SECTION 26 51 00 – lighting fixtures

1. GENERAL
	* + 1. RELATED DOCUMENTS
				1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
				2. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.
			2. SUMMARY
				1. This Section specifies requirements for indoor and outdoor lighting fixtures, exit signs, lamps and ballasts.
			3. REFERENCE STANDARDS
				1. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
				2. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.
				3. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:

NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures.

NEMA WD1 - General-Purpose Wiring Devices.

ANSI C82.1 - Specification for Fluorescent Lamp Ballasts.

ANSI C82.4 - Specifications for High-Intensity-Discharge Lamp Ballasts (Multiple Supply Type).

NEMA LE - H-I-D Lighting System Noise Criterion (LS-NC) Ratings.

NFPA 90-A – Standard for the Installation of Air-Conditioning and Ventilating Systems

ANSI/ASHRAE/IESNA Standard 90.1 – Energy Standard for Buildings Except Low-Rise Residential Buildings.

* + - 1. SUBMITTALS
				1. Product Data:

Submit a 3-ring binder with manufacturer's data on lighting fixtures in booklet form, with a separate sheet for each fixture, assembled by luminaire "type” in alphabetical order, with the proposed fixture and accessories clearly labeled. Ballast and lamp product data shall accompany fixture submittals.

* + - * 1. Record Documents:

Submit dimensioned drawings and performance data including coefficients of utilization, candela distribution, spacing to mounting height ratio, efficiency and visual comfort probability for each fixture, assembled by luminaire type in alphabetical order.

* + - 1. DELIVERY, STORAGE and HANDLING
				1. Deliver lighting fixtures individually wrapped in factory-fabricated fiberboard type containers, with the type of each fixture clearly marked on the box . Parabolic louvers shall be shipped in thermally sealed polyethylene wrapper.
				2. Handle lighting fixtures carefully to prevent breakage, denting and scoring the fixture finish. Do not install damaged lighting fixtures.
				3. Store product in a clean, dry space protected from weather.
			2. EXTRA MATERIALS
				1. Maintenance Stock:

Furnish a stock of replacement lamps in the original cartons or packing sleeves, amounting to 5 percent (but not less than two (2) lamps in each case) of each type and size lamp used in each fixture type.

Deliver replacement stock as directed to Owner's storage space

1. PRODUCTS
	* + 1. GENERAL
				1. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.
				2. Lighting fixtures and accessories shall comply with the design and functional requirements of the Project. Design characteristics shall be as noted in manufacturer's submittal data.
				3. Provide lighting fixtures of the size, type and rating as scheduled, complete with, but not limited to, lamps, lamp holders, reflectors, ballasts, and wiring.
			2. MANUFACTURERS
				1. Per BJC Healthcare Owner’s Representative.
			3. INTERIOR LIGHTING FIXTURES
				1. Linear Fluorescent Fixtures:

Lenses shall be minimum 0.140-inch-thick virgin acrylic. Lens pattern shall be KSH 20 or approved substitution.

Parabolic louvers shall have a low iridescent diffuse silver finish, 3-inch deep, 6-cells per 4-foot lamp.

Frames shall be flush or regressed, aluminum, steel hinged and equipped with rotary-action cam latches. Spring latches are not acceptable. Frames shall be reversible and capable of latching either side.

* + - * 1. Compact Fluorescent Fixtures:

Reflectors shall be clear, with integral white trim ring, unless noted otherwise.

Open reflectors shall be 7-inch minimum diameter.

Fixtures installed over food handling areas shall be lensed. Fixtures installed in shower locations shall be provided with flush type plastic reflector with clear lens.

* + - * 1. Incandescent downlight fixtures shall be prewired equipped with integral thermal protection.
				2. Special Application and Function:

Teleconferencing areas shall have fixtures which match, and are compatible with existing facility installations, including lamp type, lamp color, fixture and lens type, controls, and minimum lighting levels for the vertical and horizontal planes. Low voltage fixtures utilizing MR16 lamps shall be lensed.

‘Clean-room’ type fixtures for high purity areas and special laboratory functions shall be triple gasketed, with sealed cam latches at a minimum. Room specific requirements may require a more robust design.

Warning signs (In Use, Beam On, X-Ray In Use, etc.) shall be LED illuminated with housing and face color as specified.

Task lights shall be equipped with an integral rocker switch. Where two or more task lights are located in a room, a wall switch shall be installed at the entry door for control.

