

**SECTION 16490
HOT CELL LIGHTING FIXTURES**

PART 1 – GENERAL

1.1 SCOPE

- A. This specification addresses the design, materials, testing and inspection, preparation for shipment, and documentation of Hot Cell Lighting Fixtures.

1.2 INDUSTRY CODES AND STANDARDS

- A. The Hot Cell Lighting Fixtures shall be designed, fabricated, tested and inspected in accordance with manufacturer's own standards and recognized good practices.

1.3 QUALITY ASSURANCE

- A. Hot Cell Lighting Fixtures shall be furnished by a firm which is qualified and regularly engaged in this type of work. The firm shall maintain facilities for fabrication of subject items.
- B. Materials and products used in the fabrication of Hot Cell Lighting Fixtures shall be new. Materials shall be furnished and installed in strict accordance with Sub-Tier Supplier's current published recommendations, recognized good practices and these specifications.
- C. The Supplier shall operate under an approved quality assurance program. The program shall provide control over activities affecting quality to an extent consistent with their importance. The Supplier's quality control program shall be reviewed and approved by the Buyer.
- D. The Buyer reserves the right to access the Supplier's and Sub-Tier Supplier's facilities at which work is being performed. Access shall be provided for any personnel designated by the Buyer. The purpose of accessing facilities shall be to perform assessments, audits, reviews, surveillance, inspections, investigations, or test witnessing applicable to the work being performed by the Supplier or Sub-Tier Suppliers under this specification.
- E. The Supplier shall resolve all deficiencies noted, to the Buyer's satisfaction. The Buyer's concurrence with "use-as-is" or "repair" disposition of any nonconformance must be obtained. Concurrence will not be reasonably withheld. The terms "use-as-is", "repair", and "rework" are defined below.
 - 1. "Use-as-is" is a disposition permitted for a nonconforming item when it can be established that the item is satisfactory for its intended use.
 - 2. "Repair" is the process of restoring a nonconforming characteristic to a condition to ensure that the capability of an item to function reliably and safely is unimpaired, even though that item still does not conform to the original requirements.
 - 3. "Rework" is the process by which an item is made to conform to the original requirements by completion or correction.
- F. Witness and hold points are specific points in the fabrication process requiring witnessing or verification by the Buyer. Activities shall not proceed past a hold point without witness or verification by the Buyer unless specifically waived in writing by the Buyer.

- G. All provisions contained herein shall be extended to cover Sub-Tier Suppliers employed by the Supplier.

PART 2 – PRODUCTS

2.1 DESIGN REQUIREMENTS

- A. For this specification the term “Lighting Fixture” refers to the entire assembly consisting of the lamp housing, reflector, lamp, mounting bracket, hardware, ballast, and connector.
- B. Each light fixture shall be provided with a single 400 watt, high pressure sodium (HPS) lamp rated for a minimum life of 24,000 hours and brightness of 45,000 lumens.
- C. The ballast shall be suitable for remote installation and shall be capable for operation using 120 volts AC. The ballast shall be shipped loose.
- D. Each fixture shall be provided with a steel screen face rather than splash proof glass to improve lighting output. The screen shall be designed for remote handling.
- E. An emergency light source in the Lighting Fixture shall not be provided.
- F. The mounting bracket shall be suitable for installation on the vertical walls of a lined hot cell. The walls are clad with 11 gauge, type 304L, stainless steel. A weld-pad, of suitable size, shall be provided with the mounting bracket. Refer to Figure 16490-1 for details of proposed light fixture installation.

Figure 16490-1 Hot Cell Light Fixture and Bracket

- G. The interface between the mounting bracket and the light fixture shall be designed to ensure that the entire light fixture can easily be removed from the hot cell using a bridge mounted servo-manipulator. Upon lamp failure, the Owner intends to remove the entire light fixture from the mounting bracket and replace the lamp using master-slave manipulators at a hot cell window workstation.

- H. Each light fixture shall be provided an AMPHENOL 3-pin #12 Socket, Part No. 9442KS20-4PW-(190) connector.
- I. All cabling shall include radiation resistant insulation similar to Rockbestos XLPE insulation, CSPE jacket, Class 1E.

