME Y14.3. The application of space geometry and space analysis included as appendices in ANSI/ASME Y14.3 shall not be included in NAVSEA drawings unless otherwise specified in the contract or tasking documentation.

**3.4.6 Dimensions and Tolerance Levels.** Dimensions and tolerance levels of NAVSEA drawings shall be in accordance with ANSI/ASME Y14.5. Drawings shall utilize U.S. customary units (non-metric units) unless otherwise specified in the contract or tasking documentation (dual dimensions shall not be utilized). Use of fractional or decimal dimensions is left to the option of the Planning Yard, but shall be consistent throughout the drawing. Both decimal and fractional dimensions may be utilized on drawings that contain machining details (decimals) as well as structural/equipment/piping details (fractions). Graphic and architectural symbols specified in ANSI/ASME Y14.5 shall not be used. Requirements for these symbols are covered elsewhere in this specification.

**3.4.7 Abbreviations.** Abbreviations used on drawings shall be used only where the limitation of space or conservation of significant drafting time dictate. When required, abbreviations shall be

in accordance with ASME Y14.38. A note shall explain abbreviations not covered in this standard on the drawing.

3.4.8 Reference Designations. Reference designations for electrical and electronic equipment shall be in accordance with ANSI Y32.16.

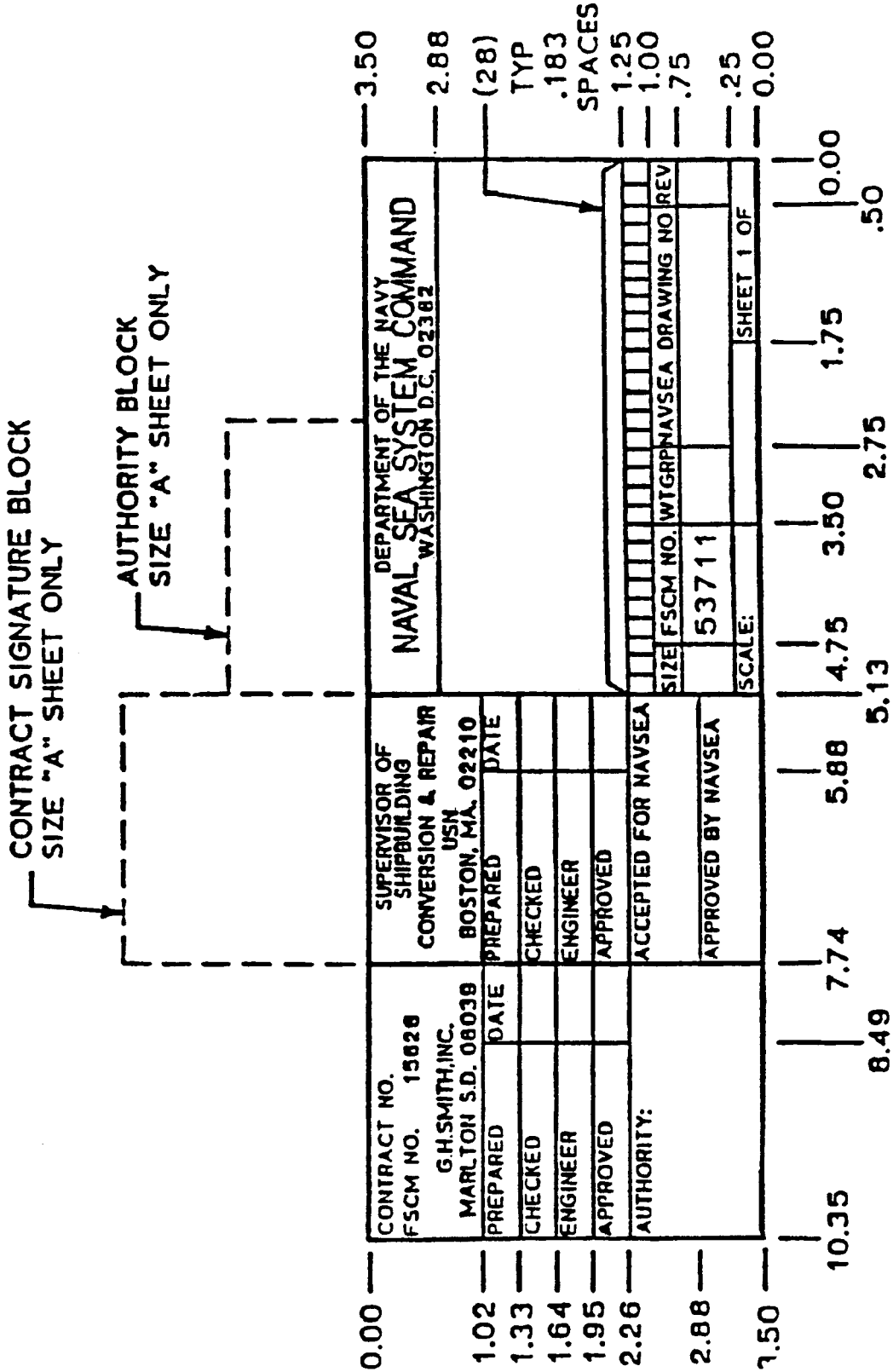


FIGURE 10

TITLE BLOCK (FRONT SHEET)

