SECTION 12 24 13

FACTORY ASSEMBLED ROLLER SHADES

Display hidden notes to specifier. (Don't know how? [Click Here](https://www.arcat.com/sd/display_hidden_notes.shtml))

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\*\* NOTE TO SPECIFIER \*\* Legrand: Wattstopper; Vantage lighting and shading control products.  
This section is based on the products of Legrand: Wattstopper, which is located at:   
2240 Campbell Creek Blvd No. 110,   
Richardson, TX 75082   
Tel: 1-800-879-8585   
Email: request info.   
Web: https://www.legrand.us/wattstopper.aspx   
 [ [Click Here](https://arcat.com/company/legrand-wattstopper-36455) ] for additional information.  
Wattstopper, a product line of Legrand, offers the most comprehensive line of simple, scalable, and flexible energy efficient lighting and shading control solutions for commercial and residential applications. The Wattstopper range of products, programs, and services have been helping customers save energy, meet green initiatives and comply with energy codes for more than 30 years.  
A leading provider of products and systems for electrical installations and information networks wherever people live and work, Legrand delivers an unequaled depth and breadth of innovative solutions. Legrand North America and Legrand Canada companies include: Cablofil, Electrorack, Middle Atlantic, On Q, Ortronics, Pass & Seymour, Vantage and Wiremold.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Legrand Teleshade TS Series Manual Shading System.
    2. Legrand Teleshade TS Series Low Voltage Motorized Shading System for DLM controls.
    3. Legrand Teleshade TS Series Low Voltage Motorized Shading System for QIS Controls.
    4. Legrand Teleshade TS Series Line Voltage Motorized Shading System for Somfy Controls.
    5. Shade unit accessories.
    6. Shade fabric.
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 06 10 00 - Rough Carpentry.
    2. Section 07 90 00 - Joint Protection.
    3. Section 09 21 16.33 - Gypsum Board Area Separation Wall Assemblies.
    4. Section 09 51 23 - Acoustical Tile Ceilings.
    5. Section 09 90 00 - Painting and Coating.
    6. Section 23 09 00 - Instrumentation and Control for HVAC.
    7. Section 26 05 00 - Common Work Results for Electrical.
    8. Section 26 09 43 - Network Lighting Controls.
    9. Section 26 09 43 - Network Lighting Controls.
  1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. National Fire Protection Association (NFPA):
       1. NFPA 70 - National Electrical Code
    2. National Electrical Manufacturers Association (NEMA).
    3. Federal Communications Commission (FCC):
       1. Emissions standards
    4. Underwriters Laboratories, Inc. (UL):
       1. UL Listings
       2. UL GREENGUARD Certification Program (GreenGuard Gold).
       3. UL 20 - General Use Switches, Plug Load Controls
       4. UL 924 - Standard for Emergency Lighting and Power Equipment
       5. UL 2043 - Standard for Fire Test for Heat and Visible Smoke Release for Discrete Products Installed in Air-Handling Spaces.
    5. Underwriter Laboratories of Canada (ULC):
       1. ULC Listings
    6. United States Green building Council (LEED):
       1. LEED - Leadership in Energy and Environment Design is an internationally recognized third-party green building certification program.
  1. SUBMITTALS
     1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
     2. Product Data: Manufacturer's data sheets on each product to be used, including:
        1. Preparation instructions and recommendations.
        2. Installation and maintenance instructions.
        3. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
        4. Storage and handling requirements and recommendations.
        5. Mounting details and installation methods.

\*\* NOTE TO SPECIFIER \*\* Delete the following paragraph for manual operation shades.

* + - 1. Typical wiring diagrams including integration of motor controllers with building management system, and lighting control systems as applicable.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph for projects with complex requirements for window treatment. Delete if not required.

* + 1. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, wiring diagrams and relationship to adjacent work
    2. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings, field verified window dimensions, quantities, type of shade, controls, shadeband material, and color, and include opening sizes and key to typical mounting details.

\*\* NOTE TO SPECIFIER \*\* Delete the following paragraphs if LEED is not applicable.

* + 1. LEED Submittals: Provide documentation of how the requirements of Credit will be met:

\*\* NOTE TO SPECIFIER \*\* Delete selection samples if colors have already been selected.

* + 1. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
    2. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
    3. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.
    4. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
    5. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic checking and adjustment and periodic cleaning and maintenance of all components.
  1. QUALITY ASSURANCE
     1. Manufacturer Qualifications: Company specializing in manufacturing of centralized and distributed lighting control systems with a minimum of 25 years documented experience.
     2. Installer Qualifications: Company certified by Legrand and specializing in installation of networked lighting control products with minimum 3 years documented experience.
     3. System Components: Demonstrate that individual components have undergone quality control and testing prior to shipping
     4. NFPA Flame-Test: Passes NFPA 701. Materials tested shall be identical to products proposed for use

\*\* NOTE TO SPECIFIER \*\* Select the following paragraph if required for motorized products specified.

* + 1. Motor operators, controls, and controllers shall be certified by a Nationally Recognized Testing laboratory (NRTL) to provide UL or ETL recognized or listed wired AC and DC powered motors and components.

\*\* NOTE TO SPECIFIER \*\* Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.

* + 1. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
       1. Finish areas designated by Architect.
       2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
       3. Refinish mock-up area as required to produce acceptable work.
       4. Accepted mock-ups shall be comparison standard for remaining work.
  1. DELIVERY, STORAGE, AND HANDLING
     1. Deliver products in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.
     2. Store cassette units flat, on a flat horizontal surface to prevent sagging and deformation/twisting of contents, until ready for installation.
     3. Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation.
  2. SEQUENCING
     1. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.
     2. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
  3. PROJECT CONDITIONS
     1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
     2. Do not install shade units until interior painting, wet work, ceilings, window pockets, and mechanical/electrical work above window site is complete before installation.
  4. WARRANTY
     1. For all shade motors, controls, and power supplies manufactured by Legrand: Lifetime of the motor, control or power supply.
     2. For all shade motors, controls, and power supplies manufactured by Others: Eight (8) years.
     3. For all hardware including shade brackets, metal extrusions, and manual clutches: Twenty-five (25) years.
     4. For fabrics used as part of the shade system; for interior use only, regardless of whether fabrics are rated for outdoor/exterior use:
        1. Mermet Fabrics:
           1. Mermet GreenScreen fabric: Five (5) years.
           2. All other Mermet fabrics: Ten (10) years.
        2. Phifer Fabrics: Twenty-five (25) years.
        3. All Others: Five (5) years.

\*\* NOTE TO SPECIFIER \*\* Include the following optional paragraphs for use with Motorized TS Series Low Voltage Shade System for DLM Motors and Controls only. Delete entirely if not required. Coordinate with Section 26 09 43 [26 09 43] - Distributed Digital Lighting Controls" for lighting and shading integration into digital shading systems.

* 1. MAINTENANCE AND OPERATIONAL SERVICES
     1. Remote Access and Enhanced Warranty for Networked Lighting Controls: Provide Manufacturer's Remote Access and Enhanced Warranty for Networked Lighting and Shading Controls as follows:
        1. Configure to allow Manufacturer remote access to the lighting and shading control system. Configuration Includes at a Minimum:
           1. Cellular modem, antenna for the modem, cellular service contract, and any connections required to enable communication to the specified Network Lighting and Shading Control system.
        2. Remote Access Program: Automatically triggers a First Year Enhanced Warranty Agreement that starts once the lighting and shading control system startup is complete and accepted by the Owner. During this one year period:
           1. Owners authorized site contact can request the Manufacturer to check the system for proper operation and make any programmable changes desired.
           2. Manufacturer is to provide a phone number dedicated to customer calls concerning Remote Accessible systems, and a support organization capable of enabling cellular communication to the system for troubleshooting and making requested changes to the system.
           3. Users attempting to request remote support on the system will be fully verified by the Remote Operations Center (ROC) before providing remote support or making any changes to the system.
           4. Systems allowing the modem to be always accessible will not be acceptable.
           5. Access: By a secured VPN connection to the private lighting control network that is completely isolated from the Owner's internal network.
           6. Remote access requiring a connection through the Owner's internal network is not acceptable.
        3. Remote Access Program may be continued by the Owner after the first year.
           1. If Owner does not continue the enhanced warranty the cellular contract will lapse. All hardware components, while remaining property of the Owner, will remain in situ so they may be re-activated should the Owner desire.
        4. Manufacturer's Remote Access Capability will Provide the Following Features:
           1. Initial system diagnostics through LMCS Software to detect fault conditions in hardware or connected devices.
           2. Access to all devices via LMCS Software for programming of device features. This includes scheduling of Time of Day Events and programming of individual device parameters to meet Sequence of Operation requirements.
           3. LMSM Segment Manager browser-based interface access, if included on project, to verify it is setup per project documentation, and functional operations are working properly.
           4. On demand access to Manufacturer technical support via a Remote Operations Center (ROC) that provides remote troubleshooting, diagnostics, configuration, and programming assistance.
           5. Additional client training and tuning of the Lighting and Shading Control System after building occupancy can be performed while remotely site connected.
           6. Remote Site Readiness Check (SRC):

Allows Remote Operations Center to perform a remote discovery of devices connected to the lighting and shading control network during installation.

DLM Networked projects having an RACCESS cellular modem and have successfully completed the Site Readiness Check (SRC) process will receive priority scheduling.

An SRC is successful if 80 percent or more of the networked devices are found on the network during discovery.

After the scheduled on-site startup, all Manufacturer provided startup work for a site with a successful SRC will be done remotely, or via later complimentary return trips.

\*\* NOTE TO SPECIFIER \*\* Include the following optional paragraphs only if "Remote Access and Enhanced Warranty for Networked Lighting and Shading Controls" is specified above. Delete entirely if not required.

* + 1. Technology-Enabled Service Contract: The Lighting and Shading Control System Manufacturer will provide a service contract for continued system support, post installation that combines secure accessible remote support with backup assurance of onsite support when necessary. Coverage levels and features of the selected service contract will apply immediately upon completion of startup and supersede enhanced remote support offered by the Manufacturer during the first year after startup.
       1. Requires a RACCESS (Remote Access) secure cellular connection allowing Manufacturer remote access to the lighting control system to provide remote troubleshooting, diagnostics, configuration, and programming assistance.
          1. Manufacturer will ensure provision of a cellular service plan that keeps modem active through the chosen Technology-Enabled Service Contract's duration.
       2. If customer does not renew the Service Contract at the end of the contract term, the cellular service plan will lapse. All hardware components will remain in situ so they can be re-activated later should customer desire.
       3. Technology-Enabled Service Contract Specifics:

\*\* NOTE TO SPECIFIER \*\* Select one of the following paragraphs a. or b. below and delete the one not required.

