Science & Technology Facilities Council

Specification for HiLASE Procurement

System Enclosure

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Contents

Introduction and Purpose of Document

This document specifies the requirements of the large environmental enclosure for the HILASE laser system. The purpose of the enclosure is to provide a localised clean and dust-free environment within an ISO7 clean room. The enclosure also provides some light limiting baffling, a support structure for key components & services and a branded aesthetic for the system. Design and assembly details must be submitted in the tender response, these must be shown in both 2D and 3D formats to aid visual understanding.

Design Requirements:

Dimensional Values and Layout

The design of the enclosure is as per drawing supplied SL-1028365-B

The main body of the enclosure framework shall be manufactured from aluminium extrusion. The design provided does not specify fasteners or connecting components as these are best selected by the supplier. The roof and upper door panels shall be made from suitable transparent material to allow light into the enclosure space. The lower levels of the door and local light baffling can be made from any opaque material, be it Aluminium panel or coloured polycarbonate/acrylic. There is no necessity to use specialist laser safety panels within the system.

The overall dimensions of the enclosure suit the overall dimensions of the laser system and the room in which it sits. The doors and sliding panels are designed to provide necessary access to parts of the laser system. The service apertures in the enclosure are also designed to provide necessary access to the laser system and to the adjacent service racks. The doors, sliding panels and aperture locations, and their overall dimensions are fixed, however the supplier is free to amend the design to suit the components available to the supplier and to ensure that the structure meets the requirements of this document, as an example, with regards to loading. Any changes made shall be discussed and agreed with STFC. STFC shall endorse the design prior to manufacture.

The Enclosure also requires a roof-mounted cable tray design to route the laser systems electrical and data connections to several points on the structure. At these points the services will be directed downwards through the roof and into the enclosure. Details of their position and sizes are indicated on Drawing set SL-1028365-B. The supplier should preferably offer this cable-tray design and its supporting system as an option but if unable to do so, provide a suitable roof structure capable of mounting and supporting the trays in situ (see Loading and Support Conditions).

Loading & Support Conditions

The enclosure shall be self-supporting from the floor base only. Bolts for fixing the support structure to the floor may be used though the depth and type of necessary holes need to be advised prior to manufacture. The loads that the enclosure will need to support, additional to its own weight, include:

1) Cable trays & Cabling – Loading & extent as shown in Drawing set SL-1028365-B, Sheet 1.
2) Cryogenic transfer lines – these are in two locations and will be supported at three points (as shown in Drawing set SL-1028365-B). The mass of the 10J cooling system transfer lines is 120kg. The mass of the 100J cooling system transfer lines is 150kg.
3) There are seven fan filter units in the roof whose positions are fixed – these each have a mass of 32kg. (As shown in Drawing set SL-1028365-B)
4) There is an additional requirement for an evenly distributed 25kg per m^2 load in order to support internally mounted components and monitors
5) The sliding and trap door panels in the roof will be accessed using a lean-to ladder. The edge of these apertures must be capable of supporting a ladder and a person on the ladder up to a maximum combined weight of 110kg at an angle of 60 degrees.

The LH end of the enclosure must be removable without disturbing the integrity of the structure as shown in Drawing set SL-1028365-B.

The maximum allowable sag is 2mm per m with a maximum overall sag/difference in roof height of 20mm over the whole enclosure.

Calculations for all structural loading situations must be submitted to support the proposed design. A safety factor of 2 should be applied to all loading situations.

The integrity of the structure shall be the responsibility of the supplier, installation instructions shall be supplied with the delivered assembly.

Cleanliness

The primary purpose of the enclosure is to exclude dust and debris from the delicate optics on the laser table located within the enclosure. The room within which the enclosure and system sits is already classified as an ISO7 clean room. With the additional of 7 fan filter units and the enclosure, we expect the inside of the enclosure to meet close to ISO6 standard. We expect that standard aluminium extrusion with grooves on all faces will be adequate in this application.

If the supplier can provide additional options that they view as advantageous for the internal faces of the enclosure, for example, a clean room seal between polycarbonate/acrylic and extrusion or fillers for the grooves, these may be included as optional items within the quote.

Prior to packaging for delivery, all structural elements and panels must be cleaned thoroughly and free of swarf and dust particles. The components shall be wrapped within an appropriate clean and dust free plastic covering prior to placement within any wooden crates.