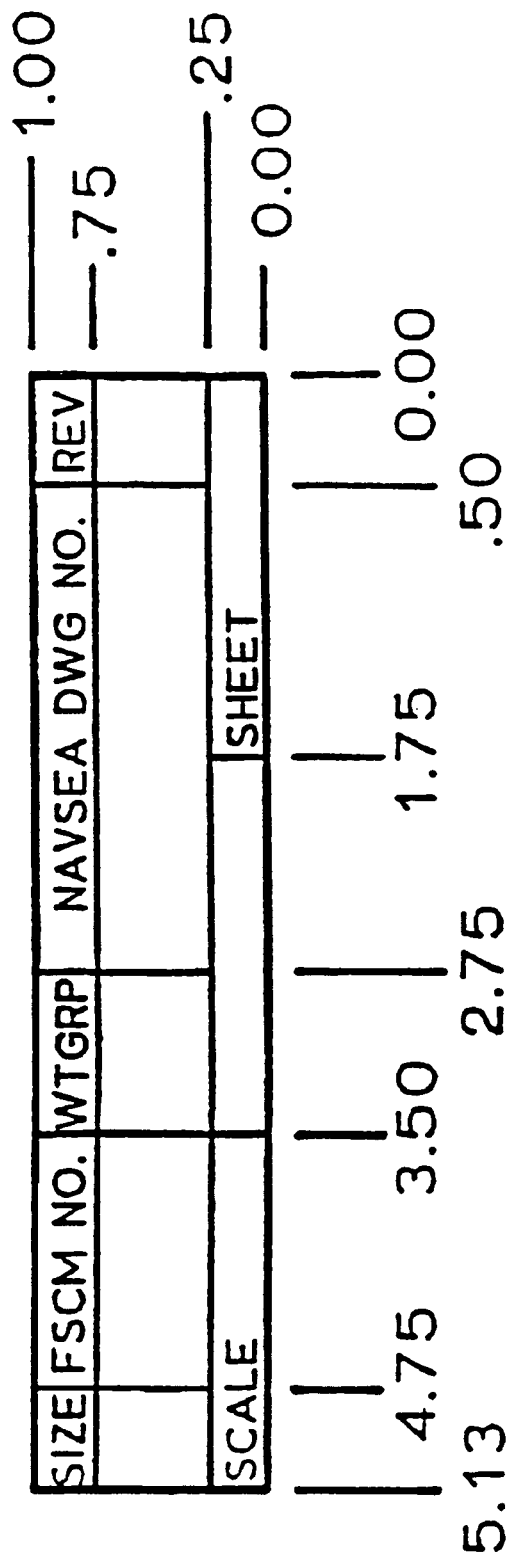


FIGURE 11

TITLE BLOCK CONTINUATION SHEETS

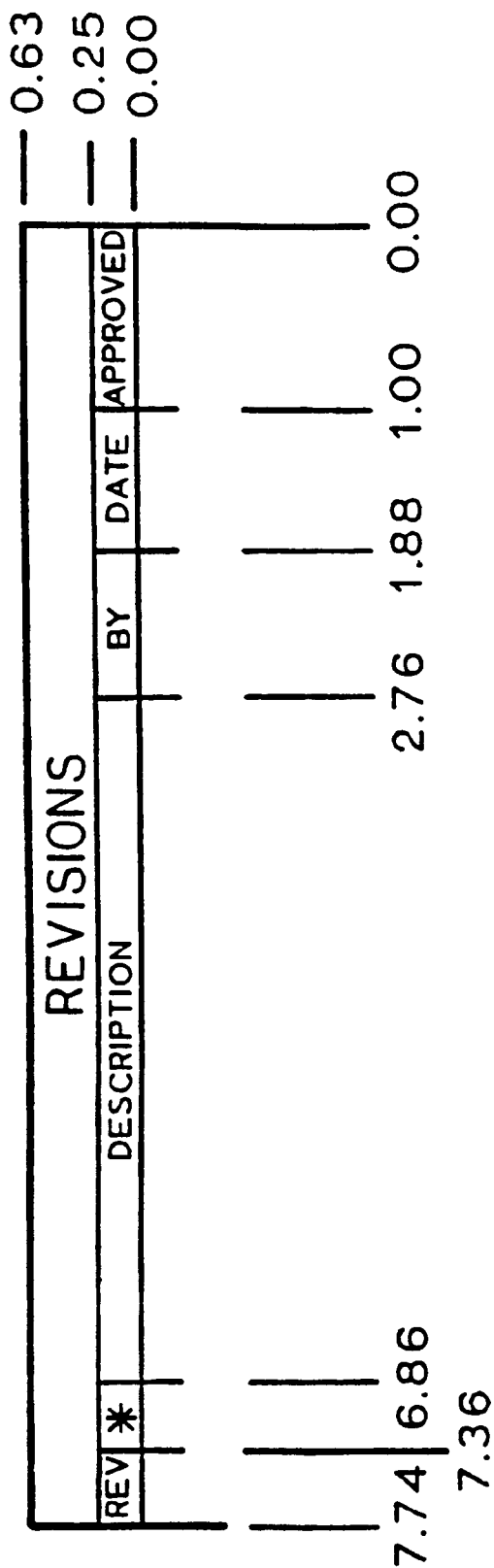


FIGURE 12

\* "SHEET" FOR SIZE "A" FORMATS  
 "ZONE" FOR SIZE "B"; "C"; "D"; "F" AND "H" FORMATS

REVISION BLOCK

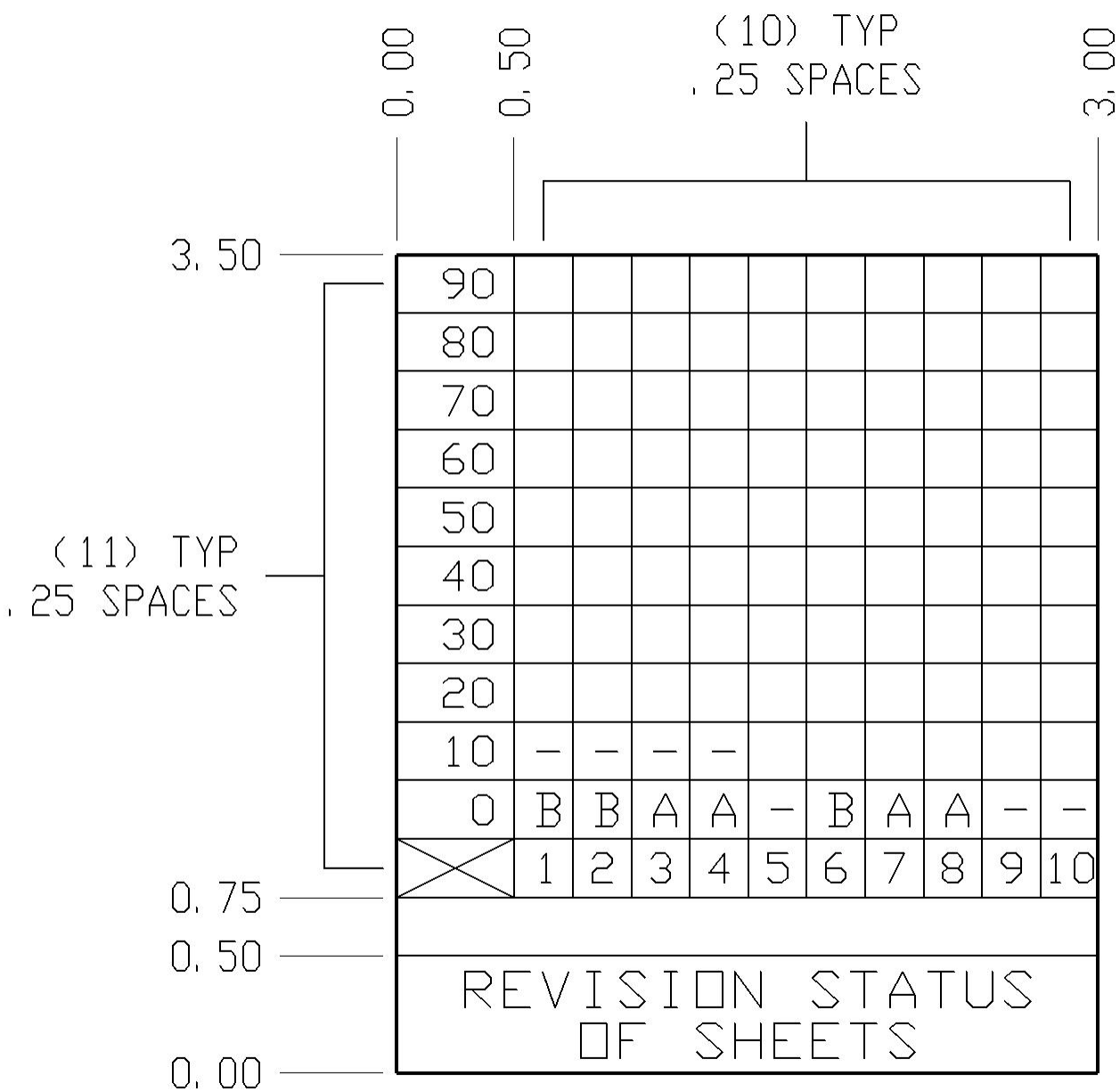


FIGURE 13

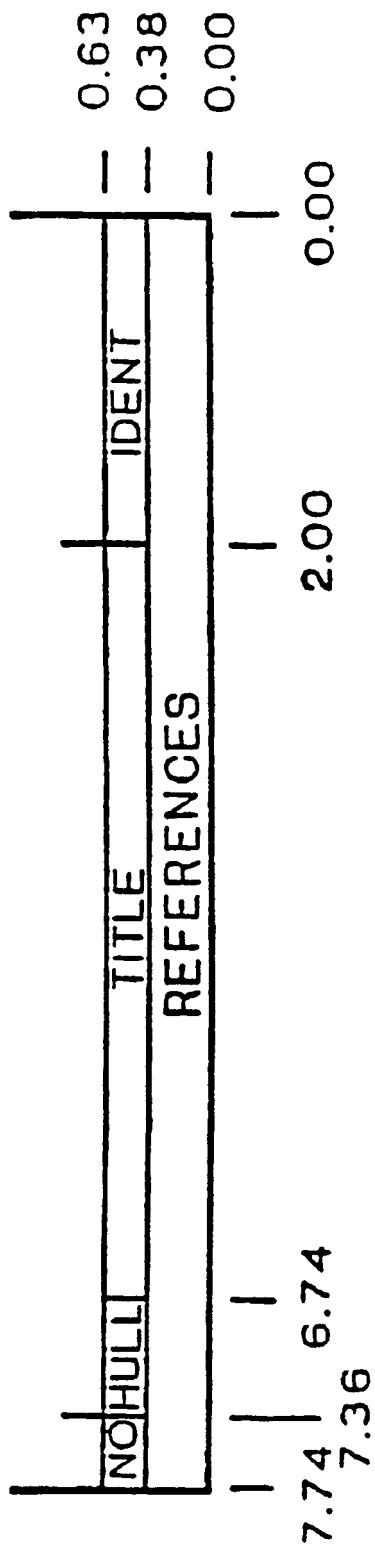


FIGURE 14

REFERENCE LIST BLOCK



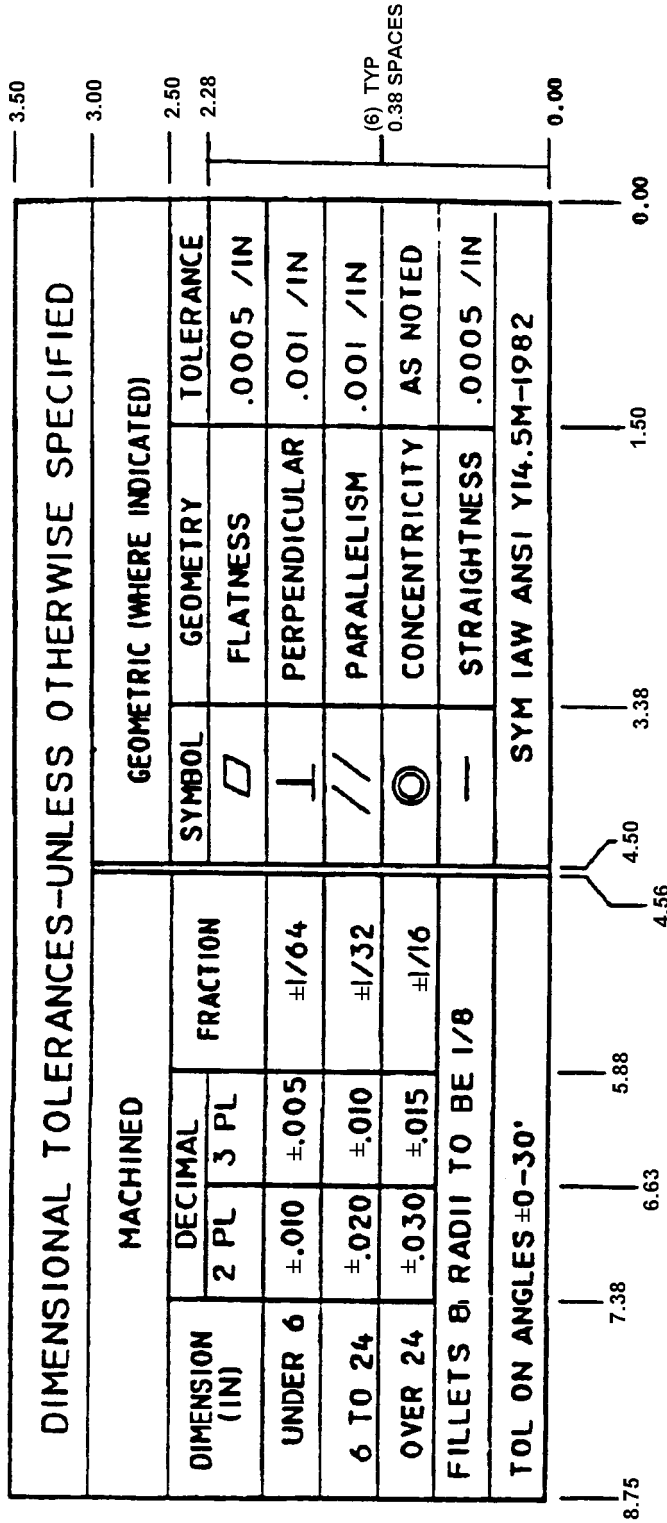
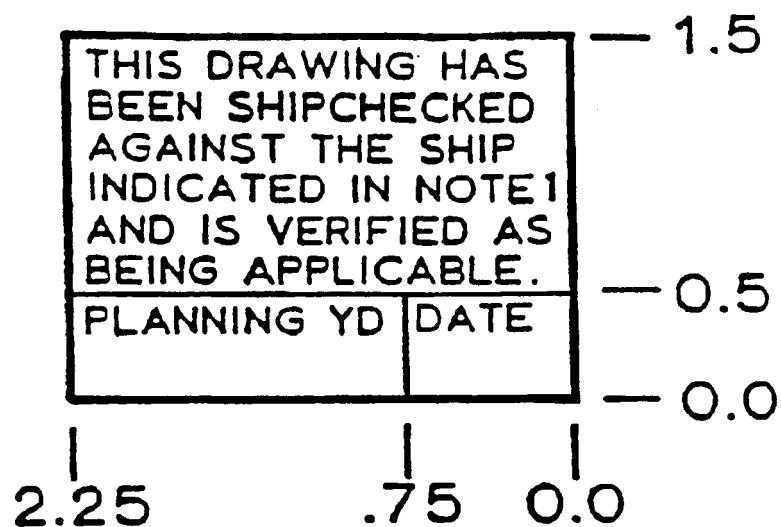


FIGURE 16

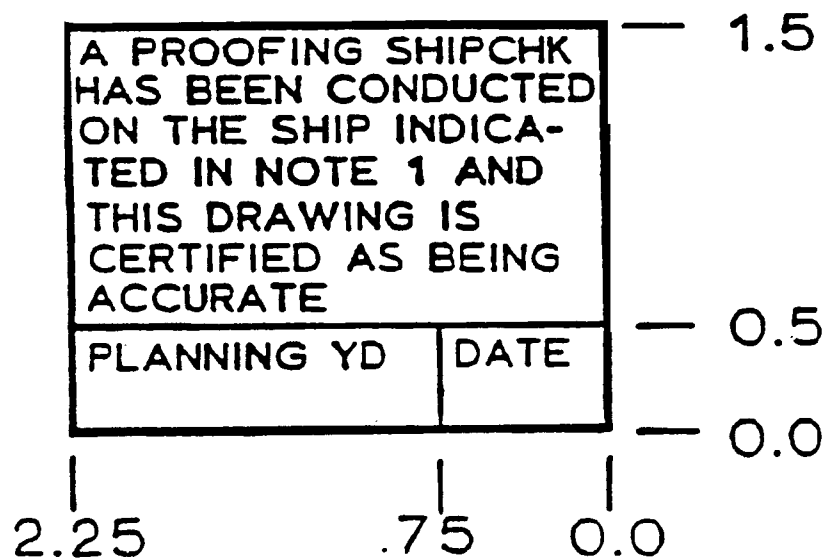
DIMENSIONAL TOLERANCE BLOCK





## VERIFICATION SHIPCHECK BLOCK

FIGURE 18



## PROOFING SHIPCHECK BLOCK

FIGURE 19

LIST OF PARTS FOR ONE ASSEMBLY

S/A NO.	ITEM NO.	QTY	DESCRIPTION	MATERIAL SPECIFICATIONS	MATERIAL RECT	NSN OR MF OR PART NO	SCE	A/L NO.	UNIT WT	REMARKS
20.75										
20.00										
19.25										
18.50										
13.50										
11.50										
10.25										
8.25										
7.75										
6.25										
5.50										
0.0										

FIGURE 20

LIST OF PARTS





**TABLE 1**  
**MINIMUM LETTER HEIGHTS FOR DRAWINGS**  
**(Extracted from ANSI/ASME Y14.2)**

USE	INCH (FREEHAND)	INCH (CAD)	DRAWING SIZE
Drawing Number in Title Block	5/16 (.312)	.290	Larger than 'C'
	1 / 4 (.250)	.240	'C' or Smaller
Drawing Title	1 / 4 (.250)	.240	All
Section and Tabular Letters	1 / 4 (.250)	.240	All
Zone Letters and Numerals in Borders	3/16 (.188)	.175	All
Dimensions, Tolerances, Limits, Notes, Subtitles for Special Views, Table, Revision, and General Lettering for the Body of the Drawing	5/32 ** (.156)	.120 *	'C' or Smaller
	5/32 ** (.156)	.140	Larger than 'C'

\* For CAD or computer generated lettering, .120" lettering is permitted; otherwise .140" lettering shall be the minimum letter height permitted.

\*\* In variance with ANSI/ASME Y14.2

3.4.9 Type Designations. Equipment type designations used on drawings shall conform to MIL-STD-196 for electronics equipment or other appropriate documents for other types of equipment (see DOD-STD-100).

