Tender

Tender for the Supply and Installation of an Open Source Electron Beam Selective Melting 3D Printer or the University of Birmingham

THE UNIVERSITY OF BIRMINGHAM

F02: Contract notice
Notice identifier: 2023/S 000-028614
Procurement identifier (OCID): ocds-h6vhtk-040608
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Section I: Contracting authority

I.1) Name and addresses

THE UNIVERSITY OF BIRMINGHAM

Edgbaston

BIRMINGHAM

B152TT

Contact

Emily Villers

Email

e.villers@bham.ac.uk

Country

United Kingdom

Region code

UKG31 - Birmingham

Companies House

RC000645

Internet address(es)

Main address

www.birmingham.ac.uk/index.aspx

I.3) Communication

The procurement documents are available for unrestricted and full direct access, free of charge, at

www.in-tendhost.co.uk/universityofbirmingham/aspx/Home

Additional information can be obtained from the above-mentioned address

Tenders or requests to participate must be submitted electronically via

www.in-tendhost.co.uk/universityofbirmingham/aspx/Home

I.4) Type of the contracting authority

Body governed by public law

I.5) Main activity

Education

Section II: Object

II.1) Scope of the procurement

II.1.1) Title

Tender for the Supply and Installation of an Open Source Electron Beam Selective Melting 3D Printer or the University of Birmingham

Reference number

SC11994/23

II.1.2) Main CPV code

- 42990000 - Miscellaneous special-purpose machinery

II.1.3) Type of contract

Supplies

II.1.4) Short description

The University of Birmingham invites tenders for supply of an open source electron beam selective melting (EBSM) 3D printing machine. The machine will be a part of an investment by the University of Birmingham to facilitate/support the development of components for the UK's nuclear, space, and defence sectors. In this context, the machine will be used to develop new applications for the technology in collaboration with the end-users and carry out feasibility studies and pilot projects to address the specific requirements of these sectors. Therefore, it will be required as part of the project to build strong partnerships with the technology providers and define a joint co-funded R&D programme for the benefits of the UK's economy.

The machine should be capable of 3D printing refractory and structural metals and alloys using focused electron beam. The machine should allow full control on the process parameters (power/heat input, electron beam parameters, scanning strategies, materials dosing, etc...). There should be very limited restrictions on the types of materials (in powder form) that can be utilised using this platform.

The system should be fully equipped with a process control interface, while being open source with respect to the process parameters. The build chamber should permit the usage of limited quantities of powders, allowing quick optimisation runs to performed and ease of cleaning following the completion of builds.

The University requests quotations for a rent-to-purchase plan with ownership transferring at the end of the rental term upon payment of a nominal fee, alongside a quotation for purchasing outright.

This project may be funded by the University of Birmingham or;

- Research Councils UK (RCUK), the strategic partnership of the UK's seven Research Councils.

- Other government organisations

- UK industry

II.1.6) Information about lots

This contract is divided into lots: No

II.2) Description

II.2.3) Place of performance

NUTS codes

- UKG31 - Birmingham

II.2.4) Description of the procurement

APPENDIX A

SPECIFICATION OF REQUIREMENTS

The University of Birmingham invites tenders for supply of an open source electron beam selective melting (EBSM) 3D printing machine. The machine will be a part of an investment by the University of Birmingham to facilitate/support the development of components for the UK's nuclear, space, and defence sectors. In this context, the machine will be used to develop new applications for the technology in collaboration with the end-users and carry out feasibility studies and pilot projects to address the specific requirements of these sectors. Therefore, it will be required as part of the project to build strong partnerships with the technology providers and define a joint co-funded R&D programme for the benefits of the UK's economy.

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General characteristics

1. Electron beam

• Power: The system should be equipped with electron beam gun with a maximum power of 6 kW, with the power input being fully controllable by the user.

• Electron beam position/resolution: The electron beam size needs to be smaller or equal to 250 ?m (full width -half power) for the entire beam power range.

• Electron beam speed: Electron beam deflection speed of >2000 m/s is required during 3D printing operation.

• Electron beam deflection angle: The electron beam deflection angle should cover the full build area.

2. Process chamber

• Build Volume: The system needs to have a small build volume (minimum 10 cm in diameter x 10 cm in height) for limited powder usage and quick material changeover. The build should be able to start with limited powder quantities (e.g. 1 cm height)

• Build platform carrier: Resolution of the build platform carrier in the vertical z-direction (build direction) should be 5 ?m (or smaller).

• Layer thickness: The system should permit full control on powder layer thickness, including within the same build.

• Build platform heating: The build plate needs to be heated and maintain the processing temperature up to at least 1200 °C to in-situ relieve the residual stresses, while should enabling fast and efficient heating. Preheating using the electron beam should avoid interaction the powder-electron interactions (smoke-events).

• Recoater system: The recoater system should allow recoating spherical and non-spherical powders.

• Auxiliary ports: The system should have auxiliary ports to allow for in-situ instrumentation that can be integrated to the system software by the client.

• Vacuum quality: The base pressure should reach 10-6 mbar region in the main build chamber and in the electron gun, with high vacuum purity and optimum beam quality

• Process monitoring: The system should have the capability to monitor the build process using an electron back scatter detector, as well as a viewport.

3. System Software

• System source code: The system should be fully open with the code for the control software available under open-source license to allow the users to set the desired beam power and beam path to allowing for full process control for research purposes.

The preferred purchasing type for this project is on a rent-for-purchase basis with ownership transferring to the University at the end of the rental period following payment of a nominal fee. An outright purchase option is also possible.

II.2.5) Award criteria

Quality criterion - Name: Compliance to the Specifications / Weighting: 40

Quality criterion - Name: After Sales and Technical back up / Weighting: 10

Quality criterion - Name: Delivery and Training / Weighting: 10

Quality criterion - Name: Sustainability and Environmental / Weighting: 5

Quality criterion - Name: Standard Supplier Questionnaire (SQ) / Weighting: 10

Price - Weighting: 25

II.2.7) Duration of the contract, framework agreement or dynamic purchasing system

Start date

1 November 2023

End date

31 May 2024

This contract is subject to renewal

No

II.2.10) Information about variants

Variants will be accepted: No

II.2.11) Information about options

Options: No

Section IV. Procedure

IV.1) Description

IV.1.1) Type of procedure

Open procedure

IV.1.8) Information about the Government Procurement Agreement (GPA)

The procurement is covered by the Government Procurement Agreement: Yes

IV.2) Administrative information

IV.2.2) Time limit for receipt of tenders or requests to participate

Date

27 October 2023

Local time

11:59am

IV.2.4) Languages in which tenders or requests to participate may be submitted

English

IV.2.7) Conditions for opening of tenders

Date

27 October 2023

Local time

12:00pm

Section VI. Complementary information

VI.1) Information about recurrence

This is a recurrent procurement: No

VI.4) Procedures for review

VI.4.1) Review body

The University of Birmingham

Birmingham

B15 2TT

Country

United Kingdom