



## CHART STANDARDIZATION & PAPER CHART WORKING GROUP (CSPCWG)

[A Working Group of the Committee on Hydrographic Requirements for Information Systems – CHRIS]

Chairman: Peter JONES  
Secretary: Andrew HEATH-COLEMAN

UK Hydrographic Office  
Admiralty Way, Taunton, Somerset  
TA1 2DN, United Kingdom

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Telephone:  
(Chairman) +44 (0)1823 723343  
(Secretary) +44 (0) 1823 337900 x 3656  
Facsimile: +44 (0)1823 325823  
E-mail: peter.jones@ukho.gov.uk  
andrew.coleman@ukho.gov.uk

To CSPCWG Members

13

December 2004

Dear Colleagues,

### **Subject: Revision M-4 Section B-200, Second Draft (further to CL17/2004)**

We received eleven responses to CL 17/2004, for which we are grateful. While giving a general endorsement of the first draft of the revision of B-200, they included a large number of helpful suggestions for further improvements. We have therefore spent a lot of time studying all the comments and produced a second draft, copy at Annex A. This also includes changes resulting from the standardization of the strength of wording (must/should/may), as agreed at CSPCWG 1.

Most of the responses to CL17/2004 were sent by email, and copied to all WG members. However, for convenience, the Secretary has produced a compilation of the comments, copy at Annex B. A copy of Australia's response, as a track change version of the draft B-200 is attached separately at Annex C.

By examining Annexes B and C, you will understand that it was not possible to include all the suggested changes, as some were mutually exclusive. However, we have considered them all seriously and reworded B-200 as necessary to try to incorporate at least the intentions underlying the suggestions, even where we have not used the exact wording suggested. All the changes should be readily visible, as "track changes"; in general, the reasons should be self-evident, especially when Annexes B and C are consulted. However, in appropriate cases, we have added comments to explain the reasoning, and in some cases these comments ask you to respond in order to provide further guidance (see Response Form at Annex D).

Please send me your views and any suggestions for further improvements **by 17 January 2005**. Please note that, owing to the size of this document and use of colour, hard copies will not be posted unless specifically requested. Recipients are respectfully requested to print their own copies, as necessary.

Yours sincerely,

Peter G. B. Jones,

Chairman

Annex A: Draft revised section B-200

Annex B: Compilation of WG members comments

Annex C: Australia's "track change" version of the original draft

Annex D: Response form

Please note that, owing to the size of the documents and use of colour, hard copies of annexes A-C will not be posted **unless specifically requested**. Recipients are respectfully requested to print their own copies from the digital copies attached to the email copy of this letter, as necessary.

# **PART B**

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## **SECTION 200**

**CHART FRAMEWORK  
(FORMATS, POSITIONS, COMPASS ROSES, SOURCE DIAGRAMS)**

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**CONTENTS****Section 200 – CHART FRAMEWORK  
(FORMAT, POSITIONS, COMPASS ROSES, SOURCE DIAGRAMS)**

- B-201** Ellipsoid (spheroid) of reference and horizontal datum
- B-202** Indication on charts of relationship of horizontal datum to world-wide and other datums
- B-203** Projections
  
- B-210** Chart construction
- B-211** Scale
- B-212** Graduation
- B-213** Graticule
- B-214** Corner co-ordinates
- B-215** Rectangular grids
  
- B-220** Linear scales, dimensions
- B-221** Linear (graphical) scales
- B-222** Dimensions
  
- B-230** Not currently used
  
- B-240** Title, notes
- B-241** Title block
- B-242** Cautionary and explanatory notes
- B-243** Reference to other publications
  
- B-250** Chart numbering, marginal information
- B-251** Chart numbering
- B-252** Date of publication and updates
- B-253** Copyright legend
- B-254** References to other charts
- B-255** Other marginal information
  
- B-260** Compass roses, bearings
- B-261** Compass roses: patterns, true and magnetic
- B-262** Compass roses: size and position
- B-263** Bearings: conventions
  
- B-270** Magnetic data
- B-271** Magnetic data: source material
- B-272** Magnetic data: symbols
- B-273** Magnetic data: corrections
- B-274** Abnormal magnetic variation
  
- B-280** Depth unit conversion table
- B-281** Other tables
  
- B-290** Source Diagrams....etc – to be added before publication

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**SECTION 200 - CHART FRAMEWORK  
(FORMAT, POSITIONS, COMPASS ROSES, SOURCE DIAGRAMS)**

**B-201 ELLIPSOID (SPHEROID) OF REFERENCE AND HORIZONTAL DATUM**

**B-201.1** IMO Safety of Navigation Circular 213 defines a horizontal datum (also known as a geodetic datum) as follows:

‘A horizontal datum is a reference system for specifying positions on the Earth’s surface. Each datum is associated with a particular reference spheroid that can be different in size, orientation and relative position from the spheroids associated with other horizontal datums. Positions referred to different datums can differ by several hundred metres.’

**B-201.2** The **World Geodetic System (1984) (WGS84)** should be used as a basic worldwide reference system for nautical charts until an adequate alternative geodetic datum is adopted by the relevant international organizations to be used as the international geodetic reference system for cartographic work on land and sea areas.

Note: WGS84 is the system to which the Global Positioning System (GPS) is referred and it is therefore essential that nautical charts use this reference.

**B-201.3** Internationally recognized **regional datums or local datums** may continue to be used for the graduation of paper charts in areas where they apply; however, a transformation adjustment to WGS84 should be included on any such chart (see B-202). For ENCs, the horizontal datum must be WGS84 Datum.

**B-201.4** **IHO Publication S-60 ‘User’s Handbook on Datum Transformations Involving WGS84’**, contains transformation constants and formulae to relate local and regional geodetic datums to WGS84. (S-60 has been derived from a comprehensive Technical Report (TR8350.2, 3rd edition, 4 July 1997, corrected to 6/03) published by the National Geospatial Agency (NGA) of the United States and provided to the IHB).

Reproduction of formulae, transformation constants and related local and regional datums does not imply that these data have been officially adopted by the concerned States or by the IHO. Member States are encouraged to refine their own transformation parameters and to report these to the IHB.

*IHB to Cancel TR B1.1*

**B-202 INDICATION ON CHARTS OF RELATIONSHIP OF HORIZONTAL DATUM TO WORLD-WIDE AND OTHER DATUMS**

**B-202.1** **All charts at scales larger than 1:500 000** must include a legend in the title block (see B-241.7) indicating the name (and date, if appropriate) of the geodetic datum upon which the graticule is based. The WGS year, for example WGS84, must be stated on charts of a scale larger than 1:50 000.

**B-202.2 Appropriate transformation notes** (commonly titled SATELLITE-DERIVED POSITIONS) must be inserted, in black, on all charts at scales larger than 1:500 000 to enable the navigator to use directly, or to convert to chart datum and vice-versa, satellite-derived geographical positions which are in the world-wide datum. They should also be inserted on smaller-scale charts if the difference between the datum used and WGS84 datum is plottable at the scale of the chart. In the plotting of geographic positions on charts, for the purposes of these specifications, a plottable difference is considered to be 0.3mm or greater. Where differences are insignificant, or the chart is not based on a single homogeneous datum, the note should so state. Transformation notes should also be included to facilitate transfer between charts on different datums within the same area.

**B-202.3** The following standardized wording, to be shown in black, is recommended for transformation notes. Similar wording may be used for other transformation notes, if required, e.g. to a national mapping datum:

- a. An optional note for charts based on WGS84 datum, or a datum compatible with WGS84, or where the shift is not plottable at chart scale:

SATELLITE-DERIVED POSITIONS

Positions obtained from satellite navigation systems, such as GPS, are normally referred to WGS84 Datum. Such positions can be plotted directly on this chart.

- b. For charts on which the relationship between WGS84 Datum and the local datum cannot be determined:

SATELLITE-DERIVED POSITIONS

Positions obtained from satellite navigation systems, such as GPS, are normally referred to WGS84 Datum. The differences between satellite-derived positions and positions on this chart cannot be determined. Mariners are warned that these differences MAY BE SIGNIFICANT TO NAVIGATION and are therefore advised to use alternative sources of positional information, particularly when closing the shore or navigating in the vicinity of dangers.

- c. For charts on internationally accepted regional or local datums (including charts on previous World Geodetic Datums, such as WGS72):

SATELLITE-DERIVED POSITIONS

Positions obtained from satellite navigation systems, such as GPS, are normally referred to WGS84 Datum. Such positions must be adjusted by 0.XX minutes NORTHWARD/SOUTHWARD and 0.XX minutes EASTWARD/WESTWARD to agree with this chart.

- d. To facilitate transfer between charts on different datums within the same area:

POSITIONS

To agree with the larger scale / smaller scale / adjoining charts which are referred to [name] Datum, positions read from chart [number] must be adjusted by 0.XX minutes NORTHWARD / SOUTHWARD, and 0.XX minutes EASTWARD / WESTWARD.

Notes for examples c) and d), above:

- i. The figure to be inserted at XX is the mean value over the charted area, normally to two decimal places of a minute, of the adjustment to be applied. On scales larger than 1:15 000 the datum shift values should be given to three decimal places of a minute, provided the datum shift is accurate enough to support it. On scales of 1:500 000 and smaller, the values should be given to one decimal place of a minute, if the difference between the datums is plottable at the scale of the chart (see B202.2).
- ii. Where the shift is in one direction only, the reference to the other direction should be omitted.
- iii. The datum shift value may also be quoted as a unit of distance, in addition to minutes of latitude/longitude, e.g. 0.08 minutes (approximately 96 metres).
- iv. A worked example may be included to illustrate the application of the shifts.

B-202.4

**B-202.4 Chart Accuracy.** In many parts of the world, even the most recent data available may have been gathered when survey methods were less sophisticated than they are now and the achievement of accuracy currently available with GPS was not possible. In these areas, GPS positions available to the navigator may be more accurate than the charted detail. Therefore, in such circumstances, the following note may be combined with the appropriate note at B-202.3:

However, due to the age and quality of some of the source information, such positions may be more accurate than the charted detail.

**B-203 PROJECTIONS**

A projection can generally be regarded as suitable for large scales if the chart will be identified within fractions of a mm to the chart that might have been drawn on any other survey projection, and any suitable grid will plot as a system of practically straight lines on the chart. This will be the case when the projection meets the conditions that its rectangular grid (N,E) or (X,Y) is a function of the Earth's graticule ( $f\lambda$ ) or ( $\lambda f$ ) and that it has its central meridian, standard parallel, or point of origin within a few hundred km of the area charted.

**B-203.1 Charts of scale 1:50 000 and larger** may be compiled on any suitable projection, taking into account the possible advantages of using the surveying projection or the rectangular grid used by the national mapping authorities. In latitudes approaching  $75^\circ$ , the limiting scale may be larger than 1:50 000, to minimize apparent distortions.

**B-203.2 Charts of scale smaller than 1:50 000** must be compiled on the Mercator projection. Exceptions to this rule may be necessary in high latitudes, where the Mercator projection is unsuitable because of gross distortions. For example, the conformal Polar Zenithal Stereographic projection, which shows parallels as concentric circles and meridians as equally-spaced lines radiating from the pole, may be suitable for charts in high latitudes (beyond about  $70^\circ$ ).

**B-210 CHART CONSTRUCTION**

Note: For high latitudes it may be necessary to make exceptions to the specifications in paragraphs B211-213.

**B-211 SCALE**

The **natural scale** is the ratio between the linear dimensions on the chart and the actual linear dimensions represented, taken at the intersection of spheroid and projection-plane(s); usually the mid-latitude or central meridian of the chart. Natural scales which are multiples of 1 000 or 2 500 e.g. 1:100 000; 1:12 500 should be used for all charts.

The **latitude of reference** should be specified for charts on the Mercator projection. As far as possible this latitude should be the middle latitude of the chart, or in the case of a series of adjoining charts, the middle latitude of the area concerned.

See B-241.4 for the description of chart scale as it appears in the title block.

**B-212 GRADUATION**

**The graduation** is the division and subdivision of latitude and longitude shown in the borders of a chart at the outside of the neatline. All charts must be graduated. Plans should also be graduated, but may be graduated on 2 sides only; exceptionally, they may be left ungraduated if of very small size or if the numbering of the graduation becomes impracticable, e.g. if successive half-minute ticks do not occur within the limits.

**B-212.1 The pattern of graduation** varies with the scale of the chart. See INT 2 for the particulars and for graphical illustration of the various intervals, dicing length (i.e. highlighting of alternate subdivisions), and mitred corners.

**B-212.2 The neatlines of charts** should be located on exact graduation (sub) divisions.

**B-212.3 Minor subdivisions of border graduations** may show, where appropriate to the scale, tenths of a minute and, where considered useful, hundredths of a minute. Where only small portions of minor sub-divisions are shown, these should be applied adjacent to meridians and parallels:

- in N latitudes above and in S latitudes below the parallel
- in W longitudes to the left and in E longitudes to the right of the meridian.

On a plan where there is no meridian (or parallel), one suitable tenth-minute division should be subdivided into hundredths of a minute, preferably near the centre of the border graduation.

**B-212.4 Equal intervals** of subdivision, numbering and dicing should normally be used for latitude and longitude. All meridians and parallels shown must be numbered. The interval of graduation numbering must be chosen from the sequence 00,5' ? 01' ? 02' ? 05' ? 10' ? 30' ? 1° ? 5°, such that the numbers are not less than about 20mm apart.

**B-212.5 High latitudes.** If the chart extends to a latitude beyond 70° it may be necessary to subdivide the longitude graduation at a greater interval than the latitude. In these instances, similar patterns should not be used to denote dissimilar intervals unless the ratio of the lengths of latitude units to longitude units is 5:2 or greater. The dicing must continue to represent the same interval of latitude and longitude (see B-212.1).

**B-212.6 Graduation numbering.**

a. **Degrees:** At scales larger than 1:500 000, degree values should be quoted in the form 51°00' rather than 51°, for example. Additional degree values should be inserted (preferably at a meridian or parallel) to satisfy the following requirements:

- The degree value should appear in each half of a folded chart
- Where there is only one whole degree value falling within the limits, one appropriate graduation tick should be additionally numbered with the next lower degree value, as well as the minutes value
- Where the one whole degree value on a side not requiring folding occurs close to a corner, the degree value should be shown again at one of the numbered minutes.

b. **Minutes:** To encourage the correct reporting of positions, minute values lower than 10' should be expressed in the form 01', 02', 03', etc. If space is limited however, the leading zeros may be omitted.

c. **Tenth-minute values:** Where two whole minute divisions do not fall within limits (e.g. on a small plan), certain tenth-minute ticks should be numbered as follows:

- If neither a whole degree nor whole minute tick falls within limits, the degree value should be added at a half-minute tick (if there is one), or otherwise at a tenth-minute tick near the centre of the border graduation.
- The numbering of tenth-minute ticks must be in minutes and decimals, the decimal value not appearing without its minute value and being on the same line as it, e.g. 02,4'. A whole minute occurring in a border graduation containing tenth-minute values should be in the form 02,0', not 02'. Decimal points may be used in lieu of commas, in accordance with national practice.

**B-212.7 Hemisphere labelling.** **The longitude** of the chart must be referred to the Greenwich meridian. A reference to the hemisphere may be shown, preferably in the lower border. This may be the letter E or W, as appropriate, or the full reference may be given, in the form 'Longitude East/West from Greenwich'. It should be positioned on a meridian (preferably a graduated one if there is supplementary graduation, see B-212.8) near the centre of the border graduation. On charts comprised only of plans, one hemisphere label on a plan which forms the lowest border of the chart will usually be sufficient (unless there is potential for confusion with plans located on both sides of the Greenwich meridian).