3.4.9.1 Equipment Subdivisions. Equipment subdivisions shall be in accordance with MIL-HDBK-505.

3.4.10 Hull, Structural and Mechanical Graphic Symbols. Hull, structural and mechanical graphic symbols for use on all NAVSEA drawings shall be as follows:

- a. Structural graphic symbols shall be in accordance with MIL-STD-25.
- b. Welding graphic symbols shall be in accordance with MIL-STD-22 and ANSI/AWS A2.4. In case of conflict between these specifications, MIL-STD-22 shall take precedence.
- c. Fluid power graphic symbols for diagrammatic drawings shall be in accordance with ANSI/ASME Y32.10.

- d. Pipe fitting, valve and piping graphic symbols for diagrammatic drawings shall be in accordance with NAVSEA Dwg. No. 803-5001049, except for fluid power systems (see 3.4.10(c)).
- e. Heating, ventilation and air conditioning graphic symbols for diagrammatic drawings shall be in accordance with ANSI Y32.2.4.

3.4.11 Electrical and Electronic Graphic Symbols. Electrical and electronic graphic symbols for schematic diagrams shall be in accordance with ANSI/ASME Y32.2. Symbol numbers, where used for standard electrical equipment, shall be in accordance with MIL-HDBK-290.

3.4.12 Security Classification. Security classification for drawings shall be marked in accordance with SECNAVINST 5510.30 and SECNAVINST 5510.36.

3.4.13 Drawing Scale. Drawing scale, where utilized, shall be indicated using the architectural method (example: 1/2" = 1'-0, 6" = 1'-0) in lieu of the fractional method. To allow for overlaying and ease of interference control, drawings for the same SHIPALT shall, where feasible, be drawn to the same scale for drawings such as arrangements, foundations, ventilation, piping, etc. As an option, each sheet may have a bar scale (graphic scale) for each scale-utilized on that sheet. Bar scales shall show both vertical and horizontal dimensions.

3.4.13.1 Arrangement Scale. General and Machinery Arrangement drawing scales shall be not less than 1/4" = 1' 0".

3.4.14 Drawing Materials. Materials used in the preparation of NAVSEA drawings shall be of the type and quality that will assure legibility and reproducibility.

3.4.15 Final Drawings. Final drawings, whether an original tracing or an electronic file, must show all required approvals. For electronic drawing files, per NAVSEA guidance, a signature can be signified with '/s/' after the typed name of the signer.

3.4.16 Revisions and Modifications to and Superseding of Existing Drawings. Existing drawings, defined as those final drawings whose final copies are held by the Planning Yard, can be affected by design developed for SHIPALTs. All changes to existing drawings shall be in accordance with DOD-STD-100. The following criteria shall be utilized to determine the level of change required:

- a. **Drawing Revisions**. A revision of an existing drawing is authorized if all of the following conditions are met:
  1. The Master File Drawing (or 'as issued' electronic file) is held by the Planning Yard and reproduction quality is acceptable.
  2. Less than 25% of the existing drawing is affected.
  3. The revision will clearly show changes caused by the SHIPALT without loss of essential information that describes ships which have not completed the SHIPALT or are not applicable to the SHIPALT. (Use of cross-hatching over original information shall not be permitted unless the information is only applicable to one ship. Except for corrections, erasing or removal of original information shall not be permitted.)

- b. **Modification Drawing.** A modification drawing, defined as a drawing that, by modification of an existing drawing, defines the total change required for accomplishment of the SHIPALT. Preparation of a modification drawing is authorized when both of the following conditions are met:
1. The Master File Drawing is not available or a revision of the existing drawing would cause confusion.
  2. Less than 25% of the existing drawing is affected.
- c. **Superseding Drawing.** A superseding drawing, defined as a drawing that takes the place of and cancels an existing drawing, is authorized when more than 25% of an existing drawing is changed by a SHIPALT. The superseded drawing shall have a supersedure note added and shall be retained by the Planning Yard.

3.4.17 General Notes. Each drawing shall have general notes to explain its purpose and provide general information on procedures and methods of installation (not local process instructions), welding criteria, surface preparation and painting, etc. These notes are also used to provide cautionary and safety information and to bring attention to special controls or requirements imposed on the drawing or the work to be accomplished by the drawing. All notes shall be clear, concise and complete sentences. The notes provided herein shall apply to all drawings developed in accordance with this specification. Other notes which may be required shall be as specified by NAVSEA 0902-018-2010, NAVSEA SA9AA0-AB-GOS-010, or other documentation invoked by the contract or tasking documentation, or by the Planning Yard as determined during development of the drawing.

3.4.17.1 The first general note on all BACDs shall read as follows:

*"(1) THIS IS A BASIC ALTERATION CLASS DRAWING FOR ACCOMPLISHMENT OF SHIPALT \_\_ REV \_\_. IT WAS PREPARED BASED ON A SHIPCHECK OF USS (Ship Name and Hull Number). AN APPLICABILITY SHIPCHECK (IS/IS NOT) REQUIRED PRIOR TO ITS USE ON OTHER SHIPS"*

3.4.17.2 The first general note on all SADs shall read as follows:

*"(1) THIS IS A SUPPLEMENTAL ALTERATION DRAWING FOR ACCOMPLISHMENT OF SHIPALT \_\_ REV \_\_. IT WAS PREPARED BASED ON A SHIPCHECK OF USS (Ship Name and Hull Number). THIS DRAWING MODIFIES/REPLACES REF (Parent BACD) FOR (Hull Number(s)) ONLY FOR ACCOMPLISHMENT OF THIS SHIPALT. AN APPLICABILITY SHIPCHECK (IS/IS NOT) REQUIRED PRIOR TO ITS USE ON OTHER SHIPS."*

3.4.17.3 The first general note on all Expanded Planning Yard SHIPALT drawings shall read as follows:

*"(1) THIS DRAWING WAS DEVELOPED FOR ACCOMPLISHMENT OF SHIPALT(S) \_\_ REV \_\_. BASED ON A SHIPCHECK OF THE USS (Ship Name and Hull Number). AN APPLICABILITY SHIPCHECK (IS/IS NOT) REQUIRED PRIOR TO ITS USE ON OTHER SHIPS."*

3.4.17.4 The second general note on all drawings shall read as follows:

*"(2) THIS DRAWING IS BASED UPON THE REQUIREMENTS OF (NAVSEA 0902-018-2010 or S9AA0-AB-GOS-010 or other specification as applicable and provide effective date or revisions as appropriate) WHOSE PROVISIONS SHALL PREVAIL IN AREAS WHERE THIS DRAWING IS SILENT."*

3.4.17.5 The third general note on all drawings shall read as follows:

*"(3) EXCEPT WHERE OTHERWISE NOTED OR APPROVED BY NAVSEA, THE EFFECTIVE DATE OF FEDERAL OR MILITARY SPECIFICATIONS, PUBLICATIONS AND STANDARD/TYPE DRAWINGS AND REVISIONS AND CHANGES THERETO SHALL BE THE EFFECTIVE DATE OF (NAVSEA 0902-018-2010 or S9AA0-AB-GOS-010). LATER SPECIFICATION REVISIONS MAY BE USED PROVIDED THAT THEY MEET THE INTENT AND INTERFACE REQUIREMENTS OF THE SPECIFICATION INVOKED FOR THE SPECIFIC AVAILABILITY."*

3.4.17.6 If the engineering data required by 3.5.10.7 are not an integral part of the drawing, the fourth general note on all drawings shall read as follows:

*"(4) ENGINEERING DATA SUPPORTING THIS DRAWING IS FOUND ON REF\_\_." (The drawing which contains the supporting data shall be the corresponding reference listed in the List of References.)*

3.4.18 Test Notes. Test notes are to be placed on all drawings which install or alter structure, systems or equipment that require testing. The notes shall specify the type of test to be performed and the test criteria to be used. Test notes shall be separated from the general notes.

3.4.19 Modification/Supersedure Notes. All SHIPALT drawings shall contain a modification/supersedure note which states whether or not a drawing is being modified or superseded. One of the following notes shall be conspicuously placed to the left of the title block:

- a. *"THIS DRAWING MODIFIES REF \_\_ FOR APPLICABLE SHIPS UPON ACCOMPLISHMENT OF SHIPALT\_\_REV\_\_"*
- b. *"THIS DRAWING SUPERSEDES AND CANCELS REF \_\_ FOR APPLICABLE SHIPS UPON ACCOMPLISHMENT OF SHIPALT\_\_REV\_\_."*
- c. *"THIS DRAWING MODIFIES NO KNOWN DRAWING. "*

3.4.20 Drawing Submittal and Approval. SHIPALT drawings not developed by the cognizant Planning Yard will be submitted to the Planning Yard for review and approval prior to execution.

3.4.20.1 Submittal of Drawings for NAVSEA Approval. Drawings requiring approval by NAVSEA will be specified by the SHIPALT(s) designated in the contract or tasking documentation. Prints of the proposed final drawings shall be marked PRELIMINARY and submitted to NAVSEA for review and approval. (If there are drawing original tracings, they shall remain in the custody of the Planning Yard and shall not be forwarded to NAVSEA.) Two drawings prints shall be submitted to the designated NAVSEA Ship's Logistic Manager (SLM). Drawing submitted for approval shall be accompanied by a transmittal document identifying the drawings submitted, applicable SHIPALT(s), and the applicable contract or task number.

3.4.20.1.1 Proposed Departure(s) From Specifications. The Planning Yard shall request approval of any proposed departure(s) from specifications, contracts or tasking documentation as soon as possible. When the request is made concurrent with drawing submittal, it shall be accomplished by calling specific attention to the proposed departure(s) in the transmittal letter. In either case, the request for proposed departure(s) shall be submitted in accordance with

NAVSEA 0902-018-2010 or NAVSEA S9AA0-AB-GOS-010. Approved departure(s) shall be listed on the drawing(s).

3.4.20.1.2 Resubmittal of Drawings. When drawings are disapproved, the reviewer may require resubmittal of the corrected drawings

3.4.20.1.3 Previously-approved Drawings. Drawings previously approved by NAVSEA will not require further NAVSEA approval unless revisions which change technical design details are made to the drawing (revisions which add ship applicability or correct reference listing, stock numbers, etc., and do not change technical design details will not require further NAVSEA approval).

3.4.20.1.4 Review and Comment. Where the applicable SHIPALTs do not specify the need for specific NAVSEA drawing approval as indicated in Section 4, NAVSEA may desire to review the Planning Yard's effort and may elect to comment thereon. The Planning Yard's authority to proceed will not be made contingent upon such review. Any comment made as a result of the review shall not be construed as indicating approval (or disapproval). Such comments will be limited to directing attention to possible departures from specified requirements. In most cases, a formal reply or notification of actions taken by the Planning Yard will not be required, except for reviews conducted in accordance with Section 4.

3.4.21 Drawing Distribution. Except for the general distribution of drawings made by the Naval Engineering Drawing Support Activity, the distribution of SHIPALT drawings shall only be made by and shall be controlled by the cognizant Planning Yard as directed by the contract or tasking documentation. Except as otherwise specified in the contract or tasking documentation, the type of drawing copy distributed shall be as follows:

3.5 Content and Format. Content and format of NAVSEA drawings shall be as specified herein.

3.5.1 General.

3.5.1.1 Product Drawings. All NAVSEA drawings shall be prepared as product drawings and associated lists as defined by MIL-DTL-31000 except as specified herein and in contract or tasking documentation.

3.5.1.2 New drawing number. When preparing a drawing, if a major portion is developed by reproducing an existing drawing, upgrading to this specification is not required. However, a new NAVSEA drawing number shall be assigned and a new title block (see 3.4.3) shall be applied. All new and revised drawings shall be processed to achieve the requirement of Master File Drawings (see 3.4.14.2).

3.5.1.3 Separate views and notes. Where drawings are specifically applicable to more than one ship, separate views and notes shall be utilized to reflect minor differences. Views and notes which are associated with a specific ship (or ships) shall be clearly identified as such and grouped together on the drawing(s) insofar as possible.

3.5.2 Level of Detail. The installation design shall be final, complete and accurate to allow installing activities to accomplish the industrial work involved without additional design work. Drawings shall be as self-sufficient as practicable; for example, to the maximum extent possible they shall include rather than reference information given on reference drawings (other than SHIPALT drawings for that SHIPALT and Standard or Type drawings).

