

**METRIC**  
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SUPERSEDING  
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**GENERAL MILITARY SPECIFICATION**

**HARBOR, APPROACH, AND COASTAL CHARTS (HAC-ALL SCALES)**

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

1. SCOPE

1.1 Scope. This general specification defines requirements for the Defense Mapping Agency's (DMA) Harbor, Approach, and Coastal Charts (HAC) at any scale. Detailed feature and attribute requirements for specific scale ranges are contained in the associated detail specifications (see 2.1.1).

1.2 Purpose. The purpose of this specification is to assure uniformity of treatment among mapping and charting elements, primarily DMA and its contractors, engaged in a coordinated production and maintenance program for this product. Feature requirements are stated in terms of DMA's Feature/Attribute Coding Standard (FACS), to maintain consistency between various DMA production methods. The use of FACS in this specification is not intended to imply any external digital data coding standard. FACS is the internal coding standard used by DMA's Digital Production System (DPS), which is the primary intended, but not exclusive, method for production of this product at this time. The Digital Geographic Information Exchange Standard (DIGEST) Feature Attribute Coding Catalog (FACC), not FACS, is the approved coding standard for the exchange of digital geographic data, as well as the standard for DMA's Vector Product Format product line. FACC may be included in, or replace FACS in a future edition of this specification.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Director, Defense Mapping Agency, ATTN: PR, ST A-13, 8613 Lee Highway, Fairfax, VA 22031-2137 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

AREA MCGT

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

### 1.3 Security.

1.3.1 Security Classification. The security classification of the products generated by the use of these specifications will be the lowest category practicable. When it is necessary to assign a security classification to the product, it shall be in accordance with established national security procedures.

## 2. APPLICABLE DOCUMENTS

### 2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the current Department of Defense Index of Specifications and Standards (DODISS) and the supplement thereto, cited in the solicitation (see 6.2).

#### MILITARY SPECIFICATIONS

- MIL-H-89201/1(DMA) - Associated Detail Military Specification for Harbor, Approach and Coastal Charts at Scales 1:25,000 and Larger (HAC 1)
- MIL-H-89201/2(DMA) - Associated Detail Military Specification for Harbor, Approach and Coastal Charts at Scales 1:25,001 to 1:50,000 (HAC 2)
- MIL-H-89201/3(DMA) - Associated Detail Military Specification for Harbor, Approach and Coastal Charts at Scales 1:50,001 to 1:100,000 (HAC 3)
- MIL-H-89201/4(DMA) - Associated Detail Military Specification for Harbor, Approach and Coastal Charts at Scales 1:100,001 to 1:250,000 (HAC 4)
- MIL-H-89201/5(DMA) - Associated Detail Military Specification for Harbor, Approach and Coastal Charts at Scales 1:250,001 to 1:350,000 (HAC 5)
- MIL-H-89201/6(DMA) - Associated Detail Military Specification for Harbor, Approach and Coastal Charts at Scales 1:350,001 to 1:600,000 (HAC 6)
- MIL-H-89201/7(DMA) - Associated Detail Military Specification for Harbor, Approach and Coastal Charts at Scales 1:600,001 to 1:750,000 (HAC 7)
- MIL-H-89201/8(DMA) - Associated Detail Military Specification for Harbor, Approach and Coastal Charts at Scales 1:750,001 to 1:1,000,000 (HAC 8)
- MIL-H-89201/9(DMA) - Associated Detail Military Specification for Harbor, Approach and Coastal Charts at Scales Smaller than 1:1,000,000 (HAC 9)

#### MILITARY STANDARDS

- MIL-STD-129 - Marking for Shipment and Storage

- MIL-STD-2402(DMA) - MC&G Symbology for Graphic Products
- MIL-STD-2403(DMA) - MC&G Product Generation Rules
- MIL-STD-2408(DMA) - Mapping, Charting & Geodesy Glossary of Feature and Attribute Definitions
- MIL-STD-2409 - MC&G Accuracy
- MIL-STD-2410(DMA) - MC&G Reproduction and Printing
- MIL-STD-2414 - Defense Mapping Agency Bar Coding

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robins Avenue, Philadelphia, PA 19111-5094.)

2.1.2 Other Government documents, drawings, and publications.

The following other Government documents, drawings and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

- DMA Standard Supporting Mark 90, Section 500 - Geographic Names
- STANDCONTABLE 02 - Standard Conversion Table No. 2
- STANDCONTABLE 03 - Standard Conversion Table No. 3
- STANDCONTABLE 04 - Standard Conversion Table No. 4

(Copies of the above publications are available from the Defense Mapping Agency, ATTN: TIJ, ST A-10, Fairfax, VA 220031-2137).

- DMA TM 8358.1 - Datums, Ellipsoids, Grids and Grid Reference Systems

(Copies of the above publications are available from the Defense Mapping Agency Combat Support Center, 6001 MacArthur Boulevard, Bethesda, MD 20816-5001).

- Chart No. 1 - Nautical Chart Symbols and Abbreviations
- PUB. 9 - American Practical Navigator
- PUBS 110-116 (LLPUB) - List of Lights
- N M - Notice to Mariners (NM)
- PUB117 - Radio Navigation Aids
- SDPUB - Sailing Directions

(Copies of the above publications are available for DoD users from the Defense Mapping Agency Combat Support Center, 6001 MacArthur Boulevard, Bethesda, MD 20816-5001. Other users may obtain these publications from the National Ocean Service, and its authorized sales agents).

2.2 Non-Government publications.

- IHO Special Pub. 46 - Correction of Echo Soundings

(Copies of the above publication are available on disc or paper format, upon request, from the International Hydrographic Organization - Monaco)

- NP139 - Echo Sounding Correction Tables (3rd or latest edition)

(Copies of the above publication are available from the British Admiralty, Taunton, U.K.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specification sheets, or MS standards) the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 Associated detail specifications. The individual item requirements shall be as specified herein and in accordance with the applicable associated detailed specifications. In the event of any conflict between the requirements of this specification and the associated detail specifications, the latter shall govern. (If a specific requirement specified herein is not required for an item, it shall be so indicated on the associated detail specification; for example, "Shock - N/A".).

3.2 First Article When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.3) in accordance with 4.3.

#### 3.3 Accuracy.

3.3.1 Horizontal Accuracy. The absolute horizontal accuracy requirement for Harbor, Approach, and Coastal Charts is 1.0mm (at chart scale) circular error (CE) to the preferred datum, at a 90% confidence level. See 6.5 for definition of CE.

#### 3.3.2 Vertical accuracy.

3.3.2.1 Topographic. This section is not applicable to this specification.

3.3.2.2 Hydrographic. The absolute vertical accuracy requirement for depths shown on Harbor, Approach, and Coastal Charts is 0.3 meters (from 0 to 30 meters), and 1% of depth (over 30 meters), linear error (LE), at a 90% confidence level. See 6.5 for definition of LE.

3.3.3 Hydrographic data accuracy. DMA strives to compile nautical charts with the most accurate information available, but DMA charts are compiled from a variety of sources, with varying accuracies. Often the metric accuracy (expressed as circular and linear error at a certain level of confidence) of the hydrographic and bathymetric data is unknown, or the information is not available to DMA. In this case, a subjective determination of accuracy is made, based on the survey dates, scale, and originating agency of the source.

3.3.4 Displaced features. Feature symbols which are displaced, as identified in Table I, and MIL-STD-2403 are excluded from the accuracy requirement stated above.

3.3.5 Tolerance for graticules. The intersections of the parallels and the meridians will be within 0.1 mm (0.005 in.) of their computed positions.

### 3.4 Datum.

3.4.1. Horizontal Datum. For new production, as charts are revised or updated for periodic maintenance, the WGS 84 or NAD 83 datum shall be used. Where appropriate, a revised Military Grid System, also based on WGS 84 or NAD 83, shall be depicted as the primary grid (Purple), and if required, the overlapping grid (Blue). The old (local) datum and secondary grid will not be shown. Charts on the Mercator projection will show interior ticks in addition to border ticks, due to the curvature of grid lines on that projection.

3.4.2 Vertical datum. Charts generally have three vertical datums. Topographic features are referenced to Mean Sea Level. Shoreline (2A010) is referenced to Mean High Water. The hydrographic features are referenced to a vertical datum based on a low water tide level and is called the sounding datum or hydrographic datum. The specific low water datum used depends on the type of tide in the area or on the number and magnitude of high and low tides in one tidal cycle.

3.5 Series. Harbor, Approach and Coastal Charts are not normally produced as a series, each chart having its own scale, limits, etc. Occasionally, a series of coastal charts will be produced, for use in coastal transit, having a common scale at the mid-latitude of the series, rather than at the mid-latitude of each chart. See 3.6.d. The available coverage is indexed in the catalog of nautical charts.

### 3.6 Scale.

a. There are three chart series covered by these specifications: Harbor, Approach, and Coastal Charts. The designation of a chart series for a product is dependent on the intended use of the product and not its scale. Chart scales will vary with the coverage required, detail essential for safe navigation (physical and cultural features), and hydrography of the area. Requirements dictate the intended use of a product and hence the appropriate series designator. The selection of scale is addressed below for harbor, approach, and coastal requirements.

b. For Harbor Charts, scale selection may vary because of size and configuration, traffic involved, and ease of entry. Harbor Charts are generally the largest scale of the navigational products and shows more detail of the shoreline, culture and hydrography than Approach and Coastal Charts. Most harbors are charted at scales from 1:10,000 to 1:50,000 (HAC 1 and 2).

c. Approaches to ports and harbors are charted at scales according to the navigational difficulty, the geographic character of the coastal landmass, and degree of hydrographic and cultural detail needed to support navigation. Most approach charts are developed at scales ranging from 1:25,000 to 1:100,000 (HAC 2-3). Ports which must be approached through a limiting landmass configuration (strait, archipelago, channel, or river) will require a larger scale approach chart than those ports with direct access to open bodies of water.

d. Charts designed for coastal transits may be part of a coordinated series with a common scale computed for the latitude at the midpoint of the series. A coordinated series provides a common longitudinal value for an interlocking chain of charts and facilitates

navigation from one chart to the next. An overlap area incorporated in coastal chart schemes permits direct transfer of the ship's plotted position and tracks from one chart to the next. The coordinated series is identified by the common mid-latitude in the title. In many areas a layering of coastal charts at varying scales may be required due to navigational difficulty, heavy ship traffic, or the complexity of the area. The coast of Norway is an example of such a layered scheme. In this example a 1:50,000 (HAC 2) scale coastal series provides insular navigational information, while a 1:200,000 (HAC 4) scale series is more generalized in support of offshore transiting. Most coastal charts range in scale from 1:75,000 (HAC 3) to 1:500,000 (HAC 6), with a nominal scale being 1:300,000 (HAC 5). However, it is not unusual to have an inshore coastal chart requiring a scale as large as 1:25,000 (HAC 1), or to have an offshore coastal requirement fulfilled by a scale of 1:1,000,000 and smaller (HAC 8 and 9).

e. See 3.26.1 for definitions of the scale ranges, i.e., HAC 1-9, used in these specifications.

3.7 Chart design. Harbor, Approach, and Coastal Charts are designed to provide a layered coverage. At the smallest scales, Coastal Charts allow the mariner to safely approach the coast, and transit coastal waters offshore. Approach Charts provide more detail at larger scales for use in approaching a specific port. Harbor Charts provide the most detail at the largest scales for navigating and anchoring within harbors. When two charts adjoin, a small overlap area is provided to facilitate the transfer of positions from one chart to the next.

3.7.1 Authority. The statutory authority for DMA to publish nautical charts is contained in Sections 2791, 2792, 2793, and 2794 of the U.S. Code, Title 10, Chapter 639.

3.7.2 Requirements (originators of). Charts are produced and/or revised depending upon current requirements. These requirements for updating and improving charts on issue may originate with the charting agency, or they may originate with the operating forces or military planners. The following are the most common:

- a. Unified or specified commands, plus fleet requirements.
- b. Maritime Administration (MARAD) requirements.
- c. U.S. Coast Guard requirements.
- d. Specific requests by users for more detail (larger scale may be required) or because of known changes in an area.

3.8 Size and dimension. Refer to APPENDICES A and B (Style Sheets).

### 3.9 Projection.

a. A nautical chart portrays data essential for safe maritime navigational purposes. To prepare a chart so that navigational data can be placed upon it, that area of the earth which is to be charted must be represented on a flat surface. This is accomplished by an orderly arrangement of the coordinates that constitute the framework of the

chart. These lines are called meridians and parallels. Meridians are imaginary north-south reference lines extending through the geographic poles, providing the basis for plotting longitude. The zero meridian, sometimes referred to as the prime meridian, is the meridian which passes through Greenwich, England. The United States and most other countries accept Greenwich as the zero meridian for their mapping and charting. There are 360 degrees of longitude (meridians), 180 degrees east of Greenwich and 180 degrees west of Greenwich. Therefore, there are east and west longitudes. A parallel, or parallel of latitude, is an imaginary circle on the surface of the earth, parallel to the plane of the equator. It connects all points of equal latitude. The equator, a great circle, is a limiting case connecting points of 0° latitude. The poles, single points at latitude 90°, are the other limiting case. All other parallels are smaller circles. Latitude is the angular distance from the equator, measured northward or southward along a meridian from 0° at the equator to 90° at the poles. It is designated north (N) or south (S) to indicate direction of measurement.

b. As required by the NATO Standardization Agreement (STANAG) 1113MC (Edition No. 3), "General Specifications for Projections Required for Nautical Charts for the Polar Regions and the Higher Latitudes", the type of chart projections that would normally be used in Polar Regions and higher latitudes are shown in the following matrix:

<u>LATITUDE</u>	<u>1:50,000 or Larger HAC 1-2)</u>	<u>1:50,001 - 500,000 (HAC 3-6)</u>
Lower than 80° (If chart extends above 80°, greater part of chart is below 80°)	* Mercator	Mercator
70° or higher, but does not cover pole	* Mercator or Transverse Mercator or Lambert Conformal	Polar Stereographic or Lambert Conformal
Higher than 70° and covers pole	Not Applicable	Polar Stereographic

\* Harbor and Approach charts of scales 1:50,000 and larger may be compiled on a Transverse Mercator projection.

c. Graticule lines cannot be spaced a standard distance apart, because nautical charts are produced at various scales, and the length of a degree of longitude varies with latitude. The navigator must be able to reach from any point on the chart to a graticule line, using his dividers. Therefore, graticule lines on nautical charts are spaced from about 11.25 cm (4.5 inches) to about 25.0 cm (10 inches) apart. All parallels and meridians shown on the chart should be labeled. Graticule lines should be matched to a standard increment of latitude and longitude along the border. For example, if the border is to be labeled every five minutes, the interior graticule lines should be shown at an increment that can be divided by five. If the border is to be labeled every thirty minutes, the graticule lines should be shown at an increment that can be divided by thirty minutes. Preference should be given to increments that include whole degrees.

d. Lineweights for the graticule are 0.1mm (0.005 in.). Length of graticule extension ticks are as follows:

HAC Charts with scales of 1:75,000 and larger (HAC 1-3)

Whole Minute Ticks 2.0mm  
 Second or Two Second Ticks 1.0mm  
 Lineweight for ticks are 0.1mm (0.005 in.)

HAC Charts with scales of 1:75,001 and smaller (HAC 3-9)

Ticks are 1.0mm  
 Lineweight for ticks are 0.1mm (0.005 in.)

e. Graticules shall be shown on insets (small, medium, or large scale) based on the size of the inset. If the inset is larger than 4.5 inches square than at least one set of latitude and longitude lines should be shown. The logic that is used for graticule lines on the main body of the chart also holds for insets, with the exception that if the inset is of a small size (less than 4.5 inch square) the graticule lines can be eliminated.

3.10 Reference systems

3.10.1 Grid line spacing - For information regarding the portrayal of grids on nautical charts, see DMA TM 8358.1. Grid ticks, or if a special requirement dictates grid lines, shall be spaced according to FIGURE 1. The grid, however, must not be so closely spaced as to detract from the chart information, or spaced so far apart as to be inconvenient when locating points.

<u>Scale</u>	<u>Interval</u>	
larger than 1:40,000	5,000 meters	(HAC 1-2)
1:40,001 - 1:75,000	10,000 meters	(HAC 2-3)
1:75,001 - 1:150,000	20,000 meters	(HAC 3-4)
1:150,001 - 1:300,000	50,000 meters	(HAC 4-5)
1:300,001 and smaller	None	(HAC 5-9)

FIGURE 1. Spacing of grid lines/ticks.

The grid interval on the actual chart ranges from 5 to 15 centimeters using the above table. Ease of referencing is the main reason for the table; the second consideration is suitable spacing to reduce chart clutter.

a. On insets and plans the grid line interval should be selected so that at least two grid lines are shown horizontally and two vertically, even though the interval does not conform to FIGURE 1.

b. Grids will be shown on insets (including plans) of charts with grids except when the inset is of a smaller scale than the main chart. Charts composed of several plans will show grids on each plan, regardless of the scale differences between plans. The grids will be portrayed as follows:

(1) All nautical charts, on the Transverse Mercator Projection, requiring a UTM grid will contain border grid ticks. Full or continuous grid lines will be shown when a specific requirement is validated.

(2) On Mercator and other projections where the grid will not be parallel lines, the grid will be shown by border ticks and where necessary, by interior grid intersections (+) on the purple plate.

3.10.2 Grid extension. The UTM Grid normally consists of grid zones extending 3° west and 3° east of a central meridian labeled with a false easting of 500,000 meters. Frequently the adjoining grids beyond the normal junction are extended so that the dual grids will be shown on charts containing a junction. However, extending the grid to the west more than 500,000 meters should be avoided to preclude showing negative grid values. Other exceptions include an area in Norway, where the grid zone is extended to cover 9° of longitude so it will encompass the coast line, and areas where the British Grids are the preferred grid.

a. In Norway the boundary of zones between 56°N and 64°N occurs at the 3° meridian. North of 64°N latitude the zones are unchanged, but the overlap area of each zone extends to the central meridian of adjacent zones. Therefore, all charts must show one or more overlapping grids by marginal ticks and values. A chart centered on a central meridian, for example, must have three grids.

b. Special exceptions to these specifications, when required, must be authorized by DMA.

c. The most common case of overlapping grids occurs when multiple grids, both on WGS-84, appear on a chart. The extent of the grids will be subject to the following conditions:

1. At scales of 1:75,000 and larger (HAC 1-3), both grids will be shown across the entire chart.

2. At scales smaller than 1:75,000 (HAC 3-9), both grids will extend one set of border ticks beyond the zone junction, if that junction is within the chart limits. If the junction is slightly beyond the chart limits, then the primary grid will be shown across the entire chart, and the non-primary grid will extend two sets of ticks beyond the edge of the chart closest to the junction.

### 3.10.3 Grid specifications.

a. UTM grids will be portrayed as (1) border ticks, or (2) as border ticks and interior ticks at grid intersections in accordance with the scale of the chart (see FIGURE 1).

b. All grid information will be printed in same color as the grid.

3.10.4 UTM grid and colors on Transverse Mercator projection. UTM grid is shown by border ticks only. Primary grid ticks are printed in purple, and overlapping grid ticks are printed in blue.

3.10.5 UTM grid and colors on Mercator projection. UTM grid is shown by border ticks, and interior ticks. Primary grid ticks are printed in purple, and overlapping grid ticks are printed in blue.

3.10.6 Grid labeling (exterior).

a. Border ticks will be labeled between the neatlines and border, with the labels centered on the ticks.

b. Full grid values shown on the side of the chart will be oriented parallel to the neatline with the tops of the characters toward the West. Grid values for eastings will be oriented with the tops toward the North.

c. Unless a special requirement exists for showing full grid values on all ticks, only the ticks nearest each corner will be labeled with full grid value indicating <sup>m</sup>N or <sup>m</sup>E as appropriate.

d. Each value will be aligned at the top, e.g., <sup>5</sup>78<sup>000m</sup>E

e. Charts at all scales (HAC 1-9) will show two principal figures representing 10,000 and 1,000 meters, preceded by one or two smaller figures. Example: <sup>6</sup>87 <sup>4</sup>1<sup>55</sup>

f. The principal digits will be in 10 point Swiss 742 Light condensed all other digits will be 6 Point Swiss 742 Light condensed.

3.10.7 Grid labeling (interior). Interior ticks at intersections of grid lines will not be labeled in any manner.

3.10.8 Notes (grid system). Explanation of the grid system and data pertaining to the major grid will be shown on all charts as follows:

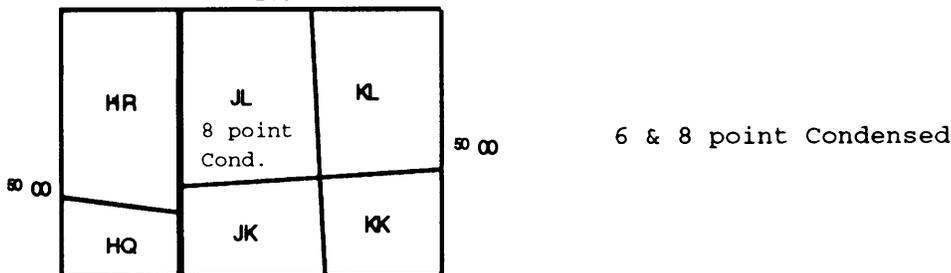
a. The following note referring to the convergence between grid north and true north will be shown on all charts that have military grid ticks. This note will apply equally to all grids shown as ticks regardless of the projection used. The following note will be shown in the same color as the primary grid:

**CAUTION**

Grid lines constructed by connecting border ticks are NOT true North and South. The resulting UTM Grid is NOT to be used for navigation. It is designed to facilitate the reporting of positions according to the Military Grid Reference System prescribed for this area.

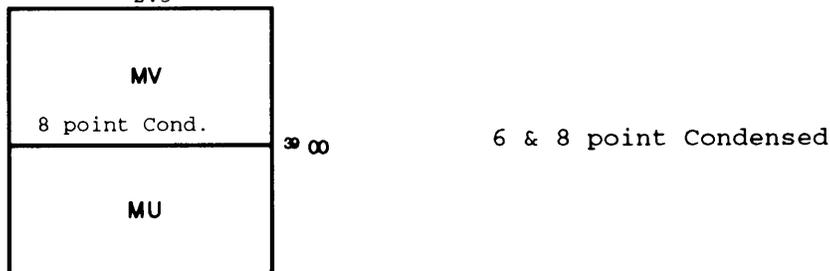
b. Each chart with a UTM overprint will contain a Grid Reference Box with instructions and pertinent data for composing standard grid references. Appropriate information as shown in FIGURE 2 will be used on all charts that have grid ticks. For charts with only border ticks the wording will be changed to read: "To form 10,000 meter squares, join the ticks on neatlines with straight line segments."

UNIVERSAL TRANSVERSE MERCATOR (UTM) GRID 10 point Condensed  
 2.5  
 ZONES 35S, 34S, WORLD GEODETIC SYSTEM (WGS-84) DATUM AND ELIPSOID 8 point Condensed  
 2.5  
 FOR MILITARY GRID REFERENCE 10 point Condensed  
 5.0  
 100,000 METER SQUARES JL, JK, KL, KK, HR, HQ 6 point  
 2.5



6 & 8 point Condensed  
 10 point  
 TO FORM 10,000 METER SQUARES, JOIN THE TICKS ON NEATLINES WITH STRAIGHT LINE SEGMENTS THROUGH THE INTERIOR TICKS. 6 point  
 4.5  
 THE UTM GRID TICKS AND CHART ARE BASED ON THE WORLD GEODETIC SYSTEM (WGS-84) DATUM. TO REPORT WGS DATUM-GRID COORDINATES OF A POINT, GIVE THE LETTERS OF THE 100,000 METER SQUARE DESIGNATION FOLLOWED FIRST BY THE NUMBERS OF THE EAST READING AND THEN BY NORTH READING: eg. AKRA PLAKA LIGHT (PLAN A) KL247082. 6 point

UNIVERSAL TRANSVERSE MERCATOR (UTM) GRID 10 point Condensed  
 2.5  
 ZONE 35S, EUROPEAN DATUM, INTERNATIONAL SPHEROID 8 point Condensed  
 2.5  
 FOR MILITARY GRID REFERENCE 10 point Condensed  
 5.0  
 100,000 METER SQUARES MU, MV 6 point  
 2.5



6 & 8 point Condensed  
 5.0  
 TO FORM 5,000 METER SQUARES, JOIN THE TICKS ON NEATLINES WITH STRAIGHT LINE SEGMENTS THROUGH THE INTERIOR TICKS. 6 point  
 4.5  
 THE UTM GRID TICKS ARE BASED ON THE EUROPEAN DATUM, INTERNATIONAL SPHEROID, AND THE CHART IS ON THE WORLD GEODETIC SYSTEM-1972 DATUM. TO REPORT EUROPEAN DATUM-GRID COORDINATES OF A POINT, GIVE THE LETTERS OF THE 100,000 METER SQUARE DESIGNATION FOLLOWED FIRST BY THE NUMBERS OF THE EAST READING AND THEN BY NORTH READING: eg. AKRA PLAKA LIGHT (PLAN A) MU 355051. 6 point

FIGURE 2. Sample Grid Reference Boxes

c. A sample point is a point or object shown on the chart whose grid coordinates are given in the grid reference box to assist in the explanation of the UTM Grid Reference System. Only one sample point and note will be used on each chart even though more than one plan or chart is printed inside a common border. The chart or plan on which the

sample point falls will be indicated -- SAMPLE POINT: 482 (Plan B). The sample point selected should be an easily identified, permanent point not subject to change by weekly Notice to Mariners. If possible, the selected point should be approximately midway between grid lines.

3.10.9 Gisement. On gridded nautical charts, when necessary because of a special requirement, a gisement (grid declination) will be computed and placed on the chart according to the following:

a. Paragraph 3.10.9.g below, contains an example in the use of a simplified formula for computing the gisement or grid declination for gridded nautical charts.

b. The gisement of those charts oriented north-south shall be determined for the mid-latitude of each of its bounding meridians.

c. On skewed charts the point of determination shall be the intersection of the parallel and meridian, to the nearest minute, approximately at the physical center of the chart.

d. The computation of the gisement shall be accurate to the nearest minute of arc, and shall be obtained by using the following formula:

$$\text{Grid Declination} = D k \sin v$$

Departure from grid zone central meridian expressed in minutes, multiplied by the sine of (latitude), gives the grid declination in minutes of arc. The grid declination is east or west depending on whether the point is to the east or west of the central meridian of the grid zone. When a zone junction occurs within the chart limits, grid declination will be computed at the zone junction, in addition to the grid declinations at the east and west edges of the chart.

e. The computation data page for each chart will be reviewed and inserted as part of the chart record.

f. The following caution will be shown in place of the note specified in 3.10.8.a. (content of the note is variable). The declination note is the same color as the grid.

