



## *Geographic eXchange Format*

**ASCII Text Format for Vector Chart Display Data**

**Version 1.25 © Euronav Ltd. 1997-2006**

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## Document History

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1.20	Re-arrangement of object specification to indicate the object bias	
1.21	Correction to the Appendix C data codes. Codes alter from item 5 onwards At time of change only Euronav products use these codes (and have always used the codes given here).	
1.22		
1.23	Added FLOBJ – object is a floating object such as a pontoon	
1.24	Added basic information on S57 support (reference to full S57.3 specification also required)	
1.25	Added more information on ICON in Mark object	

## CONTENTS

<b>OVERVIEW</b>	<b>5</b>
Object Records	..
Layers	..
Charts	..
<b>1. FORMAT DESCRIPTION</b>	<b>6</b>
1.1 Transfer File Set (TFS)	..
1.2 Data Record Conventions	..
1.2.1 Layout	..
1.2.2 Coordinate System	..
1.3 Chart Header File	7
1.4 Layer Files	8
1.5 Single-File Charts	..
1.6 File Conventions	9
1.6.1 Chart Header Filename	..
1.6.2 Layer Filenames	..
1.6.3 Transfer File Set - File Locations	..
<b>2. DATA RECORD DESCRIPTIONS</b>	<b>10</b>
2.1 Chart Header	..
2.2 Layer Directory	..
2.3 Layer Header	..
2.4 MARK Object	..
2.5 LINE Object	..
2.6 POLYGON Object	..
2.7 NUMERIC DATA Object	..
2.8 ARC LINE Object	..
2.9 POINT Object	..
2.10 MAGNETIC VARIATION Object	..
2.11 TIDE REFERENCE Object	..
2.12 TIDE OBSERVATION Object	..
2.13 TEXT Object	..
2.14 END-OF-FILE Token	..
<b>3. DATA RECORD FIELDS - NOTES</b>	<b>21</b>
3.1 Field Order	..
3.2 Comments & Blank Lines	..
3.3 Compulsory Fields	..
3.4 Omitted Fields	..
3.5 RID Field	..
3.6 REF Field	..
3.7 ZOOM Field	..
3.8 FLAGS Field	..
3.9 INFO Field	..
3.10 DIY Field	..
3.11 Alternative Field Tag Labels (“?”)	..
3.12 Layer Directory	..
3.13 MARK Object	..
3.14 ARC LINE Object	..
3.15 TIDE REFERENCE Object	..
<b>4. S57 SUPPORT</b>	<b>26</b>
<b>APPENDIX A: Lookup Codes - GXF MARINE</b>	<b>29</b>
A.1 Colours	..
A.2 Fill Patterns	..
A.3 Line Fonts	..
A.4 Countries	..
A.5 Vertical & Sounding Datums	..
A.6 Horizontal Datums	..
A.7 Objects	..
A.8 Symbols	..
A.9 Top Marks	..
<b>APPENDIX B: Euronav Rich Text (ERT)</b>	<b>58</b>

## OVERVIEW

GXF is an ASCII text format for encoding vectorised geographical data. It has been developed by Euronav Ltd. from a simple text export format, formerly used by its “**seaPro**” range of products.

The principles behind the design of GXF are ...

- **Specific use for geographic objects:** The objects described in the format directly map to geographical features - this is something that many other vector formats (such as DXF) do not handle easily.
- **Ease of understanding & implementation:** The text records defined by the format are easily read by both software and humans!
- **Ease of rendering to a screen display:** Each geographical record contains all the information required for drawing the corresponding feature object.

The data in GXF is stored in three basic constructs ...

- **Object Record:** The basic unit of geographical data, representing a single feature (eg: a depth contour line, or buoyage mark).
- **Layer:** A collection of object records, usually of a similar type (eg: contours at a particular depth).
- **Chart:** A collection of layers, containing geographical data within a defined area.

### Object Records

Each geographical feature is encoded in its own, separate “object” record. As mentioned above, the record contains all the information required for displaying the feature - for example, the colours, fill-pattern, and boundaries for drawing a polygon representing an island. The format describes physical limits by the use of individual (and hence possibly *repeated*) lines and polygons rather than shared, linked lines. For example, in this version of GXF, separate polygons would be used to define land and sea areas, whereas in a linked-vector format (such as S57) shared lines would be used to define the land/sea borders. Storing separate vectors is less data-efficient than the linked method, however it has the following major advantages:

- It vastly improves the *human* readability of the data.
- It avoids the processing overhead (and consequent time delay) involved if display software has to re-build separate polygons before drawing them.

### Layers

The format is based on the data being structured in layers, where each layer consists of header data plus one or more geographical object records - generally of a particular type. Each layer can be self contained and hence treated as an object itself. For example, one layer could contain all the lines and polygons to describe the land areas on a map, while another could be used for the sea depth areas on a chart, another for all the depth soundings in a lake, and so on.

### Charts

Separate layers can be grouped together to form a complete map, or chart of an area. The grouping is coordinated by a block of header data, which references the member layers of the chart, and lists the order in which they should be displayed (ie: the last one in the list should be the last one drawn, and hence *overlay* all its predecessors). For example, a typical chart could consist of separate layers for sea areas at decreasing depths, followed by land, then buildings, and finally place-name text - each drawn over the one before.

## 1. FORMAT DESCRIPTION

### 1.1 Transfer File Set (TFS)

The files containing the data for a single chart are collectively referred to as a “*Transfer File Set*” (*TFS*). This set should consist of the following files:

- A “*Header*” (aka: “*Export*”) file, which defines the file set (see *1.3*, below).
- One or more “*Layer*” data files containing the data.
- An optional “*Information*” file, containing supplementary textual information - eg: a description of the interpretation of any INFO data fields (see *3.7 INFO Fields*, below).

As a TFS often consists of a large number of files, it is recommended that, when stored in a disk file structure, they should be grouped together in a sub-directory (see also *1.6 File Conventions*, below).

As an alternative to the TFS grouping system, a complete, single-layer chart can be contained in a single file - see *1.5*, below.

### 1.2 Data Record Conventions

#### 1.2.1 Layout

All data records in GXF ASCII have the same basic structure, conforming to these rules:

- The record is enclosed in square brackets (“[ ]”). Each bracket must be the first character on a new line.
- A two-letter label code (uppercase), identifying the record type, immediately follows the opening bracket, on the same line. NB: The open-bracket and identifier are referred to as a “record-start token”, and the close-bracket is referred to as a “record-end token”.
- Each item of data is supplied on a separate line, usually in two parts - an identifier tag (uppercase), followed by the actual data (there are exceptions to this - see section *2. DATA RECORD DESCRIPTIONS*, below). NB: A field tag should never be included without data following it.
- Comments may be added, by using two forward-slash characters (“//”). Where these are used, all the text from the “//” to the end of the line is considered to be the body of the comment (and so should be ignored by reader software).

Example ...

```
[ID           // record-start token
// This is comment text.
TAG1 1234     // more comment text
TAG2 data
]             // record-end token
```

#### 1.2.2 Coordinate System

All geographical positions are defined using Longitude/Latitude co-ordinates, where ...

- Positions are always given as longitude followed by latitude, ie: X Y.
- Positive values indicate North and East.
- Negative values indicate South and West.
- Values are given in decimal degrees.
- Values should be separated by a SINGLE space character.

Example ...

```
11.5 -20.25 // This position indicates 11°30' East, by 20°15' South
```

### 1.3 Chart Header File

The header (aka: "export") file for a chart usually consists of two records, and is terminated with an "[EOF]" end-of-file token. The two records are:

- A chart header record [HD], containing the basic chart descriptive data, eg: border limits, source dates, etc.
- A "**Layer Directory**" record [LD], specifying the names of the layer data files, and laying down the order in which they should be drawn (each should be drawn over the preceding layer).

Example ... (for descriptions of the records, see section 2. **DATA RECORD DESCRIPTIONS**)

```
// Chart header data ...
[HD // Header Record
NAME "BA2045"
TITLE "ENGLAND SOUTH COAST: OUTER APPROACHES TO THE SOLENT"
FORMAT GXF
LOOKUP GXF_MARINE
USAGE 0
CELL 0
STYLE 0
OVERLAY 0
CORR 0
ORI 540
S57 0
EARLY 1,1,1925
LATE 1,10,1990
NM 28,8,1997
ISSUE 12,9,1997
HDAT 17
NAVSYS 1
OFFDAT 0
OFFSET 0.00144 -0.00048
AREA
-1.733333 50.832332
-0.654999 50.832332
-0.654999 50.408332
-1.733333 50.408332
END
SCALE 75000
ZOOMMAX 48.293289
ZOOMMIN 0.000001
ASPECT 0.410
UNITS 1
PROJ 2
NEXTRID 10203
NEXTREF 1
]

// Layer files included in the data set ...
[LD // Layer Directory Record
FILE "ba2045\ba2045.000" GXF // Copyright Notice
FILE "ba2045\ba2045.001" GXF // 20 m
FILE "ba2045\ba2045.002" GXF // 10 m
]

[EOF]
```

**NOTE:**

If the chart consists of only one layer, in a single file, extra records may be included between the layer directory record-end token and the end-of-file token (see **1.1** above, and **1.5** below).

## 1.4 Layer Files

A layer file usually consists of at least two records, and is terminated with an “[EOF]” end-of-file token. The records are:

- A layer header record [LY], containing basic descriptive data, eg: border limits, title, etc.
- One or more object data records, in the order in which they should be drawn (each should be drawn after, and so potentially over the preceding one).

Example ... (for descriptions of the records, see section 2. **DATA RECORD DESCRIPTIONS**)

```
[LY // Layer Header Record
NAME "BA2045"
TYPE 96
ID 9
FLAGS 0
VALUE 0.000000
MANDATORY 0
TEXT "Traffic/zone/areas"
ZOOM 24.146645
COL 5
BKCOL 0
STYLE 0
PATTERN 1
]

[LL // Line Object Record
ID 9
RID 7412
ZOOM 24.15
POS
-1.017691 50.702539
-1.010603 50.701745
-1.017691 50.702539
END
]

[EOF]
```

The order in which layers are to be displayed, and the names of the files containing the layer data records, are defined in the chart header file (see 1.3, above).

Important properties of layers are:

- Each layer must be contained in a single file. (If there is a large amount of data for a particular layer, it may be split, for convenience, into a number of *separate*, smaller layers. Each of those layers must be contained in a *separate* file, and all should duplicate the same header record data.)
- Each layer file must only contain data for only one layer.
- Each layer file is self contained, having no explicit reference to any “parent” chart. This allows the layer to be shared between several charts, if required.

## 1.5 Single-File Charts

An alternative to the Transfer File Set (see 1.1, above) method for grouping chart data, is to insert all the data into a single file, consisting of:

- A chart header [HD] record.
- A layer directory [LD] record, which must contain only one file reference, indicating the same file (ie: the chart header file) as the source of the layer data.
- A single layer header [LY] record.
- One or more object data records.
- An “[EOF]” end-of-file token.

For descriptions of the record formats, see section 2. **DATA RECORD DESCRIPTIONS**.



## 1.6 File Conventions

It is recommended that ‘live’ GXF data should be stored in a standard, plain text file format - as opposed to a word-processed, compressed, or other binary file form. This is to reflect and facilitate the intended usage of GXF as a simple, pure-text format, viewable by any text editor software.

The basis of all disk filenames is a “chart code”, which is typically an 8-character (or less) alphanumeric string. This is often taken directly from an existing chart designation - for example “BA2045”. This string is used as a filename “stem”, from which other names are derived ...

### 1.6.1 Chart Header Filename

The chart header filename consists of the filename stem, plus the extension “.GXF”. For example, including a directory path:

```
C:\Charts\ba2045.gxf
```

### 1.6.2 Layer Filenames

The layer filenames usually consist of the filename stem, plus a sequential number for the extension. This is *recommended*, but not compulsory, as the order of drawing is defined in the Layer Directory [LD] record, in the header file (see **1.3**, above). It is also recommended that, if sequence numbers are used, they should always be in the form “.999”, starting from “.001”. For example, including a directory path:

```
C:\Charts\ba2045.001  
C:\Charts\ba2045.002  
C:\Charts\ba2045.003
```

### 1.6.3 Transfer File Set - File Locations

For a TFS, it is recommended that a sub-directory, named after the filename stem, should be created in the same directory as the header file, and used as the location for the layer files. For example:

```
C:\Charts\ba2045.GXF  
C:\Charts\ba2045\ba2045.001  
C:\Charts\ba2045\ba2045.002  
C:\Charts\ba2045\ba2045.003
```

## 2. DATA RECORD DESCRIPTIONS

Unless otherwise specified each attribute has all its parameters specified on the same line.

If a contradiction exists in any of this documentation, then the current GXF implementation as applied to Euronav charting products applies. Developers are urged to view the output from these products as a way of fully understanding the format. The demo products will allow this capability.

### CHANGES / AMENDMENTS

- Differences from version 1.07 are indicated by “\*” marks, against the relevant items.
- See also section 3.11 *Alternative Field Tag Labels*.

