

Addendum No. 1
February 5, 2021

Project: Fine Arts Colton Theatre Renovation
University of South Dakota
Vermillion, South Dakota
OSE Project #0621--09X
Architecture Incorporated Project #2906

Architect: Architecture Incorporated

Letting: Thursday, February 24, 2021
2:30 P.M.
Office of the State Engineer, Joe Foss Building, 523 East Capitol, Pierre, South Dakota

Scope of this Addendum:

To all bidders and all others to whom drawings and specifications have been issued by Architecture Incorporated, this Addendum forms a part of the Contract Documents. Acknowledge receipt of this addendum by listing its number and date in the bidder's Form of Proposal. Failure to do so may subject bidder to disqualification. This addendum modifies the drawings and specifications as follows:

GENERAL ITEMS:

- 1) SPECIFICATION SECTION 092900 – GYPSUM BOARD
 - a) Part 2.3.B.1: Clarification – both 5/8 inch and 1/2 inch gypsum board are required for this project.
- 2) SPECIFICATION SECTION 095113 – INTERIOR PAINTING
 - a) Change Part 2.3.D to read “PNT-3 (door frames and handrails – except where noted otherwise): Color: Sherwin Williams 7069 Iron Ore.”
- 3) SPECIFICATION SECTION 260933 – THEATRICAL DIMMING CONTROLS & DISTRIBUTION
 - a) Clarification: Part 2.16 specifies Architectural LED Downlights that are to be included in the Base Bid. Quantity and Catalog number of the Type ‘D’ fixture is identified in the Luminaire Schedule on Drawing Sheet 9.70.
- 4) SPECIFICATION SECTION 265561 – THEATRICAL LIGHTING AND ACCESSORIES & ATTACHMENT
 - a) This section was excluded from the original project manual. Refer to Section 265561 attached to the end of this addendum.
 - b) Part 1.01.A: Clarification – Theatrical Lighting and Accessories included in Section 265561 are associated with Add Alternate #3. Note Type ‘D’ Architectural LED Downlights specified in Section 260933 are to be included in the Base Bid.
- 5) DRAWING SHEET 4.11 – FLOOR PLANS
 - a) Add the following General Note “I. Provide 3/4” plywood within openings of removed step lights at Rooms 156B and 156D. Face of plywood to be flush with the face of the adjacent concrete masonry unit walls. Refer to Electrical for locations.”

- b) Wall Type G1: Steel studs at this wall type are to be 3 5/8" structural steel studs.
- c) Partial First Floor Plan:
 - i) Reinstall existing thermostats at north wall of Rooms 156 and 156A – refer to Partial First Floor Demolition Plan at Drawing Sheet 4.01 for approximate location. Extend pneumatic lines as necessary to surface mount the thermostats to the finished face of the new wall assemblies.
 - ii) Room 156: Note new carpet extends approximately 1'-0" under the front (east) edge of the stage.
- 6) DRAWING SHEET 4.50 – INTERIOR ELEVATIONS
 - a) Details 2 & 4: Clarification – the arrows on the wood panels indicate wood grain direction.
 - b) Detail 7: Bottom of new wall assembly shall have one layer of ½" gypsum board that returns to the existing wall. Adhere one layer of ½" gypsum board to the existing concrete masonry unit wall from the bottom of the new wall assembly to the floor slab.
- 7) DRAWING SHEET 4.51 – INTERIOR ELEVATIONS & DETAILS
 - a) Detail 1: Clarification – the arrows on the wood panels indicate wood grain direction.
 - b) Detail 4: Clarification – the new ½" wood paneling at the stage front is to be included in the Base Bid.
- 8) DRAWING SHEET 4.60 – SEATING PLAN & DOOR SCHEDULE
 - a) Door Frame & Finish Schedule Notes: Clarification – the letter key designations for these notes should be lower case letters.
 - b) Door Schedule:
 - i) Door 156A-1: Clarification – door frame is existing.
 - ii) Door 156A-3: Add Door Frame & Finish Schedule Notes 'a' and 'c' to the Additional Notes column.
 - c) Details 1, 2, 5, and 6: Change references to ½" Treated Plywood to ½" Fire Treated Plywood.
- 9) DRAWING SHEET 6.11 – REFLECTED CEILING PLANS
 - a) Partial First Floor Reflected Ceiling Plan – at the north and south walls of Room 156 – provide ½" gypsum board returns at the top of the new curved wall assemblies where they project beyond the existing angled walls. Top face of the gypsum board shall align with the bottom of the existing angled walls.
- 10) DRAWING SHEET 10.10 – RIGGING, LIGHTING, AND AV
 - a) Change General Note D to read "D. See Drawing Sheet 10.11 for speaker to be hung at 1st electric."