**CAUTION**  
GRID LINES ARE NOT TRUE NORTH AND SOUTH

At West edge of chart Grid N is 0°40'E of True N  
At East edge of chart Grid N is 0°35'E of True N

FIGURE 3. Declination note.

g. Computation of grid declination

TOP LATITUDE	31°41'00"
MINUS BOTTOM LAT.	31°19'00"
DIFFERENCE	22'
DIFFERENCE/2	11'
DIFFERENCE/2 + BOTTOM LAT.	
= LAT. MIDPOINT	31°30'00"

## DEPARTURE

	West Edge <u>of Chart</u>	East Edge <u>of Chart</u>
CENTRAL MERIDIAN	135°00'	135°00'
MINUS LONG. OF CHART EDGE	133°40'	134°20'
= DEPARTURE	1°20'	40'
DEPARTURE IN MINUTES	80'	40'

SIN (LAT.) MIDPOINT x DEPARTURE (IN MINUTES) = DECLINATION (MINUTES)

SIN of 31°30'00" (Midpoint Lat.)	0.522498	0.522498
MULTIPLIED BY DEPARTURE	80'	40'
EAST OR WEST OR TRUE NORTH	(41.79)	(20.89)
NORTH (CENTRAL MERIDIAN)	42'W of TRUE N.	21'W of TRUE N.

### 3.11 Margin data.

3.11.1 General. Margin data and other notes consist of textual and graphic information used to identify the product and to enhance its usability. This section will provide information on use, content, applicability, position, type style and size, and color of required chart format items. The following terms will be used to identify content and position.

3.11.1.1 Fixed. The item is always portrayed exactly as described in this section

3.11.1.2 Variable. When used to describe content, the notes must be written to specifically apply to an individual chart. When used to describe position, variable means that the item is placed on the chart so that the least chart detail is obscured. This is the order of preference for placing variable items:

a. On land areas, not to obscure navigational aids such as lights, radio navigational aids, or significant landmarks. If possible, the notes will be stacked in the following order, with at least 5mm vertical spacing between each note:

1. Main Title
2. Horizontal Datum Note
3. Source Diagram
4. Source Data
5. Copyright Note
6. Caution Note
7. General Note
8. Datum Note
9. Buoyage Note
10. Tidal Information
11. Glossary

Not all of these notes will always apply to an individual chart. Also, the stacking may need to be separated due to space limitations.

b. In the upper margin, at least 5mm above the heavy border line.

c. In the lower margin, at least 2mm below the heavy border line.

d. On water areas, obscuring as little hydrography as possible, and not obscuring navigational aids. The same stacking preference as applies to land areas will be used for notes in water areas.

e. These placement rules will be adjusted to suit individual charts. For instance: the main title, and vertical and horizontal datums may fit in the upper margin; source diagram, source data, copyright note, and accuracy note might fit in the lower margin; and the rest of the notes would be stacked on land areas.

3.11.1.3 Preferred. This term will be used only for positioning. If possible, the margin data will be portrayed as described in this section. If the preferred position is not possible, then the position becomes variable, and placement rules for variable notes will apply as previously stated.

3.11.1.4 Requirements. APPENDIX A, the Plan Border Style Sheet, and APPENDIX B, the Scale Border Style Sheet, are intended for use as graphic illustrations of the positions described in this section. Fixed and preferred positions are portrayed the same way on the style sheets. Variable positions are shown on the style sheets without measurements. All HAC margin notes shown in section 3.11 of this specification are portrayed in a convenient font type and size. The correct fonts (type size and style), color, justification, format, and placement for all margin notes and diagrams are provided in APPENDICES A and B.

#### 3.11.2 Buoyage notes.

3.11.2.1 Use. The buoyage note tells the user that the International Association of Lighthouse Authorities (IALA) Maritime Buoyage System is either in effect or will be in effect in the area covered by the chart.

3.11.2.2 Applicability. The buoyage note is shown on charts as authorized by Maritime Safety Branch.

3.11.2.3 Content. One of four buoyage notes is shown on the chart, depending on authorization received from the Maritime Safety Branch. The heading "BUOYAGE" or "CHANGES IN BUOYAGE" are centered above the notes.

a. When the IALA Buoyage System, Region A, is in effect in the area covered by the chart, the content of the buoyage note is fixed as shown in FIGURE 4.

b. When the IALA Buoyage System, Region B, is in effect in the area covered by the chart, the content of the buoyage note is fixed as shown in FIGURE 5.

## BUOYAGE

IALA Buoyage System, Region A,  
is in effect in the area covered  
by this chart. See Chart No. 1.

FIGURE. 4. Region A in effect.

## BUOYAGE

IALA Buoyage System, Region B,  
is in effect in the area covered  
by this chart. See Chart No. 1.

FIGURE. 5. Region B in effect.

c. When the aids to navigation in the area covered by the chart are in the process of being converted to the IALA Maritime Buoyage System, Region A, the content of the buoyage note is fixed as shown in FIGURE 6.

d. When the aids to navigation in the area covered by the chart are in the process of being converted to the IALA Maritime Buoyage System, Region B, the content of the buoyage note is fixed as shown in FIGURE 7.

## CHANGES IN BUOYAGE

Certain buoys, lights, and beacons within the area of this chart will be affected by the conversion to IALA Maritime Buoyage System, Region A. For further explanation, see annual Notice to Mariners 1(6) and Chart No. 1.

FIGURE. 6. Conversion to IALA Region A.

## CHANGES IN BUOYAGE

Certain buoys, lights, and beacons within the area of this chart will be affected by the conversion to IALA Maritime Buoyage System, Region B. For further explanation, see annual Notice to Mariners 1(6) and Chart No. 1.

FIGURE 7. Conversion to IALA Region B.

3.11.2.4 Position. The position of the buoyage note is variable.

3.11.2.5 Type. The headings - "BUOYAGE" and "CHANGES IN BUOYAGE" are shown in 9 point Swiss 742, upper case. The text of the note is shown in 7 point Swiss 742 upper and lower case.

3.11.2.6 Color. SPC 58600 Black - Solid.

3.11.3 Catalog number The catalog number was used to assist the user in looking up charts in the chart catalog. As there is now only one catalog, the catalog number will not be added to charts.

3.11.4 Caution notes.

3.11.4.1 Use. Caution notes are shown on charts to warn the user of dangers to navigation; either physical dangers existing in charted waters, or idiosyncrasies inherent in the chart itself.

3.11.4.2 Applicability. Caution notes are applied to charts on an individual basis.

3.11.4.3 Content. The content of caution notes is variable, although the wording may be standardized in some cases, as in 3.10.8.a. regarding cautions for use of UTM grids. There are two parts to a caution note: the note itself; and the caution referenced.

a. The type for caution notes is justified on both sides and enclosed in a box with a 0.2mm linewidth. The box should be no wider than 10 cm, but the height is variable.

(1) A single caution is shown in the box beneath the heading "CAUTION". The heading is centered on the note (see FIGURE 8).

(2) Multiple cautions are numbered and shown in the box beneath the heading "CAUTIONS". The heading is centered on the note. Specific cautions (i.e., those applying to a specific part of the chart) shall be listed first, followed by the more general ones (i.e., those applicable to the entire chart), (see FIGURE 9).

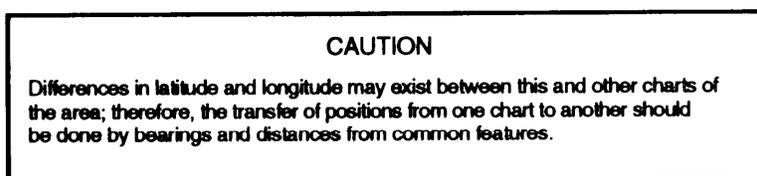


FIGURE 8. Single caution note

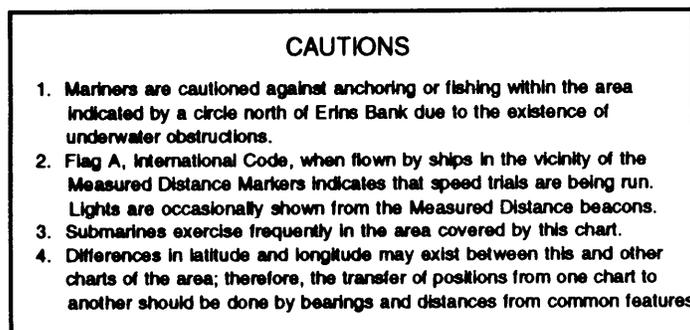


FIGURE 9. Multiple cautions note

b. If cautions contained in the caution note concern only a certain area of the chart, a caution reference is placed in the applicable area.

(1) If only a single caution is contained in the caution note, the caution reference is fixed, and reads "SEE CAUTION" (see FIGURE 10).

(2) If multiple cautions are shown in the caution note, the caution reference is variable to refer to the correct caution (see FIGURE 11).

(3) If more than one caution in a caution note applies to the same area, each applicable caution is referenced in the caution

reference. Use dashes to separate consecutive cautions, "&" to separate nonconsecutive cautions. Periods and commas are not shown (see FIGURE 12).

**SEE CAUTION****CAUTION NO 2**

FIGURE 10. Caution reference to single caution.

FIGURE 11. Caution reference to numbered cautions.

**CAUTION NOS 1-3 & 5**

FIGURE 12. Caution reference to multiple cautions.

(4) Caution notes which apply to the entire chart do not require a caution reference.

3.11.4.4 Position. The position of the caution note is variable.

3.11.4.5 Type. The heading of the caution note is shown in 9 point Swiss 742, upper case. The text of the caution note is shown in 7 point Swiss 742, upper and lower case. The caution reference is 9 or 10 point Swiss 742 Italic, upper case (10 point is preferred when space is adequate).

3.11.4.6 Color. SPC 96532 Purple - Solid.

3.11.5 Chart number.

3.11.5.1 Use. Chart numbers are assigned to hydrographic charts in accordance with the scale range and geographical area of coverage of the chart. Five digit numbers are assigned to the products covered by these specifications, which cover portions of the coastline rather than significant portions of ocean basins. These numbers are based on the regions of the nautical chart index. The first of the five digits indicates the region; the second digit indicates the subregion; the last three digits indicate the geographical sequence of the chart within the subregion.

3.11.5.2 Applicability. A Chart number appears on each chart.

3.11.5.3 Content. Each chart number is five Arabic digits long. The content is variable (see FIGURE 13).

# 62430

FIGURE 13. Sample chart number.

3.11.5.4 Position. The chart number is shown four times on each chart. The positions are fixed in the following positions:

a. In the lower left margin, readable from the bottom of the chart, the top 5mm below the heavy border line and the left side of the number aligned with the left outside corner of the heavy border line. See APPENDICES A and B for graphic examples.

b. In the upper left side margin, readable from the left side of the chart, 2mm away from the border line, and with the left side of the number aligned with the top outside corner of the heavy border line. See APPENDICES A and B for graphic examples.

c. In the upper right side margin readable from the right side of the chart, 2mm away from the heavy border line, and with the right side of the number aligned with the top outside corner of the heavy border line (see APPENDICES A and B for graphic examples).

d. In the lower right side margin, readable from the right side of the chart, 2mm away from the heavy border line, and with the left side of the number aligned with the bottom outside corner of the heavy border line (see APPENDICES A and B for graphic examples).

3.11.5.5 Type. 30 point Swiss 742.

3.11.5.6 Color. SPC 58600 Black - Solid.

3.11.6 Classification notes.

3.11.6.1 Use. Classification notes clearly identify the security classification of the chart.

3.11.6.2 Applicability. Classification notes are shown on all charts with classifications of Confidential or higher.

3.11.6.3 Content. The content of the classification note is one of three fixed classifications (see FIGURE 14). A declassification note is also shown describing the authority which classified the chart and the authority required (or date required) for declassification. The declassification note is enclosed within a box with a 0.2mm linewidth (see FIGURE 15 for example).

**CONFIDENTIAL      SECRET**  
**TOP SECRET**

FIGURE 14. Classification notes.

CLASSIFIED BY: OPNAVINST C1234.5A DECLASSIFY ON: OADR
--

FIGURE 15. Sample declassification note.

3.11.6.4 Position. Four classification notes and one declassification note are shown on classified charts (see FIGURES 14 and 15, and APPENDIX A.

a. One classification note is shown in a preferred position in the lower right hand corner of the chart margin, the right side of the note is 5mm away from the DMA bar code and stock number, the top of the note is approximately 25mm below the south heavy border line, and the note is readable from the bottom of the chart.

b. One classification note is shown in a fixed position in the upper left hand corner of the chart margin. The left side of the note is 60mm away from the extension of the north heavy border line, the top of the note is 3mm away from the west heavy border line, and the note is readable from the left side of the chart.

c. One classification note is shown in a fixed position in the lower left hand corner of the chart margin. The left side of the note is aligned with the west heavy border line and the top is 3mm below the chart number. The note is readable from the bottom of the chart.

d. One classification note is shown with the main title.

(1) If the main title is shown in its preferred position (See 3.11.25), a classification note is shown 3mm above the DMA Seal, or 3mm above the electronics note, if the electronics note is shown centered on the main title and readable from the bottom of the chart.

(2) If the main title is shown in a variable position (see 3.11.25), one classification note is shown 3mm above the uppermost line of the main title, or 3mm above the electronics note, if the electronics note is shown, centered on the main title, and readable from the bottom of the chart.

e. The preferred position of the declassification note is in the lower right corner of the chart border, approximately halfway between the warning note (see 3.11.35) and the publication note (see 3.11.29), the top of the box is 2mm below the south heavy border line, and the note is readable from the bottom of the chart.

3.11.6.5 Type. The classification notes in the lower right, lower left, and upper left chart margins are shown in 30 point Swiss 742 upper case. The classification note above the main title is shown in 20 point Swiss 742 upper case. The declassification note is shown in 8 point Swiss 742 upper case.

3.11.6.6 Color. SPC 58600 Black - Solid.

### 3.11.7 Source data list

3.11.7.1 Use. The source data list provides information on the origins, scales and dates of the hydrographic sources so the user can generally determine their quality. The primary purpose of the source data listing, used in conjunction with the source diagram, is to guide navigators and those involved in planning "navigational operations" (including the planning of new routes and routing measures) on the degree of confidence they should have in the adequacy and accuracy of charted depths and positions. As a secondary function, the source listing serves as a readily accessible, but not necessarily

comprehensive, record of the sources that were used to compile the chart.

3.11.7.2 Applicability. Source data is shown for each chart.

3.11.7.3 Content. Source data consists of four parts; the source listing, the note "With additions from other sources," miscellaneous notes, and the foreign copyright note. In all cases, an attempt will be made to cite the original survey data of U.S. and foreign sources being used in each area. Only if the original survey sources are unknown will the charts which contain information from original surveys be cited.

3.11.7.3.1 Source listing. The source listing shows the data about sources shown in the source diagram. Each source is identified by a letter which is keyed to a specific area in the source diagram. If only one source was used, the letter identifier is not shown on the source data list. See FIGURE. 16.

a. For hydrographic survey sources (direct or from foreign charts), the country of origin, date and scale shall be listed. Surveys of similar origin, type, date and scale may be grouped together to avoid too long a list or too complex a diagram, for example, French Surveys, 1978-1983, 1:20,000-1:30,000. Dates are grouped as follows: prior to 1940 (no sonar), 1940s (sonar but no electronic positioning), and 1950s and later (both sonar and electronic positioning). Lead line and echosounder surveys should not be grouped together.

b. For chart sources, the producing country, chart number, edition number (if applicable), edition date, correction date (if different than the edition date), and scale shall be listed. Charts are cited only if no information about the surveys used to compile them is known. If the survey(s) used to make a source chart are known, either with geographic limits, or only as general information, the foreign chart is not cited as the source, and the survey information shall be shown (see paragraph a above).

c. If known, the type of survey, such as "sketch survey" or "reconnaissance survey" shall be shown. These terms imply that there is a significant risk of undetected dangers, even if the survey is of a recent date. "Random track data" (i.e., IHO passage soundings) implies soundings acquired on an uncoordinated basis over a period of years. "Unsurveyed" indicates no data of any kind; it should be written in the appropriate area on the diagram, but not shown in the source listing. Qualifying terms such as "leadline" or "no sonar" may be added after the type of survey where the date does not give sufficient indication of the survey methods. Where a charted survey is supplemented by occasional soundings from older or later sources, only the main survey should normally be listed.

d. If unconventional or remotely collected bathymetry was used, it shall be identified in the source listing. An example is shown in FIGURE 17.

e. The sources used to compile the shoreline may be shown if considered useful. See FIGURE 17 for an example.

f. In listing sources, the only country name that shall be abbreviated is the U.S. All other country names shall be spelled out. "British Admiralty" shall be spelled out when citing chart sources, and "British" shall be used when citing surveys, originating from the Hydrographic Department, Ministry of Defence of the United Kingdom. Surveys made by non-government agencies, such as oil companies, shall be called "Commercial Surveys."

3.11.7.3.2 Other sources note. At the bottom of the source listing is the note "With additions from other sources" The content of this note is fixed. This part of the note allows minor sources to be used for enhancement, without listing them in the source data.

3.11.7.3.3 Miscellaneous notes. Notes are sometimes shown below the source list to provide the user with additional information about sources.

a. If soundings from a source cannot be corrected for sound velocity the source shall be identified in the source diagram. A note shall be added at the bottom of the list of hydrographic sources. It shall read: "\* Uncorrected soundings" An asterisk shall be added to both the source reference line, as shown by sources A and B in FIGURE 17, and to the corresponding source identifier in the source diagram. If all soundings on a chart are either corrected for sound velocity or uncorrected, the "Uncorrected soundings" note is not required in the source diagram and the presence or absence of the corrected sounding note in the title block (see 3.11.34) shall be used to indicate if the soundings are corrected for sound velocity.

b. Miscellaneous notes are also used to identify sources with different units of soundings than what is shown on the majority of the chart, as shown by source H in FIGURE 17. See 3.13.4.3.

3.11.7.3.4 Foreign copyright note. When foreign charts or surveys are used as sources in the source listing, a copyright note is added beneath the source listing and miscellaneous notes, with a fixed content as shown in FIGURES 16 and 17. If only U.S. Government sources are used in the source listing, the copyright note is omitted.

**SOURCE DATA**

Finnish Chart 909.....1:150,000  
(Ed. 1955)  
With additions from other sources

This chart is based in whole or in part on information from other than official U.S. Government sources, as indicated above. Copyright restrictions of the country of origin continue to exist.

FIGURE 16. Example of a single-source source data note.

* A.	U.S. Navy Surveys, 1976-1980.....	1:30,000-1:50,000
* B.	U.S. Navy Surveys, 1946.....	1:25,000
C.	British Survey, 1980 (Reconnaissance survey).....	1:75,000
D.	Commercial Surveys, 1977-1986.....	1:18,000-1:24,000
E.	Finnish Surveys, 1967-1972.....	1:20,000-1:40,000
F.	Finnish Surveys, 1929-1950, no other information provided	
G.	British Admiralty Chart 1234..... (Ed. 1988, Corr. 1992, sources not identified)	1:40,000
+H.	Swedish Chart 942..... (3rd. Ed., 1958, sources not identified)	1:200,000
I.	Multipectral (LANDSAT), 1988	
J.	Airborne Laser Sounder, 1993	
K.	Random track data	
Z.	Shoreline	
	1. Aerial Photography, 1982	
	2. Commercial Engineering Drawings, 1986	
	3. Finnish Chart 356, 1988	
	4. Multipectral (LANDSAT), 1990	
	With additions from other sources	
	* Uncorrected soundings	
	+ Meters and half meters	

This chart is based in whole or in part on information from other than official U.S. Government sources, as indicated above. Copyright restrictions of the country of origin continue to exist.

Source    Example of:

- A.    Uncorrected soundings, scales, and dates (all after 1950) grouped together.
- B.    Uncorrected soundings, date prior to 1950 shown as separate source. Also note the leader line in FIGURE 18.
- C.    "British" survey, that is a also special type of survey.
- D.    Commercial surveys, grouped into similar scales and ranges.
- E.    Finnish surveys identified in the source diagram of a Finnish source chart.
- F.    Finnish survey information taken from Finnish chart(s), where only a range of dates of surveys was provided, i.e., as given in the chart title block.
- G.    "British Admiralty" chart, with edition and correction dates, but no edition number, and with no source data provided.
- H.    Chart with edition number and date, and no source data provided. Depth units are meters and half meters.
- I., J.    Examples of unconventional surveys.
- K.    Random track data, which is listed after all other hydrographic sources.
- Z.    Examples of shoreline sources. These are listed last, and identified as source "Z."

FIGURE 17. Example of a multi-source source data note.

3.11.7.4 Position. The position of the source data is variable but it must be shown adjacent to the source diagram (if applicable). The source data may be either 5mm below (preferred), or 5mm to either side of, the source diagram. The "other sources" note is shown directly below the source listing, followed by other miscellaneous notes (if applicable). The copyright note (if applicable) is positioned 5mm below the miscellaneous notes.

3.11.7.5 Type. 6 point Swiss 742, upper and lower case. Five point type may be used if the note is too large.

3.11.7.6 Color. SPC 58600 Black - Solid.

### 3.11.8 Source diagram.

3.11.8.1 Use. The source diagram is a miniature representation of the chart, that graphically illustrates the location of the various sources shown in the source listing (see 3.11.17).

3.11.8.2 Applicability. Source diagrams are only shown on charts having more than one source.

3.11.8.3 Content. The content of the diagram is variable, except that the title - "SOURCE DIAGRAM" - is fixed. The linear dimensions of the graphic should normally be one-tenth those of the chart's neatline dimensions, but they may be reduced further if space is too limited to show the preferred size. The inner neatline is 0.1 mm linewidth, and the outer neatline is 0.2 mm linewidth. The diagram is a miniature representation of the chart, and uses a generalized shoreline with land tint (see 3.24) as the only chart feature. Areas covered by chart or survey sources are outlined with a 0.1 mm linewidth. Letters, keyed to the list of sources in the source data list (see FIGURE 17), are shown in the appropriate area. Asterisks or plus signs are sometimes used preceding the letter to refer to notes in the source data list (see FIGURE 18). Points of change for shoreline sources are indicated by dotted lines (diameter: 0.1mm, spacing: 0.75mm) extending 3mm inland.

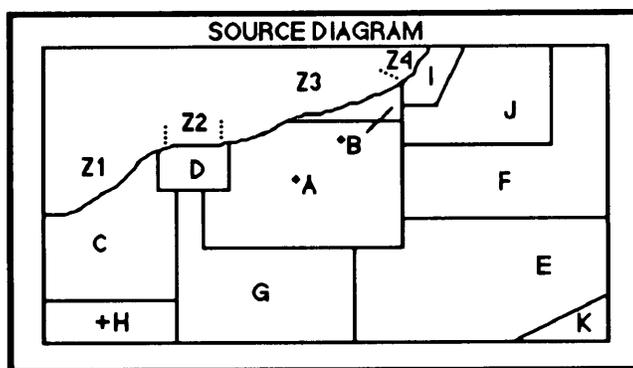


FIGURE 18 Example of a source diagram.

3.11.8.4 Position. The position of the source diagram is variable. The preferred position is inside the neatline, on land, where it does not obscure any important chart detail. The positioning of the source diagram must also take into consideration the adjacent source listing (see 3.11.7.4). The source diagram and source data may be placed outside the neatline on the top, left, or right side of the chart when space is limited inside the neatline, or if it cannot be placed inside the neatline without obscuring important chart detail.

3.11.8.5 Type. The title "SOURCE DIAGRAM" is shown in 7 point Swiss 742, upper case. The preferred size of letters designating sources is 9 point Swiss 742, upper case. Smaller type, down to 6 point, may be used if the 9 point type is too large. Leader lines (0.1mm linewidth) may also be used to identify small areas.

3.11.8.6 Color.

a. Inner and outer neatlines, title, letters designating sources, shoreline, and source outlines are shown in solid black (SPC 58600).

b. Land tint is screened 12% black (SPC 58600) with a 15° screen angle.

3.11.9 Continuation notes.

3.11.9.1 Use. Continuation notes provide easy transition from one chart to another.

3.11.9.2 Applicability. Continuation notes are shown on all charts at or near the same scale, or charts intended for the same use, which are adjacent to one another.

3.11.9.3 Content. The first part of the continuation note is fixed, reading: "CONTINUED ON." The second part of the continuation note is variable.

a. If the adjacent coverage is another chart, the chart number is referred to in the continuation note (see FIGURE 19).

CONTINUED ON 62340

FIGURE 19. Continuation note for chart.

b. If the adjacent coverage is a panel or inset contained on the same chart (see 3.11.27), the second part of the continuation note refers to the specific panel or the inset, whichever is appropriate (see FIGURES 20 and 21).

CONTINUED ON INSET

FIGURE 20. Continuation note for insets.

CONTINUED ON PANEL A

FIGURE 21. Continuation note for panels.

c. If the adjacent coverage on the panel or inset is at a different scale, type is added to the end of the continuation note (see FIGURE 22).

CONTINUED ON PANEL B AT SMALLER SCALE

CONTINUED ON INSET AT LARGER SCALE

FIGURE 22. Continuation note for panels and insets of different scales.

d. Labeling of adjacent coverage is mutual. For example a chart with two panels (A and B) would carry "CONTINUED ON PANEL A" on panel B and "CONTINUED ON PANEL B" on panel A. Insets refer to the main chart or to the panel which is extended by the inset. Changes of scale are also added to this note (see FIGURE 23).

#### CONTINUED ON MAIN CHART

FIGURE 23. Continuation note for inset referring to main chart.

3.11.9.4 Position. Continuation notes are shown in the area which is continued as other coverage and are aligned parallel with the inner neatline. The distance between the continuation notes and the inner neatline is 2mm. The note is readable from the bottom of the chart when aligned parallel to the north or south inner neatlines, and from the right side of the chart when aligned with the west or east inner neatlines. The note should not be placed where it will obscure other chart detail.

3.11.9.5 Type. 7 point Swiss 742, upper case.

3.11.9.6 Color. SPC 58600 Black - Solid.

3.11.10 Corner coordinates.

3.11.10.1 Use. Corner coordinates give the user a quick reference to the geographical limits of the chart.

3.11.10.2 Applicability. Corner coordinates are shown on all charts except certain inset plans. Inset plans carry corner coordinates only if they fall outside the area of the main chart. Charts consisting of several plans do not require corner coordinates to be shown on each plan.

3.11.10.3 Content. The content of corner coordinates is variable, and shows the longitude and latitude in degrees, minutes, and seconds value of the outermost neatlines.

