

Applications and Application groups for CIB water quality instruments

version 25-4-2017

Application groups	Application group	Real-time multi-parameter					Autonomous multi-parameter		Autonomous and readable			Anti-fouling real-time multi-parameter	
Applications		A	B	C1	C2	C3	D	E	F	G	H	I	
Application reference													
Application title		marine tow fish (rugged and fast)	marine profiler	inland waterways / coastal tow fish and profiler: Zeeland	inland waterways / coastal tow fish and profiler: Wadden	inland waterways / coastal tow fish and profiler: IJM and rivers	CTD measurement project	Multi-parameter measurement project	manual measurements general multi-parameter	Manual temperature measurement	manual PAR light intensity measurement	Measuring pontoon in flow-through system	
Measuring platform		tow fish	Profiler	Tow fish	Tow fish	Tow fish	Quayside, shore	Quayside, shore	From bridge, boat, shore	From bridge, boat, shore	Boat	Measuring pontoon	
Locations (vessel names in brackets)		North Sea (Zirfaea)	North Sea (Zirfaea and Arca)	Zeeland (Roompot, Delta)	Wadden Sea (Asterias, Harder)	IJsselmeer (MS Zuiderzee), Rivers	Brackish rivers, locks, weirs	National: Rivers, Wadden Sea, inland lakes	National: Rivers, Wadden Sea, inland lakes	Wadden Sea (Asterias, Harder) IJsselmeer (Zuiderzee)	IJM (Zuiderzee) Rhoon (Nes)	Eijsden, Lobith, Bimmen	
Indicative number in use	Expected number used individually	1	2	2	2	2	40	3	5	7	6	4	
Test-specific requirements	Parameters	test range	accuracy	measurement	accuracy	measurement	accuracy	measurement	accuracy	measurement	accuracy	measurement	accuracy
Parameters	temperature (T)	-4 ↔ 40 °C	+/- 0.1 °C	0 ↔ 6000 mS/m	+/- 1%	0 ↔ 20 mg/l	+/- 0.2 mg/l	0 ↔ 4000 NTU	+/- 3%	0 ↔ 4000 FTU	+/- 3%	4 ↔ 10 pH	+/- 0.1 pH
	conductivity (Ec)	-4 ↔ 40 °C	+/- 0.1 °C	0 ↔ 6000 mS/m	+/- 1%	0 ↔ 20 mg/l	+/- 0.2 mg/l	0 ↔ 4000 NTU	+/- 3%	0 ↔ 4000 FTU	+/- 3%	4 ↔ 10 pH	+/- 0.1 pH
	dissolved oxygen (DO)	-4 ↔ 40 °C	+/- 0.1 °C	0 ↔ 6000 mS/m	+/- 0.5%	0 ↔ 20 mg/l	+/- 0.2 mg/l	0 ↔ 4000 NTU	+/- 3%	0 ↔ 4000 FTU	+/- 3%	4 ↔ 10 pH	+/- 0.1 pH
	turbidity (D)- nephelometric	-4 ↔ 40 °C	+/- 0.1 °C	0 ↔ 6000 mS/m	+/- 0.5%	0 ↔ 20 mg/l	+/- 0.2 mg/l	0 ↔ 4000 NTU	+/- 3%	0 ↔ 4000 FTU	+/- 3%	4 ↔ 10 pH	+/- 0.1 pH
	turbidity (D) - backscatter	-4 ↔ 40 °C	+/- 0.1 °C	0 ↔ 6000 mS/m	+/- 0.5%	0 ↔ 20 mg/l	+/- 0.2 mg/l	0 ↔ 4000 NTU	+/- 3%	0 ↔ 4000 FTU	+/- 3%	4 ↔ 10 pH	+/- 0.1 pH
	acidity (pH)	-4 ↔ 40 °C	+/- 0.1 °C	0 ↔ 6000 mS/m	+/- 0.5%	0 ↔ 20 mg/l	+/- 0.2 mg/l	0 ↔ 4000 NTU	+/- 3%	0 ↔ 4000 FTU	+/- 3%	4 ↔ 10 pH	+/- 0.1 pH
	fluorescence - Chlorophyl (fChl)	-4 ↔ 40 °C	+/- 0.1 °C	0 ↔ 6000 mS/m	+/- 0.5%	0 ↔ 20 mg/l	+/- 0.2 mg/l	0 ↔ 4000 NTU	+/- 3%	0 ↔ 4000 FTU	+/- 3%	4 ↔ 10 pH	+/- 0.1 pH
	fluorescence - cyanobacteria (fBGA)	-4 ↔ 40 °C	+/- 0.1 °C	0 ↔ 6000 mS/m	+/- 0.5%	0 ↔ 20 mg/l	+/- 0.2 mg/l	0 ↔ 4000 NTU	+/- 3%	0 ↔ 4000 FTU	+/- 3%	4 ↔ 10 pH	+/- 0.1 pH
	PAR light intensity (Eo) for extinction	-4 ↔ 40 °C	+/- 0.1 °C	0 ↔ 6000 mS/m	+/- 0.5%	0 ↔ 20 mg/l	+/- 0.2 mg/l	0 ↔ 4000 NTU	+/- 3%	0 ↔ 4000 FTU	+/- 3%	4 ↔ 10 pH	+/- 0.1 pH
	depth (d)	-4 ↔ 40 °C	+/- 0.1 °C	0 ↔ 6000 mS/m	+/- 0.5%	0 ↔ 20 mg/l	+/- 0.2 mg/l	0 ↔ 4000 NTU	+/- 3%	0 ↔ 4000 FTU	+/- 3%	4 ↔ 10 pH	+/- 0.1 pH
	CDOM	-4 ↔ 40 °C	+/- 0.1 °C	0 ↔ 6000 mS/m	+/- 0.5%	0 ↔ 20 mg/l	+/- 0.2 mg/l	0 ↔ 4000 NTU	+/- 3%	0 ↔ 4000 FTU	+/- 3%	4 ↔ 10 pH	+/- 0.1 pH
	pCO2	-4 ↔ 40 °C	+/- 0.1 °C	0 ↔ 6000 mS/m	+/- 0.5%	0 ↔ 20 mg/l	+/- 0.2 mg/l	0 ↔ 4000 NTU	+/- 3%	0 ↔ 4000 FTU	+/- 3%	4 ↔ 10 pH	+/- 0.1 pH