MECHANICAL ITEMS:

NA

ELECTRICAL ITEMS:

NA

GENERAL APPROVALS:

The following material or equipment furnished by the manufacturers listed, may be substituted as equivalent providing that each item, material, and piece of equipment conforms to the design and requirement of the specifications.

<u>SECTION</u>	<u>ITEM</u>	<u>MANUFACTURER</u>
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NA

END OF ADDENDUM

SECTION 265561 - THEATRICAL LIGHTING AND ACCESSORIES & ATTACHMENT

PART 1 - GENERAL

1.01 WORK INCLUDES

- A. Base Bid:
 - 1. All Theatrical luminaires and accessories listed.
- B. Unit Prices:
 - 1. Provide unit prices per schedule on bid form.
 - 2. The Owner reserves the right to select fixtures and accessories of types and quantities desired based upon bid prices and available funds. Only one manufacturer representative will be awarded a contract to provide the fixtures selected.

1.02 RELATED PRODUCTS AND SERVICES SPECIFIED ELSEWHERE

- A. Audience, Decoration, Platform, Circulation, etc lights
- B. Lobby Lighting Control
- C. Theatrical Lighting Control and Distribution Equipment

1.03 DEFINITION OF TERMS

- A. The term Manufacturer or Theatre Lighting Equipment Manufacturer as used herein, refers to the manufacturer responsible for fabrication; assembly, shop drawings and shipping of all luminaires and accessories as covered in these specifications, and related drawings.
- B. The terms Owners, Architects and General Contractor, are used herein to refer to organizations, individuals and their representatives as typically defined for construction projects.
- C. Technical terms peculiar to stage, audience and special lighting and related work shall be construed in the following order, in accordance with:
 - 1. Captions on related drawings.
 - 2. Generally recognized theatrical usage.
 - 3. Relevant usage and definitions of handbooks, guidebooks, or trade-group recommendations by Manufacturer's Associations or Professional and Engineering Societies, such as UL, IES, SMPTE, NEC, NEMA, ESTA.
- D. ESTA PHOTOMETRIC REFERENCE STANDARDS
 - 1. Photometric product documentation for stage and studio luminaires used in the live entertainment and performance industries shall comply with the rules and recommendations of the following standard: Entertainment Services & Technology

Association (ESTA) ANSI E1.9-2007, Entertainment Technology - Reporting Photometric Performance Data for Luminaires Used in Entertainment Lighting.

2. Lens quality documentation for pattern projecting luminaires intended for entertainment use shall comply with the rules and recommendations of the following standard: Entertainment Services & Technology Association (ESTA) ANSI E1.35 – 2007, Standard for Lens Quality Measurements for Pattern Projecting Luminaires Intended for Entertainment Use

1.04. SCOPE

- A. This specification covers luminaires and accessories for the Colton Recital Hall.
- B. The manufacturer shall furnish all equipment and materials specified herein and comply with all general conditions related to this contract.
- C. The manufacturer shall furnish all services necessary to provide the equipment, including:
 1. Submittals and data sheets for review by Architect and Consultant prior to fabrication; samples may be requested.
 2. Schedule coordination and shipping to job site. All cartons to be labeled for content: Equipment generic name and catalog number.
 3. Submission of record drawings, service and operational data, test certificates and guarantees.

1.05 QUALITY ASSURANCE

- A. All families of equipment to be the responsibility of a single Theatre Lighting Equipment Manufacturer who shall own and operate his own shop for fabrication of portable theatre lighting fixtures and accessories.
- B. Subject to the requirements of this and related specifications, the following are approved representatives and manufacturers.
- C. Listing of acceptable manufacturers and their representatives is to establish and assure quality of equipment and workmanship. This listing does not waive any bid submission, General Conditions, or other requirements of the Contract Documents for this project:

<p>Gopher Stage Lighting 4141 Cedar Avenue South Minneapolis, MN 55407 (612) 871-0138 http://www.gopherstagelighting.com</p>	<p>Norcostco 825 Rhode Island Ave. S. Minneapolis, MN 55426-1611 (763) 544-0601 http://www.norcostco.com</p>
<p>Heartland Scenic Studio 5329 Lindbergh Drive Omaha, NE 68110 (402) 905-4953 http://www.heartlandscenic.com</p>	

- D. Other manufacturers must obtain approval in writing from the Owner, Architect and the Theatre Consultants no later than 14 days prior to bid submittal date. Approval is contingent upon review

of detailed technical information, project lists, references and samples required by the Architect and Consultant and additional items required in General Conditions.