**The latitude** of the chart must be referred to the Equator. Hemisphere labels N or S, as appropriate, may be included in the border.

**B-212.8 Supplementary (subsidiary) internal graduation** may be used for skewed charts (see B-212.9). They may also be inserted on other charts (particularly those with additional folds) to facilitate plotting. This is particularly useful for users when the chart is folded back, so that the border graduation is not accessible.

Supplementary graduated meridians and parallels should be spaced not more than 450mm apart. Any plans with a side longer than 450mm should also include additional internal graduation. The graduations should be labelled at the same interval and using the same style as in the main border graduation, with longitude labels normally above the parallel and latitude labels normally to the right of the meridian. At intersections of graduated meridians and parallels, latitude labels (with N/S qualifier to differentiate them from longitude labels) should be inserted to the right of the meridian and below the parallel, while longitude labels (with E/W qualifier) should be inserted above the parallel and to the left of the meridian. This may be varied to avoid important chart detail. At the intersection of a graduated line with an ungraduated line, the latter may be broken to insert a label.

**B-212.9 Skewed charts.** Charts should normally be oriented 'North-up', whichever hemisphere they are in. However, it may occasionally be necessary to configure a chart 'off-North', e.g. for a water area which trends NW-SE. The graduation of such skewed charts must follow the pattern of the supplementary graduation (see B-212.8).

**B-212.10 Insets** (including larger-scale and continuation plans, see B-254) should be oriented with their outer borders parallel to the neatline of the main chart and at equal distances from it when near its corners

**B-212.11 Border breaks.** Border breaks to insert significant features lying just outside the limits of the neatline should not extend beyond the thick outer border line, and must not extend beyond the outer marginal information. In such cases, the neatline should be broken for a whole number of graduation units, with the graduation divisions indicated on the inside of the outer border wherever possible.

## **B-213 GRATICULE**

**The graticule** is the network of lines representing meridians and parallels on the chart.

**B-213.1 Meridians and parallels** must be shown not more than 230mm apart and not closer than 100mm. They should be numbered and shown at equal intervals and preferably at values which are multiples of the interval, e.g. 24', 28', 32', not 25', 29', 33'. If a meridian or parallel falls very close to the inner neatline (ie within 15mm) it may be omitted.

**B-213.2 Meridians and parallels** should be as unbroken as possible and names, legends and notes should be placed clear of them. Where this is unavoidable, meridians and parallels may be broken, e.g: for the title of the chart, names, symbols, small reefs, compass roses, notes, diagrams and tables.

**B-213.3 On graduated plans**, at least one meridian and one parallel should be shown.

**B-213.4 On charts with a non-rectangular graticule** the neatline should follow the graticule. However, if the neatline is drawn as a rectangle, additional meridians and parallels may be drawn close to the border, to draw attention to the curvature of the graticule. The central meridian must be drawn perpendicular to the N and S borders of the chart, or as near to that as possible.

## **B-214 CORNER CO-ORDINATES**

The geographical co-ordinates of the inner neatline of the chart should be labelled, if possible in the lower left- and upper right-hand neatline corners, as shown in INT 2, to facilitate cataloguing of the charts for both manual and automated cataloguing systems. They should be rounded outwards, where necessary, and normally be expressed to 0,01' but may be expressed to 0.001 on larger scales (i.e. = 1:10 000) or to 0,1' on smaller scales (i.e. = 1:500 000).

**B-215 RECTANGULAR GRIDS**

A (rectangular) grid, as distinguished from a graticule, is a referencing system on a flat plane in which points are defined by their distances from two straight axes at right angles to one another; these two distances, measured usually in the same unit, are called grid co-ordinates.

**Rectangular Grids** may be distinguished as Primary or Construction-Grids and Secondary or Reference-Grids.

**The Primary Grid** is the grid relating to the projection used; it may serve as the construction-framework of the chart. The Mercator projection does not need a construction-grid, as its graticule is rectangular and straight-lined.

A **Secondary Grid** is one that is superimposed on the chart for other (e.g. military) reference purposes. Grids usually have no practical interest for the marine navigator and a grid note should make this clear.

**B-215.1** If the **primary grid** is shown, it must be shown in black, by short ticks in the chart border (see INT 2). The ticks should be 100 mm apart on the chart and the two ticks nearest each corner should be labelled.

**B-215.2** If a **secondary grid** (e.g. Universal Transverse Mercator (UTM) or a national mapping grid) is shown, this should be portrayed in magenta with longer ticks, possibly all labelled, at distances representing 1000m or multiples, appropriate to the scale of the chart. A grid note, also in magenta, should be added to the chart's explanatory notes, explaining the incidence of grid letters, the number of last digits omitted, an example, etc. The note may be included in a diagram showing the incidence of grid letters. Sometimes this diagram can conveniently be combined with a source diagram (see B-178).

Secondary grid ticks and accompanying explanatory notes may be shown in black, especially where no primary grid ticks are charted. If two secondary grids are shown on one chart, e.g. because of a change in zone, the labelling of one of these should be distinct, e.g. in italics, or one should be shown in black and the other in magenta.

Grids should not be shown on charts of scale smaller than 1: 100 000.



**B-220 LINEAR SCALES, DIMENSIONS**

**B-221 LINEAR (GRAPHICAL) SCALES**

Linear scales should be in metres and normally shown in accordance with the following rules (see INT 2 for patterns, etc):

- Charts on scales smaller than 1:80 000: no scales.
- Charts on scales 1:80 000 and larger: metre scales in the borders.
- Insets: linear scales.

Linear scales must be sited clear of folds and important detail; a folded chart must carry the appropriate scales in each half. The length of the scales depends on the space available, and the labelling interval on the length.

**B-221.1 Border scales** should be between 200 and 450 mm long. The exact length is calculated for the scale at the mid-latitude of the chart.

The main advantage of border scales is that scales can be longer without obscuring chart detail. Scales should be placed in both borders, for convenience when using the chart folded back.

**B-221.2 Additional linear scales** may be shown (eg sea miles/cables and feet). The dicing (see B-212.1) of scales is only appropriate where the unit is directly related to the graticule (i.e. sea-miles/cables) to avoid potential confusion.

**B-221.3 In high latitudes** exceptions may be made to the above specification, e.g. a sliding scale as shown below, or the showing of more than one scale, each of which must be used in a specified latitude zone.

Scale



**B-222 DIMENSIONS**

A0 (1189 x 841mm) must be the maximum paper size used for nautical charts.

**B-222.1 The neatline dimensions** should be either 1100 x 750mm or 980/1100 x 630/650mm, subject to the minor variations required to locate charts' neatlines on exact graduation sub-divisions (see B-212.2).

In exceptional cases the maximum neatline dimensions permissible are 1110 x 760mm. In such cases, border breaks (see B-212.11) must not extend beyond the outer border.

**B-222.2 Charts having titles outside** their north border should have the N/S neatline dimension 25 mm shorter than standard, to accommodate the title.

**B-222.3** To facilitate accurate reproduction of charts **the dimensions must be quoted** in brackets in the lower right-hand corner in millimetres to one decimal place. The east-west dimension must be quoted first, eg (649,7 x 980,3 mm) is an upright ('portrait') chart, whereas (980,3 x 649,7mm) is a landscape chart.

**B-222.4** **Where convergence is measurable** and the neatline follows the meridian, the lengths of both borders should be quoted, the length of the north border being given above that of the south, e.g.

(648,2  
x 979,6mm)  
(650,3

**B-230** **Not used**

**B-240 TITLE, NOTES****B-241 TITLE BLOCKS**

The titles of charts, including associated notes, should be arranged in one block, located in the land area if possible, clear of essential detail. It should be translated into English or French and if the more important information cannot be inserted on the front of the chart, it may be printed on the back. *IHB to Cancel TR B2.15* The title block should include the following items, reading from top to bottom:

**B-241.1 Seal (or Crest).** Most Hydrographic Offices print their seal on the chart, usually above the chart title.

**B-241.2(I) On international charts** the seal of the producer nation and the IHO seal must be placed above the title, side by side and of equal height, with the producer nation's seal on the left. In the case of a reproduced international chart, the printer nation's seal must be placed between the seals of the producer nation (to the left) and the IHO (to the right); the latter two seals must be smaller in height than the seal of the printer nation (about 0.8 of the height).

The words 'INTERNATIONAL', or equivalent, above and 'CHART SERIES', or equivalent, below the seals must also be shown on international charts.

**B-241.3 General geographical area** (e.g. FRANCE – NORTH COAST) and the formal unique **chart title**, i.e. specific geographical description of the location. Countries which do not use the Roman alphabet should print an additional title of the chart in Roman characters. *IHB to Cancel TR B2.15*

**B-241.4 Scale.** The natural scale of the chart must be shown using a colon, thus:

SCALE (or equivalent) 1:10 000

For Mercator projections, the mid-latitude or scale parallel must be added, in brackets or in the form 'at lat 21°30' (Note: no hemisphere identifier is required). See also B-211.

**B-241.5 Unit of measure for depths** with a general statement about the vertical chart datum used (see B-405).

**B-241.6 Unit of measure for heights** with a general statement about the plane(s) of reference used (see B-302). Distinctions should be made as appropriate for drying heights (B-413), clearance heights (B-380) and heights of lights (B-471.6), if these are referred to a different datum.

**B-241.7 The name (and date) of the horizontal datum** used with a statement, as appropriate, about the conversion of geographical positions to the international reference system and the internationally recognized regional datum. See B-201 and B-202

**B-241.8 The IALA Maritime Buoyage** region, e.g. 'IALA Maritime Buoyage System - Region A (Red to port)'. If the navigational marks within the chart area, or part of it, have not been converted to comply with the IALA system, this should be stated in a cautionary note.

**B-241.9 The name of the projection** used (see B-203).

**B-241.10 A note citing the sources.** This may be either noted in the title or the note may refer to a separate Source Diagram. See B-170.

**B-241.11 Titles blocks of insets** should be limited to information that is not contained in, or differs from, the main chart title block.

**B-242 CAUTIONARY AND EXPLANATORY NOTES**

In addition to those already mentioned in B-241, cautionary and explanatory notes should be added to or put near to the title block. Such a block-arrangement has cartographic advantages and assists the mariner in locating important information.

Notes should be kept to a minimum and be as concise as is compatible with accuracy and intelligibility. Hydrographic terminology (jargon) should be avoided, giving preference to easily understood words, e.g. 'depths' rather than 'bathymetry'.

**B-242.1 Headings.** Notes, especially cautionary notes, should have an informative title heading for reference. This title should, where possible, be derived from the description as used in the chart, e.g. 'Restricted Area', 'Deep Water Route'. This practice is regarded as being more informative and easier for reference than having numbered notes or cautions.

**B-242.2 Specimens** of various notes are given elsewhere in these specifications.

**B-242.3 Cautionary notes** must normally be printed in the same colour as their subject, e.g. notes about wrecks, currents, magnetic anomalies, etc, in black; notes about exercise areas, anchorages, reporting points, etc, in magenta. Exceptions include notes referring to differences between horizontal datums and notes which refer to two or more features which are charted in different colours. (See B-140 to B-146 for more information about colour conventions). In any case, the reference legend '(see Note)' should be in the colour of the note, to aid identification.

**B-242.4 Translation.** If space permits, on non-English language charts cautionary notes should be duplicated in English under the national wording. See also B-241.

**B-242.5 Explanatory notes,** as distinguished from cautionary notes, include those mentioned in B-241 and also notes on the kind of light-ranges shown, glossaries of terms, etc.

**B-243 REFERENCE TO OTHER PUBLICATIONS**

A reference to other publications may be added as marginal information, e.g. outside the border in the upper right-hand corner. A specimen is given below:

Refer to relevant Sailing Directions, List of Lights and other publications to supplement the information shown on this chart. For general information on navigation, charts and hydrographic publications see The Mariners' Handbook. For an explanation of chart symbols and abbreviations see Chart INT 1.

For references to other charts and other marginal information, see B-250 to B-255.

**B-250 CHART NUMBERING, MARGINAL INFORMATION****B-251 CHART NUMBERING**

The numbering of charts within national chart series is a matter for national discretion. As a minimum, national numbers should be printed in black in the lower right-hand corner of the chart and, inverted, in the upper left-hand corner. The national prefix (ISO two-letter code, see Technical Resolution A1.19) may be included.

**B-251.1(I) International charts** must carry international chart numbers shown in magenta, in Arabic figures, with the prefix 'INT'. The international number should be placed next to or above the national number.

**B-251.2(I) International numbering** must follow the principles described in M-4 A-204 and M-11 (Part A).

**B-252 DATES OF PUBLICATION AND UPDATES**

Charts must bear the date of their original publication, that of the latest edition, and the year date and numbers of the Notices to Mariners, if any, which originated updates (formerly termed corrections). *IHB to Cancel TR B2.14*

The wording of these notes is left to national discretion. See A-401 for the definitions of terms referring to the issue of charts.

**B-252.1 The publication note** (publisher's imprint), which should include the date of the chart's original publication (i.e. Edition 1), should be placed in the centre of the lower margin of the chart. Copyright acknowledgements (see B-253), or reference to the original chart in the case of reproduced charts (see B-252.4), should be placed underneath the publication note.

**B-252.2 Edition date and numbers.** Notes giving the edition publication date, and if desired the edition number, of the chart must be shown in accordance with national practice. The preferred position is to the right of the publication note or in the lower left-hand corner of the chart, with other updating details.

**B-252.3 Notices to Mariners.** Charts must bear the legend 'Notices to Mariners' in the lower left-hand corner, outside the border of the chart, where the mariner can insert the relevant references for updates carried out on the chart following their appearance in Notices to Mariners (NMs).

Charts should be brought up to date to the day they leave the Hydrographic Office. At the time of despatch, each chart must have a stamp or note indicating the last NM included, or the date of the last group of NMs consulted for its correction, even if this group and possibly preceding groups did not in fact contain any updates to be made to the chart in question. This stamp or notation should state very clearly the name of the Hydrographic Office concerned. *IHB to Cancel TR B2.14*

**B-252.4 On reproduced (adopted) charts** the publication note must be amplified by the following, or equivalent, note:

For international charts:

‘Modified reproduction of INT (...INT number...), published (...date of the edition of the producer’s chart which has been reproduced...) by (...name of the producer nation...)’.

For national charts:

‘Modified reproduction of (...country...) chart (...producer’s national number...), published (...date of the edition of the producer’s chart which has been reproduced...)’.

## **B-253 COPYRIGHT LEGEND**

This may be shown in accordance with national practice. When data has been included from other nations’ charts, acknowledgment of the owner’s copyright should be made in accordance with any bilateral arrangement between the Hydrographic Offices. It should be located under the publication note, see B-252.1.

## **B-254 REFERENCES TO OTHER CHARTS**

Hydrographic Offices should include on their charts references to similar or larger scale charts published by their own nation *IHB to Cancel TR B2.13* These fall into two categories:

- a. References in the border of the chart to adjoining charts of the same or similar scale and to continuation insets.
- b. References to larger scale charts or plans which cover part of the area covered by the chart.

Note: **Insets**, including continuation insets and large-scale plans, are small charts with their own borders included within the limits of a larger chart. A **plan** is a large scale inset of a nautical chart (e.g. a port plan). For more detailed definitions, see the Hydrographic Dictionary, S-32.

For references to insets on Source diagrams see B-173.6. For references to foreign charts see B-254.4.