### 2.1 Chart Header

[HD		// Record identifier label
VERGXF	<n>	// Version number of the GFX format being used (eg: 1.00)
ENCRYPT	<type> <key>	// Optional security (data after header is encoded using <key>)
* NAM/NAME	“ASCII text”	// Name of chart, eg: “BA2045”
TITLE	“ERT text”	// Chart title (see <i>APPENDIX B</i> )
VER	<n>	// Version number of chart eg: 1.6
FORMAT	<n>	// TO BE DEFINED
S57	<n>	// 1 or 0 If set implies all attribute codes and ID’s are // S57 version III compatible. These are different to those for the // native GXF (although there is a close correlation). // Default is GXF coding i.e Code not usually present.
LOOKUP	<ASCII>	// System of Lookup Codes (default: GXF_MARINE)
CRIGHT	“ERT text”	// Copyright notice (see <i>APPENDIX B</i> )
USAGE	<n>	// Intended usage of chart: 0 = undefined, 1 = sea, 2 = land, 3 = air
OVERLAY	<1/0 flag>	// If 1, data is a chart overlay - otherwise data is a full chart
COR	<1/0 flag>	// If 1, data is a chart correction - otherwise data is a full chart
CELL	<1/0 flag>	// If 1, chart is a Cell (& AREA defines cell area)
STYLE	<n>	// 0 = normal chart, 1 = crosses dateline, 2 = N polar, 3 = S polar
ORI	<code>	// Country of Origin
EARLY	dd,mm,yyyy	// Earliest source data of chart - not used
LATE	dd,mm,yyyy	// Latest source data of chart - not used
NM	dd,mm,yyyy	// Updated to Notice to Mariners date
ISSUE	dd,mm,yyyy	// Issue date of this GXF chart
HDAT	<code>	// Horizontal Datum
VDAT	<code>	// Vertical Datum
SDAT	<code>	// Sounding Datum
NEXTRID	<n>	// Next value of the unique reference (RID) that can be issued
NEXTREF	<n>	// Next value of reference number that can be issued
AREA		// Start label for POLYGON describing coverage area of the chart
<lng> <lat>		// LNG & LAT point coordinates, repeated as required
END		// List terminator token
ZOOMMAX	<nm>	// Diag dist across zoomed display at which chart should be shown
ZOOMMIN	<nm>	// Minimum diagonal distance across zoomed display
NAVSYS	<nav marks>	// Navigation marks: 0=IALA‘A’ or 1=IALA‘B’
OFFDAT	<offset datum>	// If omitted, a default of WGS84 is assumed
OFFSET	<lng> <lat>	// Offset LNG & LAT in degrees between WGS84 and this chart
EQDIST	<lat>	// LAT distance from bottom-left corner of chart to equator
SCALE	<scale>	// Eg: 1:100,000 is given as 100000
ASPECT	<aspect ratio>	// Ratio of LNG to LAT Eg: 0.45
UNITS	<n>	// Distance units: 1 = m, 2 = ft, 3 = fathom+ft, 4 = km, 5 = nm
PROJ	<projection code>	// Original projection

```
PWTOP      <n>           // Paper chart top width (mm)
PWBOT      <n>           // ... bottom width (mm)
PHLEFT     <n>           // ... height (mm)
GRID       <1/0 flag>    // If 1, grid is used (& following fields required)
GRIDSTART  <lng> <lat>   // Grid Start LNG & LAT
GRIDSTEP   <lng> <lat>   // Grid step values in DEGREES
GRIDMINSTEP <lng> <lat>   // Grid sub-step values in MINUTES (+ decimal Seconds)
INFO                               // Optional additional information
]
```

#### **OFFSET Field - Chart datum offset**

The values entered for the offset are in degrees and is the offset WGS84 (or as specified datum). To the chart datum. Normally these are given on a paper chart in minutes, and are given as values to convert from WGS84 to chart datum. Hence these values need to be divided by 60.

For example:

Where the paper chart says objects in WGS84 datum must be moved  
0.01 Southward and 0.06 minutes East to agree with this chart.

The required entry would be (long lat)

```
OFFSET 0.001 -0.0001666 // 0.06/60 and -0.01/60 (negative as south)
Note South/West are (-)
```

## 2.2 Layer Directory

```
[LD // Record identifier label
<layer specification> // Layer identifier, repeated as required - see below
INFO // Optional additional information
]
```

A layer can be defined in the directory in the following ways:

- I. // Format for specifying a single file as a single layer ...  
FILE “filename” <type>
- II. // Alternative, for grouping multiple layer files into a single display layer,  
// adopting the layer identity supplied in the first file ...  
LAYER // Start of layer file list  
FILE “filename” <type> // Repeated as required  
END // List terminator token
- III. // As above, but supplying a specific layer title ...  
LAYER // Start of layer file list  
\* TXT/TEXT “text” // Overriding layer title  
FILE “filename” <type> // Repeated as required  
END // List terminator token

## 2.3 Layer Header

```
[LY // Record identifier label
* NAME “ASCII text” // Name of parent chart, to which this layer belongs, eg: “BA2045”
TYPE <n> // Layer type: 96=Drawing, 100=Text, 104=Tide, 107=MagVar
ID <code> // Associated IHO code or ID
FLAGS <?> // User-defined flag value(s)
ZOOM <nm> // Zoom value (of lowest member object zoom)
AREA // Start label for POLYGON describing coverage area of the layer
<lng> <lat> // LNG & LAT point coordinates, repeated as required
END // List terminator token
MAND <1/0 flag> // If 1, layer is mandatory (must be drawn), otherwise 0
VALIDV <1/0 flag> // If 1, VALUE is valid (VALUE field required!)
VALUE <n> // Any associated value (floating point), eg: depth
* TXT/TEXT “ASCII text” // Title of layer
* TEXTF “filename” // Name of file containing extracts referenced by MARK Objects
COL <code> // Default foreground colour for objects in this layer
BKCOL <code> // Default background colour for objects in this layer
STYLE <code> // Default line font for objects in this layer
THICK <n> // Default thickness of line: 0,1,3 pixels
PATTERN <code> // Default fill pattern for objects in this layer
INFO // Optional additional information
* DIY <1/0 flag> // If 1, layer uses non-standard drawing functions, otherwise 0
]
```

## Attributes common to all objects

Each object to be described consists of a number of attributes (or sub-objects), a number of these attributes are common to all objects. To save multiple descriptions and to ease the application of the specification into an object orientated environment these are described below.

Attribute	Parameter	Description
DELETED	FLAG	If 1, object should be ignored
ID	<code> <s57 attribute ID>//	Associated IHO code or ID – s57 ID optional
AT	<code> <s57 attribute ID>//	Associated IHO code or ID – s57 ID optional
RID	<number>	Unique Record Identifier
REF	<n>	Reference code associating this with other records of same code
FLAGS	<?>	User-defined flag value(s)
ZOOM	<n>	Zoom value in nautical miles of the diagonal distance across the displayed area at which the object will appear. -1 indicates always displayed
AREA	<lng> <lat> <lng> <lat>	Bounding Rectangle of data: Left, Bottom, Right, Top
VALUE	<n>	Any associated value (floating point)
COL	<code>	Color of line
STYLE	<code>	Line font – see appendix
THICK	<n>	Thickness of line or border in pixels (n)
TEXT	Euronav Rich Text format (ERT)	Text, up to 512 characters (see APPENDIX B)
COLTEXT	<code>	Text color
SIZTXT	<n>	Text size n: 0=Normal, 1=Small, 2=Large
RASLINE	<code>	0 for transparent between line elements (default 0) 1 for opaque
BKCOL	<code>	Background color of filled object such as a polygon
PATTERN	<code>	Fill pattern – see appendix
NOFILL	FLAG	1 if object to be drawn in outline 0 draw filled
TRANS	FLAG	1 if this is to be a transparent polygon – fill pattern will be transparent i.e. the bgcolor pattern is transparent 0 Draw with solid fill pattern
BRDVALID	FLAG	1 if border required for filled object 0 No border drawn
BRDCOL	<code>	Color of border line
POS <lng> <lat> ..... <lng> <lat> END	Followed by a sequence of lng lat position values each pair on a separate line  List terminator token for POS	A list of positions that might be used to define a line or a polygon
INFO	DATA list	Additional application specific data, Used by Euronav for adding S57 specific data
DIY	FLAG	Application specific. 1 indicates special drawing function required
FLOBJ	0 or 1	If 1 – indicates object floats on the water

Note: Not all these attributes are used by all objects and may not be implemented, for example lines are not relevant to a mark object.

The base attributes and the specific attributes for an object are always enclosed in the following sequence

```
[ Object name MK etc  
Attributes .....  
.....  
] End of object terminator
```

## 2.4 MARK Object

*Eg: Buoyage marks, lights, place-name text, etc.*

[MK // Record identifier label  
**COMMON ATTRIBUTES – see start of section**

Attribute	Parameter	Description
SYCODE	<code>	Display code for an associated symbol
SYCOL	<code>	Color of symbol (if not present, a default should be chosen)
SYROT	<n>	Any rotation of symbol (in degrees clockwise) from vertical
TOPMK	<code>	Symbol for first top mark
TOPMKO	<n>	Topmark orientation: 0=vert, 1=tilt left, 2=tilt right
TOP2MK	<code>	Symbol for second top mark
TOP2MKO	<n>	0=vert above 1 <sup>st</sup> top mark, 1=tilt left, 2=tilt right, 3=as 1 <sup>st</sup> top mark
BLIT	<n>	Light blip pos = n x 45° - eg: 0=0°, 1=45°, 2=90°, 7=315°, etc
BCOL	<code>	Light blip color
IMGF	“filename”	Name of associated picture file (ASCII text)
TEXTF	“filename”	Name of associated text file (ASCII text)
TEXTFEXTR	<extract ID> <file offset>	Reference to a text file extract
POS	<lng> <lat>	Position LNG & LAT coordinates
SECTOR	<start°> <end°> <colour> <range> <radius> “ASCII text”	Sector light data – all on a single line x x x x x “text”
QTXT	<help file .hlp> <optional help topic index> or <Html file .html or .htm> To display html help file  Note: For Euronav use only	Allows a help file or other file such as html to be attached to a mark. This is displayed directly on clicking with the information button (Euronav oemkit) optional help topic index – set to –1 for contents only. Further capabilities may be added for Acrobat and simple messages.
ICON	<filename> <xoffset> <yoffset> <center> <small icon> <small_icon_distance>	Displays a user defined icon or image for the mark. <filename> name of image file .ext is significant i.e. ico, jpg, bmp etc. <xoffset> left offset in pixels <yoffset> down offset in pixels <center> 1 to center icon (set offsets to 0 0), 0 for top left  <b>small icon</b> – an image to use once zoomed beyond mark zoom (nm) Note: Must be an icon – not an image. <b>small_icon_distance</b> – point at which the small icon disappears
LIGHT		See following specification

LIGHT (Always part of mark object)

**Syntax**

This is an attribute object than can be added to a mark object, there can be as many of these attribute objects as required. Not all attributes need to be present. The light object can be repeated as many times as required for different light sequences/ light arcs etc.

**Important : This object must be AFTER the mark position (POS) setting**

Note:If RAD is set to 0, then this appears as a simple light object.

This replaces the old sector object SECTOR for all new data.

The light characteristics are based on that given in the S57 format ID a description is given after the light format specification below.

**Format**

LIGHT  
[ // Start of object data

Attribute	Parameter	Description
ID		Type of light – flashing characteristics default fixed – see S57 code table below
COL		Color of the light - default white (15)
COL1		Flashing alternative color 1
COL2		Flashing alternative color 2
HT		Height of the light in meters – default 0m
SIGG		Light sequence encoded as (1)(2+3) etc based on id or Morse e.g. (AA) for double A in Morse
GPER		Group period in seconds (total period of light sequence)
RAN		Range of the light in nm
START		Start and end of a defined light sector
END		
TEXT		Light sector text appears close to the sector line <i>Note: This is additional to any mark text</i>
		<b>Following are presentation hints only</b>
SHIFT	x y	x,y Visual display hint on where to display the light (default 0,0)
RAD		Distance to place the displayed light sector (default 0)
LEXT		Length of line delineating sector from next in nm from point
LTHICK		Thickness of line coloring for sector arc display (default 3 pixels)
LSTYLE		Style of line for separation line – default dotted

] // End of command

**Note**

SHIFT x and y values is the shift in Cartesian co-ordinates, the units are generated by the display application based on the graphical object used to display a light

This is a display hint and has NO navigational or physical meaning.



## S57 format ID

ID	Meaning	INT 1	M-4
1	: fixed	IP 10.1;	
2	: flashing	IP 10.4;	
3	: long-flashing	IP 10.5;	
4	: quick-flashing	IP 10.6;	
5	: very quick-flashing	IP 10.7;	
6	: ultra quick-flashing	IP 10.8;	
7	: isophased	IP 10.3;	
8	: occulting	IP 10.2;	
9	: interrupted quick-flashing	IP 10.6;	
10	: interrupted very quick-flashing	IP 10.7;	
11	: interrupted ultra quick-flashing	IP 10.8;	
12	: morse	IP 10.9;	
13	: fixed/flash	IP 10.10;	
14	: flash/long-flash		
15	: occulting/flash		
16	: fixed/long-flash		
17	: occulting alternating		
18	: long-flash alternating		
19	: flash alternating		
20	: group alternating		
21	: Not used		
22	: Not used		
23	: Not used		
24	: Not used		
25	: quick-flash plus long-flash		
26	: very quick-flash plus long-flash		
27	: ultra quick-flash plus long-flash		
28	: alternating		
29	: fixed and alternating flashing		

Above as defined for LITHR in S57 version 3 feature attributes

### Definitions:

fixed: a signal light that shows continuously, in any given direction, with constant luminous intensity and colour. (IHO Dictionary, S-32, 5th Edition, 2780)

## 2.5 LINE Object *Eg: Contour lines.*

```
[LL // Record identifier label  
COMMON ATTRIBUTES – see start of section  
Just uses the base attributes, the POS record defining the line points  
]
```

## 2.6 POLYGON Object *Eg: Land areas.*

```
[PL // Record identifier label  
  
COMMON ATTRIBUTES – see start of section  
Where COL is the color of the polygon  
POS is the list of points making up the polygon  
// The POS...END field may appear only ONCE in this record, to define the polygon's outline.
```

Attribute	Parameter	Description
VOIDPOS <lng> <lat> .... END		Start label of VOID point data LNG & LAT point coordinates, repeated as required List terminator token

]

Note :The VOIDPOS...END field may be repeated as required, to define holes in the polygon.