* + - * 1. A complete "Connect Plus" Service Contract including the following features:

Priority access to manufacturer technical support via a Remote Operations Center.

System backup of LMCS and Segment Manager software files; semi-annually.

Device Health Checks: Identify bypassed devices, disconnected, or not functioning with resolution recommendations; semi-annually.

Annual onsite training session by a certified factory-trained technician.

System Tuning Visits: Optimize lighting and shading configuration, fine tune Sequence of Operations, or make system programming changes; semi-annually.

A 3 day onsite response time for unscheduled emergency visits provided by factory-trained technicians.

* + - * 1. A complete "Connect Prime" Service Contract that includes the following:

Priority access, 24/7 to Manufacturer technical support via a Remote Operations Center.

Complete system LMCS backup and Segment Manager software files quarterly.

Device Health Checks: Identify bypassed devices, disconnected, or not functioning with recommendations for resolution; quarterly.

Onsite training sessions by a certified factory-trained technician; semi-annually.

System Tuning Visits: Optimize lighting configuration, fine tune Sequence of Operations, or make system programming changes quarterly.

A next day onsite response time for unscheduled emergency visits provided by factory-trained technicians.

\*\* NOTE TO SPECIFIER \*\* Delete Duration of service contract options not required.

* + - 1. Duration of Technology-Enabled Service Contract: 1 Year.
      2. Duration of Technology-Enabled Service Contract: 2 Year.
      3. Duration of Technology-Enabled Service Contract: 3 Year.
      4. Duration of Technology-Enabled Service Contract: 4 Year.
      5. Duration of Technology-Enabled Service Contract: 5 Year.
  1. EXTRA MATERIALS
     1. See Section 01 60 00 - Product Requirements.
     2. Furnish extra maintenance materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: Wattstopper/Legrand: Legrand Shading, which is located at 2240 Campbell Creek Blvd No. 110; Richardson, TX 75082; Tel: 1-800-879-8585; Email: request info; Web: https://www.legrand.us/wattstopper.aspx

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
    2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
    3. All products specified in this section shall be provided by a single manufacturer.
  1. MANUAL TS SERIES SHADE SYSTEM
     1. Legrand Solarfective Teleshade TS Series Shading System: Smooth operating chain and sprocket roller shade system. Sunscreen or opaque roll or double type contained in a factory assembled shade cassette unit.

\*\* NOTE TO SPECIFIER \*\* Select the configuration types required from the following and delete those not applicable. If multiple configurations are required indicate the location of each on the Drawings or in the Schedule at the end of this section. Consult with the manufacturer for additional standard and custom configuration for unusually shaped windows, corner applications, or various pocket designs as required.

* + 1. Base Configurations:
       1. SF-T1: Manual Teleshade 4 Cassette with front fascia.
          1. Cassette Size (DxH): 3-1/16 x 3-15/16 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       2. SF-T12: Manual Teleshade 4 Cassette with front fascia.
          1. Cassette Size (DxH): 3-1/16 x 3-15/16 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       3. SF-T2: Manual Teleshade 4 Cassette with back fascia.
          1. Cassette Size (DxH): 3-1/8 x 4 inches H.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       4. SF-T2A: Manual Teleshade 4 Cassette reverse roll with back fascia.
          1. Cassette Size (DxH): 3-1/8 x 4 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       5. SF-T3: Manual Teleshade 4 Cassette with spring loaded door shade.
          1. Cassette Size (DxH): 3-1/16 x 3-15/16 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       6. SF-T5: Manual Teleshade 4 Cassette in pocket.
          1. Cassette Size (DxH): 3-1/16 x 4-1/8 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       7. SF-T6: Manual Teleshade 4 Duplex Cassette.
          1. Cassette Size (DxH): 3-1/16 x 3-15/16 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       8. SF-RD1: Manual Teleshade 4 Cassette with side and bottom channels.
          1. Channels: 1-1/8 inch. Cassette Size (DxH): 3-1/16 x 3-15/16 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       9. SF-RD2: Manual Teleshade 4 Cassette with back fascia, side, and bottom channels.
          1. Channels: 1-1/8 inch. Cassette Size (DxH): 3-1/16 x 4 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       10. SF-RD3: Manual Teleshade 4 Cassette in pocket with side and bottom channels.
           1. Channels: 1-1/8 inch. Cassette Size (DxH): 3-1/16 x 4-1/8 inches.
           2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       11. SF-RD20: Manual Teleshade 4 Cassette with chain retainer, side, and bottom channels.
           1. Channels: 1-1/8 inch. Cassette Size (DxH): 3-1/16 x 3-15/16 inches.
           2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       12. SF-T17: Manual Teleshade 4 Cassette standard pocket.
           1. Cassette Size (DxH): 3-3/4 x 4-7/16 inches.
           2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       13. SF-T4A: Manual Teleshade 4 Cassette with vented pocket System A with 13/16-inch removable tab.
           1. Cassette Size (DxH): 4-3/8 x 4-7/16 inches.
           2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       14. SF-T4B: Manual Teleshade 4 Cassette with vented pocket System B with 13/16-inch removable tab.
           1. Cassette Size (DxH): 4-1/16 x 4-1/2 inches.
           2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       15. SF-T9: Manual Teleshade 4 Dual Cassette.
           1. Cassette Size (DxH): 5-5/16 x 6-3/16 inches.
           2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       16. SF-T9A: Manual Teleshade 4 Dual Cassette in 6-inch Pocket.
           1. Cassette Size (DxH): 5-5/16 x 6-5/8 inches.
           2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       17. SF-T11: Manual Teleshade 4 Dual Stepped Cassette.
           1. Cassette Size (DxH): 4-1/16 overall x 3-15/16 inches for each cassette.
           2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       18. SF-T13: Manual Teleshade 4 Dual Cassette.
           1. Cassette Size (DxH): 3-1/16 x 7-3/4 inches overall.
           2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       19. SF-T14: Manual Teleshade 4 Dual Cassette vertical mount reverse roll.
           1. Cassette Size (DxH): 3-7/8 x 7-13/16 inches overall.
           2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       20. SF-RD11: Manual Teleshade 4 Dual Cassette with side and bottom channels.
           1. Channels: 1-1/8 inch. Cassette Size (DxH): 15-5/16 x 6-3/16 inches.
           2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       21. SF-RD14: Manual Teleshade 4 Dual Cassette horizontal mount with side and bottom channels.
           1. Channels: 1-1/8 inch. Cassette Size (DxH): 3-1/16 each x 3-15/16 inches.
           2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       22. SF-T10: Manual Teleshade 5 Cassette.
           1. Cassette Size (DxH): 4-1/8 x 5-1/8 inches.
           2. Maximum Shade Size (HxW): Up to 129 x 200 inches (3.28 x 2.79 m).
       23. SF-RD13: Manual Teleshade 5 Cassette with side and bottom channels.
           1. Channels: 1-1/8 inch. Cassette Size (DxH): 4-1/8 x 5-1/8 inches.
           2. Maximum Shade Size (HxW): Up to 129 x 200 inches (3.28 x 2.79 m).

\*\* NOTE TO SPECIFIER \*\* Select one of the following two paragraphs for Chain Operation or Crank Operation and delete the one not required.

* + 1. Chain Operation:
       1. Clutchless Easy-Lift Action: Chain operated with infinite positioning. Shade may be closed at any point across its length of travel. Left hand, right hand, or both sides operation Factory installed into shade cassette unit.
       2. Manual Teleshade: Shade may be pulled down by the hembar without damaging the shade system.
    2. Crank Operation: Gear Box with Crank Handle: Left or right hand operation. Factory installed into shade cassette unit. Removable, without disassembly of shade cassette unit.
       1. Three Operational Options: Cranking through the face, cranking through the corner, and cranking through the bottom. Smooth operation with infinite positioning. Shade may be closed at any point across its length of travel.
       2. Manual Teleshade: Shade may be pulled down by the hembar without damaging the clutch.
       3. Crank Handle: One-piece or folding type with chrome or anodized finish.

\*\* NOTE TO SPECIFIER \*\* Custom lengths are available. Contact Manufacturer for more information.

* + - * 1. Handle Lengths: 40 inches (100 cm), 56 inches (140 cm), 64 inches (160 cm), and 80 inches (200 cm). with custom lengths as an option.
    1. Assembly:
       1. Factory assembled and pre-tested. Shade cassette unit consisting of two end brackets, chain, shade tube, extruded aluminum fascia, hembar, fabric shade material, regular or reverse roll of shade material, and cassette mounting attachment brackets for on-site installation. End Brackets: Adjustable to level unit and minimize light gap above shade cassette unit. Shade Cassette Unit: Ready for installation using attachment brackets included with each unit.
       2. Attachment Brackets: T5 6005 Aluminum, allow for simple direct installation of the shade cassette unit to building structure.
          1. Mounting Type: Between Mullions.
          2. Mounting Type: Face of Mullions.
          3. Mounting Type: Ceiling.
          4. Mounting Type: Above-ceiling, inherently vented PUSH-UP for use with vented pocket assemblies for pre-assembled shade cassette units.
       3. Removal of Shade Cassette: Not to require shade unit or shade tube disassembly.
       4. End Bracket within Cassette Unit: 3 inches by 3-3/4 inches (77 by 96 mm), zinc plated steel with two-piece molded ABS construction with 2-1/2 inches (64 mm) diameter nylon drive sprocket pop-riveted onto bracket. Bracket Color: Coordinate with fascia color.
    2. Shade Tube: Extruded T5 6005 aluminum, 1/16 inch (1.52 mm) thick. Continuous screw fins 3/16 inch (4.82 mm) high; for strength and drive capabilities when attached to nylon sprocket. Fins: Spaced equidistant on tube and placed according to weight and sizing characteristics necessary to support intended shade. Tube to be of sufficient diameter to negate deflection caused by shade material weight and size assuring good performance.
    3. Fascia and End Caps: Extruded T6 6063 or 6360 aluminum fascia with front towards room interior, 1/16 inch (1.7 mm) thick with two continuous screw flutes.
       1. Finish: Anodized, powder coated, or custom painted.
       2. Attachment of Fascia: Two-part process.
          1. First: A friction fit of fascia into cassette shade unit.
          2. Second: Mechanically secured by a hidden/concealed screw lock-down, of fascia to cassette shade unit; eight No. 6, 3/4 inch screws.
          3. Fascia to be suitable for regular or reverse roll. Reverse fascia with back towards window, is also an available option.
          4. Fascia End Caps: T6 6063 or 6360 aluminum. Fabricated via a press fit and a secure mechanical fastener.
       3. Fascia and End Cap Colors: Extruded aluminum with plastic end finials.