1.06 SUBMITTALS

- A. All submittals including shop drawings and related data must be submitted complete and at one time. Isolated items will not be considered for review. Subsequent required submissions similarly must include all items at one time unless exceptions are previously authorized in writing.
- B. With bid submit complete, at one time, the following for review. Bids unaccompanied by this information will not be accepted.
 - 1. Completed bid form.
 - 2. Two copies of the complete bill of materials with manufacturer's names, model and type numbers and catalog data sheets covering all luminaires and accessory items with clear notation where products vary from this specification.
 - 3. Test data by an independent laboratory as specified herein and/or requested by the Architect. The Architect reserves the right to specify a suitable laboratory and/or personally witness tests as may be required to ascertain the performance of the equipment.
 - 4. Schedule for submittal preparation, fabrication, and shipping conforming to time limits set for this project.
 - 5. A representative list of installed equipment of the types specified herein with an Architect, Consultant or Owner's Representative for each representative system and his address to serve as a reference contact.
 - 6. Other items as may be required in the General Conditions.
- B. Shop Drawings: Submit within fifteen (15) days of bid acceptance for review and approval by the Architect and Consultant:
 - 1. Complete shop drawings and data sheets where appropriate, for all items specified.
 - 2. Shop drawings and related data must be submitted complete and at one time.
- C. Samples: Samples may be requested by the Architects or Theatre Consultants and shall be provided or available for factory inspection.
 - 1. Samples as requested shall be provided within seven (7) days of written request. Samples may include all major components and materials.
 - 2. Such samples shall become quality and finish standards for all similar items provided to the project.
- D. Record Drawings and Manuals: Within thirty (30) days of Final Tests and Inspections of equipment with the Owner and the Architect, the Manufacturer shall submit to the Architect three copies of each of the following. Final approval will not be granted until this material is delivered.
 - 1. Operating and maintenance manuals with telephone number(s) and names for service.
 - 2. Luminaire shop drawings and data sheets; inventory showing all items provided

- E. Review of Submissions:
 - 1. Review of shop drawings and samples is for quality and design.
 - 2. Such review does not change requirements of contract drawings or specifications, or reduce quality or quantity of items to be supplied, unless so stated in writing.
 - 3. Such review does not relieve Contractor of responsibilities re site conditions unless so stated in writing.

1.07 WARRANTIES AND GUARANTEES

- A. Manufacturer shall guarantee parts replacement and shipping and system repair and site visits by factory representative, including time and travel expenses, for two years. All guarantee work shall be coordinated with Using Agency's requirements for facility use. All guarantee work shall be performed within thirty (30) days of notification.
 - 1. Ordinary wear and defects due to improper usage are excepted.
 - 2. Three signed copies of the above are required as a condition for final approval of the work.

1.08 TESTS AND INSPECTIONS FOR FINAL ACCEPTANCE

- A. Tests and inspections upon receipt in full of all luminaires and accessories for final approval may include any of the following and/or such other tests, inspections and operations as the Using Agency, or Architect/Engineer, or their representatives, or local authorities having jurisdiction may find necessary.
 - 1. Visual examination, uncovering and disassembly of components.
 - 2. Operation of all luminaires and accessories for proper operation.
- B. Following tests and inspections, the Theatre Lighting Equipment Manufacturer shall make any replacements, adjustments, or modifications necessary from the punch list to bring the work into conformance with established contract requirements, and, shall then certify that the work is ready for final inspection.
- C. The following conditions must be met before acceptance can be acknowledged.
 - 1. Approval of final tests and inspections.
 - 2. Submittal of three signed copies of the warranty.
 - 3. Submittal of record drawings, and data.
- D. Should deficiencies due to faulty equipment or missing components require reinspection after final inspection, all expenses of such reinspection, including time and travel of the Architect/Engineer and their representatives shall be the responsibility of the Theatre Lighting Equipment Manufacturer without cost to the Owner.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Luminaires shall conform to the NEC and to UL1573. All luminaires shall be UL listed.
- B. Provide each luminaire with yoke or hanger(s), theatrical C-clamp(s), Black safety cable, in quantities as appropriate.
- C. Provide 60" Powercon or TruCON to NEMA5-15 power cable for each LED fixture that

requires it.

- D. Provide color frames, and other accessories as required for luminaires.
- E. Owner is responsible for receiving, storage, and handling of luminaires and accessories. Luminaires must be hung and lamped for checkout of theatre lighting system at the time of Substantial Completion.