3.11.10.4 Position. The preferred position for corner coordinates (except those labeling curved graticules as in FIGURE 28 and 29) is parallel to and 1mm inside the neatline the coordinate refers to, and 3mm away from the perpendicular neatline. If displacement is necessary due to other significant chart features, the corner coordinate value may be moved outside the neatline. Latitude values are readable from the bottom of the chart and longitude values are readable from the right side of the chart.

a. Charts with neatlines extended in N-S or E-W directions (such as those constructed on Mercator projections) give a single value of latitude and longitude for the extent of each neatline. See FIGURE 24. Other charts, though oriented the same way, are nonrectangular in shape (such as those constructed on transverse Mercator projections). These charts have parallel graticules of unequal length and meridional graticules which converge (see FIGURE 25). Both types show corner coordinates in the upper right and the lower left corners.

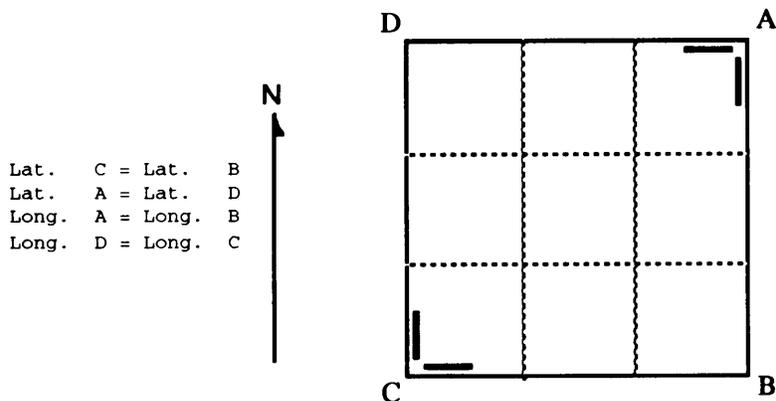


FIGURE 24. Rectangular graticule.

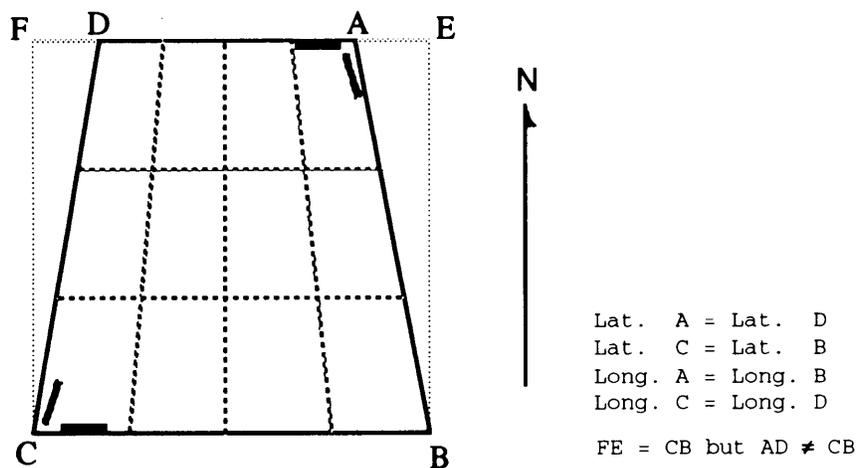


FIGURE 25. Converging graticule.

b. On some N-S oriented charts, the neatlines do not represent constant values. These are charts whose meridians converge toward the poles, with the top and bottom neatlines having the same length due to the squaring off of the chart.

(1) On these charts the limiting latitude is indicated at the lower left and upper right corners. The limiting longitude is indicated on the upper left and upper right corners for convergence to the North (see FIGURE 26), or at the lower left and lower right corners for convergence to the south (see FIGURE 27).

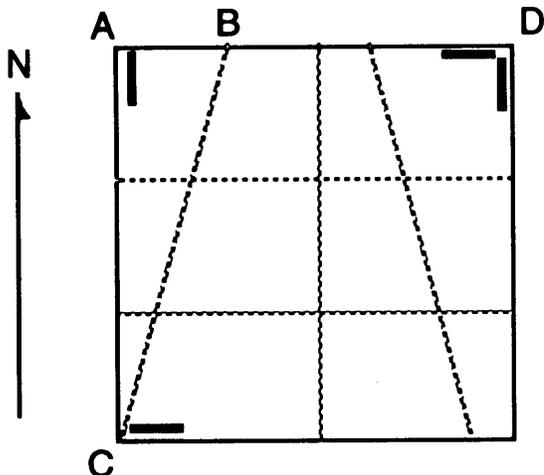


FIGURE 26. North pole convergence.

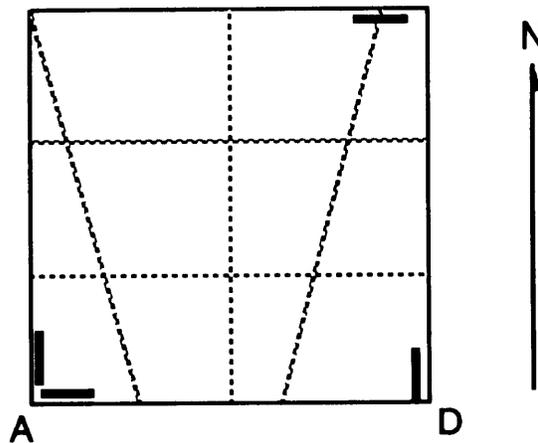


FIGURE 27. South pole convergence.

(2) Some small scale charts have curved parallels of latitude. In these cases one of the latitude values will be shown at the point of greatest latitude extent, instead of at the corners (see FIGURES 28 and 29).

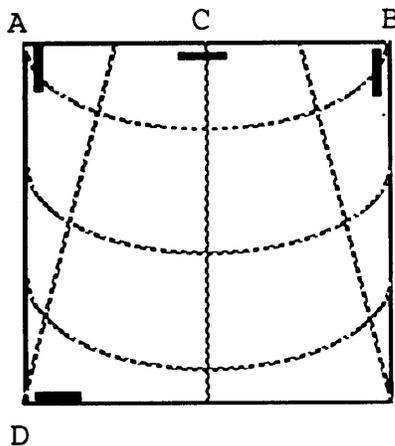


FIGURE 28. Curved graticule.

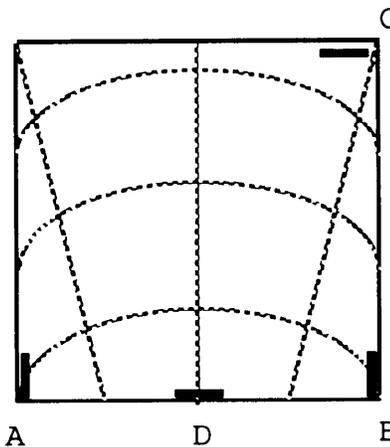


FIGURE 29. Curved graticule.

A is max. West Long.  
 B is max. East Long.  
 C is max. Top Lat.  
 D is max. Bottom Lat.

c. Charts which have skewed graticules carry labels in the farthest north, south, east, and west corners (see FIGURES 30 and 31).

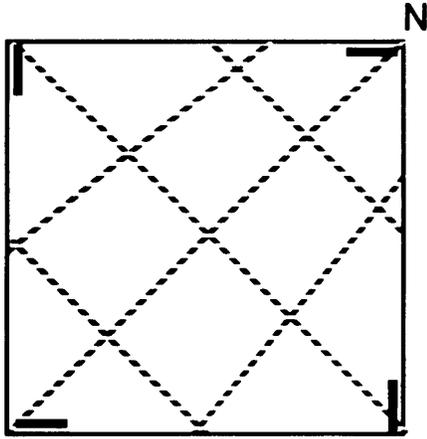


FIGURE 30.  
Skewed graticules.

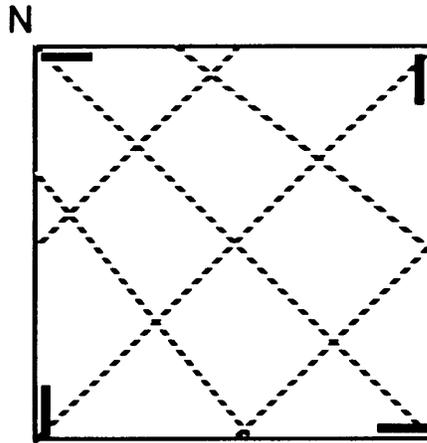


FIGURE 31.  
Skewed graticules.

d. Irregularly shaped charts or plans shall have their maximum extent indicated in the appropriate corner. The 3mm clearance between the type and the corner may need to be changed in some cases (see FIGURES 32 through 36). Neatline extension (dog-ears) do not carry corner coordinates.

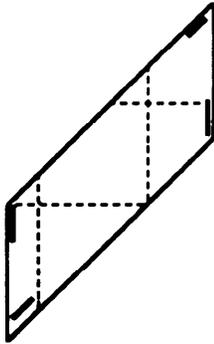


FIGURE 32.

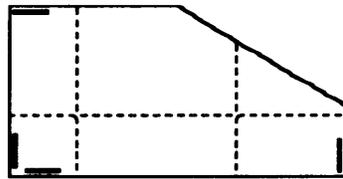


FIGURE 33.

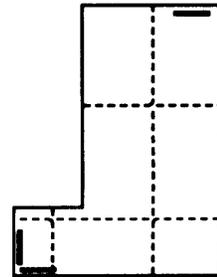


FIGURE 34.

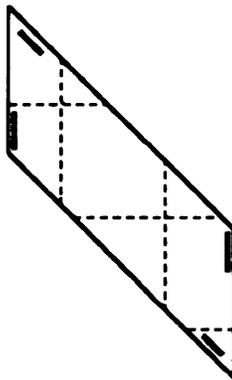


FIGURE 35.

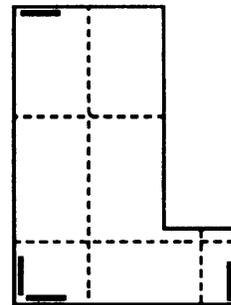


FIGURE 36.

Corner coordinate locations on irregular shaped charts (FIGURES 32-36).

3.11.10.5 Type. 6 point Swiss 742 Light Condensed, upper case.

3.11.10.6 Color. SPC 58600 Black - Solid.

### 3.11.11 Datum conversion notes

3.11.11.1 Use. Datum notes inform the user of the compatibility of the chart with positions obtained from satellite navigation systems.

3.11.11.2 Applicability. Datum notes are shown on charts with scales of 1:500,000 and larger (HAC 1-6) that are not on the World Geodetic System (WGS).

3.11.11.3 Content. The content of the datum note is variable, depending on the datum of the chart. The datum note should not be more than 10cm wide.

a. If the chart is constructed on WGS, no datum note is required.

b. If the chart is not constructed on WGS, but a shift can be derived from the chart to WGS, the note is shown as in the example in FIGURE 37; filling in actual values to the nearest hundredth of a minute for shifts northward or southward and eastward or westward.

### DATUM NOTE

Positions obtained from satellite navigation systems referred to the World Geodetic System 1984 (WGS-84) \* must be moved 0.77 minutes NORTHWARD and 0.77 minutes WESTWARD to agree with this chart.

FIGURE 37. Datum note for shift to WGS.

\*Note: The datum "World Geodetic System 1984 (WGS-84)" is shown at scales of 1:50,000 and larger. The year is omitted from charts at scales smaller than 1:50,000, i.e., "World Geodetic System (WGS)"

c. If the chart cannot be shifted to WGS because of the lack of a tie-in to the chart datum or if the chart is internally inconsistent; the datum note is fixed (see FIGURE 38).

### DATUM NOTE

Adjustments for plotting positions obtained from satellite navigation systems based on the World Geodetic System (WGS) \* cannot be determined for this chart.

FIGURE 38. Datum note used when chart cannot be shifted to WGS.

\*Note: The datum "World Geodetic System 1984 (WGS-84)" is shown at scales of 1:50,000 and larger. The year is omitted from charts at scales smaller than 1:50,000, i.e., "World Geodetic System (WGS)"

3.11.11.4 Position. The position of the datum note is variable, but should be placed as close to the Horizontal Datum note as possible.

3.11.11.5 Type. The heading - "DATUM NOTE" - is shown in 9 point Swiss 742, upper case. The text is shown in 7 point Swiss 742, upper and lower case, except that the words "NORTHWARD" "SOUTHWARD" "EASTWARD" and "WESTWARD" are shown in upper case only.

3.11.11.6 Color. SPC 58600 Black - Solid.

3.11.12 Depth conversion scale.

3.11.12.1 Use. The depth conversion scale allows the user to quickly convert depths from one unit to another, without calculation.

3.11.12.2 Applicability. The depth conversion scale is shown on each chart.

3.11.12.3 Content. The content of the depth conversion scale is fixed (see FIGURE 39).

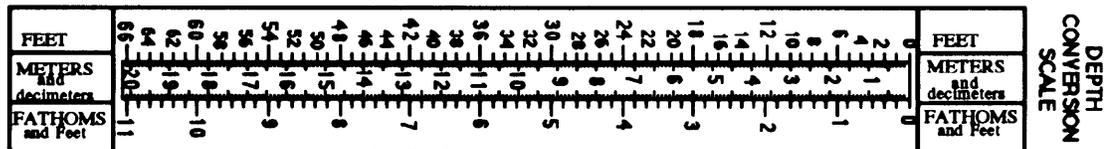


FIGURE 39. Depth conversion scale.

3.11.12.4 Position. The position of the depth conversion scale is fixed in the lower right side border, readable from the bottom of the chart, 5mm away from the heavy border line and 60mm away from the bottom outside corner of the heavy border line.

3.11.12.5 Type. The label - "DEPTH CONVERSION SCALE" is shown in 7 point Swiss 742 Light Condensed, upper case. The inside of the scale is shown in 5 and 6 point Swiss 742 Light Condensed.

3.11.12.6 Color. SPC 58600 Black - Solid.

3.11.13 Limited distribution note.

3.11.13.1 Use. The "LIMITED DISTRIBUTION" note identifies charts that are intended for a special use and are published for limited distribution.

3.11.13.2 Applicability. Charts which are published for limited distribution are identified as such in the project special instructions, or other production management guidance.

3.11.13.3 Content

a. The content of the "LIMITED DISTRIBUTION" note is fixed (see FIGURE 40).

## LIMITED DISTRIBUTION

FIGURE 40. Limited distribution note.

b. The content of the Distribution guidance note is fixed (see FIGURE 41).

**Distribution authorized to DoD, and to nonDoD Government Agencies, IAW 10 U.S.C. Sect. 130 & 2796. Release authorized to U.S. DoD contractors IAW 48 C.F.R. Sect. 252.245-7000. Refer other requests to Headquarters, DMA, ATTN: Release Officer, Stop A-10. Destroy as "For Official Use Only." Removal of this caveat is prohibited.**

FIGURE 41. Distribution guidance note.

3.11.13.4 Position. The "LIMITED DISTRIBUTION" note is shown in two places in the chart border (see APPENDIX B).

a. One "LIMITED DISTRIBUTION" note is shown in a preferred position; in the lower right corner of the chart margin, with the top of the note is 15mm below the south heavy border line, readable from the bottom of the chart. The distribution guidance note is shown 2mm below and centered on this LIMITED DISTRIBUTION note. The right side of the note is 90mm from the extension of the east heavy border line.

b. One "LIMITED DISTRIBUTION" note is shown in a fixed position; in the upper left corner of the chart border, with the left side of the note 60mm from the extension of the north heavy border line, the top of the note 3mm away from the west heavy border line, and readable from the left side of the chart.

3.11.13.5 Type. The words "LIMITED DISTRIBUTION" is shown in 18 point Swiss 742, upper case. The distribution guidance note is shown in 8 point Swiss 742, upper and lower case type.

3.11.13.6 Color. SPC 58600 Black - Solid.

3.11.14 DMA seal.

3.11.14.1 Use. The DMA seal authenticates the chart as an official Defense Mapping Agency product.

3.11.14.2 Applicability. A 19mm (0.75 inch) diameter DMA seal is shown on each chart.

3.11.14.3 Content. Content of the DMA seal is fixed (see FIGURE 42).

3.11.14.4 Position. The position of the DMA seal is dependent upon the position of the main title.

a. If the main title is shown in its preferred position (see 3.11.25), the DMA Seal is shown 3mm above the top line of the main

title, centered on the main title, and readable from the bottom of the chart.



FIGURE 42. DMA seal.

b. If the main title is shown in a variable position (see 3.11.25), the DMA seal is shown outside the left margin of the chart, 5mm above the north heavy border line, aligned with the west inner neatline, and readable from the bottom of the chart.

3.11.14.5 Type. The DMA seal is a standard symbol.

3.11.14.6 Color. SPC 58600 Black - Solid.

3.11.15 Bar codes and stock numbers.

3.11.15.1 Use. The National Stock Number (NSN), and edition number, in both bar code and human readable form, are shown on each chart, to uniquely identify the chart in the DoD Logistics Standard Systems (DLSS). The DMA stock number, in human readable form only, is also shown, for internal DMA use. Stock numbers and bar codes are shown in accordance with MIL-STD-2414.

3.11.15.2 Applicability. A NSN bar code and stock number, and DMA stock number are shown on each chart.

3.11.15.3 Content.

3.11.15.3.1 National stock number. The first four digits of the NSN indicate the Federal Supply Classification (FSC), which is 7642 for hydrographic products. The next two digits indicate the National Codification Bureau that assigned the item identification number to the item of supply. The remaining seven digits are a nonsignificant, serially assigned item identification number. The letters "NSN" are shown in front of the human readable national stock number to distinguish it from the DMA stock number (see below).

3.11.15.3.2 DMA stock number. The first two numbers of the DMA stock number are the region and sub-region, and are the same as the first two numbers of the chart. The next three digits are the chart portfolio and type (see Pub. 9). The last five numbers of the stock number are the same as the chart number itself (see FIGURE 43).



FIGURE 43. Bar code and DMA stock number example.

3.11.15.4 Position. The position of the bar code and stock numbers is fixed as 25mm below the south heavy border on the right side, beneath the users' note, and aligned on the right side against the east heavy border (see APPENDICES A and B). The bottom line is 2mm below the top line.

3.11.15.5 Type. The HRI stock numbers are Swiss 742 type (or equivalent) and is printed in black (see MIL-STD-600010).

3.11.15.6 Color. The bar code is printed in black (see MIL-STD-600010).

3.11.16 Edition number and date.

3.11.16.1 Use. The edition number and date tell the user how current the chart is. After this date, the user is responsible for applying changes to the chart made by Notice to Mariners (NM).

3.11.16.2 Applicability. The edition number and date is shown on each chart.

3.11.16.3 Content. The content of the edition number and date is variable. The word "edition" is abbreviated "Ed.", the month is abbreviated, and "Notice to Mariners" is abbreviated.

a. For new editions, the edition date is the same as the date of the latest Notice to Mariners the chart has been corrected through. The Notice to Mariners, in this case, is represented by the notice number, a slash, and the last two digits of the year (see FIGURE 44).

5th Ed., Apr. 27, 1985 (Correct through NM 17/85)

FIGURE 44. Edition number and date for new editions.

b. For corrected reprints, the edition number and date do not change from the last printing. Notice to Mariners updates are cited by giving the notice number and the date - including month and day - of the notice (see FIGURE 45).

3rd Ed., Feb. 21, 1981; Correct through NM 17 of Apr. 27, 1985

FIGURE 45. Edition number and date for corrected reprints.

3.11.16.4 Position. The position of the edition number and date is fixed. The position is in the lower left border of the chart, 2mm below the heavy border line, with the left side of the edition number aligned with the left outside corner of the heavy border line.

3.11.16.5 Type. 7 point Swiss 742, upper and lower case.

3.11.16.6 Color. SPC 58600 Black - Solid.

3.11.17 Electronics note.

3.11.17.1 Use. The electronics note indicates which electronic navigation system, if any, is shown on the chart.

3.11.17.2 Applicability. Electronic navigation system lattices are no longer required to be shown on most nautical charts. Special requirements for individual charts will be addressed in the project special instructions.

3.11.17.3 Content. If applicable, the content of the electronics note is variable, depending on the electronic navigation system shown on the chart (see FIGURE 46 for examples).

## LORAN C                      OMEGA                      DECCA

FIGURE 46. Electronics note.

3.11.17.4 Position. The position of the electronics note is dependent upon the position of the main title.

a. If the main title is shown in its preferred position (see 3.11.24) the electronics note is shown 2.5 mm above the DMA seal, centered on the main title, and readable from the bottom of the chart.

b. If the main title is shown in a variable position the electronics note is shown 2.5mm above the uppermost line in the main title, centered on the main title, and readable from the bottom of the chart.

3.11.17.5 Type. The electronics note is shown in 24 point Swiss 742 Bold, upper case.

3.11.17.6 Color. The electronics note is shown in the solid color of the primary color plate of the electronic lattice.

3.11.18 First edition date.

3.11.18.1 Use. The original date of issue shows how long the chart has been maintained. This date, combined with the current edition number and date, can give the user an indication of how quickly the area changes.

3.11.18.2 Applicability. The first edition date is shown on each chart.

3.11.18.3 Content. The beginning of the note is fixed, and will always read: "1st Ed., \_\_\_\_". The date of the first edition is variable. Only the month and year are shown. Months are abbreviated (see FIGURE 47).

1st Ed., Sept. 1985

FIGURE 47. First edition date.

3.11.18.4 Position. The position of the first edition date is fixed. It is shown in the upper margin 2mm above the heavy border line, readable from the bottom of the chart, and centered on the center of the chart.

3.11.18.5 Type. 5 point Swiss 742, upper and lower case.

3.11.18.6 Color. SPC 58600 Black - Solid.

3.11.19 General notes.

3.11.19.1 Use. Information specific to the chart and not concerning dangers to navigation, is shown in the form of general notes. General notes may contain information on currents, harbor procedures, traffic zones, etc.

3.11.19.2 Applicability. General notes are applied to charts on an individual basis.

3.11.19.3 Content. The content of general notes is variable. There are two parts to general notes; the general note, and the note reference. Other notes described separately in this specification are not stacked with general notes unless indicated by their respective paragraphs.

a. General notes are left and right justified. The width of general notes shall be no wider than 10cm, but the height is variable.

(1) Single notes are shown beneath the heading "NOTE". The heading is centered on the note (see FIGURE 48).

(2) Multiple notes are numbered and shown beneath the heading "NOTES." The heading is centered on the note (see FIGURE 49). Specific notes (i.e., those applying to a specific part of the chart) should be listed first, followed by the more general ones (i.e., those applicable to the entire chart) (see FIGURE 49).

#### NOTE

During strong south winds the entrance to  
Madiq Kamaran has very discolored water.

FIGURE 48. Single general note.

#### NOTES

1. Maintenance dredging is conducted frequently in Bishop Channel and the surrounding area. See Sailing Directions for details.
2. The height of the tide may vary depending on meteorological conditions. Winds between SE and SW cause a decrease in height; winds between NW and NE cause an increase. The deviation in height may, under exceptional conditions, amount to as much as a meter.

FIGURE 49. Multiple general notes.

b. If notes contained in the general note concern only a certain area of the chart, a note reference is placed in the applicable area.

(1) If only a single note is contained in the General Note, the note reference is fixed, and reads: SEE NOTE (see FIGURE 50).

(2) If multiple notes are shown in the general note, the note reference on the chart must refer to the correct note number (see FIGURE 51).

(3) If more than one note in a general note applies to the same area, each applicable note is referenced in the note reference. Dashes are used to separate consecutive notes. Use an ampersand (&) to separate nonconsecutive notes. Periods and commas are not shown (see FIGURE 52).

**SEE NOTE**

FIGURE 50. Note reference to a single note.

**NOTE NO 3**

FIGURE 51. Note reference to numbered notes.

**NOTE NOS 1 - 3 & 5**

FIGURE 52. Multiple note reference.

c. General notes which apply to the entire chart do not require a note reference.

3.11.19.4 Position. The position of general notes is variable.

3.11.19.5 Type. The heading of the general note is shown in 9 point Swiss 742, upper case. The text of the general note is shown in 7 point Swiss 742, upper and lower case. Note references are shown in 9 or 10 point Swiss 742 Italic, upper case (9 point is used only when space is limited).

3.11.19.6 Color. SPC 58600 Black - Solid.

3.11.20 Glossary.

3.11.20.1 Use. A glossary is provided on charts so that the user can translate (into English) foreign terms, that are on the chart and are necessary for navigation.

3.11.20.2 Applicability. A glossary is shown on charts in areas where English is not the accepted language. Each chart has a unique glossary, although the same glossary may appear on the same charts, depending on the translations required.

3.11.20.3 Content. The content of the glossary is variable. The glossary is shown with each foreign term listed in alphabetical order; the foreign term is shown on the left side and the English translation is shown on the right side. Both left and right sides are justified. The glossary should not be more than 5 cm wide. The height

is variable. The heading - "GLOSSARY" - is centered above the list of terms (see FIGURE 53).

## GLOSSARY

Ayer.....	stream
Batu (Bt.).....	rock, stone, bank, reef, shoal
Darat.....	coast, land
Kepulauan.....	islands
Pulau (pu.).....	islet, island

FIGURE 53. Glossary.

3.11.20.4 Position. The position of the glossary is variable.

3.11.20.5 Type. The heading of the glossary is shown in 6 point Swiss 742, upper case. The rest of the glossary is shown in 6 point Swiss 742, upper and lower case.

3.11.20.6 Color. SPC 58600 Black - Solid.

3.11.21 Grid reference box.

3.11.21.1 Use. The grid reference box gives instructions and pertinent data for determining standard grid coordinates.

3.11.21.2 Applicability. A grid reference box is shown on all charts that show a Universal Transverse Mercator Grid.

3.11.21.3 Content. See DMA TM 8358.1 for variable information used in the grid reference box. Refer to the example in FIGURE 2.

a. The heading of the grid reference box is composed of four lines with variable and fixed contents.

(1) The first line of the heading is fixed, as shown in FIGURE 2.

(2) The second line of the heading is variable. The Zone Number(s), the grid datum, and the grid ellipsoid are shown.

(3) The third line of the heading is fixed as shown in FIGURE 2.

(4) The first part of the fourth line of the heading is fixed, reading "100,000 METER SQUARES", and the letter designators of the 100,000 meter squares are variable.

b. The grid reference box is composed of lines with 0.1mm linewidth, and is variable. Zone junctions will be shown with a 0.2mm linewidth line. The letter designators (matching those in the fourth line of the heading) are shown in the proper parts of the box in order to show the relationship of 100,000 meter squares used on the chart. Also, variable northing or easting meter values are shown to indicate where the separation of 100,000 meter squares occur. The variable zone junction is also shown.

c. The paragraph below the box gives instructions on forming squares to facilitate measurement of grid coordinates. The grid interval is determined when the grid is constructed. The grid interval

in the grid box must show at least two grid lines that are on the chart: one line for northing measurements; and one line for easting measurements. The grid interval instructions are fixed (see FIGURE 2), except for the grid interval, which is variable, according to the grid.

d. The last paragraph is the grid coordinate instructions.