3.5.3 Drawing Types. As specified in the contract or tasking documentation, final drawing shall consist of the following types of drawings, as applicable, and shall meet all requirements of this specification:

- a. Hull/Structural drawings (see 3.5.6)
- b. Machinery, piping and heating, ventilation and air conditioning (HVAC) drawings (see 3.5.7)
- c. Electrical/electronic drawings (see 3.5.8)
- d. Arrangement drawings (see 3.5.9)
- e. Removal drawings (see 3.5.10)
- f. Support drawings (see 3.5.11)

3.5.4 Data Elements. As specified in the contract or tasking documentation, final drawings (see 3.4.15.2) shall contain the following data elements, formatted as specified herein:

3.5.4.1 Title Block (Front Sheet). Front sheet title blocks shall be in accordance with 3.4.3 and as follows:

- a. Show drawing titles in the following form:  
SHIPALT DESIGNATION(S)  
AND APPLICABLE SHIP  
CLASS (OR INDIVIDUAL SHIP): (SHIPALT SSN1561 - SSN 637 CL)  
SYSTEM DESIGNATION: (60HZ AC POWER DISTR)  
TYPE OF DRAWING: (MOD TO WIRING DECK PLAN)
- b. An abbreviated title (not to exceed 28 characters, including spaces) shall be entered in the series of blocks between the title and the drawing identification blocks. (The SHIPALT and ship identification may be omitted from the abbreviated title.)
- c. The drawing sheet size (see 3.4.2) shall be entered in the drawing identification block marked *SIZE*.
- d. In accordance with NAVSEAINST 9085.2, the Commercial and Government Entity (CAGE) code CAGE number 53711 shall be placed in the drawing identification block marked *CAGE NO.* on all NAVSEA drawings.
- e. The weight group number (located in S9040-AA-IDX-010/SWBS5D) applicable to the drawing shall be placed in the drawing identification block marked *WT GRP*. (The weight group system chosen shall be the same as originally used on the new construction drawings for the applicable class of ships.)
- f. Each NAVSEA drawing shall have a unique drawing number assigned in accordance with NAVSEAINST 9085.2. This unique number shall be placed in the drawing identification block marked *NAVSEA DWG NO.*
- g. The latest revision of the drawing shall be indicated in the drawing identification block marked *REV*. The initial drawing issue shall be indicated as revision "-" and

- the first change to the drawing shall be revision "A". Subsequent revisions shall be indicated as revisions "B", "C", "D", etc., in alphabetic sequence. Numeric ("1", "2", etc.) Or alphanumeric ("A1", "4B", etc.) designators shall not be used for revisions of NAVSEA drawings.
- h. The scale of the drawing (not just of the first sheet) shall be indicated in the block marked *SCALE*. On drawings where more than one scale is used, the block shall indicate *AS SHOWN*. On drawings which are not to any particular scale, the block shall indicate *NONE*.
  - i. The block marked "SHEET 1 OF" shall indicate the total number of sheets in the drawing ("SHEET 1 OF 5" for a five sheet drawing).
  - j. The identification and signature blocks to the left of the main title area and above the *ACCEPTED FOR NAVSEA* block are for use by the Naval activity assigned the responsibility for the drawing, normally the Planning Yard. The complete name, address and CAGE number (from DOD Handbook H4-1/H4-2) of the activity responsible for the drawing shall be placed in the area above the signature/date blocks. The preparer (CAD operator), the drawing checker, the cognizant engineer and the approving official shall sign and date the appropriate blocks below the activity name and address. Per 3.4.15, the electronic files shall include the typed name and '/s/' to show who signed the drawing. (The Signature Blocks may be modified to include Code and Phone Number if desired.) These blocks shall be filled in on all NAVSEA drawings which are ready for issue even when the drawing is prepared by another activity (except the *PREPARED* block which shall be lined out or filled in with the preparing activity name).
  - k. For those drawings prepared by activities other than the Planning Yard, an appropriate Planning Yard official shall sign and date *the ACCEPTED FOR NAVSEA* block after review and approval of the drawing by the Planning Yard (or other activity responsible for the drawing). (If the drawing is prepared by the Planning Yard, this block may be crossed out, corner to corner.)
  - l. For those drawings which are required to be approved by NAVSEA, the document which provides specific NAVSEA approval of the drawing shall be referenced in the *APPROVED BY NAVSEA* block. (No actual signature shall be placed in this block.) For those drawings not requiring NAVSEA approval, *NOT REQUIRED* shall be entered in this block.
  - m. The identification and signature blocks to the left of the Naval activity block and above the *AUTHORITY* block (above the Naval activity block on "A" size formats) are for the use of the activity actually preparing the drawing if other than the Planning Yard (or other activity responsible for the drawing). The complete name, address and CAGE number (from DOD handbook H4-1/H4-2) of the non-Planning Yard activity preparing the drawing (and contract number, if applicable) shall be placed in the area above the signature/date blocks. The preparer (CAD operator), the drawing checker, the cognizant engineer and the approving official shall sign and date the appropriate blocks below the activity name and address. (If the Planning Yard prepares the drawing, this block may be crossed out, corner to corner.)
  - n. The *AUTHORITY* block below the non-Planning Yard signature block (to the right of the block on "A" size formats) is to provide reference to the documentation which authorized preparation of the drawing (not the SHIPALT number).

3.5.4.2 Title Block (Continuation Sheet). Continuation sheet title blocks shall be in accordance with 3.4.3 and shall contain the same drawing identification, revision, scale and sheet number data as that required for the Front Sheet (see 3.5.4.1) except as follows:

- a. The revision letter indicated in the REV block shall be the latest revision of that sheet. The revision letter shall only be changed when that sheet is revised.
- b. The scale of the information shown on that sheet shall be indicated in the *SCALE* block. On sheets where more than one scale is used, the block shall indicate *AS SHOWN*. On sheets which are not to any particular scale, the block shall indicate *NONE*.
- c. The block marked *SHEET* shall contain the specific sheet number of that sheet ("2", "3", "4", etc.) and shall not refer to the total number of sheets in the drawing (SHEET "2 OF 4", etc.)

3.5.4.3 Revision Block. Revision blocks shall be in accordance with 3.4.3 and shall contain a complete description of the revision as follows:

- a. The *REV* column shall contain the letter designation of the revision. (The initial drawing issue, revision "-" of the drawing, shall have no information in the revision block.) The first change to the drawing, revision "A", shall begin at the top of the revision block and shall proceed down the block (when the bottom of the block is reached the revision block shall be continued (using the same dimensions) on a continuation sheet. Subsequent revisions shall be indicated as revisions "B", "C", "D", etc., in alphabetic sequence. Numeric ("1", "2", etc.) or alphanumeric ("A1", "4B", etc.) designators shall not be used for revisions of NAVSEA drawings.
- b. The *ZONE* or *SHEET* column shall contain reference to each zone or sheet affected by the revision. The zones or sheets affected by each of the *ADDED*, *DELETED*, *CHANGED*, etc., descriptions shall be placed opposite that description.
- c. The *DESCRIPTION* column shall contain reference to the document or action which required the revision to be made and shall provide a description of the modifications which were made to the drawing. This information shall be provided in the form of - *ADDED*, *DELETED*, *CHANGED*, etc. When the complete description of the revision has been provided, a line shall be drawn across the revision block at the end of the description, signifying the end of the revision description.
- d. The *BY* and *DATE* columns shall contain the signature of the person actually making the revision to the drawing and the date.
- e. The *APPROVED* column shall contain the signature of the Planning Yard official responsible for the system design. This signature shall be placed on the drawing only after the revision has been reviewed and is found to be acceptable.

3.5.4.4 Revision Status Block. Revision Status Blocks shall be in accordance with 3.4.3. The block will show the current revision status for each sheet (up to 100 sheets) (see Figure 13). The initial issue of the drawing shall indicate a "-" above the applicable sheet number indicating that all sheets are in their initial issue. As revisions are made to the drawing, the Revision Status Block is updated to reflect the current revision of each sheet. Because the first sheet is changed by every revision, the first sheet shall always show the current revision of the drawing and each sheet will always reflect the current revision status of that sheet.

**3.5.4.5 Reference List Block.** Reference list blocks shall be in accordance with 3.4.3 and shall list all sources of technical data referenced on the drawing. The references shall be numbered from the bottom up and a line shall be drawn across the block between each reference to avoid confusion. References on drawings are to provide details of manufacturing, detail procedures or methods, drawings being modified or superseded, pertinent information regarding the ship's structural or system configuration, and other information, as required, which will better enable the accomplishing activity to complete the work. (When referencing information or details shown on other drawings or documentation, consideration shall be given to including the information on the drawing being prepared rather than referencing it. Generally, if the referenced information has any options or decisions which must be made by the user, the information should be shown on the drawing rather than referenced. (Or if the referenced material is beyond the scope of what is expected as basic trade competency.) If the list of references exceeds the space available on the front sheet, the list may be continued (using the same dimensions) on a continuation sheet. If a listed reference is only applicable to a single ship or is being referenced for only one ship, the ship hull number shall be indicated in the column marked *HULL*, otherwise, this column shall be left blank. (If the reference is applicable to a series of ships, but not all of the ships the drawing is applicable to, a General Note shall be referenced and the applicable ships listed in the Note.)

**3.5.4.6 Ship Applicability/Shipcheck Block.** The ships which are applicable to a drawing and the revision of the drawing which provided applicability shall be listed in the appropriate columns of the ship applicability/shipcheck block (See 3.4.3). The shipcheck data shall be filled in when the actual applicability shipcheck takes place. (When the Planning Yard determines that an applicability shipcheck is not required for a specific drawing, the *SHIPCK BY and DATE* columns shall be crossed out, corner to corner, and *NOT RQD* shall be written across them.)

**3.5.4.7 Dimensional Tolerance Block** The dimensional tolerance block shall be in accordance with 3.4.3 and shall provide the dimensional tolerances for matching and geometric alignment of surfaces, parts and equipment. On drawings which do not require a dimensional tolerance block, this block shall be crossed out, corner to corner (or may be omitted).

**3.5.4.8 Weight Control Data Block.** The weight control data block shall be in accordance with 3.4.3. (Weight control data shall only be calculated on drawings with material lists or equipment lists which order material, not parts lists, or for Removal drawings.) The data shall be calculated in accordance with the instructions in NAVSEA 0902-018-2010, NAVSEA S9AA0-AB-GOS-010, or other documentation invoked in the contract or tasking documentation. The following entries shall be made for each SHIPALT reflected on the drawing:

- a. Drawing revision that the calculations support.
- b. SHIPALT number. If more than one SHIPALT is shown on the drawing, the weight calculations for each SHIPALT shall be shown on separate lines.
- c. Weight group (located in S9040-AA-IDX-010/SWBS5D). (Weight group system shall be the same as originally used on the new construction drawings for the applicable class of ships.)
- d. Weight added (in pounds, to the nearest pound). E. Weight removed (in pounds, to the nearest pound).

- e. Vertical center of Gravity (VCG) above the ship baseline (in feet, to the nearest tenth of a foot).
- f. Longitudinal Center of Gravity (LCG) from a specified reference point (longitudinal center of buoyancy, if known) (in feet, to the nearest tenth of a foot).
- g. Transverse Center of Gravity (TCG) identified with an (S) for starboard, a (P) for port or (CL) for centerline (in feet, to the nearest tenth of a foot).

For drawings which do not order material, the weight control data block shall be crossed out, corner to corner, with the statement *NOT APPLICABLE* written over it.

3.5.4.9 Verification Shipcheck Block. The verification shipcheck block shall be in accordance with 3.4.3 and shall be prepared, signed and dated by a responsible Planning Yard official when a high risk or complex SHIPALT drawing is shipchecked against an applicable ship to verify applicability and adequacy of design. In those instances where complex or critical SAD preparation is an overhaul activity responsibility, a verification shipcheck may be performed at the discretion of the overhaul activity upon notification of the cognizant NAVSEA SLM/SPM. Drawings shall only be verified when the drawing may have significant impact on an availability and the Planning Yard (or overhaul activity for locally prepared SADs) has reason to believe that the drawing or the design presented on the drawing is inadequate. (See also 3.3.1(c).) (For drawings which have not had a verification shipcheck, this block shall be omitted.)

3.5.4.10 Proofing Shipcheck Block. The proofing shipcheck block shall be in accordance with 3.4.3 and shall be prepared, signed and dated by a responsible Planning Yard official when proofing of a SHIPALT is required by a SHIPALT Record. The shipcheck is normally conducted after completion of a specified first-time SHIPALT as part of the formal proofing requirements. The formal proofing demonstrates that the SHIPALT satisfies its intended purpose and the proofing shipcheck certifies that the successful SHIPALT is accurately reflected in the SHIPALT drawings. (For drawings which do not require a proofing shipcheck, this block shall be omitted.)

