Argonne National Laboratory

9700 Cass Avenue

Argonne, Illinois 60439

DOCUMENT NO. 410201-00092-01

TECHNICAL SPECIFICATION

FOR

FRONT END SUPPORT TABLES, STAGES AND KINEMATIC MOUNTS

WBS 1.4.1.2.2.1.7
WBS 1.4.1.2.2.1.8
WBS 1.4.1.2.1.1.10
WBS 1.4.1.2.1.1.11

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1.0 SCOPE

1.1 This Technical Specification establishes the requirements for the fabrication, inspection, testing, and delivery of the Front End Support Tables and Stages and the Front End Support Tables and Kinematic Mounts assemblies in the quantities listed in Section 2.1 of the Statement of Work 410201-00091.

1.2 The Support Tables and Stages and Support Tables and Kinematic Mounts are used to support the Front End components of the Advanced Photon Source (APS). The primary features of these support systems include a very narrow design, high frequency stability, accessibility to the Front End components, 5 degree-of-freedom adjustment motion in a low profile space, thermal expansion freedom of the Front End component, and manual and stepper motor operating modes. Two styles of support systems were designed. The first is a manual adjustment style and comprises the majority of support systems. The second is a stepper motor driven style comprised of precision vertical and horizontal stages.

2.0 APPLICABLE DOCUMENTS AND /OR SPECIFICATIONS

2.1 Application.

2.1.1 Deviations. The documents listed in paragraphs 2.2 through 2.4 of the exact issue shown form a part of this standard to the extent specified herein. Any deviations from these documents or their requirements shall be requested by the contractor and approved by the Laboratory prior to any contractor action being taken. Requests for Deviations shall be made on a Supplier Disposition Request (ANL-31 1)

2.1.2 Conflicts. Any conflicts between the requirements of this Technical Specification and those of any applicable document shall be brought to the attention of the Laboratory' s Subcontract Administrator prior to any related action on the part of the contractor.

2.1.3 Exceptions. Where the materials or standards to be employed in the manufacture of any part are not identified in this Technical Specification or the documents referenced herein, the contractor shall submit for the Laboratory's approval the materials or standards he proposes to use.

2.1.4 Referenced Documents. Documents which are referenced without citation of section or paragraph shall apply in their entirety. Where there is a citation of section or paragraph, only that cited portion is applicable.

2.1.5 Sub-Tier References. When a referenced document cites additional references, those sub-tier references shall not apply unless the Technical Specification or the Statement of Work specifically mentions them as required documents.

2.2 Drawings.

The following drawings, and their associated sub-tier drawings, specify the support assemblies which are to be fabricated by the contractor. These drawings, and their associated sub-tier drawings, are attached to this Technical Specification.

Drawing Number	Title
410202-210100-00	T1 BM 1st Fixed Mask Support Assembly
410202-240100-00	T1 BM 2nd Fixed Mask/1st Photon Shutter Support Assembly
410202-250100-00	T1 BM Slow/Fast Valves Support Assembly
410202-280100-00	T1 BM 3rd Fixed Mask/2nd Photon Shutter Support Assembly
410202-290100-00	T1 BM Safety Shutter Support Assembly
410201-230100-00	T1 ID 1st Fixed Mask/1st Photon Shutter Support Assembly
410201-240300-00	T1 ID Slow/Fast Valve Support Assembly
410201-260100-00	T1 ID 2nd Fixed Mask/2nd Photon Shutter Support Assembly
410201-270100-00	T1 ID Filter Box Support Assembly
410201-280100-00	T1 ID Safety Shutter Support Assembly
410201-310100-00	T1 ID Differential Pump Support Assembly

2.3 Welding.

2.3.1 Weld Symbols. Weld symbol interpretation shall be in accordance with the Standard Symbols for Welding, Brazing and Nondestructive Examination, ANSI/AWS A2.4-86.

2.3.2 Weld Practice. Welding practice shall conform to the Structural Welding Code, ANSI/AWS D1.1-90

2.4 Aluminum Anodizing.

Anodizing of aluminum, when required, shall conform to the Military Specification Anodic Coatings, for Aluminum and Aluminum Alloys, Mil-A-8625E, Type II, Class 2.

3.0 TECHNICAL REQUIREMENTS

3.1 Design Requirements.

The designs of the support assemblies are defined in the drawings, and their associated sub-tier drawings, which are listed in Section 2.2 of this Technical Specification.

3.2 Material Requirements.

The contractor shall use the materials specified in the drawings, and their associated sub-tier drawings, which are listed in Section 2.2 of this Technical Specification, and certification of materials used in the fabrication shall be submitted to ANL.

3.3 Fabrication Requirements.

Fabrication of the support assemblies shall be in accordance with the drawings which are listed in Section 2.2 of this Technical Specification.

3.4 Assembly and Workmanship.

3.4.1 The parts shall be free of burrs and sharp edges, and free of dents, gouges and scratches.

3.4.2 The parts shall be clean and free of dirt, oil and grease with the exception of the appropriate lubrication on moving bearing surfaces, and unpainted mild steel mounting surfaces. Bearing surfaces shall be lubricated as required by the assembly drawing. Unpainted steel mounting surfaces (those surfaces clearly defined on the engineering drawing to be paint free) shall be clean, rust free and coated with a light film of machine oil.