\*\* NOTE TO SPECIFIER \*\* Delete finish options not required.

* + - * 1. Finish: Clear Anodized.
        2. Finish: Gloss White.
        3. Finish: Beige.
        4. Finish: Dark Grey.
        5. Finish: Black.
        6. Finish: Light Bronze.
        7. Finish: Ceiling White.
        8. Finish: Charcoal.
        9. Finish: Dark Bronze.
        10. Finish: Color as selected by the Architect.
    1. Shade Drive Assembly:
       1. Factory set for size and travel of shades; chain installed.
       2. Field adjustable from the exterior of the cassette shade unit without disassembling the hardware.
          1. No field servicing or lubrication of the bi-directional drive assembly is required.
          2. Operation and Pulling of Chain: To be free and without binding inside the assembly and permitting shade to stop at any point that chain is stopped and no longer being pulled.
       3. Built-in shock absorber: Prevents chain breakage, under normal usage conditions.
       4. Factory Installed Upper Bead Stop:
          1. Prevents shade from rolling beyond preset upper limit.
          2. Lower Bead Stops: Installed in field after consultation with project Architect.

Can be removed in the field and adjusted as required without disassembly of cassette shade unit.

Prevents shades from being raised or lowered too far thereby preventing damage to shade and/or mechanism.

* + - 1. Compliant Child-Safety Active-Spring-Loaded Tensioning Chain Retainer: Supplied with cassette shade units. One retainer per chain drive. Design is to be as specified by Window Covering Materials Association (WCMA).
      2. Manufacturer will include and fabricate with roller shade, a Lift Assist Mechanism (LAM): Sized according to shade weight. A spring device installed in the roller shade tube. To be installed on all very large or heavy shades.
      3. Drive Chain: No. 10 Stainless Steel bead chain formed in a continuous loop. Chain Tensile Strength: 90-pound. Plastic or Nickel-plate chain is not acceptable.
    1. Exterior Hembar: Extruded T6 6360 aluminum with plastic end finials. Attached in factory to shadeband fabric material. Exposed hembars and shadeband wrapped and sealed hembars are supplied with both ends of hembars sealed.

\*\* NOTE TO SPECIFIER \*\* Select the Options required from the following and delete those not applicable. If multiple configurations are required indicate the location of each on the Drawings or in the Schedule at the end of this section.

* + - 1. Hembar: Exposed.
      2. Hembar: Concealed, Fabric Wrapped with open ends.
      3. Hembar: Wrapped and sealed. Fabric Wrapped with fabric sealed ends.
      4. Exterior Hembar Colors: Extruded aluminum with plastic end finials.

\*\* NOTE TO SPECIFIER \*\* Delete finish options not required.

* + - * 1. Finish: Clear Anodized.
        2. Finish: Gloss White.
        3. Finish: Beige.
        4. Finish: Dark Grey.
        5. Finish: Black.
        6. Finish: Light Bronze.
        7. Finish: Ceiling White.
        8. Finish: Charcoal.
        9. Finish: Dark Bronze.
        10. Finish: Color as selected by the Architect.
    1. Shadeband Material Attachment: Attach shadeband material to roller shade tube in factory.

\*\* NOTE TO SPECIFIER \*\* Selection of attachment method can be determined by Specifier preference or depending on project requirements and size of finished shade cassette unit. Delete attachment method option not required.

* + - 1. Attachment Method: Via double sided tape insuring shadeband material lays flat.
      2. Attachment Method: Hidden spline with lightweight small profile plastic extrusion attached to shadeband material and inserted into a machined groove in roller tube.
      3. Finished shades must be fabricated with one complete wrap of material minimum, to cover the attachment of the shade and material to the shade tube. This wrap length will vary due to size of shade and size of tube and factory assembly conditions.
    1. Light Gap: Cassette shade units must maintain equivalent and symmetrical light gaps on both sides.
       1. Gap Width Manual: 3/4 inch (19.5 mm).
       2. Gap Width Motorized: 7/8 inch (22.23 mm).
    2. Shadeband Assembly Details:
       1. Manufacturer:
          1. Assemble roller shade with specified shadeband material to fill window opening from sill to head and from jamb to jamb unless otherwise specified.
          2. Assemble roller shade with the indicated front side of shadeband fabric material facing the interior of the room when roller shade is in down position unless specified to be reversed or turned so face is visible from window.
          3. Shadeband Material: To hang flat without buckling, puckering, or distortion.
          4. Battens: T6 6061 aluminum in standard roller shades as necessary to insure proper rolling of roller shades and for proper tracking.

Width-to-Height Ratio: Not to exceed manufacturer's guidelines.

Batten to be selected at manufacturers discretion based on size of shade and shadeband material selected to minimize tracking distortion and for proper rolling of the shadeband material on the tube.

Seam Locations: To be approved by the Architect.

* + - * 1. Shadebands: Railroaded type. Seams as required to meet size requirements and match other seams.
  1. MOTORIZED TS SERIES LOW VOLTAGE SHADE SYSTEM FOR DLM CONTROLS
     1. Legrand Solarfective Teleshade TS Series DLM Shading System: A quiet motorized shade system, sunscreen or opaque roll or double contained in a factory assembled shade cassette unit.

\*\* NOTE TO SPECIFIER \*\* Select the configuration type(s) required from the following and delete those not applicable. If multiple configurations are required indicate the location of each on the Drawings or in the Schedule at the end of this section. Consult with the manufacturer for additional standard and custom configuration for unusually shaped windows, corner applications, or various pocket designs as required.

* + 1. Base Shade Configurations
       1. SF-TQ7M: Motorized Teleshade 4 Motorized, QIS or DLM DC Cassette System.
          1. Cassette Size (DxH): 3-1/16 x 3-15/16 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       2. SF-RD/TQ7M: Motorized Teleshade 4 Motorized, QIS or DLM DC Cassette System. Includes side and bottom channels.
          1. Channels: 1-1/8 inch. Cassette Size (DxH): 3-1/16 x 3-15/16 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       3. SF-T17M: Motorized Teleshade 4 Motorized, QIS or DLM DC Cassette standard pocket system.
          1. Cassette Size (DxH): 3-3/4 x 4-7/16 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       4. SF-RD/T17M: Motorized Teleshade 4 Motorized, QIS or DLM DC Cassette standard pocket system with side, and bottom channels.
          1. Channels: 1-1/8 inch. Cassette Size (DxH): 3-3/4 x 4-7/16 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       5. SF-4BM: Motorized Teleshade 4 Motorized, QIS or DLM DC Cassette vented pocket system.
          1. Cassette Size (DxH): 4-1/16 x 4-1/2 inches.
          2. Maximum Shade Size (HxW): Up to 195 x 95 inches (4.95 x 2.41 m).
       6. SF-RD/4BM: Motorized Teleshade 4 Motorized, QIS or DLM DC Cassette vented pocket system with side, and bottom channels.
          1. Channels: 1-1/8 inch. Cassette Size (DxH): 4-1/16 x 4-1/2 inches.
          2. Maximum Shade Size (HxW): Up to 195 x 95 inches (4.95 x 2.41 m).
       7. SF-TQ10M: Motorized Teleshade 5 Motorized, QIS or DLM DC Cassette System.
          1. Cassette Size (DxH): 4-1/18 x 5-1/8 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 200 inches (3.28 x 5.08 m).
       8. SF-RD/TQ10M: Motorized Teleshade 5 Motorized QIS or DLM Cassette System with side, and bottom channels.
          1. Channels: 1-1/8 inch. Cassette Size (DxH): 4-1/18 x 5-1/8 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 200 inches (3.28 x 5.08 m).
    2. DLM Shade Motors:
       1. Self-configuring digital devices incorporating a wired connection and wireless Bluetooth low energy technology for a variety of control options.
       2. A counter-balance spring design allows shade to use less energy and operate quietly.
          1. Allows shades to be manually pulled into position using the hembar.
       3. Power: 24 to 36 VDC coming from the DLM room controller power supply. Controller has a number of wired switch options for shade control.
       4. Operation: Two gear ratios supporting different size shades.
          1. Gear Ratio Motors: 40:1 (LMSH-MCA140): For smaller shades.
          2. Gear Ratio Motors: 73:1 (LMSH-MCA173): For larger and coupled shades.
          3. Counter-Balance Spring: Chosen for weight of the shade and motor type.
          4. Motor and Spring Assembly: Specified and tested by the factory.

Using Plug n' Go (PnG) Operation: The motor control assemblies (MCA) automatically joins the network, set a default upper and lower shade limit, and be assigned to any shade switches on the Project.

Settings: Customizable by using the Push n' Learn (PnL) and Pull n' Save (PnS) procedures found in shade controller power supply or shade switch installation instructions.

Automated Start Up Procedures: Designed to save installation and startup time by defaulting to a default initial system configuration based on installed components.

* + - 1. Technical Specifications:
         1. UL and cUL listed.
         2. UL/C-UL Ratings: 36 VDC, 0.12 A, Class 2 Supply.
         3. Input voltage: 24/36 VDC.

Connects to LMSH-PS602 or LMSH-PS610 Power Supply.

* + - * 1. Current Consumption: 250 mA, 6W
        2. Speed/Torque: LMSH-MCA140: 38 RPM/10 N-cm
        3. Speed/Torque: LMSH-MCA173: 29 RPM/15 N-cm
        4. Connection to Shade Bus: 4-Conductor wire whip with female terminal; power and data over four wires.
        5. Cable Whip Length: 13 inches.
        6. Motors Status LED: Tri-color (RGB).
        7. Minimum Shade Width: 16 inches.
        8. Maximum Shade Size (WxT): 15 x 20 feet.
        9. Operating Temperature: 32 to 120 degrees F (0 to 50 degrees C).
        10. Storage Temperature: -20 to 180 degrees F (-28 to 82 degrees C).
        11. Relative Humidity: 5 to 95 percent, non-condensing.
        12. IP Rating: IP44.
      1. Controls
         1. DLM Motor Control Assembly, 24V, 40:1 Gear Ratio, 36 inch wire whip.
         2. LMSH-MCA173
         3. DLM Motor Control Assembly, 36V, 73:1 Gear Ratio, 36 inch wire whip.
      2. DLM-Based Low Voltage LMSH Series Wall Switches:
         1. Self-configuring digital low voltage devices for manual control of DLM based shades from one or more locations.

Part of a Digital Lighting Management (DLM) system.