**B-254.1 Border references** should be shown in magenta and be worded ‘Adjoining chart...’ or ‘Continued in inset’, or equivalent, as appropriate.

**B-254.2 The limits of larger scale charts or plans** should be identified by numbered outlines in magenta, or by the legend 'see Plan' if the plan is on the same sheet. If there is more than one inset on a chart, they should be labelled A, B, C etc, and have letter identifiers added to the reference on the main chart, or in its border.

A charted outline may be other than the actual neatline limits, to show that a water area is not charted in detail at the larger scale (e.g. because it is cut off from the main sea area, or is an area covered by title, notes or diagrams).

A legend such as 'see Chart...' may be inserted (e.g. under the place name which is covered by the chart or plan) instead of limits if the area is so small that the limits and number cannot be shown with clarity.

An index of larger scale charts may be used in place of charted outlines in some instances, e.g. in the case of numerous charts forming a coastal series, where the exact limits of each one are of less consequence. This may be combined with another diagram if space is limited, see B-178.

**B-254.3(I) References to INT chart numbers** may be included in brackets alongside the national number, e.g. Adjoining Chart 1234 (INT4321).

**B-254.4 References to foreign charts.** When a Hydrographic Office considers that its own chart coverage is not adequate for all navigation needs, reference may be made to those foreign charts, preferably original national charts, which would usefully supplement the coverage. Such references must include the identity of the publishing office in front of the chart number. **This should be the** two-letter ISO national code, see Technical Resolution A1.19 and IHO publication S-62. A different colour may be used to differentiate references to foreign charts from the Hydrographic Office's own charts.

In particularly important cases, the national Chart Catalogue and Sailing Directions should also refer to the foreign charts mentioned above. [\*IHB to Cancel TR B2.13\*](#)

**B-254.5** If there is a plottable (see B-202.2) **horizontal datum** difference between scales or adjoining charts, the legend '(see Note – POSITIONS)' or equivalent should be added to the chart number reference, in black, and the relevant note included on the chart (see B-202.3).

## **B-255 OTHER MARGINAL INFORMATION**

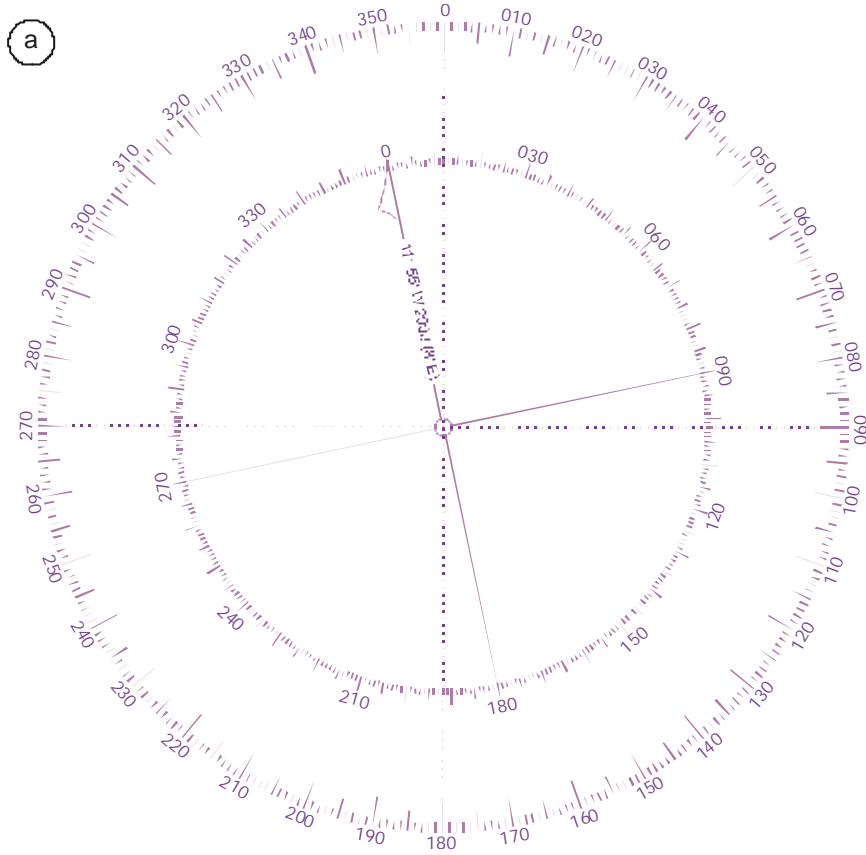
**B-255.1** The term marginal information, as used here, refers to all information shown between the neatline and the outer edge of the paper. Most marginal information has been covered in the preceding specifications.

**B-255.2 Units.** Those member countries whose chart series contain charts showing depths in fathoms and/or feet may wish to include a note, e.g. 'DEPTHS IN METRES', 'DEPTHS IN FATHOMS', or equivalent, on their charts and this is left to national discretion. Such notes should be shown in large magenta capitals, in the top and bottom margins.

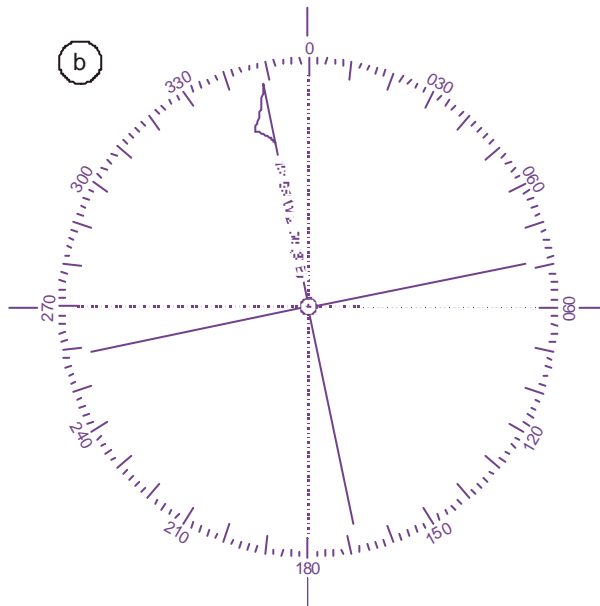
**B-255.3 Horizontal datum.** A legend to quickly draw the mariner's attention to the horizontal datum, for its use with satellite navigation equipment, (e.g. 'WGS84 POSITIONS can be plotted directly on this chart' or simply 'WGS84'), may be inserted in large magenta type, in the margins. For charts NOT referred to WGS84, the actual datum to which the chart is referred may be inserted in similar format.

**B-260 COMPASS ROSES, BEARINGS**

SPECIMENS OF COMPASS ROSES:



**IB 70**



**B-261 COMPASS ROSES: PATTERNS, TRUE AND MAGNETIC**



In this specification 'pattern' means (sub)division, labelling and centre indication.

One or more compass roses should be shown on each chart in places particularly selected for their use, see B-262.2.

The value of the magnetic variation, together with the year date and the annual rate of change, must be shown on charts, see B-272.

Compass roses should be in **magenta** in the form shown at B-260, taking note of the fact that these specimens also illustrate **optional** features.

**B-261.1 The true circle**, where combined with a magnetic circle, must be the outer circle; its pattern is illustrated by the specimens at B-260.

These specimens also show optional additions, which are:

- the outward extensions of the 0°-180° and 090°-270° axes,
- the dotted lines joining 0°-180° and 090°-270°.

Another optional addition, not illustrated, is a 'North Star'.

**B-261.2 The magnetic circle** is optional: its pattern is illustrated by specimen a. For further particulars on magnetic data, see B-272.

## **B-262 COMPASS ROSES: SIZE AND POSITION**

**B-262.1 The diameter** of the rose should normally be 100 to 140 mm, depending on the size and configuration of the chart – see B-260 specimen a. Smaller roses of 65 to 100 mm diameter may be used on insets, or in order to facilitate positioning. Specimen b is recommended for sizes smaller than 80 mm diameter.

**B-262.2 Position.** Compass roses should be distributed so as to limit the sliding distance of parallel rulers etc as much as possible. Ideally, it should be possible to reach all service areas of a chart, including inland fixing marks, by moving a 450mm rolling parallel ruler (aligned on both the bearing and its reciprocal across a compass rose) without any part of the ruler crossing the limits of the chart paper (which takes account of the limitation in size of chart tables, and the possibility of raised edges). For this reason, no part of a rose should be closer than 50mm to the inner neatline of the chart.

If possible, the centre of the compass rose should either coincide with the intersection of a parallel and a meridian or with one of these lines, or alternatively it should be amply clear of them. They should be kept clear of internally graduated meridians and parallels. On projections with converging meridians, care must be taken to ensure that compasses are oriented on North, wherever they are placed.

When practicable, roses should be placed clear of chart folds and of critical features, (e.g. dangers, navigational aids, etc). The coincidence of a sounding with a degree label in the rose or with the magnetic variation legend must be avoided, e.g. by selecting a suitable alternative sounding, or displacing a critical sounding using symbol I 11.

Compass roses should not be placed in the approaches to harbour entrances.

Compass roses may be placed in the land area, but for clarity not partly inside and partly outside the land or coloured areas.

Small craft mariners rarely use 450mm parallel rulers and they often fold charts; more and smaller compass roses are therefore appropriate in areas popular with these users.

**B-263 BEARINGS: CONVENTIONS**

Bearings must be given in degrees from 0° (North) to 360° reckoned clockwise. Bearings should be quoted and charted, with the exception of 0°, as three figures, eg 230°, 095°, 005°. This is in accordance with usual navigational practice. Bearings may be quoted and charted to tenths of a degree, e.g. 096,4°. All bearings indicated on charts must be TRUE bearings.

**B-263.1 Bearings from seaward.** The bearings of the following must be given from seaward:

- limits of sectors and arcs of visibility of lights
- alignments of leading lights or other objects
- directions for passing off-lying dangers.

**B-263.2 Bearings from charted marks.** When, in the description of dangers, (e.g. in a Notice to Mariners or a publication), the position of an object is given by distance and bearing, the bearing must be given **from** some well-defined and, if possible, permanent mark. The word 'from' or its equivalent must be inserted.

*IHB to Cancel TR A2.6*

**B-263.3 Reciprocal Bearings.** Any line drawn on a chart, or observed, bears in two reciprocal directions (e.g. 030° and 210°). Most bearings given on charts should be expressed from seaward (as stated at B-263.1). Therefore, in most cases, the figure given should be that which mariners will observe from their vessels or measure to plot on the chart. There are a few exceptions to this (as stated at B-263.2, e.g. in the plotting of NM updates; also, when leaving port a ship's heading on a leading line will be the reciprocal of the charted value). However, in certain cases, both bearings should be charted e.g. '120°-300°', for example:

- Some reaches of fairway channels which are marked by a pair of leading marks at either end.
- Recommended tracks not defined by fixed marks.
- Measured distance courses.

**B-270 MAGNETIC DATA**

Of the various magnetic data, **magnetic variation** (also called magnetic declination) is the most important element for the mariner, and the only one to be shown on standard navigational charts. (See B-274 for abnormal magnetic variation.) Magnetic variation is defined in the Hydrographic Dictionary (S-32) as:

‘The angle between the magnetic and geographical meridians at any place, expressed in degrees east or west to indicate the direction of magnetic north from true north.’

Magnetic models are typically replaced every five years (e.g. 2000, 2005... termed epochs). Magnetic variation can be calculated from computer models, or derived from charts produced by certain Hydrographic Offices or mapping authorities, which show the spatial distribution of magnetic variation values worldwide for the current epoch, by means of lines of equal magnetic variation (termed isogonals). The rate-of-change curves, which are over-printed on such charts, enable values for any point to be extrapolated for any time within the current epoch.

**B-271 MAGNETIC DATA: SOURCE MATERIAL**

The variation and its annual change should be based on a reliable world model (e.g. derived from an authoritative computer program or the current issue of Magnetic Variation Charts).

**B-272 MAGNETIC DATA: SYMBOLS**

**B-272.1** On charts of scale smaller than 1:750 000 and on charts where the charting of magnetic legends inside compass roses is impracticable, (e.g. due to the closeness of isogonals, or to the irregularity of their pattern), the variation must normally be shown as follows:

- a. **Magnetic variation lines (isogonals)** must be shown in magenta by unbroken lines connecting points of equal variation at 1°, 2°, or 5° intervals so that spacing does not generally exceed 150mm. These lines must be labelled with appropriate values of variation and annual change. Isogonals should not normally be inserted at intervals of less than 1°, because diurnal and seasonal fluctuations in the earth's magnetic field can change the stated variation by up to 1° and, in some parts of the world, the data on which isogonals are based may not ensure the accuracy of charted values to better than ±2°. For similar reasons, if the spacing of isogonals (at 1° intervals) is greater than about 150mm on the chart, the magnetic variation should be charted as a legend within each compass rose (see B-272.2).
- b. The magnetic variation must be shown in degrees followed by the letter E or W as appropriate. Where the isogonal of 0° is charted, it must be so labeled. The annual rate of change, expressed in minutes and followed by the letter E or W as appropriate, must immediately follow the variation, in brackets.



**IB 71**

- c. A note (in magenta) indicating the 5-year epoch date of the lines must be shown, preferably in or near the title block.

MAGNETIC VARIATION LINES ARE FOR (YEAR)  
 The Magnetic Variation is shown in degrees, followed by the letter W or E, as appropriate, at certain positions on the lines. The annual change is expressed in minutes with the letter W or E and is given in brackets, immediately following the variation.

**IB 71**

- d. When isogonals are shown, compass roses must consist of the true circles only.

**B-272.2** On charts of scale =1:750 000, magnetic data must normally be shown in magenta, as a legend within each compass rose. These legends may be amplified by the addition of magnetic circles or Magnetic North arrows. However, in cases where this proves impracticable, the magnetic data may be shown:

- By isogonals (see B-272.1)
- By a boxed note in position (INT 1 IB 68.1)
- By an out-of-position note (INT 1 IB 68.2: exceptionally, in black when forming part of the title notes, e.g. of a plan)

**B-272.3** **Magnetic legends** inside compass roses must be in the same colour as the rose, usually magenta as in the specimens at B-260.

The Magnetic North arrow must be labelled with the value of the variation, the year to which the value applies and, in brackets, the rate of annual change of variation. Variation must be given to the nearest 5', change to the nearest 1'. To both, values E or W must be added as appropriate. Where the increase or decrease in the rate of annual change is 0.5' or less, it must be shown as (0').

**B-273 MAGNETIC DATA: CORRECTIONS**

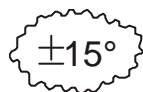
If a hydrographic office finds the values based on its national data differ by more than 45' for variation or more than 3' for annual change from the charts in B-271, the publisher of the latter should be notified, giving the supporting observations accompanied by an overlay showing the proposed correction. If and when the correction is accepted, the publisher will promulgate details as appropriate.

**B-274 ABNORMAL MAGNETIC VARIATION**

Abnormal magnetic variation or local magnetic anomalies are local effects superimposed on the Earth's normal magnetic field which cause anomalous variation values. Reports of abnormal magnetic variation should be referred to one of the World Data Centres which exist under the auspices of the International Association of Geomagnetism and Aeronomy (IAGA), to establish whether it is a long-lasting feature, or relates to a temporary phenomenon, usually due to a magnetic storm.

**B-274.1** Permanent anomalies are caused by concentrations of ferromagnetic material in the Earth's crust or, to a more limited extent, by wrecks or man made structures on the sea bed. They should not be charted unless they vary by at least 3° from the norm for the area, because diurnal and seasonal fluctuations in the Earth's magnetic field can change the stated variation by up to 1°, and, in some parts of the world, the data on which isogonals are based may not ensure the accuracy of charted values to better than ±2°.

