LIGO LABORATORY
California Institute of Technology
1200 E. California Blvd.
Pasadena, CA 91125

Statement of Work
Fabrication of Storage-Only Containers for Advanced LIGO BSC ISI

The following documents are incorporated into and made a part this purchase order. Click on the following LIGO Document Control Center (DCC) links to access these documents or go on line to the LIGO Public DCC at https://dcc.ligo.org/ to access the DCC#.

1.0 Terms:

DCC #	*Description*
C080185-v1	Laser Interferometer Gravitational Wave Observatory (LIGO) Commercial Items or Services Contract General Provisions California Institute of Technology "Institute", LIGO Rev 11/12/08
F0810001-v4	Technical Direction Memorandum.

2.0 Quality Control:

DCC #	*Description*
Q0900001-v4	Advanced LIGO Supplier Quality Requirements, dated 2/10/10, describes following contractor/supplier QA/QC actions for this procurement:

☐	3.1 Pre-Award Inspection	☒	3.9 Discrepant Material Storage	☒	4.4 Calibration Program
☒	3.2 Supplier In Process Quality Control	☒	3.10 Quality Records	☐	4.5 Critical Interface
☒	3.3 In Process Inspection	☐	3.11 Drawing and Specification Change Control	☒	4.6 Cleanliness
☒	3.4 Pre-Ship Inspection	☒	3.12 Welding Certification	☒	4.7 Packaging
☒	3.5 Receiving Inspection	☒	3.13 End Item Data Package (including Certifications of Compliance)	☒	4.8 Storage
☒	3.6 Discrepant Material	☐	4.1 Design Verification	☒	4.9 Transport
☒	3.7 Material Review Action	☐	4.2 Raw Material Procurement	☐	4.10 Customs
☒	3.8 Material Review Actions at Contractor	☒	4.3 Traceability of Materials		

For the above list the Supplier shall: 1) Identify the corresponding sections/paragraphs in their existing QA/QC system 2) meet or exceed the design requirements contained in the attached engineering documents for each area called out.

3.0 End Item Data Package:

At the time of delivery of the parts, the Supplier shall also provide the following data, as a minimum:

- Any as-built modifications (with approval of the LIGO Contracting Officer) as mark-ups to the drawings
- Certification of the material used
- Dimensional & QC inspection reports—this shall include a report showing that parts have been inspected and fall within specified tolerances.
- Certificate or statement of compliance with all contract and drawing process restrictions.

4.0 Included Documents:

Drawings of the overall assembly, BSC ISI Storage Container Assembly, D1002663-v2 as well as drawings for all parts, both "off-the-shelf" and fabricated parts, are included in the drawing package: C1002575-v2. In addition to the drawings, the contractor will be provided with CAD solid models of the parts (SolidWorks Professional 2010).

DCC #	*Description*
D1002663-v2	Drawing of final assembly of BSC ISI storage container
C1002575-v2	Drawing package for BSC ISI Storage Only Container
E0900364-v7	Metal components intended for use in the AdvLIGO Vacuum System- this is to be used as a guide for the storage containers bearing in mind that the interior of these storage containers will store UHV compatible clean materials.

5.0 Scope:

This SOW is for eight (8) assembled storage containers in assembly drawing D1002663 using parts fabricated from the drawings in the drawing package C1002575-v2. These storage containers will provide long term storage for the BSC internal seismic isolation system. This system is a clean system built for use in ultra high vacuum (UHV) and the containers must ensure that it stays clean and unaffected by the surrounding environment.

6.0 Quantity Required:

D1002663-v1 (final assembly of all part drawings in C1002575-v1)	Storage Containers	quantity: 8

7.0 Delivery Requirements:

The deliveries are FOB at these destinations, i.e. the contractor has responsibility for shipping title and control of goods until they are delivered and the transportation has been completed. The contractor selects the carrier and is responsible for the risk of transportation and for filing claims for loss or damage.

Shipping Locations –

3 Storage containers will be shipped to LIGO Livingston and 5 storage containers will be shipped to LIGO Hanford at:

LIGO Livingston Observatory (LLO)
Attn: Tom Gentry and Celine Ramet
19100 LIGO Lane
Livingston, LA 70754

and

LIGO Hanford Observatory (LHO)
Attn: Hugh Radkins and Jodi Fauver
127124 North Route 10
Richland, WA 99354

Shipping Containers:
The contractor is responsible for providing shipping containers and transportation which protects these parts from damage from the transportation environment (weather, handling, accidents, etc.). Mating edges of parts should be especially protected from damage during shipping.

8.0 Manufacturing:

8.1 Precedence

The Statement of Work (SOW) sections below regarding processing or fabrication of the parts are meant to convey the scope and nature of the requested work. If there is a conflict between the SOW and the drawing, the drawing has precedence.
The parts are to be produced using the drawings and CAD models. CAD models will be provided to the contractor upon award. If there are discrepancies between the drawings and the CAD model, the model takes precedence.

8.2 Restrictions

- Machine all surfaces of machined parts to remove oxides and mill finish. Abrasive removal techniques are not acceptable. No sanding or "Scotchbrite" abrasive methods shall be used on any surface on the interior of the storage containers.
- All machining fluids must be fully synthetic, water soluble (not simply water miscible) and free of sulfur, chlorine, and silicone.
- Thoroughly clean part to remove all oil, grease, dirt, and chips with soap and water. Follow with solvent (acetone) wipe. Pay close attention to holes.
- Note: Interior of storage container will be cleaned and will store a UHV-cleaned HAM ISI. The exterior of the container will be stored in air.
- No epoxy or other non-approved material may be used within these storage containers.

8.3 Materials

Materials are noted on the drawings. Manufacturer part numbers are listed on drawings where "off-the-shelf" parts can be used. Equivalent parts from other manufacturers may be substituted with LIGO approval but no material changes may be made. Fasteners that are specified may be substituted for same size and same material fasteners by competing manufacturers.

8.4 Machining

For all machined parts and faces INTERNAL to the storage container:
All parts are to be machined. No grinding or lapping with abrasive wheels, cloth or stones is permitted. No sanding of any type. No parts shall be cast or molded. Water soluble (not just water miscible) cutting fluid (lubrication) is to be used for all machining operations. The use of cutting fluids or lubricants, which contain sulfur, chlorine or silicone compounds is prohibited.
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8.5 Welding

Subassemblies D1002682, D1002685, D1002670, D1100491 require welds as detailed in the drawings.

8.6 Finishing

Any required surface finish is defined in the drawings.
Localized scratches, digs and blemishes should be minimized on surfaces internal to the shipping containers to enable cleaning.

8.7 Painting

Painting noted on drawings is to be done with:
Smooth white, Sherwin Williams Polane T-Plus Polyurethane Enamel
Prime with: Sherwin Williams Industrial Wash Primer P60G2

8.8 Marking

All shipping containers should be marked with a final part number (D1002663) and a serial number.
Marking is to be accomplished by mechanically scribing, stamping or engraving (no dyes or inks).
If not indicated in the drawing, mechanically scribe, stamp or engrave as follows:

<drawing number> - <revision code>
<unique 3 digit serial number starting at 001 for the first part and incrementing thereafter>

As an example:

D1002663-v2
001