PR18175 AW6.1 Mandatory Criteria

1. MANDATORY REQUIREMENTS

Scoring methodology is pass/fail

Proposals will cover all components necessary, including:-

Item	Specification Reference	Description	Yes (Y) or No (N)
1	1.1 para 3	Equipment supplied must be suitable for operation in the UK and Europe.	
2	1.1 para 3	Equipment supplied must meet European Regulations and, as appropriate, be CE marked.	
3	1.2 a)	Documentation and minutes for agreed review meetings with customer (minimum three meetings) will be provided.	
4	1.2 b)	Factory and Site Acceptance test procedures will be supplied	
5	1.2 c)	Quality management plan including quality control measures and reviews will be supplied	
6	1.2 d)	Factory and Site Acceptance Test reports will be provided including proofs of compliance	
7	1.2 e)	Full support documentation in English will be provided	
8	1.2 f)	Engineering drawing pack and design file including P&ID, Detailed drawings of the GA, 3D models (STEP, IGES or Parasolid), electrical drawings, software coding and documentation will be provided for the prototype	
9	1.2 f)	Engineering drawing pack and design file including P&ID, GA and all detailed drawings necessary for manufacture of the production model, 3D models (STEP, IGES or Parasolid), electrical drawings, software coding and documentation will be provided for the production unit.	
10	1.2 g)	Costed list of recommended spares will be provided	
11	1.2 h)	Environmental Safety and Health report will be provided	
12	1.2 i)	COSHH assessment, data sheets and documentation will be provided	

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13	1.2 j)	Lifting certification (analysis and proof load testing) in compliance with LOLER will be provided	
14	1.2 k)	Quality Assurance Documents for the completed device will be provided	
15	1.2 l)	Full technical construction file, certification and declaration of conformity in compliance with EU trading regulations (CE marking) will be provided	
16	1.2 (second paragraph)	All documentation shall be in English	
17	1.4 (first paragraph) and 2.3.2	A logically linked, work breakdown structure based project plan shall be provided	
18	2.4	The system must be capable of operating for extended periods in excess of six months without maintenance	
19	2.5 (third paragraph)	A hazard database or HAZOP study shall be provided	
20	2.6	Detailed installation, operation and maintenance manuals must be provided for the system	
21	3.1.1	The system will be optimised for operation under the following conditions: Helium mass flow rate: 200g/s Pressure 9.3 barA at 140K Temperature stability ± 0.5K or better Absolute temperature (at inlet to amplifier): 140K	
22	3.1.2	System shall be designed to consider the system's own heat loads (fans) and normally expected heat loads.	
23	3.1.2	System shall be designed for heat load of 4kW from the laser amplifier.	
24	3.1.3 c)	The supplier will provide a dummy head for test purposes	
25	3.1.4 a)	Pressure test certificate/s for the helium circuit and associated blanking flanges shall be supplied	

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26	3.1.4 b)	The helium loop shall contain a minimum of one pressure sensor ranged 0-25 barA which shall be capable of withstanding the necessary test pressure	
27	3.1.4 d)	All components within the helium gas of the circulator must be oil free	
28	3.1.4 e)	The helium circuit shall contain at least one pressure relief valve with calibration certificate	
29	3.1.4 f)	The helium circuit input and exhaust port shall be fitted with a manual diaphragm shutoff valve	
30	3.1. g)	The helium circuit evacuation port shall be fitted with a suitable valve that can withstand the maximum allowable pressure	
31	3.1.4 h)	Provision for all exhausts from PRVs, bursting discs etc. to be captured to allow venting externally to the laser operating area.	
32	3.1.4 i)	The requirements of the EC Pressure Equipment Directive and the Pressure Systems Safety Regulations (Year 2000) shall be followed.	
33	3.1.5 c)	Temperature stability of the helium gas under constant amplifier heat load within ± 0.5 K	
34	3.1.5 d)	The helium circuit shall contain at least two temperature sensors measuring helium gas temperature.	
35	3.1.5 f)	The rate of change of temperature at P1 shall be regulated by the control system and shall not exceed ± 15 K/min	
36	3.1.7 a)	The assembled cooling system shall fit within the maximum space available	
37	3.1.7 b)	The component parts of the system, including retractable wheels and adjustable feet, shall be able to fit through the door	
38	3.1.7 i)&j)	The circulator will be fitted with a method of manoeuvring, aligning securing the circulator assembly	
39	3.1.7 k)	The circulator and refrigerator must be capable of being handled using fork lift, single hook crane and pallet truck through LOLER compliant lifting points	