## 2.7 NUMERIC DATA Object *Eg: Depth soundings.*

```
[NU // Record identifier label  
COMMON ATTRIBUTES – see start of section  
As the base attributes but the POS field has an extra value specifying the value  
UNITS <n> // 1 = metres, 2 = feet, 3 = fathoms & feet  
POS // Start label of point data  
<lng> <lat> <n> // LNG/LAT coords & value (eg: depth), repeated as required  
END // List terminator token  
]
```

**2.8 ARC LINE Object**      *An arc of a circle/ellipse, eg: Sector light.*

[AL                                      // Record identifier label  
*COMMON ATTRIBUTES – see start of section*

Attribute	Parameter	Description
TOPL	<lng> <lat>	Top left of containing rectangle
BOTR	<lng> <lat>	Bottom right of containing rectangle
START	<lng> <lat>	Start position of arc, anti-clockwise (can be outside the rectangle)
STOP	<lng> <lat>	End position of arc, anti-clockwise (can be outside the rectangle)
POS	<lng> <lat>	Optional Position LNG & LAT coordinates (origin of arc)

]

**2.9 POINT Object**                      *Eg: Any object to be represented by a single dot - no symbol.*

[PT                                      // Record identifier label  
*COMMON ATTRIBUTES – see start of section*

Attribute	Parameter	Description
POS <lng> <lat> ..... END		Start of point data (label) LNG & LAT point coordinates, repeated as required List terminator token

]

**2.10 MAGNETIC VARIATION Object**

[MV                                      // Record identifier label

*COMMON ATTRIBUTES – see start of section*

Attribute	Parameter	Description
MAGVAR	<n>	Magnetic variation (degrees x 10 <sup>7</sup> )
RATE	<n>	Annual rate of change (Eastwards, degrees x 10 <sup>7</sup> )
YEAR	<n>	Year of observation
POS	<lng> <lat>	Position LNG & LAT coordinates of observation point

]

## 2.11 TIDE REFERENCE Object

\* New object for version 1.08 ...

[TR // Record identifier label  
**COMMON ATTRIBUTES** – see start of section

Uses common attributes

COLTXT <code> // Text colour  
SIZTXT <n> // Text size: 0=Normal, 1=Small, 2=Large

Attribute	Parameter	Description
PORTNAME	“ASCII text”	Name of reference port
TIMEZONE	<n>	Hours relative to UT (GMT)
UNITS	<n>	Units of tide: 1=metres, 2=feet, 3=fathoms
NEAPMEAN	<n>	Mean neap tide height in units
SPRINGMEAN	<n>	Mean spring tide height in units

]

## 2.12 TIDE OBSERVATION Object

\* Object **RE-DEFINED** for version 1.08 ...

[TO // Record identifier label  
**COMMON ATTRIBUTES** – see start of section

Where

AREA <lng> <lat> <lng> <lat> // Diamond limits: Left, Top, Right, Bottom  
// this is effective influence of the tidal data

Attribute	Parameter	Description
PORTDIFF	<minutes>	Time difference of observation between point and port
FLOWHEADING	<n1> <n2> <...> <n13>	13 (hourly) tide flow HEADINGS (degrees)
NEAPFLOW	<n1> <n2> <...> <n13>	13 (hourly) neap tide flow RATES
SPRINGFLOW	<n1> <n2> <...> <n13>	13 (hourly) spring tide flow RATES
UNITS	<n>	Units of flow rate: 1=knots, 2=mph, 3=kmh, 4=ms
POS	<lng> <lat>	Position LNG & LAT coordinates of observation point

]

### 2.13 TEXT Object

**\* New object for version 1.08 ...**

Note: This is not for text geo-referenced Text, but used as an ‘embedded text file’, normally used for displaying textual information such as chart notes.

[TX // Record identifier label

**COMMON ATTRIBUTES – see start of section**

Attribute	Parameter	Description
TEXT	“ERT text” repeated as many times as required – each text sequence is enclosed within quotes.	Start of text data (label)
END		Text, up to 512 chars List terminator token
		Text, up to 512 chars (see APPENDIX B), repeated as required
END		List terminator token

]

### 2.14 \*Data Record

*Eg: A data set at a given position and time.*

**New object for version 1.10**

[DR // Record identifier label – Data record

**COMMON ATTRIBUTES – see start of section**

//

Attribute	Parameter	Description
DATE	<ddmmyyyy,hhmmss>	Date and time stamp - all fields required
PEN	<mode>	0 = NO change 1 = pen down 2 = PenUp
TEXT	“ERT text”	Text, up to 512 characters (see APPENDIX B)
POS	lng> <lat>	Position LNG & LAT coordinates of data recording
DATA	<data type> <value>	series of data fields – repeated as required See notes for data type identifications
END		Terminator for DATA list

]

### 2.14 END-OF-FILE Token

**NO COMMON ATTRIBUTES – see start of section**

[EOF] // This must always be the last item in any file.

## 3. DATA RECORD FIELDS - NOTES

### 3.1 Field Order

In general, the order in which fields occur within a record is unimportant. The exceptions to this rule are any list fields, which must start with a label, then follow with values, and terminate with the “END” token - for example the “POS” position list field. There should be no interruptions in this sequence, unless they are either comments or blank lines ...

### 3.2 Comments & Blank Lines

Comments (ie: text beginning with “/”, see also *1.2.1 Layout*) and blank lines (ie: lines which are empty, or contain only blank spaces) should be ignored by any reader software, unless they are within text data strings (delimited by double-quotes “”). Comments should be ignored from the first “/” character, to the end of the line. For this reason, comments cannot be inserted between data items on a line.

### 3.2 Compulsory Fields

The only fields which are compulsory for ANY record are ...

- The record-start token, ie: “[HD”, or “[LD”, etc.
- The record-end token, ie: “]”.

### 3.4 Omitted Fields

The handling of omitted record fields depends very much on the application software reading them. In general, any record field NOT supplied should be handled by software EITHER ...

- By implying that a default setting should be used - for example, if the colours for a POLYGON are omitted, then use the values specified in the corresponding layer header.
- By invalidating the record - for example, if a MARK record does not contain a position.

### 3.5 RID Field

The “RID” field is used to hold a unique Reference ID number for a record. The “NEXTRID” field of the Chart Header record (see *2.1*, above) indicates the next number that should be allocated to any object that may be added to the chart.

### 3.6 REF Field

The “REF” field is used to encode an association REFERENCE identifier number. The value may be unique, or it may be duplicated to provide an association of non-mark objects with a group of marks. Uses for this are such as attaching “floating” text marks to area features, eg: islands, etc. The “NEXTREF” field of the Chart Header record (see *2.1*, above) indicates the next REF number that should be allocated to any new grouping of objects that may be added to the chart.

### 3.7 ZOOM Field

Zoom levels are defined as distances, in Nautical miles, and are used to reduce cluttering of the display with unnecessary information. The rule is simply that, if an object’s zoom level is less than the diagonal distance across the portion of the chart currently being displayed, then the object should not be drawn. If a “ZOOM” field level is encoded with a value of -1, it means that the object does not have a level at which it should be hidden, ie: it should always be drawn.

### 3.8 FLAGS Field

The “FLAGS” field allows the incorporation of additional, user-defined data. This field is entirely open to interpretation - ie: it is up to any reading system to either recognise it or ignore it. However, a description of the interpretation must be included in the Information file of the Transfer File Set (see *1.1*, above). This field is intended to be used for holding any important characteristic values not supported by other fields.

### 3.9 INFO Field

One or more “INFO” fields may be included in any record, purely for informational purposes. Each field must be started with the label “INFO”, optionally followed (on the same line) by identifier string(s) indicating the type of data included. This identifier is entirely open to interpretation - ie: it is up to any reading system to either recognise it or ignore it. However, a description of the interpretation must be included in the Information file of the Transfer File Set (see *1.1*, above). After the starting label, a list of data lines can follow, which must be explicitly terminated with the label “INFOEND”. For example, to include S57 (version 3) source data in any object record ...

```
INFO S57.3
* FRID.OBJL 18 // Buoy (Safe Water)
* ATTF 75 4 // Colour, Green
INFOEND
```

### 3.10 DIY Field

As is mentioned in the *OVERVIEW*, GXF is a display-oriented format. As such, it is assumed that application software will incorporate functions for drawing each type of object. The “DIY” flag field - which stands for “Draw It Yourself” - may appear in layer and object records, and indicates that a non-standard drawing method should be used. This allows different applications, or different system modes, to use GXF data in different ways - logically, in conjunction with the corresponding object identifier values. If the DIY flag is set (present, with a value of 1) in an object record, this indicates that *that* object should (conditionally) be drawn differently from normal. If the flag is set in a layer header record, this condition applies to every object in the layer.

### 3.11 Alternative Field Tag Labels (“/”)

Some of the fields described in section 2. contain a “/” within the identifier tag text. This indicates that the tag may have more than one form, most likely to facilitate backwards compatibility, and hence all the alternatives given should be supported. For example, the tag for the *text* field (common to all GXF object records) is specified as “TXT/TEXT”, indicating that the field may appear in the following forms:

- TXT “This is GXF object text.”
- TEXT “This is GXF object text.”

### 3.12 Layer Directory

- The sub-field “filename” can be a single path, or contain wildcards to include multiple files.
- If the reading software re-saves the data, it is expected that any layers read from multiple files will be exported in a *single* file.
- The sub-field <type> indicates the format of the data contained in the file. In this specification, the value of <type> should always be “GXF”.
- It is recommended that a comment should be added after each FILE entry, to indicate what it contains.

Examples ...

```
FILE "data_1\land.001" GXF // Include a specific layer file.
FILE "WATER\lake.*" GXF // Include all files named "lake", any extension.
```

### 3.13 MARK Object

- A mark may contain a reference to text held in a separate file. In the simplest case, this is indicated by the presence of the TEXTF field. If the TEXTFEXTR field is present, this indicates that only an extract of the text file is referenced. The “extract ID” value identifies a label within the text file, and “file offset” provides an additional byte offset option. An extract within a text file is formatted as follows:

```
This is a text file. The following line is a
label indicating the start of a text extract ...
[1013]
This line, and the next one, is within the
extract. The following is the terminator label ...
[-1]
This line is not within the extract.
```

This extract would be referenced as follows:

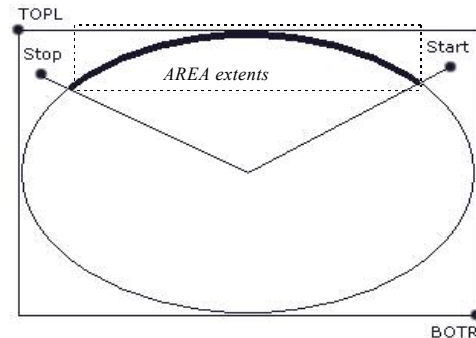
```
TEXTF "lines.txt"
TEXTFEXTR 1013 // The offset value is omitted!
```

If the TEXTFEXTR field is present, without the TEXTF file identifier, the default is to access the file specified by the *layer's* TEXTF field (if given!).

- A mark may contain one or more SECTOR fields, defining light sectors. The first two values are the start and end angles of the sector, in degrees clockwise from zero vertical. Then follows a colour code, a visible range (nautical miles), and a value to use as the radius for display purposes (also in nautical miles). The final value is a string, listing any flashing/signalling characteristics.

### 3.14 ARC LINE Object

- The TOPL and BOTR points delimit a rectangle enclosing a whole ellipse.
- The START and STOP points each define a line, from their position to the centre of the ellipse (ie: the centre of the rectangle).
- The arc to be drawn is defined as the portion of the ellipse between the intersections of the start and stop lines (anti-clockwise).
- The AREA extents rectangle should only bound the arc to be drawn.
- This format is used because it maps very well to the arc line format defined by MS-Windows graphics software. However, this object should be used with care when describing large surface features, as it does not account for the planet being an oblate spheroid. It is recommended for use only to cover small areas (eg: sector lights).



### 3.15 TIDE REFERENCE Object

- Tidal data should be stored in dedicated layers, one for each port.
- Each port tide data layer should only have one TIDE REFERENCE, as the first object record.
- Each TIDE OBSERVATION object in a layer should associate with the TIDE REFERENCE object, via the REF number.



### 3.16 Data Record

- This object is designed for use as a general data holder, to be considered as a more conventional database, each Data Object being a record, with an attached list of records (variable number) Each data object contains the position and \or the date and time stamp of the recording of the data.
- This record is not designed to be directly displayable, but to form part of a database, such as a ship’s log.
- See Appendix C for a list of the data identifier codes
- This object does not need to be supported for charting purposes – it’s a data extension.
- PEN used to indicate how the data may be interpreted as a line. The following values are valid:

1 = Pen Down at this point – this data record is start of a line  
0 = No change  
2 = Pen up after this entry - This point marks the end of a line

### 3.17 Object identification records ID and AT

These are used to specify the type of object the record reefer to. Such as Land contour or a type of mark, this can then be further specified into say the type of cardinal mark, Westerly using the second entry on the line.