Can control any shade motor connected to DLM shade room controllers.

Motors and Power Supplies: Connected using a four-wire shade bus with pre-configured cables and simple to configure bus system using standard DLM in-room-bus (IRB) RJ45 cables.

* + - * 1. Operation: On Class 2 power supplied to DLM local network by one or more shade room controllers.

Switches send a digital signal for shade control whenever a pushbutton is pressed by a user.

Plug n' Go (PnG) Automatic Configuration:

Assigns shades to the switch buttons upon system startup.

Assigns shade default upper and lower limits during PnG.

Two additional programming procedures allow for customization of the motorized shade system.

Press n' Learn: Allows switch button assignments and functions to be reconfigured.

Press n' Save: Allows installer to change the shade upper and lower limits.

* + - * 1. Specifications:

UL and cUL listed. FCC part 15 compliant.

Input Voltage: 24 VDC from DLM local network.

Current Consumption: 5 mA.

DLM Local Network Connection: 2 RJ45 ports.

Control Buttons: 1, 2, 4, or 5. Each with LED status indicator.

Hidden Configuration Button: To access Push n' Learn and Pull n' Save configurations.

Infrared (IR) transceiver.

Operating Conditions: Indoor use only. 32 to 131 degrees F (0 to 55 degrees C); 5 to 95 percent RH, non-condensing.

Programmable top and bottom shade limits.

Wired Wall Switches: 1-Rocker.

Wired Wall Switches: 2-Button.

Wired Wall Switches: 4-Button.

Wired Wall Switches: 4-Button Plus Rocker.

Colors: White, Black, Gray, Ivory, and Light Almond.

* + - 1. DLM Shade System Wiring Components: Includes preconfigured shade bus connections, customized wiring, shade bus extenders and testers, non-plenum and plenum rated local network cables as required. Shade Bus supports an open topology wiring structure using passive shade bus connectors, extenders, and cables.
      2. DLM Shade Room Controllers: Provide power and control for shades on the shade bus and integrate switches on the shade In-Room-Bus (IRB).
         1. Self-configuring digital devices providing low voltage power and control for up to ten motorized shades.

Input Line Voltage: 120/277VAC.

Typically mounted in ceiling to a four-square junction box.

* + - * 1. Features:

Distributed shade control system reduces lengthy homerun wiring.

Two Shade Room Controller Options: Allows system flexibility when setting up a shade room network.

LMSH-PS610 for up to 10 shades.

LMSH-PS602 for up to two shades.

Buttons: For shade control and system configuration to allow testing and control of system while installing the shades.

Automatic Configuration: Plug n' Go.

For System Personalization: Push n' Save and Push n' Learn.

Plug to other components (switches) using Cat 5e cables with RJ45 connectors eliminating wiring errors.

Four Wire Shade Bus with Preconfigured Wires: Simplifies wiring to shade motors. The wiring system is plug and play.

Provide option for creating groups and astronomic schedules independent of integration with other systems or lighting controls.

Component of Digital Lighting Management integrated shade and lighting control system.

* + - * 1. Specifications

UL and cUL listed

Input Voltage: 120/277VAC, 50/60 Hz.

Shade Bus Ports: 1 (LMSH-PS602), 2 (LMSH-PS610).

Shade Bus Voltage: 24 V (LMSH-PS602), 36 V (LMSH-PS610).

Shade Capacity: Up to 2 (LMSH-PS602) or 10 (LMSH-PS610) DLM-based shade motors.

Connection to the DLM Local Network: 2, RJ-45 ports.

Local Network Characteristics When Using Shade Controller:

Shade Network provides low voltage power to shade motors over Shade Bus cables, up to 1,000 ft (or 2 x 500 ft) max.

DLM Local Network In-Room Bus (IRB) provides low voltage power to switches over Cat 5e cable LMRJ.

Class 2 Output to DLM Local Network: 24 VDC, 150 mA

DLM Local Network Parameters:

Maximum Current: 800 mA

Cat 5e cable: 150 ft per device to 1,000 ft max. Up to 64 loads and communicating devices.

Operating Conditions: Indoor use only. 32 to 131 degrees F (0 to 55 degrees C); 5 to 95 percent RH, non-condensing.

* + 1. Fascia and End Caps: Extruded T6 6063 or 6360 aluminum, front-towards room interior, 1/16 inch (1.7 mm) thick with two continuous screw flutes. Finish: Anodized, powder coated or custom painted.
       1. Fascia Attachment: Two-part process:
          1. First: A friction fit of fascia into cassette shade unit.
          2. Second: Secure fascia to the shade cassette with hidden/concealed screw lock-down having eight No. 6, 3/4-inch screws.
       2. Fascia to be suitable for regular or reverse roll. Reverse fascia towards window, to be also available.
       3. Fascia End Caps: T6 6063 or 6360 aluminum, fabricated via a press fit and a secure mechanical fastener.
       4. Fabrication of a two-sided fabric can result in the entire tube being installed in reverse roll configuration, similar to when a reverse roll is specified. Therefore the hanging fabric is closer to the interior of the room and further away from the window glass.
       5. Fascia and End Cap Colors: Extruded aluminum with plastic end finials.

\*\* NOTE TO SPECIFIER \*\* Delete finish options not required.

* + - * 1. Finish: Clear Anodized.
        2. Finish: Gloss White.
        3. Finish: Beige.
        4. Finish: Dark Grey.
        5. Finish: Black.
        6. Finish: Light Bronze.
        7. Finish: Ceiling White.
        8. Finish: Charcoal.
        9. Finish: Dark Bronze.
        10. Finish: Color as selected by the Architect.
    1. Exterior Hembar: Extruded T6 6360 aluminum with plastic end finials. Attached in factory to shadeband fabric material. Exposed hembars, and shadeband wrapped and sealed hembars, are supplied with both ends of hembar sealed.

\*\* NOTE TO SPECIFIER \*\* Select the Options required from the following and delete those not applicable. If multiple configurations are required indicate the location of each on the Drawings or in the Schedule at the end of this section.

* + - 1. Hembar: Exposed.
      2. Hembar: Concealed, Fabric Wrapped with open ends.
      3. Hembar: Wrapped and sealed. Fabric Wrapped with fabric sealed ends.
      4. Exterior Hembar Colors: Extruded aluminum with plastic end finials.

\*\* NOTE TO SPECIFIER \*\* Delete finish options not required.

* + - * 1. Finish: Clear Anodized.
        2. Finish: Gloss White.
        3. Finish: Beige.
        4. Finish: Dark Grey.
        5. Finish: Black.
        6. Finish: Light Bronze.
        7. Finish: Ceiling White.
        8. Finish: Charcoal.
        9. Finish: Dark Bronze.
        10. Finish: Color as selected by the Architect.
    1. Shadeband Material Attachment: Attach shadeband material to roller shade tube in factory.

\*\* NOTE TO SPECIFIER \*\* Selection of attachment method can be determined by Specifier preference or depending on project requirements and size of finished shade cassette unit. Delete attachment method option not required.

* + - 1. Attachment Method: Via double sided tape insuring shadeband material lays flat.
      2. Attachment Method: Hidden spline with lightweight small profile plastic extrusion attached to shadeband material and inserted into a machined groove in roller tube.
      3. Finished shades must be fabricated with one complete wrap of material minimum, to cover the attachment of the shade and material to the shade tube. This wrap length will vary due to size of shade and size of tube and factory assembly conditions.
    1. Motorized Shade System Design Intention:
       1. Low-voltage quiet motors and one cable 24 AWG Cat5e or Cat6 interconnection.
          1. Bi-directional communication
          2. Be flexible for zones and number of shades.
          3. Offer power and communication units that can be combined as required.
          4. Hard-wired switches for convenient user interfacing.
          5. Multiple controls and interconnection with third-party systems and control protocols.
       2. One Cable Interconnection for the Motor: To have bi-directional digital communication and low-voltage power, not a PoE (Power over Ethernet) or other network wiring configuration or protocol.
       3. Motorized Shade System Network: A connected system capacity of 96 devices, shade motors, hard-wired wall switches, and up to 12 power and communication panels. Network to have capacity of 96 shades under control of one switch.
       4. Hard-Wired User Interface Switches: Four Buttons: Up, down, and two customizable presets.
    2. Shade Drive Assembly: Factory installed motor, pre-tested, and with limits preset. Motors of different lifting capacity are available depending on shade material weight and size of window to be covered.
       1. Shade DC Motor Drive Assemblies:
          1. Inside a shade tube with special springs as part of a shade cassette unit.

Factory assembled, inspected, tested, motor limits set, and shipped complete. Ready for installation into the two attachment brackets fastened to building structure.

* + - * 1. Quiet operation. Less than 38 dbA at three feet.
        2. Digital bidirectional communication.
        3. Programmable Intermediate Shade Positions: 98 total. Allow customized and matching stop points of shade.
        4. Encoder-based drive for precise positioning. Plus or minus 1/16 inch (1.6 mm).
        5. Power Supply: 24 VDC.
        6. Motor Limits: Electronic and not manual type.
        7. Single Cable for Shade Power and Communications: 24 AWG Cat5e or Cat6.
        8. Shades standard with a 6 inch (152 mm) pre-assembled connector in any gender. Optional lengths of connector wire include 4 inches (102 mm) or 35 inches (0.89 m).
        9. Can be installed left or right drive, inside shade tube.
        10. Motors are not damaged when a user "pulls down" on shade hembar when power or control is not engaged.
        11. Shade Cassette System: Enables users to send shade all the way open, all the way down, or to stop at a fixed position via a prescribed sequence of "tugs" or pulling on the hembar without damaging the motor, drive, brackets, or roller shade. System enables installer to set lower and upper limits or return to a master reset of the shade to default upper and lower limits.
    1. Power and Communication Panels:
       1. Low voltage motors are interconnected via 24 AWG Cat5e or Cat6 cabling providing power and control within a single cable.
       2. Tested and designed system supports a distance between power and communication panel and shades of 750 ft (228.6 m) for the farthest shade.
       3. Maximum distance between a power and communication panel and a hard-wired switch: Limited to 1,000 feet (304.8 m).
       4. System to utilize RJ-45 connectors and straight thru wiring with no crossing of conductors at different cable ends.
       5. A Single Panel: Able to power eight shades with a DC output of 24 VDC, 7.5 Amps.
       6. AC Input Requirements: 100 to 200 Volts at 2.5 Amps via separate power supply connected to the power and communication panel.
       7. Associated low-voltage motors shall not require any other AC power supply or transformer for DC power, along the network or at the shade motor location.
       8. Panels can be joined together daisy-chain style, RS-485 to control more shades, switches, and zones. Twelve separate panels shall be able to be connected together for control of 96 shades.
       9. Interconnection to building management systems, automated lighting systems, third party manufacturers, and other Legrand systems for daylight integration and lighting control is to be seamless and effected by RS-485, RS-232, BACnet, or Dry Contact protocols and parameters.
       10. Shade Motors: Offer individual addressing to facilitate usage with systems manufactured by others via BACnet protocols.
       11. Panels to be controlled by a hard-wired switch for simplified user control and interfacing.
       12. Special cable adapters for those installations where utilization of a two-wire cabling system is required. System shall provide power.

