

**SECTION 26 55 71
MEDICAL AND SURGICAL LIGHTING FIXTURES**

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies the furnishing, installation, and connection of the surgical lighting fixtures.

1.2 RELATED WORK

- A. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements and items that are common to more than one section of Division 26.
- B. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.
- C. Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS: Seismic supports and lateral bracing for light fixtures.

1.3 SUBMITTALS

- A. Submit in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.
- B. Shop Drawings:
 - 1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
 - 2. Include electrical ratings, dimensions, mounting details, materials required clearances, terminations, wiring and connection diagrams, lubrication, ballasts, lenses, louvers, lamps and controls.
 - 3. Include photometric data for surgical lighting fixture from an independent testing laboratory. The photometric report shall include data to show the surgery light fixtures are in full compliance with requirements for illumination level, shadow reduction, beam heat and color temperature. Where testing procedures or parameters are specified, the report shall indicate the surgery light fixtures were tested to these criteria.
- C. Manuals:
 - 1. Submit, simultaneously with the shop drawings, companion copies of complete maintenance and operating manuals including technical data sheets, wiring diagrams, and information for ordering replacement parts.

- a. Wiring diagrams shall have their terminals identified to facilitate installation, operation, and maintenance.
 - b. Wiring diagrams shall indicate internal wiring for each item of equipment and the interconnections between the items of equipment.
 - c. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system.
 - d. Approvals will be based on complete submissions of manuals together with shop drawings.
2. Two weeks prior to final inspection, submit four copies of a final updated maintenance and operating manual to the Resident Engineer.
 - a. The manual shall be up-dated to include any information necessitated by shop drawing approval.
 - b. Complete "As installed" wiring and schematic diagrams shall be included which show all items of equipment and their interconnecting wiring.
 - c. Show all terminal identification.
 - d. Include information for testing, repair, trouble shooting, lubrication, assembly, disassembly, and recommended maintenance procedures and intervals.
 - e. Provide a replacement parts list with current prices. Include a list of recommended spare parts, lamps, tools, and instruments for testing and maintenance.
- D. Certifications: Two weeks prior to final inspection, submit four copies of the following to the Resident Engineer:
 1. Certification that the materials are in accordance with the drawings and specifications.
 2. Certification, by the Contractor, that the equipment has been properly adjusted installed and tested.

1.4 APPLICABLE PUBLICATIONS

Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by basic designation only.

- A. Illuminating Engineering Society of North America (IESNA):

RP-29-2006Lighting for Hospitals and Health Care
Facilities

HB-9-2000 Lighting Handbook Reference and Application

B. National Fire Protection Association (NFPA):

70-2005.....National Electrical Code (NEC)

99-2005.....Health Care Facilities

C. Underwriters Laboratories, Inc. (UL):

544-1998.....Medical and Dental Equipment

1598-2004.....Luminaries

PART 2 - PRODUCTS

2.1 SURGICAL LIGHTING FIXTURES, GENERAL

- A. Fixtures shall be in accordance with UL 1598, NEC, NFPA 99 and IESNA RP-29, as shown on the drawings and as specified.
- B. Fixtures shall be complete, grounded, fungi-proof, adequately enclosed for asepsis, and designed for use in human operating rooms by a firm regularly engaged in the manufacture of such fixtures.
- C. Fixtures shall be supplied complete with suspension systems, lightheads, transformers, and controls. Components shall be products of a single manufacturer.
- D. Suspension components shall not flex during normal use. Articulation of the suspension to any position in its range shall maintain the lighthead at that point without drift.
- E. All exposed surfaces shall be free of burrs and sharp edges. Finishes on all exposed surfaces shall be specifically designed to resist scuffing and deleterious effects of the use of hospital cleaning materials.
- F. Except for finished aluminum, stainless steel, chrome, nickel and brass surfaces, all metal surfaces shall be thoroughly cleaned and painted at the factory with a corrosion resistant primer and not less than two coats of lacquer or baked enamel finish.
- G. Maximum leakage current of each lighthead and its respective control shall not exceed 100 microamperes as measured in accordance with UL 544.

2.2 SURGICAL LIGHTING FIXTURE TYPE

- A. Dual Lightheads and Pivot Arms, Single Point Suspension: Shall be a major light system incorporating two identical lighthead units, each mounted on an independent arm assembly. The arm assemblies shall pivot

around the same axis. Lighthouse shall rotate within a clearance circle of 3624 mm (11 feet 9 inches) to 6544 mm (21 feet 6 inches) depending on light head site horizontal arm selection Center of lighthouse adjusted vertically from 1190 mm (3 feet 11 inches) to 2250 mm (7 feet 4 ½ inches) above the floor.