* + - 1. ENVIRONMENTAL ROOMS AND EXTERIOR LIGHTING FIXTURES
				1. Enclosures shall be complete with gaskets to form weatherproof seal and UL approved for wet locations.
				2. Provide low temperature ballasts with reliable starting to 0 degrees F.
				3. In-ground or buried fixture and ballast systems are not approved for use.
				4. Exterior fixtures shall match Owner’s existing style and types, particularly bollard, pole-top, parking garage, soffit, roadway, perimeter area lights and landscaping types. Exterior fixtures shall be compatible with BJC standards as applicable.
			2. RETURN AIR TROFFER
				1. The return air troffer where indicated on Drawings, shall have white enamel finish, and shall be recessed in inverted "T" bar ceiling. Lens pattern K SH 20 or approved substitution.
				2. The return air troffer shall have the capacity to handle 200 CFM of return air through the side slots of the nominal 4-foot long fixture (without return air attachment) with a total pressure drop from the rooms to the return air ceiling plenum not to exceed 0.05 inches w.g.
			3. EMERGENCY EXIT SIGNS
				1. Provide exit signs with red LED illumination.
				2. Exit signs shall have covers that are composed of a white face and body, smooth red diffusion material, with 6 inch-high red letters on black background, directional arrows as indicated. Individual LED's shall not be visible through the diffusion material.
				3. Fixtures shall have minimum five (5) year warranty.
				4. Fixtures shall be UL924 and Energy Star compliant.
				5. Exit signs shall be rated for dual voltage; 120/277.
			4. LAMPS
				1. Incandescent lamps shall not be used unless otherwise approved for special use.
				2. Pin-based compact fluorescent lamps shall be quad or triple tube, 13, 18, 26 or 32 watt similar to NEMA lamp type CFQ13W/G24Q/835 or CFTR26W/GX24Q/835. ‘Long’ compact fluorescent lamps in nominal 39 and 40 watt sizes are acceptable.  Compact fluorescent lamps shall be 3500K color temperature. Original equipment manufacturer lamps that are only available from a single manufacturer are not acceptable.
				3. Linear fluorescent rapid, or instant-start lamps shall be medium bi-pin equal to or better than Philips T-8 lamps, minimum CRI of 85. General use four foot lamps shall be equal to or better than Philips Energy Advantage F32T8/ADV841/XEW/ALTO. If different lamp manufacturers are submitted, no noticeable difference in color temperature shall be allowed and performance shall be equal to or better than the base lamp.  T-8 fluorescent lamps shall have a color temperature of 3500 K and be specified in 2 foot, 3 foot and 4 foot lengths only. U-bent (6 inch, 3 inch, 1-5/8 inch) and circline lamps are not acceptable. Linear four foot lamps used in open fixtures in environments below 70 degrees F, or in operation rooms, shall be full wattage type. All lamps shall be from one manufacture, no exceptions.
				4. Metal halide HID lamps shall be ceramic metal halide type, clear, unless noted otherwise, with mogul or medium bases. Acceptable medium base lamp sizes are 50, 100 and 150 watts. Double-ended lamps are not acceptable. Any base type other than medium or mogul shall be submitted for Owner review and approval in advance. Metal halide fixtures shall be lensed or utilize a lamp (PAR type) which does not require special arc tube protection. Location and usage may determine the need for Owner approved alternate.
				5. Cold cathode, neon, T-5 and T-2 systems are not approved for use.
				6. LED, induction and fiber optic lighting systems may be approved for special applications when submitted for Owner review and approval in advance.
				7. Lamps, including linear fluorescent, compact fluorescent and high intensity discharge, shall be low mercury type and shall pass all federal TCLP (Toxicity Characteristic Leaching Procedure) test requirements at the time of manufacture.
			5. BALLASTS FOR FLUORESCENT T-8 LAMPS
				1. High frequency (20 kHz or greater) electronic type.
				2. THD (total harmonic distortion) of less than 10 percent.
				3. Power factor greater than or equal to 95 percent.
				4. Ballasts shall operate with 265 MA lamps.
				5. Unless noted otherwise (i.e. dual switching, etc.), provide one ballast per fixture.
				6. All ballasts shall be rated for 277-volt operation except for under-counter, patient headwall, and patient room night light fixtures that shall be rated for 120-volt operation. Universal voltage ballast preferred. 120-277V
				7. Ballasts shall be Class P thermally protected.
				8. Ballasts shall include a 5-year manufacturer's warranty.
				9. Ballasts shall meet FCC requirements governing electromagnetic and radio frequency interference.
			6. BALLASTS FOR COMPACT FLUORESCENT LAMPS
				1. All ballasts shall be of the high power factor type and be capable of independent switching if two ballasts are provided with a fixture.
				2. Ballasts shall have a minimum five (5) year warranty.
				3. Dimming ballasts shall be electronic and compatible for line voltage or control wire dimming systems as specified on the Contract Documents.
				4. Ballasts shall be electronic 4 pin lamp application. Electronic ballasts for other applications shall be submitted for Owner approval in advance.
			7. BALLASTS FOR HID LAMPS
				1. HID ballast shall be of the lead-peak autotransformer type for metal halide lamps. Ballast shall start and operate the lamp at ambient temperatures ranging from minus 20 degrees F to 105 degrees F. All ballasts shall have automatic thermal protection, and high power factor, minimum of 90 percent. Ballasts for interior applications shall be encased and potted, or be of the electronic type.
				2. HID ballasts for M90, M110, M130, M139 and M140 rated lamps shall be electronic, and shall include a five (5) year manufacturer’s warranty.
1. EXECUTION
	* + 1. INSTALLATION
				1. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
				2. Install light fixtures in accordance with the manufacturer's written instructions, the applicable requirements of NEC and the National Electrical Contractors Association's "Standard of Installation".
				3. If a fixture type designation is omitted, furnish fixture of the same type as shown for rooms of similar usage. Verify with Owner’s Project Manager before purchase and installation.
				4. Check the building electrical system requirements and architectural finishes. Regardless of the catalog number prefixes and suffixes shown, furnish fixtures with the proper trim, frames, supports, hangers, ballasts, voltage rating, and other miscellaneous appurtenances to properly coordinate with Project conditions. Verify with Owner’s Project Manager prior to ordering.
				5. Check the type of ceilings to be installed in each room and verify that the recessed light fixtures are proper for the type of ceiling to be installed before ordering fixtures. Provide a frame compatible with the type of ceiling in which the recessed lighting fixture is installed. Refer to the Architectural Room Finish Schedule for the specified ceiling type.
				6. Fixtures shall be securely attached to the ceiling-framing members by mechanical means. Clips identified for use with the type of ceiling framing member(s) and fixture(s) shall also be permitted. Fasten lighting fixtures in areas where there is no ceiling securely to the structure.
				7. Immediately before final observation, clean all fixtures, inside and out, including plastics and glassware, and adjust all trim to properly fit adjacent surface, replace broken or damaged parts, and lamp and test all fixtures for electrical as well as mechanical operation.
				8. Protect installed fixtures from damage during the remainder of the construction period.
				9. Wiring methods:

Lighting fixtures shall be connected to a typical metal conduit, junction box, and wire lighting grid system. MC (Metal-Clad Cable) and FMC (Flexible Metal Conduit), where are permitted to be used, shall be concealed to prevent physical damage. Exposed MC and FMC installations are not acceptable.

Modular cabling, flexible whip assemblies, feed through wiring, ‘daisy-chain’ feeds, tandem wiring and other similar wiring methods are not acceptable for the lighting circuit distribution and wiring system.

* + - 1. TESTING
				1. Upon completion of installation of interior lighting fixtures, and after circuitry has been energized, apply electrical energy to demonstrate capability and compliance with requirements. When possible, correct malfunctioning units at the Project Site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting.
				2. Incandescent lamps shall be new at time of Final Completion.
				3. Fluorescent lamps may be used in the final finishing of the Project. Those that have exceeded more than 20 percent of their rated life (as established by Owner records) or that have darkened ends shall be replaced with new lamps before Final Completion.
				4. HID lamps may be used in the final finishing of the Project. Those that have exceeded more than 20 percent of their rated life (as established by Owner records) shall be replaced with new lamps before Final Completion.
				5. All existing fixtures in work area that are re-used or relocated shall be cleaned inside and out, broken or damaged parts replaced and new lamps installed.
			2. LIGHTING FIXTURE SCHEDULE
				1. Refer to Lighting Fixture Schedule on Drawings for list of specified manufacturers for each fixture proposed.

END OF SECTION 26 51 00