\*\* NOTE TO SPECIFIER \*\* There are numerous methods to control motorized shades and a variety of motors. Control options may include direct-wired control via switches, single shade control or multiple shade control via hard-wired switches, timer, and light sensor control; integration with third-party manufacturer control or audio-visual systems via RS-232/RS-485, interconnection with Building Automation Systems and Lighting Control Systems via BACnet, and direct operation with other Legrand products specified in Section 16575 [26 09 43] Distributed Digital Lighting Control System. Contact a Legrand Solarfective Sales Consultant for more information and detail

* + 1. Control of Shades:
       1. User Interface Hard-Wired Switches: To fit standard decorator type paddle switch plates and fit standard type junction boxes.
          1. Four Buttons: Up, down, and two customizable presets. Presets are for 33 percent and 65 percent of shade height based on lower limit.
          2. Available Colors: White, Light Ivory, Ivory, Gray, and Black.

\*\* NOTE TO SPECIFIER \*\* Select the following paragraph if applicable. Delete if not required.

* + - 1. Automated Lighting Control System with Features as specified in Section 16090 Network Lighting Controls" for lighting integration into digital shading and other compatible systems.
  1. MOTORIZED TS SERIES LOW VOLTAGE SHADE SYSTEM FOR QIS CONTROLS
     1. Legrand Teleshade TS Series Shading System: A quiet motorized shade system sunscreen or opaque roll or double contained in a factory assembled shade cassette unit.

\*\* NOTE TO SPECIFIER \*\* Select the configuration type(s) required from the following and delete those not applicable. If multiple configurations are required indicate the location of each on the Drawings or in the Schedule at the end of this section. Consult with the manufacturer for additional standard and custom configuration for unusually shaped windows, corner applications, or various pocket designs as required.

* + 1. Base Shade Configurations
       1. SF-TQ7M: Motorized Teleshade 4 Motorized, QIS DC Cassette System.
          1. Cassette Size (DxH): 3-1/16 x 3-15/16 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       2. SF-RD/TQ7M: Motorized Teleshade 4 Motorized , QIS DC Cassette System. Includes side and bottom channels.
          1. Channels: 1-1/8 inch. Cassette Size: 3-1/16 x 3-15/16 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       3. SF-T17M: Motorized Teleshade 4 Motorized, QIS DC Cassette standard pocket system.
          1. Cassette Size (DxH): 3-3/4 x 4-7/16 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       4. SF-RD/T17M: Motorized Teleshade 4 Motorized, QIS DC Cassette standard pocket system with side, and bottom channels.
          1. Channels: 1-1/8 inch. Cassette Size (DxH): 3-3/4 x 4-7/16 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).
       5. SF-4BM: Motorized Teleshade 4 Motorized, QIS DC Cassette vented pocket system.
          1. Cassette Size (DxH): 4-1/16 x 4-1/2 inches.
          2. Maximum Shade Size (HxW): Up to 195 x 95 in (4.95 x 2.41 m).
       6. SF-RD/4BM: Motorized Teleshade 4 Motorized, QIS DC Cassette vented pocket system with side, and bottom channels.
          1. Channels: 1-1/8 inch channels. Cassette Size (DxH): 4-1/16 x 4-1/2 inches.
          2. Maximum Shade Size (HxW): Up to 195 x 95 in (4.95 x 2.41 m).
       7. SF-TQ10M: Motorized Teleshade 5 Motorized, QIS DC Cassette System.
          1. Cassette Size (DxH): 4-1/18 x 5-1/8 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 200 inches (3.28 x 5.08 m).
       8. SF-RD/TQ10M: Motorized Teleshade 5 Motorized QIS Cassette System with side, and bottom channels.
          1. Channels: 1-1/8 inch channels. Cassette Size (DxH): 4-1/18 x 5-1/8 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 200 inches (3.28 x 5.08 m).
    2. Operation:
       1. Motorized Operation Roller Shades Within Shade Cassette Units:
          1. A drive system controlled by a motor with specified controls for remote operation of the shade. Quiet Operation: Less than 38 dba at 3 ft.
          2. Low Voltage Power. Wiring done by 24 AWG Cat5e or Cat 6 cabling.
          3. Drive system incorporates springs, sized according to weight of shade and dimensions of window, to allow for efficiencies of motorization within the shade cassette system.
          4. Interconnection to different control systems:

Third-party manufacturers' control/integration systems.

Building Automation Systems: For energy efficiency and comfort.

Lighting Control Systems: Wall switches, and/or handheld remotes.

* + - 1. Manual Override: For when a user "pulls down" on the shade hembar when power or control is not engaged, without damage to the motor, brackets, or the roller shade.
         1. Enable user to send shade all the way open, all the way down, or stop at a fixed position via a prescribed sequence of "tugs" by pulling on the hembar.
    1. Assembly:
       1. Fully factory assembled and pre-tested shade cassette unit consisting of two end brackets, appropriately sized motor installed as required, shade tube, extruded aluminum fascia, hembar, shade fabric material, regular or reverse roll of shade material, and cassette mounting attachment brackets for on-site installation.
       2. Brackets for Shade Cassette Units: Adjustable to level the units allowing for building irregularities and to minimize light gap above the unit.
       3. Cassette Unit to be ready for installation via attachment brackets fabricated from aluminum, included with each unit.
       4. Attachment Brackets: T5 6005 aluminum. Fabricated to allow for simple direct installation of the shade cassette units to the building structure.
       5. Four Standard Types Offered by the Manufacturer:
          1. Mounting Type: Between Mullions.
          2. Mounting Type: Face of Mullions.
          3. Mounting Type: Ceiling.
          4. Mounting Type: Above-the-ceiling, inherently vented PUSH-UP for use with vented pocket assemblies for the pre-assembled shade cassette units.
       6. Removal of shade cassette unit shall not require disassembly of the shade unit or roller shade tube.
       7. End Brackets within Shade Cassette Unit: Zinc plated steel. Color to coordinate with fascia color.
    2. Shade Tube: Extruded T5 6005 aluminum, 1/16 inch (1.52 mm) thick. Continuous screw fins 3/16 inch (4.82 mm) high; for strength and drive capabilities when attached to nylon sprocket. Fins: Spaced equidistant on tube and placed according to weight and sizing characteristics necessary to support intended shade. Tube to be of sufficient diameter to negate deflection caused by shade material weight and size assuring good performance.
    3. Fascia and End Caps: Extruded T6 6063 or 6360 aluminum fascia with front towards room interior, 1/16 inch (1.7 mm) thick with two continuous screw flutes.
       1. Finish: Anodized, powder coated, or custom painted.
       2. Attachment of Fascia: Two-part process.
          1. First: A friction fit of fascia into cassette shade unit.
          2. Second: Mechanically secured by a hidden/concealed screw lock-down, of fascia to cassette shade unit; eight No. 6, 3/4 inch screws
          3. Fascia to be suitable for regular or reverse roll. Reverse fascia with back towards window, is also an available option.
          4. Fascia End Caps: T6 6063 or 6360 aluminum. Fabricated via a press fit and a secure mechanical fastener.
       3. Fabrication of a Two-Sided Fabric: Can result in entire tube being installed in reverse roll configuration, similar to when a reverse roll is specified. Therefore the hanging fabric is closer to the interior of the room and further away from the window glass.
       4. Fascia and End Cap Colors: Extruded aluminum with plastic end finials.

\*\* NOTE TO SPECIFIER \*\* Delete finish options not required.

* + - * 1. Finish: Clear Anodized.
        2. Finish: Gloss White.
        3. Finish: Beige.
        4. Finish: Dark Grey.
        5. Finish: Black.
        6. Finish: Light Bronze.
        7. Finish: Ceiling White.
        8. Finish: Charcoal.
        9. Finish: Dark Bronze.
        10. Finish: Color as selected by the Architect.
    1. Exterior Hembar: Extruded T6 6360 aluminum with plastic end finials, attached in factory to shadeband fabric material. Exposed hembars and shadeband wrapped and sealed hembars are supplied with both ends of hembars sealed.

\*\* NOTE TO SPECIFIER \*\* Select the Options required from the following and delete those not applicable. If multiple configurations are required indicate the location of each on the Drawings or in the Schedule at the end of this section.

* + - 1. Hembar: Exposed.
      2. Hembar: Concealed, Fabric Wrapped with open ends.
      3. Hembar: Fabric Wrapped with fabric sealed ends.
      4. Exterior Hembar Colors: Extruded aluminum with plastic end finials.

\*\* NOTE TO SPECIFIER \*\* Delete finish options not required.

* + - * 1. Finish: Clear Anodized.
        2. Finish: Gloss White.
        3. Finish: Beige.
        4. Finish: Dark Grey.
        5. Finish: Black.
        6. Finish: Light Bronze.
        7. Finish: Ceiling White.
        8. Finish: Charcoal.
        9. Finish: Dark Bronze.
        10. Finish: Color as selected by the Architect.
    1. Shadeband Material Attachment: Attach shadeband material to roller shade tube in factory.

\*\* NOTE TO SPECIFIER \*\* Selection of attachment method can be determined by Specifier preference or depending on project requirements and size of finished shade cassette unit. Delete attachment method option not required.

* + - 1. Attachment Method: Via double sided tape insuring shadeband material lays flat.
      2. Attachment Method: Hidden spline with lightweight small profile plastic extrusion attached to shadeband material and inserted into a machined groove in roller tube.
      3. Finished shades must be fabricated with one complete wrap of material minimum, to cover the attachment of the shade and material to the shade tube. This wrap length will vary due to size of shade and size of tube and factory assembly conditions.
    1. Motorized Shade System Design Intention:
       1. Low-voltage quiet motors and one cable 24 AWG Cat5e or Cat6 interconnection.
          1. Bi-directional communication.
          2. Be flexible for zones and number of shades.
          3. Offer power and communication units that can be combined as required.
          4. Hard-wired switches for convenient user interfacing.
          5. Multiple controls and interconnection with third-party systems and control protocols.
       2. One Cable Interconnection for the Motor: To have bi-directional digital communication and low-voltage power, not a PoE (Power over Ethernet) or other network wiring configuration or protocol.
       3. Motorized Shade System Network: A connected system capacity of 96 devices, shade motors, hard-wired wall switches, and up to 12 power and communication panels. Network to have capacity of 96 shades under control of one switch.
       4. Hard-Wired User Interface Switches: Four Buttons: Up, down, and two customizable presets.
    2. Shade Drive Assembly: Factory installed motor, pre-tested, and with limits preset. Motors of different lifting capacity are available depending on shade material weight and size of window to be covered.
       1. Shade DC Motor Drive Assemblies:
          1. Inside a shade tube with special springs as part of a shade cassette unit.

