

SECTION 12 2413 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Motor-operated roller shades **[solar] [and] [room darkening]**.
- 2. Shade accessories.
- 3. Control systems

B. Related Requirements:

- 1. Section 061053 "Miscellaneous Rough Carpentry" for wood blocking and grounds for mounting roller shades and accessories.
- 2. Section 079200 "Joint Sealants" for sealing the perimeters of installation accessories for light-blocking shades with a sealant.
- 3. Section 2600000 - Electrical: Connection to electrical motor control system and lighting control system components.

1.3 REFERENCES

A. American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE):

- 1. C62.41-1991 – Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.
- 2. D4674 -02a Standard Test Method for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Fluorescent Lighting and Window-Filtered Daylight.

B. Association of Electrical and Medical Imaging Equipment Manufacturers (NEMA) WD1-1999 (R2005) - General Color requirements for Wiring Devices.

C. ASTM International (ASTM):

- 1. D4674-89 - Standard Test Method for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Fluorescent Lighting and Window-Filtered Daylight.
- 2. G21-96 (2002) - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- 3. G22-76 (1996) - Standard Practice for Determining Resistance of Plastics to Bacteria.

D. Underwriters Laboratories, Inc. (UL):

1. 1310 – Class 2 Power Units.
2. 508 – Industrial Control Equipment.

1.4 SYSTEM DESCRIPTION

- A. Roller Shade System: 24V Low-Voltage powered, Ultra-quiet, precision-controlled electronic drive unit contained within head tube, controlling shade movement.
- B. Controls: [Wall mounted Keypads in combination with software enabled shades tied to campus Quantum solution.]

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  1. Descriptive literature and details for each product type including materials, finishes, construction, and dimensions of individual components, profiles, and mounting requirements.
  2. Wiring diagrams, details on integration to lighting control systems, AV systems, and building management systems, installation instructions, and operating instructions.
  3. Current certificates showing that line voltage components of system are either [UL Listed or UL recognized.]
- B. Shop Drawings:
  1. Shade schedule indicating room number, opening sizes, quantities and key to details.
  2. Head, jamb and sill details, and mounting dimension requirements for each product and mounting condition.
  3. One-line wiring system diagrams including connection details and overall arrangement of shades and control locations.
- C. Samples.
  1. Fabric samples showing [each specified color.] [manufacturer's full range of available colors.]
  2. Samples showing available color and finish selections for controls.
- D. Quality Control Submittals:
  1. Test Reports: Indicating compliance with specified fabric properties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roller shades to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Roller Shades: Full-size units equal to 5 percent of quantity installed for each size, color, and shadeband material indicated, but no fewer than two units.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Minimum 5 years experience in manufacture of precision-engineered, low-voltage motorized shading systems.
2. Assign responsibility for design, engineering, installation, and performance of window shade system to single manufacturer and their qualified dealers and installers.
3. Furnish shading system and electrical control equipment for complete installation [and single source responsibility of shading and lighting control].
4. Qualified to supply specified products and to honor claims against product presented in accordance with warranty.

B. Installer Qualifications: Qualified to install and commission specified products by prior factory training, experience, demonstrated performance, and acceptance of any requirement of the manufacturer, subsidiary of the manufacturer, or licensed agent.

C. Mockups:

1. Provide mockup of window shade complete with selected shade fabric including sample of seam when applicable.
2. Locate where directed.
3. Approved mockup may [not] remain as part of the Work.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Do not deliver shades until concrete, masonry, plaster, painting, and other wet work is complete and dry.

C. Deliver shades to project in protective packaging, labeled to identify each shade for each opening.

D. Include installation, programming, and maintenance instructions.

1.10 FIELD CONDITIONS

A. Maintain environmental conditions in installation areas within manufacturer's recommended limits:

1. Ambient operating temperature: 32 to 104 degrees F.
2. Humidity: 0 to 90 percent, non-condensing.

B. Do not install products under environmental conditions outside manufacturer's absolute limits.

C. Do not install shade system until building is operating at ambient temperature and humidity ranges that are consistent with those intended for buildings ultimate use.

1.11 COORDINATION

- A. Coordinate pre-wiring of system utilizing manufacturer's approved low voltage wiring to each shade drive location.
- B. Fabricate shades after obtaining field dimensions for each opening.
- C. Coordinate construction of surrounding conditions to allow for timely field dimension verification.