	Accurate acidity (pH)	-4 ↔ 40 °C	+/- 0.1 °C	0 ↔ 6000 mS/m	+/- 0.5%	0 ↔ 20 mg/l	+/- 0.2 mg/l	0 ↔ 4000 NTU	+/- 3%	0 ↔ 4000 FTU	+/- 3%	4 ↔ 10 pH	+/- 0.1 pH
	Measurement-specific preconditions	Minimum measurement frequency (Hz)	≥12	≥24	≥1	n/a	n/a	≥ 2	n/a	≥1	n/a	≥1	≥0.1
	Usage aspects	Response time (per parameter) * The response time includes any pumping time, if a sensor pump is used for water supply.	Oxygen, acidity, fluorescence: around 1 minute. The rest 1 sec	Oxygen, acidity, fluorescence: around 1 minute. The rest 1 sec	Oxygen, acidity, fluorescence: around 1 minute. The rest 1 sec	Oxygen, acidity, fluorescence: around 1 minute. The rest 1 sec	Oxygen, acidity, fluorescence: around 1 minute. The rest 1 sec	About 1 second	Oxygen, acidity, fluorescence: around 1 minute. The rest 1 sec	Oxygen, acidity, fluorescence: around 1 minute. The rest 1 sec	1 sec	1 sec	Oxygen, acidity, fluorescence: around 1 minute. The rest 1 sec
Data	Internal data logger	-	-	-	-	-	≥ 100,000 readings	≥ 100,000 readings	≥ 100,000 readings	-	≥ 1000 readings	≥ 1000 readings	
	Real-time data output	Yes, RS232 ASCII	Yes, RS232 ASCII	Yes, RS232 ASCII	Yes, RS232 ASCII	Yes, RS232 ASCII	-	-	-	-	-	Yes, RS232 ASCII	
Power supply	Readable on instrument	-	-	-	-	-	-	-	Yes	Yes	Yes	-	
	Internal power supply (battery) permanent (sufficient capacity available)	-	-	-	-	-	Yes	Yes	Yes	Yes	-	-	
Version	standard	-	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes	
	compact/mobile	-	-	-	-	-	-	Yes	Yes	Yes	Yes	-	
	rugged	Yes	-	-	-	-	-	-	-	-	-	-	
Requirements from data-acquisition	Frequency of use in water	Weekly	Zirfaea weekly: Arca only in emergency cases	Weekly	Weekly	Weekly	Project-based for a few days	Half-yearly, for one month	Weekly	Weekly	Weekly	Continually	
Aspects of environmental conditions	Anti-fouling	No	No	No	No	No	No	No	No	No	No	Yes	
	Max. current or navigation speed	15 knots	n/a	10 knots	10 knots	10 knots	n/a	n/a	n/a	n/a	n/a	n/a	
	Temperature of body of water	0 to 40 °C	0 to 40 °C	0 to 40 °C	0 to 40 °C	0 to 40 °C	0 to 40 °C	0 to 40 °C	0 to 40 °C	0 to 40 °C	0 to 40 °C	0 to 40 °C	
	Maximum water depth (watertight)	To 60 meters	To 60 meters	To 60 meters	To 60 meters	To 60 meters	To 60 meters	To 60 meters	To 60 meters	To 60 meters	To 20 meters	To 20 meters	
Integration in measurement configuration	Connection of interfaces beyond scope	PC, umbilical (2-core)	Echo sounder, PC, umbilical (2-core)	Echo sounder, PC, Umbilical (multiple cores available)	PC	PC	None	None	None	None	Wadden: PC and pressure sensor	PC	
	Additional functionality within scope	Bundling measurement signals underwater	Bundling measurement signals underwater, incl. echo sounder	Bundling measurement signals underwater, incl. echo sounder	Bundling measurement signals underwater	Bundling measurement signals underwater	Stand-alone with own power supply and data storage	Stand-alone with own power supply and data storage	Convenient in use, stand-alone	Convenient in use, stand-alone	Bundling measurement signals, incl. pressure sensor	Bundling measurement signals	
Software functions	Programming and calibrating	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
	Data-gathering interfaces beyond scope	No	Yes, echo sounder	Yes, echo sounder	No	No	No	No	No	No	Yes, pressure sensor (Wadden Sea)	No	
	Presenting and exporting	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes (after reading logger)	Yes (after reading logger)	No	Yes	