2.02 SPECIFICATIONS

- A. SEE FIXTURE SPEC DOC "Colton Recital Hall Light Fixture Specs" attached to the end of this section.

2.03 LUMINAIRES AND ACCESSORIES

- A. Desire D40 Studio HD, black, ETC 7410A1402-B; DPA-A (7410B7037-A) power cable
- B. ColorSource PAR Deep Blue, black; ETC 7412A1008; DPA-A (7410B7037-A) power cable
- C. 7.5" Extra-Wide lens (round field) ETC SELRW-7.5 (7410K1039)
- D. 7.5" Wide lens (round field) ETC SELRW-7.5 (7410K1013)
- E. 7.5" Medium lens (round field) ETC SELRM-7.5 (7410K1012)
- F. 7.5" Narrow lens (round field) ETC SELRN-7.5 (7410K1011)

2.04 ACCESSORIES

- A. 10' 12/3 SJ Powercon Extension (Powercon A to B)
- B. 25' 12/3 SJ Powercon Extension (Powercon A to B)
- C. 15' 12/3 Powercon to Edison 5-15P
- D. 5' 5-pin Tour Quality (premium grade) DMX, TMB Proplex or Equivalent
- E. 15' 5-pin Tour Quality (premium grade) DMX, TMB Proplex or Equivalent
- F. 25' 5-pin Tour Quality (premium grade) DMX, TMB Proplex or Equivalent
- G. City Theatrical Stackers. 7.5" full top hat.
- H. Egg Crate Louver, PSF1028

2.05 SCHEDULE OF QUANTITIES

(This schedule or a photo copy of this schedule shall be used for the MANUFACTURER'S PRICE FORM. All prices - both line totals and unit costs - shall include costs of equipment, shipping, insurance, and all other related services and items required to furnish and deliver equipment to Owner's site.)

Fixtures				
LINE ITEM		QUANTITY	UNIT COST (\$)	TOTAL (\$)
1	ColorSource PAR-Deep Blue	6	_____	_____
2	Desire D40 Studio HD	14	_____	_____
ACCESSORIES				
	7.5" Extra-Wide (round field)	20	_____	_____
	7.5" Wide lens (round field)	20		
	7.5" Medium lens (round field)	20		
	7.5" Narrow lens (round field)	20		
	10' 12/3 SJ Powercon Extension (Powercon A to B)	15		
	25' 12/3 SJ Powercon Extension (Powercon A to B)	5		
	15' Powercon to Edison 5-15P	4		
	5' 5-pin DMX	10		
	15' 5-pin DMX	15		
	25' 5-pin DMX	5		
	7.5" Stacker Top Hats	20		
	7.5" Egg Crate Louver	20		

End of Section 265561

THEATRICAL LUMINAIRES AND ACCESSORIES & ATTACHMENT

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COLOTON RECITAL HALL LIGHT FIXTURE SPECS

1.01 COLOR MIXING LIGHT EMITTING DIODE WASH FIXTURE – DESIRE D40

A. General

1. The fixture shall be a color-mixing high-intensity LED illuminator with DMX control of intensity and color. The fixture shall be a Desire D40 or D40 Studio as manufactured by Electronics Theatre Controls, Inc. or approved equal.
2. All LED fixtures shall be provided by a single manufacturer to ensure compatibility
3. The fixture shall be UL 1573 listed for stage and studio use
4. The fixture shall comply with the USITT DMX-512 A standard
5. The fixture shall be provided with the minimum warranty of 5 years full fixture coverage and 10 years LED array coverage
6. All LED emitters must have a L70 rating of no less than 50,000 hours
 - a. Substitutes must provide evidence of minimum L70 rating of no less than 50,000 hours via a LM-80 report on all emitters
 - 1) LM-80 report must be provided with a LM-79 report and an in situ temperature measurement test verifying the conditions of the fixture meet the conditions of the LM-80 report
 - 2) All tests and reports must be completed by a Nationally Recognized Testing Laboratory
 - 3) All tests must be conducted to IES standards

B. Physical

1. The fixture shall be contained in a rugged all-metal die-cast housing, free of burrs and pits.
2. The housing shall have a rugged black powdercoat finish
 - a. White or silver/gray powdercoat finishes shall be available as color options
 - b. Other powdercoat color options shall be available on request
3. Power supply, cooling and electronics shall be integral to each unit.
4. Fixture housing shall provide two easy-access slots for secondary lenses and other accessories
 - a. Slots shall be equipped with locking retaining clip
5. The unit shall ship with:
 - a. Theatrical-style hanging yoke as standard
 - b. 5' power lead with Edison connector as standard
6. Available options shall include but not be limited to:
 - a. Yoke with floor stand conversion feature
 - b. Bare-end, Stage-Pin or Twist-lock type-equipped power leads