Additionally two object attributes can be given:

ID the original type of object identification code (not to be confused with the S57 ID )  
AT an addition code with same format as the ID

AT or ID <Attribute code> <s57 ID>

Attribute codes are those object codes given in the object codes appendix

For the s57 ID please refer to the s57 code documents (light ID’s are given in this document)

For example

ID	254		Pillar buoy
AT	505	2	Beacon cardinal mark – East ( ID of 2)

i.e. This is an easterly cardinal mark on a pillar buoy

## 4. Extension to support raw S57 data

The GXF format is capable of supporting the S57 specification (format used in ENC/ECDIS charts). S57 uses a shared line topology rather than each object having its own pints, lines or polygons. This can be more efficient space wise, but can dramatically slow down the drawing as lines, polygons etc have to be re-created.

Note: A full working knowledge of S57 format, Groups, objects and attributes etc., is presumed, the GXF format simply (!) encapsulated this information, the mapping will be obvious if familiar with the S57 format.

Changes to the header file (.GXF) adds the  
ECDIS flag indicates this is S57 data derived from an ENC  
INFO S57.3-META record Encapsulates the S57 Meta data

Sample layout:

```
ECDIS 1
INFO S57.3-META
*
dsid.expp 1
dsid.intu 3
dsid.dsnm "DE321002.000"
dsid.edtn 1
dsid.updn 0
dsid.uadt 25-10-2002
dsid.isdt 25-10-2002
dsid.sted 3.100000
dsid.prsp 1
dsid.psdn ""
dsid.pred 2.000000
dsid.prof 1
dsid.agen 180
dsid.comt "Formatted by ENCDesigner of SevenCs"
*
INFOEND
]
```

Support for S57 adds an extra layer that is always filename.001, this contains all the vector data

Layer Type is 1000  
Typical header for the layer file  
[ LY  
PROTECT 1  
NAME "DE321002"  
TYPE 1000  
ID 1000  
TEXT "Vectors"  
VALIDV 0  
MAND 1  
ZOOM -1.000000  
COL -1

BKCOL -1  
STYLE -1  
. etc

The rest of the vector layer file consists of the vector data records

VR - Vector data record.

Follows the standard GXF layout with the following fields

VID	Vector identification or key (referred to by objects such as a Mark or contour)
VNAME	The Vector type 110 = isolated node 120 = connected node 130 = edge
POS	Start of the list of positions (one or more)
-1.510800	50.66456
END	

Sample vector data record

```
[ VR  
VID 5541  
VNAME 110  
UNITS 1  
POS  
7.8619170 54.1422670  
7.8659900 54.1469990  
7.9052840 54.1443100  
END  
]
```

### Additions to objects

#### Object positional information

The actual object will now refer to VR (Vector records) for their positional information rather than direct positions. This is done using the extra optional VECTOR entry that has 3 fields per position specified

VECTOR

VID	VNAME	DIRECTION
-----	-------	-----------

VID	Vector record identification in the vector layer (file .001)
VNAME	The Vector type 110 = isolated node 120 = connected node 130 = edge
DIRECTION	Forward or reverse (1 or 0) direction of the vector

For example a line vector

```
VECTOR  
12 120 1  
10 130 1  
11 120 1
```

#### Type of object attributes etc

All of the S57 data associated with an object is encoded with a number of extra fields

This is done using the

INFO S57.3 field

This contains the direct values for the appropriate feature data in S57 – normal S57 coding is used. An INFO FIELD is terminated by

\*

INFOEND

Multiple INFO fields may be used separated by a '\*' – this is typical when a single GXF object encompasses several S57 objects for example a buoy +fog signal. The sequence also represents the master/slave relationship.

LUPT x                      The LUPT sequence references the Lookup table x  
END

Typical example for a Mark

```
[ MK
RID 89
ID 638
TEXT "{ESC16,25,4.000,16}f{ESC16,13,16}S{ESC16,25,4.000}"
ZOOM 4.000000
VECTOR
13342 110 1
END
INFO S57.3
*
foid [180,1007378935,1]
frid 121 1 2
atff 113 "4"
atff 114 "1"
atff 133 "299999"
atff 147 "20010518"
atff 148 "DE,DE,graph,chart87"
*
INFOEND
LUPT 2
974
END
LUPT 3
1401
END
POS 6.9462280 54.1131090
]
```

## APPENDIX A: Lookup Codes - GXF\_MARINE

Various fields in the record descriptions given in section 2. **DATA RECORD DESCRIPTIONS** contain data marked as “<code>”. This indicates that the data is a lookup-code, referencing a table of values (nb: a value of -1 denotes *invalid* or *ignore*). The “LOOKUP” field of the Chart Header record (see 2.1, above) identifies the set of tables in which the meanings of codes are defined.

At present, this GXF specification only contains lookup codes for marine navigation applications - collectively referred to as “GXF\_MARINE”. To indicate that this set of tables should be used, the chart header record should contain the field:

LOOKUP GXF\_MARINE

NOTE: If this field is not present in the chart header record, then it should be **assumed** that GXF\_MARINE codes are to be used.

The LOOKUP field allows data-producers to specify the lookup code nomenclature being used - the only provision being that software must recognise the specifying ASCII text identifier. Future versions of GXF will include extra lookup table sets, provisionally named:

- GXF\_AVIATION - for use with aviation navigation charts
- GXF\_SURVEY - for use with land-based geographical survey data

Examples of other, user-defined alternatives could be:

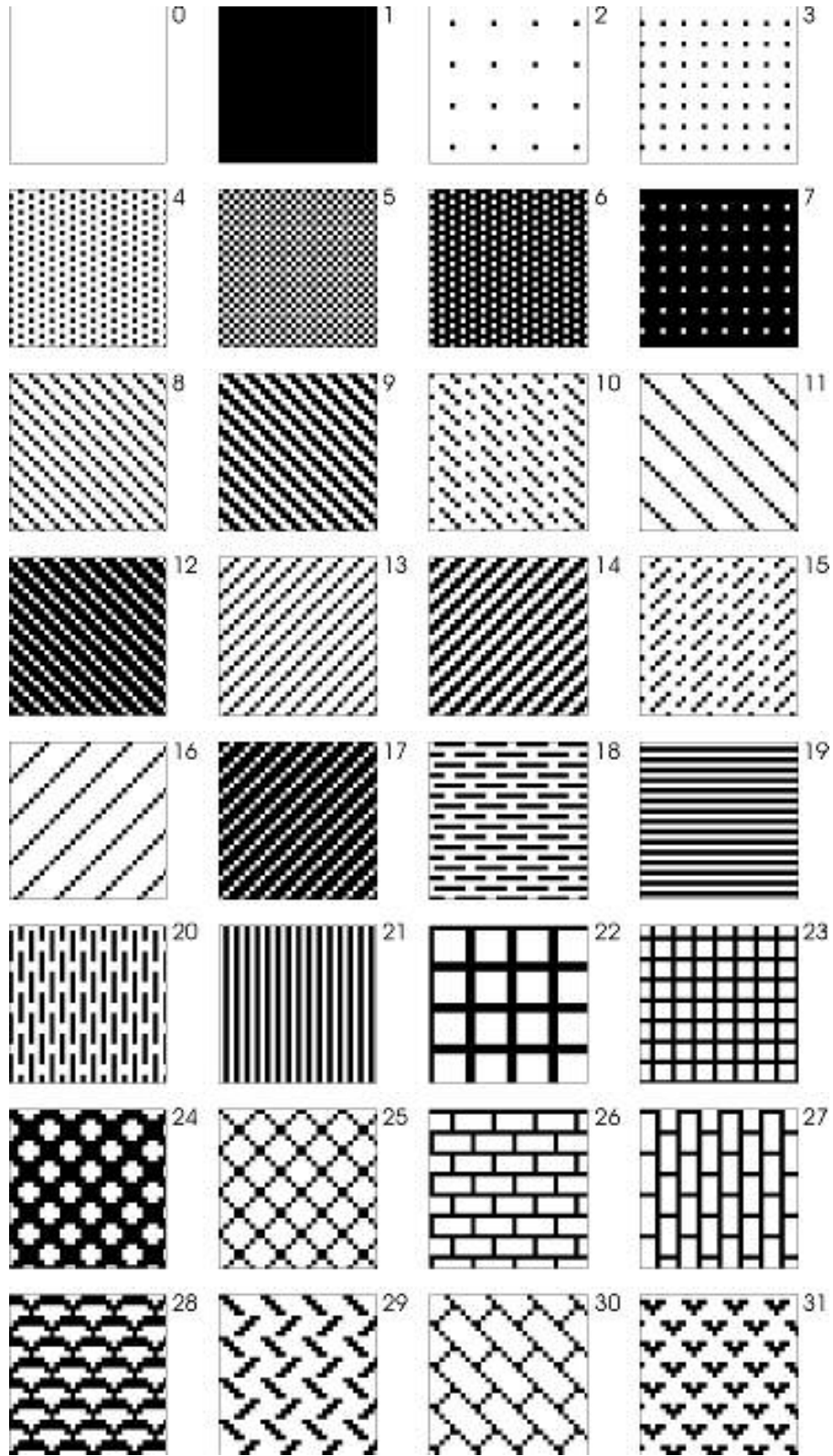
- LOOKUP S57
- LOOKUP NSKV

### A.1 Colours

The recommended colour codes, applying to all colour data fields, are as follows:

Code	Colour	Main Usage
0	Black	Buoys / text, main lines etc.
1	Blue - darkest	Contours (1)
2	Green - dark	Intertidal areas
3	Blue - mid	Depth area tint (shallowest)
4	Red - dark	Danger lines
5	Magenta - dark	Light blips, some text & symbols
6	Buff	Built-up areas, towns, etc.
7	White / Grey - light	Chart background / deepest water
8	Grey - dark	Buildings, contours
9	Blue - light	Depth area tint (2 <sup>nd</sup> shallowest)
10	Green - light	Buoys / lights
11	Blue - lightest	Contours (2)
12	Red - light	Buoys / lights
13	Magenta - light	Magnetic variation symbols
14	Yellow	Land / lights
15	White	Contours (3) / buoys / lights

**A.2 Fill Patterns**



The patterns above depict foreground colour as black and background colour as white or transparent.

## A.3 Line Fonts

Code

0	Solid
1	36:11
2	24:11
3	14:8
4	5:5
5	24:10, 14:10, 14:10
6	24:10, 7:10, 7:10, 7:10, 7:10
7	1:4

## A.4 Countries

2 Chr	3 Chr	Code	Country
AF	AFG	4	AFGHANISTAN
AL	ALB	8	ALBANIA
DZ	DZA	12	ALGERIA
AS	ASM	16	AMERICAN SAMOA
AD	AND	20	ANDORRA
AO	AGO	24	ANGOLA
AI	AIA	660	ANGUILLA
AQ	ATA	10	ANTARTICA
AG	ATG	28	ANTIGUA AND BARBUDA
AR	ARG	32	ARGENTIAN
AW	ABW	533	ARUBA
AU	AUS	36	AUSTRALIA
AT	AUT	40	AUSTRIA
BS	BHS	44	BAHAMAS
BH	BHR	48	BAHRAIN
BD	BGD	50	BANGLADESH
BB	BRB	52	BARBADOS
BE	BEL	56	BELGIUM
BZ	BLZ	84	BELIZE
BJ	BEN	204	BENIN
BM	BMU	60	BERMUDA
BT	BTN	64	BHUTAN
BO	BOL	68	BOLIVIA
BW	BWA	72	BOTSWANA
BV	BVT	74	BOUVET ISLAND
BR	BRA	76	BRAZIL
IO	IOT	86	BRITISH INDIAN OCEAN TERRITORY
BN	BRN	96	BRUNEI DARUSSALAM
BG	BGR	100	BULGARIA
BF	BFA	854	BURKINO FASO
BU	BUR	104	BURMA
BI	BDI	108	BURUNDI
BY	BYS	112	BYELORUSSIAN SSR
CM	CMR	120	CAMEROON
CA	CAN	124	CANADA
CV	CPV	132	CAPE VERDE
KY	CYM	136	CAYMAN ISLANDS
CF	CAF	140	CENTRAL AFRICAN REPUBLIC
TD	TCO	148	CHAD
CL	CHL	152	CHILE
CN	CHN	156	CHINA
CX	CXR	162	CHRISTMAS ISLAND
CC	CCK	166	COCOS(KEELING ISLANDS)
CO	COL	170	COLOMBIA
KM	COM	174	COMOROS
CG	COG	178	CONGO
CK	COK	184	COOK ISLANDS
CR	CRI	188	COSTA RICA
CI	CIV	384	COTE D'IVOIRE
CU	CUB	192	CUBA
CY	CYP	196	CYPRUS
CS	CSK	200	CZECHOSLOVAKIA
DK	DNK	208	DENMARK
DJ	DJI	262	DJIBOUTI
DM	DMA	212	DOMINICA
DO	DOM	214	DOMINICAN REPUBLIC
TP	TMP	626	EAST TIMOR

