**Appendix No. 2 to the Request for Quotation No. 2/CPR/2023 – description of the subject of the contract**

 **DESCRIPTION OF THE SUBJECT OF THE CONTRACT**

1. **Robotic dispensing system for radiopharmaceuticals - 3 pcs**

The subject is the robotic dispensing system for radiopharmaceuticals with following features.

This dispenser complies with EU GMP guidelines and is equipped with a chamber for inserting materials and an extraction system with shielded container and has shielded liquid waste compartment. The dispenser is suitable for aseptic operations or final sterilisation with the built-in autoclave module. The dispenser receives the multi-dose solution of the drug substance of radiopharmaceutical from the synthesis module into a bulk vial, and is capable of immediate RAC (radioactive concentration) calculation thanks to the built-in dose calibrator and scales. Then it automatically carries the formulation of the drug product by dilution with the solution of excipient to achieve the preset RAC.

Final container dispensing is based on weight/volume measurement with dispensed activity verification with a second dose calibrator. The dispenser features gas-driven dispensing technology using a simplified, easy-to-install and cost-effective consumable kit with sterilizing filter built-in at dispensing point.

This technology is used for automatic filling of open vials.

All the critical chamber parameters are monitored (pressure in pre-chamber; pressure, temperature, humidity and LAF speed in main chamber, pressure in dispensing tube).

Real-time parameters visualisation is available on the user interface panel and historic trend in a database created by an embedded data logger.

Main features:

* Epoxy-coated carbon steel support structure
* 304 AISI stainless steel front coverings, easy to decontaminate, separates the laboratory area (front) from the technical cabinet (rear)
* 316L AISI stainless steel work chambers with Mirror-Bright internal surface finish, TIG continuous welds, and widely rounded corners
* Shielded chamber under constant negative or positive pressure
* Shielded hinged front door with shielded glass
* Shielding elements from primary ingots with Pb 98% + Sb 2% purity.
* Shielding of 75 mm Pb
* Ventilation system for the main chamber, consisting of a supply fan and an air extraction fan, an absolute HEPA H14 inlet filter, and an active carbon filter for expelling waste air
* Work chamber for dispensing with air quality complying with Class A "At rest" (EU GMP), equipped with local laminar flow in the critical area and handling gloves
* Material passage chamber (airlock) with air quality complying with Class B "At rest" (EU GMP), equipped with handling gloves
* Shielded entry for radioactive fluids
* Internal manipulation system through anthropomorphic robot for fully automatic dispensing without operator
* Dispensing system with separate calibrator for bulk and filled containers
* Product extraction system in shielded container by means of a specific automatic drawer, which is an airlock system with air quality complying with Class B "At rest" (EU GMP)
* Automatic processes supported in the formulation stage: predilution in bulk, concentration calculation, automatic adjustment of the optimum concentration, dilution in bulk with flushing inert gas for bubbling the solution and making it homogeneous
* Automatic processes supported in the dispensing phase: remove / apply cap, remove / apply rubber stopper, volume filling or calculated activity, automatic crimping
* touch-screen operator panel to check and trace the critical parameters of the machine both in "at rest" or "in operation" mode.
* Recipe management, automation and workflow control by means of operator interface developed in accordance with GAMP regulation and compliant with Annex 11 of EU GMP
* Bubble point test (BPT) for automatic verification of filters integrity
* Integrated circuit for bioburden test by-passing the sterilizing filter
* Traceability of production through the creation and application of barcode on each vial processed
* Tray manually operated for introduction / extraction materials
* Temperature and humidity sensor
* There is 0.22 μm sterilising ventilated filter in the disposable kit next to filling point
* automatic procedures for washing the disposable at the end of the production cycle integrating cleaning cycles with ethanol
* Possibility of introducing particle and microbiological contamination monitoring probes
* liquid and solid waste compartment with back door for extraction
* Possibility of setting up chamber and pre-chamber for sanitization cycles with vaporized hydrogen peroxide (VPHP) and use of compatible materials
* Integrated particle counter for main chamber and pre-chamber which controls particle sizes 0.5|um and 5.0|um with a flow speed of 1.0 CFM (28.3 LPM). The sensor is directly built into the control panel of the cell using Modbus/RS485 communication. The counter complies with ISO 21501-4. The counter complies with GMP requirements and is suitable to monitor classified environments.
* Built in autoclave for over 30 vials with separate sterilization parameters monitoring system aside the autoclave control system
* Overall dimensions of the cell maximum (w x d x h)[mm] 1800 x 1300 x 2400
* The system should be equipped with radiomonitoring satisfying the atomic law requirements.

The offer should include installation and IOQ qualification.

The offer should be priced per machine offered.

1. **Double hot cell for radiopharmaceutical synthesis modules in horizontal alignment – 3 pcs**

The shielded hot cells for synthesis modules will host automatic synthesis modules for the production of radiopharmaceuticals for experimental use or daily production in EU GMP radiopharmacy.

They should guarantee radioprotection to the operator and the utmost decontamination and cleaning procedures effectiveness. The compartments are sealed, shielded on every side, and kept under negative pressure.