2.3 LIGHTHEAD

A. Light Source:

1. Light source shall be three optically improved, 50-watt quartz-halogen bulbs wired in parallel to assure continuous operation.
2. Light source shall have the following characteristics and shall comply with IESNA RP-9:
 - a. Minimum illuminance of 8,000 foot-candles, measured at 61 cm (24 inches) from the light source.
 - b. Corrected color temperature of 3300 degrees.
 - c. Cool operation assured with heat filters and dichroic coatings.
 - d. Color Rendering Index (CRI) shall be a minimum of 94.
 - e. Lamp life shall be average of 2000 hours.

B. Focus and pattern size shall be adjustable by either raising and lowering the unit and/or through operation of focus controls which change the pattern size without movement of the unit. The smallest pattern size in the focal range shall be not greater than 200 mm (8 inches) in diameter.

C. Control Handle: A surgeon's control handle shall be located beneath each lighthouse and shall be easily removable for sterilization.

2.5 SUSPENSION

A. Vertical arm members and suspension tubes: Shall be constructed of high strength steel or heavy gauge aluminum for rigidity. Coordinate vertical lengths with the ceiling height of the room wherein each fixture will be installed to provide the proper positioning of the lighthouse or lighthouse arm assembly, within the unit's range of vertical mobility as recommended by the manufacturer. Attach the suspension to structure with bolts and metal inserts (power-set fasteners will not be accepted) as required by the manufacturer and/or structural calculations.

B. Horizontal Arm Assemblies:

1. Each lighthouse shall be mounted from a two section, essentially horizontal, counter-balanced arm assembly which pivots in either

- direction 360 degrees continuously about the ceiling attachment tube axis, and a minimum of 340 degrees about its midpoint, permitting positioning of the lighthead assembly approximately under the ceiling axis or outside of the sterile area. In systems with multiple arms attached to the same mount, each individual arm and lighthead shall operate independently and be mounted so that they can be positioned outside the sterile area, bypass each other and be raised, lowered and rotated. In the multi-arm installation at least one of the lightheads shall be positionable directly under the ceiling axis.
2. The lower arm member shall pivot vertically to permit raising and lowering the lighthead. It shall be possible to limit the travel so the electrical components of the lamp assembly (or assemblies) will not adjust below 1500 mm (5 feet) from the finished floor. When maintained in the horizontal position, the lighthead shall be raisable to a minimum of 2200 mm (7'-4") above the finished floor as measured to the lowest point of the optical assembly (lens or reflector) from which the final light beam is emitted. The component parts of the joint between the upper and lower support arms shall be at least 2000 mm (80 inches) above the floor.
 3. The lighthead shall be attached to the lower arm assembly through a dual-bow pivot system that allows lighthead rotation in all directions without the need to rotate the suspension arms.
 4. The clearance circle of each lighthead about its pivot center shall be at least 3550 mm (140 inches) in diameter.
- C. Ceiling Mount Assembly, Single Point Suspension: The mounting assembly shall support the complete fixture unit by attachment to the structural ceiling. Vertical portions of the mount assembly between the structural ceiling and a suspended ceiling shall be cross-braced as part of the installation to prevent lateral movement. The exposed portions of the attachment assembly, or the hole where the ceiling mount tube passes through the false ceiling, shall be covered by a gasketed spun aluminum or sturdy plastic trim canopy designed to make a tight seal with the ceiling. The mount assembly shall be installed in accordance with the manufacturer's recommendations, with required fasteners for a stable and rigid system. The assembly shall be capable of supporting the weight of the entire unit plus the weight of additional lighthead

assemblies, which currently can be provided in the future by standard manufacturer's modification.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Installation shall be in accordance with NEC, IESNA HB-9, as shown on the drawings, and in accordance with the manufacturers' recommendations.
- B. Coordinate the components electrically and mechanically with the ceiling heights and with other equipment, such as ductwork, service drops, and like items, in the room wherein each fixture will be installed.
- C. Mount the controls with the bottom of the control 1500 mm (5 feet) above the finished floor.
- D. Upon completion of the installation, conduct an operating test to demonstrate that each surgical lighting fixture meets the requirements of this specification. Perform all manufacturers recommended visual and physical performance checks.

3.2 SPARE LAMPS AND STERILIZABLE HANDLES

Furnish three spare lamps and sterilizable handles for each fixture provided.

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