(1) The grid datum, grid ellipsoid, and chart datum are restated in the first sentence. All are variable.

(2) The next instructional sentence is fixed, except for the grid datum and the grid interval, both of which are variable.

(3) The last part of the grid coordinate instructions is variable and shows a sample point and its grid coordinates. The sample point is chosen after the chart is compiled and should be an easily identified permanent point that is not subject to change by weekly Notice to Mariners. If possible, the sample point should be approximately midway between grid lines. The appropriate letter designator is shown next, followed by the six digit coordinate.

3.11.21.4 Position. For spacing between different parts of the grid reference box, see FIGURE 2. The grid reference box should be no wider than 10cm. The preferred position of the grid reference box is in the top left margin, as shown on the style sheets (APPENDICES A and B).

3.11.21.5 Type. Type used for the grid reference box is Swiss 742 Light Condensed, upper case. The instructions below the box are in upper and lower case (see FIGURE 2).

a. The heading of the grid reference box is shown as follows: 10 point for the first line, 8 point for the second line, 10 point for the third line, and 6 point for the fourth line. All four lines are all shown in Swiss 742 Light Condensed, upper case.

b. Inside the box, letter designators are shown in 8 point; 100,000 and greater meter values are shown in 6 point; 10,000 and 1,000 meter values, and the zone junction label are shown in 10 point. These are all Swiss 742 Light Condensed, upper case.

c. The grid interval instructions and grid coordinate instructions are shown in 6 point Swiss 742, upper case, except the abbreviation "e.g.," which is lower case.

3.11.21.6 Color. The grid reference box is shown in purple, except for the zone junction and label (black), and the non-primary grid information (blue) (see 3.10).

3.11.22 Horizontal datum note.

3.11.22.1 Use. The horizontal datum note provides information concerning horizontal measurements on the chart. It also refers the user to Chart No. 1 for a description of symbols and abbreviations and, if necessary, disclaims the chart as an authority for boundaries.

3.11.22.2 Applicability. A horizontal datum note is shown on each chart.

3.11.22.3 Content.

a. The first line of the horizontal datum note is variable and defines the type of projection the chart was constructed on.

b. The second line of the horizontal datum note is variable and defines the horizontal datum the chart is based on.

c. The third line of the horizontal datum note is variable and states the scale of the chart

(1) Charts with scales smaller than 1:75,000 (HAC 3-9) show the scale along with the mid-latitude for which the scale is based at (see FIGURE 54).

(2) Charts with scales of 1:75,000 and larger (HAC 1-3) do not show mid-latitude (see FIGURE 55).

d. The fourth line is fixed, and reads: "For Symbols and Abbreviations, see Chart No. 1."

e. A fifth line is shown if the chart contains lines separating areas of sovereignty or boundaries. The content is fixed and reads "Boundary representation is not necessarily authoritative" (See FIGURES 54 and 55).

MERCATOR PROJECTION  
WORLD GEODETIC SYSTEM (WGS)  
SCALE 1:200,000 AT LAT. 23°10'  
For Symbols and Abbreviations, see Chart No. 1  
Boundary representation is not necessarily authoritative

FIGURE 54. Example of horizontal datum note - smaller than 1:75,000.

MERCATOR PROJECTION  
WORLD GEODETIC SYSTEM 1984 (WGS-84)  
SCALE 1:45,000  
For Symbols and Abbreviations, see Chart No. 1  
Boundary representation is not necessarily authoritative

FIGURE 55. Example of horizontal datum note - 1:75,000 and larger.

3.11.22.4 Position. The position of the horizontal datum note is dependent upon the position of the Main Title.

a. If the main title is shown in its alternate position (see 3.11.25) the position of the horizontal datum note is in the upper left chart margin, 5mm above the north heavy border line, the right side of the fourth line is 60mm away from the left-most side of the main title. The vertical spacing between each line is 2.5 mm, with the note readable from the bottom of the chart, and each line of the note centered on the others.

b. If the main title is shown in its preferred position (see 3.11.25) the position of the horizontal datum note is 5mm below the vertical datum note (See 3.11.34), and centered under the main title.

See APPENDICES A and B for line order that is different from FIGURES 54 or 55.

3.11.22.5 Type. The first three lines of the horizontal datum note are shown in 8 point Swiss 742, upper case. The fourth line is shown in 10 point Swiss 742, upper and lower case. The fifth line, if shown, is 8 point Swiss 742, upper and lower case.

3.11.22.6 Color. SPC 58600 Black - Solid.

3.11.23 Index to next larger scale charts.

3.11.23.1 Use. Indexing to next larger scale charts is provided to the user to allow for quick transition to more detailed coverage.

3.11.23.2 Applicability. Next larger scale chart information is provided on all charts with scales larger than 1:1,000,000 (HAC 1-8) when next larger scale charts exist within the area covered by the chart.

3.11.23.3 Content. Areas covered by next larger scale charts are portrayed in three different ways. When areas are covered by plans, panels, and insets, only the chart number of the chart containing the plan, panel, or inset is shown.

a. When electronic information is not shown on the chart and the density of data on the purple plate is sparse, areas covered by the next larger scale charts are depicted directly on the chart. The following note is also added to the chart. The content of the note is fixed (see FIGURE 56).

#### NOTE

Limits of next larger scale chart(s) are shown in purple. Users should consult chart catalog which may contain later information.

FIGURE 56. Next larger scale chart note.

(1) Areas covered by next larger scale charts are shown as an outline reference, outlining the area with 0.3 mm line weight. The chart number of the larger scale chart is shown inside the outline in at least one corner (but not more than two corners) and is readable from the bottom of the chart. If a chart is a plan, panel, or inset, it should be referenced underneath the chart number. This is applicable in all methods of portrayal (see example in FIGURE 58). The preferred labeling is in opposing corners of the outline (upper left and lower right or lower left and upper right). The chart numbers will be placed so they will not obscure other information (see FIGURE 57).

(2) If the chart number is larger than the chart outline, the chart number is shown outside the outline and, if necessary for clarity, a 0.1 mm line weight leader line pointing from the chart number to the outline should be added (see FIGURE 58).

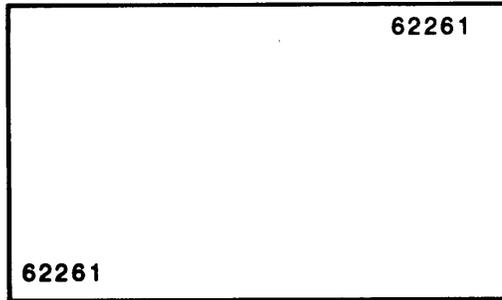


FIGURE 57. Outline reference of next larger scale chart.

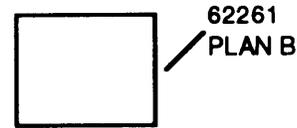


FIGURE 58. Chart number outside outline reference.

(3) Areas covered by next larger scale charts whose outline would measure less than 5 mm on the longest side are depicted by a number reference. The number reference shows no outlines. Instead, only the chart number is shown with a 0.1 mm lineweight leader line pointing to the area covered (see FIGURE 59). The number reference can be oriented in any way so long as it does not obscure other information and is readable from the bottom of the chart.

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FIGURE 59. Number Reference.

b. When electronic information is shown on the chart, or when purple outlines are undesirable because of the density of purple data, a separate diagram is shown as the "Index to next larger scale charts." The base of the diagram is the same as the base of the source diagram in 3.11.2. The size of the diagram is variable, but should not exceed 10cm on any side. The inner neatline of the index to next larger scale charts is a 0.1 mm lineweight, and the outer neatline is a 0.2 mm lineweight. The heading of the index is fixed between the inner and outer neatlines at the top of the diagram and centered, reading: "INDEX TO NEXT LARGER SCALE CHARTS." The diagram is a miniature representation of the chart, and uses a generalized shoreline with land tint as the only chart features. Outlines of next larger scale charts are shown in 0.1 mm lineweight. Chart numbers are shown in one corner inside each chart neatline. When a chart number will not fit inside the chart outline, the number can be set off to the side or, for better clarity, leader lines with a 0.1 mm lineweight can be used to point to the outline from the chart number. To maintain clarity, chart outlines will be deleted where overlapping occurs, however, in retaining limits preference will be given to the larger scale coverage (see FIGURE 60).

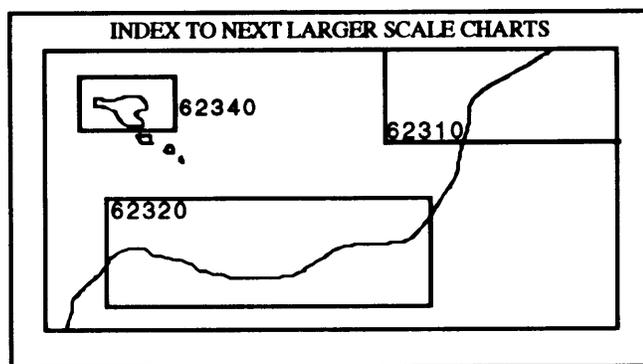


FIGURE 60. Index to next larger scale charts.

3.11.23.4 Position. The positions of outline references, number references, next larger scale chart notes, and index to next larger scale charts, are variable. Positions of outlines are based on the actual coordinates of the next larger scale charts.

3.11.23.5 Type. The heading "NOTE" in the next larger scale chart note (see FIGURE 56), is shown in 9 point Swiss 742, upper case. The text of the note is shown in 7 point Swiss 742, upper and lower case. Chart numbers for the outline reference (see FIGURES 57 and 58) are shown in 10 point Swiss 742 (9 point or 7 point if space is limited). Number references are shown in 9 point Swiss 742 (7 point if space is limited) (see FIGURE 59). The heading "INDEX TO NEXT LARGER SCALE CHARTS" is shown in 7 point Swiss 742, upper case. Chart numbers for the index to next larger scale charts (see FIGURE 60) are shown in 5 point Swiss 742.

3.11.23.6 Color. Number references, and next larger scale chart notes are shown in solid purple (SPC 96532). Outline references (boxes) are normally shown in solid purple (SPC 96532) unless this would detract from other chart information,, in which case a purple 31%, 30°/60° bi-angle screen may be used. The index to next larger scale charts is shown in solid black, except that land tint inside the diagram is screened 12%, 15° angle black (SPC 58600).

#### 3.11.24 Logarithmic speed scale.

3.11.24.1 Use. Measurement of speed becomes more critical the closer a ship is to shore. The logarithmic speed scale allows the user to quickly determine the speed of the vessel in knots when the distance and a time to go that distance are known.

3.11.24.2 Applicability. Logarithmic speed scales are applied to all charts that have a scale of 1:40,000 and larger (HAC 1-2). The application of the logarithmic speed scales on small scale charts having a plan with a scale of 1:40,000 and larger is left to the judgment of the cartographer.

3.11.24.3 Content. The content of the logarithmic speed scale is fixed, (see FIGURE 61).

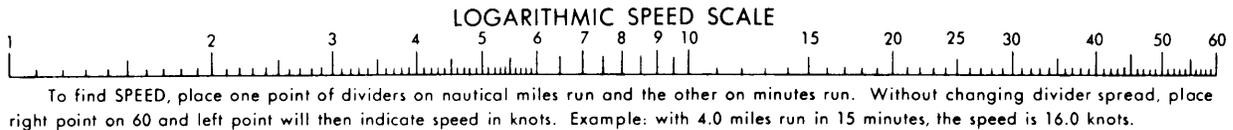


FIGURE 61. Logarithmic speed scale.

3.11.24.4 Position. When used, two logarithmic speed scales are shown. Their positions are fixed as follows:

a. One logarithmic speed scale is shown in the lower left side border, readable from inside the chart neatline, 5mm away from the heavy border line, and with the left side of the note 60mm away from the bottom outside corner of the heavy border line (see APPENDIX A).

b. One logarithmic speed scale is shown in the upper right side border, readable from inside the chart neatline, 5mm away from the heavy border line, and with the left side of the note 60mm away from the top outside corner of the heavy border line (see APPENDIX A).

3.11.24.5 Type. The label "LOGARITHMIC SPEED SCALE" is shown in 8 point Swiss 742, upper case. Numbers on the scale are shown in 6 point Swiss 742 Light Condensed. Instructions for use are shown in 6 point Swiss 742, upper and lower case.

3.11.24.6 Color. SPC 58600 Black - Solid.

3.11.25 Main title.

3.11.25.1 Use. The main title provides convenient and specific information on what geographic area is covered by the chart, and general information on chart sources. The main title is used along with the chart number to enable the user to identify which charts are appropriate for navigation in the area.

3.11.25.2 Applicability. Main titles are shown on each chart.

3.11.25.3 Content. The main title is made up of two parts; the title and the sources, each of which is variable.

a. The title is built in an "inverted pyramid" fashion; with a general geographic area at the top, narrowing to a smaller area (i.e., a country's coastline), and finally describing the specific locality of the chart. The geographic area used should be the same as that used on other charts in the same area, which allows easy transition from one chart to the next.

(1) Coastal charts. Coastal charts generally carry the names of two features in the specific locality which define the geographical limits of the chart. Names of bodies of water are preferred (i.e., from a harbor to another harbor), although names of topographic features and town names can be used. The order of listing names of features in the specific locality is counter-clockwise around

the respective continent. For instance, a chart of the east coast of a continent would name the southernmost feature first and the northernmost feature last (see FIGURE 62).

BALTIC SEA  
GULF OF BOTHNIA  
**TAUVO TO KAGNASET**

FIGURE 62. Title of a coastal chart.

Some Coastal Charts are based on bodies of water and not on a certain continent. In these cases, the name of the body of water is shown in the specific locality (see FIGURE 63).

BALTIC SEA  
WESTERN PART  
**GULF OF FINLAND**

FIGURE 63. Title of a coastal chart when based on a body of water.

(2) Approach charts. Titles of Approach Charts contain the word "Approach(es)" and the destination of the approach. If only the approaches are shown on the chart, and the destination is not shown or is in small scale, the specific locality will read "Approach(es) to ..." and the name of the destination (see FIGURE 64).

BALTIC SEA  
FINLAND - SOUTH COAST  
**APPROACHES TO HELSINKI**

FIGURE 64. Title of approach chart.

(3) Titles of Approach Charts which portray the destination of the approach in detail carry the name of the destination first, then ".... and Approach(es)" (see FIGURE 65).

CANADA  
BRITISH COLUMBIA  
VANCOUVER ISLAND  
**ESQUIMALT HARBOR AND  
APPROACHES**

FIGURE 65. Title of approach chart with destination shown.

(4) Harbor charts. Titles of charts depicting detailed information on harbors give the name of the harbor as the specific locality (see FIGURES 66 and 67).

BALTIC SEA  
SWEDEN - EAST COAST  
**STOCKHOLMS HAMN**

FIGURE 66. Title of harbor chart.

WEST INDIES  
CUBA - SOUTH COAST  
**GUANTANAMO BAY**

FIGURE 67. Title of harbor chart.

b. The second part of the main title briefly describes the sources for the chart. The country of origin, the medium (charts or surveys), and the dates are cited. The date of the latest chart is used as the date for all charts, and the date of the latest survey is used as the date for all surveys. Charts which would require more than three sources to be cited will show "Various sources to ...." and the date of the latest chart or survey (see FIGURES 68 through 70).

From French and U.S. Charts to 1985

FIGURE 68. Main title sources (charts).

**From British Admiralty Charts to 1987  
and a U.S. Navy survey of 1988**

FIGURE 69. Main title sources (surveys).

**From various sources to 1987**

FIGURE 70. Main title sources (multiple sources).

3.11.25.4 Position. The preferred position of the main title is on land in an area where it will not obscure important information such as lights, radio beacons, or significant landmarks. The alternate position of the main title is in the upper margin of the chart, 5mm above the first edition date, with all the lines of the main title centered on the center of the chart. See APPENDICES A and B for line spacing.

3.11.25.5 Type. The main title is shown in Swiss 742. The title portion is all upper case, and the title sources are upper and lower case. The specific locality is shown in 30 point, the first line above it in 20 point. If needed, the second line above the specific locality is in 16 point, and the third line is in 12 point. The title sources (below the Specific Locality) are 10 point. Prepositions in the title names such as "TO", "AND", "FROM", and "INCLUDING" are shown in 20 point, upper case.

3.11.25.6 Color. SPC 58600 Black - Solid.

3.11.26 Neatline dimensions.

3.11.26.1 Use. Neatline dimensions are provided so the user will know what size the chart was when it was originally constructed.

3.11.26.2 Applicability. Neatline dimensions are shown on all Mercator projection charts, except those consisting only of plans.

3.11.26.3 Content. The first part of the note is the label - "Neatlines:", and is fixed. The dimensions are variable and are given in centimeters and tenths of centimeters (decimeters are used) from the north to the south and from the east to the west inner neatlines. The north - south measurement is always listed first (see FIGURE 71).

Neatlines: 60.7cm N - S x 100.1cm E - W

FIGURE 71. Neatline Dimensions.

3.11.26.4 Position. The position of the neatline dimensions is fixed in the lower right hand corner inside the inner neatline, readable from the bottom of the chart, 1mm above the south neatline and with the right side of the note 1 mm away from the east neatline (see APPENDICES A and B).

3.11.26.5 Type. 5 point Swiss 742, upper and lower case.

3.11.26.6 Color. SPC 58600 Black - Solid.

3.11.27 Panel, plan and inset labels.

3.11.27.1 Use. Panels, plans and insets are identified so the user can distinguish separate parts of the chart, and separate parts of the chart can be referenced in other publications such as Notice to Mariners and Chart Catalog.

3.11.27.2 Applicability. Panel, plan and inset labels are shown on each panel, for paneled charts and on each plan or inset when more than one plan or inset is shown on a chart.

3.11.27.3 Content. Panels, plans, and insets are different ways to divide the area available on a chart to enhance the chart's coverage. The content of the panel label is variable. Letters are used, starting with "A", and are enclosed by a circle which is 8mm in diameter and 0.3mm linewidth (see FIGURE 72).

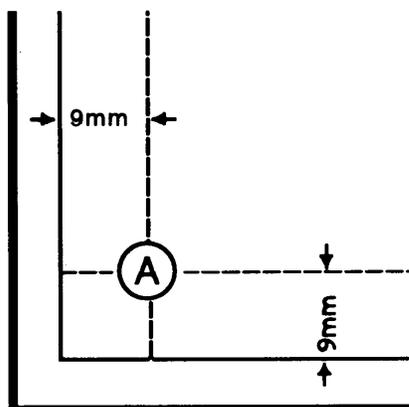


FIGURE 72. Panel label.

a. Panels are used as an aid in chart planning to allow odd shaped bodies of water to be covered on the same chart. For instance, river charts almost always have at least two panels. All panels carry a panel label. Panels usually overlap each other (which distinguishes panels from plans) and each panel treats the panels next to it as a "continued on chart" (see 3.11.9).

b. Plans are detailed, large scale coverage of an area which is covered on the smaller scale of the same chart or on a different chart. Plans are identified by panel labels and plan references.

(1) Charts which contain only one plan do not show a panel label on the plan. In the area on the main chart which is covered by the plan, the plan reference is shown. In this case, the plan reference is fixed and reads: "SEE PLAN" (see FIGURE 73).

**SEE PLAN**

FIGURE 73. Plan reference for a single plan.

(2) Charts which contain more than one plan show consecutive panel labels in each plan. The appropriate plan reference is shown in the area on the main chart which is covered by the plan, referring to the correct panel label (see FIGURE 74 - plan references are not shown on charts which contain only plans).

**PLANA            PLAN B**

FIGURE 74. Plan references for multiple plans.

(3) When the smaller scale coverage of a plan is shown on a different chart, the plan is referenced on that chart as a next larger scale chart (see 3.11.23).

c. Insets, like panels are used to expand the area of coverage on the same chart within the chart limits. Insets are distinguished from plans in that their coverage is exclusive of that of the main chart, and they are not meant to cover an area of the main chart in greater detail. Insets cover a smaller area than panels, and are used only for small extensions of the main chart coverage. Insets carry a Panel Label only when more than one inset is shown on the chart. Insets are treated as continuations of the main chart (see 3.11.9).

3.11.27.4 Positions. The preferred position of the panel label is in the lower left corner of the panel, plan, or inset; the center of the circle containing the letter is 9mm from the south and west inner neatlines. If the detail in the lower left corner is too great, the panel label can be shown in the lower right corner, 9mm from the south and east inner neatlines. No other positions are used.

3.11.27.5 Type. The panel label is shown in 16 point Swiss 742, upper case. Plan References are shown in 9 point or 10 point (preferred) Swiss 742 Italic, upper case.

3.11.27.6 Color. The panel label is shown in solid black (SPC 58600). Plan References are shown in solid purple (SPC 96532).

3.11.28 Plan titles.

3.11.28.1 Use. The plan title provides convenient and specific information on what geographic area is covered by the plan, and general information on chart sources.

3.11.28.2 Applicability. Plan titles are shown on each plan.

3.11.28.3 Content. Plan titles are similar to main titles in their construction. Refer to 3.11.25 for instructions on titles. Plan titles will be shown in three or four lines; the top line of the plan title is the geographic area, then the specific locality, the title sources, and last the scale (see FIGURE 75).

a. The geographic area is variable. No geographic area is shown if it is the same as that shown in the main title (see FIGURE 76).

b. The specific locality of the plan title is determined using the same guidelines as the Specific Locality in the main title, however, the plan title must be named for only the area covered by the plan. It must be different from the specific locality of the main title. For instance, if the main title were "Port 1 to Port 2", a plan title for a plan of Port 1 would read: "Port 1."

c. Title sources in the plan title are described in the same way as for title sources in the main title. Only those sources covering the area of the plan are cited.

d. The last line of the plan title shows the scale of the plan. The word "SCALE" is fixed, and the scale itself is variable.

**KERKIRA**  
**LIMENES ALIPA AND AYIOS SPIRIDHON**

From a BRITISH SURVEY IN 1863  
Scale 1:18,000

FIGURE 75. Plan title with geographic area.

**TOKYO WAN**

From Japanese surveys of 1985  
Scale 1:20,000

FIGURE 76. Plan title without geographic area.

3.11.28.4 Position. The lines of the plan title are stacked and centered, with 3mm vertical separation between each line. The position of the plan title is variable, but must be shown inside the inner neatline of the plan it applies to.

3.11.28.5 Type. The geographic area is shown in 12 point Swiss 742, upper case. The specific locality is shown in 20 point Swiss 742, upper case, except prepositions, which are shown in 16 point Swiss 742, upper case. Title Sources are shown in 10 point Swiss 742, upper and lower case. The scale of the plan is shown in 8 point Swiss 742, upper case.

3.11.28.6 Color. SPC 58600 Black - Solid.

3.11.29 Publication and copyright note.

3.11.29.1 The DMA publishing and copyright note identifies the Defense Mapping Agency as the publishing authority, and identifies the product as copyrighted material.

3.11.29.2 Applicability. The publication and copyright note appears on all charts.

3.11.29.3 Content. The content of the publication and copyright note is fixed, with the exception of the year of publication (see FIGURE 77).

Prepared and published by the  
DEFENSE MAPPING AGENCY

© COPYRIGHT (year of publication) BY THE UNITED STATES GOVERNMENT  
NO COPYRIGHT CLAIMED UNDER TITLE 17 U. S. C.

FIGURE 77. Publication and copyright note.

3.11.29.4 Position. The position of the publication and copyright note is fixed. It appears in the lower chart margin, 2mm below the south heavy border line. The center of the note is on the center of the chart as measured from the left and right edges of the heavy border line. The first two and last two lines of the note are spaced 2mm apart and centered. The space between the second and third lines is 4mm.

3.11.29.5 Type. First line: 8 point, Swiss 742, upper & lower case. Second and third lines: 8 point, Swiss 742, upper case. Fourth line: 6 point, Swiss 742, upper case. Copyright sign: Posicut #227.

3.11.29.6 Color. SPC 58600 Black - Solid.

3.11.30 Sounding note.

3.11.30.1 Use. To alert the user to the unit of measure the soundings are based on.

3.11.30.2 Applicability. Sounding notes appear on each chart.

3.11.30.3 Content. The content is fixed (see FIGURE 78).

## SOUNDINGS IN METERS

FIGURE 78. Sounding note.

3.11.30.4 Position. The sounding note appears twice on the chart. The preferred positions are as follows: one in the lower left border of the chart, 2mm below the south heavy border line and approximately halfway between the west border line and the center of the chart; and one in the upper right margin of the chart, 5mm above the north heavy border line, and approximately halfway between the center and the right edge of the chart. If it is necessary to vary from the preferred positions, the Sounding Note will not be placed inside the neatline.

3.11.30.5 Type. 30 point Swiss 742, upper case.

3.11.30.6 Color. SPC 96532 Purple - Solid.

3.11.31 Subtitle.

3.11.31.1 Use. The subtitle is provided for easy reference to the title of the chart, the sounding units, and the scale. In the position it is placed (see 3.11.31.4) the user does not need to unfold the chart completely or remove it from a drawer just to see the title.

3.11.31.2 Applicability. A subtitle appears on each chart.

3.11.31.3 Content. The content of the subtitle is variable. The subtitle consists of two parts, described below:

a. The content of the upper part of the subtitle must match the specific locality in the main title exactly (see 3.11.25).

b. The lower part of the subtitle contains the unit of soundings and the scale. Only the scale of the main chart is mentioned in the subtitle (mid-latitudes are not noted in the subtitle, see FIGURE 79). A chart containing only a set of plans at various scales will omit reference to scale in the subtitle (see FIGURE 80).

**Strait of Malacca - Central Part**  
SOUNDINGS IN METERS - SCALE 1:200,000

**Ponta de Caio to Cap Verga**  
including Arquipelago dos Bijagos  
SOUNDINGS IN METERS - SCALE 1:300,000

FIGURE 79. Samples of subtitles.

**Ports in Makassar Strait (Sulawesi)**  
SOUNDINGS IN METERS

**Inokuchi Ko and Setoda Suido**  
SOUNDINGS IN METERS

**Plans on the North Coast of New Guinea**  
SOUNDINGS IN METERS

FIGURE 80. Samples of subtitles for charts with plans only.

3.11.31.4 Position. The position of the subtitle is fixed in the lower right chart border, 2mm below the south heavy border line, with the right side of the note 25mm from the left side of the users' note (see 3.11.33). The subtitle is centered, with 3mm spacing between the upper and lower parts.

3.11.31.5 Type. The upper part of the subtitle is 12 point, Swiss 742, upper & lower case type. The lower part is 7 point, Swiss 742, upper case.

3.11.31.6 Color. SPC 58600 Black - Solid.

3.11.32 Tide box and tide stream tables.

3.11.32.1 Use. The tide box is shown to give the user a quick reference to vertical tidal variation in relation to the chart sounding datum. Tide stream tables indicate the horizontal rate and direction of flow caused by astronomical conditions, i.e., the rise and fall of the tide, as opposed to flow caused by currents.