Main features:

* Epoxy-coated carbon steel support structure
* 304 AISI stainless steel front coverings, easy to decontaminate, separates the laboratory area (front) from the technical cabinet (rear)
* 316L AISI stainless steel work chambers with Mirror-Bright internal surface finish, TIG continuous welds, and widely rounded corners
* Chambers tightness ensured by inflatable gasket system, placed on the perimeter of the openings
* Shielded and hinged front doors
* Shielding elements made with primary ingots (Pb 98% + Sb 2% purity)
* Shielding equivalent to 75 mm Pb
* Shielded glass window in each chamber
* Air inlet filtration system made with HEPA absolute filtering cartridge with 99.995% efficiency
* Air outlet filtration system made with active carbon filtering cartridge
* Work chambers air quality complies with Class B "At rest" (EU GMP)
* 1/8" technical gas supply lines with shut-off valves, which can be controlled from the outside
* 6 mm technical gas supply line with shut-off valves, which can be controlled from the outside
* Shielded entry for radioactive fluids
* Cable inlet via multi-diameter seal system
* Protected power supply sockets controlled from the operator panel
* touch-screen operator panel to check and trace the critical parameters of the machine both in "at rest" or "in operation" mode
* Removable tray for synthesis module
* a Geiger-Muller probe to detect radioactivity inside the cell and door interlock management
* a system for automatic leak tests
* connecting of the hot cell to the contaminated air compressing station (ACS)
* installation of the automatic ventilation closing system
* The system should be equipped with radiomonitoring satisfying the atomic law requirements.
* Internal dimensions of each box at least (w x d x h) [mm] 600x500x548 (from tray)
* Internal dimensions of the tray at least (w x d)[mm] 600x500
* Overall dimensions of the cell maximum (w x d x h)[mm] 2200 x 1200 x 2400

The offer should include installation and IOQ qualification.

The offer should be priced per machine offered.

1. **Double hot cell for radiopharmaceutical synthesis modules in vertical alignment - 1 pcs**

The shielded hot cells for synthesis modules will host automatic synthesis modules for the production of radiopharmaceuticals for experimental use or daily production in EU GMP radiopharmacy.

They should guarantee radioprotection to the operator and the utmost decontamination and cleaning procedures effectiveness. The compartments are sealed, shielded on every side, and kept under negative pressure.

Main features:

* Epoxy-coated carbon steel support structure
* 304 AISI stainless steel front coverings, easy to decontaminate, separates the laboratory area (front) from the technical cabinet (rear)
* 316L AISI stainless steel work chambers with Mirror-Bright internal surface finish, TIG continuous welds, and widely rounded corners
* Chambers tightness ensured by inflatable gasket system, placed on the perimeter of the openings
* Shielded and hinged front doors
* Shielding elements made with primary ingots (Pb 98% + Sb 2% purity)
* Shielding equivalent to 100 mm Pb
* Shielded glass window in each chamber
* Air inlet filtration system made with HEPA absolute filtering cartridge with 99.995% efficiency
* Air outlet filtration system made with active carbon filtering cartridge
* Work chambers air quality complies with Class B "At rest" (EU GMP)
* 1/8" technical gas supply lines with shut-off valves, which can be controlled from the outside
* 6 mm technical gas supply line with shut-off valves, which can be controlled from the outside
* Shielded entry for radioactive fluids
* Cable inlet via multi-diameter seal system
* Protected power supply sockets controlled from the operator panel
* touch-screen operator panel to check and trace the critical parameters of the machine both in "at rest" or "in operation" mode
* Removable tray for synthesis module
* a Geiger-Muller probe to detect radioactivity inside the cell and door interlock management
* a system for automatic leak tests
* connecting of the hot cell to the contaminated air compressing station (ACS)
* installation of the automatic ventilation closing system
* The system should be equipped with radiomonitoring satisfying the atomic law requirements.
* Teflon coating of internal surface of cells required to protect against strong acids
* Internal dimensions of each box at least (w x d x h) [mm] 620x730x670
* Internal dimensions of the tray (w x d)[mm] 600x500
* Overall dimensions of the cell maximum (w x d x h) [mm] 1295 x 1220 x 2400

The offer should include installation and IOQ qualification.

The offer should be priced per machine offered.

1. **Radiomonitoring system – 1 set**
* The radiomonitoring system should consist of at least:
* Environmental monitoring system hardware - 1 pcs
* Environmental monitoring system software for large lab - 1 pcs
* Detection unit with geiger mueller detector and system interface – 9 pcs
* Luminous alarm column - 5 pcs
* Neutron detector with system interface - 1 pcs
* Stack monitor for continuous air activity measurement in the stack including gamma spectrometry probe and multichannel analyzer with system interface - 1 pcs
* Digital flow meter for stack monitor with system interface - 1 pcs

The offer has to include installation, SAT and training of the personel.

1. **Contaminated air compressing station – 1 pcs**

The system collects radioactive air from inside of hot cells during radiopharmaceutical production or after a malfunction of the synthesis modules.

The extracted air is then sent to a compression system and stored inside pressurised tanks. Once the stored radioactive activity has decayed, the air, no longer contaminated, is discharged in the extraction conduit of the laboratory general ventilation.

Moreover, the compression station can be connected to the cyclotrone vacuum pump. In the event of an accident or failure of the target, the contaminated air is stored in the relative tanks.

The system should have following characteristic:

* Be able to be connected to up to 16 cells and up to 5 boxes in production simultaneously.
* Have three-valve system mounted on each cell (2 pneumatic valves and 1 electric valve)
* Have pressure gauges used to measure the positive and negative pressure in the extraction circuit.
* 200-litre air accumulation tank and 200-litre storage tank
* 50-litre vacuum tank with storage function

The offer has to include installation and SAT.

**I declare that the products I offer meet the above parameters.**

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| *Place and date* | *signature of the person/persons authorized to represent the Contractor* |