2 Chr	3 Chr	Code	Country
-------	-------	------	---------

EC	ECU	218	ECUDOR
EG	EGY	818	EGYPT
SV	SLV	222	EL SALVADOR
GQ	GNQ	226	EQUATORIAL GUINEA
ET	ETH	230	ETHIOPIA
FK	FLK	238	FALKLAND ISLANDS (MALVINAS)
FO	FRO	234	FAROE ISLANDS
FJ	FJI	242	FIJI
FI	FIN	246	FINLAND
FR	FRA	250	FRANCE
GF	GUF	254	FRENCH GUIANA
PF	PYF	258	FRENCH POLYNESIA
TF	ATF	260	FRENCH SOUTHERN TERRITORIES
GA	GAB	266	GABON
GM	GMB	270	GAMBIA
DD	DDR	278	GERMAN DEMOCRATIC REPUBLIC
DE	DEU	280	GERMANY
GH	GHA	288	GHANA
GI	GIB	292	GIBRALTA
GR	GRC	300	GREECE
GL	GRL	304	GREENLAND
GD	GRD	308	GRENADA
GP	GLP	312	GUADELOPE
GU	GUM	316	GUAM
GT	GTM	320	GUATEMALA
GW	GNB	624	GUINEA-BISSAU
GN	GIN	324	GUINEA
GY	GUY	328	GUYANA
HT	HTI	332	HAITI
HM	HMD	334	HEARD AND MC DONALD ISLANDS
HN	HND	340	HONDURAS
HK	HKG	344	HONG KONG
HU	HUN	348	HUNGARY
IS	ISL	352	ICELAND
IN	IND	356	INDIA
ID	IDN	360	INDONESIA
IR	IRN	364	IRAN (ISLAMIC REPUBLIC OF)
IQ	IRQ	368	IRAQ
IE	IRL	372	IRELAND
IL	ISR	376	ISREAL
IT	ITA	380	ITALY
JM	JAM	388	JAMAICA
JP	JPN	392	JAPAN
JO	JOR	400	JORDAN
KH	KHM	116	KAMPUCHEA DEMOCRATIC
KE	KEN	404	KENYA
KI	KIR	296	KIRIBATI
KR	KOR	410	KOREA
KP	PRK	408	KOREA DEMOCRATIC PEOPLES REP.
KW	KWT	414	KUWAIT
LA	LAO	418	LAO PEOPLES DEMOCRATIC REP.
LB	LBN	422	LEBANON
LS	LSO	426	LESOTHO
LR	LBR	430	LIBERIA
2 Chr	3 Chr	Code	Country



LY	LBY	434	LIBYAN ARAB JAMAHIRIYA
LI	LIE	438	LIECHTENSTEIN
LU	LUX	442	LUXEMBOURG
MO	MAC	446	MACAU
MG	MDG	450	MADAGASCAR
MW	MWI	454	MALAWI
MY	MYS	458	MALAYSIA
MV	MDV	462	MALDIVES
ML	MLI	466	MALI
MT	MLT	470	MALTA
MH	MHL	584	MARSHALL ISLANDS
MQ	MTQ	474	MARTINIQUE
MR	MRT	478	MAURITANIA
MU	MUS	480	MAURITIUS
MX	MEX	484	MEXICO
FM	FSM	583	MICRONESIA
MC	MCO	492	MONACO
MN	MNG	496	MONGOLIA
MS	MSR	500	MONTSERRAT
MA	MAR	504	MOROCCO
MZ	MOZ	508	MOZAMBIQUE
NA	NAM	516	NAMIBIA
NR	NRU	520	NAURU
NP	NPL	524	NEPAL
NL	NLD	528	NETHERLANDS
AN	ANT	532	NETHERLANDS ANTILLES
NT	NTZ	536	NEUTRAL ZONE
NC	NCL	540	NEW CALEDONIA
NZ	NZL	554	NEW ZEALAND
NI	NIC	558	NICARAGUA
NE	NER	562	NIGER
NG	NGA	566	NIGERIA
NU	NIU	570	NIUE
NF	NFK	574	NORFOLK ISLAND
MP	MNP	580	NORTHERN MARIANA ISLANDS
NO	NOR	578	NORWAY
OM	OMN	512	OMAN
PK	PAK	586	PAKISTAN
PW	PLW	585	PALAU
PA	PAN	590	PANAMA
PG	PNG	598	PAPUA NEW GUINEA
PY	PRY	600	PARAGUAY
PE	PER	604	PERU
PH	PHL	608	PHILIPPINES
PN	PCN	612	PITCAIRN
PL	POL	616	POLAND
PT	PRT	620	PORTUGAL
PR	PRI	630	PUERTO RICO
QA	QAT	634	QATAR
RE	REU	638	REUNION
RO	ROM	642	ROMANIA
RW	RWA	646	RWANDI
KN	KNA	659	SAINT KITTS AND NEVIS
LC	LCA	662	SAINT LUCIA
VC	VCT	670	SAINT VINCENT & THE GRENADINES
WS	WSM	882	SAMOA
SM	SMR	674	SAN MARINO
ST	STP	678	SAO TOME AND PRINCIPE
SA	SAU	682	SAUDI ARABIA
SN	SEN	686	SENEGAL

SC	SYC	690	SEYCHELLES
SL	SLE	694	SIERRA LEONE
SG	SGP	702	SINGAPORE
SB	SLB	90	SOLOMON ISLANDS
SO	SOM	706	SOMALIA
ZA	ZAF	710	SOUTH AFRICA
ES	ESP	724	SPAIN
LK	LKA	144	SRI LANKA
SH	SHN	654	ST.HELENA
PM	SPM	666	ST.PIERRE AND MIQUELON
SD	SDN	736	SUDAN
SR	SUR	740	SURINAME
SJ	SJM	744	SVALBARD & JAN MAYEN ISLANDS
SZ	SWZ	748	SWAZILAND
SE	SWE	752	SWEDEN
CH	CHE	756	SWITZERLAND
SY	SYR	760	SYRIAN ARAB REPUBLIC
TW	TWN	158	TAIWAN PROVINCE OF CHINA
TZ	TZA	834	TANZANIA UNITED REPUBLIC OF
TH	THA	764	THAILAND
TG	TGO	768	TOGO
TK	TKL	772	TOKELAU
TO	TON	776	TONGA
TT	TTO	780	TRINIDAD AND TOBAGO
TN	TUN	788	TUNISIA
TR	TUR	792	TURKEY
TC	TCA	796	TURKS AND CAICOS ISLANDS
TV	TUV	798	TUVALU
UG	UGA	800	UGANDA
UA	UKR	804	UKRANIAN SSR
AE	ARE	784	UNITED ARAB EMIRATES
GB	GBR	826	UNITED KINGDOM
US	USA	840	UNITED STATES
UM	UMI	581	UNITED STATES MNR OUTLYING IS.
UY	URY	858	URUGUAY
SU	SUN	810	USSR
VU	VUT	548	VANUATU
VA	VAT	336	VATICAN CITY STATE (HOLY SEE)
VE	VEN	862	VENEZUELA
VN	VNM	704	VIET NAM
VG	VGB	92	VIRGIN ISLANDS (BRITISH)
VI	VIR	850	VIRGIN ISLANDS (U.S.)
WF	WLF	876	WALLIS AND FUTUNA ISLANDS
EH	ESH	732	WESTERN SAHARA
YE	YEM	886	YEMEN
YD	YMD	720	YEMEN DEMOCRATIC
YU	YUG	890	YUGOSLAVIA
ZR	ZAR	180	ZAIRE
ZM	ZMB	894	ZAMBIA
ZW	ZWE	716	ZIMBABWE

2 Chr	3 Chr	Code	Country
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## A.5 Vertical & Sounding Datums

Code	Vertical / Sounding Datum
0	Unspecified
1	Mean low water springs
2	Mean lower low water springs
3	Mean sea level
4	Lowest low water
5	Mean low water
6	Lowest low water springs
7	Approximate mean low water springs
8	Indian spring low water
9	Low water springs
10	Approximate lowest astronomical tide
11	Nearly lowest low water
12	Mean lower low water

Code	Vertical / Sounding Datum
13	Low water
14	Approximate mean low water
15	Approximate mean lower low water
16	Mean high water
17	Mean high water springs
18	High water
19	Approximate mean sea level
20	High water springs (Springhochwasser)
21	Mean higher high water
22-99	RESERVED
100	IGLD International Great Lakes Datum (1955)

## A.6 Horizontal Datums

Code	Horizontal Datum
1	Adindan
2	ARC 1950
3	Australian Geodetic 1966
6	Djakarta (Batavia)
7	European 1950
9	Geodetic Datum 1949 NZ
15	Hjorsey 1955
17	Indian
18	Ireland 1965
19	Kertau 1948
20	Liberia 1964
21	Luzon -Philippines
22	Merchich - Morocco
25	NAD-27 Conus
26	NAD-27 Alaska
30	Ordinance Survey of Great Britain
31	Qornoq (S.Greenland)+C115
34	Corrogo Alegre (S>American)
35	Campo Inchauspe (S.American)
36	Chua Astro
39	Timbalai 1948
45	WGS84
46	WGS72
47	Adindan
48	Adindan
49	Adindan
50	Adindan
51	Adindan

52	Adindan
53	AFG
54	AIN EL ABD 1970
55	AIN EL ABD 1970
56	Anna 1 Astro 1965
66	ARC 1960
67	Ascension Island 1958
68	Astro Beacon ‘E’
69	Astro DOS 71/4 (St Helena Island)
70	Astro B4 SOR. ATOLL
71	Astronomical Station 1952 (Marcus)
72	Australian Geodetic 1984
74	Bellevue (IGN) - Efate Is.
75	Bermuda 1957
77	Bogota Observatory
78	Canton Island 1966
79	Cape
80	Cape Canaveral
81	Carthage
82	Chatham 1971 NZ
84	DOS 1968
85	Easter Island 1967
86	European 1950
87	European 1950
88	European 1950
89	European 1950
90	European 1950
91	European 1950

Code	Horizontal Datum
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Code	Horizontal Datum
92	European 1950

93	European 1950
94	European 1950
95	European 1950
96	European 1950
97	European 1979
101	GUX 1 Astro
102	Guam 1963
102	Hong Kong 1963
103	Indian Bangladesh
105	Indian Thailand
107	ISTS 073 Astro 1969(Diego Garcia)
108	Johnston Island 1961
109	Kandawala (Sri Lanka)
110	Kerguelen Island
112	L.C. 5 Astro
114	Mindanao Island - Philippines
115	Mahe 1971
116	Massawa
117	Midway Astro 1961
118	Minna
119	Minna
122	Nahrwan Masirah Island
123	Nahrwan Saudia Arabia
124	Nahrwan United Arab Emirates
125	“Naparima, BWI”
128	NAD-27 Conus
129	NAD-27 Conus
130	NAD-27 Alaska
131	NAD-27 Caribbean
132	NAD-27 San Salvador Island
133	NAD-27 Canada
134	NAD-27 Canada
135	NAD-27 Canada
136	NAD-27 Canada
137	NAD-27 Canada
138	NAD-27 Bahamas
138	NAD-27 Canal Zone
139	NAD-27 Cuba
140	NAD-27 Greenland
141	NAD-27 Mexico
142	North America 1983(Alaska)
143	NAD-27 Central America
143	North America 1983 C.American

145	Old Egyptian 1930
147	Old Hawaiian
148	Oman
149	Ordinance Survey of Great Britain
150	Ordinance Survey of Great Britain
151	Ordinance Survey of Great Britain
152	Ordinance Survey of Great Britain
153	Pico de las Nieves
154	Pitcairn Astro 1967
158	Provisional South American 1956
159	Provisional South American 1956
160	Provisional South American 1956
166	Provisional South Chilean 1963
167	Puerto Rico
168	Qatar National
169	La Reunion
170	Rome 1940
171	Santo (DOS)
172	Santa Braz
173	Sapper Hill 1943
174	Namibia
177	South American 1969
178	South American 1969
179	South American 1969
180	South American 1969
181	South American 1969
182	South American 1969
183	South American 1969
184	South American 1969
185	South American 1969
186	South American 1969
187	South American 1969
188	South American 1969
189	South American 1969
190	South Asia (Singapore)
191	Tokyo
192	Tokyo
193	Tokyo
194	Tristan Astro 1968
195	Viti Levu 1916
196	Wake-Eniwetok 1960
198	Zanderij (Suriname)

<b>Code</b>	<b>Horizontal Datum</b>
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## A.7 Objects

Object Class	DX90 X-ref. Object Class	Euronav Code Description
0		Null heading
1		Danger line
2		Depth Contour
3		Inter tidal streams
4		Rocky foreshore/Rocky area limit line
5		Land
6		Intertidal area
7		Maintained channel
8		Pipes and Cables
9		Traffic zones
10		Fishing limits
11	IN40A/IN41A	International boundaries
12		Feature lines
13		Topography
14		Contour undefined
15		Built up area
16		Height contour
17		Note boxes
18		Copyright notice
19		Buoyage \ marks
20		Auxilliary marks
21		Depth soundings
22		Chart correction - marks
23		Chart correction - depths
24		Chart corrections - contours
25		Magnetic variation - roses
26		Tidal data format A 12 hour cycle
27		Tidal data format B
28		Current flows monthly for year
29		Wind directions and strength -monthly
30		Sector lights
31		Outside border
32		Mountainous region \ high ground
33		Coral reef limit line
34		Fishing zone
35		Radar/Radio
36		Ice limits
37		Altitude contour
38		Magnetic variation contours
39		Transit lines
40		Prohibited or danger zone
41		Deleted item
42		DECCA
43		Loran
44		Positional line
45		Survey data
46		Non marine

