

ANNEX B-7: UNITS AND CONVERSION

This notes summarises the units that should be used for data submission within the COMBINE programme, and also gives the relevant formulas for conversion between different commonly used units.

References are made to the appropriate sections of the COMBINE Manual.

Please note that the units dm^3 and cm^3 are used throughout the note, although the units l (litre) and ml (millilitre) would be equally correct.

Part 1: Units

Parameter	Symbol	Unit	Comment
Temperature	t	C	see Annex C2
Salinity	S		see Annex C2
Secchi depth (light attenuation)		m	according to the current definition of the Practical Salinity Scale of 1978 (PSS78) see Annex C2
Current speed		cm/s	see Annex C2
Current direction			report as compass directions; see Annex C2
Dissolved Oxygen	DO	cm^3/dm^3	see Annex C2
Oxygen saturation			reported as fraction (%) see Annex C2
Hydrogen Sulphide		$\mu\text{mol}/\text{dm}^3$	see Annex C2
Nutrients		$\mu\text{mol}/\text{dm}^3$	as N, P or Si; see Annex C2
Total P and N	TP/TN	$\mu\text{mol}/\text{dm}^3$	see Annex C2
pH			NBS-scale; see Annex C2
Alkalinity		mmol/dm^3	as carbonate, see Annex C2
Particulate and dissolved organic matter (TOC, POC, DOC and PON)		$\mu\text{mol}/\text{dm}^3$	as C or N; see Annex C2
Humic matter			depending on way of calibration; see Annex C2
Parameter	Symbol	Unit	Comment
Heavy metals in water		ng/dm^3 or pg/dm^3	dissolved
Halogenated organics in water		ng/dm^3	
PAH in water		ng/dm^3	
Heavy metals in biota		$\mu\text{g}/\text{kg}$	wet weight
Halogenated organics in biota		$\mu\text{g}/\text{kg}$ or ng/kg	wet weight, reported together with lipid content
Total suspended matter load		mg/dm^3	

Chlorophyll-a	Chl-a	mg/m ³	see Annex C4
Primary production (as carbon uptake)		mg/m ³ *h	see Annex C5
Phytoplankton species			see Annex C6
--- -abundance		Counting units/dm ³	
---- biomass		mm ³ /dm ³	
Mesozooplankton			see Annex C7
--- abundance		Individuals/m ³	
--- biomass		mm ³ /m ³ ; mg/m ³	
Macrozoobenthos			see Annex C8
--- abundance		Counting units/m ²	
--- biomass		g/m ²	dry or wet weight

Part 2: Conversions:

Parameter	From	To	Formula or multiplication factor
Any compound	g/dm ³	mol/dm ³	(g/dm ³)/molar weight
	mol/dm ³	g/dm ³	(mol/dm ³)* molar weight
	µmol/kg	µmol/dm ³	(µmol/kg)*density; density determined from salinity, temperature and pressure
	µmol/dm ³	µmol/kg	(µmol/dm ³)/density; density determined from salinity, temperature and pressure
Dissolved Oxygen	mg/dm ³	cm ³ /dm ³	0,700
	cm ³ /dm ³	mg/dm ³	1,429
	µmol/dm ³	cm ³ /dm ³	0.0224 [µmol/dm ³ *0.0224=cm ³ /dm ³]
	cm ³ /dm ³	µmol/dm ³	44.6
	mg/dm ³	µmol/dm ³	31.25
	µmol/dm ³	mg/dm ³	0.0320 [0.0319988]
	DO	Oxygen saturation	see Grasshoff et al., Methods of Seawater Analysis, 2nd or 3rd edition
Oxygen saturation	DO	see Grasshoff et al., Methods of Seawater Analysis, 2nd or 3rd edition	
Hydrogen sulphide	µmol/dm ³	Negative oxygen	- 0.044001 (multiplication factor)
	Negative oxygen	µmol/dm ³	- 22.727 (multiplication factor)