1.12 WARRANTY

- A. Provide manufacturer's 2 year parts and labor and 8 years limited parts warranty for defective equipment.

1.13 MAINTENANCE

- A. Make ordering of new equipment for expansions, replacements, and spare parts available to qualified dealer or installer.
- B. Make replacement parts available for minimum of ten years after date of manufacture.
- C. Provide 24-hour, 7-day a week technical support to troubleshoot system wiring and aid in system programming.
- D. Provide on-site service support within 24 hours anywhere in continental United States and within 72 hours.
- E. Offer renewable service contract on yearly basis to include parts, factory labor, and annual training visits. Make service contracts available up to ten years after date of system startup completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design (Substitutions are Not permitted): Lutron Electronics.

2.2 SYSTEM REQUIREMENTS

- A. Roller Shade Description
  - 1. Lutron Sivoia QS 24V low voltage motor-operated shade.
  - 2. Ultra-quiet, precision-controlled electronic drive unit housed inside roller tube, controlling shade movement.
  - 3. Audible noise: Maximum 50 dBA measured 3 feet from electronic drive unit. No audible clicks when motor starts or stops.
  - 4. Include 10 year power failure memory for preset stops, open and close limits, shade grouping and subgrouping, and system configuration.
  - 5. Operate independently, without use of external group controllers.

B. System Description

1. Control shade speed for tracking within plus or minus 0.0625 inch throughout entire travel.
2. Integrate directly with skylight shades, roman shades and drapery tracks incorporating electronic drive units.
3. Systems with multiple electronic drive units electronically synchronized to start, stop, and move in unison.
4. Allow for maximum of 100 devices including roller shades, skylight shades, drapery tracks, keypads, lighting controls, and power supplies.
5. Allow for 100 zones including roller shades, skylight shades, drapery tracks, and lighting zones.
6. System devices, including shades and lighting controls, connected through common communication link.

C. Grouping:

1. Keypads can control any electronic drive unit without separate group controller.
2. System groups and subgroups configured at point of control without rewiring and without access to electronic drive unit.
3. System may contain multiple electronic drive units.

D. Integration:

1. Electronic drive units integrate with lighting controls by same manufacturer without interfaces.
2. Contact closure, RS232, and Ethernet interfaces available to interface with audio/visual equipment and security systems.

E. System Performance:

1. One-touch control of shades by means of keypad or lighting control.
2. Capable of stopping within accuracy of 0.125 inch at any point between open and close limits.
3. Store over 250 programmable stop points, including open, close, and any other position.
4. Presets set by 5-second button push and hold from keypad or lighting control.
5. Open and close limits programmable from electronic drive unit, lighting control, wall-mounted keypad, or shade software.
6. Electronic drive units, keypads, and lighting controls contain microprocessors, allowing high level programming from any source.

F. Shade System Control

1. Basis of Design:
  - a. Lutron Quantum System for lights and shades.
2. Enables shade control system software to control and monitor Sivoia QS shades.
3. Integral control station devices, shades, lighting loads, to a single system with:
  - a. Distributed architecture, provides fault containment. Single hub failure loss of power does not compromise shades connected to other shade control system hubs.
  - b. Manual overrides, automatic control, central computer control and monitoring.

4. Furnished with astronomical time clock and solar clock to track the position of the sun to control the shades and limit penetration of direct sunlight.
5. Maintains a backup of the programming in a non-volatile memory capable of lasting more than 10 years without power.

G. Shade Control System Computers

1. Computers:
  - a. System PC (Desktop/Laptop):
    - 1) Suitable for occasional programming, monitoring, and control of shade control system.
    - 2) Unless otherwise indicated, computer(s) to be provided by lighting and shade control system manufacturer.
  - b. Computers Provided by Shade Control System Manufacturer: Computer software to be preinstalled and tested prior to shipping.

H. Shade Control System Software

1. Provide system software license and hardware that is designed, tested, manufactured, and warranted by a single manufacturer.
2. Control and Monitor Software:
  - a. Basis of Design:
  - b. Control of lighting and shades from one software system.
  - c. Area shades can be monitored for current preset or position, shades can be opened/closed, sent to a preset, or sent to a specific non preset position.
  - d. Reporting: provide reporting capability that allows the building manager to gather real-time and historical information about the system as follows: Activity report, shade level report, shade position report, sensor level report.
  - e. Diagnostics: ability to check status of all equipment, Alerts and Alarms.