47		Rocky Foreshore
48		Cartographic Sea fill and lakes
49		Information (Information Symbol)
50		Picture (EYE Symbol)
51		Chart information (chart text)
52		Unsurveyed areas
53		National Limits/zones
54		Bottom Quality
55		Fishing Position
56		Fishing Depth
57		Fishing Water Temperature
58-89		RESERVED
90		Prohibited zones - aviation
91		Danger zones - aviation
92		Zones - aviation
93		Airway - aviation
94		ATZ - aviation
95		MATZ - aviation
96		CTA - aviation
97		Prohibitive zones - general
98		Danger zones - general
99		Zones - general
100		Light Float Buoy
101		Vertical Clearance
102		Power Symbol
103		Safe Clearance (Power)
104		Rocks
105		Rock with Pole or Spar
106		Designation of berth
107		Position of tabulated tidal stream data
108		Heights above ground (or reference)
109		Name
110		Light Blip
111		Coloured or white mark
112		Generic green buoy
113		Generic red buoy
114		Major light with blip
115		Horizontal Clearance
116		Rock which does not cover
117		US style buoy
118		US style buoy - solid colour fill
119		US style buoy - vertical stripe
120		US style buoy - chequered
121		US style buoy - diagonal stripe
122		US - Bell Submerged
123		Park Ranger Station
124		Visitors Mooring
125		RESERVED
126		Public Landing
127		Information (general)
128		Flood tide stream
129		Ebb tide stream

130		Current in restricted water
131		Ocean Current
132		Recommended direction of traffic
133		RESERVED
134		One/two way track symbol
135		Mandatory direction of traffic
136		Direction of buoyage arrow
137		Woods general
138		Swept by wire drag or divers
139		Painted mark - striped
140		Shoal sounding/obstruction/well
141		Stump of post, or pile, wholly submerged
142		Lock 1
143		Lock 2
144		Foul Ground
145		Rock which covers and uncovers
146		Rock awash at chart datum
147		Rock of uncertain depth or dangerous
148		Boulder
149		Crib
150		Notice Board
151		Explosives anchorage or Firing range or Danger
152		Spar Beacon
153		Tide gauge
154		Pylon or beacon
155		Telephone or cable landing beacon
156		Spot heights
157		Conveyor
158		Pinicale
159		Obstruction (significant to fishing operations)
160		Bad Obstruction (fishing)
161		Wreck (significant to fishing operations)
187	WATLEV	<b>Category of water level effect</b> see S57 spec for ID's of types of.
		<b>Buoy Attributes Data</b>
250	BOYSHP-0	Undefined buoy
251	-1	Conical buoy
252	-2	Can/Cylindrical buoy
253	-3	Spherical buoy
254	-4	Pillar buoy
255	-5	Spar/spindle buoy
256	-6	Barrel buoy
257	-7	Super buoy
		<b>Beacon Attributes</b>
276	BCNSHP-0	Undefined beacon
277	-1	Stake, pole
278	-2	Withy
279	-3	Beacon tower
280	-4	Lattice beacon
		<b>Category of Anchorage</b>
281	CATACH-0	Undefined anchorage
282	-1	Unrestricted anchorage
283	-2	Deep water anchorage
284	-3	Tanker anchorage

285	-4	Explosives anchorage
286	-5	Quarantine anchorage
287	-6	Sea-plane anchorage
288	-7	Small craft anchorage
289	-8	Small craft mooring area
290	-9	Anchorage for periods up to 24 hours
		<b>Category of Built Up Area</b>
300	CATBUA-0	Undefined built up area
301	-1	Urban area
302	-2	Settlement
303	-3	Village
304	-4	Town
		<b>Category of Single Buildings</b>
305	CATBUI-0	Undefined
306	-1	Building without function/service of major interest
307	-2	Harbour-masters office
308	-3	Custom Office
309	-4	Health Office
310	-5	Hospital
311	-6	Post Office
312	-7	Hotel
313	-8	Railway Station
314	-9	Police Station
315	-10	Water police station
316	-11	Pilot office
317	-12	Pilot look-out
318	-13	Power station
319	-14	Bank office
320	-15	Headquarters for district control
321	-16	Transit shed/warehouse
322	-17	Factory
323	-18	Administrative
324	-19	School/University
		<b>Category of Control Point</b>
325	CATCTR-0	Undefined
326	-1	Triangulation point (height above ground)
327	-2	Observation spot
328	-3	Fixed point
329	-4	Benchmark
330	-5	Boundary mark
		<b>Category of Harbour Facility</b>
331	CATHAF-0	Undefined
332	-1	RoRo-terminal
333	-2	Timber yard
334	-3	Ferry terminal
335	-4	Fishing harbour
336	-5	Yacht harbour/marina
337	-6	Naval base
338	-7	Tanker terminal
339	-8	Passenger terminal
340	-9	Shipyard
341	-10	Container terminal
		<b>Category of Land Region</b>
342	CATLND-0	Undefined

343	-1	Fen
344	-2	Marsh
345	-3	Moor
346	-4	Heathland



347	-5	Low Mountain range
348	-6	Lowlands
349	-7	Canyon lands
		<b>Category of Mooring/Warping Facilities</b>
350	CATMOR-0	Undefined
351	-1	Dolphin
352	-2	Deviation dolphin
353	-3	Bollard
		<b>Category of Pile</b>
354	CATPLE-0	Undefined
355	-1	Stake
356	-2	Snag
357	-3	Post
		<b>Category of Restricted Area</b>
358	CATREA-0	Undefined
359	-1	Offshore Safety Zone
360	-2	Anchoring prohibition-area
361	-3	Fishing prohibition-area
362	-4	Nature reserve
363	-5	Bird Sanctuary
364	-6	Game preserve
365	-7	Seal sanctuary
366	-8	Degaussing range
367	-9	Military area
368	-10	Historic wreck restricted area
369	-11	Inshore traffic zone
370	-12	Navigational aid safety zone
371	-13	Danger of stranding area
372	-14	Mine field
373	-15	Diving prohibition area
374	-16	Area to be avoided
		<b>Category of Small Craft Facilities</b>
375	CATSCF-0	Undefined
376	-1	Visitors berth
377	-2	Yacht club
378	-3	Boat hoist
379	-4	Sail maker
380	-5	Boat yard
381	-6	Public inn
382	-7	Restaurant
383	-8	Chandler
384	-9	Provisions
385	-10	Doctor
386	-11	Pharmacy
387	-12	Water tap
388	-13	Fuel Station
389	-14	Electricity
390	-15	Bottle Gas
391	-16	Showers
392	-17	Launderette
393	-18	Public toilets
394	-19	Post box

395	-20	Public telephones
396	-21	Refuse bin
397	-22	Car park
398	-23	Parking for boats and trailers
399	-24	Caravan site
400	-25	Camping site
		<b>Category of Trees</b>
401	CATTRE-0	Undefined
402	-1	Evergreen
403	-2	Conifer
404	-3	Palm
405	-4	Nipa Palm
406	-5	Casuarina
407	-6	Filao
408	-7	Eucalypt
409	-8	Deciduous
		<b>Category of Vegetation</b>
410	CATVEG-0	Undefined
411	-1	Grass Field
412	-2	Paddy Field
413	-3	Bush
414	-4	Deciduous Woodland
415	-5	Coniferous Woodland
416	-6	Wood in general
417	-7	Mangroves
418	-8	Park
419	-9	Park land
420	-10	Field
		<b>Category of Water Turbulence</b>
421	CATWAT-0	Undefined
422	-1	Breakers
423	-2	Eddies
424	-3	Overfalls
425	-4	Tide Rips
		<b>Category/Conspicuous, Radar</b>
426	CONRAD-0	Undefined
427	-1	Radar Conspicuous
428	-2	Not radar conspicuous
429		RESERVED
		<b>Quality of Sounding Measurement</b>
430	QUASOU-0	Undefined
431	-1	Depth known
432	-2	Depth unknown
433	-3	Doubtful sounding
434	-4	Unreliable sounding
435	-5	No bottom found at value shown
436	-6	Least depth known
437	-7	Least depth unknown, safe clearance at value shown
438	-8	Value reported (not surveyed)
439	-9	Value reported (not confirmed)
440	-10	Maintained depth

		<b>DX90 Equivalent Object Class</b>
501	AIRARE	Airport area
502	ACHPNT	Anchor
503	ACHBRT	Anchor berth
504	ACHARE	Anchorage area
505	BCNCAR	Beacon - cardinal
506	BCNISD	Beacon - isolated danger
507	BCNLAT	Beacon - lateral
508	BCNSAW	Beacon - safe water
509	BCNSPP	Beacon - special purpose
510	BRTFAC	Berthing facility
511	BRIDGE	Bridge
512	BUIREL	Building - religious
513	BUISGL	Building - single
514	BUAARE	Built-up area
515	BOYCAR	Buoy - cardinal
516	BOYINB	Buoy - installation
517	BOYISD	Buoy - isolated danger
518	BOYLAT	Buoy - lateral
519	BOYSAW	Buoy - safe water
520	BOYSPP	Buoy - special purpose
521	CBLOHD	Cable - overhead
522	CBLSUB	Cable - submarine
523	CBLARE	Cable area
524	CAIRNS	Cairn
525	CANALS	Canal
526	CANBNK	Canal bank
527	CTSARE	Cargo transhipment area
528	CAUSWY	Causeway
529	CTNARE	Caution area
530	CEMTRY	Cemetery
531	CHNWIR	Chain/Wire
532	CHKPNT	Checkpoint
533	CHIMNY	Chimney
534	CGUSTA	Coast guard station
535	COALNE	Coastline
536	CONZNE	Contiguous zone
537	COSARE	Continental shelf area
538	CTRPNT	Control point
539	CRANES	Crane
540	CUSZNE	Custom zone
541	DAMCON	Dam
542	DWRTPT	Deep water route - part
543	DWRTCL	Deep water route centreline
544	DEPARE	Depth area
545	DEPCNT	Depth contour
546	DIFFUS	Diffuser
547	DSHAER	Dish aerial
548	DISMAR	Distance mark
549	DOCARE	Dock area
550	DRGARE	Dredged area
551	DRYDOC	Dry dock
552	DMPGRD	Dumping ground

553	DUNARE	Dune
554	DYKARE	Dyke area
555	DYKCRW	Dyke crown
556	EXEZNE	Exclusive Economic Zone
557	FAIRWY	Fairway
558	FNCLNE	Fence line
559	FERYRT	Ferry route
560	FSHHAV	Fish haven
561	FSHZNE	Fishery zone
562	FSHFAC	Fishing facility
563	FSHGRD	Fishing ground
564	FLGSTF	Flagstaff/pole
565	FLASTK	Flare stack
566	FLODOC	Floating dock
567	FOGSIG	Fog signal
568	FORSTC	Fortified structure
569	FRPARE	Free port area
570	GATCON	Gate
571	GRIDRN	Gridiron
572	HRBARE	Harbour area (administrative)
573	HRBFAC	Harbour facility
574	HILARE	Hill
575	HULKES	Hulk
576	ICEARE	Ice area
577	ICNARE	Incineration area
578	ITDARE	Intertidal area
579	LAKARE	Lake
580	LAKSHR	Lake - shore
581	LNDARE	Land area
582	LNDELV	Land elevation
583	LNDRGN	Land region
584	LNDPLC	Landing place
585	LNDSTS	Landing stairs
586	LIGHTS	Light
587	LITMOI	Light - moiré effect
588	LITFLT	Light - float
589	LITVES	Light - vessel
590	LOKBSN	Lock basin
591	LOGPON	Log pond
592	MARCUL	Marine farm/culture
593	MSTCON	Mast
594	MIPARE	Military practice area
595	MONUMT	Monument
596	MORFAC	Mooring/warping facility
597	NATARE	National territorial area
598	NAVLNE	Navigation line
599	OBSTRN	Obstruction
600	OFSPLF	Offshore platform
601	OFSPRD	Offshore production area
602	OILBAR	Oil barrier
603	PILPNT	Pile
604	PILBOP	Pilot boarding place
605	PINGOS	Pingo
606	PIPOHD	Pipeline - overhead

607	PIPSOL	Pipeline - submarine/on land
608	PIPARE	Pipeline area
609	PONTON	Pontoon
610	PRCARE	Precautionary area
611	PRDINS	Production installation
612	PYLONS	Pylon
613	RADDOM	Radar dome
614	RADLNE	Radar line
615	RADRNG	Radar range
616	RADRFL	Radar reflector
617	RADSTA	Radar station
618	RTPBCN	Radar transponder beacon
619	RDOCAL	Radio calling-in point
620	RDOSTA	Radio station
621	RAILWY	Railway
622	RMPARE	Ramp
623	RAPIDS	Rapids
624	RCRTCL	Recommended route centreline
625	RECTRC	Recommended track
626	RCTLPT	Recommended Traffic Lane Part
627	RSCSTA	Rescue station
628	RESARE	Restricted area
629	RIVERS	River
630	RIVBNK	River - bank
631	RODCRS	Road crossing
632	ROADPT	Road part
633	RUNWAY	Runway
634	SLTPAN	Salt pan
635	SNDWAV	Sand waves
636	SEAARE	Sea area
637	SPLARE	Sea-plane landing area
638	SBDARE	Seabed area
639	SLCONS	Shoreline construction
640	SISTAT	Signal station - traffic
641	SISTAW	Signal station - warning
642	SILBUI	Silo
643	SLIPWY	Slipway
644	SLOTOP	Slope topline
645	SLOGRD	Sloping ground
646	SMFAC	Small craft facility
647	SOUNDG	Sounding
648	SPOGRD	Spoil ground
649	SPRING	Spring
650	SQUARE	Square
651	STSLNE	Straight territorial sea baseline
652	SUBTLN	Submarine transit line
653	TNKCON	Tank
654	TELPHC	Telepheric
655	TESARE	Territorial sea area
656	TIDEWY	Tideway
657	TOPMAR	Top mark
658	TOWERS	Tower
659	TSELNE	Traffic Separation Line
660	TSSBND	Traffic Separation Scheme - Boundary