3.5.4.11 List of Parts/Material/Equipment Blocks. Blocks for parts, material and equipment lists shall be in accordance with 3.4.3 and 3.5.5.

3.5.5 Parts/Material/Equipment Lists. For purposes of NAVSEA drawings, parts lists, material lists and equipment lists shall be defined as follows:

- a. **Parts List** - Parts lists (Figure 20) shall be utilized on fabrication drawings only and shall list all items required to fabricate one assembly. They shall be utilized for ordering material but shall not be utilized for calculation of weight and moment changes.
- b. **Material List** - Material lists (Figure 21) shall be utilized on all drawings (except those listed in 3.5.5(a) and 3.5.5(c)) which order material. They shall list all material, equipment and assemblies required for one ship. Where assemblies are utilized, the assembly part and the fabrication drawing shall be listed as the material specification. Material lists shall be utilized for ordering material and for calculating weight and moment changes.

- c. **Equipment List** - Equipment lists (Figure 22) shall be utilized on arrangement drawings and machinery drawings and shall only list components except spares, support equipment, etc. (See 3.5.5.3).

3.5.5.1 Additional drawings. In order to prevent possible loss of information, parts, material and equipment lists shall be integrated into applicable drawings (see 3.5.5(a), 3.5.5(b) and 3.5.5(c)) to the maximum extent possible. If a material, parts or equipment list is too voluminous to be accommodated on a drawing, it may be prepared separately as a size "D", or "F" drawing provided that:

- a. The list is in the form of a separate drawing and is assigned a unique NAVSEA drawing number.
- b. A statement *SEE SEPARATE LIST OF MATERIAL/PARTS/EQUIPMENT, REF. \_\_\_\_\_*, shall be placed on the drawing in the space on the title sheet normally reserved for the material, parts or equipment list.
- c. The separate list is clearly identified by cross-referencing back to the parent drawing.

3.5.5.2 Required information. Parts and material lists (3.5.5(a) and (b)) shall contain all material required to accomplish the work shown on the drawing. The following information, as a minimum, shall be provided (other required data shall be as specified in 3.5.6 through 3.5.11.)

- a. **Item number**. Item numbers are assigned sequentially to each of the different items in the list, excluding electrical cables.
- b. **Quantity required**. The total quantity of each item for one ship shall be entered in the Quantity Required column. An effort shall be made to specify exact quantities, but in those where they cannot be derived, approximations shall be made and specified as such. Use of phrases such as *'as required'* shall not be used except for items such as cable clamps, paint, etc. If incidental items are covered by other drawings, those other drawings shall be referenced.
- c. **Description**. A complete description (noun name and size) as described in the material specification (as applicable) shall be provided. For items such as structural shapes, the overall dimensions (width and height) shall be provided and shall be referenced to detail sketches on the drawing or shall be assigned assembly numbers and referenced to an assembly or detail drawing in the Part Number Column.
- d. **Material Specification**. The applicable military or other approved specification for each item of material being ordered by the drawing shall be entered in this column. Do not list the specification revision letter or date unless only a specific revision is applicable. Do not indicate an item in this column as being *COMMERCIAL* or identify an item by a proprietary or commercial name or trademark unless it is found that no standard specification is available. In such cases, the *REMARKS* column may be used to indicate *SIMILAR OR EQUAL TO \_\_\_\_\_*.
- e. **Material Requirements**. Applicable type, grade, class, condition or other classification, as applicable, is shown in this column when a specification or standard is referenced and the specification lists alternate choices. If necessary to fully describe the material required, the *REMARKS* column shall provide the additional data or a General Note shall be referenced which shall provide such information.

- f. **National Stock Number or Manufacturer's Part Number.** Unless otherwise directed by NAVSEA, the National Stock Number (NSN) or manufacturer's part number for each item shall be entered into this column. Maximum effort shall be exerted to utilize standard stock items and to minimize or preclude the use of one-of-a-kind or unsupportable items.
- g. **Source.** The source of material ordered by the drawing shall be indicated as follows:
1. **Existing Material.** When the parts or material list contains existing, relocated and/or modified items, identify each of these items by the use of one of the following symbols:
    - E - Existing item (not relocated)
    - R - Existing item relocated
    - M - Existing item modified (not relocated)
    - MR - Existing item modified and relocated
  2. **New Material.** Identify all new items in the parts or material list by use of the following symbols:
    - GFM - Government Furnished Material (provided as part of the SHIPALT)
    - IAF - Installing Activity Furnished (not long lead time)
    - CP - Centrally Procured (not long lead time)
    - LLTM(CP) - Centrally Procured Long Lead Time Material
    - LLTM(IAF) - Installing Activity Furnished Long Lead Time Material
  3. The source of all material required by the drawing (e.g. "2GFM" for two items, both Government Furnished Material, or "2R/IIAF" for three items, two relocated and one installing activity furnished, etc.) shall be accounted for. The total material in the SOURCE column must equal the total in the QUANTITY column.
- h. **Allowance Parts List.** (INCREASE COLUMN WIDTH) The Allowance Parts List (APL) number for each item, as applicable, shall be provided in this column when a standard APL is available. Where no standard APL exists or the APL is to be prepared during the ship's availability, this requirement shall be omitted and the column space left blank for each applicable item.
- i. **Unit Weight.** The operating weight, including required fluids (oil, water, etc.) (not ordering weight) in pounds for one item shall be provided. (For those items ordering in running feet, square feet, gallons, etc., the weight of one unit of measure shall be provided.)
- j. **Remarks.** Any clarifying statements shall be entered in this column.
- k. For multi-SHIPALT drawings (Integrated Designs), a column titled *SHIPALT* shall be added to the left of the Part Number column. This column shall indicate the authority responsible for the purchase of each item of new material in the List of Material. (Exception: Drawings utilizing many piece-parts common to more than one SHIPALT where separate identification of quantities is impractical (e.g., foundation drawings), may specify the quantities for the group of SHIPALTs.)

3.5.5.3 Equipment lists. Equipment lists (3.5.5(c)) shall contain all equipment in the compartment, space or area depicted on the arrangement drawing. The following information, as a minimum, shall be provided:

- a. **Item Number.** Item numbers are assigned sequentially, to each of the different equipment in the list.

- b. **Quantity.** The total quantity of each equipment shown on the drawing shall be entered.
- c. **Description.** A complete description of the item shall be provided (noun name and type designation, e.g., R-1051/URR HF RECEIVER).
- d. **Source.** The source of each item shown on the drawing shall be indicated in the three *SOURCE* columns, N (New), R (Relocated) and E (Existing), as appropriate. The appropriate quantity shall be entered into the applicable column for each equipment (columns which are not applicable to a specific item shall be left blank: do not enter a quantity of "0").
- e. **Ordered on reference.** The drawing(s) which order(s) the equipment shall be referenced. For spares, support equipment (fire extinguishers, furniture, etc.) and other miscellaneous equipment which may be ordered by the arrangement drawing, a General Note shall be referenced which states, *EQUIPMENT REFERENCED TO THIS NOTE IS ORDERED BY THIS DRAWING*.
- f. **Foundation shown on reference.** The drawing which provides the equipment's foundation shall be referenced. (For equipment not requiring foundations, "N/A" shall be entered in this column.)
- g. **Allowance Parts List.** The Allowance Parts List (APL) number for each item, as applicable, shall be provided in this column when a standard APL is available. When no standard APL exists or the APL is to be prepared during the ship's availability, this requirement shall be omitted and the column space left blank for each applicable item.
- h. **Unit Weight.** The installed operating weight (not ordering weight) in pounds for one item shall be provided. (For those items ordering in running feet, square feet, gallons, etc., the weight of one unit of measure shall be provided.) (This shall only apply to items, not ordered on another drawing (spares, support equipment, etc.).)
- i. **Heat dissipation.** The heat dissipation of one unit, in watts, shall be entered. (For those items not dissipating heat, a "O" shall be entered in this column.)
- j. **Remarks.** Any clarifying statements shall be entered in the Remarks column. For equipment being ordered by the arrangement drawing, the Remarks column shall provide ordering information (part/identification number, source etc.) or shall reference General Notes which shall provide such information.

3.5.6 **Hull/Structural Drawings.** Hull/structural drawings consist of structural, foundation, penetration, arrangement (outfitting), welding, painting, hull and compartment insulation, deck covering, stowage, inspection and weld documentation drawings. They shall provide for fabrication, installation, modification, or removal of such things as hull, deck and superstructure components, compartment arrangements, painting, accesses, ladders and stairs, rigging, fittings, equipment foundations, label plates, access cuts, masts, etc.

3.5.6.1 **Symbols.** Symbols used on hull/structural drawings shall be as follows:

- a. MIL-STD-25 provides structural symbols for use on ship drawings and is to be used to assure uniformity in the preparation of structural drawings.
- b. MIL-STD-22 provides symbols to be used for welded joint design.

- c. ANSI/AWS A2.4 provides symbols for welding and non-destructive testing. (In case of conflict between ANSI/ASW A2.4 and MIL-STD-22, MIL-STD-22 shall take precedence.)

3.5.6.2 List of Material. Lists of Material on all hull/structural design drawings ordering material shall provide the following data:

- a. All material required to accomplish the task shown on the drawing shall be identified by Item Number, Quantity Required, Description, Material Specification, Material Requirements, Stock or Part Number, Source and APL number (see 3.5.5.2).
- b. If split piece bubbles are used, the following information shall also be required:
  1. **Last Number Used**. Enter the total number of pieces to be cut from the Quantity Required (applies to sheets, plates and lengths of steel, aluminum, etc.).
  2. **Sizes Required**. Enter the total number of different sizes to be cut from the Quantity Required (applies to sheets, plates and lengths of steel, aluminum, etc.).

3.5.6.3 General Content. Hull/structural drawings shall be sufficiently detailed so that no decisions affecting the features or testing of the completed installation are required by production personnel. All construction dimensions and test requirements shall be controlled by realistic tolerances consistent with function and original ship fabrication and installation design tolerances. Foundation drawing requirements are as follows:

- a. Machinery equipment foundation. Complete details of foundations are required for all machinery equipment weighing fifty pounds or more. For machinery equipment weighing less than fifty pounds, complete foundation/mounting details are required if the foundation is fabricated or if the mounting requirements are critical, unusual or complex. The location of machinery foundations shall be referenced to the applicable machinery arrangement drawing which shall provide specific mounting dimensions for the foundations.
- b. Electrical/Electronic equipment foundations. Complete details of fabrications, mounting plates, racks, etc., are required for all electrical/electronic equipment. Complete locating dimensions/requirements shall be provided on the foundation drawing to enable shop fabrication and installation of foundations, plates, racks, etc., without referring to arrangement drawings. The outline of the equipment to be supported by the foundation, plate etc., shall be shown in phantom line if it does not confuse detail.

3.5.7 Machinery, Piping and Heating, Ventilation and Air Conditioning (HVAC) Drawings. Machinery, (including all deck machinery) piping and HVAC drawings include piping, ventilation, , air conditioning and machinery arrangements, diagrams and manufacturing drawings for associated parts and assemblies. They shall provide for the installation, modification and removal of machinery, piping, hull and compartment insulation, and HVAC systems and associated equipment. Fluid power diagrams shall generally be in accordance with ANSI Y14.17. Other machinery, piping and HVAC drawings shall be in accordance with NAVSEA 0902-018-2010, NAVSEA S9AA0-AB-GOS-010 or other direction provided in the contract or tasking documentation.

### 3.5.7.1 Symbols.

- a. Pipe fitting, valve and piping graphic symbols for diagrammatic drawings shall be in accordance with NAVSEA Drawing No. 803-5001049, except fluid power systems, which shall be in accordance with ANSI/ASME Y32.10. A symbol legend shall be included for all fitting, valve and piping symbols used on the diagram.
- b. Welding graphic symbols shall be in accordance with MIL-STD-22 and ANSI/ AWS A2.4. In case of conflict between these specifications, MIL-STD-22 shall take precedence.
- c. Heating, ventilation and air conditioning graphic symbols for diagrammatic drawings shall be in accordance with ANSI Y32.2.4. A symbol legend shall be included for all symbols used on the drawing.

