

### **Review of Relevant IHO Charting Specifications – Submitted by the IHB**

In the Annex to this document you will find an extract of the articles relevant to the IHOTC taken from IHO publication M-4.

The IHOTC reviewed these at its 7<sup>th</sup> meeting in 2006 and proposed changes to: B-302.2; B-380.1; B-406.4; and B-407.3. These were forwarded to the Chairman of CSPCWG and have been included in M-4

The IHB suggests that no further action by the IHOTC is required at this time regarding M-4.

## **SECTION 300**

### TOPOGRAPHY

#### **B-302 PLANE OF REFERENCE FOR HEIGHTS**

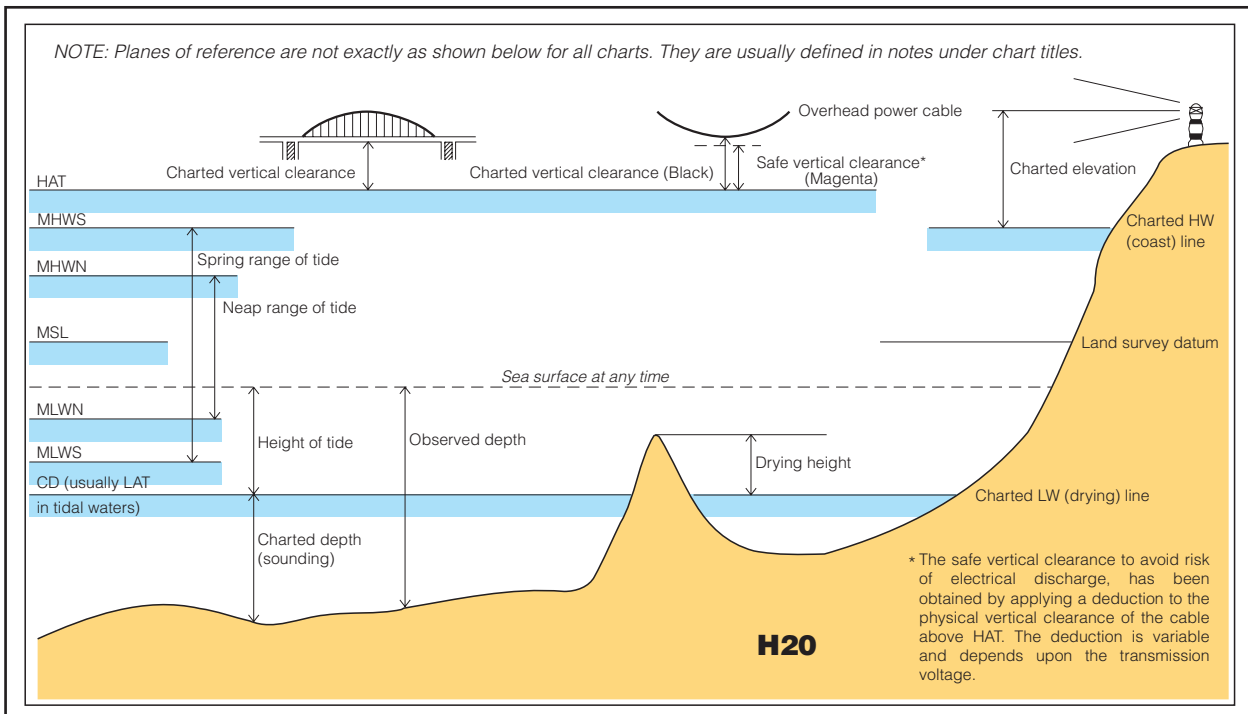
This paragraph **excludes drying heights**, ie heights of features submerged at high water; for drying heights, see B-413.1.

For overhead clearances beneath bridges and other obstructions, see B-380.

##### **B-302.1 The explanatory notes** beneath the chart title shall always quote the plane of reference for heights. See B-241.6.

**B-302.2** The plane of reference for all heights, except drying heights, must be a High Water (HW) datum, such as ‘Mean High Water Springs (MHWS)’ or ‘Mean Higher High Water (MHHW)’. Where there is little appreciable tide at the adjacent shoreline, then ‘Mean Sea Level (MSL)’ may be used.