**Where the magnitude and extent** of permanent local magnetic anomalies have been established to be 3° or greater, they should be shown by a limiting undulating line with the value of the anomalous variation:



**IB 82.1**

Within the enclosed area the magnetic variation may deviate from the normal by the value shown. Where the magnetic compass is known to be deflected either to the west alone or to the east alone, 5°W or 5°E should be quoted, rather than +5° or -5°, to reduce the ambiguity resulting from either a W or E 'normal' variation in the general area. Where the deflection may be in either direction it is expressed as ±5°. In all cases, the value quoted for the anomaly must be the deviation from the normal magnetic variation expected for the area.

**B-274.2** **Where local magnetic anomalies have not been investigated** in detail, an appropriate legend should be shown, e.g. Local Magnetic Anomaly (see Note) or Area of Magnetic Disturbance (see Note), with further information in an accompanying note.

Local Magnetic Anomaly  
(see Note)

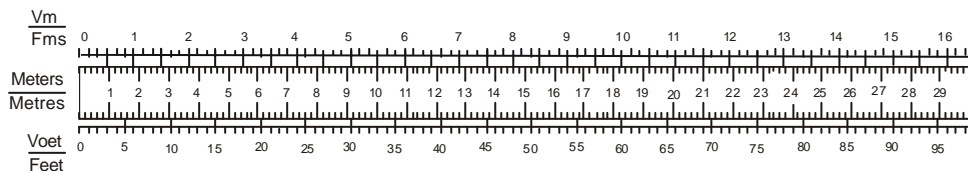
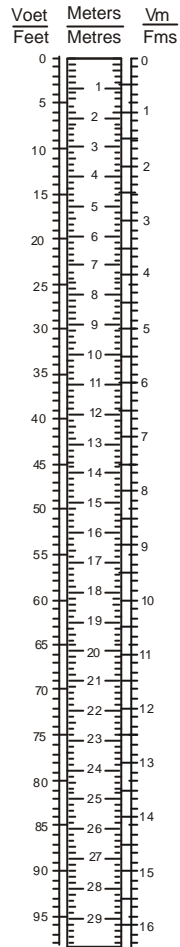
**IB 82.2**

**B-274.3** **Magnetic poles.** Charts of those areas in the vicinity of the Magnetic Poles, where the magnetic compass becomes so disturbed as to be erratic or valueless, should have cautionary notes to this effect inserted in the compass rose, in magenta. The notes should, if possible, refer the user to an appropriate magnetic chart for fuller information.

**B-280 DEPTH UNIT CONVERSION TABLE**

Those member countries whose chart series contain charts showing depths in fathoms and/or feet may wish to include a depth unit conversion table (metres/fathoms/feet) on their charts. The inclusion of such a table is left to national discretion.

Where shown, the conversion table should be in black, in the form of the following specimens, preferably the upright version, along one or both of the E/W borders of the chart or near the title. The table should be placed clear of folds and chart detail.



Examples of bilingual English-Dutch conversion table.

**B-281 OTHER TABLES**

Depicting other information on charts in tabular form may be considered. In many circumstances, the inclusion of such details in associated publications, such as Sailing Directions, will be more appropriate; however, examples of tables on charts include the following:

- Table of depths in maintained sections of river channels and canals
- Key to berths, jetties and mooring areas
- Table of clearances under bridges
- Key to new or non-standard symbols
- Glossaries of foreign words, particularly on adopted charts
- Table, in magenta, showing marina facilities (see INT 1 IU 32) may be used on large scale charts covering small craft centres.

For tidal levels and tidal stream tables, see B-406.

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**B-290 SOURCE DIAGRAMS *[To be transferred from B-170]***

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**Annex B to CL 20/2004**

**B-200 – Combined comments (except AU)**

B-201.2 (DK) The text proposed by the chairman is preferred

B-201.3 (DK) Australia suggest the following wording: “Such charts shall be converted to WGS84 at their next new edition.” I do not support that statement. We can not order any nation to use their resources on such a task. We can only give advise and guidance. The Hydrographic Offices themselves must decide how to use their (often very limited) resources. And the conversion to WGS84 is probably not the most urgent task to perform. You have after all the possibility to add a note on the chart stating the difference between WGS84 and the datum used. It is also my impression that Australia seems to take for granted that all chart production is based on digital production lines. That might not be the case. And I can inform you that e.g. Denmark have no resources at all to convert all the charts of the Greenlandic area to WGS84 within a foreseeable timeframe.

B-202.1 and 202.2 (DK) The AUS comments regarding the WGS72 and plottable difference is supported

B-202.3 (DE) For charts based on WGS84 datum we think the note a) is not necessary. Because of space problems we’ve already done without it.

B-202.4 (DE) Can be removed.

B-202.4: (DK) Can be removed.

B.202.4 (ES) The note could be irrelevant. Nevertheless, it is already specified that it is for exceptional cases and it may remain so.

B-202.4 (NL) can be removed

B-202.4 (NZ) NZ charts do not refer to any earth based electronic navigation system. We consider that this section is no longer relevant.

B-212.1 NZ charts have the following variants to the pattern of graduation defined in INT 2 in order to give more detailed graduation:

| Style | Limiting Scale |            |
|-------|----------------|------------|
|       | Largest        | Smallest   |
| E     | -              | 1:50 000   |
| F     | >1:50 000      | 1:100 000  |
| G     | >1:100 000     | 1:200 000  |
| H     | >1:200 000     | >1:500 000 |

Does any other country vary the pattern of graduation similarly? If so, could this be included in INT 2 at some point?

B-212.3 (DE) We should try to eliminate seconds and standarize on the use of decimals of a minute.

B-212.3 (DK) The answer to your question is yes but it is in conflict with INT 2. INT 2 will need to be amended accordingly. Also it is a "problem" for us as we will have to change some of our charts and more or less all of our plans. But if recommended in the specifications we will do it step by step.

B212.3 (ES) We consider it a good idea to try and eliminate seconds.

We do not use the 0 before the number for the minutes. In fact we follow the existing INT2. We are not in favour of change.

B-212.3 (NL) we agree with the proposed divisions; consequences for INT2. No supplementary internal graduation needs from NL users

B-212.3 (NZ) We agree that we should standardise the use decimals of a minute.

We use INT 2 border style E for all charts of scale 1:50,000 and larger and show decimals of a minute on all charts of scale larger than 1:50,000. We specify the decimal subdivision of border style E as:

|                                     |                             |
|-------------------------------------|-----------------------------|
| <b>&gt; or equal to 1:25 000</b>    | <b>10ths of 0.1'</b>        |
| <b>&lt;1:25 000 to &lt;1:50 000</b> | <b>5ths of 0.1'</b>         |
| <b>1:50 000</b>                     | <b>No minor subdivision</b> |

Is this common practice and therefore worth defining in M-4?

B-212.4 and .6 (DE) Because of space problems in the border area we do not support the form 00,5'- 01' - ... and like to stay with 0,5'- 1' - ...

The decimal point instead of the comma in the Australian proposal (B212.6 a) we won't support. It only can be a national speciality.

B-212.6 (DK) The text proposed by the chairman is preferred. The reason is that DK is no longer producing charts for the small craft market. Consequently the Danish standard navigational charts are also used by small boaters.

B-212.6 (NZ) We don't agree with the addition of the '0's. We do not do this on NZ charts and consider them redundant. Otherwise the additional instruction is good.

The wording of the first bullet point under c. could be clarified as follows:

If neither a whole degree **value** nor **a** whole minute tick falls within the limits ([for example on a small plan](#)), the degree...

B-212.7 (ZA) Hemisphere labelling. The question we ask. Shouldn't this equally apply to hemispheres NORTH and SOUTH of the equator as hemisphere identifier? The recommended changed wording would then need to read as follows;

.....border. This may be in the form 'Longitude East/West from Greenwich' or the letter E or W and 'Latitude North/South from the Equator or the letter N or S, as appropriate, may be used instead of the full legend. It should be positioned on a meridian or parallel (preferably....

.....be sufficient (unless there is potential for confusion with plans located on both sides of the Greenwich meridian or 0° parallel).

This may well be required if NO hemisphere identifier is required under the Title Block – B-241.4 Scale. This would have a further impact on amendments to INT 2!

B-212.9 (NL) we support guidance UKHO

B-212.9 (NZ) The reference at the end of this paragraph should read (see B-212.10).

212.10 (NO) We have so far not experienced any request for additional meridians and parallels on charts. If, however, this practice is used among several member states, we

support the proposal of including guidance for this in the specifications.

212.10 (DK) Regarding your question whether or not there has been a request from the user to insert supplementary internal graduations I can say that we have not had such requests.

B-212.10 (ES) Supplementary internal graduation. Although we have not received requests from users, we consider it desirable the inclusion of guidance on this subject.

B-212.10 (NZ) We have not had any requests to add supplementary internal graduation but are happy with the inclusion of the guidance at B-212.10.

B-212 (ZA) South Africa has NOT experienced any requests from our chart users for the insertion of supplementary internal graduations. Secondly, South Africa values and supports the UKHO's guidance and that this be included as Specification B-212.9.

B-212.10 (BR) No this HO have not experienced requests about insertion of supplementary internal graduations. The inclusion of guidance like Specification B-212.9 will help, mainly for skewed river charts.

B-213.1 (NZ) We don't agree with the change from 20cm to 10cm (to 230mm to 130mm) as the defining distance apart for meridians and parallels. We use 100mm to 200mm and think this suitable.

B-213.2 (NZ) We have the additional instruction for NZ charts as follows:

When a meridian or parallel falls closer than 15mm to the chart border it is to be omitted. Is this common practice and therefore worth defining in M-4?

B-222.1 (NZ) NZ chart dimensions are based on 980 x 630mm. Could the second set of dimensions be changed to 980/110 x 630/650 to accommodate this?

B-222.3 (DK) It is suggested to extend the paragraph to also include an example of a landscape chart E.g. The east-west dimension shall be quoted first, e.g. (649,7 x 980,3mm) is a 'portrait' chart and e.g. (980,3 x 649,7mm) is a 'landscape' chart.

B-222.3 (NZ) It may be worth giving a reason for showing dimensions on charts. This section could start with something like:

[To facilitate accurate reproduction of charts the dimensions are quoted...](#)

B-222.5 (DK) Which format to prefer should be left to the producer to decide as we have to assume that the area to be charted will have the greatest influence on choosing a portrait or landscape format.

B-232 (NO) It will be more logical to renumber this paragraph into the Graduation & Graticule section.

B-232 (DK) Support to move this paragraph to e.g. B-214

B-232 (ES) Corner coordinates. We do not consider that re-numbering is necessary.

B-232 (NL) Move it to the Graduation and Graticule section

B-232 (NZ) We don't currently show corner co-ordinates to these specifications but are willing to do so with the exception of charts of scales larger than 1:10,000. We show the corner co-ordinates to three decimal places of a minute (0.001') on charts of scale larger than 1:10,000. We think this would be better moved to the Graduation and Graticule section as B-214.

B-232 (ZA) This is supported (renumbered B-214) as the corner geographic co-ordinates are identified at the same time as the main chart framework is generated.

B-232 (BR) Yes. It would be better if renumbered B-214. In addition, it seems that specification B-233 could be renumbered B-215.

B-233.1 (NZ) The second sentence could be clarified as follows:

The ticks shall normally be 100 mm apart on the chart and the **two** ticks nearest **each corner** shall be labelled.

B-241.11 (NZ) Consider adding a section defining titles of inset plans. For NZ charts we show less detail in titles of inset plans as follows:

- **Show the name and scale.**
- **The word 'scale' is omitted.**
- **State the projection only if the inset is on a different projection to the chart body.**
- **Do not add a note stating the datum, as this is always the same as on the chart body.**

**An example is:**

**DEA'S COVE**

1:7 000

**Projection: Transverse Mercator.**

Is this common practice and therefore worth defining in M-4?

B-242.3 (NZ) In the situation of a note referring to two or more features which are charted in different colours, we show the text '(see Note)' in the colour of the note, even if this is different to the colour of the feature. Is this common practice and therefore worth defining in M-4?

B-251 (SE) Since national charts also are used internationally it should be beneficial to have the national prefix code (two letter ISO national code) in front of the number. This would make it very easy to see in what country the chart is produced.

B-251 (DK) The original text shall be retained. There is no true value in amending the paragraph. Many nations have probably already produced their charts in accordance with the original text.

It is a matter of national discretion where to place the national chart number. However it could be suggested that as a minimum the national number is placed as proposed by the chairman.

B-251.1(I) (DK) The original text shall be retained.

B-252.3 (DK) Second part. The Australian proposal is not supported due to the fact that the Danish HO in 1990 stopped bringing the charts up to date to the day they left the Office. The text from the TR is therefore supported.

B-252.5 (DK) Only the first two sentences of the Australian proposal is supported. Regarding the text "When a chart is reprinted all Notices....." is superfluous. The cartographer knows very well that if corrections have been applied to a chart all obsolete information is to be removed.

B-254 (DK) The Australian proposal named c. is not supported. It is outside the scope of this paragraph.

B-254 (DE) We recommend an addition, that references to other nations' charts are also possible (see B-254.4).

Point c) should only be an additional way to chart references, not a choice.

B254.4. (SE) If we describe foreign charts with their outlines in our charts, should there not be a recommendation what colour the limit should have?

B-255.3 (FR) *Horizontal datum. A legend to quickly draw the mariner's attention to the horizontal datum, for its use with satellite navigation equipment, (e.g. 'WGS84 POSITIONS can be plotted directly on this chart' or simply 'WGS84'), may be inserted in large magenta type, in the top and bottom margins. A note stating the reverse may be read quickly and misunderstood, and is therefore not recommended.*

Comment : France use a note stating the reverse (see attached example - in french). We decided to do so because the users strongly asked us to make thus. They seem to be very happy with these notes. I don't understand the justification : "may be read quickly and misunderstood". I think that is more important to say clearly on the chart that it is not established in WGS 84 and so not compatible with GPS.

And later: About B-255.3, I understand well your justification. Perhaps the wording could be modified to specify this and to authorize (or to recommend) notes as French notes.

B-255.3 (CO) I prefer only the note Datum WGS-84 is short, quickly and clear to mariners. All Colombian charts use this datum and the note in black

B-260 (DK) I can inform you that DK does not use any of the shown compasses. We do not feel it worth-while to use many resources on correcting the compasses as the magnetic variation in the Danish waters is almost zero. Instead we are using a compass rose similar to the outer circle shown in example a and b of the existing M-4 B-260. The text e.g: Magnetic variation 0 (I don't know how to make the symbol for degrees) 45' W 2003 (6'E) is placed parallel to the E-W diameter of the rose.

B-260 NL uses on New Editions symbol a without inner circle

B-261.3 (DE) Germany does not use points circles, specimen c can be removed.

B-261 (NO) We are not using "points" circle roses in Norwegian charts.

B-261.3 (DK) We do not use "points" circle roses in our charts.

B261 (ES) We do not use chart point circles.

B-261 NL does not use point circles

B-261 NZ does not chart points circles. We are happy for this to be removed.

B-261 (ZA) No, the points circle need not be retained.

B-261 (BR) No, this HO still not charts points circle, but why not still use the North Star?

B-263 (DE) Bearings should not be charted with a decimal point instead of the comma, see above.

B-271 (NO) Magnetic data: Source material OK to include the text as proposed.

Regarding Magnetic anomalies: We have no strong opinion in this matter.