COLOTON RECITAL HALL LIGHT FIXTURE SPECS

- c. PowerCon to PowerCon cables for fixture power linking
 - d. Multiple secondary lens options to include multiple angles in the following patterns:
 - 1) Linear
 - 2) Round
 - 3) Oblong
7. Light output shall be via a round aperture
- a. Aperture and accessory slots shall accommodate standard 7.5" accessories such as used in other similar-sized fixtures
 - b. Accessories available as options shall include but not be limited to:
 - 1) Gel/diffusion frames
 - 2) Top hats
 - 3) Barndoors
 - 4) Egg crate louvers
 - 5) Concentric ring louvers
 - 6) Multiple secondary lensing options

C. ENVIRONMENTAL AND AGENCY COMPLIANCE

- 1. The fixture shall be UL and cUL LISTED and/or CE rated, and shall be so labeled when delivered to the job site.
- 2. The fixture shall be UL LISTED to the UL1573 standard for stage and studio use
- 3. The fixture shall be rated for IP-20 dry location use.

D. THERMAL

- 1. Fixture shall be totally convection cooled, requiring no cooling fan. Fixtures which require an on-board cooling fan shall not be acceptable unless pre-approved
- 2. The fixture shall utilize advanced thermal management systems to maintain LED life to an average of 70% intensity after 50,000 hours of use
 - a. Thermal management shall include multiple temperature sensors within the housing to include:
 - 1) LED array circuit board temperatures
 - 2) Temperature sensors placed on each individual LED color circuit
 - 3) Fixture ambient
 - 4) CPU
 - b. Fixture user shall permit monitoring of temperature sensors via a legible LCD multi-line backlit display
 - c. Fixtures that do not provide active thermal monitoring of LED circuits and other temperature readings shall not be acceptable
- 3. The fixture shall operate in an ambient temperature range of -20°C (-4°F) minimum, to 40° C (104°F) maximum ambient temperature.

E. ELECTRICAL

COLOTON RECITAL HALL LIGHT FIXTURE SPECS

1. The fixture shall be equipped with 100V to 240V 50/60 Hz internal power supply
2. The fixture shall support power in and thru operation
 - a. Power in shall be via Neutrik® PowerCon™ input connector
 - b. Power thru shall be via Neutrik® PowerCon™ output connector
 - c. Fixture power wiring and accessory power cables shall be rated to support linking of multiple fixtures up to the capacity of a 15A breaker
3. The fixture requires power from non-dim source
4. Power supply outputs shall have self-resetting current limiting protection
5. Power supply shall have power factor correction

F. LED Emitters

1. The fixture shall contain a minimum of 5 different LED colors to provide color characteristics as described in Section G below.
2. All LEDs used in the fixture shall be high brightness and proven quality from established and reputable LED manufacturers.
 - a. Fixture shall utilize Luxeon® Rebel™ LED emitters
3. Manufacturer of LED emitters shall utilize an advanced production LED binning process to maintain color consistency.
4. LED emitters should be rated for nominal 50,000 hour LED life to 70% intensity
5. All LED fixtures (100% of each lot) shall undergo a minimum eight-hour burn-in test during manufacturing.
6. LED system shall comply with all relevant patents

G. CALIBRATION

1. Fixture shall be calibrated at factory for achieve consistent color and intensity output between fixtures built at different times and/or from different LED lots or bins
 - a. Calibration data shall be stored on the LED array as a permanent part of on-board operating system
 - b. All arrays, including replacement arrays shall be calibrated to the same standard to insure consistency
 - c. Fixtures not offering LED calibration shall not be acceptable

H. COLOR

1. The fixture shall utilize an minimum of 40 LED emitters
2. The fixture shall be available in specialized LED arrays as outlined below:
 - a. Desire D40