**Comments:** Technical Resolution A 2.5, paragraphs 1 and 2, resolve that heights on shore and elevations of lights shall be referred to mean sea level. However, the use of a HW datum in tidal areas is necessary for clearances under bridges and is consistent with the definition of the coastline (see B-310). It is also a safety factor for navigators using a quoted height and vertical angle to determine distance offshore. Many IHO members use an HW datum for elevation of lights.



**B-302.3** All height figures relating to features on land shall be upright. Height figures relating to a summit or spot height shall be placed immediately adjacent to the symbol marking the position.

All other ‘out of position’ height figures are to be enclosed in brackets (see B-421), except elevations of lights forming part of a light description (see B-471.6).

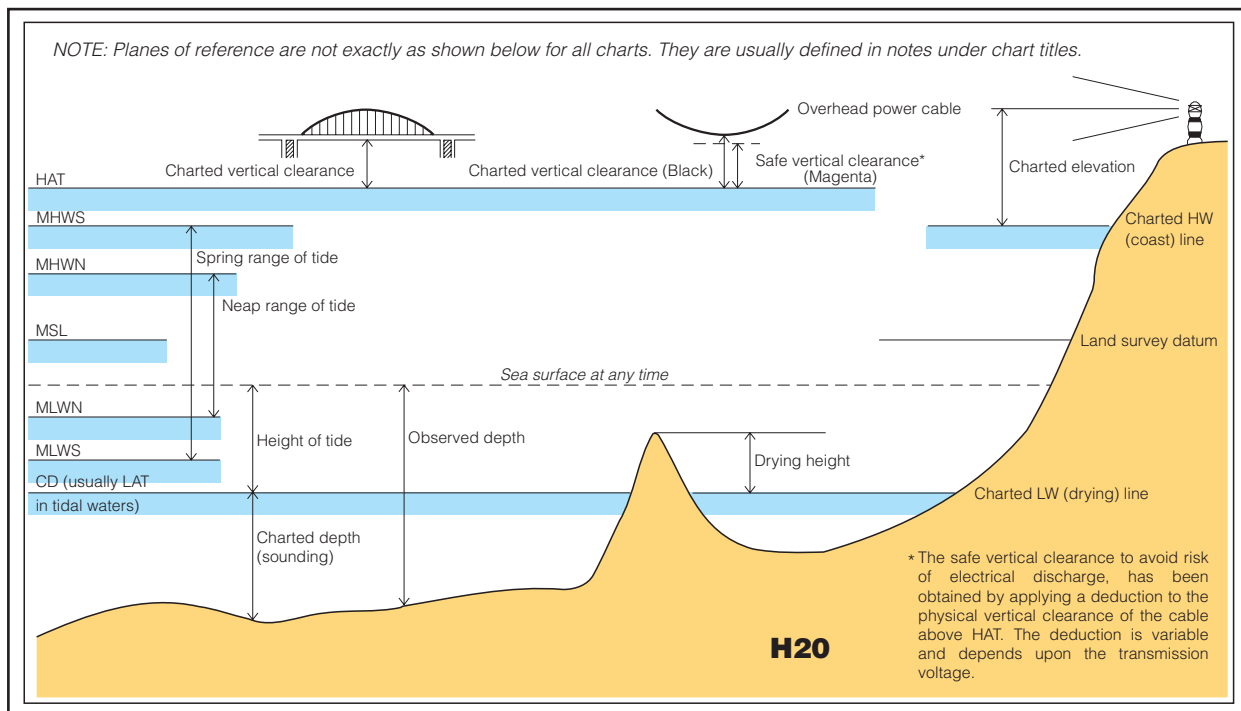


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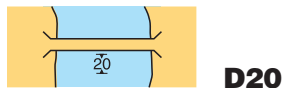
**B-380 BRIDGES AND OVERHEAD OBSTRUCTIONS: CLEARANCES**

A statement of the vertical clearance between (high) water level and any fixed overhead obstruction is always to be given on large scale charts intended for navigation under the obstruction or for detailed passage planning.