Earth bonding

As the enclosure includes several electrical fan units, due consideration needs to be given to the earth bonding of the metalwork elements of the enclosure. This is also of high importance to minimise the build-up of electrostatic charge which itself, could be detrimental to electronic elements within the laser. All metallic parts of the enclosure must be bonded together and an appropriately sized stud provided for connection to the building earthing system.

Aesthetics

STFC appreciate that the most cost effective option for the enclosure is to use standard colour extrusion and panels however, in this case aesthetics are of great importance and the supplier shall base his quoted design on clear anodised extrusion, grey & coloured panels in opaque locations and transparent panels elsewhere (refer to Drawing set SL-1028365-B).

STFC would be interested in receiving optional prices for black anodised extrusion and for the opaque panels being provided in purple (BS5252 24 E 56).The method by which this occurs is at the discretion of the supplier – vinyl wrap or coloured panel are both acceptable options but the preferred methodology must be specified in the quotation.

Assembly Requirements:

The method by which the enclosure may be assembled needs consideration. STFC expect the enclosure to be delivered in flat pack sections. The flat packs will require assembly around a large 18m long table that supports a large number of very expensive dust sensitive components. Ideally, the enclosure would be assembled in a modular manner from the middle to the ends in self-supporting sections to ensure that tolerance build up does not occur at only one end. The space at either end of the table is as shown in (refer to Drawing set SL-1028365-B).to allow the suppliers designer to ensure that modular parts can be manoeuvred and erected to the required positions.

STFC require to view the enclosure, as a minimum, partly test assembled and preferably fully test assembled, prior to delivery. STFC expect that this will occur at the supplier's facilities and the result shall be witnessed by STFC staff who will also confirm the suitability of the product quality.

Delivery Requirements

Following the assembly and quality checks, STFC would prefer the enclosure to be delivered directly to the HILASE Laboratory in Dolní Břežany, Czech Republic under Incoterms 2010, DDP. The supplier should preferably offer this but if unable to do so, he may quote delivery direct to STFC as an alternative. In either event, the enclosure should be suitably packaged to prevent damage during transit by road, rail or air to the HiLASE laboratory; the delivery shall be palletised to provide for removal from its transport vehicle using a standard 1 to 1.5T fork lift truck. Maximum width of the crated packages must not exceed 2.2m. Our client in Czech Republic will be responsible for providing suitable lifting equipment to offload the equipment from its means of transport. STFC must be made aware of the delivery date of the enclosure at least forty eight hours before this takes place in writing.

Installation Requirements

The supplier's quotation shall exclude installation in Dolní Břežany, Czech Republic.

Where the supplier is able to provide a quote for installation in the Czech Republic whether it be through sub-contract or other, STFC would appreciate a budgetary (±15%) quotation for this work, as an additional option.

Where the supplier is not able to provide an option for installation, STFC would be grateful for any recommendations the supplier cares to make in respect of competent installation contractors for assembling the system based in the Czech Republic.

Documentation

The supplier shall provide documentation supporting the erection, maintenance and testing of the enclosure at a level of detail such that a normal member of the public, suitably equipped with tools, could reasonably be expected to erect the enclosure. This document shall be provided in a reproducible (adobe acrobat or similar) format and as two hard copies.

Timescales

STFC require the enclosure to be delivered ready for installation by 15th September 2015 (where delivered direct to Czech Republic). If the delivery is made to STFC, then a delivery date of 1st September 2015 would apply.

In order to attain these schedules we would expect design sign off by 15th July 2015 and quality inspection of the assembled enclosure by 20th August 2015. We request that the supplier provide a logically linked Microsoft project (or similar) plan covering the design, build and delivery.

Reporting

The Supplier will continuously maintain an up-to-date project plan and make this available to the Customer. Further, there will be regular reporting as agreed between the Supplier and Customer.

Quality Assurance

The Supplier will need to indicate if they have any international accreditations such as ISO 9001

The Supplier will need to provide the full contact details of its Quality Manager, or member of staff responsible for quality approval and processes

An indication of the quality plan details which will be generated by the Supplier should also be submitted

This Plan should include detail around inspecting, testing criteria, documented processes and quality control records.

The Supplier will allow access to this documentation and records upon request.

The Supplier will be required to grant access to its work premises for the Customer to undertake periodic quality control inspections as required.