3.4.3 Painted surfaces shall be free of chips, cracking or peeling. Painted or anodized surfaces shall be uniform in color and texture.

3.4.4 All assembly requirements for alignment marks, keying or pinning specified on the appropriate assembly or sub-tier drawing shall be done after verification that the assembly meets the dimensional requirements of the drawing.

3.5 Painting.

Steel surfaces that are required to be painted by the applicable drawing shall be painted with epoxy paint. The paint shall be radiation resistant, non-dusting or chalking, with a semi-gloss finish.

3.6 Drawings.

3.6.1 Since the drawings and documents listed in section 2.2 completely define the fabrication requirements of the front end support tables, stages and kinematic mounts, the preparation of new drawings by the contractor will not be required unless alternate designs and/or modifications to the designs submitted by the Laboratory are proposed by the contractor.

3.6.2 The contractor is required to review the drawings and other documentation provided by ANL for errors and inform ANL of any discrepancies and errors. Any changes or corrections must be documented by the contractor as "marked drawing" changes to the engineering drawings for the affected item and submitted for ANL's approval. If approved, revised drawings will be issued by ANL.

3.6.3 The marking and submission of marked drawings to ANL to indicate any "as-built" changes is the responsibility of the Contractor.

3.6.4 The drawing numbers in most cases will be preceded by a "P" prefix on the drawing itself. After the acceptance of the first unit of a given item and any corrections as detailed in 3.6.2 and 3.6.3, the "P" prefix on the drawing number on the drawing will be dropped.

3.6.5 Drawings can be furnished to the contractor on disk or by E-mail in AutoCAD (version 12) format (DWG) as the preferred format or in DXF format. The contractor should submit any corrected or modified drawings to ANL for approval in AutoCAD format.

4.0 QUALITY ASSURANCE AND TEST REQUIREMENTS

The following examination requirements shall comprise the minimum acceptable for the front end support tables, stages and kinematic mounts.

4.1 Certification.

All certification of materials, hardware, processes, calibrations and test data shall be signed by a contractor representative authorized to sign such certifications.

4.2 Examination Requirements.

4.2.1 Materials Examination. All raw materials and hardware shall be examined visually to detect suspect or counterfeit parts, obvious defects and the state of cleanliness.

4.2.2 Fabrication and Weld Examination.

4.2.2.1 General. All items shall be subjected to visual and dimensional examination to verify conformance with drawing requirements.

4.2.2.2 Liquid Penetrant Examination. All welds shall be examined by the liquid penetrant method. The use of liquid penetrant materials from aerosol spray cans using Freon as the propellant is prohibited on austenitic stainless steel.

4.**2.2.3** Examination of Weld Repairs. Weld repairs shall be reexamined by the examination method(s) which revealed the original defect. In addition, other nondestructive examination methods which will assure the quality of the material has been maintained may be used upon agreement between the contractor and the Laboratory.

4.2.3 Calibration and Control of Instruments. Accuracy of instrumentation used during tests shall be verified by the contractor by means of periodic calibration traceable to the National Institute of Standards and Technology. The Laboratory shall be given timely notice of any calibration discrepancies or problems. Calibration records shall be available to the Laboratory's personnel.

4.2.4 Marking and Identification. When raw materials are cut or sectioned, all markings shall be transferred to the unmarked portion of the material.

4.2.5 Examination of Lifting, Handling, and Shipping Fixtures. Following proof load testing of lifting, handling, shipping fixtures and attachment lugs, all structural welds of these items shall be examined by the magnetic particle or liquid penetrant method,. In addition, all slings and hooks, not containing structural welds, used in lifting the item shall, as a minimum, be visually examined for structural defects.

4.2.6 Acceptance Testing. The acceptance testing shall be performed in accordance with the ANL approved contractor's test plan, and the results submitted to the Laboratory for approval. The following items are the minimum requirements for inclusion in the acceptance tests.

4.2.6.1 Verification of Fiducial Holes. The size and location of fiducial holes for each assembly will be verified for compliance with the engineering drawings.

4.2.6.2 Verification of Overall Dimensions. The maximum width and height of the assemblies with respect to the appropriate reference surfaces shall be verified to be in conformance with the assembly drawing for the item.

4.2.6.3 Verification of Axis motion. The motion of each moving or adjustable axis shall be tested for the following: Range of motion, Binding, Locking, and where applicable Trueness of motion (square, straight, and linear), and Repeatability.

4.2.6.4 Verification of Load Handling Capability. The ability of the device to handle its rated load shall be tested and verified for static and dynamic conditions. Axis motion (section 4.2.6.3 above) must be verified under rated load. Testing of axis motion without load is optional.

5.0 PREPARATION FOR DELIVERY

5.1 Each assembly shipped shall be identified by the appropriate purchase order number, assembly number and a sequential identity or serial number.

5.2 Any moving components on an assembly must be firmly secured for shipment in a manner that precludes damage from motion and vibration.

5.3 Assemblies must be secured for shipment in fashion that protects the assembly from dust, dirt and weather or water damage. The assemblies must be securely fastened, padded, boxed and/or crated for shipment in a suitable manner for prevention of shipment damage to any assembly and its weather/dust protection and insure their safe delivery to the Laboratory..