3.11.32.2 Applicability. The tide box is shown on charts with scales of 1:75,000 and larger (HAC 1-3). The information must be taken from either the largest scale foreign sources of the area or from U.S. Navy surveys. If this information is not available from these sources the tide box is not shown. Tide stream data is shown on charts when data is available from source charts.

3.11.32.3 Content.

3.11.32.3.1 Tide boxes Tide box values are shown in meters from one of the sources described in 3.11.32.2 above. Tidal data from stations outside the chart area may be used if the station is located within five miles of the chart limits and if no appreciable difference in tidal height will result. Geographic coordinates are shown with the name of the station if it is outside the chart limits or if the station cannot be readily located on the chart; otherwise, geographic coordinates are not shown. Tide boxes are based on the three types of tides (see figures 81-83). The format of the tide box should be the same as that shown in the examples given in FIGURES 81 through 83. The tidal values, the stations, and the coordinates of stations shown will vary. Content is determined from sources as stated in 3.11.32.2 above. The box is shown with a 0.2mm linewidth and should be no wider than 10cm. The height is variable.

a. Semi-diurnal tides, which have two highs and two lows daily, are shown in the same format as that given for the example in FIGURE 81.

TIDAL INFORMATION							
Place	Lat	Long	Height above datum of soundings				
			Mean High Water		Mean Sea Level	Mean Low Water	
			Springs	Neaps		Springs	Neaps
			meters	meters	meters	meters	meters
Jutland	59° 42'N	009° 14'E	1.5	1.3	0.8	0.1	0.4
Helgoland	52° 22'N	007° 46'E	1.4	1.1	0.7	0.0	0.2

FIGURE 81. Tidal box for semi-diurnal tides.

b. Diurnal tides, which show a single high and a single low tide daily, are shown in the same format as that given for the example in FIGURE 82.

TIDAL INFORMATION					
Place	Height above datum of soundings				
	Mean High Water		Mean Sea Level	Mean Low Water	
	Higher	Lower		Lower	Higher
	meters	meters	meters	meters	meters
Abadan	1.3	-	0.7	0.1	-
Karg Island	1.1	-	0.5	0.0	-

Tide is usually diurnal

FIGURE 82. Tidal box for diurnal tides.

c. Mixed tides usually consist of two high and two low tides daily, but occasionally the tide may become diurnal with large differences in either the high or low water. These tides are shown in the same format as that given for the example in FIGURE 83.

TIDAL INFORMATION					
Place	Height above datum of soundings				
	Mean High Water		Mean Sea Level	Mean Low Water	
	Higher	Lower		Lower	Higher
	meters	meters	meters	meters	meters
Tokyo Wan	1.3	0.8	0.5	0.1	0.4
Yokosuka	1.1	0.5	0.3	0.0	0.1

FIGURE 83. Tidal box for mixed tides.

3.11.32.3.2 Tidal stream table. Tidal Stream Data Points (FACS Code 2G030) at which tidal streams have been observed and for which data are to be charted, shall be assigned reference letters A, B, C, etc. in some regular order. These letters, enclosed in a diamond outline, shall be inserted in the appropriate geographical positions on the chart and in a tide stream table with data relating to that position. The format of the tidal stream table in the margin is variable, and should be patterned after the box shown on the source chart.

3.11.32.4 Position. The positions of the tide box and tidal stream table are variable.

3.11.32.5 Type. The heading - "TIDAL INFORMATION" - is shown in 7 point Swiss 742, upper case. All other type in the tidal box is shown in 7 point Swiss 742, upper and lower case.

3.11.32.6 Color. SPC 58600 Black - Solid.

3.11.33 Users' note.

3.11.33.1 Use. The users' note is shown to give the user the mailing address of the Defense Mapping Agency for communications concerning the product.

3.11.33.2 Applicability. The users' note appears on each chart.

3.11.33.3 Content. Content of the users' note is fixed and it is right and left justified (see FIGURE 84 for content).

USERS SHOULD REFER CORRECTIONS, ADDITIONS,  
AND COMMENTS FOR IMPROVING THIS PRODUCT  
TO: DIRECTOR, DEFENSE MAPPING AGENCY,  
ATTN: PR, 8613 LEE HIGHWAY, FAIRFAX, VA 22031-  
2137.

FIGURE 84. Users' note.

3.11.33.4 Position. Position of the users' note is fixed in the lower right chart margin, 2mm below the south heavy border line, right justified with the east heavy border line.

3.11.33.5 Type. 6 point, Swiss 742, upper case type.

3.11.33.6 Color. SPC 58600 Black - Solid.

3.11.34 Vertical datum note.

3.11.34.1 Use. The vertical datum note provides quick reference for the unit of soundings, the sounding datum, the unit of height measurements, the vertical datum for heights, and the contour interval.

3.11.34.2 Applicability. Vertical datum notes are shown on each chart, although some small scale charts may not have a known datum.

3.11.34.3 Content. The unit of soundings is on the first line of the vertical datum note and is fixed, reading; "SOUNDINGS IN METERS." The next lines are variable, depending on sources, and indicate any soundings which are portrayed more precise than to the nearest meter (i.e., "under 30 in meters and half meters"). This may require two lines. The next line describes the sounding datum, and is variable. The next line indicates whether or not soundings have been corrected for sound velocity. The content is fixed, but its presence is variable. The next line contains the unit of heights and vertical datum for heights, and is fixed, reading; "HEIGHTS IN METERS ABOVE MEAN SEA LEVEL." The next lines are variable and state the contour interval and any supplementary contours shown on the chart (see FIGURE 85 and 86).

SOUNDINGS IN METERS  
(under 21 in meters and decimeters)  
(meters and half meters to 30)  
reduced to the level of Mean Lower Low Water  
Soundings on this chart have been corrected for sound velocity  
HEIGHTS IN METERS ABOVE MEAN SEA LEVEL  
Contour interval 50 meters  
with a supplementary contour at 25 meters

FIGURE 85. Vertical datum note with more than two measurement precision, corrected sounding note, and supplementary contours.

SOUNDINGS IN METERS  
(under 30 in meters and half meters)  
reduced to the approximate level of Mean Low Water  
HEIGHTS IN METERS ABOVE MEAN SEA LEVEL  
Contour interval 200 meters

FIGURE 86. Vertical datum note with two measurement precision.

3.11.34.4 Position. If the main title is shown in its preferred position (see 3.11.25), then the preferred position of the vertical datum note is 5 mm below and centered under the main title. If the main title is shown in its alternate position in the upper chart margin, the preferred position of the vertical datum note is in the upper right margin of the chart, 5 mm above the north heavy border line, with the lines of the note centered, and the left side of the note 60mm away from the right side of the main title.

3.11.34.5 Type. The vertical datum is shown in Swiss 742. The first line - "SOUNDINGS IN METERS" - is shown in 10 point, upper case. The lines describing which soundings are in parts of meters are shown in 10 point, lower case. The sounding datum is shown in 8 point, lower case with the exception that the name of the sounding datum is in caps and lower case. The sounding correction note is in 8 point caps and lower case. The line reading "HEIGHTS IN METERS ABOVE MEAN SEA LEVEL"

is shown in 8 point, upper case. The lines describing contours are shown in 8 point, caps and lower case.

3.11.34.6 Color. SPC 58600 Black - Solid.

3.11.35 Warning note.

3.11.35.1 Use. The warning note cautions the user not to depend entirely on any one navigational aid, especially floating aids (buoys). The note also refers the user to related publications, which discuss the reliability of buoys in detail.

3.11.35.2 Applicability. A warning note appears on each chart.

3.11.35.3 Content. The content of the warning note varies between two types. For charts in foreign of waters, see FIGURE 87. For charts in U.S. waters, see FIGURE 88. The notes shall be left and right justified.

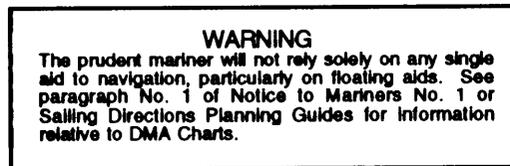


FIGURE 87. Warning note for charts of foreign waters.

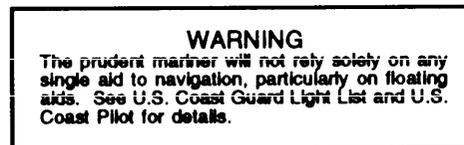


FIGURE 88. Warning note for charts of U.S. waters.

3.11.35.4 Position. The preferred position for the warning note is in the lower right margin of the chart, 2mm below the south heavy border line, with the right side of the note 25mm away from the left side of the subtitle (see 3.11.31). On charts that show the LIMITED DISTRIBUTION notes, the warning note is 25mm to the left of the distribution guidance note (see APPENDIX A).

3.11.35.5 Type. The warning note is shown in 9 point, Swiss 742, upper case for the heading, and 7 point, Swiss 742, upper & lower case for the text. The box linewidth is 0.4mm.

3.11.35.6 Color. SPC 96532 Purple - Solid.

3.11.36 Borders.

a. Borders shown on standard nautical charts are designated as a plan border (APPENDIX A) or scale border (APPENDIX B). Plan borders are made up with a single line conveniently subdivided by ticks; scale borders are more complex presenting minute subdivisions and suitable shading. The style of border to be used is determined by the scale of the chart.

b. The neatline of a plan border and the inner neatline of the scale border define the limits of the charted area. Depending on the scale of the chart, the chart area is divided by projection lines spaced for the convenience of the user. These projection lines are extended approximately 1 mm outward from the neatline or scale border. These extensions (ticks) are used to further subdivide the projection on the neatlines or scale border. Outside the neatline or border scale, separated by a space for the projection values (figures), there is a heavy black border (outer border) parallel to the neatline which is 1.0mm thick - solid black.

c. Harbor, Approach, and Coastal Charts which have meridians that converge shall not have their borders marked or ticked in the same manner as Scale Borders or Plan Borders. They shall have their graticules subdivided internally.

d. The internal projection lines for Harbor, Approach, and Coastal Charts with meridians that converge shall be marked and the graticule shall be subdivided as follows:

(1) The meridian closest to the center of the chart shall be marked with tick marks which are at right angles to the lines. The two meridians immediately inside of each of the two outermost complete meridians (extending from top to bottom neatline), including the northernmost and southernmost complete parallels, shall also be marked with tick marks which are at right angles to the lines. These ticks extend from the lines in the direction of increasing latitude and longitude (ticks point away from the equator and from the zero meridian).

(2) The meridians are divided into 1 minute ticks and the parallels are divided into 2 minute ticks.

(3) The one minute ticks on the meridian are 2mm long and the even five minute ticks are 4mm long. The two minute ticks of the parallels are 2mm long and the even ten minute ticks are 4mm long. All ticks are 0.2mm lineweight.

c. See 3.11.37 for specific plan border information and 3.11.38 for specific scale border information.

d. Border colors are SPC 58600 Black - Solid.

3.11.37 Plan borders. Plan borders are used for all charts and plans with scales of 1:75,000 and larger (HAC 1-3).

a. Degree figures for plan borders will be portrayed according to figures 89, 90, or 91. If the chart limits do not contain an even degree, place the figure next to a projection minute. Even minutes are preferred such as: 2', 4', 6', etc. The following paragraphs (a, b, and c) will be applied as a minimum requirement for the placement of degree figures on charts constructed with a plan border.

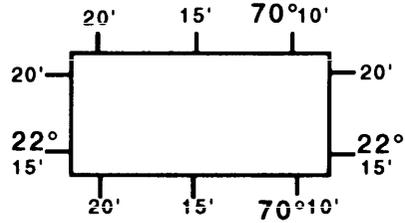


FIGURE 89. Charts that are 66.03 cm or less.

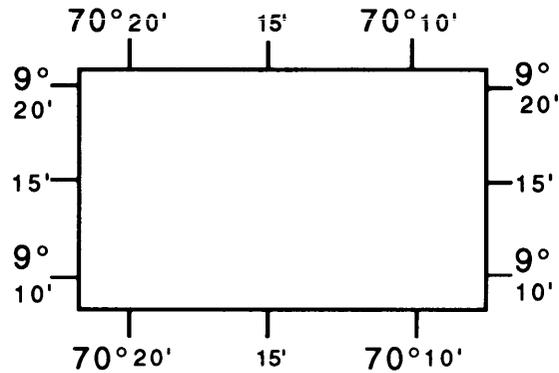


FIGURE 90. Charts that are 66.03 cm or more with no whole degrees shown on the chart.

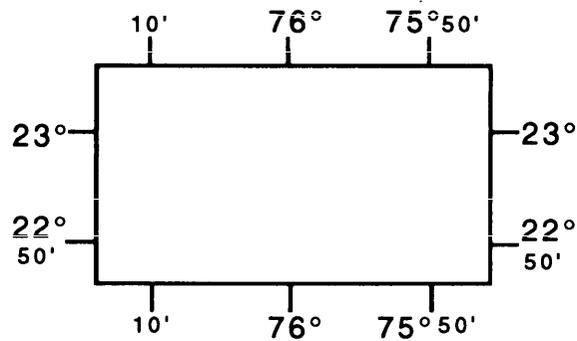


FIGURE 91. Charts that are 66.03 cm or more with a whole degree shown on the chart.

b. Minute figures and ticks.

(1) The projection ticks on the border will be in the same increments for latitude and longitude.

(2) Whole minutes of latitude and longitude will be ticked regardless of scale.

c. Based upon the length of a minute of longitude, the graticule for border subdivisions will be subdivided and numbered as follows:

**Minute of Longitude Length**

0.00 cm (0.00 inches)	to 2.53 cm (0.99 inches)	FIGURE 92
2.54 cm (1 inch)	to 5.07 cm (1.99 inches)	FIGURE 93
5.08 cm (2 inches)	to 8.88 cm (3.49 inches)	FIGURE 94
8.89 cm (3.5 inches)	to 20.31 cm (7.99 inches)	FIGURE 95
20.32 cm (8 inches)	or greater	FIGURE 96
Larger scale plans		FIGURE 97

d. The graduation is determined for both latitude and longitude by applying the following: all examples are governed by the measurement of one minute (1') of longitude.

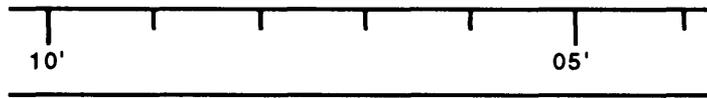


FIGURE 92. 0.00 cm (0.00 inch) to 2.53 cm (0.99 inch)  
numbered every 5'.

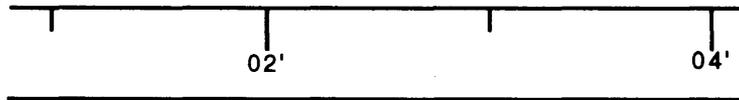


FIGURE 93. 2.54 cm (1.00 inch) to 5.07 cm (1.99 inches)  
number alternate minutes, i.e., 2, 4, 6, etc.

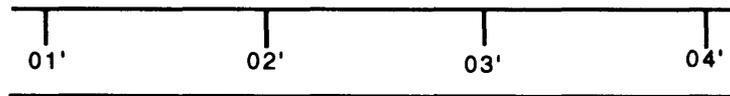


FIGURE 94. 5.08 cm (2.00 inches) to 8.88 cm (3.49 inches)  
number every minute.

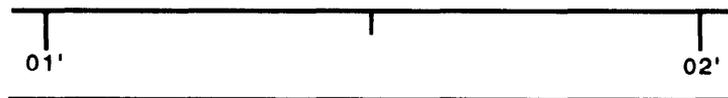


FIGURE 95. 8.89 cm (3.50 inches) to 20.31 cm (7.99 inches)  
add 30" tick. (DO NOT NUMBER THE 30" TICK.)

NOTE: Where one minute of longitude is less than three and one half inches, the thirty second ticks will not be shown regardless of the length of the latitude minute.



FIGURE 96 20.32 cm (8.00 inches) or greater, add 30" ticks and number.

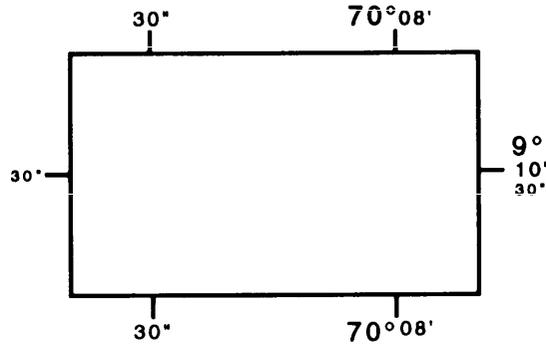


FIGURE 97. Plans covering less than a full minute of latitude or longitude will show 30" ticks and are numbered.

e. Subdivision and placement of minutes.

(1) One or two minutes on each side of the chart will be subdivided (as described in 3.11.37.f. below) and placed where they will provide the greatest utility. Accessibility for plotting should be the primary consideration for which individual minutes are chosen.

(2) The examples given below serve as a guide for subdividing minutes. Measurements are referenced to the longest side.

(3) 45.72 cm (18 inches) or less subdivide one minute top or bottom and one minute right or left (see FIGURE 98).

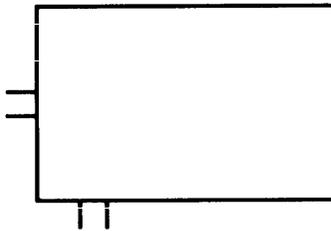


FIGURE 98. 45.72 cm or less.

(4) 45.73 cm (18.1 inches) to 63.50 cm (25 inches) subdivide one minute on each of four sides diagonally placed (see FIGURE 99).

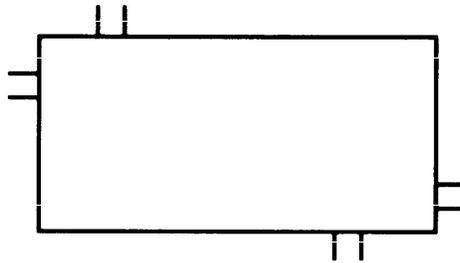


FIGURE 99. 45.73 cm to 63.50 cm.

(5) 63.51 cm (25.1 inches) or greater subdivide two well separated minutes on each side, top and bottom (see FIGURE 100).

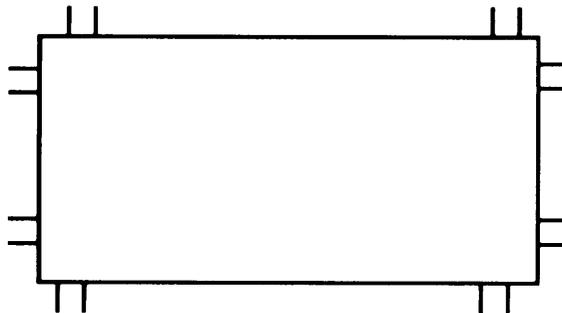


FIGURE 100. 63.51 cm or greater.

(6) For plans of unusual shape, where the longest side measures 63.51 cm (25.1 inches) or more, subdivide two well separated minutes on the long side (provided the minute of longitude does not exceed 7.62 cm (3 inches)) or one on each side diagonally placed and only one subdivided minute on each of the short sides (see FIGURE 101).

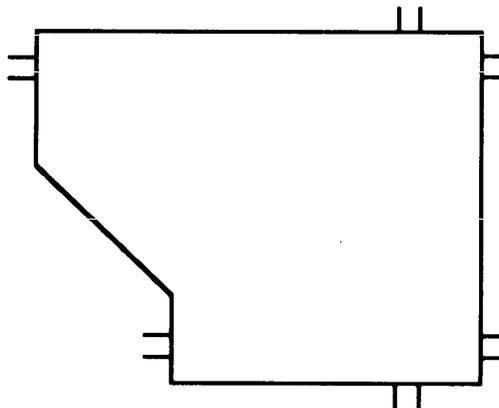


FIGURE 101. Plans of unusual shape.

f. Minute subdivision.

(1) Where 1' Longitude  $\leq$  2.53 cm (0.99 inch), subdivide 1' into five (5) equal parts.

(2) Where 1' Longitude = 2.54 cm (1.00 inch) to 6.34 cm (2.49 inches), subdivide as shown in FIGURE 102.

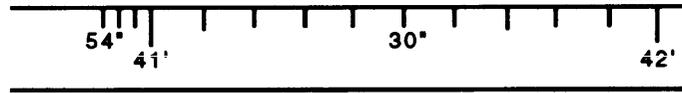


FIGURE 102. Minute subdivision (sample).

(3) Where 1' Longitude  $\geq$  6.35 cm (2.5 inches), subdivide as shown in FIGURE 103.

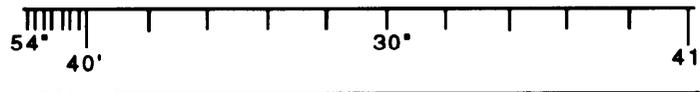


FIGURE 103. Minute subdivision (sample).

g. Six-second subdivisions.

(1) Where one minute of longitude is 2.54 cm (1.00 inch) to 6.34 cm (2.49 inches) subdivide the preceding six seconds into two second intervals (see FIGURE 102) but when impracticable, subdivide the first six seconds of the following minute.

(2) Where one minute of longitude is 6.35 cm (2.5 inches) or more subdivide the preceding six seconds into one second intervals (see FIGURE 103) but when impracticable, subdivide the first six seconds of the following minute.

(3) Where one minute of longitude is less than 6.35 cm (2.5 inches), but one minute of latitude is more than 6.35 cm (2.5 inches), disregard the six second breakdown for longitude and subdivide 6" of latitude.

3.11.38 Scale borders. Scale borders are used when the chart to be constructed is at a scale of 1:75,001 or smaller (HAC 3-9).

a. Border figures and ticks for scale borders will have the latitude and longitude subdivided and numbered in the same style throughout whenever practicable regardless of the different lengths of the minute. All increments indicated by border figures will carry ticks.

b. Graticules for scale border subdivisions are based upon the length of a minute of longitude, subdivided and numbered as follows:

c. Minute of longitude length.

1.524 cm (0.60 inch)	to 3.708 cm (1.46 inches)	FIGURE 104
0.762 cm (0.30 inch)	to 1.523 cm (0.559 inch)	FIGURE 105
0.422 cm (0.166 inch)	to 0.761 cm (0.299 inch)	FIGURE 106
0.254 cm (0.10 inch)	to 0.421 cm (0.165 inch)	FIGURE 107
0.168 cm (0.066 inch)	to 0.253 cm (0.099 inch)	FIGURE 108

d. Degree of longitude length.

- 3.810 cm (1.50 inches) to 10.159 cm (3.99 inches)      FIGURE 109
- 1.524 cm (0.60 inch)      to      3.809 cm (1.49 inches)      FIGURE 110
- 0.889 cm (0.35 inch)      to      1.523 cm (0.599 inch)      FIGURE 111
- 0.457 cm (0.18 inch)      to      0.888 cm (0.349 inch)      FIGURE 112
- Less than 0.457 cm (0.18 inch)      FIGURE 113

Shade the minute or division on the decreasing side of the even minute or degree.

e. When 1' Longitude = 1.524 cm (0.60 inch) through 3.708 cm (1.46 inches) divide border every 30" and subdivide each 1' into 10 equal parts (see FIGURE 104).

- (1) Shade alternate minutes.
- (2) Number and tick every 5'.

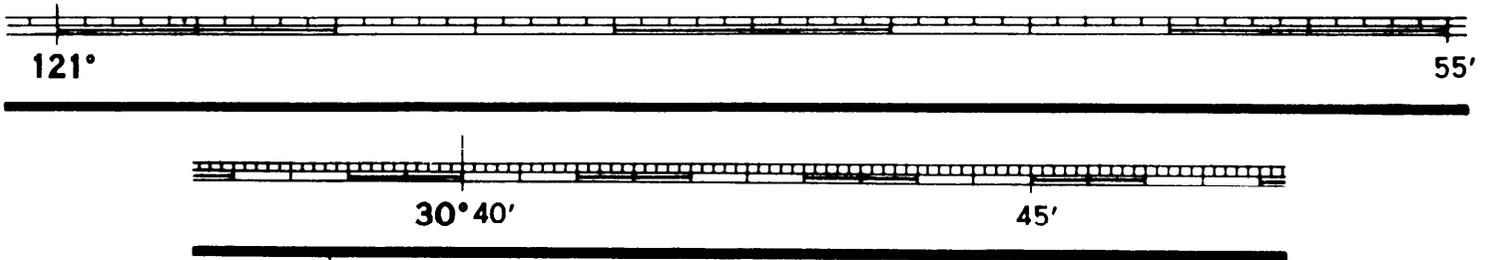


FIGURE 104. Minute of longitude length -1.524 cm (0.60 inch) to 3.708 cm (1.46 inches) sample.

f. When 1' Longitude = 0.762 cm (0.30 inch) through 1.523 cm (0.599 inch) or when 1' Longitude = 45.720 cm (18.00 inches) through 91.43 cm (35.99 inches) divide border every minute and subdivide into four equal parts (see FIGURE 105).

- (1) Shade alternate minutes.
- (2) Number and tick every 5'.

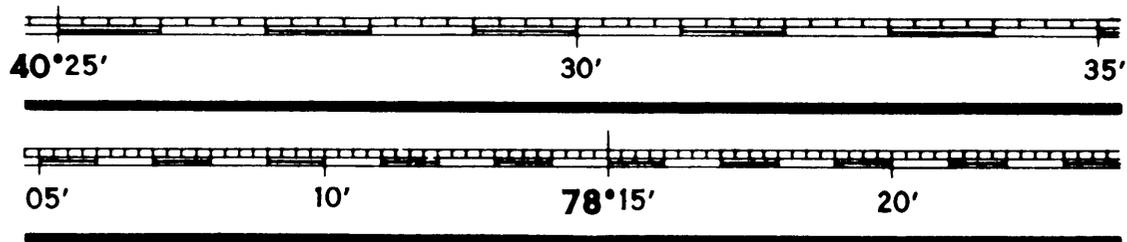


FIGURE 105. Minute of longitude length -0.762 cm (0.30 inch) to 1.523 cm (0.599 inch) sample.

g. When 1' Longitude = 0.422 cm (0.166 inch) through 0.761 cm (0.299 inch) or when 1' Longitude = 25.40 cm (10.00 inches) through 45.719 cm (17.99 inches) divide border into minutes and subdivide into four equal parts (see FIGURE 106).

- (1) Shade alternate minutes.
- (2) Tick every 5'.
- (3) Number every 10'.