B-271 (DK) All relevant information regarding chart specifications should be moved from the TRs to M-4. The proposed amendment is supported and the information should be kept under this number.

B-271 (ES) Magnetic Data. We support both its inclusion and the numbering.

B-271 (NL) You might add text B274 with B271 text

B-271 (NZ) We could not see where TR A1.6 was included. We don't think that TR A1.6 is required in M-4 and is better suited to remain a TR.

B-271 (ZA) It is recommended that this specification NOT be deleted but added at B-274.

B-271 (BR) Yes, it would be better if included here (B-271)

B-272 (ES) Magnetic anomalies. Taking into account the possibility of confusion with submarine cables, we think it better to leave magnetic anomalies in black.

B-272 (ZA) Although cosmetic, I see no reason why all magnetic data should not be shown in magenta.

B-272 (BR) This HO agrees that magnetic anomalies should be charted in black.

B-272.1 (NZ) We define how the annual rate of change is to be expressed as follows: When the annual rate of change is less than 30 seconds the expression 'nearly stationary' is to be shown. Between 30 seconds and 1 minute, 'slightly increasing' (or 'decreasing') is shown and when the annual change exceeds 1 minute, the actual figure is given. Is this common practice and therefore worth defining in M-4?

B-272.2 (DE) Germany propose to change the scale from 1: 2 000 000 (former 1: 750 000) into 1: 1 500 000, because on several charts of this scale we already show isogonals.

B-272.2 NL agrees with wording new text

B-274.1 (DK) There is no real need to change the symbol now (after more than 20 years in use if remembered correctly).

B-274.1 (NL) we prefer to maintain the black symbol

B-274.1 (NZ) We agree that magnetic anomalies should be charted in black.

B-280 (DK) The Depth Unit Conversion Table should be moved to B-412 (to be in line with the tidal level and tidal stream tables as stated in B-281).

B-290 (NO) Source Diagrams We have no opinion against transferring this text from Section B-100 to Section B-200 be as proposed.

B-290 (DK) I have no strong feelings about that.

B-290 (ES) ZOCs We agree to transfer source diagrams to this section.

B-290 (NL) we have no objection against transfer B100 to B200

B-290 (NZ) We agree that the sections on source and ZOC diagrams should be moved to B-290.

B-290 (ZA) This transfer is NOT recommended and should be retained under B-170.

B-290 (BR) Yes, this specification should be transferred to section B-200.

**More General remarks**

(DK) In general I support the revision of the M-4 Section B-200 as drafted in your CL17/2004

Also I do agree that the text from the TRs should be included in M-4 and consequently deleted from the TRs

Even though I generally support your proposed revision I have some comments. The first one being a generic one and the others are referred to the specific paragraph in M-4

The first thing is that I am not in a position to determine whether or not the English language and punctuation is used correctly in the written text. So I am not going to comment on that. In my opinion that should be left to decide by the countries with the English language as their mother tongue. But my impression is that the specifications do not need a comprehensive editorial revision if the resulting meaning and understanding of the content is the same.

What I am trying to say is that unless new subjects have been added or existing subjects are either obsolete or amended there is no need for an editorial revision.

It is also my impression that even though the specifications are made more and more specific there will always be a need for the cartographer to deviate from the rules. It is after all left to the individual Hydrographic Office to decide what suits their interest and their users interest the best.

(FI) We do not see anything to add to the proposal of CL 17/2004

(US – NOAA) Mr. Jones, I am a cartographer in the Quality Assurance, Plans and Standards Branch of the Marine Chart Division (National Ocean Service). Your name was provided to me from Mr. Robert Heeley for the purposes of forwarding the attached *.pdf* file.

**Description of Attached File:**

The attachment:

1. provides the Marine Chart Division's comprehensive documentation and specifications for the application of the International Hydrographic Organization's international border (and neatline) to Marine Chart Division nautical charts,
2. represents specifications adapted from the official IHO publications [i.e., INT2 - Borders, Graduation, Grids and Linear Scales, Edition 1990; and M - 4 (Regulations of the IHO for International Charts and Chart Specifications of the IHO), Edition 1988], and
3. represents specifications developed by the Quality Assurance, Plans and Standards Branch (QAPSB) of relevant items left to the discretion of each individual Hydrographic office (e.g., type font and size, minor subdivision unit to be indicated, etc.).

NOTE: Specifications provided for the application of the international format to existing charts (i.e., New Editions) will vary from the specifications which are provided for the application of the international format to New and Reconstructed MCD charts. [See

Section 2.10.1.2(A)]

(DE) after examining the more than 40 pages new B-200 version and the Australian reply I can give you the German statements as following.

In general we can live with the Australian wording quite as we could work with the version of Andrew and Peter. If you want to adopt the changes proposed by Australia we can agree with only little recommendations and exceptions:

(NZ) Excellent work on the draft update to M-4 Section 200. Well done.

(ZA) One has become so accustomed to the original specifications that when studying the draft revision the need is realized to speed up the process to publish the revised specifications ASAP. The secretary has done an excellent job and he needs to be commended on his efforts.



Andrew and members of the CSPCWG,

1. If you are going to print the Australian reply of B-200, ensure that you have ticked the print options: Tools/Options/Print - tick 'Comments' and 'hidden text' and then all the comments will be printed on the last page of the printout. Colour laser is best for this print to show what has been suggested by Australia. All proposed additions or alterations have been made using track changes and there are numerous comments for consideration, or provide explanations for the proposed changes to the wording.

2. Despite the numerous suggestions, Australia is very supportive of the draft B-200 prepared by Peter and Andrew, especially with the inclusion of TRs and other issues that have been around for years. One concern we have with the TR wording, is the introduction of new terms such as 'It is recommended that ...' In the review of B-100 we agreed to a 'strength of wording' in B-120.4. Australia strongly suggests that the CSPCWG 'interprets' the TR wording to comply with B-120.4. If we do not do this, it leaves the interpretation up to MS, which must be avoided in specifications. The specifications should not require further interpretation but should be as clear and concise as possible. (Most of the examples with proposed changes relating to 'strength of wording' have been highlighted in blue in the attachment for approval or otherwise).

3. When TSMAD undertook a major review of the S-57 Use of the Object Catalogue for S-57 E3.1, which contains similar encoding rules but for ENC's (but more prescriptive in many cases), we found we had to introduce some special terminology for certain cases. For paper charts it is optional to encode many features. However if an HO wishes to encode them, M-4 needs to specify how this is done. The 'strength of wording' becomes quite important in such cases. TSMAD calls this a conditional 'must' statement. Take for example the elevation of a light in B-471.6, which is optional for paper charts. S-57 UOC 12.8.4 states:

'If it is required to encode the elevation of a light on a fixed structure, it must be done using the attribute HEIGHT.'

An example of where this could be applied to M-4 Part B is in B-261.2

B-261.2 The magnetic circle is optional. For further particulars on the

showing of magnetic data, see also B-272. When it is desired to add a magnetic circle, the pattern shall normally be as in specimen a.

Using a combination of S-57 wording and B-120.4 wording, this section could be reworded as:

B-261.2 If it is required to chart a magnetic circle, its pattern shall preferably be as in specimen 'a'. (see also B-272 for further information for charting magnetic data).

This type of statement has already been used in B-233.2 "If a secondary grid ... is shown, this should be portrayed in magenta ..."

In other examples, stronger wording may be used such as 'shall be' or 'must be'.

4. Australia is not suggesting that the S-57 wording is the only way to go, but if the M-4 wording can be simplified and made more precise, we have a great opportunity to do this in these reviews. Many users of M-4 also use S-57 and the ultimate solution would be to use identical terminology.

5. Three independent Australian reviewers of B-100 and B-200 have all made comments about using decimals instead of commas within this specification. If charts indicate decimals in text, these specification should also do the same. Applies to B-212.6 (yellow highlight - Word symbol decimal point added to these examples). A few other examples also exist in B-200.

6. B-241.3 The proposed wording is very untidy and does not agree with terminology used in INT 1 IA. Suggested wording is:

The geographic location and the chart title: The general location of the chart should be specified above the chart title. Countries which do not use the Roman Latin alphabet should also print an additional chart title in Latin characters.

7. We have suggested that consideration be given to moving B-390 into B-200 as charted diagrams also have an impact on the chart framework.

8. Australia supports the transfer of Source Diagrams to B-200.

(See attached file: AHO review 1 B-200.doc)

# PART B

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## SECTION 200

**CHART FRAMEWORK**  
**(FORMATS, POSITIONS, COMPASS ROSES, SOURCE DIAGRAMS)**

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**SECTION 200 – CHART FRAMEWORK  
(FORMAT, POSITIONS, COMPASSES, SOURCE DIAGRAMS)**

**RECORD OF CORRECTIONS**

| Specification Number   | Amendment Number | Circular Letters |             | Remarks   |
|--|------------------|------------------|-------------|---|
|  |                  | Promulgated by   | Approved by |   |
| Section 200 Preliminary Edition                                    | ?                | 33/1981          | ?           | Adopted by 1982 Conference, Decision No. 23.  |
| B-212.C-B-213.B<br>B-232-INT 2<br>B-254.2-B-260<br>B-262.1-B-272.3 | ?                | ?                | ?           | Included in Cumulative Correction No. 1/1986  |
| Section 200 1988 edition   | ?                |                  | ?           | New loose-leaf edition - including symbols from chart INT 1 and editorial updating. |
| B-252  | 1/1990           | 47/1990          | ?           | New sentence added to the paragraph.  |
| <b>Section B-200</b>   |                  |                  |             | <b>Draft revision July 2004</b>   |
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## CONTENTS

**Section 200 – CHART FRAMEWORK  
(FORMAT, POSITIONS, COMPASS ROSES, SOURCE DIAGRAMS)**

- B-201** Ellipsoid (**spheroid**) of reference and horizontal datum  
**B-202** Indication on charts of relationship of **horizontal datum to world-wide and other datums**  
**B-203** Projections
- B-210** Scale, graduation, graticule  
**B-211** Scale  
**B-212** Graduation  
**B-213** Graticule
- B-220** Linear scales, dimensions  
**B-221** Linear (graphical) scales  
**B-222** Dimensions
- B-230** Geographical positions, grids  
**B-231** Geographical positions, differences between charts  
**B-232** Corner co-ordinates  
**B-233** Rectangular grids
- B-240** Title, notes  
**B-241** Title block  
**B-242** Cautionary and explanatory notes  
**B-243** Reference to other publications
- B-250** Numbering, marginal information  
**B-251** Chart numbering  
**B-252** Date of publication and **corrections-updates**  
**B-253** Copyright legend  
**B-254** References to other charts  
**B-255** Other marginal information
- B-260** **Specimen** compass roses, **compass roses**, bearings  
**B-261** Compass roses: patterns, true and magnetic  
**B-262** Compass roses: size and position  
**B-263** ~~Quoted~~ ~~b~~ Bearings: conventions
- B-270** Magnetic data  
**B-271** **Magnetic data:** source material  
**B-272** **Magnetic data:** symbols  
**B-273** **Magnetic data:** corrections  
**B-274** Abnormal magnetic variation
- B-280** **Depth unit** conversion table  
**B-281** **Other tables**
- B-290** **Source Diagrams....etc?**  
**B-291** Purpose of source diagrams  
**B-292** Scales of charts which should have Source diagrams  
**B-293** Graphical representation of limits of surveys

- B-294** Detail of sources: date and scale
  - B-295** Detail of sources: origin and type
  - B-296** Source lists
  - B-297** Zones of Confidence (ZOC) diagrams
  - B-298** Dual-purpose diagrams
  - B-299** Not currently used
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**SECTION 200 - CHART FRAMEWORK (RK  
(FORMAT, POSITIONS, COMPASS ROSES, SOURCE DIAGRAMS)**

**B-201 ELLIPSOID (SPHEROID) OF REFERENCE AND HORIZONTAL DATUM**

B-201.1 IMO Safety of Navigation Circular 213 defines a horizontal datum (also known as a geodetic datum) as follows:

‘A horizontal datum is a reference system for specifying positions on the Earth’s surface. Each datum is associated with a particular reference spheroid that can be different in size, orientation and relative position from the spheroids associated with other horizontal datums. Positions referred to different datums can differ by several hundred metres.’

B-201.2 The **World Geodetic System (1984) (WGS84)** shall be used as a basic worldwide reference system for for all new nautical charts and new editions, until an adequate alternative geodetic datum is adopted by the relevant international organizations to be used as the international geodetic reference system for cartographic work on land and sea areas.

Note: ~~The~~ WGS84 is the system ~~upon~~ to which the Global Positioning System (GPS) is ~~referenced~~ **referred** and it is therefore essential that nautical charts use this reference. (adapted from TR B 1.1)

B-201.3 Internationally recognized **regional datums or local datums** may continue to be used for the graduation of existing **paper charts** in areas where they apply; however, a transformation adjustment to WGS84 shall be included on any such chart (see B-202). Such charts shall be converted to WGS84 at their next new edition. For ENC’s the horizontal datum must be WGS84.

B-201.4 ~~The International Hydrographic Bureau will act as the central point for distributing WGS transformation constants provided by Hydrographic Offices.~~

**IHO Publication S-60 ‘User’s Handbook on Datum Transformations Involving WGS84’**, contains transformation constants and formulae to relate local and regional geodetic datums to WGS84. (S-60 has been derived from a comprehensive Technical Report (TR8350.2, 3rd edition, 4 July 1997, corrected to 6/03) published by the National Geospatial Agency (NGA) of the United States and provided to the IHB).

Reproduction of formulae, transformation constants and related local and regional datums does not imply that these data have been officially adopted by the concerned States or by the IHO. Member States are encouraged to refine their own transformation parameters and to report these to the IHB.

*[B-201.4 derived from preface to S-60 (Ed 3). IHB to Cancel TR B1.1 (Purple wording from TR)]*

**B-202 INDICATION ON CHARTS OF RELATIONSHIP OF HORIZONTAL DATUM TO WORLD-WIDE AND OTHER DATUMS ~~THE INTERNATIONAL REFERENCE DATUM~~**

**B-202.1 All charts at scales larger than 1:500 000** shall include a legend in the title block (see B-241.7) indicating the name (and date, if appropriate) of the geodetic datum upon which the graticule is based. ~~It is recommended that charts at scales larger than 1:500 000 shall bear a legend indicating the name and date (if appropriate) of the geodetic datum upon which the graticule is based.~~ The WGS year, for example WGS84, shall be stated on charts of a scale larger than 1:50 000.

**B-202.2 Appropriate transformation notes** (commonly titled **SATELLITE-DERIVED POSITIONS**) shall be inserted, in black, on ~~It is recommended that~~ all charts at scales larger than 1:500 000 ~~shall carry appropriate transformation notes~~ to enable the navigator to use directly, or to convert to chart datum and vice-versa, satellite-derived geographical positions which are in the world-wide datum. ~~They should also be inserted on smaller-scale charts if the difference between the datum used and WGS84 datum is plottable at the scale of the chart. Where differences are insignificant, or the chart is not based on a single homogeneous datum, the note should so state. Transformation notes should also be included to facilitate transfer between charts on different datums within the same area.~~

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~~It is recommended that, where a chart is based on a local datum rather than the regional datum, an additional transformation note shall be added to enable the navigator to convert positions on the regional datum to chart datum and vice-versa.~~

B-202.3 **A suitably worded transformation note** shall be inserted into the title area of the relevant charts, in black, ~~It is recommended that the following standardized wording be used for the appropriate transformation notes:~~

- a. For charts based on WGS84 datum, or a datum compatible with WGS84, or where the shift is not plottable at chart scale:

**SATELLITE-DERIVED POSITIONS**

Positions obtained from satellite navigation systems, such as GPS, are normally referred to ~~the World Geodetic System (WGS)~~ WGS84 Datum. Such positions can be plotted directly on this chart.