3.5.7.2 List of Material. List of material on piping drawings shall have material grouped by piping, valves and fittings, sequenced in that order, from the top of the list of material down. Each pipe size (for submarines - each pipe run) and each valve size shall be listed as a separate line item. Fittings shall be listed by type. Other lists for instruments, tanks, and hoses and flexible fittings, etc., may also be required and shall be kept on separate lists on submarine drawings, but may be placed in any sequence after the fittings list. (On surface ship drawings, these items may be included on the fittings list.) Machinery and HVAC drawings shall have one list of material. Lists of material on all machinery, piping and HVAC drawings ordering material shall provide the following data:

- a. All material required to accomplish the task shown on the drawing shall also be identified by Item Number, Quantity Required, Description, Specification, Material Requirements, Stock or Part Number, Source and APL Number (see 3.5.5.2).
- b. In addition, the following information shall also be required:
  1. **Classification.** All piping, machinery and pressure vessels shall be classified according to application in accordance with NAVSEA Pub S9074-AQ-GIB-010/278 and NAVSEA 0900-LP-001-7000.
  2. **Casting Category.** All castings which are to be used with piping, machinery and pressure vessels shall be categorized according to application in accordance with NAVSEA Pub S9074-AQ-GIB-010/278.
  3. **Material Identification and Control.** Piping system components, as applicable, shall be classified for Material Identification and Control (MIC) level in accordance with NAVSEA 0948-LP-045-7010. Any drawing which has Level I piping material indicated in the List(s) of Material shall so note above the Weight Control Data block (or title block of "A" size drawings) and shall have the following General Note added:
 

**ITEMS (list Item numbers) SHALL COMPLY WITH LEVEL I MATERIAL IDENTIFICATION AND CONTROL MARKINGS, INSPECTION, MATERIAL TESTING, PROCUREMENT AND DOCUMENTATION REQUIREMENTS OF NAVSEA 0948-LP-045-7010.**
  4. Service (Submarine Drawings only). Piping, valves and fittings shall identify the service use of each item. Items for piping runs shall provide descriptions similar to *RETURN DRAIN LP BEARING SSTG NO. 1*. Valves shall provide descriptions similar to *LOG-117 {Lube Oil, Generator (Valve Identification)} DRAIN SPEED CHANGER AND SERVO MTR LOW SPEED STBD*. Fittings shall be identified to the pipes and valves that they are applied to. If the quantity

of a fitting is shown as (4), then four applications must be indicated in the service column (P7, P8, P9, P10). If a pipe run or valve uses more than one of the same fitting item, the number of occurrences shall be placed in parenthesis (a gate valve using the same type of flange on both ports would be indicated as LOG-117(2) in the Service column). All components shall be accounted for in the service column.

5. **Test Pressure (Submarine Drawings only).** The test pressure for the specific pipe run shall be indicated.

3.5.7.3 General Content. Mechanical drawings shall be sufficiently detailed so that no decisions affecting the features or testing of the completed installation are required by production personnel. All dimensions and test requirements shall be controlled by realistic tolerances consistent with the original ship fabrication and installation design tolerances. Specific requirements are as follows:

- a. **General mechanical drawings.** Completed details, dimensions and tolerances shall be provided to allow installation of all required components as well as any required manufacture and/or assembly of components. Basic test criteria for all required testing and any special cautions and/or warnings shall also be noted.
- b. **Piping drawings.** Piping installation drawings shall be either line-type diagrammatic drawings or piping arrangement drawings. When pipe runs are complex or there are space constraints, a piping arrangement drawings shall be developed. For piping drawings, piping up to and including 2 inch I.P.S. (Iron Pipe Size), piping shall be represented as a single line. Piping greater than 2 inches I.P.S. shall be drawn to scale.. In complex or restricted area piping, piping arrangement drawings shall provide details of pipe, valve, hanger and fitting configuration as well as key dimensions to locate pipes, components, hangers and pipe bends whose locations are critical due to pipe stress, space constraints, etc. A tolerance of plus or minus 1/2 inch shall be applied to the dimensions unless otherwise specified and shall be so stated on the drawing.
- c. **HVAC drawings.** Except for simple duct runs in non-congested areas, duct installation drawings shall be prepared as two-line diagrammatic drawings and all complicated fittings and plenums shall be detailed on the drawings. (Simple duct runs may be represented by single lines.) Key dimensions and all critical hangers, fittings, etc. shall be detailed on the drawings.

3.5.8 Electrical/Electronic Drawings. Electrical and electronic drawings shall provide for the installation, modification and removal of electrical power and lighting distribution systems, fire control, interior communications, electronic systems such as radar, sonar, radio communications, IFF and electronic countermeasures, and control systems for various onboard machinery systems and equipment. Electrical/Electronics diagrams shall generally be in accordance with ANSI/ASME Y14.5, and ANSI Y14.15a, as applicable.

#### 3.5.8.1 Symbols.

- a. Electrical and electronic graphic symbols for use on schematic diagrams shall be in accordance with ANSI/ASME Y32.2.

- b. Symbols for electrical and interior communications (IC) circuit diagrams shall be in accordance with currently accepted industrial practices and each drawing shall have a symbol legend identifying each symbol used on the drawing. Symbol numbers, where used with standard electrical and IC equipment, shall be in accordance with MIL-HDBK-290.

3.5.8.2 List of Material. Lists of material on all electrical and electronic drawings ordering material shall provide the following data:

- a. All material required to accomplish the task shown on the drawing shall also be identified by Item Number, Quantity, Required, Description, Specification, Material Requirements, Stock or Part number, source and APL Number (see 3.5.5.2).
- b. In addition, the following information shall also be required:
  - 1. **Symbol Number**. Where items are identified on the body of the drawing by Symbol Number, the number shall be included in the description.

3.5.8.3 General Content. Electrical/Electronic drawings shall be sufficiently detailed so that no decisions affecting the features or testing of the completed installation are required by production personnel. All dimensions and test requirements shall be controlled by realistic tolerances consistent with function and original ship fabrication and installation design tolerances. Drawings shall be in accordance with NAVSEA 0902-018-2010 and S9AA0-AB-GOS-010 as applicable.

- a. General electrical/electronic drawings. Complete details, dimensions and tolerances shall be provided to allow installation of all required components as well as any required manufacture and/or assembly of components. Basic test criteria for all required testing and any special cautions and/or warnings shall also be noted.
- b. Power and lighting system drawings. Power and lighting system drawings shall generally be prepared as line-type diagrammatic drawings. These are to be prepared as cabling diagrams, elementary wiring diagrams, wiring deck plans and power distribution diagrams as required. Isometric wiring diagrams shall not be prepared for power and lighting system drawings unless specifically required by the contract or tasking documentation. . Where cableway modifications or new cableways or penetrations are required, they shall be designed in accordance with DOD-STD-2003-5, and cableway installation drawings shall be prepared. These drawings shall be based on all known cabling changes required as the result of S/A's to be accomplished during that availability. The drawings shall identify all material requirements to accomplish the installation (i.e. stuffing tubes, multiple cable penetrators, kickpipes, hangers, etc.).
- c. Electronic and interior communication (IC) system drawings. Electronic and IC system drawings shall generally be prepared as line-type diagrammatic drawings. These are to be prepared as cabling diagrams, elementary wiring diagrams, isometric wiring diagrams and schematic diagrams, as required. Electronic and IC system drawings shall not be prepared as wiring deck plans unless specifically required by the contract or tasking documentation.

3.5.9 Arrangement Drawings. Arrangement drawings are scale drawings (usually 1/4" = 1' or

larger) of the outline of, and components within a space, area or compartment. Arrangement drawings of machinery areas shall be referred to as *MACHINERY ARRANGEMENTS*, whereas arrangements of nonmachinery areas shall be referred to as *GENERAL ARRANGEMENTS*. Arrangements of piping, wireways, penetrations, antennas, etc., shall be referred to as such (*e.g., ARRANGEMENT OF PIPING*, etc.), but may be required to be shown in a smaller scale due to large areas of the ship which may be covered by the drawing. Arrangement drawings shall include, but are not limited to, the following:

- a. **Key plan.** The key plan shows the location of the compartment, space or area and it shows the area of the ship near the affected area, usually relative to the ship's centerline and frame numbers. On drawings showing more than one deck, a separate key plan is required for each deck. (Key plans are not required on arrangements of entire deck levels.)
- b. **Bar scale.** Bar Scales are optional. If used, each sheet shall have a bar scale (graphic scale) for each scale utilized on that sheet. Bar scales shall show both vertical and horizontal dimensions.
- c. **References.** The list of references shall include references to all drawings which provide equipment/material shown in the arrangement as well as any applicable foundation drawings.
- d. **Content.** Machinery and General Arrangements shall include, but are not limited to, machinery and/or equipment in the area, space or compartment, electrical equipment, main wireways, large pipes or piping banks, ladders and stairs, bilge line, accesses and pull space for equipment maintenance, removable plates for shipping and unshipping equipment, lifting or handling gear and trolley arrangements, major structures/foundations, manholes and reserved space. Knobs, handles, piping connections, and other permanently attached protrusions shall be included in the envelope depicting all equipment as well as access, service and operator areas, shock excursions and all critical dimensions. Machinery Arrangements shall also include all required information for installation of machinery foundations.
- e. **List of equipment.** Each arrangement drawing shall have a List of Equipment in accordance with 3.5.5.3.
- f. **Weight control data.** Arrangement drawings do not generally order material except for spares, support equipment (fire extinguishers, furniture, etc.) and other miscellaneous equipment which would not be ordered by a system or structural drawing. In instances where the arrangement drawing does not order any material, the weight control block shall be crossed out, corner to corner, with the statement *NOT APPLICABLE* written over it. Arrangement drawings shall not provide weight/moment calculations for any item, component or equipment ordered on any other drawing.

3.5.10 **Removal drawings.** Removal drawings shall be prepared only when it is necessary to depict removal of equipment and material in the way of new installations or when removal information is too complex to be discussed in removal notes on the installation drawing. The drawing shall usually be a mark-up of the existing system or arrangement drawing showing the specific components to be removed. A *LIST OF MATERIAL TO BE REMOVED* shall be included as part of the drawing and shall include disposition instructions for all removed material. These instructions shall be one of the following:

- a. **REMOVE & SCRAP.** This notation shall be used for all material to be disposed of locally by the installing activity. (For private shipyards, this material is to be turned over to the Property Administrator designated in the contract.)
- b. **REMOVE & FORWARD.** This notation shall be used for all material not being scrapped or retained for reinstallation. This material is to be removed and forwarded for disposition. Reference to General Note providing the name and address of the activity the material is to be forwarded to shall be provided in the Remarks column if a specific activity has been designated by the cognizant material manager. If no activity has been so designated, the General Note shall read, *MATERIAL REFERENCED TO THIS NOTE SHALL BE TURNED-IN TO THE NEAREST NAVAL PROPERTY ADMINISTRATOR.*
- c. **REMOVE & RETAIN.** This notation shall be used for all material to be removed and retained by the installing activity for reinstallation. Reference to a General Note providing reference to the drawing which will reinstall the material shall be provided in the Remarks column.

3.5.10.1 Master Removal Drawing. When foundation removal information is too complex to be discussed in removal notes on the drawing, but not complex enough to warrant a complete removal drawing (see 3.5.10), a Master Removal Drawing shall be prepared. The drawing shall list the foundations affected, the name of the equipment mounted on the foundation, the compartment and the location within the compartment, foundation installation drawing (if known), and extent of removal. Equipment status shall be designated as deleted or relocated. For relocated equipment, the arrangement drawing that reinstalls the equipment shall be listed along with the new arrangement item number.

3.5.10.2 Weight Control Data. A Weight Control Data Block shall be completed in accordance with 3.5.4.8 on all Removal Drawings or any drawing providing removal information.

3.5.10.3 List of material to be removed. As discussed in 3.5.10, all Removal Drawings shall have a *LIST OF MATERIAL TO BE REMOVED*. The format shall be the same as that of a *LIST OF EQUIPMENT* (see 3.5.5.3) except that *SCRAP, FORWARD, AND RETAIN* shall be used in lieu of *NEW, RELOCATED* and *EXISTING* under *SOURCE*.