I. Automated Shade Control Software

1. Basis of Design:
  - a. Lutron Hyperion System
2. Open loop solar adaptive algorithm to minimize the penetration depth of direct sunlight.
3. Manual override capability for occupants via wall-mounted keypad or Q-admin software.
4. Automatic overrides utilizing a local mullion sensor where excessive brightness or glare occurs.
5. Shades along same façade to start, stop, and track in unison to maintain a consistent exterior aesthetic. Visor position limits the maximum amount of light entering a space.
6. Radio Window Sensors/Glare Module System: Lutron mullion mount sensors (LRF2-SSM-XX).
  - a. Rooftop sensor not acceptable.
  - b. Monitor exterior light conditions and provides automatic override of system on dark cloudy days or in the presence of shades from neighboring buildings.

- c. Monitors exterior light conditions and provides automatic override of system during excessive brightness and shade goes to predetermined bright override position to maximize occupant comfort.
- d. Sensors to be easily mountable to mullion and can be easily removed and repositioned without marring or damaging the surface.

## 2.3 ROLLER SHADES

### A. Mounting:

1. Brackets to provide symmetrical light gaps of 0.75 inch on each side of shade.
2. Roller shade leveling adjustment allowing leveling adjustment while roller shades are mounted to brackets.
3. Allow side-to-side adjustment up to 0.375 inch on each side while shade is mounted to bracket.
4. Projection adjustment up to 0.50 inch.
5. Two-piece mounting bracket providing level, projection, and shade centering adjustments from mounting bracket.
6. Provide dual brackets permit two shades rollers to be mounted in same opening where applicable.
7. Coupling:
  - a. Single electronic drive unit capable of driving up to six shades with coupling pin.
  - b. System offers 1.5 inch minimum light gaps between panels.
  - c. Pin allows for precision adjustment of bottom bar levels without removing roller from installed point or fabric from roller tube.

- B. Shade Tube: Fabric connected to tube using double-sided adhesive strip with minimum of one turn of fabric on roller before working section of fabric starts.

### C. Fabric:

1. Pass NFPA 701 large and small scale tests.
2. Where applicable, seal shade fabric or treat PVC-coated fabric edges to prevent fraying.
3. Fabric selection:
  - a. Sheer:
  - b. Blackout:
4. Bottom Bar: 1 inch wide x 0.1875 inch thick extruded aluminum enclosed on all sides in thermally sealed pocket across bottom of shading fabric.

- D. Bottom Bar: 1 inch wide x 0.1875 inch thick extruded aluminum enclosed on all sides in thermally sealed pocket across bottom of shading fabric.

## 2.4 ACCESSORIES

### A. Wall Mounted Controls:

1. Low voltage, Lutron Seetouch QS Keypad, 24V DC, complete with cover plate, as selected by Architect from standard manufacturer's range.
2. Visible parts ultraviolet color stabilized, tested to ASTM D4674.
3. Engraved wall stations with button descriptions.

4. Capable of controlling both lights and shades from one button.

B. Power Supplies:

1. Electronic drive units powered with 24 VDC from approved power supply; power supply via NEC Class 2 power source.
2. Provide power panel including 10 individual outputs per panel.

C. SOURCE QUALITY CONTROL

1. Perform full-function testing on completed assemblies prior to shipment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER-SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
- B. Install shades to provide smooth operation.
- C. Locate controls [where directed.] [\_\_\_\_.]
- D. Electrical Connections: Connect motor-operated roller shades to building electrical system.
- E. Connect to [lighting control] [audio/visual] [\_\_\_\_] system.

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller-shade surfaces after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.



NORTHWESTERN UNIVERSITY

PROJECT NAME \_\_\_\_\_

JOB # \_\_\_\_\_

FOR: \_\_\_\_\_

ISSUED: 03/29/2017

- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

**END OF SECTION 12 2413**

NORTHWESTERN UNIVERSITY  
PROJECT NAME \_\_\_\_\_  
JOB # \_\_\_\_\_

FOR: \_\_\_\_\_  
ISSUED: 03/29/2017

**THIS PAGE IS INTENTIONALLY BLANK**