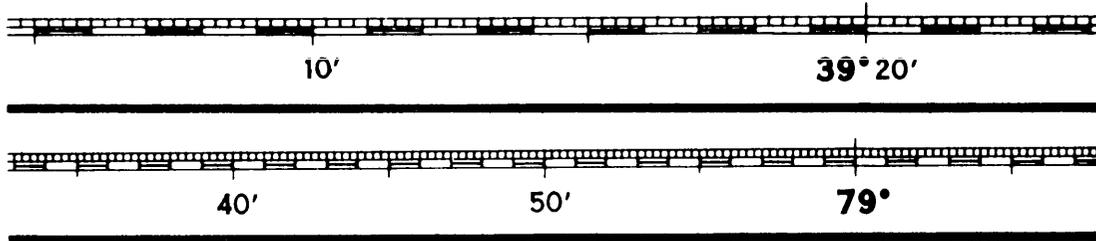


FIGURE 106. Minute of longitude length -0.422 cm (0.166 inch) to 0.761 cm (0.299 inch) sample.

h. When 1' Longitude = 0.254 cm (0.10 inch) through 0.421 cm (0.165 inch) or when 1' Longitude = 15.14 cm (6.00 inches) through 25.399 cm (9.99 inches) divide border into minutes and subdivide into two equal parts (see FIGURE 107).

- (1) Shade alternate 1'.
- (2) Tick every 5'.
- (3) Number every 10'.

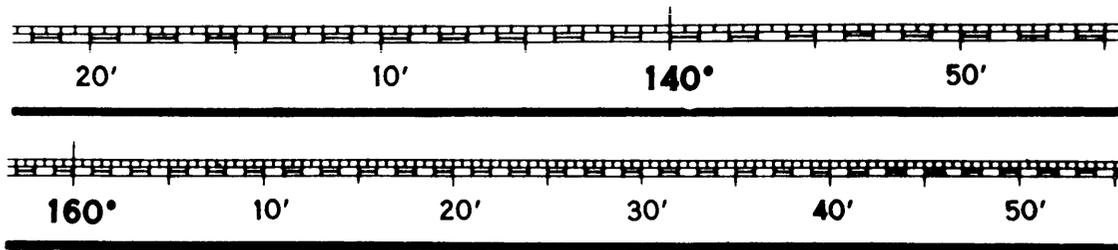


FIGURE 107. Minute of longitude length -0.254 cm (0.10 inch) to 0.421 cm (0.165 inch) sample.

i. When 1' Longitude = 0.168 cm (0.066 inch) through 0.253 cm (0.099 inch) or when 1' Longitude = 10.160 cm (4.00 inches) through 15.239 cm (5.99 inches) divide border every 10' and subdivide into minutes (see FIGURE 108).

- (1) Shade alternate 10'.
- (2) Number and tick every 30'.

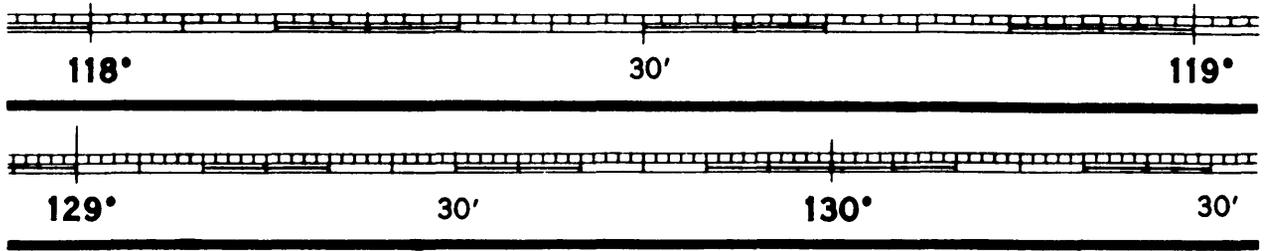


FIGURE 108. Minute of longitude length - 0.168 cm (0.066 inch) to 0.253 cm (0.099 inch) sample.

j. When 1° Longitude = 3.810 cm (1.50 inches) through 10.159 cm (3.99 inches) divide border every 10' and subdivide each 10' into five equal parts (see FIGURE 109).

- (1) Shade alternate 10'.
- (2) Number and tick every 30'.

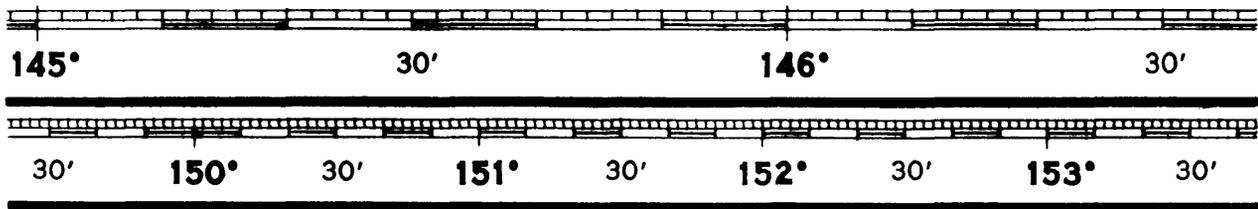


FIGURE 109. Degree of longitude length - 3.810 cm (1.50 inches) to 10.159 cm (3.99 inches) sample.

k. When 1° Longitude = 1.524 cm (0.60 inch) through 3.809 cm (1.49 inches) divide border every degree and subdivide into 12 equal parts (see FIGURE 110).

- (1) Shade alternate degrees.
- (2) Number and tick every 1° when 1° is greater than or equal to 2.54 cm (1.00 inch).
- (3) Number and tick every 5° when 1° is less than 2.54 cm (1.00 inch).

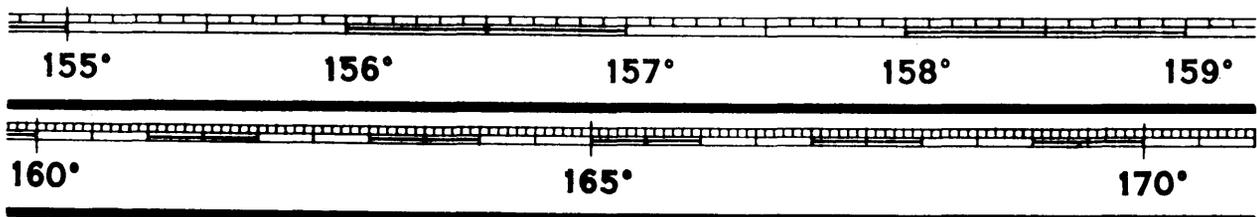


FIGURE 110. Degree of longitude length - 1.524 cm (0.60 inch) to 3.809 cm (1.49 inches) sample.

1. When  $1^\circ$  Longitude = 0.889 cm (0.35 inch) through 1.523 cm (0.599 inch) divide border every degree and subdivide each degree into six equal parts (see FIGURE 111).

- (1) Shade alternate degrees.
- (2) Number and tick every  $5^\circ$ .

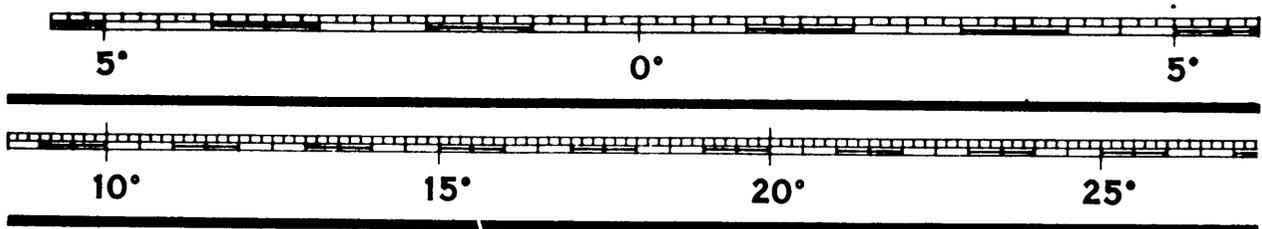


FIGURE 111. Degree of longitude length - 0.889 cm (0.35 inch) to 1.523 cm (0.599 inch) sample.

m. When  $1^\circ$  Longitude = 0.457 cm (0.18 inch) through 0.888 cm (0.349 inch) divide border every degree and subdivide into four equal parts (see FIGURE 112).

- (1) Shade alternate degrees.
- (2) Tick every  $5^\circ$ .
- (3) Number every  $10^\circ$ .

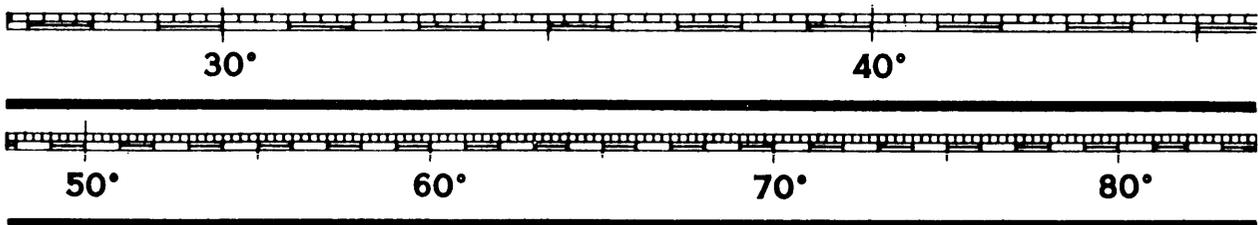


FIGURE 112. Degree of longitude length - 0.457 cm (0.18 inch) to 0.888 cm (0.349 inch) sample.

n. When  $1^\circ$  Longitude = less than 0.457 cm (0.18 inch) divide border every  $10^\circ$  and subdivide every  $1^\circ$  (see FIGURE 113).

- (1) Shade alternate  $10^\circ$ .
- (2) Number every  $10^\circ$ .



FIGURE 113. Degree of longitude length - Less than 0.457 cm (0.18 inch) sample.

o. Numbering at Chart Corners

1. If a labeling increment coincides with the chart neatline, that increment will not be labeled. No labels are shown at the extreme corners of the chart.

2. If the closest labeled tick to each corner is a minute value, rather than a whole degree, it will be labeled with full degree and minute values.

3.11.39 Graphic scales.

3.11.39.1 General - Nautical charts and insets with plan borders will carry graphic, or bar scales showing yards, meters (or kilometers), and nautical miles depending on chart scale.

a. Charts of 1:75,000 scale and larger (HAC 1-3) will carry the graphic scales inserted in the position of the heavy outer border. Charts of 1:75,001 and smaller (HAC 3-9) will not show graphic scales.

b. Charts with two or more panels or insets of various scales whose borders are composed of the extension of the same outer border, will carry bar scales inside the borders of each plan.

c. Graphic scales shown inserted in the heavy outer border on plan charts must be applicable anywhere on the chart to prevent possible misuse in plans of different scale.

3.11.39.2 Yard scale. This type of scale will be shown on the right and left sides of the chart to form a continuation of the heavy outer border. Charts with a scale of 1:5,000 and larger (HAC 1) will carry the yards in units of one hundred. Charts with a scale of 1:5,001 to and including 1:75,000 (HAC 1-3) will carry the yards in units of one thousand (see FIGURES 114 through 117 and APPENDIX A).

3.11.39.3 Metric scale. This type of scale will be located to form a continuation of the top outer border of the chart to the left of the center. Charts with a scale of 1:5,000 and larger (HAC 1) will be in meters. Charts with a scale of 1:5,001 to and including 1:75,000 (HAC 1-3) will be in kilometers (see FIGURES 114 through 117 and APPENDIX A).

3.11.39.4 Nautical mile scale. This type of scale will be located to form a continuation of the top outer border of the chart to the right of the center. Charts with a scale of 1:5,000 and larger (HAC 1) will not carry the nautical mile scale. Charts with a scale of 1:5,001 to and including 1:75,000 (HAC 1-3) will carry the nautical mile scale (see FIGURES 114 through 117 and APPENDIX A).



FIGURE 114. Graphic scale 1:5,000 and larger.

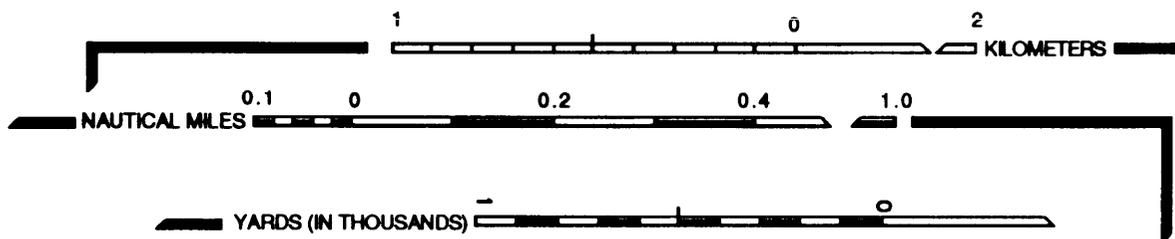


FIGURE 115. Graphic scale 1:5,001 to 1:10,000.

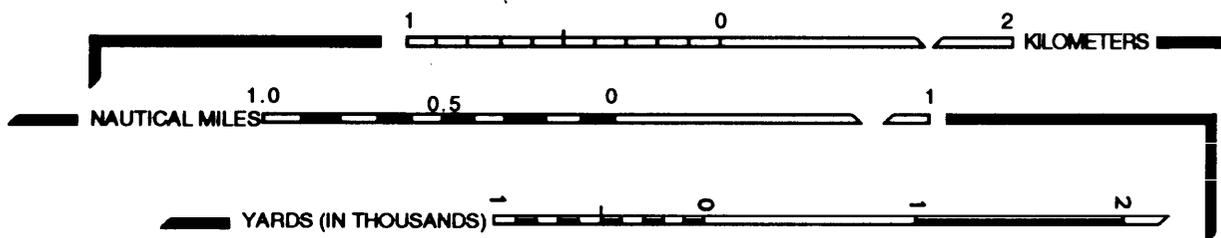


FIGURE 116. Graphic scale 1:10,001 to 1:20,000.

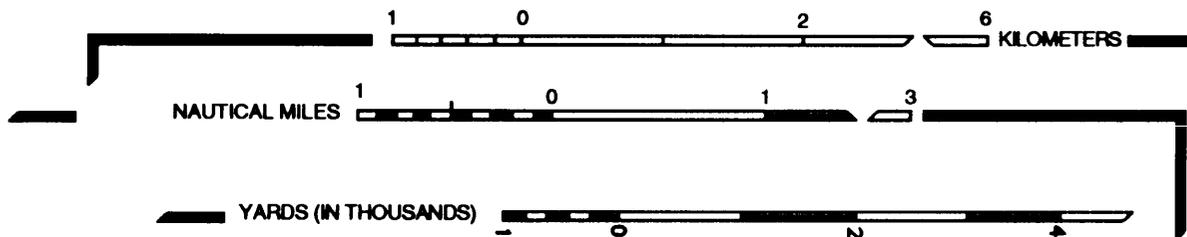


FIGURE 117. Graphic scale 1:20,001 to 1:75,000.

3.11.39.5 Graphic scales on plans.

a. Graphic scales on small inset plans will be placed, when possible, to avoid the fold of the printed chart.

b. When scales are STACKED on a plan they will be presented in the following order, reading from top to bottom; Nautical Miles, Yards, and Meters. When one nautical mile exceeds 15.24 cm (6 inches), omit the mile scale and show the yards and meters. Portions of scales may be used when space is limited. The space between the scales and the distance from the neatline will be 0.60 cm (0.24 inch).

c. The yard and meter scales will be added in the same multiple and both scales will be numbered according to the scale of the chart as illustrated below:

Graphic scales on plans (graphics are not to scale)

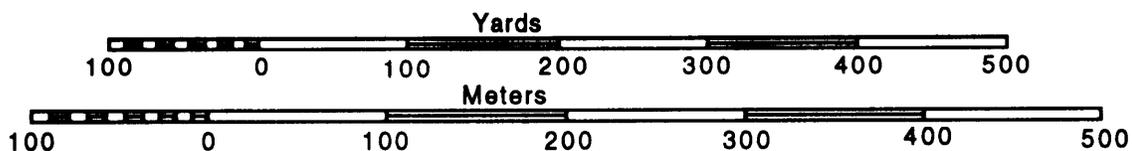


FIGURE 118. Graphic scales on plans 1:5,000 and larger.

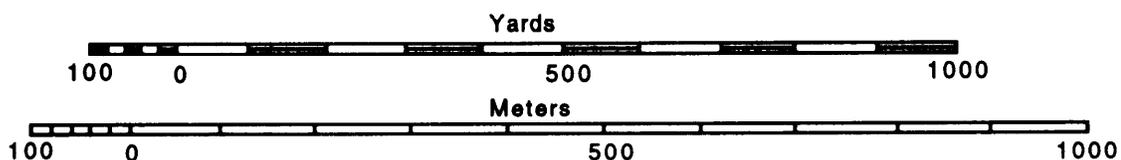


FIGURE 119. Graphic scales on plans 1:5,001 to 1:10,000.

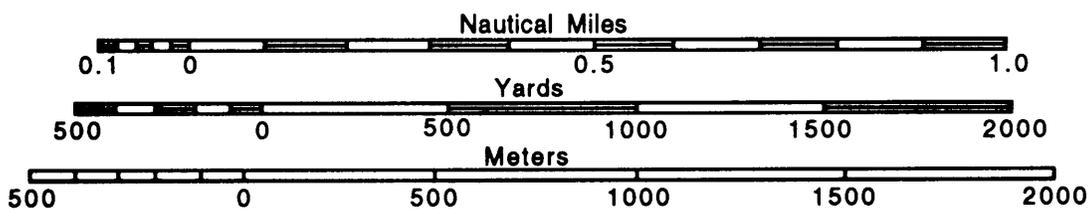


FIGURE 120. Graphic scales on plans 1:10,001 to 1:20,000.

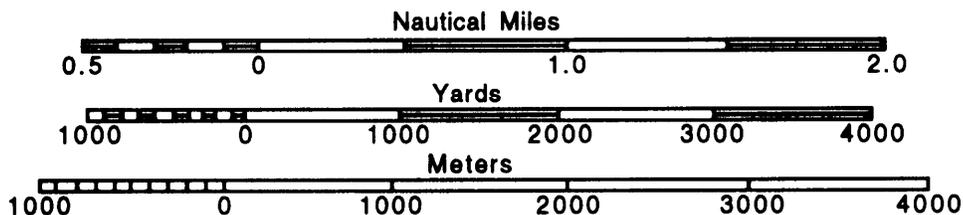


FIGURE 121. Graphic scales on plans 1:20,001 to 1:40,000.

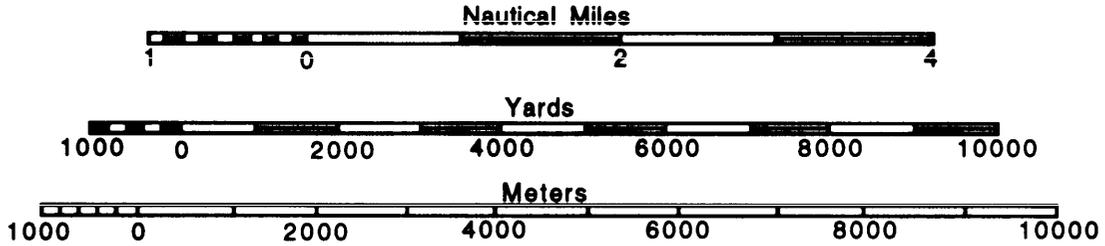


FIGURE 122. Graphic scales on plans 1:40,001 to 1:75,000.

d. When two graphic scales are placed on a horizontal line the space between the scales and the distance from the ends to the neatline should be equal. This space is one-third of the difference between the plan neatline dimensions and the combined length of the two scales (see FIGURE 123).

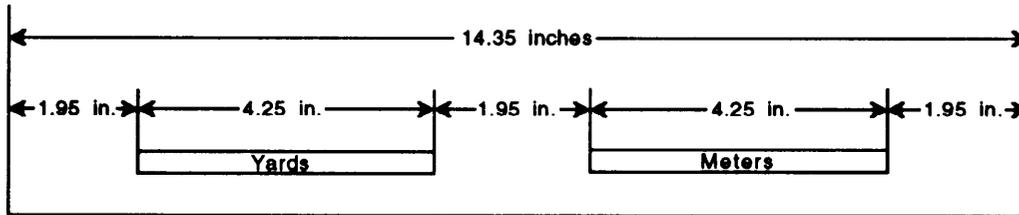


FIGURE 123. Placement of two graphic scales.

e. When three graphic scales are placed on a horizontal line, the middle scale is centered between the others. Space between the scales will be  $1/4$  of the difference between the overall neatline distance and the combined scale distance (see FIGURE 124).

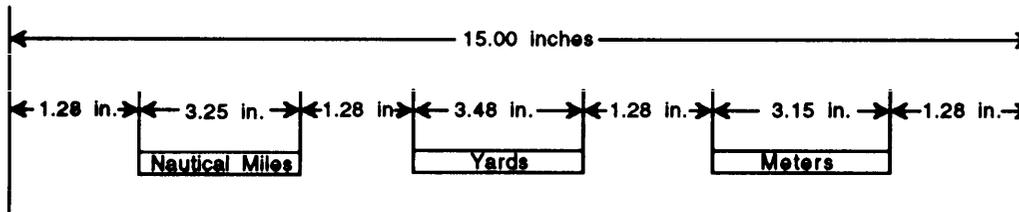


FIGURE 124. Placement of three graphic scales.

f. Color of Graphic Scales. SPC 58600 Black - Solid.

### 3.12 Culture.

3.12.1 Feature requirements. Cultural features are shown on Harbor, Approach, and Coastal Charts primarily as reference points for position fixing, and to indicate to the mariner the degree of cultural development along the coast.

3.12.2 Applicable features. Refer to FACS Code Category 1 (Culture) features in Table I of this specification for individual feature requirements, and MIL-STD-2402 for symbolization of those features.

### 3.13 Hydrography.

3.13.1 Feature requirements. Hydrographic features are shown on Harbor, Approach, and Coastal Charts to indicate to mariners the depth of water over which they are positioned (soundings), and through descriptive type and symbols, to indicate various man-made and natural water and coastline features, of significance to navigation.

3.13.2 Applicable features. Refer to FACS Code Category 2 (Hydrography) features in Table I of this specification for individual feature requirements, and MIL-STD-2402 for symbolization of those features.

#### 3.13.3 Content.

a. Hydrography is the science which deals with the measurement and description of the physical features of the oceans, seas, lakes, rivers, and their adjoining coastal areas with particular reference to their use for navigation.

b. Hydrography on nautical charts is portrayed primarily by soundings, and supplemented by depth curves. The soundings and depth curves must present a representation of the bottom that will allow a mariner to interpolate the depth of water at places where soundings and depth curves are not shown, with some degree of accuracy. Therefore, the selection of soundings to be shown on the chart is critical to the usability of the chart. Rules for sounding selection are presented in Table I of this specification, but rules cannot cover every conceivable situation. The judgment of an experienced nautical cartographer must be the final authority on the correct selection of soundings.

c. Soundings can be classified as either critical soundings, support soundings and fill soundings. Critical soundings are those soundings which identify the shoals and soundings which provide essential information required for navigation in non-dangerous areas. Support soundings provide additional information about the shape of the bottom around critical soundings and shoals, or are used to provide identifiers to depth curves and to show changes in bottom slope away from shoals or deeps. Fill soundings are used to fill in flat areas and to fill in deep areas that are not adequately defined by support soundings.

d. Emphasis must be placed on selecting a density of soundings for natural channels, shoals or other hazardous areas that are sufficiently close together so that these areas are properly highlighted (by dense sounding pattern) for quick recognition by the mariner. Additional supportive soundings and fill soundings are selected at a lesser density to complete the bottom description.

e. Depth curve portrayal will be adjusted for clarity in areas of rapid change in the configuration of the bottom. Depth curves that coalesce on steep slopes will only show the deepest and shoalest curves. Where space is limited in steep-to-channels, as in fjords, portrayal of the deepest curve is preferred. However, in other general areas where space is limited due to scale, the shoalest curve will be shown with the deep curve feathered into it. Depth curves can be interpolated at the desired interval from hydrographic surveys but when published nautical charts are used as the primary source depth curve interval will be dependent on what is shown on source charts.

3.13.4 Soundings.

3.13.4.1. Hydrographic or sounding datum. A hydrographic or sounding datum is a selected level from which depths are referenced. The reference level found to be most realistic is some form of low water. This varies in different parts of the world and is usually referred to as chart datum. The level used as chart datum must be low enough so that lower low waters do not go far below it. At most places this level is determined from the mean of a number of low waters. This level will vary throughout the world. Heights, on the other hand, are referenced to Mean Sea Level or Mean High Water. Therefore, two different vertical datums are generally used for the same chart.

3.13.4.2 Sounding portrayal. Corrected soundings shall be portrayed on nautical charts where possible.

a. If soundings are received uncorrected, and sound velocity calibrations are available, a correction shall be applied prior to inclusion on the chart. Soundings more shallow than 200 meters shall be corrected whenever bar checks, sound velocity, or temperature/salinity data are available. Soundings 200 meters and deeper shall be corrected using Echo-Sounding Correction Tables, NP 139, latest edition, issued by the British Admiralty Hydrographic Department. If directly observed sound velocity data are available, they should be used if considered to be more reliable than the average correction values for the zones in NP 139.

b. See IHO Special Publication 46, Correction of Echo Soundings, for details on sounding correction policies of IHO members. Soundings on most foreign source charts have already been corrected for sound velocity.

c. If all soundings portrayed on the chart are corrected depths, a note to that effect, in black, shall be shown 3.0mm below the sounding datum note (see 3.11.34.3 and FIGURE 85).

d. If it is not possible to correct the soundings on a source, this will be indicated in the Source Diagram and the above note shall be omitted. An asterisk "\*" shall be placed to the left of the letter identifying the source, e.g. \*B, both inside the Source diagram and in the Source Data. Add "\* Uncorrected Soundings" below the Source Data. These items will be in 7 point type (see 3.11.7-8 and FIGURES 17 and 18).