661	TSSCRS	Traffic Separation Scheme - Crossing
662	TSSLPT	Traffic Separation Scheme - Lane part
663	TSSRON	Traffic Separation Scheme - Roundabout
664	TSSZNE	Traffic Separation Zone
665	TREPNT	Tree
666	TNLENT	Tunnel entrance
667	TWRTPT	Two-way route part
668	UWTROC	Underwater rock
669	VEGARE	Vegetation area
670	WATFAL	Waterfall
671	WATTUR	Water turbulence
672	WEDKLP	Weed \ Kelp
673	WIRLNE	Weir
674	WNDMIL	Windmill
675	WIMCON	Windmotor
676	WRECKS	Wreck
677	ZEMCNT	Zero metre - contour
		<b>Composite Object Classes</b>
700	AIRPOR	Airport
701	ANCHOR	Anchorage
702	CHAEDG	Channel Edge
703	DPWTRT	Deep water route
704	DEFWAT	Defined water
705	HARBOR	Harbour
706	LDGLNE	Leading line
707	LITHOU	Lighthouse
708	MORTRO	Mooring Trot
709	NAMFLO	Navigational mark afloat
710	NAMFIX	Navigational mark fixed
711	TSSSYS	Traffic separation scheme-system
		<b>Cartographic Objects</b>
730	\$CLOLN	Closing line
731	\$COMPS	Compass
732	\$CSYMB	Cartographic symbol
733	\$LINES	Cartographic line
734	\$AREAS	Cartographic line area
735	\$SHABL	Shallow water blue
736	\$TEXTS	Text
800		Motorway/Highway
801		Toll Motorway/highway
802		Dual lane road
803		Primary or secondary road
804		Track trail or footpath
820		Single track railway/railroad
821		Multiple track railway/railroad
822		Light railway/railroad
823		Railway/railroad within an urban area
830		Railway bridge
831		Road bridge
832		Railway tunnel
833		Road tunnel
834		Rail ferry
835		Road ferry

850		Airport - Active civil
851		Airport - Active civil and military
852		Airport - Active military
853		Airport - unknown type
860		Drainage - Perennial
861		Drainage - Non-Perennial
870		Urban area
871		Place name
872		Capital city
873		Port name
880		Land area - Feature or use 0
881		Land area - Feature or use 1
882		Land area - Feature or use 2
883		Land area - Feature or use 3
884		Land area - Feature or use 4
885		Land area - Feature or use 5
886		Land area - Feature or use 6
887		Land area - Feature or use 7
888		Land area - Feature or use 8
889		Land area - Feature or use 9
900		Polygon labels (Construction data only)
901		Miscellaneous data (Construction data only)
902-1000		RESERVED

















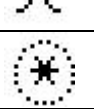









## A.8 Symbols

### 9

























**Note:** The Euronav\DX90 class and any description given in the following table is only an indication to which objects reference a particular symbol. Each symbol is only a symbol, and has no Hydrographic meaning.

Symbol Code	Symbol	Default Colour	GXF ID	HO Code	Use by IHO Object catalogue (DX 90) class	Description - meaning depends on object class/category code
0		N/A	0	0		None - blank
						<b>IHO BUOY</b>
1		Black	250	D 0	BOYSHP-0	Undefined buoy
2		Black	251	IQ20	BOYSHP-1	Conical buoy (DX90 code Buoy D1)
3		Black	252	IQ21	BOYSHP-2	Can/cylindrical buoy (DX90 code Buoy D2)
4		Black	253	IQ22	BOYSHP-3	Spherical buoy (DX90 code Buoy D3)
5		Black	254	IQ23	BOYSHP-4	Pillar buoy (DX90 code Buoy D4)
6		Black	255	IQ24	BOYSHP-5	Spar/spindle buoy (DX90 code Buoy D5)
7		Black	256	IQ25	BOYSHP-6	Barrel buoy (DX90 code Buoy D6)
8		Black	257	IQ26	BOYSHP-7	Super buoy (DX90 code Buoy D7)
9		Black	100	IQ31		Light float buoy (DX90 code Buoy D8)
						<b>IHO BEACONS</b>
10		Black	276	D 0	BCNSHP-0	Undefined beacon (DX90 code Beacon D0)
11		Black	277	D 1	BCNSHP-1	Stake, pole (DX90 code Beacon D1)
12		Black	279	D 3	BCNSHP-3	Tower beacon (DX90 code Beacon D3)
13		Black	280	D 4	BCNSHP-4	Lattice beacon (DX90 code Beacon D4)
						<b>OTHER</b>
14		Black	326	IB20	CATCTR-1	Triangulation point
15		Black	327	IB21	CATCTR-2	Observation point
16		Black	328	IB22	CATCTR-3	Fixed point
17		Black	329	IB23	CATCTR-4	Benchmark
18		Black	414	IC30-A	CATVEG-4	Area symbol deciduous tree



























19		Black	415	IC30-B	CATVEG-5	Area symbol coniferous tree
20		Black	409	IC31.1	CATTRE-8	Deciduous tree
21		Black	402	IC31.2	CATTRE-1	Evergreen
22		Black	403	IC31.3	CATTRE-2	Coniferous tree
23		Black	404	IC31.4	CATTRE-3	Palm tree
24		Black	405	IC31.5	CATTRE-4	Nipa palm
25		Black	406	IC31.6	CATTRE-5	Casuarina
26		Black	407	IC31.7	CATTRE-6	Filao
27		Black	408	IC31.8	CATTRE-7	Eucalypt
28		Black	417	IC32	CATVEG-7	Mangrove
29		Black	344	IC33	CATLND-2	Marsh
30		Black	302	ID3-A	CATBUA-2	Settlement
31		Black		ID3-B		Settlement
32		Black	501	ID17	AIRARE	Airport
33		Black	101	ID19		Clearance
34		Black	511	ID23		Opening bridge
35		Black	104			Rock that cover/uncovers outside depth contour
36		Lt Red	103	ID26-B		Safe Clearance (power)
37		Black	108	IE5-A		Height symbol (above ground)
38		Black	512	IE10.1-A	BUIREL-0	Church
39		Black	512	IE10.1-B	BUIREL-0	Church - large scale
40		Black	512	IE13	BUIREL 4,5,6	Temple/pagoda/Shinto shrine
41		Black	512	IE16-B		Buddhist temple
42		Black	512	IE17	BUIREL-8	Mosque, Minaret
43		Black	530	IE19	CEMTRY	Area symbol cemetery
44		Black	658	IE20	TOWERS-CATTOW - 0	Tower general

45		Black	658	IE21	TOWERS-CATTOW-2	Water tower
46		Black	533	IE22	CHIMNY	Chimney
47		Black	565	IE23	FLASTK	Flare stack
48		Black	595	IE24	MONUMT	Monument
49		Black	674	IE25.1	WNDMIL	Windmill
50		Black	675	IE26	WIMCON	Windmotor
51		Black	564	IE27	FLGSTF	Flagstaff \ flagpole
52		Black	593	IE28	MSTCON-CATMST-1	Radio mast
53		Black	658	IE29	TOWERS-CATTOW-3	Radio/television tower
54		Black	547	IE31	DSHAER	Dish aerial
55		Black	653	IE32-A	TNKCON	Tank
56		Black	653	IE32-B	TNKCON	Tank
57		Black	642	IE33-A	SILBUI	Silo
58		Black	568	IE34.2	FORSTC-CATFOR1,2,4	Castle, Fort, Blockhouse
59		Black	568	IE34.3	FORSTC-CATFOR-3	Battery, Small fort
60		Black	611	IE36	PRDINS-CATPRI-1,2	Mine
61		Magenta	335	IF10	HRBFAC-CATHAF-4	Fishing harbour
62		Magenta	106	IF19-A		Designation of berth
63		Black	351	IF20-A	CATMOR-1	Dolphin
64		Black		IF20-B	CATMOR-1	Dolphin
65		Black	352	IF21	CATMOR-2	Deviation dolphin
66		Black	357	IF22	CATPLE-3	Minor post or pile or buoyage mark
67		Black	575	IF34	HULKES	Hulk
68		Lt red	548	IF40-A	DISMAR	Distance mark
69		Black	353	IF-A	CATMOR-3	Bollard/Boulder
70		Black	333	IF52	CATHAF-2	Timber yard
71		Black	539	IF53.1-A	CRANES-CATCRN-0	Crane
72		Black	539	IF53.2	CRANES-CATCRN-2	Container crane













73		Black	307	IF60	CATBUI-2	Harbour master office
74		Black	308	IF61	CATBUI-3	Custom office
75		Black	309	IF62	CATBUI-4,5	Health office, hospital
76		Black	311	IF63	CATBUI-6	Post office
77		Black	424	IH44	CATWAT-3,4	Overfalls, tide rips,
78		Black	423	IH45	CATWAT-2	Eddies
79		Black		IH46-A		Position of tabulated tidal stream data
80		Black	435	II13-A	QUASOU-5	No bottom found
81		Black	672	IJ13.2	WEDKLP	Kelp, weed
82		Black	635	IJ14	SNDWAV	Sandwaves
83		Black	649	IJ15	SPRING	Spring in seabed
84		Black	138	IK2		Swept by wire drag or diver
85		Black	145	IK11-A	UWTROC-WATLEV-4	Rock which covers and uncovers
86		Black	146	IK12-A	UWTROC-WATLEV-5 EXPSOU-1	Rock, awash at chart datum (inside depth area)
87		Black	146	IK12-B	UWTROC-WATLEV-5 EXPSOU-2	Rock, awash at chart datum (outside depth area)
88		Black	147	IK13-A	UWTROC-WATLEV-3 EXPSOU-1	Rock of uncertain depth (inside depth area)
89		Black	147	IK13-B	UWTROC-WATLEV-3 EXPSOU-2	Rock of uncertain depth (outside depth area)
90		Black	422	IK17-A	CATWAT-1	Breakers
91		Black	676	IK24	CATWRK-5	Wreck showing any portion of hull at chart datum
92		Lt cyan	676	IK26	CATWRK-2 TECSOU-1	Wreck, least depth known by sounding only
93		Lt cyan	676	IK27	CATWRK-2 TECSOU-4,6	Wreck, least depth known, swept by wire drag or diver
94		black	676	IK28	Wrecks-CATWRK-2 QUASOU-2	Dangerous wreck - depth unknown
95		black	676	IK29	Wrecks-CATWRK-2 QUASOU-7	Non-dangerous wreck - depth unknown
96		Lt Cyan	676	IK30	Wrecks-CATWRK-2 QUASOU-7	Wreck, unsurveyed - clearance at depth shown

97	#	Black	144	K31-A	Wrecks-CATWRK-3	Foul ground
98	○	Black	599	IK40	OBSTRN-QUASOU-2	Obstruction, depth unknown
99	○	Black	599	IK41	OBSTRN-QUASOU-1	Obstruction, least depth known
100	○	Black	599	IK42	OBSTRN-QUASOU-1 TECSOU-4,6	Obstruction, least depth known, swept
101	⌵	Black	141	IK43.1-B		Stump of post or pile, wholly submerged
102	≡	Black	562	IK44.1	FSHFAC-CATFIF-1	Fishing stake
103	🐟	Black	560	IK46-A	FSHHAV	Fish haven
104	🐟	Black	560	IK46-B	FSHHAV	Fish haven
105	🏠	Black	592	IK48-A	MARCUL	Marine Farm
106	🏠	Black	592	IK48-B	MARCUL	Marine Farm
107	■	Black	600	IL2	OSFPLF-CATOF-1,2,3,4,5,6	Platform
108	○	Black	600	IL15	OSFPLF-CATOF-7	Artificial island or island
109	🚢	Black	516	IL16	BOYINIB	Tanker mooring buoy, SBM (Installation Buoy)
110	○	Black	611	IL20	PRDINS-CATPRI-4	Submerged production well
111	○	Black	611	IL21.1	PRDINS-CATPRI	Suspended well, depth over wellhead unknown
112	○	Black	611	IL21.2	PRDINS-CATPRI -3 QUASOU-1	Suspended well, known
113	⚡	Lt red	102	IL31.1-A ID26		Power
114	⚠	Magenta	610	IM16	PRCARE	Precautionary area symbol
115	📡	Magenta	619	IM40-A	RDOCAL-TRAFIC-3	Radio reporting point
116	📡	Magenta	619	IM40-B	RDOCAL-TRAFIC-3	Radio reporting point
117	🚢	Magenta	559	IM50-A	CATFRY	Ferry
118						RESERVED
119	⚓	Black	281	IN10	ACHARE-CATACH-0	Recommended anchorage - no defined limits
120	🚢	Magenta	503	N11.1-B	ACHBRT	Anchor berth
121	🚢	Magenta	503	IN11.1-B	ACHBRT	Anchor berth
122	⚓	Magenta	504	IN12.1 A	ACHARE	Anchorage area