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40	3.1.7 o)	Vacuum in the cooling system shall be independent from the vacuum space of the amplifier head. The supplier shall provide the vacuum break or barrier at the interface.	
41	3.1.7 p)	All vacuum carrying pipes and vessels must be fitted with vacuum pumping ports and appropriate safeguards against overpressure (including calibration certificates)	
42	3.1.7 u)	The system shall be self-sufficient and not require infrastructure other than power supply	
43	3.1.7 z)	All metal surfaces shall have a uniform and consistent finish.	
44	3.1.7 aa)	All electrical componentry shall be housed in a suitable wall mounted cabinet to at least IP55.	
45	3.1.7 bb)	The electrical cabinet and all electrical cabling shall comply with the Low Voltage Directive 2014/35/EU	
46	3.1.9 a)	No oil or grease is used in any part of the helium circuit and in particular within any unsealed bearings of the fan	
47	3.1.9 c)	Any pumps or compressors that are used in manufacturing and testing or purging the Helium circuit must be oil, grease and contaminant free	
48	3.1.9 d)	Supplier vacuum regions shall be oil and grease free	
49	3.1.9 e)	Supplier shall draw up a procedure for ensuring and testing “oxygen clean” cleanliness of the system	
50	3.2 (first paragraph)	A control system must be provided in order to be able to locally control the device	
51	3.2 (first paragraph)	A user interface must be provided able to operate the device locally. The user interface must be capable of being removed and remotely connected using an umbilical.	
52	3.2 (third paragraph)	The local control system must provide an interface for remote control and historical data logging of the device that is compatible with EPICS	
53	3.2 (seventh paragraph)	The source/application code for both the Control and User Interface must be provided, including any software tool/license required to view the code	
54	3.2 (eighth paragraph)	The whole system must be seen as a black-box from the supervising control system with at least the following requirements: control functionality, all data, including errors/faults/alarms, a “health signal” to indicate whether the system is OK, a command indicating which error was last	

Item	Specification Reference	Description	Yes (Y) or No (N)
		produced and the ability to set the IP address for external communication	
55	3.2 (tenth paragraph)	Under both remote and local control it shall be possible to change key parameters without shutting down and restarting the system to initiate the change.	
56	3.2.1 (first paragraph)	The System will provide a user interface (or control panel) for stand-alone operation that displays actual and set values for all important parameters at the same time. This will include, but may not be limited to: Temperature readings for the various sensors, rate of temperature change (ramp), valve positions, fan speed, flow rate, heater power, helium pressure, state of digital inputs and outputs, alarms and trips	
57	3.2.1 (second paragraph)	The user interface shall include at least two graphs on which the history of any of those parameters can be selected and displayed over a variable length of time, from 1 hour to 8 hours minimum	
58	3.2.2 a)	System shall include a number of digital inputs and outputs for interlock signals to ensure that the System is only operated when safe to do so and to ensure that external equipment is only operated when the System can provide sufficient cooling	
59	3.2.2 b)	Inputs (minimum 3 off.) shall interrogate a potential-free contact supplied by Customer, contact closed means True (safe to continue)	
60	3.2.2 c)	Outputs (minimum 2 off.) shall be implemented as a potential free contact that can be interrogated by Customer	
61	3.2.4 (second paragraph)	The system shall clearly show the reason for the alarm or trip to allow the operator to act accordingly	
62	3.2.4 (second paragraph)	The alarm or trip shall continue to show until the operator has acknowledged and cleared the alarm or trip at the HMI	
63	3.2.5.1	In the event of a system malfunction, or power loss to the laboratory, a cryostat emergency shutdown procedure will be activated, such that the system goes to a state where the risk of damage to itself or to the surroundings is minimised	
64	3.3 (first paragraph)	Racks need to be able to fit through a 2 m high door when on castors/pallet truck.	

Item	Specification Reference	Description	Yes (Y) or No (N)
65	3.3 (second paragraph)	All cabling between components and racks that need disconnecting for transport shall have terminations at each end to enable simple re-installation	
66	8	The equipment shall be guaranteed for 24 months after delivery or 12 months after final acceptance, whichever is the later. The Supplier agrees to this guarantee.	