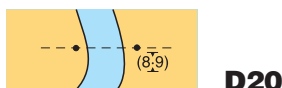
**B-380.1** Vertical clearance : the datum above which clearances are given shall be a high water level, preferably Highest Astronomical Tide (HAT), where the tide is appreciable. It shall be given on the chart rounded down to the nearest whole metre (unless under 10m, when m and dm may be quoted). In areas where the tide is not appreciable it shall be Mean Sea Level (MSL). Necessary variations of significance to the mariner shall be stated on the chart.



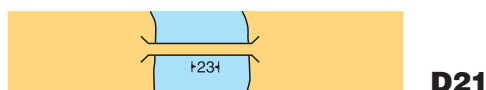
**B-380.2** The figures denoting the vertical clearance shall be charted either alongside the obstruction thus:



or on the adjacent land thus:

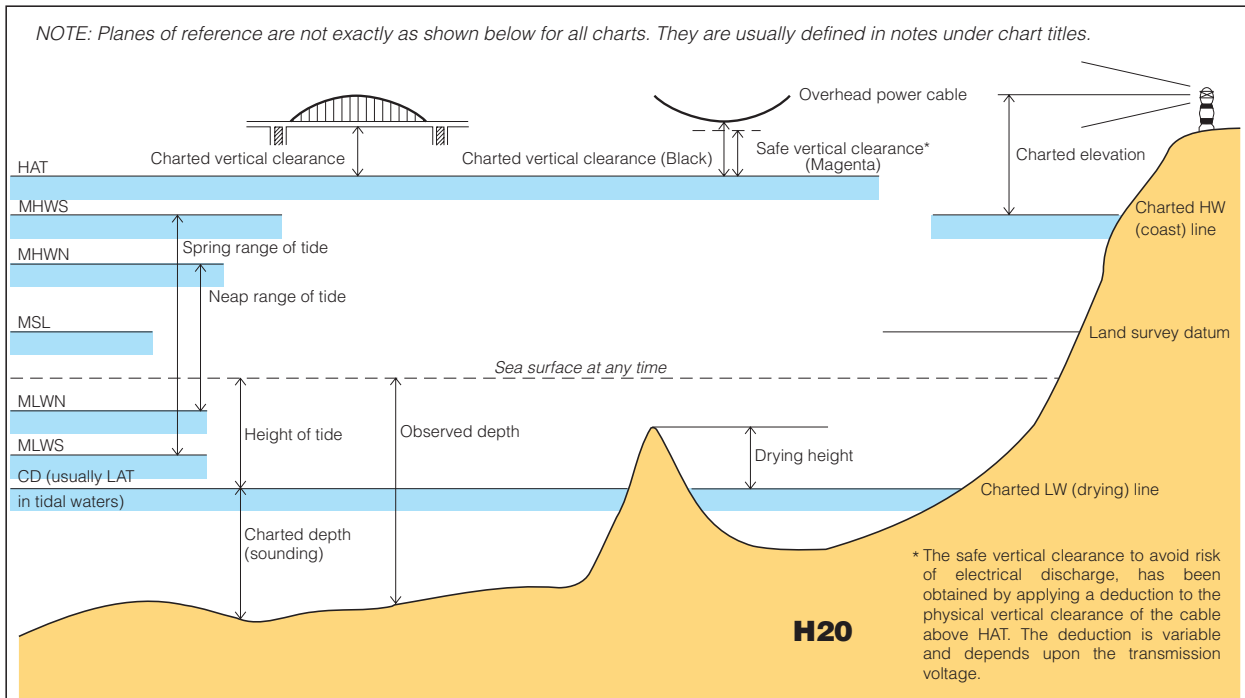


**B-380.3** Horizontal clearance, if shown, shall also be given rounded down to the nearest whole metre, and charted next to the vertical clearance figures thus:



**B-405 CHART DATUM**

Chart Datum (CD) is the plane of reference to which all charted depths and drying heights are related. In tidal areas CD is chosen to show the least depth of water found in any place under ‘normal’ meteorological conditions. CD will vary from place to place in relation to the land survey datum or mean sea level. For further information, see Technical Resolution A2.5.



