

Annex 3 Programme of Requirements (PoR)

Ozonesondes (nr. 31193342)

#	Requirement	Mandatory / Desired	Documentary proof or Information
1	The offered instrument shall be an Electro Chemical Current Ozonesonde as described in the WMO-GAW report no. 168, "Ozonesonde Measurement Principles and Best Operational Practices, ASOPOS2.0", August 2021, chapter 2: "Ozonesonde-electrochemical concentration cell (ECC)"	M	
2	The same type of ozonesonde shall be available for at least 10 years.	M	
	Operational requirements		
3	The ozonesonde and its housing are equipped to be flown with a meteorological balloon with a vertical velocity between 5 and 10m/s up to an altitude of 10 hPa	M	
4	The ozonesonde can operate with ambient pressures between 1100 and 10 hPa, temperatures between -90C and 40C, and relative humidity up to 100%.	M	
5	The ozonesonde shall come with its own power source, which shall deliver sufficient power during both upward and downward profile.	M	
6	The ozonesonde shall have an operational uptime of at least 240 minutes after switching on. This is a requirement on the combination of pump current and battery capacity.	M	
7	The ozonesonde including its housing and power source shall weigh less than 1.5 kg	M	
8	The ozonesonde is protected in such a way that the chemical solution will neither freeze nor boil during the entire flight. If this requires additional heating or cooling in some cases, the Tenderer shall specify these cases and which heating or cooling methods must be applied to prevent the solution from freezing and boiling.	M	Tenderer must provide the information to demonstrate this
9	Preferably, the ozonesonde box is well-isolated, and no additional heating or cooling is needed to prevent the chemical solution from freezing and from boiling, for the temperature profile range given in Annex 12.	D	The box is considered well-isolated if the box-temperature during flight stays between +5 C and +35 C without additional heating or cooling for the temperature profile range given in Annex 12. Tenderer must provide the information to demonstrate this.
	Performance		
10	The maximum uncertainty of the measurements, after processing according to th WMO-GAW report no. 168, must be less than 10% for the complete operating range	M	Tenderer must provide the information to demonstrate this
11	After proper preparation, according to Standard Operating Procedures, the so-called "background current (IB0)" must be smaller than 0.05 micro Ampere.	M	Tenderer must provide the information to demonstrate this
12	The pump flow rate, and therefore the pump motor, shall be stable (less than 2% variation) for the complete operating range	M	Tenderer must provide the information to demonstrate this
13	The response time, defined as the time to drop from 4 to 1.5 uA after exposure to an external ozone source, shall be less than 40 seconds	M	Tenderer must provide the information to demonstrate this
	Data output		
14	The ozonesonde output shall contain at least the raw ECC current, the pump temperature, pump motor current and battery voltage.	M	
15	The ozonesonde output optionally contains the pump rotation frequency.	D	Tenderer must provide a statement that the pump frequency is part of the output and provide a description and example of the Xdata string, in which it is clear that the pump frequency is part of the string.

	Data Communication		
16	It shall be possible to connect the ozonesonde to different brands of radiosondes	M	Tenderer shall specify which brands of radiosondes are compatible
17	The output data must be compatible with the Xdata protocol.	M	
	Required documentation		
18	The Tenderer shall demonstrate the performance of the ozone sondes by documented tests and/or intercomparisons, in particular with regard to mandatory requirements 8, 10, 11, 12, 13, and 16.	M	
19	Reusable, recyclable and/or biodegradable material for all components is preferred	D	See descriptive document 6.2.1
20	Human rights risk planning	D	See descriptive document 6.2.2
	Service and communication		
21	Performance issues of the ozonesondes must be investigated promptly. Non-compliant instruments must be repaired/replaced within 6 weeks at no cost for KNMI	M	
22	Delivery time of ozonsondes is within 4 months after ordering.	M	
23	The Tenderer shall communicate any changes in design, material, or production method during the contract period; the Tenderer shall demonstrate that the above requirements (PoR) are still met after the change.	M	