3.13.4.3 Depth unit.

a. When all source material for a new chart compilation consists of source charts or surveys depicting depths in meters and decimeters, the depth unit utilized will be in meters and decimeters to the depth shown on the foreign sources. The depth unit shall be stated in the chart title as follows:

**SOUNDINGS IN METERS**  
(under   \*   in meters and decimeters)

\* The depth to which soundings are shown in meters and decimeters on the foreign sources.

b. When all source material consists of U.S. Navy metric surveys, or foreign metric sources that utilize both decimeters and half

meters, the depth unit utilized for the chart will be the same as that used on the source material. The depth unit will be stated in the chart title as follows:

**SOUNDINGS IN METERS**  
(under   \* in meters and decimeters)  
(meters and half meters to   +)

- \* The depth to which soundings are shown in meters and decimeters on the Navy surveys or foreign source.
- + If meters and half meters are also shown, the depth to which soundings are shown in meters and half meters.

c. When source material for new chart compilation depicts depths in fathoms, fathoms and fractions, or fathoms and feet, soundings will be converted to meters and decimeters as follows: Decimeters from 0 to 20.9 meters, meters and half meters from 21 to 30.5 meters, and whole meters for 31 meters and over. The depth unit will be stated in the title as follows:

**SOUNDINGS IN METERS**  
(under 21 in meters and decimeters)  
(meters and half meters to 31)

d. When the source material for a new chart compilation is a combination of sources, the depth units utilized will be:

- (1) Meters and decimeters where the source is meters and decimeters.
- (2) Meters and decimeters where the source is in feet or fathoms and feet.
- (3) Meters and half meters where the source is in meters and half meters.

e. The depth unit that is stated in the title will be the one that was used for a greater portion of the chart. A plus sign "+" shall be placed next to the sources utilizing the other depth unit in the source diagram and a note shall be added to the bottom of the source diagram stating that the depth unit utilized in this area is different from that in the chart title. For example:

+ The depth unit in this area  
is meters and half meters

+ The depth unit in this area  
is meters and decimeters

3.13.4.4 Sounding conversion.

a. Sounding data may be placed in four categories and each should be considered as a distinct unit. When a unit is referred to, the following definition applies:

- Corrected Meters = meters corrected for sound velocity
- Corrected Fathoms = fathoms corrected for sound velocity
- Uncorrected Meters = meters based on 1500 meters/second
- Uncorrected Fathoms = fathoms based on 800 fathoms/second

b. When converting from any of the units above to other units, see 3.13.4.2 and guidance provided below:

Uncorrected Meters to Uncorrected Fathoms	-	SCT No.3
Uncorrected Fathoms to Uncorrected Meters	-	SCT No.3
Corrected Meters to Corrected Fathoms	-	SCT No.2
Corrected Fathoms to Corrected Meters	-	SCT No.4
Uncorrected Meters to Corrected Meters	-	NP139
Corrected Meters to Uncorrected Meters	-	NP139
Uncorrected Meters to Corrected Fathoms	-	NP139 + SCT No.2
Uncorrected Fathoms to Corrected Meters	-	SCT No.3 + NP139
Corrected Fathoms to Uncorrected Meters	-	SCT No.4 + NP139
Corrected Meters to Uncorrected Fathoms	-	NP139 + SCT No.3
Uncorrected Fathoms to Corrected Fathoms	-	SCT No.3 + NP139 + SCT No.2
Corrected Fathoms to Uncorrected Fathoms	-	SCT No.4 + NP139 + SCT No.3

c. The rounding off of decimeters between 21 and 30.5 meters will be in the following manner: Decimeters between 3 and 7 will be shown as 5. Example: 21<sub>3</sub> and 21<sub>7</sub> soundings shall be shown as 21<sub>5</sub>. The decimeters 1,2,8, and 9 shall be rounded off to the nearest meter. Example: 21<sub>2</sub> shall be shown as 21 while 21<sub>8</sub> shall be shown as 22. The statement in the chart title (meters and half meters to        +        ) indicates the nearest half meter as opposed to the nearest decimeter.

### 3.14 Aids to navigation.

3.14.1 Feature requirements. Aids to navigation are shown on Harbor, Approach, and Coastal Charts for aiding the mariner in determining position, heading, and/or speed. See 6.5.1.

3.14.2 Applicable features. Refer to FACS Code Category 2C (Hydrographic Nav aids) features in Table I of this specification for individual feature requirements, and MIL-STD-2402 for symbolization of those features.

### 3.14.3 Lights.

a. Lights are fixed position aids which vary from lights mounted on pillars to lighthouses. They are recognized by the mariner by their light characteristics at night and by the structure during daylight hours. The position of the light is indicated by a dot and a flare. The preferred placement of the flare will be where it will not overprint other chart data.

b. The DMA List of Lights will provide the name, location, approximate position, and characteristics for major lights. Lights of lesser importance may be taken from late source material even though they are not in the List of Lights.

c. A light sector is a sector in which a navigational light is visible or obscured, or in which it has a distinctive color different from the adjoining sectors. A sector is portrayed by an arc of a circle centered on the light, bounded by two radii, between which the light is visible, or obscured, or different from the adjoining sectors. The arc and limiting radii are indicated on the chart by dashed lines. Colors of the sectors are indicated by the first letter of the color (W, R, etc.) placed along the arc. Limits of light sectors and arcs of visibility as observed from a vessel are given in the List of lights in degrees and in clockwise order

d. The individual symbols for 2C050 (Light) vary considerably depending on the light's attribution and which product generation rules have been executed against the symbol. For example, along with the

light dot and flare, a light can show fog signal arcs (Posicut 59), a radar reflector symbol (Posicut 93), and a radio aid circle (Posicut 86). The later three symbols may appear all together, or in any combination, depending on the light's unique character. Additionally, IALA beacons (2C050, IAC002, see symbol 2C050P002) show an IALA beacon (Posicut 85) in place of the light dot, and show variable topmark posicuts, based on the attribute TMC. If there is no topmark, the TMC window is deleted.

#### 3.14.4 Buoys.

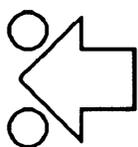
a. Buoys are floating aids to navigation, which are moored to the sea bottom. The position circle of the symbol indicates the approximate position of the buoy's sinker. Buoys can be lighted or unlighted. When lighted, the buoy symbol has a light flare extending from the position circle. The preferred placement of the flare will be where it will not overprint other chart data. The mariner recognized buoys by the light characteristics at night, and by the shape, color and markings on the buoy structure by day.

b. The individual symbols for buoys (2C010) vary considerably depending on the buoy's attribution and which product generation rules have been executed against the symbol. For example, a buoy may or may not show a light flare (Posicut 94), fog signal arcs (Posicut 59), a radar reflector (Posicut 93), and a radio aid circle (Posicut 86). Topmarks can appear in the window above the basic buoy symbol depending on the TMC attribute value. Each TMC value has a different topmark associated with it. If there is no topmark, the window will be empty.

c. This arrangement became necessary because of the many combinations of attributes possible for the features. Each change in attribute would cause a new symbol to be created. Portraying a separate symbol for each and every combination would not be feasible. With windows and the listing of possible attributes and attribute values, any combination and therefore, any buoy can be represented.

d. In certain areas, difficulties for navigators may arise in determining the direction of a lateral buoyage system, i.e., IALA. Examples of this situation might be in a one-way traffic lane where the direction of buoyage is opposed to the traffic direction, the "straight through" buoyage of a strait overrides the "approach from seaward" convention, or where two opposing directions meet, or where the lateral system extends a long way offshore and, at its outer end, has a local direction opposed the general direction (as occurs in the northern part of the outer Thames Estuary). The mariner's problem is not that of interpreting charted buoyage, but of knowing which side to pass when confronted with a "new danger" (described by IALA as one that has been marked by buoys, but not yet charted).

For potentially confusing situations, the following symbol shall be included on the chart to indicate the direction of lateral buoyage (see MIL-STD-2402). It shall be placed in the water, in the general area of the confusing situation, and point in the direction of buoyage for the area. The note is generally shown in conjunction with the symbol, but the symbol alone may be shown in congested areas.



**GENERAL  
DIRECTION  
OF BUOYAGE  
ON THIS CHART**

FIGURE 125. Direction of buoyage symbol.

3.15 Hypsography/Physiography.

3.15.1 Feature requirements. Hypsographic and physiographic features are shown on Harbor, Approach, and Coastal Charts in a smooth and generalized manner, so the mariner can identify his general location, be able to estimate his distance offshore, and give him some indication of the radar return he can expect from the land. A detailed portrayal of hypsography by a dense pattern of contours, especially when obscured from seaward by intervening terrain, is not required for this product.

3.15.2 Applicable features. Refer to FACS Code Category 3 (Hypsography) and 4 (Physiography) features in Table I of this specification for individual feature requirements, and MIL-STD-2402 for symbolization of those features.

3.15.3 Tints. Tints are used to emphasize land and water areas of the chart. A black tint (SPC-58600, 12% screen) is printed over land areas of the chart, and land areas of all applicable diagrams in the chart margin. Land tint is also printed in offshore features (outside the shoreline) that are above the high water plane of reference (VRC=001), such as breakwaters, piers, cribs, or offshore loading facilities. Land tint is not printed over glaciers, snowfields, or ice shelves, which have a white background.

3.16 Vegetation.

3.16.1 Feature requirements. Vegetation is shown on Harbor, Approach, and Coastal Charts, only when it is significant for navigation, such as when areas of trees or marsh form the apparent coastline, isolated trees or clumps of trees form landmarks, or where near the coast, wooded areas alternate with areas without tree cover, and so may assist in identifying headlands or other stretches of coastline.

3.16.2 Applicable features. Refer to FACS Code Category 5 (Vegetation) features in Table I of this specification for individual feature requirements, and MIL-STD-2402 for symbolization of those features.

3.17 Demarcation

3.17.1 Feature requirements. International boundaries on land are shown on Harbor, Approach, and Coastal Charts, as are numerous other hydrographic boundary and area limits of significance to navigation.

3.17.2 Applicable features. Refer to FACS Code Category 6A (Topographic Demarcation) and 6C (Hydrographic Demarcation) features in Table I of this specification for individual feature requirements, and MIL-STD-2402 for symbolization of those features.

3.17.3 Traffic separation scheme notes. Traffic Separation Schemes are shown on Harbor, Approach, and Coastal Charts to regulate the flow of ship traffic in congested areas. When traffic separation schemes are shown on the chart, one of the two notes in the following two paragraphs applies.

a. When Traffic Separation Scheme(s) have been adopted by IHO, the following note is shown:

**NOTE**

The traffic Separation Scheme(s) on this chart has been adopted by the International Hydrographic Organization (IHO).

b. When Traffic Separation Scheme(s) have not been adopted by the IHO, the following note is shown:

**NOTE**

The Traffic Separation Scheme(s) on this chart has not been adopted by the International Hydrographic Organization (IHO).

### 3.18 Aeronautical

3.18.1 Feature requirements. Airfields (or airports) are shown on Harbor, Approach, and Coastal Charts because they are significant for coastal navigation due to the many visual and aural features associated with them and the related air traffic. Aids to navigation established for aeronautical purposes may also be useful to the mariner if near the coast.

3.18.2 Applicable features. Refer to FACS Code Sub-category 1R (Air Traffic Services), and 1U (Airports) features in Table I of this specification for individual feature requirements, and MIL-STD-2402 for symbolization of those features.

### 3.19 Names and labeling

3.19.1 Geographic names requirements. Geographic names on nautical charts are used by the mariner to position himself on overlapping charts and as a reference in locating information in various publications such as Sailing Directions, List of Lights, Radio Aid Publications, Tide Tables, etc. In order to maintain this consistency between document and chart, the cartographer must monitor and determine carefully which names are placed on nautical charts.

3.19.2 Applicable features. Refer to Table I of this specification and MIL-STD-2402 for names requirements of FACS Code features.

3.19.3 Other geographic names. The following is a list of features which may not appear in Table I, but may be named on the final product. For definitions of the following features, see the DMA Standard Supporting Mark 90, Section 500 - Geographic Names

<u>NAME</u>	<u>EXAMPLE</u>
Banks	Outer Banks
Basin	Great Basin
Bay	Chesapeake Bay
Beach	Virginia Beach

<u>NAME</u>	<u>EXAMPLE</u>
Bench	
Bend	
Bluff	
Bottom	
Break	
Butte	
Canyon	Grand Canyon
Cape	Cape of Good Hope
Channel	English Channel
City	New York City
Cliff	
Corner	Tyson's Corner
Cove	
Crossing	
Desert	Sahara Desert
Dispersed Village	
Dome	
Everglade	Florida Everglades
Falls	
Flat	
Flats	
Forest	
Gap	
Gorge	
Gulch	
Gulf	Gulf of Mexico
Gut	
Hamlet	
Harbor	Boston Harbor
Head	
Highland	
Hill	
Hole	
Hollow	
Inlet	Hamilton Inlet
Island Chain	Hawaiian Islands
Junction	
Jungle	
Knob	
Knoll	
Lagoon	
Lake	
Lands	
Lookout	
Marina	
Mesa	
Mountain	
Mountain Range	Rocky Mountains
Narrows	
Neck	
Ocean	Atlantic Ocean
Park	Yellowstone National Park
Pass	
Passage	
Patch	
Peak	Pikes Peak
Plain	Great Plains
Plateau	Colorado Plateau
Point	
Pool	
Port	
Range	Coastal Range

<u>NAME</u>	<u>EXAMPLE</u>
Ravine	
Region	
Ridge	
River	
Roadstead	
Rock	
Sands	
Scattered Village	Comunidades of South America, Streusudlung of Europe
Sea	Caribbean Sea
Sea Mount	
Shelf	
Shoals	
Sink	
Sound	Puget Sound
Spit	
Spring	
Spur	
Strait	Bering Strait
Summit	
Town	
Valley	Death Valley
Village	

3.19.4 Secondary geographic names. New names or a radical change in spelling of names from what appears in existing products requires that the former names of navigationally significant features become secondary. In other words, the spelling of secondary names will agree with overlapping DMA charts and DMA publications. The secondary name will be shown in smaller type and enclosed in parentheses.

3.19.5 Name placement. If possible, type for land names should be placed on land; and water names, on water areas. Point names, however, should be placed on water areas, but names should not obscure hydrography in critical areas. When it is impossible to place a name where it does not obstruct hydrographic features, it may be placed on adjacent land area. If avoidable, names should not be placed along the axis of the deepest water or across a channel. Names of features that cover a considerable area should be placed as near the center of the area as possible and should be curved to follow the general configuration of the area. If a feature covers a considerable length, do not spread the name over a long distance. Repeat the name, if necessary, although this technique should be used sparingly.

### 3.20 Radar.

Radar reflectors are shown on some navigational aids. Otherwise, the radar significance of features in general is not charted.

### 3.21 Intelligence annotation.

Harbor Approach and Coastal Charts are designed to be used by navigators in the merchant marine as well as military users. They are usually unclassified, but occasionally may need to be classified. For marking requirements for classified charts, see 3.11.6. For marking requirements of Limited Distribution charts, see 3.11.13.

### 3.22 Special area.

Special area legend does not apply. Areas of all types are covered in MIL-STD-2402 and MIL-STD-2403.

### 3.23 Symbology.

Symbology for the Harbor, Approach, and Coastal Charts shall be in accordance with MIL-STD-2402. Unless otherwise specified, the center of a symbol shall correspond to the true location of the feature being represented, and the orientation of the feature shall be in accordance with its relation to surrounding features. All linear features shall be plotted in their true position and whenever the scale permits, they shall reflect the alignment which actually exists; that is, the alignment of straight segments, curves, and angles, shall be retained as nearly as practicable. Displacement of symbology, when necessary, should be in compliance with the rules in MIL-STD-2403.

### 3.24 Reproduction.

Standard nautical charts are printed by lithography, on high wet strength E50 chart paper. Symbols and tints are separated onto various color plates prior to the printing processes. The prescribed colors utilized by DMA are black, blue, purple and green.

#### 3.24.1 Black plate.

3.24.1.1 Base data. This includes the projection, border, degrees, minutes, and chart scales.

3.24.1.2 Format notes. This includes the DMA seal, title entries, chart number, edition number and date, publisher note, users' note, revision date, corner coordinates, chart classification if any, depth conversion scale, logarithmic speed scale, first edition published date, source diagram if any, and index to larger scale charts, if any.

3.24.1.3 Hydrography. This includes soundings, doubtful danger data, wrecks, currents, platforms, names, descriptive data, buoy and light legends, buoys, beacons, radar reflectors (in features 2C010, 2C050 and 2C060), stakes, tide table box, dangers, obstructions, tracklines (course line), depth curves, uncovers (dotted lines), danger curve (dotted lines), reef outlines, breakers, tide rips, eddies, kelp, light sectors (dashed lines), submerged jetties, submerged ruins, cable ferries, unsurveyed area limits, dredged areas, light dots, and hydrographic limits associated with permanent physical obstructions.

3.24.1.4 Topography. This includes land names, elevations, landmarks, descriptive type for land forms, town symbols, conspicuous object symbols, landmark symbol, shoreline, drainage, lake shoreline, built-up area outlines, piers, buildings, vegetation, outlines, roads, canals, airports, lava flows, and elevation dots.

#### 3.24.2 Black screen - land and dries areas, built-up areas.

a. Land screen plate is made by an open-window mask. All land and dries areas are left open. A 15 degree angle - 12% screen is used to delineate these areas. This requires only one land screen negative mask. Built-up area (1L020) requires a separate 45 degree - 21% screen.

b. Dries area (uncovers, mud, sand and mud, etc.) is made by two methods of open-window masks.

(1) Combination of 15 degree angle - 12% screen black, and 45 degree angle - 31% screen blue, when only one blue is used on chart. This requires one negative mask for land and dries areas and one negative mask for water and dries areas.

(2) Or a combination of 15 degree angle - 12% screen black, and when trapping, use 75 degree angle - 12% screen and 45 degree angle - 31% blue screens. This combination requires one negative mask for the water and dries areas; as follows, one negative mask from shoreline to a predetermined meter curve, and one negative mask from the shoreline to the second predetermined meter curve. All of the aforementioned negative masks will include the dries areas.

c. Land Contours (3A010) will be portrayed by a screened black line. Screening will be accomplished by using a 67% bi-angle screen. Charts portraying contours previously printed in brown will be changed to show screened contours (black). In cases where contours were formerly shown in solid black and combined with the base plate, the contours will not be separated for purposes of screening.

3.24.3 Purple plate and screens. The purple plate contains: unit of sounding notes, light flares (in features 2B170, 2C010 and 2C050), radio beacon circles (in features 2C010, 2C030, 2C050 and 2C060), compass roses, roundabouts (6C160), hydrographic limits not associated with permanent physical obstructions, offshore pipelines (11160), submarine cables (1T005), larger scale chart outlines, references to larger scale charts, notes referring to larger scale charts, caution notes, warning notes, traffic separation note, and inshore traffic separation zones (6C075). Purple screens for traffic separation schemes (6C180). Roundabouts (6C160), and Inshore Traffic Zones (6C075) are made by using an AP-130 area pattern, to avoid creating a moiré pattern when overprinted with blue or green tints.

3.24.4 Blue screen plates. A blue screen is shown from the shoreline to the depth curve considered to be the most significant. At times a second blue screen is shown from the significant depth curve to a secondary depth curve. However, other factors such as chart scale, supertanker ship routes, and dangers will determine the extent of the blue screen.

a. The blue screen will be shown from the shoreline to the depth curve considered the most significant, which could be the 2-, 5-, 10-, 20-, or 30-meter curve, depending on chart scale and bottom configuration. Depths less than the significant contour value, seaward of the contour, will show a blue screen. This blue screen will also be shown for lakes, double line drainage, mud, uncovers, and dries areas, requiring one open window negative delineating these areas and a second negative with a 31% - 45 degree screen.

b. Major portions of the water area will not be screened, unless it is clearly evident that such extensive screening is essential. On some charts, it may be desirable to show blue screens to two significant depths, e.g., a darker screen from shoreline to the 20-meter curve, and a lighter screen from the 20-meter curve to the 30-meter curve, requiring two open window negatives. One negative is from shoreline to 20-meter curve, with 31% - 45 degrees screen, and one negative is from the shoreline to 30-meter curve, with a 12% - 75 degree screen. Ribbon tints will not be used.

3.24.5 Green (swept area plate). In cases where there are swept areas, a separate plate is made for the outlines, type used and notes used for the portrayal of swept areas. The swept area will be 12% - 15 degree angle, screened green.

3.24.6 Trim size. Harbor, Approach and Coastal charts shall be trimmed after printing, to leave a 25mm (1 inch) margin on each side of the chart. The margin is measured from the maximum extent of the image area on each side, to the edge of the paper.

### 3.25 Magnetic variations.

3.25.1 Definitions. See 6.5 for definitions of magnetic variation, annual change, isogonic line and compass rose.

#### 3.25.2 Compass rose portrayal.

3.25.2.1 Size and style. On standard DMA nautical charts at scales 1:300,000 and smaller, a true compass rose with a half arrow or one-sided arrow will be shown in lieu of a magnetic rose. The half arrow is added provided that isogonic lines are not shown (see 3.25.3). The half arrow is always oriented to magnetic north along with the "+" marking the center of the rose (see FIGURE 127).

#### 3.25.2.2 Placement.

a. The compass rose will be shown on the purple plate SPC 96532 unless some other color is indicated in the individual chart instructions.

b. Whenever practical, a point shall be selected for compass rose placement in every quadrant of a nautical chart subject to double folding. Chart size, shape of land areas, and density of detail on a given chart will affect the number of points selected. Sufficient points shall be selected to ensure that all navigable waters are within reach of the navigator's parallel rulers or triangles.

c. In the selection of a point for compass portrayal, a cartographer must retain the awareness of the accompanying chart detail. Thus, a selected point shall not be less than one inch from any projection line, to keep the compass rose from obscuring the projection. On charts constructed on the Transverse Mercator Projection, compass roses will be placed in the vicinity of the meridians which are central to the areas where compass roses will most likely be used. Such positioning minimizes the course and bearing errors which may be introduced by using the Transverse Mercator projection. Compass roses must not obscure dangers, shoal soundings, or aids to navigation, nor overprint shoreline, notes, anchorages, or approaches to a harbor. A minimum of other chart detail can be overprinted. All compass roses shall be clear of a chart fold. Compass roses shall be located in a position convenient to the most important navigational features of the chart for ease in plotting bearings and courses. For example, a compass rose placed offshore (or on land) should be positioned in a locality where direct bearings between ships and navigational aids in the vicinity can be readily determined.

d. Whenever a chart or plan is too small to accommodate a compass rose without unduly obscuring the detail of the chart, a compass rose will not be shown. Instead, the magnetic variation will be computed and given for the geographic center of the plan or chart. The variation note will be identical in type size as general notes and will be shown on the purple plate. It will be placed in a convenient area on the chart, preferably under the title.

3.25.2.3 Construction. The true compass rose (outer ring) will always be oriented so that 0° is aligned with the geographic (or true) north pole. The small cross at the center of the rose will be placed so that the lines forming the cross are aligned to N-S and E-W, and their intersection coincides with the point of computations. The magnetic compass rose will be placed inside the true compass rose and centered and aligned to the magnetic variation. The 0° must be aligned to the value of the magnetic variation on the true rose.

a. Variation Value - Variation and change values for each selected point of computations will be indicated by a note in 7 point caps Swiss 742 type style. This note will give the computed variation in degrees and minutes, E or W bearing, epoch year for which computed, and annual change. It will be centered on the small cross marking the center of the true rose (outer ring) as shown below, but will be aligned to the magnetic rose.

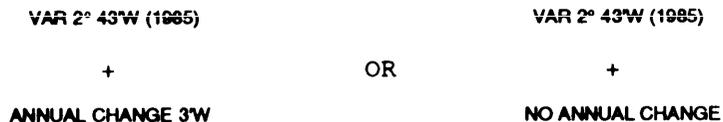


FIGURE 129. Variation portrayal.

b. All variation values in the inner rose will show the actual value to the nearest minute. The annual rate of change values shall be rounded off to the nearest minute using the following rationale.

Example: 4'30"E will be shown as 5'E  
4'29"E will be shown as 4'E

#### 3.25.2.4 Compass rose specifications.

3.25.2.4.1 Components of a compass rose. The compass roses on a Harbor, Approach and Coastal Chart consist of four parts: the outer or true rose (oriented to true north), the inner or magnetic rose (oriented to magnetic north), the points of the compass (also oriented to magnetic north), and a cross at the center. Charts at 1:300,000 and larger show all three roses, and the cross (see FIGURE 126). Charts smaller than 1:300,000 scale that do not show isogonic lines show a half arrow, aligned with magnetic north, in place of the magnetic rose (See FIGURE 127). Charts at scales smaller than 1:300,000 that show isogonic lines show only the true rose and the cross (See FIGURE 128).

#### 3.25.2.4.2 Outer compass rose (true).

a. The outer compass rose consists of 360 ticks radiating out from the center of the compass rose. On a full size rose, the ticks begin at a radial distance of 63 mm from the center of the compass rose. Reduced size roses, with radial distances of 56, 49, or 42mm, may be shown if space is not available to show the full size rose. Tick lengths are as follows: 10° ticks are 3.0 mm long, 5° ticks are 2.0 mm long, and 1° ticks are 1.0 mm long. All lineweights are 0.15 mm.

b. Ten degree ticks (0, 10, 20, 30, 40,...350) are labeled with 6 point type, with the numbers oriented so they are reading from the bottom of the chart (90 and 270 are vertical and reading from the inside of the compass rose). No degree signs are shown. Space between the end of the 10° ticks and the base of the type is 1.0 mm.

c. In addition to these ticks, extended ticks are shown at 0°, 90°, 180° and 270°. These ticks are 5.0 mm long and begin 1.0 mm outside of the numbers 0, 90, 180 and 270.

d. A five pointed star is shown above the tick over the number 0. The star is 7.5 mm in diameter and is shown by a perimeter line (0.15 mm lineweight). Each point of the star is then divided by another line down the centerline of the point (0.15 mm lineweight). The right half of each point (proceeding clockwise around the star) is shaded by lines, parallel to the center line and spaced at 0.2 mm interval (lines are 0.10 mm lineweight). The star is positioned so one of the points is pointing north and the end of the tick above the number "0" is touching the perimeter of the star opposite the top point.