COLOTON RECITAL HALL LIGHT FIXTURE SPECS

- 1) Red, Amber, Green, Cyan, Blue, Indigo and White LEDs in an array designed for broad spectrum color, light tints, and variable whites. This array shall be the Lustr+ array as manufactured by Electronic Theatre Controls, or approved equal
 - a) Measured brightness of the Lustr+ array shall be greater than 2900 field lumens
 - 2) Red, Orange, Amber, Green, Cyan, Blue and Indigo LEDs in an array designed for broad spectrum deep colors. This array shall be the Vivid array as manufactured by Electronic Theatre Controls, or approved equal
 - a) Measured brightness of the Vivid array shall be greater than 2500 field lumens
 - 3) Red, Orange, Amber, Green and Indigo LEDs in an array designed for extra-high brightness output in red/warm end of the spectrum. This shall be the Fire array as manufactured by Electronic Theatre Controls, or approved equal
 - a) Measured brightness of the Fire array shall be greater than 2500 field lumens
 - 4) Red, Orange, Green, Cyan, Blue and Indigo LEDs in an array designed for extra-high brightness output in the blue/cool end of the spectrum. This shall be the Ice array as manufactured by Electronic Theatre Controls, or approved equal
 - a) Measured brightness of the Ice array shall be greater than 1800 field lumens
- b. Desire D40 Studio
- 1) Warm White, Cool White, Red, Green, Blue and Indigo LEDs in an array designed for high-brightness variable color temperature white light output. This shall be the Studio HD array as manufactured by Electronic Theatre Controls, or approved equal
 - a) Measure brightness of the Studio HD array shall be greater than 3100 field lumens
 - 2) All Warm White LEDs in an array designed for non-variable single color high-output, warm white light. This shall be the Studio Tungsten array as manufactured by Electronic Theatre Controls, or approved equal
 - a) Measure brightness of the Studio tungsten array shall be greater than (TBD) field lumens
 - 3) All Cool White LEDs in an array designed for non-variable single color high-output, cool white light. This shall be the Studio Daylight array as manufactured by Electronic Theatre Controls, or approved equal
 - a) Measure brightness of the Studio Daylight array shall be greater than (TBD) field lumens
 - 4)

I. DIMMING

1. The LED system shall use 15-bit nonlinear scaling techniques for high-resolution dimming.
2. At least four different dimming curve options shall be accessible at the fixture's User Interface
 - a. Incandescent

COLOTON RECITAL HALL LIGHT FIXTURE SPECS

- b. Standard
 - c. Linear
 - d. Quick
 3. Dimming curves shall be optimized for smooth dimming over longer timed fades.
 4. The LED system shall be digitally driven using high-speed pulse width modulation (PWM)
 5. LED control shall be compatible with broadcast equipment in the following ways:
 - a. PWM control of LED levels shall be imperceptible to video cameras and related equipment
 - b. PWM rates shall be adjustable by the user at the fixture if necessary to avoid any visible interference to video cameras and related equipment
- J. CONTROL AND USER INTERFACE
 1. The fixture shall be USITT DMX 512A-compatible via **In** and **Thru** 5-pin XLR connectors
 2. The fixture shall be compatible with the ANSI RDM E1.20 standard
 - a. All fixture functions shall accessible via RDM protocol for modification from suitably equipped control console
 - b. Temperature sensors within the luminaire shall be viewable in real time via RDM
 - c. Fixtures not offering RDM compatibility, feature set access or temperature monitoring via RDM shall not be compatible
 3. The fixture shall be equipped with multi-line LCD display for easy-to-read status reports and configuration changes
 4. The fixture shall be equipped with a six-button user-interface
 5. The fixture shall offer multiple DMX input profile options to include:
 - a. RGB - control of all individual LED colors via a three-channel profile
 - 1) Red, Green, Blue
 - b. HSI – control of all individual LED colors via a three-channel profile
 - 1) Hue, Saturation, Intensity
 - c. HSIC – control of all LED colors via a four-channel profile
 - 1) Hue, Saturation, Intensity and Color Point
 - a) Color point provides variable color temperature settings
 - d. Direct – control of each individual color channel via an independent channel
 - e. A variable-rate strobe channel shall be provided
 6. The fixture shall offer three output settings
 - a. Boost mode - powers LEDs at maximum intensity and provides no compensation against LED ‘droop’ or intensity loss

