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Maritime Products & Services

Zones of Confidence (ZOC) Table

Cartographers use Category Zone of Confidence (CATZOC) values to highlight the accuracy of data presented on charts. The following table outlines the position accuracy, depth accuracy and seafloor coverage for each ZOC value to help you manage the level of risk when navigating in a particular geographic area. The information and values used in this table has been taken from the IHO's 'Regulations of the IHO for International Charts and chart specifications of the IHO' white paper.

ZOC [1]	Position Accuracy [2]	Depth Accuracy [3]		Seafloor Coverage	Typical Survey Characteristics [5]
A1	± 5 m + 5% depth	=0.50 + 1%d		Full area search undertaken. Significant seafloor features detected [4] and depths measured.	Controlled, systematic survey [6] high position and depth accuracy achieved using DGPS or a minimum three high quality lines of position (LOP) and a multibeam, channel or mechanical sweep system.
		Depth (m)	**Accuracy (m)**		
		10 30 100 1000	± 0.6 ± 0.8 ± 1.5 ± 10.5		
A2	± 20 m	= 1.00 + 2%d		Full area search undertaken. Significant seafloor features detected [4] and depths measured.	Controlled, systematic survey [6] achieving position and depth accuracy less than ZOC A1 and using a modern survey echosounder [7] and a sonar or mechanical sweep system.
		Depth (m)	**Accuracy (m)**		
		10 30 100 1000	± 1.2 ± 1.6 ± 3.0 ± 21.0		
B	± 50 m	= 1.00 + 2%d		Full area search not achieved; uncharted features, hazardous to surface navigation are not expected but may exist.	Controlled, systematic survey achieving similar depth but lesser position accuracies than ZOC A2, using a modern survey echosounder [5], but no sonar or mechanical sweep system.
		Depth (m)	**Accuracy (m)**		
		10 30 100 1000	± 1.2 ± 1.6 ± 3.0 ± 21.0		
C	± 500 m	= 2.00 + 5%d		Full area search not achieved, depth anomalies may be expected.	Low accuracy survey or data collected on an opportunity basis such as soundings on passage.
		Depth (m)	**Accuracy (m)**		
		10 30 100 1000	± 2.5 ± 3.5 ± 7.0 ± 52.0		
D	*Worse than ZOC C*	Worse than ZOC C		Full search not achieved, large depth anomalies expected.	Poor quality data or data that cannot be quality assessed due to lack of information.
U	Unassessed - The quality of the bathymetric data has yet to be assessed				

Explanatory notes quoted in the table:

1. The allocation of a ZOC indicates that particular data meets minimum criteria for position and depth accuracy and seafloor coverage defined in this Table. ZOC categories reflect a charting standard and not just a hydrographic survey standard. Depth and position accuracies specified for each ZOC category refer to the errors of the final depicted soundings and include not only survey errors but also other errors introduced in the chart production process. [Note: the rest of footnote 1 does not apply to paper charts and is therefore omitted from S–4].

2. Position Accuracy of depicted soundings at 95% CI (2.45 sigma) with respect to the given datum. It is the cumulative error and includes survey, transformation and digitizing errors etc. Position accuracy need not be rigorously computed for ZOCs B, C and D but may be estimated based on type of equipment, calibration regime, historical accuracy etc.

3. Depth accuracy of depicted soundings = a + (bxd)/100 at 95% CI (2.00 sigma), where d = depth in metres at the critical depth. Depth accuracy need not be rigorously computed for ZOCs B, C and D but may be estimated based on type of equipment, calibration regime, historical accuracy etc.

4. Significant seafloor features are defined as those rising above depicted depths by more than: Depth Significant Feature a. <40 m 2 m b. >40 m 10% depth A full seafloor search indicates that a systematic survey was conducted using detection systems, depth measurement systems, procedures, and trained personnel designed to detect and measure depths on significant seafloor features. Significant features are included on the chart as scale allows. It is impossible to guarantee that no significant feature could remain undetected, and significant features may have become present in the area since the time of the survey.

5. Typical Survey Characteristics – These descriptions should be seen as indicative examples only. 6 Controlled, systematic surveys (ZOC A1, A2 and B) – surveys comprising planned survey lines, on a geodetic datum that can be transformed to WGS 84. 7 Modern survey echosounder – a high precision single beam depth measuring equipment, generally including all survey echosounders designed post 1970.

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