



Consistent Use of Vertical Reference Datums in ENC's

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Definitions



Vertical Datum – Any level surface from which to reference elevations. Vertical clearances reference the **Vertical Datum**.

Sounding Datum – The horizontal plane or tidal datum to which soundings have been reduced.

VERDAT (verticalDatum for S-101) – The attribute used to encode **Vertical Datum** and **Sounding Datum**.

Aims



- Develop encoding constraints to ensure that values encoded for **Vertical Datums** and **Sounding Datums** are logical and consistent.
- Encoding constraints can be defined and verified by S-58 and the S-101 Data Classification and Encoding Guide.

Proposals



- **Vertical Datum** should reference a datum that is mean sea level or higher, or a non-tidal datum, e.g. *Local datum*.
- **Sounding Datum** should reference a datum that is mean sea level or lower, or a non-tidal datum.
- Intertidal areas should only be present when **Vertical Datum** and **Sounding Datum** are not equal.

Constraints for Vertical Datum and Sounding Datum



The S-101 DCEG already constrains **Vertical Datum** to the following.

Table 1

3	Mean sea level
16	Mean high water
17	Mean high water springs
18	High water
19	Approximate mean sea level
20	High water springs
21	Mean higher high water
24	Local datum
25	International great lakes datum 1985
26	Mean water level
28	Higher high water large tide
29	Nearly highest high water
30	Highest astronomical tide (HAT)

Constraints for Vertical Datum and Sounding Datum



However, the S-101 DCEG does not constrain the values for **Sounding Datum**. I.e. all values are allowed.

The reason for this is unclear.

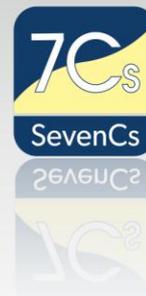
Proposed Constraints for Sounding Datum



Table 2

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
13	Low water
14	Approximate mean low water
15	Approximate mean lower low water
19	Approximate mean sea level
22	Equinoctial spring low water
23	Lowest astronomical tide
24	Local datum
25	International great lakes datum 1985
26	Mean water level
27	Lower low water large tide
44	Baltic Sea chart datum 2000 (S-101 only)

Proposed change to S-101 DCEG



Constrain the verticalDatum attribute to the values in Table 2 where verticalDatum refers to a **Sounding Datum**.

Proposed changes to S-58



Update check 2000 (based on the values in tables 1 and 2)

VERDAT		185	
	BRIDGE	11	3-16-17-18-19-20-21-24-25-26-28-29-30
	CBLOHD	21	3-16-17-18-19-20-21-24-25-26-28-29-30
	CONVYR	34	3-16-17-18-19-20-21-24-25-26-28-29-30
	CRANES	35	3-16-17-18-19-20-21-24-25-26-28-29-30
	GATCON	61	3-16-17-18-19-20-21-24-25-26-28-29-30
	LIGHTS	75	3-16-17-18-19-20-21-24-25-26-28-29-30
	PIPOHD	93	3-16-17-18-19-20-21-24-25-26-28-29-30
	M_SDAT	309	1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-19-22-23-24-26-27 (#)
	M_VDAT	312	3-16-17-18-19-20-21-24-25-26-28-29-30 (#)

Proposed changes to S-58



Check A (based on Table 1)

Check description	Check message	Check solution	Cat
If the VDAT subfield of the DSPM field is not equal to 3, 16, 17, 18, 19, 20, 21, 24, 25, 26, 28, 29 or 30.	DSPM/VDAT does not refer to a high water or local datum.	Encode a legal value for VDAT.	E

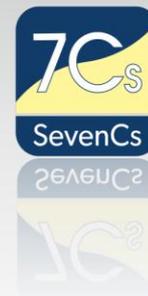
Proposed changes to S-58



Check B (based on Table 2)

Check description	Check message	Check solution	Cat
If the SDAT subfield of the DSPM field is not equal to 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 19, 22, 23, 24, 26 or 27.	DSPM/SDAT does not refer to a low water or local datum.	Encode a legal value for SDAT.	E

Proposed changes to S-58



Check C1

Check description	Check message	Check solution	Cat
For each intertidal feature object (DEPARE feature object where DRVAL2 is Less than or equal to 0) where both the Vertical Datum and Sounding Datum of that area are Equal.	Vertical and sounding datums are the same for intertidal area.	Amend datum values so that the vertical datum is above the sounding datum.	E

Proposed changes to S-58



Check C2

Check description	Check message	Check solution	Cat
For each intertidal feature object (DEPARE feature object where DRVAL2 is Less than or equal to 0) where both the Vertical Datum and Sounding Datum of that area are Equal to a Mean Sea Level datum (3 (Mean sea level), 19 (Approximate mean sea level) or 26 (Mean water level)).	Vertical and sounding datums are the same for intertidal area.	Amend datum values so that the vertical datum is above the sounding datum.	E



Thank you!

Questions?