3.5.10.4 Support Drawings. Support drawings (sometimes referred to as *non-working* drawings) are drawings which do not order material or provide specific installation data but are used as aids in design or records of design criteria which is vital to the development and accuracy of working drawings and logistic support. These drawings are not normally forwarded to production areas, but are used by designers and planners at installing activities, by stocking and material support activities for logistic support and by Ship's Force, Planning Yards and NAVSEA to maintain configuration control. Non-working drawings include, but are not limited to the following:

3.5.10.5 Interference Control Drawings. Interference Control Drawings shall be generally prepared as arrangement drawings and reflect all work to be accomplished in a space or compartment so that any interferences will become readily apparent. These drawings are not to

be considered *working drawings* in that they do not order or install material, but like arrangement drawings are to be used as guides to prepare other drawings. Interference Control Drawings shall only be prepared when required by the number or complexity of the SHIPALTs authorized for the availability as determined by the Planning Yard.

3.5.10.6 Installation Control Drawings. Installation Control Drawings are used to specify the form, fit and function of non-standard equipment to be purchased by the installing activity or by a central procurement activity such as SPCC. These drawings also provide information required to formulate an adequate Allowance Parts List (APL). (These drawings are not to be confused with Shipboard Electronics Equipment Installation Control Drawings (sometimes referred to as "RE" Drawings) which are controlled by the Naval Engineering Drawing Support Activity, Norfolk.) Installation Control Drawings shall be prepared generally in accordance with MIL-D-23140 except as modified herein, when specifically required by the SAR.

- a. Although MIL-D-23140 is intended for electronic equipment, sections 3.4.7, 3.4.8, 3.4.9, 3.4.10, 3.4.11, and 3.4.13 of MIL-D-23140 shall be applied to machinery and electrical equipment whereas 3.4.6 through 3.4.13 of MIL-D-23140 shall be applied to electronic equipment.
- b. Sections 1 through 3.4.5 and 4 through 6.4 of MIL-D-23140 do not apply to SHIPALT Installation Control Drawings.
- c. Drawing sizes and format specified in MIL-D-23140 shall not be used. Drawing size and format shall be in accordance with paragraph 3.4 of this specification.
- d. **Weight Control Data.** Installation Control Drawings do not order material and therefore shall not be utilized for calculation of weight and moment data. The weight control data block shall be prepared in the same manner as an Arrangement Drawing which does not order material (see 3.5.9(f)).
- e. **List of Equipment.** A List of Equipment shall be prepared in accordance with 3.5.5.3. This listing shall provide information on the basic equipment and material, including technical manuals, fittings, etc. A separate listing shall detail special equipment, fitting, etc., required by the installing activity to install the equipment.

3.5.10.7 Engineering Data Drawing. The SHIPALT drawing package shall contain and describe the engineering data/rationale used in preparing the drawings. This information shall normally be included on the individual drawings. However, when the data are of significant volume or when the drawing package is of significant size, the engineering data for the SHIPALT shall be placed on an Engineering Data Drawing. (For submarines - The engineering data shall be retained on a separate Engineering Data Drawing prepared for each SHIPALT.) The drawing shall be applicable to one SHIPALT and shall include, but is not limited to, the following:

- a. Engineering considerations (such as criticality on equipment location, EMI, corrosion/coating, special non-standard access closure required, etc.).
- b. Calculations (such as those associated with heat transfer, load flow stress, sizing, electrical feeder load, stability, etc.).
- c. Requirements necessary to demonstrate satisfactory installation and performance of the SHIPALT including any necessary prerequisite testing.

3.5.10.8 Special Drawings. Special drawings may be required for a particular system or

ship type. These drawings may be invoked by NAVSEA S9AA0-AA-SPN-UI0/GEN-SPEC, NAVSEA 0902-018-2010, NAVSEA 0902-LP-041-2010 or NAVSEA S9AA0-AB-GOS-010 as invoked by the contract or tasking document. It shall be incumbent on the Planning Yard to review these documents and the applicable Ship's Drawing Index to verify that special drawings such as *List of Motors, Controllers and Master Switches, Master Instrument List, Cargo Handling Flow Diagram, Storeroom Capacity*, etc., as applicable, are updated as required when SHIPALTs are accomplished.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection. Unless otherwise specified in the tasking documentation or contract, the Planning Yard shall be responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the tasking documentation or contract, the Planning Yard may use its own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by NAVSEA. NAVSEA reserves the right to perform any of the applicable inspections set forth in the documents referenced herein, which are deemed necessary to assure engineering drawings and associated lists conform to prescribed requirements.

4.1.1 Sampling. NAVSEA will normally perform inspection of drawings on a sampling basis and will normally use the evidence of this sampling as indicating conformance or nonconformance to these specifications.

4.1.2 Planning Yard's Drawing Control System. The Planning Yard shall provide and maintain a system for the detailed examination and technical review of all engineering drawings and associated lists to be supplied under the terms of the contract or tasking documentation. The system shall assure the conformance of the engineering drawings and associated lists to all requirements specified herein. The system, including the procedures, shall be documented and shall be subject to review by NAVSEA or its designated representative. The control system is subject to the disapproval of NAVSEA or its designated representative, whenever it can be demonstrated that it fails to assure conformance to the requirements specified herein.

4.1.3 Availability of Supporting Data. The Planning Yard shall permit NAVSEA to review the supporting data normally retained by the Planning Yard in the original format that the Planning Yard used to make its design decisions, in order to aid the NAVSEA representative in the review of the Planning Yard's design.

4.1.4 Drawing Control Procedures. The Planning Yard's drawing control procedures shall cover:

- a. Assignment of responsibility for detail examination, review, and signature authority of drawings for the Planning Yard.
- b. Required qualifications of personnel performing detail examination, review, and signature authority of drawings for the Planning Yard.
- c. Procedural flow of drawings and other associated documentation.
- d. Check lists to be used in the detail examination and review of drawings. The checklists shall specify each examination to be performed to verify conformance of

drawings to the applicable requirements of this specification and the contract or tasking documentation.

- e. Method of safeguarding classified information.
- f. Methods providing for the prevention and ready detection of discrepancies and for timely and positive corrective action.
- g. Method of safe storage of Master File Drawings, reference drawings, and other ship design documentation, as well as the electronic files for these items where applicable.
- h. Methods providing for control issue of drawing copies, both reproducible and nonreproducible.

## 4.2 Nonconforming Data Items.

4.2.1 Format Defects ( See Glossary). There may be random sampling by NAVSEA for quality of drawing format of all Planning Yard drawings as they are issued. When numerous format defects are discovered on Planning Yard drawings, the Planning Yard shall correct its process to prevent recurrence of defects found, but need not correct or redraw drawings or portions of drawings already issued unless they are illegible, do not meet the reproducibility requirements, or affect usability.

4.2.2 Engineering/Technical Defects ( See Glossary). Selected drawings subordinate to each system diagram or system drawing may be reviewed by NAVSEA to determine whether they describe a system which will meet the specified requirements.

4.2.2.1 Significant Engineering/Technical Defects. When, as a result of this review, it is determined that a drawing contains significant engineering/technical defects, such defects will be identified to the Planning Yard. The Planning Yard will then review all other drawings subordinate to the next higher level of drawing (for example, system diagram or system drawing), for similar defects and then correct promptly all defects found.

4.2.2.2 Minor Engineering/Technical Defects. When, as a result of this review, it is determined that a drawing contains minor engineering/technical defects, such defects will be identified to the Planning Yard, which shall correct them.

4.2.2.3 Numerous Engineering/Technical Defects. Numerous engineering/technical defects, whether significant or minor, will be considered as an indication of poor Planning Yard quality control, and the Planning Yard shall correct its process. The Planning Yard shall advise NAVSEA of the results of its process review, including drawings examined, the number of like deficiencies found, and the steps taken to prevent recurrence.

4.3 Inspection of Preparations for Delivery. Packaging and packing of documents to be delivered under this specification shall be inspected to insure that the preparation-for-delivery requirements are met.

## 5. PREPARATION FOR DELIVERY

5.1 Packaging. All drawings and lists delivered under this specification shall be packaged for mailing or shipping in accordance with level A requirements of MIL-PRF-5480. Prints of size "D", "F" or "H" drawings (see 3.4.14.3) forwarded to NAVSEA, its designated representative or an installing activity, shall be folded, accordion fashion, to 8 1/2" by 11" height, with the title block completely visible.

5.1.1 Classified Material. Classified material shall be packaged in accordance with SECNAVINST 5510.36.

5.2 Packing. All drawings and lists delivered under this specification shall be packed in accordance with level C of MIL-PRF-5480.

5.3 Marking of Shipments. Identification and address markings for interior packages and shipping containers shall be in accordance with MIL-STD-129.

## 6. NOTES

6.1 Intended Use. Ship Alteration Drawings are intended for use by installing and support activities as well as Ship's Force and Headquarters to plan and carry out accomplishment of specific alterations to ships and ship systems, to support ships and ship systems, and to provide configuration records of work accomplished.

### 6.2 Ordering Data.

6.2.1 Procurement Requirements. Procurement documents should specify:

- a. Title, number and date of this specification.
- b. When Government design activity drawing numbers are to be assigned, identify the assigning activity, and if Government drawing formats are to be supplied, identify the source.
- c. The applicable Data Item Description (DID).
- d. That the metric system shall not be used.
- e. Whether company drafting standards are accepted.
- f. Kinds of associated lists required.
- g. Drawing assembly level at which associated lists will be prepared.
- h. Identify whether the mono-detail system will be used.
- i. Selection of types of engineering drawings if different than 3.4.3 of MIL-DTL-31000.
- j. Quantity and type of reproduction.
- k. Whether delivery of original drawings and undimensioned drawings are required.
- l. What special packaging of originals, when ordered, is required.
- m. Delivery schedule, and to whom the engineering drawings and supporting documents are to be delivered.

6.2.2 Data Requirements. When this specification is used in a contract procurement, the provisions of 52.277-7015 (Rights in Technical Data-Specific Acquisition) of the Department of Defense (DOD) supplement to the Federal Acquisition Regulation (FAR) shall be invoked and the data requirements identified below will be developed as specified by an approved Data Item

Description (DID) (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (CDRL) (DD Form 1423) incorporated into the contract. Deliverable data required by this specification is cited in the following paragraphs:

Paragraph	Data Requirements	Applicable DID
3.4.15.1	Proposed Final Drawings	DI-E-7031
3.4.15.2	Final Drawings	DI-E-7031

(Copies of Data Item. Descriptions required by the contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

6.3 Definitions. For the purpose of this specification, the following definitions shall apply:

6.3.1 Allowance Parts List. A list of parts developed by the Department of the Navy for specific components which are installed on Naval Ships (Allowance Parts Lists are not yet available for all components). The parts breakdown includes all parts allowed on board and other parts stocked in the supply system.

6.3.2 Approval. The act of formally acknowledging legal responsibility by the Government (the Planning Yard (or NAVSEA if required)) for the accuracy, adequacy, and completeness of the technical data (engineering drawings and associated lists) in question to the extent/limitation specified. If the extent/limitation is not specified, it is to be assumed that the approval applies to all information disclosed.

6.3.3 Assembly. A number of parts or subassemblies or any combination thereof joined together to perform a specific function, (examples: power shovel-front, fan assembly, audio-frequency amplifier). NOTE: The distinction between an assembly and a subassembly is determine by individual application. An assembly in one instance may be a subassembly in another where it forms a portion of a larger assembly.

6.3.4 Associated list. A tabulation of pertinent engineering information pertaining to an item depicted on an engineering drawing or on a set of engineering drawings.

6.3.5 Authorize. The act of sanctioning an action (as used in this specification, the act of directing (and funding) the preparation of drawings).

6.3.6 Baseline Arrangement Drawings (submarines). A series of submarine class drawings, controlled by NAVSEA 92, which depict the approved arrangement of components in specific compartments, spaces and areas which are used by Planning Yards to develop SHIPALT arrangement drawings. Any deviation from an approved baseline drawing must be approved by NAVSEA 92.

6.3.7 Basic Alteration Class Drawings (BACDs). The first complete set of drawings prepared for a SHIPALT; they are specifically applicable to the ship for which they are prepared and generally applicable to specific follow ships of a class.