For an explanation of abbreviations, see INT 1 Section H.

**B-405.1** Uniformity of formulae for establishing CD for different nations would be difficult to achieve and is not essential for practical purposes. A general statement of the datum used must be included in the explanatory notes close to the chart title (see B-241.5) on charts of scale 1:500 000 and larger.

- B-405.2** Where the tidal range is not appreciable, ie less than about 0.3m, CD may be Mean Sea Level (MSL).
- B-405.3** Where the tidal range is appreciable, the Lowest Astronomical Tide (LAT), or as closely equivalent to this level as is practically acceptable to Hydrographic Offices, should be adopted as CD. Alternatively, the differences between LAT and national CD may be specified on nautical documents. If low water levels in a specific area frequently deviate from LAT, CD may be adapted accordingly. Since LAT is the recommended CD with worldwide application, and has the additional merit of removing all negative values from tide tables, this should be adopted as a long term objective, and be considered when opportunity for change arises.
- Highest Astronomical Tide (HAT) should be adopted as the datum for vertical clearances. Alternatively the differences between HAT and national datums for vertical clearances may be specified on nautical documents. If high water levels in a specific area frequently deviate from HAT, the datum for vertical clearances may be adapted accordingly. A HW datum should be used for vertical clearances in non-tidal waters (see Technical Resolution A 2.5).
- B-405.4** In some offshore areas, co-tidal charts and atlases may be available for use as a basis for reduction of soundings (for new surveys) to CD, eg co-tidal charts for the North Sea compiled under the auspices of the North Sea Hydrographic Commission. In depths greater than 200m, a reduction for tide is not necessary.
- B-405.5** **Tide Tables and Chart Datum.** Whatever CD is used, it is essential that it is the same as the datum adopted for the predictions given in the authoritative Tide Tables. Where, over a long period of time, datums are under adjustment to conform to LAT, or to take account of changes in sea level, the changes to Tide Tables and charts should be co-ordinated as far as possible.
- B-405.6** The connection between Chart Datum and land survey datums should not be quoted on charts but should be readily available for the use of surveyors and engineers in national Tide Tables.
- B-405.7** **Rivers and estuaries.** On the largest scale charts it may be desirable to indicate marked changes in CD over short distances by means of a diagram.

## **B-406 TIDAL LEVELS**

The term 'tide' (or its equivalent) is used to designate the periodical vertical movements of water, which are astronomical in origin. In coastal navigation, where the tidal range is appreciable, it is useful to the mariner to know the approximate height of water, above chart datum, which may be found at high and low tide at both springs and neaps. This information, which does not normally change from year to year, must be shown as a table on medium and large scale charts, giving the navigator an indication of the significance of the tide in any area so that he knows when to refer to the Tide Tables for details of tidal heights at any particular time.

- B-406.1** **Places for which tidal levels are given.** On large scale harbour charts, and in harbour approaches, it is likely that only one or two sets of figures are required, identified in the table by the name of the place or places.

On the largest scale continuous coastal cover, figures must be given for the main ports and other places which differ significantly. Not more than 10 places should be shown in the table on any chart. Where some places may be difficult to identify on the chart by name only, and exceptionally where the place does not fall within the limits of the chart, latitudes and longitudes (to the nearest minute) may be quoted in addition to the names.

**B-406.2 Semi-diurnal tides.** The **levels** given in the table must be the mean heights, in metres and decimetres, of high and low water at both springs and neaps. If full information is not available, partial data may be given, eg for springs only. A statement of the height of MSL may be included where this is considered to be useful, eg where MSL is used as the plane of reference for heights (see B-302.2). The table should be in the form of the specimen below, but national variations are acceptable. The order of the columns of heights may be changed to conform with national Tide Tables. As stated in B-406.1, latitudes and longitudes need be given only where useful.

Tidal Levels referred to Datum of Soundings

| Place | Lat.<br>N/S | Long.<br>E/W | Heights in metres above datum |      |      |      |
|-------|-------------|--------------|-------------------------------|------|------|------|
|       |             |              | MHWS                          | MHWN | MLWN | MLWS |
| Rozel | 49° 14'     | 2° 02'       | 10,7                          | 8,2  | 3,9  | 1,6  |

**H30**

The table may be accompanied by a statement of the type of tide, eg ‘tide is semi-diurnal’.