Factory assembled, inspected, tested, motor limits set, and shipped complete. Ready for installation into the two attachment brackets fastened to building structure.

* + - * 1. Quiet operation. Less than 38 dbA at three feet.
        2. Digital bidirectional communication.
        3. Programmable Intermediate Shade Positions: 98 total. Allow customized and matching stop points of shade.
        4. Encoder-based drive for precise positioning. Plus or minus 1/16 inch (1.6 mm).
        5. Power Supply: 24 VDC.
        6. Motor Limits: Electronic and not manual type.
        7. Single Cable for Shade Power and Communications: 24 AWG Cat5e or Cat6.
        8. Shades standard with a 6 inch (152 mm) pre-assembled connector in any gender. Optional lengths of connector wire include 4 inches (102 mm) or 35 inches (0.89 m).
        9. Can be installed left or right drive, inside shade tube.
        10. Motors are not damaged when a user "pulls down" on shade hembar when power or control is not engaged.
        11. Shade Cassette System: Enables users to send shade all the way open, all the way down, or to stop at a fixed position via a prescribed sequence of "tugs" or pulling on the hembar without damaging the motor, drive, brackets, or roller shade. System enables installer to set lower and upper limits or return to a master reset of the shade to default upper and lower limits.
    1. Power and Communication Panels:
       1. Low voltage motors are interconnected via 24 AWG Cat5e or Cat6 cabling providing power and control within a single cable.
       2. Tested and designed system supports a distance between power and communication panel and shades of 750 ft (228.6 m) for the farthest shade.
       3. Maximum distance between a power and communication panel and a hard-wired switch: Limited to 1,000 feet (304.8 m).
       4. System to utilize RJ-45 connectors and straight thru wiring with no crossing of conductors at different cable ends.
       5. A Single Panel: Able to power eight shades with a DC output of 24 VDC, 7.5 Amps.
       6. AC Input Requirements: 100 to 200 Volts at 2.5 Amps via separate power supply connected to the power and communication panel.
       7. Associated low-voltage motors shall not require any other AC power supply or transformer for DC power, along the network or at the shade motor location.
       8. Panels can be joined together daisy-chain style, RS-485 to control more shades, switches, and zones. Twelve separate panels shall be able to be connected together for control of 96 shades.
       9. Interconnection to building management systems, automated lighting systems, third party manufacturers, and other Legrand systems for daylight integration and lighting control is to be seamless and effected by RS-485, RS-232, BACnet, or Dry Contact protocols and parameters.
       10. Shade Motors: Offer individual addressing to facilitate usage with systems manufactured by others via BACnet protocols.
       11. Panels to be controlled by a hard-wired switch for simplified user control and interfacing.
       12. Special cable adapters for those installations where utilization of a two-wire cabling system is required. System shall provide power.

\*\* NOTE TO SPECIFIER \*\* There are numerous methods to control motorized shades and a variety of motors. Control options may include direct-wired control via switches, single shade control or multiple shade control via hard-wired switches, timer and light sensor control; integration with third-party manufacturer control or audio-visual systems via RS-232/RS-485, interconnection with Building Automation Systems and Lighting Control Systems via BACnet, and direct operation with other Legrand products specified in Section 26 09 43 [26 09 33]. Contact a Legrand Solarfective Sales Consultant for more information and detail.

* + 1. Control of Shades:
       1. User Interface Hard-Wired Switches: To fit standard decorator type paddle switch plates and fit standard type junction boxes.
          1. Four Buttons: Up, down, and two customizable presets. Presets are for 33 and 65 percent of shade height based on lower limit.
          2. Available Colors: White, Light Ivory, Ivory, Gray, and Black.

\*\* NOTE TO SPECIFIER \*\* Select the following paragraph if applicable. Delete if not required.

* + - 1. Automated Lighting Control System with Features as specified in Section 16090 Network Lighting Controls" for lighting integration into digital shading and other compatible systems.
  1. MOTORIZED TS SERIES LINE VOLTAGE SHADE SYSTEM FOR SOMFY CONTROLS
     1. Legrand Solarfective Teleshade TS Series Line Voltage Shading System: A quiet motorized shade system sunscreen or opaque roll or double contained in a factory assembled shade cassette unit.

\*\* NOTE TO SPECIFIER \*\* Select the configuration type(s) required from the following and delete those not applicable. If multiple configurations are required indicate the location of each on the Drawings or in the Schedule at the end of this section. Consult with the manufacturer for additional standard and custom configuration for unusually shaped windows, corner applications, or various pocket designs as required.

* + 1. Base Shade Configurations
       1. SF-T7M: Motorized Teleshade 4 Motorized Somfy Cassette System.
          1. Cassette Size(DxH): 3-1/16 x 3-15/16 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x (2.79 m).
       2. SF-4BM: Motorized Teleshade 4 Motorized Somfy Cassette System with vented pocket system.
          1. Channels 1-1/8 inch. Cassette Size(DxH): 4-1/16 x 4-1/2 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x (2.79 m).
       3. SF-RD4: Motorized Teleshade 4 Motorized Somfy Cassette System with side, and bottom channels.
          1. Channels 1-1/8 inch. Cassette Size(DxH): 3-1/16 x 3-15/16 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x (2.79 m).
       4. SF-RD5: Motorized Teleshade 4 Motorized Somfy Cassette System with back fascia, side, and bottom channels.
          1. Channels 1-1/8 inch. Cassette Size(DxH): 3-1/8 x 4 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x (2.79 m).
       5. SF-T7M: Motorized Teleshade 4 Motorized Somfy Cassette System.
          1. Cassette Size(DxH): 3-1/16 x 3-15/16 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x (2.79 m).
       6. SF-RD/T7M: Motorized Teleshade 4 Motorized Somfy Cassette System with side, and bottom channels.
          1. Channels: 1-1/8 inch. Cassette Size(DxH): 3-1/16 x 3-15/16 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x (2.79 m).
       7. SF-RD13M: Motorized Teleshade 5 Motorized Somfy Cassette System with back fascia, side, and bottom channels.
          1. Channels 1-1/8 inch. Cassette Size(DxH): 4-1/8 x 5-1/8 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 200 inches (3.28 x 5.08 m).
       8. SF-T10M: Motorized Teleshade 5 Motorized Somfy Cassette System.
          1. Cassette Size(DxH): 4-1/8 x 5-1/8 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x (2.79 m).
       9. SF-RD/T10M: Motorized Teleshade 5 Motorized Somfy Cassette System with side, and bottom channels.
          1. Channels: 1-1/8 inch. Cassette Size(DxH): 4-1/18 x 5-1/8 inches.
          2. Maximum Shade Size (HxW): Up to 129 x 200 inches (3.28 x 5.08 m).
       10. SF-TQ10M: Motorized Teleshade 5 Motorized Somfy Cassette System.
           1. Cassette Size(DxH): 4-1/18 x 5-1/8 inches.
           2. Maximum Shade Size (HxW): Up to 129 x 200 inches (3.28 x 5.08 m).
       11. SF-RD13M: Motorized Teleshade 5 Motorized Somfy Cassette System with back fascia, side, and bottom channels.
           1. Channels: 1-1/8 inch. Cassette Size(DxH): 4-1/18 x 5-1/8 inches.
           2. Maximum Shade Size (HxW): Up to 129 x 200 inches (3.28 x 5.08 m).
    2. Operation:
       1. Motorized Operation Roller Shades Within Shade Cassette Units:
          1. A drive system controlled by a motor with specified controls for remote operation of the shade. Quiet Operation: Less than 38 dba at 3 ft.
          2. Line-voltage power from branch circuits located near the top of the window.
          3. Communication with Motor: Via data wiring using different protocols or remote controlled via RF signals.
       2. Motor Selection: Based on control criteria, sizing of window, weight of fabric, project requirements for large shades, and/or need for quiet operation.
          1. Controls allow for single shades or groups of shades to operate remotely with customizable stopping points besides full up and down.
          2. Interconnection to different control systems:

Third-party manufacturers' control/integration systems.

Building Automation Systems: For energy efficiency and comfort.

Lighting Control Systems: Wall switches, and/or handheld remotes.

* + - * 1. Sufficient lifting capacity for specified shade. Capable of Dry-Contact RS 485, or RF control.
    1. Assembly:
       1. Fully factory assembled and pre-tested shade cassette unit consisting of two end brackets, appropriately sized motor installed as required, shade tube, extruded aluminum fascia, hembar, shade fabric material, regular or reverse roll of shade material, and cassette mounting attachment brackets for on-site installation.
       2. Brackets for Shade Cassette Units: Adjustable to level the units allowing for building irregularities and to minimize light gap above the unit.
       3. Cassette Unit to be ready for installation via attachment brackets fabricated from aluminum, included with each unit.
       4. Attachment Brackets: T5 6005 aluminum. Fabricated to allow for simple direct installation of the shade cassette units to the building structure.
       5. Four Standard Types Offered by the Manufacturer:
          1. Mounting Type: Between Mullions.
          2. Mounting Type: Face of Mullions.
          3. Mounting Type: Ceiling.
          4. Mounting Type: Above-the-ceiling, Inherently vented PUSH-UP for use with vented pocket assemblies for pre-assembled shade cassette units.
       6. Removal of shade cassette unit shall not require disassembly of the shade unit or roller shade tube.
       7. End Brackets within Shade Cassette Unit: Zinc plated steel. Color to coordinate with fascia color.
    2. Shade Tube: Extruded T5 6005 aluminum, 1/16 inch (1.52 mm) thick. Continuous screw fins 3/16 inch (4.82 mm) high; for strength and drive capabilities when attached to nylon sprocket. Fins: Spaced equidistant on tube and placed according to weight and sizing characteristics necessary to support intended shade. Tube to be of sufficient diameter to negate deflection caused by shade material weight and size assuring good performance.
    3. Fascia and End Caps: Extruded T6 6063 or 6360 aluminum fascia with front towards room interior, 1/16 inch (1.7 mm) thick with two continuous screw flutes.
       1. Finish: Anodized, powder coated, or custom painted.
       2. Attachment of Fascia: Two-part process.
          1. First: A friction fit of fascia into cassette shade unit.
          2. Second: Mechanically secured by a hidden/concealed screw lock-down, of fascia to cassette shade unit; eight No. 6, 3/4 inch screws.
          3. Fascia to be suitable for regular or reverse roll. Reverse fascia with back towards window, is also an available option.
          4. Fascia End Caps: T6 6063 or 6360 aluminum. Fabricated via a press fit and a secure mechanical fastener.
       3. Fabrication of a Two-Sided Fabric: Can result in entire tube being installed in reverse roll configuration, similar to when a reverse roll is specified. Therefore the hanging fabric is closer to the interior of the room and further away from the window glass.
       4. Fascia and End Cap Colors: Extruded aluminum with plastic end finials.