123		Magenta	285	IN12.7 -A	CATACH-4	Explosives anchorage or firing range limit symbol
124		Magenta	286	IN12.8 -A	CATACH-5	Quarantine anchorage
125		Magenta	637	IN13- A	SPLARE	Sea-plane landing area
126		Magenta	287	IN14	CATACH-6	Anchorage for sea planes
127		Magenta	360	IN20- A	CATREA-2	Anchorage prohibited
128		Magenta	361	IN21- A	CATREA-3	Fishing prohibited
129		Magenta	594	IN32- A	MIPARE	Mine-laying practice area
130		Magenta	652	IN33	SUBTLN	Submarine transit lane or exercise area
131		Magenta	561	IN45- A	FSHZNE	Fishery zone symbol
132		Magenta	540	IN48- A	CUSZNE	Customs limit symbol
133		Black	586	IP1-A	LIGHTS	Major light
134		Black	586	IP1-B	LIGHTS	Minor light
135						RESERVED
136		Black	589	IP6-A	LITVES	Light vessel
137						RESERVED
138		Green	112			Starboard marker
139		Magenta	587	IP31	LITMOI	Moiré effect light
140		Magenta	586	IP63	LIGHTS-CATLIT-9	Floodlight
141		Magenta	586	IP64-A	LIGHTS-CATLIT	Strip light 1
142		Magenta	586	IP64-B	LIGHTS-CATLIT	Strip light 2
143		Black	596	IQ40- A	MORFAC	Mooring buoy 1
144		Black	596	IQ40-B	MORFAC	Mooring buoy 2
145		Black	596	IQ40-C	MORFAC	Mooring buoy 3
146		Black	596	IQ40- D	MORFAC	Mooring buoy 4
147		Black	278	IQ92- A	BCNLAT-BCNSHP-2 CATLAM-1	Withy
148		Black	278	IQ92-B	BCNLAT-BCNSHP-2 CATLAM-2	Withy
149		Black	524	IQ100	CAIRNS	Cairn
150		Black	111	IQ101		Coloured or white mark
151		Magenta	567	IR1-A	FOGSIG	Fog signal
152		Black	150	IQ126	BCNSPP-CATSPM- 18	Notice board
153						RESERVED























154		Magenta	618	IS1-A	RTPBCN or RDOSTA	Radar, radio beacon
155		Black	616	IS4	RADRFL	Radar reflector
156		Magenta	427	IS5	CONRAD-1	Radar-conspicuous feature
157		Magenta	604	IT1,1	PILBOP	Pilot boarding point
158		Black	627	IT12	RSCSTA	Rescue station
159		Black	153	IT32.1	SISTAW-CATSIW-12,13	Tidal scale or gauge
160		Magenta	336	IU1.1	CATHAF-5	Marina
161		Black	141	IK43.2	See also 101	Subm. pile, stake, snag, well or stump (exact pos.)
162		Lt green	112			Generic buoy
163		Lt red	113			Generic buoy
164		Magenta	114			Major light with blip
165						RESERVED
166		Black	509		BCNSPP	Beacon day mark
167		Black	116			Rock which does not cover
168		Black	105			Rock with pole or spar
169-170						RESERVED
171		Black	330	IB24		Boundary mark
172		Black		IG83		Watermill
173		Black	117	Qh		US style buoy
174		Black	118	Qf, Qg		US style buoy - solid colour fill
175		Black	119	Q22		US style buoy - vert stripe
176		Black	120	Qo		US style buoy - Chequered
177		Black	121	Qp		US style buoy - diagonal stripe
178		Black	122			US - Bell submerged
179		Black	123			Park Ranger station
180		Black				Small circle with dot
181		Black				Large circle with dot
182						RESERVED
183		Black	596		MORFAC	Multiple Mooring buoy
184		Black				Large circle
185		Magenta	331		CATHAF-0	Pump out facility


























186		Black	128	IH40-A		Flood Tide stream
187		Black	129	IH41		Ebb Tide stream
188		Black	130	IH42		Current in restricted waters
189		Black	131	IH43-A		Ocean current
190		Black	132	IM11		Recommended direction of traffic
191		Black	625	IM4-C	RECTRC	Recommended track symbol
192-198						RESERVED
199						Installation buoy (See also 109)
200		Black	518	IQ21	BOYLAT	Cylindrical buoy - solid colouring
201		Black	518	IQbc	BOYLAT	Cylindrical buoy - checked pattern
202		Black	518		BOYLAT	Cylindrical buoy - Horiz. stripe
203		Black	518		BOYLAT	Cylindrical buoy - vert stripe
204		Black	518		BOYLAT	Conical buoy - solid colouring
205		Black	518		BOYLAT	Conical buoy - Checked pattern
206		Black	518		BOYLAT	Conical buoy - Horiz stripe
207		Black	518		BOYLAT	Conical buoy - Vert stripe
208		Black	509		BCNSPP	Spherical buoy - solid colouring
209		Black	509		BCNSPP	Spherical buoy - Checked pattern
210		Black	509		BCNSPP	Spherical buoy - Horiz stripe
211		Black	509		BCNSPP	Spherical buoy - Vert stripe
212		Black	507		BCNLAT	Tower - solid colouring
213		Black	588		LITFLT	Light float - solid colouring
214		Black	518		BOYLAT	Pillar - solid colouring
215		Black	520		BOYSPP	Barrel buoy - solid colouring
216		Black	520		BOYSPP	Tun buoy
217						RESERVED
218		Black	589	IP7	LITVES	Light vessel - outline
219-222						RESERVED
223		Black	139			Painted mark - striped
224		Black				Large Black square

225		Black				Medium Black square
226		Black				Small black square
227		Magenta	124			Visitors Mooring
228		Magenta	376		CATSCF-1	Visitors berth
229		Magenta	125			Slipway
230		Magenta	126			Public Landing
231		Magenta	387		CATSCF-12	Water tap
232		Magenta	388		CATSCF-13	Fuel
233		Magenta	395		CATSCF-20	Public telephone
234		Magenta	394		CATSCF-19	Post box
235		Magenta	381		CATSCF-6	Public house or Inn
236		Magenta	382		CATSCF-7	Restaurant
237		Magenta	377		CATSCF-2	Yacht or sailing club
238		Magenta	393		CATSCF-18	Public toilets
239		Magenta	397		CATSCF-22	Public car park
240		Magenta	398		CATSCF-23	Parking for boat trailers
241		Magenta	392		CATSCF-17	Launderette
242		Magenta	399		CATSCF-24	Caravan site
243		Magenta	400		CATSCF-25	Camping site
244		Magenta	362		CATREA-0	Nature reserve
245		Black	137			Woods general
246-247						RESERVED
248		Black				View
249		Magenta	41			Deleted item
250		Magenta	127			Information
251-255						RESERVED



## A.9 Top Marks

Symbol Code	Symbol	Description
0		Not defined
1		Cone - point up
2		Cone - point down
3		Sphere
4		2 spheres
5		Cylinder
6		Board
7		X-shape
8		Cross-shape
9		Cube - point up
10		2 cones - point to point
11		2 cones - base to base
12		Diamond
13		2 cones - point upwards
14		2 cones - point downwards
15		Besom - point up
16		Besom - point down
17		Straight line
18		Cylinder and sphere
19		Cone and sphere
20		Unfilled diamond
21-36		RESERVED
37		Flood-light
38		Fog signal

Symbol Code	Symbol	Description
39		Radar reflector
40		Fog or sound signal
41		Fog or sound signal
42		Lit item or transmitting station
43		Circle
44		Flare \ flame
45		Strip light
46		Trapezium
47		Cone over sphere
48		Cross over sphere
49		Sphere over cone
50		Diamond over sphere
51		Filled sphere
52		Cone over filled sphere
53		Flag
54		2 cross bars
55		Fish
56		
57		
58		Filled cone - point up
59		Filled cone - point down
60		Filled sphere - large
61		Filled cylinder
62		Filled diamond
63		Branches

## APPENDIX B: Euronav Rich Text (ERT)

The **GXF** format incorporates a text formatting code system called *Euronav Rich Text* - which is similar to (but not to be confused with) the *Microsoft Rich Text* format. This is often used for controlling the appearance of text attached to MARK objects on a chart.

**ERT** formatting can be added to any ASCII text string as “escape sequences”, in the form:

“{ESC*x,y,z*,...}”

Explanation:

- An escape sequence is enclosed in curly brackets “{}”, but is not valid as an escape sequence, unless the character token “ESC” immediately follows the opening bracket.
- Immediately following the “ESC” token must be one or more formatting codes. These codes must be in the form of text representations of decimal integers, separated (if more than one) by commas.
- Several escape sequences may be added to a string, each having a cumulative effect with those preceding it.
- When stored in a text file, an ERT formatted string should be enclosed in double quotes. If the string *contains* double quote characters, two characters must be present, for each one to be displayed.

For example, the string:

“This is “normal” text, {ESC12}and this is {ESC11,8}formatted text.”

should appear as ...

This is “normal” text, *and this is **formatted text**.*

The complete list of **ERT** formatting codes (1 to 34) is as follows ...

- |    |  |          |   |
|----|--|----------|---|
| 1  | Reverse line feed & carriage return.   | 19       | Reset - restores the settings to default normal.  |
| 2  | Half line feed & carriage return.  | 20       | Hide remainder of the string.   |
| 3  | (Reserved)   | 21       | Prevent modification of string.   |
| 4  | Centre text.   | 22       | Medium font (standard size).  |
| 5  | Left justify (positioned to the right of object symbol, if present).   | 23       | (Reserved)  |
| 6  | Right justify (positioned to the left of object symbol, if present).   | 24       | (Reserved - Display in Small font instead of Large font, if current zoom level is greater than or equal to the value of the next item following this code.) |
| 7  | Vertical text (top-down, with each letter remaining horizontal).   | 25       | (Reserved - Display only if the current zoom level is greater than or equal to the value of the next item following this code.)                             |
| 8  | Bold.  | 26       | (Reserved - Display only if the object identified by the value of the next item following this code is displayed.)  |
| 9  | Colour - the next number following this code must be the colour code, compliant with section <b>I.</b> of <b>Appendix A.</b>                               | 27       | Backspace.  |
| 10 | Line feed.   | 28       | (Reserved)  |
| 11 | Underline.   | 29       | Proportional spacing.   |
| 12 | Italic.  | 30       | Additional data file - see below.   |
| 13 | Line feed & carriage return.   | 31 to 33 | (Reserved)  |
| 14 | Strike-out.  | 34       | Name of font to use - next item is the name of font.  |
| 15 | Large font.  |          |   |
| 16 | Small Font (this is the default).  |          |   |
| 17 | Variable font - then width and height (in pixels) followed by the “name” hint of style font required (see Microsoft documentation) - if “” default is used |          |   |
| 18 | Angled font - the number following this code must be the angle (in degrees) of rotation, clockwise, from 0 at top.   |          |   |

### **Code 30 - Additional Data File**

- This allows a reference to a file, containing further information.
- It is recommended that this code should be encapsulated in a separate escape sequence from other codes.
- The sequence is in the form “{ESC30,<type>,<filename>,<offset>}”.
  - <type> is a number indicating the type of the file - either **1** for ASCII text, or **2** graphical image file.
  - <filename> is the name of the file, including the path & extension.
  - <offset> is the number of bytes past the start of the file, at which the referenced data begins. The end position in the data file is dependent upon the reading software recognising a terminator or the end of the file. Where the file contains *ERT* formatted text, the terminator is the sequence “{ESC-1}”.

## Appendix ‘C’ data codes for the Data Record

Type of record	Code
Not defined	-1
VSE COG	1
VSE SOG	2
VSE SPEED	3
VSE DEPTH	4
VSE HDG MAG	5
VSE HDG TRUE	6
VSE HDG TRUE CALC FROM MAG	7
VSE ALTI	8
VSE WATER TEMP	9
VSE WIND DIR APPARENT	10
VSE WIND SPEED APPARENT	11
VSE WIND DIR TRUE	12
VSE WIND SPEED TRUE	13
VSE WIND DIR TRUE CALC FROM APPARENT	14
VSE WIND SPEED TRUE CALC FROM APPARENT	15
VSE LOG FULL	16
VSE LOG TRIP	17
VSE MAG VAR	18
VSE ENG PORTREV	19
VSE ENG STARREV	20
VSE ENG TEMP	21
VSE ENG OIL PRES	22
VSE DIST TO GO	23
VSE BRG TO GO	24
VSE ETA	25
VSE XT ERROR	26
VSE TIDE SET TRUE	27
VSE TIDE SET MAG	28
VSE TIDE VEL	29
VSE UTC	30
VSE VOLTS BAT	31
VSE AIR TEMP	32
VSE TIME	33
VSE ANTENNA ALT MSL	34
VSE HORIZ DIL	35
VSE NUM SATS	36
VSE GPS STATUS	37
VSE SATCOM SIG	38
VSE WHOLE LEG DIST TO GO	39
VSE AUX WPT	40
VSE GEOIDAL SEPARATION	41
VSE AGE OF DGPS DATA	42
VSE DGPS REF STATION ID	43

## WARNING

Euronav Ltd. reserves the right to modify or alter the GXF format specification, without notice. For an update, or information about the latest version, please contact ...

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