**B-406.3 Semi-diurnal tides with large diurnal inequalities (Mixed Tide).** The **levels** given in the table must be the mean heights, in metres and decimetres, of the two daily high and low waters. A statement of the height of MSL may be included where this is considered to be useful.

The **table** should be in the form of the specimen below, but national variations are acceptable.

Tidal Levels referred to Datum of Soundings

| Place                      | Lat.<br>N/S | Long.<br>E/W | Heights in metres above datum |      |      |      |
|----------------------------|-------------|--------------|-------------------------------|------|------|------|
|                            |             |              | MHHW                          | MLHW | MHLW | MLLW |
| Mina Rashid                | 25° 15'     | 55° 16'      | 1,7                           | 1,8  | 0,8  | 0,4  |
| Dubayy_(Al Maktoum Bridge) | 25° 15'     | 55° 19'      | 1,7                           | 1,3  | 0,7  | 0,4  |
| Ash Shiraqah (Sharjah)     | 25° 22'     | 55° 23'      | 2,0                           | 1,7  | 1,2  | 0,8  |
| Umm Al Qaywayn             | 25° 35'     | 55° 35'      | 1,7                           | 1,5  | 0,9  | 0,5  |

**H30**

The table may be accompanied by a statement indicating the type of tide.

**B-406.4 Diurnal tides.** The **levels** given in the table must be the mean heights of high and low water in metres and decimetres. A statement of the height of MSL may be included where this is considered to be useful.

The **table** should be in the form of the specimen below, but national variations are acceptable.

Tidal Levels referred to Datum of Soundings

| Place            | Lat.<br>N/S | Long.<br>E/W | Heights in metres above datum |      |      |      | Datum and Remarks           |
|------------------|-------------|--------------|-------------------------------|------|------|------|-----------------------------|
|                  |             |              | MHHW                          | MLHW | MHLW | MLLW |                             |
| Baie de Choiseul | 6° 42'      | 156° 24'     | 1,2                           | -    | -    | 0,5  | The tide is usually diurnal |

**H30**

The table may be accompanied by a statement indicating the type of tide.

**B-406.5 Offshore areas where depth is critical.** In areas where vessels may operate offshore with minimal underkeel clearance, the tidal information on charts, and in the Tide Tables, can usefully be supplemented by reference to co-tidal charts and atlases, where these exist. On appropriate charts, a note must be inserted under the Tidal Levels table, as follows:

‘For offshore data see Co-Tidal Chart(s)’ or

‘For offshore data see Co-Tidal and Co-Range Atlas(es)’

or equivalent.

Where detailed tidal data are available for offshore positions, the positions may be identified by a small magenta square with a letter, corresponding to the position quoted in the tabular statement of tidal levels.

- B-406.6** **Areas where tidal range is barely appreciable.** Where on the largest scale continuous chart cover, and larger scales, the tidal range is so small that detailed figures are not required, a note is to be inserted under the title in a form such as ‘Mean Spring range of tide about 0.3m’ or: ‘Tidal range is not appreciable’, or equivalent. Where there is a large seasonal variation in mean sea level, an explanation should be added to the chart, or a note inserted referring the user to an explanation in the Tide Tables or elsewhere.

## **B-407 TIDAL STREAMS**

The term ‘tidal streams’ (French: ‘courants de marée’, US usage: ‘tidal currents’), is used to designate the periodical horizontal movements of the water, which are astronomical in origin. These are distinguished from currents (French: ‘courants généraux’) (see B-408), which are not dependent on astronomical conditions. In practice the navigator experiences a combination of tidal stream and current. Tidal streams are defined by the direction towards which they flow. The terms ‘flood stream’ and ‘ebb stream’ may be used for designating the horizontal movement of the water when the tide is respectively rising or falling. To avoid any ambiguity, in the case of streams which do not turn at about the time of local high or low water, an indication must be given of the direction towards which the stream flows.