COLOTON RECITAL HALL LIGHT FIXTURE SPECS

- b. Regulated mode – slightly restricts maximum LED intensity levels to compensate against LED droop
 - c. Protected mode – further restricts maximum LED intensity levels to compensate against LED droop and offer color consistency at highest permissible ambient temperatures (40C)
 - d. Fixtures that do not provide regulated and protected operation modes are not acceptable
7. The fixture shall offer additional user-definable options to including but not limited to:
- a. Display time out options
 - b. Loss of data behavior options
 - c. White point settings
 - d. Red-shift option for tungsten dimming emulation
8. The fixture shall offer five Quick Set-Ups to allow user to rapidly select different combinations of the numerous user options based on the desired usage situation, to include:
- a. General – for most situations
 - b. Stage – when emulating incandescent fixtures is desired
 - c. High Impact – when maximum output and effect is desired
 - d. XT Arch – when color consistency and architectural characteristics are desired.
 - e. Studio - when DMX or stand-alone of white light output is required with intensity, color temperature and color tint control parameters
9. The fixture shall offer stand-alone functionality eliminating the need for a console
- a. Fixture shall ship with 24 preset colors accessible as a stand-alone feature
 - b. Fixture shall ship with 12 Sequences accessible as a stand-alone feature
 - c. Each color and sequence can be modified by the end user
 - d. Fixtures can be linked together with standard DMX cables and controlled from designated master fixture
 - 1) Up to 32 fixtures may be linked
 - e. Fixtures in a stand-alone state shall restore to the settings present prior to power cycling, eliminating the need for reprogramming
 - f. Fixtures without stand-alone operation features described in a, b, c, d, and e shall not be acceptable.

COLOTON RECITAL HALL LIGHT FIXTURE SPECS

1.02 COLOR MIXING LIGHT EMITTING DIODE WASH FIXTURE – PAR-DEEP BLUE

A. General

1. The fixture shall be a color-mixing high-intensity LED illuminator with DMX control of intensity and color. The fixture shall be a ColorSource PAR, ColorSource PAR Deep Blue or ColorSource PAR Pearl as manufactured by Electronic Theatre Controls, Inc. or approved equal.
2. All LED fixtures shall be provided by a single manufacturer to ensure compatibility
3. The fixture shall be UL 1573 listed for stage and studio use
4. The fixture shall comply with the USITT DMX512-A standard
5. The fixture shall be provided with the minimum warranty of 5 years full fixture coverage and 10 years LED array coverage
6. ColorSource PAR and ColorSource PAR Deep Blue
 - a. The fixture shall have a LM-84 report with a L70 rating of no less than 55,000 hours
 - 1) Substitutes must provide evidence of minimum L70 rating of no less than 55,000 hours
 - a) If no LM-84 report is available, an acceptable alternate is a LM-80 report on all emitters with a LM-79 report and an in situ temperature measurement test verifying the conditions of the fixture meet the conditions of the LM-80 report
 - b) All tests and reports must be completed by a Nationally Recognized Testing Laboratory
 - c) All tests must be conducted to IES standards
7. ColorSource PAR Pearl
 - a. All LED emitters must have a L70 rating of no less than 20,000 hours
 - 1) Substitutes must provide evidence of minimum L70 rating of no less than 60,000 hours via a LM-80 report on all emitters
 - a) LM-80 report must be provided with a LM-79 report and an in situ temperature measurement test verifying the conditions of the fixture meet the conditions of the LM-80 report
 - b) All tests and reports must be completed by a Nationally Recognized Testing Laboratory
 - c) All tests must be conducted to IES standards

B. Physical

1. The fixture shall be contained in a rugged all-metal die-cast housing, free of burrs and pits.
2. The housing shall have a rugged black powdercoat finish
 - a. White or silver/gray powdercoat finishes shall be available as color options
 - b. Other powdercoat color options shall be available on request

COLOTON RECITAL HALL LIGHT FIXTURE SPECS

3. Power supply, cooling and electronics shall be integral to each unit.
4. Fixture housing shall provide two easy-access slots for secondary lenses and other accessories
 - a. Slots shall be equipped with locking retaining clip
5. The unit shall ship with:
 - a. Theatrical-style hanging yoke as standard
 - b. 5' power lead with Edison connector as standard
6. Available options shall include but not be limited to:
 - a. Floor stand conversion Kit
 - b. Bare-end, Stage-Pin or Twist-lock type-equipped power leads
 - c. powerCON to powerCON cables for fixture power linking
 - d. Multiple secondary lens options to include multiple angles in the following patterns:
 - 1) Linear
 - 2) Round
 - 3) Oblong
7. Light output shall be via a round aperture
 - a. Aperture and accessory slots shall accommodate standard 7.5" accessories such as used in other similar-sized fixtures
 - b. Accessories available as options shall include but not be limited to:
 - 1) Gel/diffusion frames
 - 2) Top hats
 - 3) Barndoors
 - 4) Egg crate louvers
 - 5) Concentric ring louvers
 - 6) Multiple secondary lensing options

C. ENVIRONMENTAL AND AGENCY COMPLIANCE

1. The fixture shall be UL and cUL LISTED and/or CE rated, and shall be so labeled when delivered to the job site.
2. The fixture shall be UL LISTED to the UL1573 standard for stage and studio use
3. The fixture shall be rated for IP-20 dry location use.