6.3.8 Bulk material. Necessary constituents of any assembly or part such as oil, wax, solder, cement, ink, damping fluid, grease, powdered graphite, flux, welding rods, thread, twine and chain from which the quantity required is not readily determinable or if knowing the quantity, the physical nature of the material is such that it is not adaptable to depiction on a drawing; or which can be cut to finished size by the use of such hand bench tools as shears, pliers, knives, etc., without any further machining operations and the configuration is such that it can be fully described in writing without the necessity of pictorial representation. In addition, high usage, low cost items and hardware generally available, such as, hinges, locks, light bulbs, fan belts, clamps, rivets, terminals, sleeving, wire, nuts, bolts, screws and washers, etc., are considered bulk materials providing such material are normally available in commercial channels and are normally procured in bulk quantities.

6.3.9 Caution. An examining or testing procedure which must be followed or risk damage to, or destruction of, equipment. Cautions shall be short, concise and used only to emphasize important or critical data. Cautions may be worded positively or negatively and shall state hazard and result or reason, unless obvious.

6.3.10 Commercial item. A term which includes both supplies and services of a class of kind which (a) regularly are used for other than Government purposes and (b) is sold or traded in the course of conducting normal business operations. NOTE: Services, per se, normally are not subject to delineation on engineering drawings.

6.3.11 Contract. All types of agreements and orders for the procurement of supplies or services.' It includes awards and notices of award; contracts of a fixed-price, cost, cost-plus-a-fixed-fee; or incentive type; contracts providing for the issuance of job orders, task orders, or task letters thereunder; letter contracts, and purchase orders. It is also includes supplemental agreements with respect to any of the foregoing.

6.3.12 Contract drawing. A NAVSEA drawing identified as a *Contract Drawing* which delineates design features of a ship. No departure from a contract drawing is permissible without specific NAVSEA approval. Contract drawings are not modified by or referenced on SHIPALT drawings.

6.3.13 Contract guidance drawing. A NAVSEA drawing identified as a *Contract Guidance Drawing* which illustrates design features of a ship. A contract guidance drawing does not necessarily depict, nor is it intended to depict, all features and details of the system and structures to which it relates. It serves the purpose of providing information which, when utilized in conjunction with applicable specification requirements, contract drawings, project-peculiar documents, and other information, may assist in detail design. Contract guidance drawings will not necessarily be updated or revised to reflect modifications. Contract guidance drawings are not modified by or referenced on SHIPALT drawings.

6.3.14 Deficiencies. Deficiencies are of two types: (1) conditions of characteristics in any hardware/software which are not in compliance with specified configuration, or (2) inadequate

(or erroneous) configuration identification which has resulted, or may result, in configuration items that do not fulfill approved operational requirements.

6.3.15 Design activity. An activity having responsibility for the design of an item. The activity may be a Government activity or a contractor, vendor or others.

6.3.16 Design agent. An activity contracted or tasked to develop details of a design for which the design activity retains responsibility.

6.3.17 Engineering data. Engineering documents such as drawings, associated lists, accompanying documents, manufacturer specifications and standards, or other information prepared by a design activity and relating to the design, manufacture, procurement, test, or inspection of items or services.

6.3.18 Engineering drawing. An engineering document that discloses (directly or by reference) by means of pictorial and/or textual presentations the physical and functional end-product requirements of an item.

6.3.19 Engineering/technical defect. Defective drawing resulting from an error in engineering judgement, or data preparation, such as misinterpretation of a technical requirement in a specification or standard, producibility, assembly, installation, test, operation, maintenance or logistic support of an item.

6.3.19.1 A significant engineering/technical defect, as used in this specification, is defined as a defect in a drawing which, if reflected in the ship or equipment when built, could cause damage in either one, or would require more than five man-days of effort to correct in the ship or equipment.

6.3.19.2 A minor engineering/technical defect, as used in this specification, is defined as a defect in a drawing which, if reflected in the ship or equipment when built, would require an effort of five mandays or less to correct in the ship or equipment.

6.3.20 In-process review. A review of drawings in the process of preparation. The contractor or the Government or both may perform the review. In-process reviews are performed primarily to assure that drawings are being prepared in accordance with contract or tasking specification requirements. In-process reviews may be conducted at the contractor's (or Planning Yard's) facility (as applicable) at any time during the development of the drawing.

6.3.21 Installation Control Drawing (ICD). A drawing that sets forth information for an item in terms of parameters such as area, mass, weight, space, access clearance, drainage, mounting, ship service requirements, cleaning, testing, clearance, and pipe, waveguide and cable attachments required for the installation and co-functioning of the installed item with related items.

6.3.22 Installing activity. A generic term applying to any activity which may be called upon to install SHIPALTs. This includes, but is not limited to Shipyards, Intermediate Maintenance Activities (IMAs) and Ship's Force.

6.3.23 Integrated Design Drawings. See Multi-SHIPALT drawings.

6.3.24 Manufacturer's drawing. A ship equipment drawing identified by manufacturer's drawing number.

6.3.25 Master file drawing. A final, approved drawing which is designed to be the permanent file drawing.

6.3.26 Modification drawing. A drawing which modifies the engineering information presented on an existing drawing. Modification drawings are generally prepared instead of revising the existing drawing when the Master File Drawing is not available or revision of the existing drawing would cause confusion. Less than 25% of the existing drawing is affected by a modification drawing. (If more than 25% of the existing drawing is affected, a new, superseding drawing shall be prepared.)

6.3.27 Multi-SHIPALT drawings. Drawings prepared to incorporate more than one SHIPALT on one set of drawings in cases where SHIPALT interfaces are complex and render separate sets of drawings to support each involved interfacing SHIPALT impractical. These may also be referred to as Integrated Design drawings.

6.3.28 NAVSEA drawing. Contractor/Government-prepared original drawings acquired or revised by or for the Naval Sea Systems Command. These drawings are assigned a NAVSEA drawing number and may be modified by or referenced on SHIPALT drawings.

6.3.29 Notes.

- a. General Notes. Notes which state conditions under which a drawing was prepared and highlighting conditions, procedures or general information necessary for complete understanding of the work to be accomplished by the drawing.
- b. Removal Notes. Notes providing information on the removal and disposition of equipment components and/or structures which must be removed from a ship prior to the installation of other equipment, components and/or structures. Removal notes are normally placed after the General Notes on a drawing and sequentially numbered "R-1", "R-2", etc.
- c. Special Notes. Examining or testing procedures or conditions which should be highlighted. Special notes are included as part of general, removal or test notes which require special attention and are not normally listed separately. Special notes shall be short, concise and used only to emphasize important or critical data.
- d. Test Notes. Notes which state the testing criteria which must be met to certify the work to be accomplished by a drawing. Test notes shall not take the place of or reference specific test procedures but may invoke test criteria established by other documents such as 0902-018-2010, 0902-LP-041-2010, S9AA0-AA-SPN-101/GENSPEC or S9AA0-AB-GOS-010. Test notes are normally placed after the Removal Notes on a drawing and sequentially numbered "T-1", "T-2", etc. On drawings not having Removal Notes, Test Notes shall be placed after the General Notes.

6.3.30 Proofing. The process by which the Planning Yard assures the adequacy of the SHIPALT design by actual test of the hardware and the accuracy of associated drawings by actual comparison with the completed installation.

6.3.31 Review. The process wherein technical data is checked, inspected or examined for conformance to specified requirements.

6.3.32 Revision. A second or subsequent edition of a drawing or document which supersedes the proceeding edition.

6.3.33 Revision symbol. An identifying letter which may be accompanied by a suffix number and enclosed in a circle or may be the printed letter in a revision column or block.

6.3.34 Right Reading. Term to describe an image which is directly readable as opposed to a mirror image.

6.3.35 Selected record drawings (SRDs). Drawings (usually structural or system diagrams) which have been selected because they contain basic information on hull, mechanical and electrical equipment and systems. These drawings are selected for their value for operational, maintenance, training and consulting purposes to Ship's Force, fleet commands, shipyard personnel, training centers and other naval activities. The drawings designated as Selected Record Drawings are maintained current and up-to-date throughout the life of the ship. The SRDs applicable to each class of ship are listed in NAVSEA SL720-AA-MAN-010.

6.3.36 Ship construction drawings. Drawings which are necessary for construction of the ship and other related drawings as required by Section 085 of NAVSEA S9AA0-AA-SPN-010/GENSPEC.

6.3.37 SLM. Ship Logistics Manager

6.3.38 SPM. Ship Acquisition Project Manager

6.3.39 Specification, government. A government document identified as a Federal Specification (Fed. Spec.), a Department of Defense Specification (DOD Spec.), a Military Specification (Mil. Spec.) or a NAVSEA Technical Specification (NAVSEA Tech. Spec.) which describes the technical requirements for items, materials or services, including the procedures by which it will be determined that the requirements have been met.

6.3.40 Standard. A document which establishes engineering and technical limitations and applications for items, materials, processes, methods, designs and engineering practices.

6.3.41 Standard drawing. A NAVSEA drawing designated as a *Standard Drawing* delineates arrangements or details of systems, equipment or components. No departure from details of a standard drawing shall be made without the specific written approval of NAVSEA. Departures

from a referenced standard drawing on a working drawing shall be noted on that drawing and the authority for the departure shall be indicated.

6.3.42 Standard, government. A standard developed by or for a Government activity.

6.3.43 Standard, non-government. A nationally recognized standardization document issued with intent to establish common technical requirements by a non-government organization which conducts professional standardization activities and which is not organized for profit. (Does not include *COMPANY STANDARDS*).

6.3.44 Superseding drawing. A drawing which is prepared to totally replace an existing drawing.

6.3.45 Supplementary Alteration Drawings (SADs). Drawings which modify design details presented on a BACD; required to depict individual ship differences or extend applicability of BACDs to specify follow ships.

6.3.46 System (electrical - electronics). A combination of two or more sets, generally physically separated when in operation, and such other assemblies and parts necessary to perform an operational function or functions. For example: AEW electronic system, antiaircraft defense system, telephone carrier system, GCA electronic system, fire control system including the tracking radar, computer, and gun mount.

6.3.47 System (general). A combination of parts, assemblies and sets joined together to perform a specific operational function or functions. (Examples: piping system, refrigeration system, air conditioning system).

6.3.48 Technical data, limited rights. The right to use, duplicate or disclose technical data, in whole or in part, by or for the Government, with the express limitation that, without the written permission of the party furnishing the data, such technical data shall not be:

- a. Released or disclosed in whole or in part outside the Government
- b. Used in whole or in part by the Government for manufacture, or in the case of computer software documentation, for preparing the same or similar computer software, or
- c. Used by a party other than the Government, except for:
  1. Emergency repair of overhaul work only, by or for the Government, where the item or process concerned is not otherwise reasonably available to enable timely performance of the work, provided that the release or disclosure thereof outside the Government shall be made subject to a prohibition against future use, release or disclosure; or
  2. Release to foreign government, as the interest of the United States may require, only for information or evaluation within such government or for emergency repair or overhaul work by or for such government under the conditions of (1) above.

6.3.49 Technical data, unlimited rights. The right to use, duplicate or disclose technical data or

computer software in whole or in part, in any manner and for any purpose whatsoever, and to have or permit others to do so.

6.3.50 Type drawing. A NAVSEA drawing designated as a *Type Drawing* which delineates or illustrates design features of systems or components. No departure from any feature identified as *Mandatory* shall be made without the specific written approval of NAVSEA. Departures from mandatory features of a referenced type on a working drawing shall be noted on that drawing and the authority for the departure shall be indicated. The illustrative features are subject to detail design development to assure full compliance with these specifications.

6.3.51 Validation. The process by which the Planning Yard or overhaul activity assures the technical accuracy and adequacy of a drawing and that it represents the current configuration of the applicable ship by actual inspection.

6.3.52 Warning. An examining or testing procedure or practice which must be closely observed or risk either loss of life or injury to personnel. Warnings may be worded positively or negatively and shall state the hazard and result or reason. Warnings shall be short, concise and used only to emphasize specific dangers. Warnings are generally included as part of a General or Test Note, view, etc., which requires special attention and are not normally listed separately.

6.3.53 Working drawing. Those drawings which enable the following key functions to be accomplished.

- a. Order material.
- b. Plan manufacturing, fabricating, assembly operations, tooling and manufacturing facilities.
- c. Estimate the cost of material and labor.
- d. Inspect and control quality and reliability.
- e. Perform fabrication, assembly and installation.
- f. Prepare system tests.