\*\* NOTE TO SPECIFIER \*\* Delete finish options not required.

* + - * 1. Finish: Clear Anodized.
        2. Finish: Gloss White.
        3. Finish: Beige.
        4. Finish: Dark Grey.
        5. Finish: Black.
        6. Finish: Light Bronze.
        7. Finish: Ceiling White.
        8. Finish: Charcoal.
        9. Finish: Dark Bronze.
        10. Finish: Color as selected by the Architect.
    1. Exterior Hembar: Extruded T6 6360 aluminum with plastic end finials, attached in factory to shadeband fabric material. Exposed hembars and shadeband wrapped and sealed hembars are supplied with both ends of hembar sealed.

\*\* NOTE TO SPECIFIER \*\* Select the Options required from the following and delete those not applicable. If multiple configurations are required indicate the location of each on the Drawings or in the Schedule at the end of this section.

* + - 1. Hembar: Exposed.
      2. Hembar: Concealed, Fabric Wrapped with open ends.
      3. Hembar: Wrapped and sealed. Fabric Wrapped with fabric sealed ends.
      4. Exterior Hembar Colors: Extruded aluminum with plastic end finials.

\*\* NOTE TO SPECIFIER \*\* Delete finish options not required.

* + - * 1. Finish: Clear Anodized.
        2. Finish: Gloss White.
        3. Finish: Beige.
        4. Finish: Dark Grey.
        5. Finish: Black.
        6. Finish: Light Bronze.
        7. Finish: Ceiling White.
        8. Finish: Charcoal.
        9. Finish: Dark Bronze.
        10. Finish: Color as selected by the Architect.
    1. Shadeband Material Attachment: Attach shadeband material to roller shade tube in factory.

\*\* NOTE TO SPECIFIER \*\* Selection of attachment method can be determined by Specifier preference or depending on project requirements and size of finished shade cassette unit. Delete attachment method option not required.

* + - 1. Attachment Method: Via double sided tape insuring shadeband material lays flat.
      2. Attachment Method: Hidden spline with lightweight small profile plastic extrusion attached to shadeband material and inserted into a machined groove in roller tube.
      3. Finished shades must be fabricated with one complete wrap of material minimum, to cover the attachment of the shade and material to the shade tube. This wrap length will vary due to size of shade and size of tube and factory assembly conditions.
    1. Motorized Shade System Design Intention:
       1. Communication with Motor: Via data wiring using different protocols or remote controlled via RF signals.
       2. Manufacturer is to provide selection of motors for single shades or groups of shades to be operated remotely.
       3. Shade System Versatility Options:
          1. Interconnection to different control systems such as third-party manufacturers' control/integration systems.
          2. Building automation systems for increasing energy efficiency and occupant comfort.
          3. Lighting control systems.
          4. Wall switches, and/or handheld remotes.
          5. Manufacturer will provide line voltage motors with sufficient lifting capacity for specified shade and capable of either Dry-Contact, RS 485, or RF control to meet project requirements.
    2. Shade Drive Assembly: Factory installed motor, pre-tested, and with limits preset. Motors of different lifting capacity shall be available depending on shade material weight and size of window to be covered.
       1. Shade Motor Drive Assembly Features: UL listed and tested.
          1. Placed inside shade tubes with drive attachments and brackets to be a part of a complete shade cassette unit that is factory assembled, inspected, tested, and motor limits set.
          2. Ships complete, ready for installation into two attachment brackets fastened to building structure.
          3. Line Voltage: 120 VAC, 60 Hz. Quiet Operation: Less than 38 dbA at three ft.
          4. Free of clicks and gear sounds during operation.
          5. Upper and Limit Presets: Set by the following.

Buttons on the motor if dry-contact control capable.

A limit setting device connected to motor if RS 485 capable.

Handheld remote if RF controlled capable.

* + - * 1. Programmable intermediate shade positions allowing customized and matching stop points of shade stored into memory.
        2. Encoder-based drive for precise positioning.
        3. Built-in thermal limit protection of four minutes.
        4. Interior Use Rating: IP 31. Operating Temperature Range: 32 to 140 degrees F (0 to 60 degrees C).
        5. RF Controlled Motors: SOMFY RTS type. Antenna built-into power cord, without use of external connection.
        6. Dry-contact and RS 485 capable motors to have a small connector on motor head for connection to control networks.
        7. Factory Installed Power Cord: Integral to tubular motor.
        8. Standard power lead lengths with factory installed connectors and options for customizable lengths and different power connectors.
        9. Motors to be installed left or right drive, inside shade tube.

\*\* NOTE TO SPECIFIER \*\* There are numerous methods to control motorized shades and a variety of motors. Control options may include direct-wired control via switches, single shade control or multiple shade control via hard-wired switches, timer, and light sensor control; integration with third-party manufacturer control or audio-visual systems via RS-232/RS-485, interconnection with Building Automation Systems and Lighting Control Systems via BACnet, and direct operation with other Legrand products specified in Section 16570 [26 09 33] Architectural Lighting Control System. Contact a Legrand Solarfective Sales Consultant for more information and detail.

* + 1. Control of Shades:
       1. User Interface Hard-Wired switches: Fit standard decorator type paddle switch plates and fit standard type junction boxes.
          1. Four buttons: Up, down, preset 1 customizable, and preset 2 customizable. Two Preset Buttons: Customizable. Factory Preset: 33 and 65 percent of shade height based on lower limit.
          2. Colors: White and Ivory.
       2. Dry-Contact Motor Control: Interconnection cable.
          1. For others to control operation of dry contact shade motor via other system.
       3. RF Controlled Motors: Motors, defined above, shall be SOMFY RTS RF-controlled.
          1. RTS Product Line Includes:

Remotes: Handheld single shade RTS.

Remotes: Handheld five shade RTS.

Remotes: Wall-mounted single shade RTS.

Remotes: Wall-mounted five shade RTS.

Remotes: Handheld and wall mounted. Colors: White or Black.

Sun Sensor RTS compatible units.

Time clock RTS compatible units.

RTS dry-contact interfaces.

Home Automation RTS interfaces.

Smart Phone and "App" interfaces.

* + - 1. RS 485 Digital Network-Controlled Motors:
         1. Allow interconnection to other systems.
         2. Provide operational flexibility and control.
         3. Individually addressable motors via a digital network.
         4. Digital network wiring topology for "daisy-chaining".
         5. Bi-directional communication along RS 485 network.
         6. Interconnection with third party systems for control.
         7. Network interconnection with Building Automation and Lighting Control Systems via RS-485 or BACnet interfaces.

\*\* NOTE TO SPECIFIER \*\* Select the following paragraph if applicable. Delete if not required.

* + - 1. Automated Lighting Control System: Features as specified in Section 16090 - Architectural Lighting Controls System" for lighting integration into self-configuring digital device shading systems.
  1. SHADE UNIT ACCESSORIES
     1. Double-Dual Shade: Where specified, two roller shade bands consisting of a Sunscreen and an Opaque or Blackout shadeband material inside the shade cassette unit.
        1. Each Roller Shade: Independently controlled by pull chain as specified.
        2. Shadeband materials: To be selected by Architect from manufacturer's standard range.
        3. Specify as Necessary:
           1. Room Darkening Side Material: \_\_\_\_\_\_\_\_.
           2. Sill Channels: \_\_\_\_\_\_\_\_.
           3. Room Darkening Hembars: \_\_\_\_\_\_\_\_.
     2. Pocket Type:

\*\* NOTE TO SPECIFIER \*\* Delete pocket types not required.

* + - 1. Metal Pocket: For installation by others, to encase the roller shade assembly above the finished ceiling. Provides isolation from ceiling plenum with continuous pocket or used to allow hot air trapped between glass and shadeband to escape up and through openings in the pocket. Provide with pocket components, including closure.
      2. Continuous Pocket: T6 6063 extruded aluminum for 4 inch shade cassette system. Assembly of the continuous pocket to be specific to the shade cassette unit and allow for the shadeband to be installed securely and without screws.
         1. Closure to be designed and built into the fascia.
         2. Manufacturer to select width of closure based upon single or dual shade and regular or reverse roll as specified by the Architect.
         3. Finishes: Same colors as hembar and fascia.
         4. Tile Support: Pocket to be formed with tile support with continuous metal lip 3/4 inch (19 mm) for use with acoustical lay-in type ceilings as standard.
         5. No Tile Support: Pocket without tile support.
      3. Vented Pocket: T5 6005 extruded aluminum. 3 inch (76 mm) brackets holding the frame of the pocket sections to be available for use with the 4 inch shade cassette system.
         1. Sections serve as intermediary between the attachment bracket and shade cassette unit, thereby providing maximum amount of clearance for venting of hot air trapped between glass and shadeband.
         2. Tile Support: Pocket to be formed with tile support with continuous metal lip 3/4 inch (19 mm) for use with acoustical lay-in type ceilings as standard.
         3. No Tile Support: Pocket without tile support.
    1. Closure for Pocket: Manufacturer provide matching trim plate closure of T6 6063 aluminum, to conceal most of the opening of cassette shade unit and associated roller shades.
       1. Attached to the pocket via concealed fasteners and a snap fit.
       2. Available for attachment to drywall-built pocket enclosures for achieving same results as with usage of factory supplied pocket.
       3. Manufacturer to Offer:
          1. Width of closure based on single or dual shade and regular or reverse roll.
          2. Connector plate to butt seams of closure together for tight and secure fit.
       4. A specific location for routing and attaching low-voltage cabling and plastic "zip" cable tie hold downs for effective cable management, when motorized shades are utilized. Finish: Same colors as hembars and fascia.
       5. Closure Colors:

\*\* NOTE TO SPECIFIER \*\* Delete finish options not required.