D. THERMAL

1. The fixture shall be cooled with a variable speed fan.
2. The fixture shall utilize advanced thermal management systems to maintain LED life to an average of 70% intensity after 20,000 hours of use for color mixing versions and 36,000 hours of use for Pearl variety
 - a. Thermal management shall include multiple temperature sensors within the housing to include:

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- 1) The LED array
- 2) The control board
3. The fixture shall operate in an ambient temperature range of 0°C (32°F) minimum, to 40°C (104°F) maximum ambient temperature.

E. ELECTRICAL

1. The fixture shall be equipped with 100V to 240V 50/60 Hz internal power supply
2. The fixture shall support power in and thru operation
 - a. Power in shall be via Neutrik® powerCON™ input connector
 - b. Power thru shall be via Neutrik® powerCON™ output connector
 - c. Fixture power wiring and accessory power cables shall be rated to support linking of multiple fixtures up to the capacity of a 15A breaker
3. The fixture requires power from non-dim source
4. Power supply outputs shall have self-resetting current limiting protection
5. Power supply shall have power factor correction

F. LED Emitters

1. The fixture shall contain 4 different LED colors to provide color characteristics or two color temperature white LEDs for the Pearl products, as described in Section H below.
2. All LEDs used in the fixture shall be high brightness and proven quality from established and reputable LED manufacturers.
 - a. Fixture shall utilize Luxeon® Z™ LED emitters
3. Manufacturer of LED emitters shall utilize an advanced production LED binning process to maintain color consistency.
4. LED emitters should be rated for nominal 20,000-hour L70 rating for color mixing versions and 36,000-hour L70 rating for Pearl variant
5. LED system shall comply with all relevant patents

G. CALIBRATION

1. Fixture shall be calibrated at factory for achieve consistent color between fixtures built at different times and/or from different LED lots or bins
 - a. Calibration data shall be stored in the fixture as a permanent part of on-board operating system
 - b. All arrays, including replacement arrays shall be calibrated to the same standard to insure consistency
 - c. Fixtures not offering LED calibration shall not be acceptable

H. COLOR

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1. The fixture shall utilize an minimum of 40 LED emitters
 - a. These emitters shall be made up of Red, Green, Blue and Lime for ColorSource
 - b. These emitters shall be made up of Red, Green, Indigo and Lime for ColorSource Deep Blue
 - c. These emitters shall be made up of 2700 K and 6500 K for ColorSource Pearl

I. DIMMING

1. The LED system shall use 15-bit nonlinear scaling techniques for high-resolution dimming.
2. The dimming curve shall be optimized for smooth dimming over longer timed fades.
3. The LED system shall be digitally driven using high-speed pulse width modulation (PWM)
4. LED control shall be compatible with broadcast equipment in the following ways:
 - a. PWM control of LED levels shall be imperceptible to video cameras and related equipment
 - b. PWM rates shall be adjustable by the user via RDM to avoid any visible interference to video cameras and related equipment

J. CONTROL AND USER INTERFACE

1. The fixture shall be USITT DMX512-A compatible via **In** and **Thru** 5-pin XLR connectors
2. The fixture shall be compatible with the ANSI RDM E1.20 standard
 - a. All fixture functions shall accessible via RDM protocol for modification from suitably equipped control console
 - b. Temperature sensors within the luminaire shall be viewable in real time via RDM
 - c. Fixtures not offering RDM compatibility, feature set access or temperature monitoring via RDM shall not be compatible
3. The fixture shall be equipped with a 7-segment display for easy-to-read status and control
4. The fixture shall be equipped with a three-button user-interface
5. The fixture shall offer RGB control
6. The fixture shall operate in Regulated mode for droop compensation
7. The fixture shall offer stand-alone functionality eliminating the need for a console
 - a. Fixture shall ship with 12 preset colors accessible as a stand-alone feature
 - b. Fixture shall ship with 5 Sequences accessible as a stand-alone feature
 - c. Each color and sequence can be modified by the end user

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- d. Fixtures can be linked together with standard DMX cables and controlled from designated master fixture
 - 1) Up to 32 fixtures may be linked
- e. Fixtures in a stand-alone state shall restore to the settings present prior to power cycling, eliminating the need for reprogramming
- f. Fixtures without stand-alone operation features described in a, b, c, d, and e shall not be acceptable.