- b. For charts on which the relationship between WGS84 Datum and the local datum cannot be determined:

**SATELLITE-DERIVED POSITIONS**

Positions obtained from satellite navigation systems, such as GPS, are normally referred to ~~the World Geodetic System (WGS)~~ WGS84 Datum. The differences between satellite-derived positions and positions on this chart cannot be determined ~~for this chart~~. Mariners are warned that these differences MAY BE SIGNIFICANT TO NAVIGATION and are therefore advised to use alternative sources of positional information, particularly when closing the shore or navigating in the vicinity of dangers.

- c. For charts on internationally accepted regional or local datums (including charts on previous World Geodetic Datums, such as WGS72):

**SATELLITE-DERIVED POSITIONS**

Positions obtained from satellite navigation systems, such as GPS, are normally referred to ~~the World Geodetic System (WGS)~~ WGS84 Datum. Such positions ~~must be adjusted by 0.XX minutes NORTHWARD/SOUTHWARD and 0.XX minutes EASTWARD/WESTWARD to agree with this chart.~~

- d. To facilitate transfer between charts on different datums within the same area:

**POSITIONS**

To agree with the larger scale / smaller scale / adjoining charts which are referred to [name] Datum, ~~all latitudes~~ positions read from ~~this chart~~ [number] ~~should be decreased~~ must be adjusted by 0.XX minutes NORTHWARD / SOUTHWARD, and ~~all longitudes should be increased~~ adjusted by 0.XX minutes EASTWARD / WESTWARD.

Notes for examples c) and d), above:

- v. The figure to be inserted at XX **shall be** the mean value over the charted area, normally to two decimal places of a minute, of the correction to be applied. On scales larger than 1:15 000 the datum shift values should be given to three decimal places of a minute, provided the datum shift is accurate enough to support it. On scales of 1:500 000 and smaller, the values should be given to one decimal place of a minute, if the difference between the datums is plottable at the scale of the chart.
- vi. Where the shift is in one direction only, the reference to the other direction should be omitted.
- vii. The datum shift value may also be quoted as a unit of distance, in addition to minutes of latitude/longitude, e.g. 0.08 minutes (approximately 96 metres).
- viii. A worked example may also be included to illustrate the application of the shifts.

~~In the notes at a. and b. above, the WGS year, WGS72 or WGS84, shall be stated on charts of a scale larger than 1:50 000.~~

**B-202.4** The note specified in paragraph B-202.3c may be expanded to include also the name of any **earth-based electronic navigation system** in those exceptional cases in which such a system both:

a. provides positions of very high accuracy in the charted area, and

b. refers those positions to ~~the~~ WGS84.

*[Is B-202.4 still relevant? Australian reply: NO, suggest removal. Original wording was inserted in TR at request of Portugal, for differential Omega, which is now discontinued. Loran C is still in use and receivers may have the ability to output position in WGS84.]*

*[IHB to Cancel TR B2.10 (Purple wording from TR)]*

**B-202.5 Chart Accuracy.** In many parts of the world, even the most recent data available may have been gathered when survey methods were less sophisticated than they are now and the achievement of accuracy currently available with GPS was not possible. In these areas, GPS positions available to the navigator may be more accurate than the charted detail. Therefore, in such circumstances, the following note may be combined with the appropriate note at B-202.3:

However, due to the age and quality of some of the source information, such positions may be more accurate than the charted detail.

## **B-203 PROJECTIONS**

A projection can generally be regarded as suitable for large scales if the chart will be identified within decimals of a mm to the chart that might have been drawn on any other survey projection, and any suitable grid will plot as a system of practically straight lines on the chart. This will be the case when the projection meets the conditions that its rectangular grid (N,E) or (X,Y) is a function of the Earth's graticule ( $f ?$ ) or ( $?f$ ) and that it has its central meridian, standard parallel, or point of origin within a few hundred km of the area charted.

**B-203.1 Charts of scale 1:50 000 and larger** may be compiled on any suitable projection, taking into account the possible advantages of using the surveying projection or **the rectangular grid that** used by the national mapping authorities. In latitudes approaching  $75^\circ$  the limiting scale **may** be larger than 1:50 000, **to minimize apparent distortions.**

**B-203.2 Charts of scale smaller than 1:50 000** shall be compiled on the Mercator projection. Exceptions to this rule may be necessary in high latitudes, **where the Mercator projection is unsuitable because of gross distortions.** For example, the conformal Polar Zenithal Stereographic projection, which shows parallels as concentric circles and meridians as equally-spaced lines radiating from the pole, may be suitable for charts in latitudes beyond about  $70^\circ$ .

**B-210 SCALE, GRADUATION, GRATICULE**

**Note:** For high latitudes it may be necessary to make exceptions to the guidance in paragraphs B211-213 ~~paragraph~~.

**B-211 SCALE**

The **natural scale** is the ratio between the linear dimensions on the chart and the actual linear dimensions represented, taken at the intersection of spheroid and projection-plane(s); usually the mid-latitude or **central meridian of the chart**. ~~scale parallel(s): Normally;~~ Natural scales using multiples of 1 000 or 2 500 e.g. 1:100 000; 1:12 500 ~~are to-should~~ be used for all charts.

~~On charts on Mercator projection~~ The **latitude of reference** should be specified for charts on the Mercator projection. This latitude **should** be the mid-latitude of the chart, or in the case of a series of adjoining charts, the mid-latitude of the area concerned.

See B-241.4 for the description of chart scale as it appears in the title block.

**B-212 GRADUATION**

The **graduation** is the division and subdivision of latitude and longitude shown in the borders of a chart at the outside of the neatline. All charts and plans ~~are~~ shall preferably be graduated. Exceptionally, a plan may be graduated on 2 sides only; or it may be left ungraduated if it is of very small size or if the numbering of the graduation becomes impracticable, e.g. if successive half-minute ticks do not occur within the limits.

**B-212.1** The **pattern of graduation** varies with the scale of the chart. See INT 2 for the particulars and for illustration of the terms used, e.g. the various intervals, dicing length, mitred corners ~~in examples T and U~~.

**B-212.2** The **neatlines of charts** should be located on exact graduation (sub) divisions.

**B-212.3** **Minor subdivisions of border graduations** **should** show, where appropriate to the scale, decimals of a ~~or seconds~~. *[Can we try to eliminate seconds, to try and standardize on the use of decimals of a minute?] Australian reply: 2 decimals of a minute are appropriate for charted neat lines as text, and complies with INT 2, but more accurate values will be required for chart databases, etc. Australia agrees to deleting the reference to seconds here.* Sub-divisions to 2 decimals of a minute **should be** used for charts or plans at a scale of 1:25 000 or larger. Where only small portions of such minor sub-divisions are shown, these should be applied adjacent to meridians and parallels:

- in N latitudes above and in S latitudes below the parallel
- in W longitudes to the left and in E longitudes to the right of the meridian.

On a plan where there is no meridian (or parallel), one suitable tenth-minute division should be subdivided into hundredths of a minute, preferably near the centre of the border graduation.

**B-212.4 Equal intervals** of subdivision, numbering and dicing **should be** given for latitude and longitude. All meridians and parallels shown **shall** be numbered. The interval of graduation numbering **shall be** chosen from the sequence 00,5' ? 01' ? 02' ? 05' ? 10' ? 30' ? 1° ? 5°, such that the numbers are not less than about 20mm apart.

**B-212.5 High latitudes.** If the chart extends to a latitude beyond 70° it may be necessary to subdivide the longitude graduation at a ~~wider~~ **greater** interval than the latitude. In these instances, similar patterns should not be used to denote dissimilar intervals unless the ratio of the lengths of latitude units to longitude units is 5:2 or greater. The dicing should continue to represent the same interval of latitude and longitude.

**B-212.6 Graticule values.**

**The graticule** is the network of lines representing meridians and parallels on the chart.

a. **Degrees:** At scales larger than 1:500 000, degree values should be quoted in the form 51°00' rather than 51°, for example. Additional degree values should be inserted (preferably at a meridian or parallel) to satisfy the **following requirements** :

- The degree value should appear in each half of a folded chart
- Where there is only one whole degree value falling within the limits, one appropriate graduation tick should be additionally numbered with the next lower degree value, as well as the minutes value
- Where the one whole degree value on a side not requiring folding occurs close to a corner, the degree value should be shown again at one of the numbered minutes.

b. **Minutes:** To encourage the correct reporting of positions, minute values lower than 10' should be expressed in the form 01', 02', 03', etc.

c. **Tenth-minute values:** Where two whole minute divisions do not fall within limits (e.g. on a small plan), certain tenth-minute ticks should be numbered as follows:

- If neither a whole degree nor whole minute tick falls within limits, the degree value should be added at a half-minute tick (if there is one), or otherwise at a tenth-minute tick near the centre of the border graduation.
- The numbering of tenth-minute ticks shall be in minutes and decimals, the decimal value not appearing without its minute value and being on the same line as it, e.g. **02.4**'. A whole minute occurring in a border graduation containing tenth-minute values should be in the form **02.0**', not 02'.

**B-212.7 Hemisphere labelling.** A reference to the hemisphere should be shown, preferably in the lower border. This may be in the form 'Longitude East/West from Greenwich' or the letter E or W, as appropriate, may be used instead of the full legend. It should be positioned on a meridian (preferably a graduated one if there is supplementary graduation, see B-212.10) near the centre of the border graduation. On charts comprised only of plans, one hemisphere label on the plan which forms the lowest border of the chart will usually be sufficient (unless there is potential for confusion with plans located on both sides of the Greenwich meridian).

**B-212.8 Border breaks.** Border graduation breaks (or chart windows) to insert significant features lying just outside the limits of the neatline should preferably not extend beyond the thick outer border line, and shall not extend beyond the outer marginal information. In such cases, the neatline should be broken for a whole number of graduation units, with the graduation divisions indicated on the inside of the outer border wherever possible.

**B-212.9 ~~Charts with a second fold and~~ Skewed charts.** ~~Charts with a length in excess of 980 mm may carry a subsidiary graduation along a meridian or parallel. See example N in diagram INT 2.~~ The graduation of skewed charts (i.e. not North/South oriented charts) shall follow the pattern of the supplementary graduation (see B-212.10).

**B-212.10 Supplementary (subsidiary) internal graduation** may be used for skewed charts (see B-212.9). They may also be inserted on other charts (particularly those with additional folds) to facilitate plotting. This is particularly useful for users when the chart is folded back, so that the border graduation is not accessible.

Supplementary graduated meridians and parallels should be spaced not more than 450mm apart. Any plans with a side longer than 450mm should also include additional internal graduation. The graduations shall be labelled at the same interval and using the same style as in the main border graduation, with longitude labels normally above the parallel and latitude labels normally to the right of the meridian. At intersections of graduated meridians and parallels, latitude labels (with N/S qualifier) should be inserted to the right of the meridian and below the parallel, while longitude labels (with E/W qualifier) should be inserted above the parallel and to the left of the meridian. At the intersection of a graduated line with an ungraduated line, the latter may be broken to insert a label.

**B-212.11 Inset plans** should be compiled with their outer borders parallel to the neatline of the main chart sheet and at equal distances from it when near its corners. (See also INT 2 example D)

## **B-213 GRATICULE**

The **graticule** is the network of lines representing meridians and parallels on the chart.

**B-213.1 Meridians and parallels** shall be shown not more than ~~20 cm~~ 230mm apart and not closer than ~~10 cm~~ 130mm. They should be numbered and shown at equal intervals and shall preferably be at values which are multiples of the evenly numbered interval, e.g. 24', 28', 32', not 25', 29', 33'.

**B-213.2 Meridians and parallels** should be as unbroken as possible and names, legends and notes should be placed clear of them. Where this is unavoidable, however, meridians and parallels will may be broken, e.g. for the title of the chart, for names, , soundings, symbols, and small reefs, and also for compass roses, notes, diagrams and tables.

**B-213.3 On graduated plans,** at least one meridian and one parallel should ~~are to~~ be shown; ~~also on ungraduated plans if practicable.~~



**B-213.4** **On charts with a non-rectangular graticule** the neatline **should** follow the graticule. However, if the neatline is drawn as a rectangle, additional meridians and parallels may be drawn close to the border, to draw attention to the curvature of the graticule. The central meridian shall be drawn perpendicular to the N and S borders of the chart, or as near to that as possible.

**B-220 LINEAR SCALES, DIMENSIONS**

**B-221 LINEAR (GRAPHICAL) SCALES**

Linear scales shall be in the same units of measurement as the chart and should be shown in accordance with the following rules (see INT 2 for patterns, etc):

- Charts on scales smaller than 1:80 000: no scales.
- Charts and plans on scales 1:80 000 and larger: scales in the borders.

Linear scales shall be sited clear of folds and important detail; a folded chart shall carry the appropriate scales in each half. The length of the scales depends on the space available, and the labelling interval on the length.

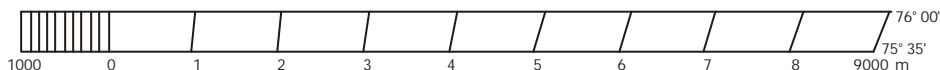
**B-221.1 Border scales should be** between 200 and 450 mm long. The exact length is calculated for the scale at the mid-latitude of the chart.

The main advantage of border scales is that chart information is not obscured.. Scales should be placed in both borders as it is convenient when using the chart folded back.

**B-221.2 Additional scales** may be shown if considered useful to the mariner. The dicing of scales should not be done, except where the unit is directly related to the graticule (sea-miles, cables).

**B-221.3 In high latitudes** exceptions may be made to the above specification, e.g. a sliding scale as shown below, or the showing of more than one scale, each of which must be used in a specified latitude zone.

Scale



**B-222 DIMENSIONS**

A0 (1189 x 841mm) shall preferably be the maximum paper size used for nautical charts.

**B-222.1 The neatline dimensions** should be either 1100 x 750mm or 980/1100 x 650mm, subject to the minor variations required to locate charts' neatlines on exact graduation sub-divisions (see B-212.2).

In exceptional cases the maximum neatline dimensions permissible are 1110 x 760mm. In this case, border graduation breaks shall not be permitted (see B-212.8)

**B-222.2 Charts having titles outside** their north border should have the N/S one neatline dimension 25 mm shorter than standard, to accommodate the title.

**B-222.3 The dimensions shall be quoted** in brackets in the lower right-hand corner in millimetres to one decimal place. The east-west dimension shall be quoted first, e.g. (649,7 x 980,3 mm) is an upright ('portrait') chart.

**B-222.4** Where convergence is measurable and the neatline follows the meridian, the lengths of both borders shall be quoted, the length of the north border being given above that of the south, e.g.

(648,2  
x 979,6mm)  
(650,3

**B-222.5** Charts with the longer side running east-west are in 'landscape' format. They are convenient for use on chart plotting tables and are therefore the preferred format in scheming decisions.

**B-230 GEOGRAPHICAL POSITIONS, GRIDS****B-231 GEOGRAPHICAL POSITIONS, DIFFERENCES BETWEEN CHARTS**

*See B-202. [this has now been included at B-202, so that the examples of transformation notes are grouped together, and excessive repetition is avoided]*

**B-232 CORNER GEOGRAPHICAL CO-ORDINATES**

The geographical co-ordinates of the inner neatline of the chart shall preferably be labelled in the lower left- and upper right-hand neatline corners, as shown in INT 2, to facilitate cataloguing of the charts for both manual and automated cataloguing systems. They shall preferably be expressed either to 0,01' or the nearest second on scales larger than 1:500 000 and 0,1' on scales = 1:500 000, and rounded outwards, where necessary.