2.2 MATERIAL REQUIREMENTS

- A. The entire lighting fixture assembly shall be fabricated using 300 series stainless steel. That would include the lamp housing, reflector, face screen, mounting bracket, fasteners, and other miscellaneous hardware.
- B. The Supplier, on the fabrication drawings, shall indicate materials not addressed in this specification.
- C. Use of any elastomers shall be avoided if possible.

PART 3 – EXECUTION

3.1 FABRICATION REQUIREMENTS

- A. Controls are to be exercised during all stages of fabrication to minimize exposure of stainless steel to contaminants including chlorides and carbon steel. Any compounds, liquids, or markers that come into contact with stainless steel surfaces shall not contain more than 250 ppm by weight chlorides.
- B. Carbon arc or iron powder cutting shall not be used on stainless steel. All cut or raw edges shall be deburred and shall be smooth to the touch.
- C. In order to preserve the original finish of stainless steel sheet material, care shall be exercised to prevent scratching, abrading, nicking, and denting during receiving, storage, fabrication and handling. The original protective coating shall be preserved as long as practical.
- D. Grinding wheels and wire brushes shall either be new or previously used only on austenitic stainless steel. Wire brushes shall have stainless steel bristles; all welds shall be wire brushed clean.

3.2 TESTING AND INSPECTION

- A. Each lighting fixture shall be given a final inspection and functional tests prior to shipment. The inspection and tests shall be in accordance with manufacturer's standard procedures described in the manufacturer's quality control manual. The final inspection and functional tests shall be approved by the Buyer.
- B. If any instruments are used for testing and inspection, they shall carry current certification from NIST.

3.3 PACKAGING, DELIVERY, STORAGE AND HANDLING

- A. The Supplier shall thoroughly clean the Hot Cell Lighting Fixtures of debris, weld splatter, grease, oil, markings from pens and dyes, shop soil, visible rust, and other foreign matter before shipment.
- B. Lighting Fixtures shall not be packaged and shipped until all testing and inspection has been performed and the results have been approved by the Buyer.
- C. Lighting Fixtures shall be shipped as completely assembled units. Other components such as lamps, ballasts, mounting hardware or items that may work loose or be lost in transit shall be packed separately.

- D. Ship Lighting Fixtures after they have been prepared for the intended method of transport.
- E. The Supplier shall be responsible for the overall integrity of the Lighting Fixtures during shipment.

3.4 SUBMITTALS

- A. A Fabrication Schedule shall be provided indicating all fabrication steps, tests and inspections. The Supplier shall provide to the Buyer a revised Fabrication Schedule within seven (7) working days of a modification to the contract, which revises the required delivery date or when other approved Buyer modifications change a scheduled assembly step, test or inspection.
- B. A controlled copy of the Supplier's Quality Assurance Program Manual and an index of the implementing procedures shall be submitted with the proposal.
- C. The Supplier shall provide test procedures, inspection procedures, and test reports for Hot Cell Lighting Fixtures to the Buyer for review and comment at least two weeks prior to conducting said test or inspection.
- D. The Supplier shall submit a complete package of material certifications for all materials used in the fabrication and assembly of the Filter Housings, including, but not limited to, stainless steel sheet, welding filler rods, and fasteners. Material certifications shall be legible copies of Certified Mill Test Reports (CMTR) indicating chemical analysis, physical test data and heat number. Certificates of Conformance (CoC) may be submitted in lieu of CMTRs, with prior approval by the Buyer.
- E. The Supplier shall submit dimensional outline drawings of the Hot Cell Lighting Fixture.
- F. The Supplier shall prepare documentation packages with the proposal, prior to fabrication, and after fabrication in accordance with Table 16490-1.

Table 16490-1 Documentation Requirements

<i>Document Description</i>	<i>With Proposal</i>	<i>Prior to Fabrication</i>	<i>Prior to Shipment</i>
Quality Assurance Program Manual	X		
Dimensional Outline Drawings		X	
CMTRs for all Light Fixture Components		X	X
Fabrication Schedule	X		
Inspection and Test Procedures		X	
Inspection and Test Reports			X

*Sample

END OF SECTION 16490