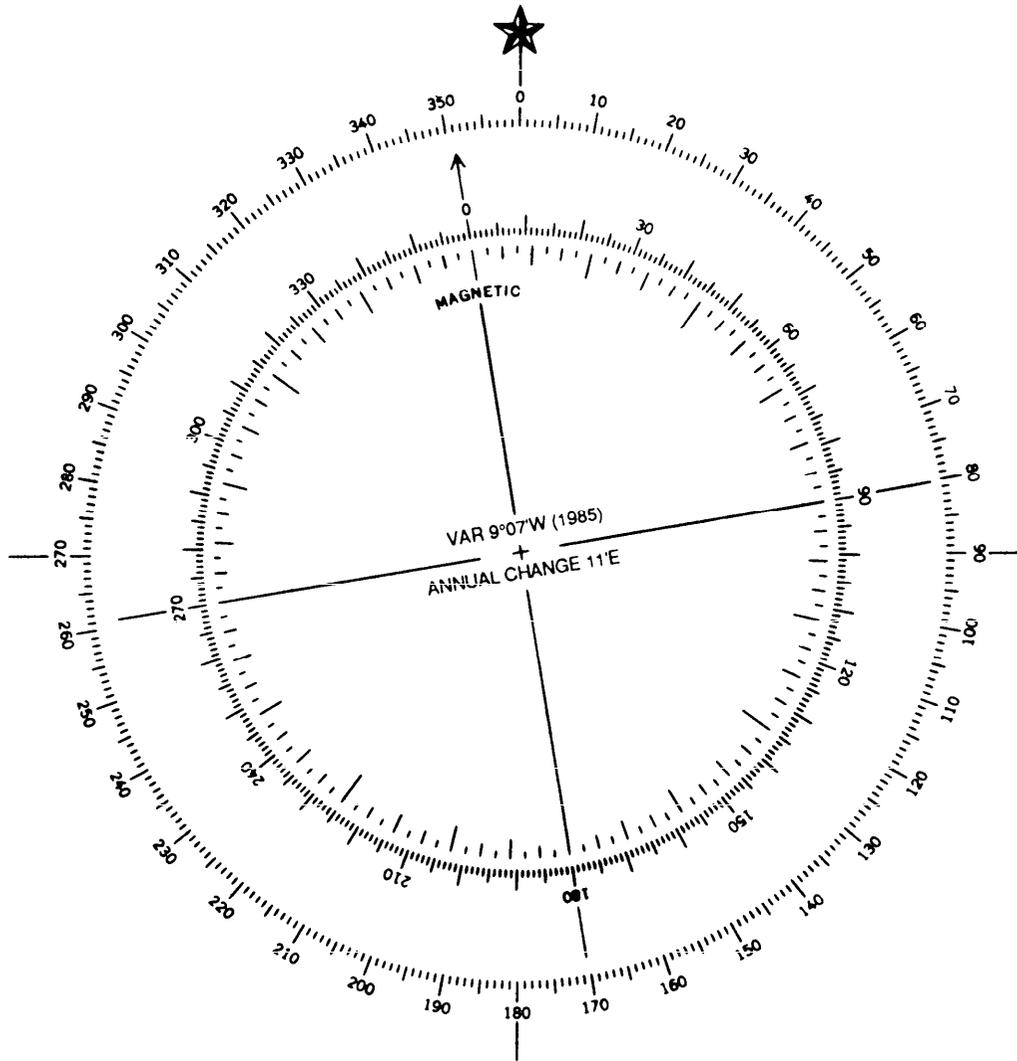


FIGURE 126. Example of a compass rose on charts larger than 1:300,000 (HAC 1-5).

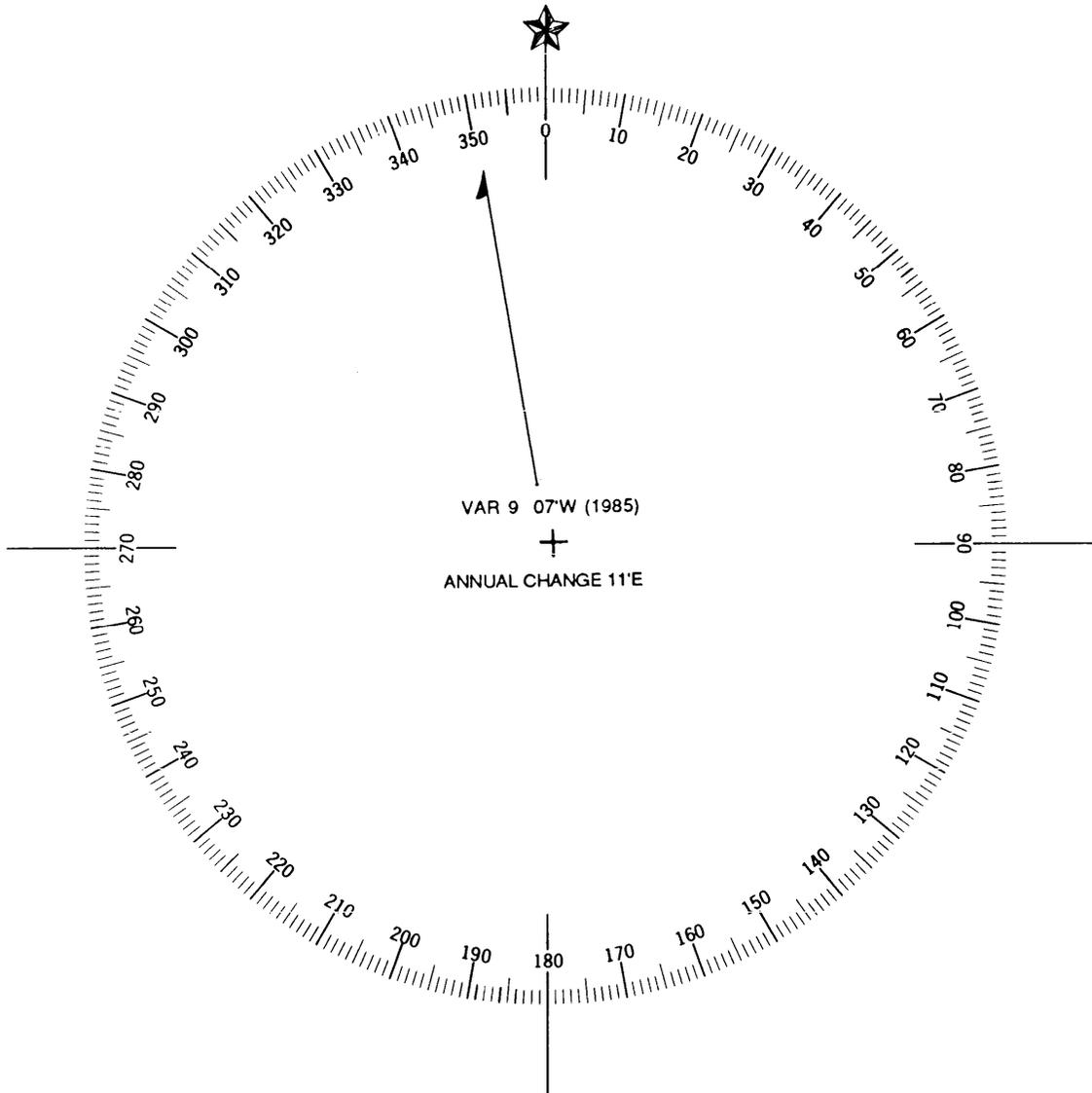


FIGURE 127. Example of a compass rose on charts 1:300,000 and smaller without isogonic lines (HAC 5-9).

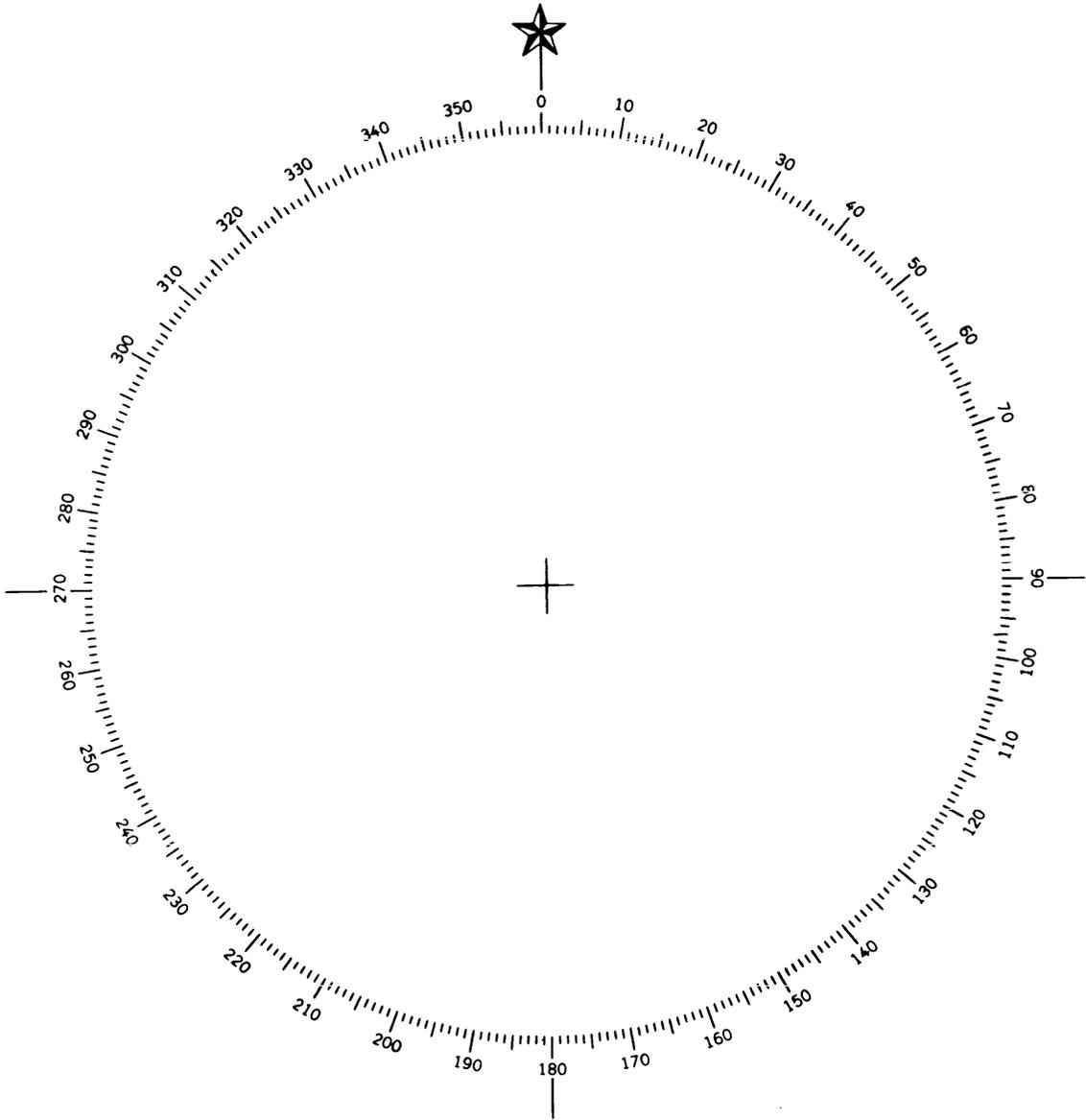


FIGURE 128. Example of a compass rose on charts 1:300,000 and smaller with isogonic lines (HAC 5-9).

#### 3.25.2.4.3 Inner compass rose (magnetic).

a. The inner compass rose consists of 360 ticks radiating out from the center of the compass rose. The inner ends of the ticks on this rose are 15mm inside the circle formed by the inner ends of the ticks of the outer rose. Tick lengths are as follows: 10° ticks are 3.0 mm long, 5° ticks are 2.0 mm long, and 1° ticks are 1.0 mm long. All lineweights are 0.15 mm.

b. Thirty degree ticks (0, 30, 60, 90, 120,...330) are labeled with 6 point type, with the numbers oriented so they are reading from the bottom of the chart (90 and 270 are vertical and reading from the inside of the compass rose). No degree signs are shown. Space between the end of the 10° ticks and the base of the type is 1.0 mm.

c. In addition to these ticks, extended ticks are shown at 0°, 90°, 180° and 270°. These ticks are 6.0 mm long and begin 1.0 mm outside of the numbers 0, 90, 180 and 270.

d. An arrowhead is shown at the end of the extended 0° tick. Arrowhead stems are oriented 30° on each side of the main tick, and are 2.0mm long.

#### 3.25.2.4.4 Magnetic half arrow.

Chart at scales smaller than 1:300,000 that do not show isogonic lines show a half arrow pointing to magnetic north. The arrow shaft is aligned with magnetic north, and runs from 7.0mm from the center of the rose, to 1.0mm inside the circle formed by the inner ends of the ticks on the outer compass rose. Lineweight is 0.15mm. The top edge of the half arrowhead is 7.0mm long and oriented 30° from the main shaft on the side away from true north. The arrowhead is 4.0mm wide adjacent to the shaft, and tapers to a point.

#### 3.25.2.4.5 Points of the compass.

a. The points of the compass is a traditional method of giving compass directions in fractions of a circle rather than in degrees, i.e., north, north northeast, northeast, etc. Points of the compass are shown by ticks pointing inward, starting 2.0mm inside the circle formed by the inner ends of the ticks of the magnetic rose. The circle is divided into 128 equal parts. Tick lengths are as follows: The primary points of the compass, north, south, east and west, have ticks extending inward to 6.0mm from the center of the rose. Eighths of the compass are 5.0mm long, 16ths are 4.0mm long, 32nds are 3.0mm long, 64ths are 2.0mm, and 128ths are 1.0mm long.

b. Points of the compass are not labeled, however the word "MAGNETIC" in 6 point type is shown, centered in a 3.0mm long break in the north tick, starting 5.0mm from the outer end of the tick. The word is horizontally centered on the tick, and vertically centered in the space, and curved to conform to the curvature of the compass rose.

#### 3.25.2.4.6 Center cross.

The cross at the center of the compass rose is 0.15 mm lineweight. Ticks are oriented 90 degrees to each other and are positioned at cardinal directions (north-south, east-west). If a full magnetic rose is shown (see 3.25.2.4.3), the center ticks are aligned with magnetic cardinal directions. If no magnetic rose is shown, or the half arrow is shown (see 3.25.2.4.4), the center ticks are aligned with true cardinal directions. The overall tick length is 2.0 mm.

### 3.25.3 Isogonic lines.

3.25.3.1 Requirements. If the range of the Magnetic variation over the limits of the chart is two or more degrees, isogonic lines will be portrayed on the chart. Only epoch year values will be drawn (1980, 1985, etc.). Under no circumstances will the position of isogonic lines be modified or updated to reflect intermediate year values.

#### 3.25.3.2 Isogonic line portrayal.

3.25.3.2.1 General. Magnetic variation (isogonic) lines will be shown on the purple plate by unbroken lines connecting points of equal variation, e.g., at 1-degree, 2-degree, or 5-degree intervals so that spacing does not generally exceed 15 cm. These lines shall be labeled with appropriate values of variation and annual change. Line weights shall be 0.13 mm (0.005 inches) wide.

a. The magnetic variation shall be shown in degrees followed by the letter E or W as appropriate. The annual change (placed in parentheses), expressed in minutes, followed by E or W as appropriate, shall immediately follow the variation.

b. Where the isogonic line of 0-degrees must be charted, it shall be so labeled, followed in parentheses by the annual change. The line shall be unbroken and 0.56 mm (0.022 inches) wide.

3.25.3.2.2 Labeling. Isogonic lines will be labeled at each end, with the variation expressed in degrees and minutes E or W. Annual change will be indicated in parentheses following the variation, e.g., "12°E(5'E)." When appropriate, the labeling will be modified, e.g., "NO VARIATION", or "12°E (NO CHANGE)." Type will be 10 point Swiss 742 condensed. placed above but clear of the line, and avoiding overprints or conflicts with other chart data.

3.25.3.2.3 Spacing. Isogonic lines shall not be less than 0.838 cm (0.33 inch) apart. Whenever closer, as may occur on polar charts, the interval will be reduced to each even degree, every five degrees, or every 10-degrees, according to line spacing. If two or less isogonic lines are to be shown, only compass roses shall be used.

3.25.3.2.4 Note. On all charts with isogonic lines, a note indicating the 5 year epoch date of the curves and the rules for applying annual change to magnetic variation shall be shown below or near the title block of the chart on the purple plate as follows:

**Magnetic variation curves are for (year). Figures in parentheses indicate annual change.**

#### **RULES FOR APPLYING ANNUAL CHANGE TO MAGNETIC VARIATION**

**The following procedures are to be followed when applying annual change to the magnetic variation. If annual change is of the same direction as the variation (East or West), it is to be added and the variation is increasing. If annual change is opposite in direction to the variation, it is to be subtracted and the variation is decreasing.**

FIGURE 129. Isogonic lines note.

#### 3.25.3.3 Isogonic lines on charts with electronic lattices.

a. When a need for clarity within the working area of a chart is desirable and especially where electronic lattices are shown the following practice will be followed: The standard inset showing the

next larger scale will be used and overprinted in purple with lines of magnetic variation and annual change.

b. The purple overlay will contain solid lines 0.13 mm (0.005 in.) linewidth for magnetic variation, labeled with whole degrees and the suffix E or W. Annual change is shown by dashed lines 0.13 mm (0.005 in.) linewidth, dashes 2.54 mm (0.10 in.), spaces 0.64 mm (0.025 in.) and the suffix E or W and enclosed in parentheses.

c. A solid line 2.5 mm (0.1 in.) Line Weight will be used for "NO ANNUAL CHANGE" and so labeled.

d. All type for line labels will be 6 Point 742 Swiss (CAPS). The title for the magnetic data will be centered below the inset box and will read:

(EPOCH) MAGNETIC VARIATION CURVES IN PURPLE - 8 Point. Swiss 742 (CAPS)  
Dashed lines and figures in parentheses indicate annual change - 7 Point Swiss 742

3.25.4 Chart record. An entry will be made in the chart record, stating the source material (including its epoch), the date of computation, and a copy of all magnetic data notes added to the chart.

3.26 Feature/Attribute data. The associated detail specifications of this general specification contain feature, feature attributes category, feature attribute category value, inclusion condition and specific rules corresponding to HAC production. These product specifications have been written for standard nautical charts of all scales. They have not been written for a Harbor, and Approach, or a Coastal Chart, per se. Instead, charts have been divided into nine separate ranges, based on scale, to provide a means of generalizing and showing less detail as scale decreases. If the intended use of a chart is for harbor navigation, and the scale is smaller than 1:25,000, it will not have the complete detail available for charts at 1:25,000 scale and larger. The chart planner must keep this in mind when selecting scales for new charts, and new editions of existing charts, to ensure that the proper HAC range is selected to produce the level of information desired for the intended use of the product. The feature and attribute information for HAC charts is provided in nine separate associated detail specifications (see 2.1.1). The nine scale ranges are as follows, and are referred to as HAC 1-9.

HAC 1	1:25,000 and larger
HAC 2	1:25,001 to 1:50,000
HAC 3	1:50,001 to 1:100,000
HAC 4	1:100,001 to 1:250,000
HAC 5	1:250,001 to 1:350,000
HAC 6	1:350,001 to 1:600,000
HAC 7	1:600,001 to 1:750,000
HAC 8	1:750,001 to 1:1,000,000
HAC 9	1:1,000,001 and smaller

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities

suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.2 Classification of inspection. The inspection requirements specified herein are classified as follows:

- a. Visual examination (see 4.4)
- b. Review of construction records (see 4.5)

4.3 First article inspection. When a first article inspection is required (see 3.2 and 6.2), it shall be examined for defects as specified in 4.4, and the construction record reviewed for compliance with 4.5.

4.4 Visual examination. The map/chart shall be examined for defects and errors as specified by the contract or Government. Required corrections shall be made to manuscripts, drafting positives, and reproducible material before the map/chart is sent to the next production stage. Defects detected during the inspection of the printed "catch copy" shall be evaluated by DMA for criticality, and suitable corrective action.

4.5 Review of construction records. Records about the construction of the map/chart shall be maintained. The records shall document sources, decisions regarding reconciliation of conflicting data, etc. Chart records/construction histories shall be reviewed concurrently with visual examinations (see 4.4) to ensure that proper cartographic procedures have been followed.

4.6 Government furnished materials. The contractor shall not duplicate, copy or otherwise reproduce the MC&G property for purposes other than those necessary for performance of the contract.

4.7 Government property surplus. At the completion of performance of the contract, the contractor, as directed by the contracting officer, shall either destroy or return to the Government all Government-furnished MC&G property not consumed in the performance of the contract.

## 5. PACKAGING.

5.1 General. Nautical charts may be issued as flat stock, i.e., unfolded, or folded and packaged in accordance with the provisions in this section. Unless a customer requests folded stock, nautical charts shall be issued as flat stock.

## 5.2 Folding.

5.2.1 Number of folds. When a customer requests folded stock, standard nautical charts shall be folded into quarters (4 panels).

5.2.2 Method of folding. The chart shall be folded edge to edge, (right-to-left and top-to-bottom) with the image side in (obscured). Classified charts shall be stamped to show the overall classification, on the front and back when folded, in accordance with DoD security marking policy.

## 5.3 Packaging.

5.3.1 Level of protection. Packaging shall be Level C (see 6.2) unless otherwise specified. This packaging provides minimum protection, and is needed to protect material under known favorable conditions. The following criteria determine the requirements for this degree of protection.

- a. Use or consumption of the item at the first destination.
- b. Shock, vibration, and static loading during the limited transportation cycle.
- c. Favorable warehouse environment for a maximum of 18 months.
- d. Effects of environmental exposure during shipment and intransit delays.
- e. Stacking and supporting superimposed loads during shipment and temporary storage.

5.3.2 Package size. This section is not applicable to this document.

5.4 Marking. In addition to any special markings required by the contract or order, markings shall be in accordance with the requirements of MIL-STD-129 for military levels of protection.

## 6. NOTES

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

6.1 Intended use. Harbor, Approach and Coastal Charts (HACs) are various scale charts used for plotting ship courses in ocean waters. HACs are produced to support the naval and maritime community.

6.2 Acquisition Requirement. Acquisition documents must specify the following:

- a. Title, number and date of this specification.
- b. Issue of the DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- c. When a first article is required (see 3.2, 4.3, and 6.3).
- d. Levels of packaging (see 5.3).

6.3 First article. When a first article is required, it shall be inspected and approved under appropriate provisions of FAR 52.209. The

contracting officer shall specify the appropriate type of first article and the number of units to be furnished in the solicitation/contract. The contracting officer shall also include specific instructions in acquisition documents regarding arrangement for selection, inspection, and approval of the first article.

6.4 Supersession. These specifications supersede Military Specifications for Harbor, Approach, and Coastal Charts (HAC), MIL-H-89201, 31 August 1990.

6.5 Definitions.

6.5.1 Aids to navigation. Any man-made object or objects of visible, audible, or of an electronically receivable nature established specifically for aiding the mariner in determining position, heading, and/or speed.

6.5.2 Annual change. - The increasing or decreasing value of the variation on a yearly basis, usually expressed in minutes.

6.5.3 Circular error (CE). - An accuracy figure representing the stated percentage of probability that any point expressed as a function of two linear components (e.g., horizontal position) will be within the given figure.

6.5.4 Compass roses.

a. A true compass rose is a circle graduated in degrees, clockwise from 0 to 360. The compass rose is portrayed to afford the mariner an easy method of plotting compass headings or bearings. It is oriented with respect to true north.

b. A magnetic compass rose is a circle graduated in degrees from 0° to 360°, placed inside the true compass and oriented to magnetic north.

6.5.5 Isogonic line. A line connecting points on the earth's surface having equal magnetic variation (not to be confused with magnetic meridian). The zero variation line is called the "agonic line."

6.5.6 Linear error (LE). - A one dimensional error (such as an error in elevation) defined by the normal distribution function.

6.5.7 Magnetic variation. - The angle between magnetic and geographic meridian expressed in degrees and minutes east or west to indicate the direction of magnetic north from true north.

6.6 Standardization agreements. Certain provisions of this specification may be subject to international standardization agreements. When amendment, revision, or cancellation of this specification is proposed that will modify the international agreement concerned, the preparing activity will take appropriate action through international standardization channels, including departmental standardization offices, to change the agreement or make other appropriate accommodations.

6.6.1 NATO Standardization Agreements (STANAGs)

STANAG 1113, General Specifications for Projections Required for Nautical Charts for Polar Regions and the Higher Latitudes.

STANAG 2211, Geodetic Datums, Spheroids, Grids, and Grid References.

STANAG 3673, Identification of Source Data on Nautical and Special Naval Charts.

STANAG 3678, Method of Adding the Military Grid to Nautical Charts in the NATO Area.

6.6.2 Quadripartite Standardization Agreements (OSTAGs).

This section is not applicable to this specification.

6.6.3 Air Standardization Coordinating Committee Agreements (ASCCs).

This section is not applicable to this specification.

6.6.4 International MC&G Agreements.

This specification is generally based on, and attempts to implement the Chart Specifications of the International Hydrographic Organization (IHO) and Regulations of the IHO for International (INT) Charts. The Chart Specifications of the IHO are intended to provide a framework for the standardization by member countries of all nautical charts, both in their national series, and in the international (INT) series of the IHO. Standardization among DMA products has also influenced this specification, resulting in some minor differences between this specification and the Chart Specifications of the IHO.

6.6.5 Executive Orders.

This section is not applicable to this specification.

6.6.6 Inter-Agency Agreements.

This section is not applicable to this specification.

6.6.7 Other Documentation.

This section is not applicable to this specification.

6.7 Subject term (key word) listing.

Bathymetry  
Charting  
Defense Mapping Agency (DMA)  
Hydrography  
Marine  
Maritime  
MC&G (Mapping, Charting and Geodesy)  
Nautical  
Navigation

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

APPENDIX A

HAC STYLE SHEET (PLAN BORDER-22223)

10. SCOPE

10.1 Scope. This Appendix is a graphic illustration of the design, composition, and location of the margin data of charts at scales 1:75,000 and larger. This Appendix is a mandatory part of the specification. The information contained herein is intended for compliance.

20. APPLICABLE DOCUMENTS

20.1 Government documents.

20.1.1 Specifications, standards and handbooks. This section is not applicable to this Appendix.

20.2.1 Other government documents, drawings, and publications. Technical manual 8358.1. Copies of DMA TM 8358.1 are available to Department of Defense users, from the Defense Mapping Agency Combat Support Center, 6001 MacArthur Boulevard, Bethesda, MD 20816-5001. All other request should be directed to the National Technical Information Center, Cameron Station, Alexandria, VA. 22315-6145

20.2 Non-government publications. This section is not applicable to this Appendix.

30. HAC STYLE SHEET

30.1 Style sheet. See next page for style sheet information.

30.2 Order of precedence. In the event of a conflict between type styles/sizes illustrated on this style sheet and the type styles/sizes specifications shown in red, the specifications in red shall take precedence.

30.3 Folding. This style sheet is folded to the size of this document. See 5.2 for folding requirements of standard nautical charts.

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APPENDIX B

HAC STYLE SHEET (SCALE BORDER-44290)

10. SCOPE

10.1 Scope. This Appendix is a graphic illustration of the design, composition, and location of the margin data of charts at scales 1:75,001 and smaller. This Appendix is a mandatory part of the specification. The information contained herein is intended for compliance.

20. APPLICABLE DOCUMENTS

20.1 Government documents.

20.1.1 Specifications, standards and handbooks. This section is not applicable to this Appendix.

20.2.1 Other government documents, drawings, and publications. Technical manual 8358.1. Copies of DMA TM 8358.1 are available to Department of Defense users, from the Defense Mapping Agency Combat Support Center, 6001 MacArthur Boulevard, Bethesda, MD 20816-5001. All other request should be directed to the National Technical Information Center, Cameron Station, Alexandria, VA. 22315-6145

20.2 Non-government publications. This section is not applicable to this Appendix.

30. HAC CHART STYLE SHEET

30.1 Style sheet. See next page for style sheet information.

30.2 Order of precedence. In the event of a conflict between type styles/sizes illustrated on this style sheet and the type styles/sizes specifications shown in red, the specifications in red shall take precedence.

30.3 Folding. This style sheet is folded to the size of this document. See 5.2 for folding requirements of standard nautical charts.

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(Project MCGT-0126)

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