**B-233 RECTANGULAR GRIDS**

A (rectangular) grid, as distinguished from a graticule, is a referencing system on a flat plane in which points are defined by their distances from two straight axes at right angles to one another; these two distances, measured usually in the same unit, are called co-ordinates.

**Rectangular Grids** may be distinguished as Primary or Construction-Grids and Secondary or Reference-Grids.

**The Primary Grid** is the grid appertaining relating to the projection used; it may serve as the construction-framework of the chart. The Mercator projection does not need a construction-grid, its graticule itself being rectangular and straight-lined.

**A Secondary Grid** is one that is superimposed on the chart for other (e.g. military) reference purposes. Grids usually usually have no practical interest for the marine navigator and a grid note ~~could~~ should make this clear.

**B-233.1** If the primary grid is shown, it shall be shown in black, by short ticks in the chart borders ~~of large-scale charts~~ (see INT 2), ~~example S~~. The ticks should be 100 mm apart on the chart and the 8 ~~corner~~-ticks nearest the corners should be labelled.

**B-233.2** If a secondary grid (e.g. Universal Transverse Mercator (UTM) or a national mapping grid) is shown, this should be portrayed ~~done~~ in magenta with longer ticks, possibly all labelled, at distances representing 1000m or multiples, appropriate to the scale of the chart. A grid note, also in magenta, should be added to the chart's explanatory notes, explaining the incidence of grid letters, the number of last digits omitted, an example, etc. The note may be included in a diagram showing the incidence of grid letters. Sometimes this ~~note-diagram~~ can conveniently be combined with a source diagram (see B-178).

Secondary grid ticks and accompanying explanatory notes may be shown in black, especially where no primary grid ticks are charted. If two secondary grids are shown on one chart, e.g. because of a change in zone, the labelling of one of these should be distinct. For example in italics, *or one should be in black and the other in magenta.*

Grids should not be shown on charts of scale smaller than 1:~~80 000~~ 100 000.

**B-240 CHART TITLE AND NOTES****B-241 CHART TITLE**

The titles of charts shall preferably be arranged in one block, located in the land area if possible, but must be clear of essential detail. It ~~should be translated into English or French and if the more important information cannot be inserted on the face of the chart, it may be printed on a slip of paper pasted on the back of the chart.~~ *IHB to Cancel TR B2.15 (Purple wording from TR)* The chart title shall include the following items, reading from top to bottom:

**B-241.1 Seal (or Crest).** Most Hydrographic Offices print their seal on the chart, usually above the chart title.

**B-241.2(I) On international charts** the seal of the producer nation and the IHO seal shall be placed above the title, side by side and of equal height, with the producer nation's seal on the left. In the case of an adopted international chart, the printer nation's seal shall be placed between the seals of the producer nation (to the left) and the IHO (to the right); the latter two seals shall be 1/5 smaller in height than the seal of the printer nation.

The words 'INTERNATIONAL', or equivalent, above and 'CHART SERIES', or equivalent, below the seals shall also be shown on international charts.

**B-241.3 Geographic location:** (e.g. FRANCE – NORTH COAST) and the specific geographical reference to description of the area shown, i.e. the formal unique chart title ~~proper~~. It is recommended that countries which do not use the Latin alphabet print an additional title of the chart in Latin characters. *IHB to Cancel TR B2.15 (Purple wording from TR)*

**B-241.4 Scale note.** The natural scale of the chart shall be shown using a colon, thus:

SCALE (or equivalent) 1:10 000

~~Where applicable~~ For Mercator projections, the mid-latitude or scale parallel shall be added, in brackets or in the form 'at lat 21°30' (Note: no hemisphere identifier is required). See also B-211.

**B-241.5 Unit of measure for depths** shall be stated together with a general statement about the vertical chart datum used (see B-405).

**B-241.6 Unit of measure for heights** shall be stated together with a general statement about the plane(s) of reference used (see B-302). Distinctions should be made as appropriate for drying heights (B-413), clearance heights (B-380) and heights of lights (B-471.6), if these are referred to a different datum.

**B-241.7 The name (and date) of the horizontal datum** used for the chart shall be stated. A statement, as appropriate, about the conversion of geographical positions to the international reference system and the internationally recognized regional datum shall also be included. See B-201 and B-202 ~~and B-231~~.

**B-241.8** The IALA Maritime Buoyage region for the chart shall be stated, e.g. 'IALA Maritime Buoyage System - Region A (Red to port)'. If the navigational marks within the chart area, or part of it, have not been converted to comply with the IALA system, this should be stated in a cautionary note.

**B-241.9** The name of the projection used shall be stated (see B-203).

**B-241.10** A note citing the sources or authorities may be either noted in the title or the note may refer to a separate Source Diagram. See B-170.

## B-242 CAUTIONARY AND EXPLANATORY NOTES

~~Other than~~ In addition to those already mentioned in B-241, cautionary and explanatory notes shall preferably be added to or located near the chart title. Such a block-arrangement has cartographic advantages and assists the mariner in locating important information.

~~For obvious reasons~~ Notes should be kept down to a minimum and be as concise as is compatible with accuracy and intelligibility. Hydrographic terminology (jargon) should be avoided, giving preference to easily understood words, e.g. 'depths' rather than 'bathymetry'.

**B-242.1** **Headings.** Notes, especially cautionary notes, shall preferably have an informative title heading for reference. This title should, where possible, be derived from the description as used on the chart, e.g. '~~Gas Pipelines~~' or '~~Production Platforms~~' 'Access Restricted a' 'Deep Water Route'. This practice is regarded as being more informative and easier for reference than having numbered notes or cautions.

**B-242.2** **Specimens** of various notes are given elsewhere in these ~~pertinent~~ specifications and should be adapted to suit national requirements.

**B-242.3** **Cautionary notes** shall normally preferably be printed in the same colour as their subject, e.g. notes about wrecks, currents, magnetic anomalies, etc, in black; notes about exercise areas, anchorages, reporting points, etc, in magenta. Exceptions include notes referring to differences between horizontal datums and notes which refer to two or more features which are charted in different colours. (See B-140 to B-146 for more information about colour conventions.)

**B-242.4** **Translation.** If space permitson non-English language charts, cautionary notes shall preferably be duplicated in English under the national wording. See also B-241.

**B-242.5** **Explanatory notes,** as distinguished from cautionary notes, include those mentioned in B-241 and also notes on the kind of light-ranges shown, glossaries of terms, etc.

**B-243 REFERENCE TO OTHER PUBLICATIONS**

A reference to other publications may be added as marginal information, e.g. outside the border in the upper right-hand corner. A specimen is given below:

Refer to relevant Sailing Directions, List of Lights and other publications to supplement the information shown on this chart. For general information on navigation, charts and hydrographic publications see The Mariners' Handbook. For an explanation of chart symbols and abbreviations see Chart INT 1.

For references to other charts **and other marginal information, see B-250 to B-255.**



**B-250 CHART NUMBERING, MARGINAL INFORMATION****B-251 CHART NUMBERING**

The numbering of charts within national chart series is a matter for national discretion. National numbers shall preferably be printed in black in the lower right-hand corner of the chart and, inverted, in the upper left-hand corner.

~~For the identification of latticed charts see B-603.~~

**B-251.1(I) International medium and large scale charts** shall carry international chart numbers shown in magenta, in Arabic figures, with the prefix 'INT'. The international number shall be placed next to or above the national number ~~in the lower right hand corner of the chart and, inverted, in the upper left hand corner.~~

**B-251.2(I) International numbering numbers** shall be agreed by the groups of hydrographic offices who devise the regional schemes of medium and large scale international charts, e.g. the MBSHC. This numbering shall follow the principles described in paragraphs 2.8 to 2.13 of the 'Regulations of the IHO for International (INT) Charts' (see Part 3) M-4 A-204 and M-11.

**B-252 DATES OF CHART VERSIONS AND UPDATES**

~~It is resolved that~~ Where applicable, charts shall always bear the date of their original publication, that of the ~~last~~ latest edition, and the year date and numbers of the Notices to Mariners, if any, which originated the updates. *IHB to Cancel TR B2.14 (Purple wording from TR)*

The wording of the following notes shall be left to national discretion. See ~~B-128~~ A-401 for the definitions of terms referring to the issue of charts.

**B-252.1 The publication note** (publisher's imprint), which should include the date of the chart's original publication, shall preferably be placed in the centre of the lower margin of the chart. Copyright acknowledgements (see B-253), or reference to the original chart in the case of adopted charts (see B-252.4), should be placed underneath the publication note.

**B-252.2 New editions.** Notes giving the date, and if desired the number, of the current edition shall be shown in accordance with national practice. The preferred position is to the right of the publication note or in the lower left-hand corner of the chart, with other updating details.

**B-252.3** ~~Small corrections~~ **Notices to Mariners**. Charts shall ~~also~~ bear the legend ‘Notices to Mariners’ in the lower left-hand corner, outside the border of the chart, where the mariner can insert the relevant references for corrections carried out on the chart following their appearance in Notices to Mariners (NMs).

Charts **should be** brought up to date to the day they leave the Hydrographic Office. At the time of despatch, each chart shall have a stamp or note indicating the **last NM included, or the** date of the last group of NMs consulted for its correction, even if this group and possibly preceding groups did not contain any updates to the chart in question. This stamp or notation **should** state very clearly the name of the Hydrographic Office concerned. ~~All particulars about corrections, either by reprint or manually, are to be shown in the lower left hand corner of the chart. IHB to Cancel TR B2.14 (Purple wording from TR)~~

**B-252.4** ~~(+) Adopted International charts~~. On adopted ~~international~~ charts the publication note **shall** be amplified by the following, **or equivalent**, note:

For international charts:

‘Modified reproduction of INT (...INT number...), **originally** published (...date of the ~~producer's~~ edition of the producer’s chart which has been adopted..) by (...name of the producer nation...)’.

For national charts:

‘Modified reproduction of (...country...) chart (...producer’s national number...), published (...date of the edition of the producer’s chart which has been adopted...)’.

**B-252.5** **Print date:** many nations also indicate the date the chart was printed. When provided, this date shall preferably be located in the upper right-hand corner, outside the border of the chart. When a chart is reprinted, all Notices to Mariners numbers are removed from the lower left-hand corner of the chart as the updates will have been applied to the chart before the reprint.

**B-253** **COPYRIGHT LEGEND**

This **may** be shown in accordance with national practice. **When data has been included from other nations’ charts, acknowledgment of the owner’s copyright **must** be made, in accordance with any bilateral arrangement between the Hydrographic Offices. (see also B-252.1). It is normally located underneath the publication note.**

**B-254 REFERENCES TO OTHER CHARTS**

Hydrographic Offices should include reference to similar or larger scale charts published by their own nation, on the chart *IHB to Cancel TR B2.13 (Purple wording from TR)* These references fall into three categories:

- a. References in the border of the chart to adjoining charts of the same or similar scale.
- b. References to larger scale chart and plans or the overlap of insets, which cover part of the area covered by the main chart.
- c. References to larger scale charts on ZOC diagrams (see **B-177.7 I**).

**B-254.1** **Border references** shall preferably be shown in magenta and be worded ‘Adjoining chart...’, or equivalent.

**B-254.2** **The limits of larger scale charts, and plans or insets** should be identified by numbered outlines in magenta, or by the legend ‘see Plan’ if the plan is on the same sheet. If there is more than one inset on a chart, they should be labelled A, B, C etc, and have letter identifiers added to the reference on the main chart. For insets, the reference ‘see Plan’ should be added within the area of overlap with the main chart.

A charted outline may be other than the actual neatline limits where it is desired to show that a water area is not charted in detail at the larger scale (e.g. because it is cut off from the main sea area, or an area is covered by a series of chart notes, tables or source diagram).

A legend such as ‘see Chart...’ may be inserted useful if the limits are not extensive, so that (e.g. if a chart number cannot be shown within or immediately adjacent to the limits).

An index of larger scale charts may be used in place of charted outlines in some instances, e.g. in the case of numerous charts forming a coastal series, where the exact limits of each one are of less consequence. This may be combined with another diagram if space is limited, see **B-178**.

**B-254.3(I)** **References to INT chart numbers** may be included with the international number, in brackets, e.g. Adjoining Chart 1234 (INT 4321).

**B-254.4** **References to foreign charts.** When a hydrographic office considers that its own chart coverage, at various scales, is not adequate for all navigation needs, reference should be made to those foreign charts, preferably original national charts, which would usefully supplement the coverage. Reference should include the identity of the publishing authority (as a two-letter ISO national code), in front of ~~with~~ the chart number. (see S-62) [*ref TR A1.19*]

In particularly important cases, the national Chart Catalogue and Sailing Directions should also refer to the foreign charts mentioned ~~paragraph 2~~ above. *IHB to Cancel TR B2.13 (Purple wording from TR)*

**B-254.5** If there is a **horizontal datum** difference between scales or adjoining charts, the legend ‘(see Note – POSITIONS)’ or equivalent may be added to the chart number reference, in magenta, and the relevant note included on the chart (see B-231).

**B-255 OTHER MARGINAL INFORMATION**

**B-255.1** The term marginal information, as used here, refers to all information shown between the neatline and the outer edge of the paper. ~~Paragraphs B-212.8, B-221.1, B-222.3&4, B-233.1&2, B-243, B-251 to B-254 refer. See also B-603 for marginal information on latticed charts.~~ Most marginal information has been covered in the preceding specifications.

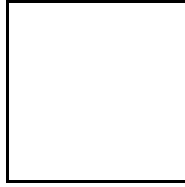
~~**Graticule and grid.** For the border and all figures connected with the graticule and grid, see B-2102, B-22033 and INT-2.~~

**B-255.2 Units.** Those member countries whose chart series contain charts showing depths in fathoms and/or feet may wish to include a note, e.g. 'DEPTHS IN METRES', 'DEPTHS IN FATHOMS', or equivalent, on their charts and this is left to national discretion. If required, such notes should be shown in large magenta capitals, in the top and bottom margins.

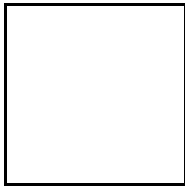
**B-255.3 Horizontal datum.** A legend to quickly draw the mariner's attention to the horizontal datum, for its use with satellite navigation equipment, (e.g. 'WGS84 POSITIONS can be plotted directly on this chart' or simply 'WGS84'), may be inserted in large type, in the margins.

**B-260 , COMPASS ROSES and BEARINGS**

**COMPASS ROSE SPECIMENS**



**IB 70**



**B-261 COMPASS ROSES: PATTERNS, TRUE AND MAGNETIC**

In this specification ‘pattern’ means (sub)division, labelling and centre indication. Compass roses only apply to paper charts.

One or more ~~true~~ compass roses shall be shown on each nautical chart in places particularly selected for their use, see B-262.2.

The value of the magnetic variation, together with the year date and the annual rate of change, must be shown on charts, see B-272.

Compass roses shall preferably be shown in magenta in the form shown at B-260 on page 1-200.14, taking note of the fact that these specimens are also illustrating optional features.

**B-261.1 The true circle rose, where combined with a magnetic circle, must be the outer circle; its pattern shall be as shown in the specimens a. and b.**

These specimens also show ~~the~~ optional additions, which are:

- ~~the ‘North Star’ and~~ the outward extensions of the 0°-180° and 090°-270° axes,
- the dotted lines joining 0°-180° and 090°-270°.