* + - * 1. Finish: Clear Anodized.
        2. Finish: Gloss White.
        3. Finish: Beige.
        4. Finish: Dark Grey.
        5. Finish: Black.
        6. Finish: Light Bronze.
        7. Finish: Ceiling White.
        8. Finish: Charcoal.
        9. Finish: Dark Bronze.
        10. Finish: Color as selected by the Architect.
    1. Room Darkening Side and Bottom Channels: Reduces light infiltration at sides of shades.
       1. Extruded T6 6063 Aluminum: 2-3/4 x 1-1/8 inches (57 x 29 mm).
       2. Channels have 0.45 inch (11 mm), Pile / Fuzzy weather stripping, further minimizing light infiltration.
       3. Finishes: Same colors as hembars and fascia.
  1. SHADE FABRIC

\*\* NOTE TO SPECIFIER \*\* Refer to Legrand's Roller Shades Memo Samples at https://store.samplingproduct.com/10389/tags/index/1543 for a complete list of available shade fabrics and selection guidelines. Select the Shade Fabrics required and include below or use the Schedule at the end of this section if required to define locations of multiple fabrics. Note that for dual roller shades, choose two, and indicate which is for front roller and which is for back roller.

* + 1. Light Filtering Fabric: \_\_\_\_\_\_\_.
    2. Room Darkening Fabrics: \_\_\_\_\_\_\_.
    3. Color and Pattern: As indicated in Color Schedule on Drawings.
    4. Color and Pattern: As selected by Architect from manufacturer's standard range.

\*\* NOTE TO SPECIFIER \*\* Select the following for motor operated units. Delete if not applicable.

* 1. SOURCE QUALITY CONTROL
     1. Motor Manufacturer Factory Quality Control Process:
        1. Testing and approval of motors is to be completed by one or more global safety testing laboratories including, but not limited to: UL, CUL, TUV, ETL, CE, and VDE.
        2. Prior to shipment, each motor must pass testing for defects in wiring and operation including:
           1. Assembled motor test design specifications when installed in various end products.
           2. Product installation testing.
           3. Product safety tests.
           4. Product performance tests.
           5. Life cycle testing for endurance and reliability.
           6. Embedded software tests.
           7. Heat and fire resistance tests.
           8. Water and oxidation resistance tests.
           9. Climate tests, temperature and humidity.
           10. Acoustic tests, sound level and quality.
           11. Radio frequency tests, transmission and reception.
           12. Electromechanical capability, CEM.

1. EXECUTION
   1. EXAMINATION
      1. Do not begin installation until substrates have been properly prepared.
      2. Examine areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, blocking.

\*\* NOTE TO SPECIFIER \*\* Include one of the following paragraphs for motorized operators. Delete if not applicable.

* + 1. Identify locations of connections to building electrical system, and other conditions affecting performance of the Work.
    2. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
  1. PREPARATION

\*\* NOTE TO SPECIFIER \*\* Include one of the following paragraphs. Delete if not applicable.

* + 1. Coordinate requirements for blocking and structural supports to ensure adequate means for installation of window shades.
    2. Coordinate requirements for blocking, construction of shade pockets, and structural supports to ensure adequate means for installation of window shades.

\*\* NOTE TO SPECIFIER \*\* Include one or more of the following paragraphs for window shades with headboxes recessed in ceilings. Delete those not applicable.

* + 1. Coordinate installation of recessed shade pockets with construction of suspended acoustical panel ceilings specified in Section 09 51 23 - Acoustical Tile Ceilings.
    2. Coordinate installation of recessed shade pockets with construction of suspended gypsum board ceilings specified in Section 09 21 16.33 - Gypsum Board Area Separation Wall Assemblies.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph for motorized shades. Delete if not applicable.

* + 1. Coordinate requirements for power supply conduit, and wiring required for window shade motors and controls.
  1. INSTALLATION
     1. Install in accordance with manufacturer's instructions.
     2. Install roller shades level, plumb, square, and true. Allow proper clearances for window operation hardware.
     3. Installation should be performed by Manufacturers authorized dealer or internal installation team

\*\* NOTE TO SPECIFIER \*\* Shade Pockets are designed to be installed prior to or as part of ceiling system installation. Shade and operating mechanism can be site installed in pockets after construction operations that might damage shade are complete.. Include the following paragraph if pockets are to be installed. Delete if not applicable.

* + 1. Shade Pockets:
       1. Install shade pockets prior to installation of suspended ceiling system. Attach to supporting structure with screws through top of pocket at 24 inches (610 mm) minimum centers.
       2. Install shade pockets in conjunction with installation of suspended ceiling system. Attach to supporting structure with screws through top of pocket at 24 inches (610 mm) minimum centers.
       3. Install corner pieces securely and in alignment with pockets.
       4. Install pocket ends securely and in alignment with pockets.
       5. After interior construction is complete, install shade and operating mechanism in pocket.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph if fascia or separate closure for site constructed recess is being provided. Note fascia is not applicable if pockets are being provided. Delete if not applicable.

* + 1. Install the following items to conceal roller and operating mechanism. Do not use exposed fasteners.

\*\* NOTE TO SPECIFIER \*\* Select items to conceal roller and operating mechanism from the following as applicable. Delete if not applicable.

* + - 1. Fascias.
      2. Closure panels.
      3. Endcaps.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraphs for room darkening shades. Delete if not applicable.

* + 1. Install headbox, side channels, and sill channel with sealant specified in Section 07 90 00 - Joint Protection.
    2. Position shades level, plumb, and at proper height relative to adjacent construction. Secure with fasteners recommended by manufacturer.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraphs for motor operated shades. Delete if not applicable.

* + 1. Comply with NECA 1 and NECA 130.
    2. Comply with FCC guidelines.

\*\* NOTE TO SPECIFIER \*\* Select the Electrical Connections Paragraph below for hard wired motor-operated roller shades. Delete if not required.

* + 1. Electrical Connections: Connect each roller shade motor operator and stationary control system to building electrical system.
       1. Grounding: Provide electrical grounding in accordance with NFPA 70.

\*\* NOTE TO SPECIFIER \*\* Select the Networked Building Management System Paragraph below when System is included in project. Delete if not required.

* + 1. Networked Building Management System: Connect networked automation controls for motorized equipment to building management system.

\*\* NOTE TO SPECIFIER \*\* Select the Sun, Rain, and Wind Sensor Paragraph below when System is included in project. Delete if not required.

* + 1. Sun, Rain, and Wind Sensor Locations: Mount on exterior according to manufacturer's written instructions.
  1. ADJUSTING
     1. Adjust and balance roller shades and motorized equipment to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
        1. Program each motor-operator control system to Owner-provided program settings.
     2. Commissioning Control Systems: Perform commissioning of integrated automation control systems performed by Solarfective/WattStopper Factory Authorized Tech.
  2. TESTING

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph for motorized shades. Delete if not applicable.

* + 1. Test motorized window shades to verify that controls, limit switches, interface to other building systems, and other operating components are functional. Correct deficiencies.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph for room darkening shades. Delete if not applicable.

* + 1. Test window shades to verify that operating mechanism, fabric retainer, and other operating components are functional. Correct deficiencies.

\*\* NOTE TO SPECIFIER \*\* Select the operating mechanism from the list below. Delete those not applicable.

* + - 1. Crank.
      2. Chain operation.
      3. Motorized operating mechanism.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph for room darkening shades. Delete if not applicable.

* + 1. During daylight hours, lower shades and turn off interior lights. Verify that there are no light leaks at perimeter or within shade assembly. Correct deficiencies.
    2. Demonstrate operation of shades to Owner's designated representatives.
  1. CLEANING AND PROTECTION
     1. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.
     2. 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.
     3. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.
  2. SCHEDULES

\*\* NOTE TO SPECIFIER \*\* Edit and retain paragraph below to suit project requirements. Identify products by name on the Drawings or use this paragraph to Name and define the location of each shade type and mounting to be used using the "Type" designation on the Drawings. The following are some examples of schedule references. Edit as required to suit project or delete and identify products on the Drawings.

* + 1. Manually Operated Shades:
       1. Shade Type MOS-1 Single Roller
          1. SF-T1: Manual Telshade cassette with front fascia.

Shade Size as Indicated (HxW). Up to 129 x 110 inches (3.28 x 2.79 m).

Mounting Type: Surface with front fascia as indicated.

Hembar: Exterior.

Fabric: Light Filtering Option 5.

Fabric Drop: Standard Roll.

Crank: Left.

Facia/Hembar Color: Dark Gray.

* + - 1. Shade Type MOS-2 Single Roller
         1. SF-RD2: Manual Teleshade 4 Cassette with back fascia, side, and bottom channels.

Shade Size as Indicated (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).

Mounting Type: Surface with back fascia as indicated.

Hembar: Exterior with side channel and sill rail.

Fabric: Room darkening Option 31.

Fabric Drop: Standard Roll

Chain: Both.

Facia/Hembar Color: As selected by the Architect

* + 1. Simple Motorized Shades:
       1. Shade Type SMS-1 Single Roller
          1. SF-RD4: Motorized Teleshade 4 Motorized Somfy Cassette System with side, and bottom channels.

Channels: 1-1/8 inch (29 mm).

Shade Size as Indicated (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).

Mounting Type: Surface with back fascia as indicated.

Hembar: Exterior with side channel and sill rail.

Fabric: Fabric: Light Filtering Option 5.

Fabric Drop: Standard Roll.

Facia/Hembar Color: As selected by the Architect.

* + - * 1. SF-RD5: Motorized Teleshade 4 Motorized Somfy Cassette System with back fascia, side, and bottom channels.

Channels: 1-1/8 inch (29 mm).

Shade Size as Indicated (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).

Mounting Type: Surface with back fascia as indicated.

Hembar: Exterior with side channel and sill rail.

Fabric: Room darkening Option 31.

Fabric Drop: Standard Roll.

Facia/Hembar Color: As selected by the Architect.

* + 1. Automated Shades:
       1. Shade Type AS-1 Single Roller
          1. SF-T7M: Motorized Teleshade 4 Motorized Somfy Cassette System.

Cassette Size (DxH): 3-1/16 x 3-15/16 inches (77 x 100 mm).

Maximum Shade Size (HxW): Up to 129 x 110 inches (3.28 x 2.79 m).

Mounting Type: Surface with back fascia as indicated.

Hembar: Exterior with side channel and sill rail.

Fabric: Room darkening Option 31.

Fabric Drop: Standard Roll.

Chain: Both.

Facia/Hembar Color: As selected by the Architect.

END OF SECTION