**Where tidal streams are predominantly semi-diurnal**, they should be predicted by reference to the times of high or low water at a port for which daily predictions are given in Tide Tables. This should preferably be for a Standard Port, ie a station for which daily tidal predictions are published, and where the tides have similar characteristics to those of the tidal streams under consideration. This information should be shown with the help of tables, which should be included on all charts of scale 1:750 000 and larger. In a few important areas, eg Juan de Fuca Strait, North America, the tidal streams cannot be related to a Standard Port and it is necessary to refer to additional information to predict the rates and directions. This additional information where known, is to be found in the Tide Tables of the areas concerned.

For countries which publish Tidal Stream or Current Tables giving daily information relating to tidal streams referred to the time of the day, reference should be made on the chart to the time of slack or maximum rate at a place for which daily tidal stream predictions are given in such tables.

For races, overfalls and eddies associated with tidal streams, see B-423.

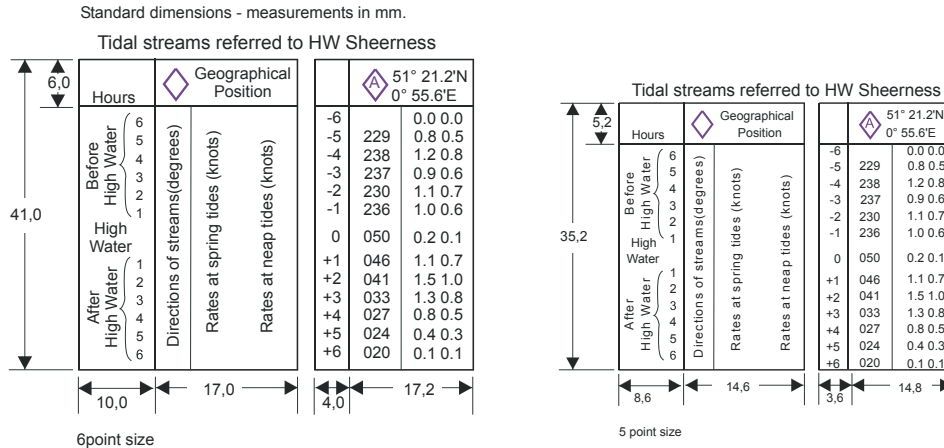
- B-407.1** **Rates** (velocities) of tidal streams should be given in knots to one decimal place. In rivers and estuaries where there are permanent currents caused by the flow of river water, such currents must be included in the calculation of the figures shown in tidal stream tables.
- B-407.2** **Stations** (locations) at which tidal streams have been observed and for which data are to be charted must be assigned reference letters A, B, C,... in some regular order. These letters, enclosed in a diamond outline and printed in magenta, must be inserted in the appropriate positions. Not more than 20 stations should be shown on any chart.





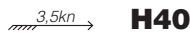
**B-407.3 Tidal stream tables** must be in the form shown below. The 6 point text size is the normal standard size but the 5 point text size may be used where it is essential to save space. Only one Standard Port (port of reference) should be used on any one chart but additional information may be added below the tables if desired, eg ‘H W Hoek van Holland = H W Dover + 3h’ (where Dover is the Standard Port). It may be preferable to place the reference to the Standard Port on one line, centred above the tables. Slack water must be indicated by 0,0 0,0 for the rates in the tables.

The table should be in the form of the specimen below, but national variations are acceptable.

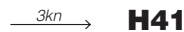


**H31**

**B-407.4 Tidal stream arrows.** Where data are inadequate for tabulated information, or where otherwise required, arrows may be used to indicate tidal streams. A flood tide stream (rising tide) must be indicated in black, by an arrow with tail feathers drawn on one side of the shaft only. The mean spring rate in knots, if known, must be indicated along the upper side of the shaft, eg:



An ebb tide stream (falling tide) must be similarly indicated but the arrow must have no tail feathers, eg:



The length of the arrow must be 10mm.

**B-407.5 Tidal stream diagrams.** Exceptionally, where streams are particularly significant, diagrams showing their strength and direction, at each hour before and after High Water, may be inserted on charts, eg at Dover Harbour (UK).