Another optional addition, not illustrated, is a 'North Star' (see INT 1 IB).

**B-261.2** The inner magnetic circle rose is optional, ~~but para B-261 above must be complied with.~~ For further particulars on magnetic data, see also B-272.

When it is desired to add a magnetic circle, the pattern shall preferably be as in specimen a.

**B-261.3** A 'points' circle rose, as in specimen c, may be shown in exceptional cases, if required, such as for military purposes. *[Does anyone still include points circles on charts? Note that the specimen in the digital version of M-4 is not a points circle] Australia does NOT use points roses, however it is suggested it be left in the specifications as an option with a real points circle specimen.*

## **B-262 COMPASS ROSES: SIZE AND POSITION**

**B-262.1** The diameter of the ~~true~~ rose shall preferably be 135 mm (to the outside of the standard degree ticks). However variations between 100 to 140 mm diameter, depending on the size and configuration of the chart may also be used – see B-260 specimen a. Smaller roses, preferably of 105 mm diameter, but between 65 to 100 mm diameter may be used on plans or insets, or in order to facilitate positioning on main charts. Specimen b is recommended for sizes smaller than 80 mm diameter.

**B-262.2 Position.** Compass roses shall be distributed so as to limit the sliding distance of parallel rulers etc as much as possible. Ideally, it should be possible to reach all service areas of a chart, including inland fixing marks, by moving a 450mm parallel ruler (aligned on both the bearing and its reciprocal across a compass rose) without any part of the ruler crossing the limits of the chart paper (which takes account of the limitation in size of chart tables, and the possibility of raised edges). For this reason, no part of the rose should be closer than 50mm to the inner neatline of the chart.

If possible, the centre of the compass rose should either coincide with the intersection of a parallel and a meridian or with one of these graticule lines, or alternatively it should be amply clear of them. They should be kept clear of internally graduated meridians and parallels (see B-212.10).

When a non-rectangular projection is used for the chart, the compass roses must be placed parallel to, or coincide with the meridians. This will ensure constant bearings across the whole chart.

When practicle, roses shall be placed free clear of chart folds and of critical features, (e.g. dangers, major buoys, etc). In any all cases, the coincidence of a depth figure with a degree label in the rose or with the variation note must be avoided, ~~Coincidence of a depth figure with the degree graduation should be avoided if possible~~, e.g. by selecting a suitable alternative sounding or in the worst case, displacing a critical sounding (see B-412.2).

Compass roses should not be placed in the approaches to harbour entrances.

Compass roses may be placed in the land area, but for clarity preferably not partly inside and partly outside the land or coloured areas.

Small craft mariners rarely use 450mm parallel rulers and they often fold charts; additional smaller compass roses may therefore be appropriate in areas popular with these mariners.

## **B-263 ~~QUOTED~~ BEARINGS: CONVENTIONS**

Bearings shall be given in degrees from 0° (North) to 360° reckoned clockwise. Bearings should be charted, with the exception of 0°, as three figures, eg 230°, 095°, 005°. This is in accordance with usual navigational practice. Bearings may be charted to ~~within half~~ decimals of a degree, e.g. 096.4°. Only TRUE bearings shall be indicated on charts.

**B-263.1 Bearings from seaward.** The bearings of the limits of sectors of lights, arcs of visibility of lights and alignments of leading lights or of other conspicuous objects shall be given from seaward. ~~When this procedure is not adhered to, the fact shall be~~ expressly stated in each case. In directions for passing off-lying dangers, bearings shall be given from seaward.

**B-263.2 Bearings from landward.** ~~It is resolved that~~ When, in the description of dangers, (e.g. in a Notice to Mariners), the position of an object is given by distance and bearing, the bearing shall always be given from some well-defined and, if possible, permanent mark, from landward, and the word 'from' or its equivalent shall be inserted.

*IHB to Cancel TR A2.6 (Purple wording from TR)*

~~Bearings shall always be quoted such as they appear to the observer from seaward.~~

**B-263.3 Reciprocal Bearings.** Any line drawn on a chart, or observed, bears in two reciprocal directions (e.g. 030° and 210°). Most bearings given on charts shall be expressed from seaward (as stated at B-263.1). Therefore, in most cases, the figure given should be that which the mariner will observe from their ship or measure to plot on the chart. There are a few exceptions to this (as stated at B-263.2, e.g. in the plotting of NM corrections; also, when leaving port a ship's heading on a leading line will be the reciprocal of the charted value). However, in certain cases, both bearings should be charted [e.g. '120°-300°'], for example:

- Some reaches of fairway channels which are marked by a pair of leading marks at either end.
- Recommended tracks not defined by fixed marks.
- Measured distance courses.



**B-270 MAGNETIC DATA**

Of the various magnetic data, **magnetic variation** (also called magnetic declination) is the most important element for the mariner, and the only one that shall be shown on standard navigational charts. Magnetic variation is defined in the Hydrographic Dictionary (S-32) as:

‘The angle between the magnetic and geographical meridians at any place, expressed in degrees east or west to indicate the direction of magnetic north from true north.’

Magnetic models are typically replaced every five years (e.g. 1995, 2000...) termed epochs and charts should be updated accordingly. Magnetic variation can be calculated from computer models, or derived from charts produced by certain Hydrographic Offices or mapping authorities, which show the spatial distribution of magnetic variation values worldwide for the current epoch, by means of lines of approximately equal magnetic variation (termed isogonals). The rate-of-change curves, which are over-printed on such charts, enable values for any point to be extrapolated for any time within the current epoch.

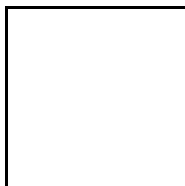
**B-271 MAGNETIC DATA: SOURCE MATERIAL**

The variation and its annual change shall preferably be based on a reliable world model (e.g. derived from ~~the UK or US~~ an authoritative computer program or the current issue of Magnetic Variation Charts).

**B-272 MAGNETIC DATA: SYMBOLS**

**B-272.1** On charts of scale smaller than 1:750 000 and on charts where the charting of magnetic legends inside compass roses is impracticable (e.g. due to the quick succession closeness of isogonals lines, or to the irregularity of their pattern), the variation shall preferably be shown by lines of equal magnetic variation, as follows:

- a. **Magnetic variation lines (isogonals)** shall preferably be shown on the in magenta plate by unbroken lines connecting points of equal variation at 1°, 2°, or 5° intervals so that spacing does not normally exceed 150 mm. These lines shall be labelled with appropriate values of variation and annual change. Isogonals should not be inserted at intervals of less than 1°, because diurnal and seasonal fluctuations in the earth's magnetic field can change the stated variation by up to 1° and, in some parts of the world, the data on which isogonals are based may not ensure the accuracy of charted values to better than ±2°. For similar reasons, if the spacing of isogonals (at 1° intervals) is greater than about 150 mm on the chart, the magnetic variation should be charted as a legend within each compass rose (see B-272.2).
- b. The magnetic variation shall be shown in degrees followed by the letter E or W as appropriate. Where the isogonal line of 0° is charted, it shall be so labelled. The annual rate of change, expressed in minutes and followed by the letter E or W as appropriate, shall immediately follow the variation, in parenthesis brackets.



**IB 71**

- c. A note (in magenta) indicating the 5-year epoch date of the curves lines shall be shown in or near the title block.

MAGNETIC VARIATION CURVES LINES ARE FOR (YEAR)  
 The Magnetic Variation is shown in degrees, followed by the letter W or E, as appropriate, at certain positions on the curves lines. The annual change is expressed in minutes with the letter W or E and is given in brackets, immediately following the variation.

**IB 71**

- d. When isogonals lines are shown, the compass roses shown shall consist of the true rose circle only.

**B-272.2** **On charts of large and medium scale** ~~up to~~ (larger than 1: 2 000 000), magnetic data shall be shown in magenta, normally as a legend within each compass rose. ~~legends, inside the compass roses where roses are shown.~~ These legends may be amplified by the addition of magnetic circles or Magnetic North arrows. However, in cases where this proves impracticable, the magnetic data may be shown,

- By isogonals (see B-272.1)
- By a boxed note in position (INT 1 IB 68.1)
- By an out-of-position note (INT 1 IB 68.2: **exceptionally**, in black when forming part of the title notes, e.g. of a plan)

**B-272.3** **Magnetic legends** inside compass roses should be shown, in magenta, as in the specimens ~~on page 1-200.14~~ at B-260.

The Magnetic North arrow shall be labelled with the value of the variation, the year to which the value ~~appertains~~ applies and, in ~~parenthesis~~ brackets, the rate of annual change of variation. Variation ~~is~~ shall be given to the nearest 5', annual change to the nearest 1'. To both, values E or W shall be added as appropriate. Where the increase or decrease in the rate of annual change is ~~30"~~ 0.5' or less, it shall be shown as (0').

### **B-273** **MAGNETIC DATA: UPDATES**

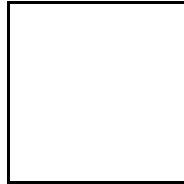
If a hydrographic office finds the values based on its national data differ by more than 45' for variation or more than 3' for annual change from the charts in B-271, the publisher of the latter should be notified, giving the supporting observations accompanied by an overlay showing the proposed correction. If and when the correction is accepted, the publisher **shall** promulgate details as appropriate.

### **B-274** **ABNORMAL MAGNETIC VARIATION**

Abnormal magnetic variation or local magnetic anomalies are local effects superimposed on the Earth's normal magnetic field which cause anomalous variation values. Reports of abnormal magnetic variation should be referred to one of the World Data Centres which exist under the auspices of the International Association of Geomagnetism and Aeronomy (IAGA), to establish whether it is a long-lasting feature, or relates to a temporary phenomenon, usually due to a magnetic storm.

**B-274.1** Permanent anomalies are caused by concentrations of ferromagnetic material in the Earth's crust or, to a more limited extent, by wrecks or man made structures on the sea bed. They should not be charted unless they exceed 3°, because diurnal and seasonal fluctuations in the Earth's magnetic field can change the stated variation by up to 1°, and, in some parts of the world, the data on which isogonals are based may not ensure the accuracy of charted values to better than ±2°.

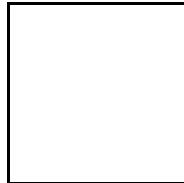
Where the magnitude and extent of permanent local magnetic anomalies have been verified to be greater than 3°, they should be shown by a limiting undulating line with the value of the anomalous variation:



**IB 82.1**

Within the enclosed area the magnetic variation may deviate from the normal by the value shown. Where the magnetic compass is known to be deflected either to the west alone or to the east alone, 5°W or 5°E should be quoted, rather than +5° or -5°, to reduce the ambiguity resulting from either a W or E 'normal' variation in the general area. Where the deflection may be in either direction it is expressed as ±5°. In all cases, the value quoted for the anomaly shall be the deviation from the normal magnetic variation expected for the area.

**B-274.2** Where local magnetic anomalies have not been investigated in detail, an appropriate legend should be shown, e.g. Local Magnetic Anomaly (see Note) or Area of Magnetic Disturbance (see Note), with further information in an accompanying note.



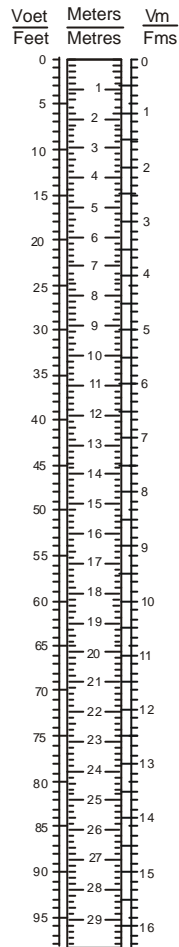
**IB 82.2**

**B-274.3** **Magnetic poles.** Charts of those areas in the vicinity of the Magnetic Poles, where the magnetic compass becomes so disturbed as to be erratic or valueless, should have cautionary notes to this effect inserted in the compass rose, in magenta. The notes should, if possible, refer the user to an appropriate magnetic chart for fuller information.

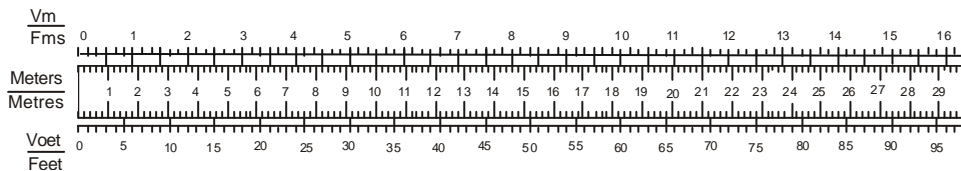
**B-280 DEPTH UNIT CONVERSION TABLE**

Those member countries whose chart series contain charts showing depths in fathoms and/or feet may wish to include a **depth unit** conversion table (metres/fathoms/feet) on their charts. The inclusion of such a table is left to national discretion.

Where shown, the conversion table **should** be in black, in the form of the following specimens, preferably using the upright version, along one or both of the E/W borders of the chart or near the title. The table should preferably be placed **free clear** of folds and **of charted** detail.



Exam-  
ples of  
bilingual  
English-  
Dutch  
conversion  
table.



**B-281 OTHER TABLES AND CHART INFORMATION**

**B-281.1** The depicting other information on charts in tabular form may be considered. In many circumstances, the inclusion of such detail in associated publications, such as Sailing Directions, will be more appropriate; however, examples of tables on charts include the following:

- Table of depths in maintained sections of river channels and canals
- Key to berths, jetties and mooring areas
- Table of clearances under bridges or different sections of a bridge
- Key to new or non-standard symbols
- Glossaries of foreign words, particularly on adopted charts
- Table, in magenta, showing marina facilities (see INT 1 IU 32) may be used on large scale charts covering small craft facilities.

For tidal levels and tidal stream tables, see B-406.

**B-281.2 Sketches and diagrams:** for some charted features, it may be advantageous to provide a detailed sketch or diagram to provide additional information relevant to the mariner. For example, a diagram of a complex curved bridge may provide a clear indication of various vertical clearances between various spans of the bridge. There are some very important lights which it may be beneficial to provide a sketch of how it appears when it is approached. Other examples are in INT 1 IE 3

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**B-290 SOURCE DIAGRAMS** *[To be transferred from B-170?]*

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**Annex D to CSPCWG CL 20/2004**

Response by: .....

| No | Paragraph | Question   | YES/NO |
|----|-----------|--|--------|
| 1  | 212.6b    | Are you content with the revised test? If 'NO', please suggest alternative.  |        |
| 2a | 213.1     | Is it your practice to omit meridians or parallels close to the neatline?  |        |
| 2b |           | Should this option be included in the specifications, as drafted?  |        |
| 3  | 222       | Can we now be prescriptive about the maximum size for chart paper size?  |        |
| 4  | 222.5     | Do you agree that the deleted advice should be included in M-11 (Part A) if opportunity arises?  |        |
| 5  | 242.3     | Should the reference legend 'see Note' always be in the same colour as the note to which it refers?  |        |
| 6  | 252.4     | Do you agree that we consider the issues of print dates, thumb labels and related information in a new 'maintenance' section? (Work item A.8 refers) |        |
| 7a | 255.3     | Is the amended paragraph acceptable pending further consideration?   |        |
| 7b |           | Should the standardization of marginal references to horizontal datum be considered further by Circular Letter?                                      |        |
| 8  | 263       | Do you agree that the specifications about bearings should be moved to B-132, as it is a convention?   |        |

FURTHER COMMENTS (Please add any clarifying remarks, comments or suggestions for alternative text.):