SECTION 12494

MechoShades and WhisperShade IQ2 DC ElectroShades

\*\* NOTE TO SPECIFIER \*\* MechoShade Systems, Inc.; interior manually-operated and electrically-operated roller shades and control systems.

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This section is based on the products of MechoShade Systems, Inc., which is located at:

 42-03 35th Street

 Long Island City, NY 11101

 Tel: (718) 729-2020

 Fax: (718) 729-2941

 Email: info@mechoshade.com

 [www.mechoshade.com](http://www.mechoshade.com)

Energy-conserving MechoShade’s and ElectroShade’s work in harmony with the dynamic use of glass to improve interior environments with optimum solar protection, greater use of natural light, energy savings and those vitally important outdoor views so beneficial to human personal well-being and productivity.

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MechoShade Systems offers an integrated system of visually transparent and room darkening roller shades that provide optimum solar protection with the functionality and design esthetics architects and designers worldwide desire. Whether you need a manual chain-driven shade for a typical window, a motorized mid-window alignment system for a curtain wall, a multi-zone shading control system for a entire office, or a computerized solar tracking system for the entire building, MechoShade is the shade of choice for windows, skylights, greenhouses and atriums.

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SECTION 12494 - ROLLER SHADES, Copyright 2004, ARCAT, Inc.

1. GENERAL
	1. SECTION INCLUDES

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

* + 1. Manually operated sunscreen roller shades.
		2. Manually operated room-darkening shades.
		3. Manually operated double-roller sunscreen and room-darkening shades.
		4. Electrically operated sunscreen roller shades.
		5. Electrically operated room-darkening shades.
		6. Electrically operated double-roller sunscreen and room-darkening shades.
		7. Local group and master control system for shade operation.
		8. Local group and master control system for shade operation with addressable motors.
	1. RELATED SECTIONS

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

* + 1. Section 06100 - Rough Carpentry: Wood blocking and grounds for mounting roller shades and accessories.
		2. Section 09260 - Gypsum Board Assemblies: Coordination with gypsum board assemblies for installation of shade pockets, closures and related accessories.
		3. Section 09510 - Acoustical Ceilings: Coordination with acoustical ceiling systems for installation of shade pockets, closures and related accessories.
		4. Division 16 - Electrical: Electric service for motor 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. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
		2. NFPA 70 - National Electrical Code.
		3. NFPA 701-99 - Fire Tests for Flame-Resistant Textiles and Films.
	1. SUBMITTALS

		1. Submit under provisions of Section 01300.
		\*\* NOTE TO SPECIFIER \*\* Delete paragraph below if EcoVeil is NOT being specified.
		2. Submit Environmental Certification and Third Party Evaluation per Section 1.5 Qualifications.
		3. Product Data: Manufacturer's data sheets on each product to be used, including:
			1. Preparation instructions and recommendations.
			2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
			3. Storage and handling requirements and recommendations.
			4. Mounting details and installation methods.

\*\* NOTE TO SPECIFIER \*\* Delete paragraph below if no motor-operated units.

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

\*\* NOTE TO SPECIFIER \*\* Delete paragraph below for projects without complex requirements for window treatment and rely on submission of window treatment schedule specified following.

* + 1. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, wiring diagrams and relationship to adjacent work.

\*\* NOTE TO SPECIFIER \*\* Manufacturer recommends retaining paragraph below to reduce preparation time for shop drawings.

* + - 1. Prepare shop drawings on Autocad or Microstation format using base sheets provided electronically by the Architect.
		1. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.

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

* + 1. Selection Samples: For each finish product specified, one set of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.
		2. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements. Shadecloth sample and aluminum finish sample as selected. Mark face of material to indicate interior faces.
		3. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.
	1. QUALITY ASSURANCE
		1. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section.
		2. Installer Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.
		3. Fire-Test-Response Characteristics: Passes NFPA 701-99 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.
		4. Electrical Components: NFPA Article 100 listed and labeled by either UL or ETL or other testing agency acceptable to authorities having jurisdiction, marked for intended use, and tested as a system. Individual testing of components will not be acceptable in lieu of system testing.
		5. Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.
		\*\*Note to specifier – Delete Sections F – I if NOT selecting EcoVeil™ as shadecloth\*\*

\*\* NOTE TO SPECIFIER \*\* Include a mock-up if the project size and/or quality warrant. 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 (manual shades only) of one roller shade assembly for evaluation of mounting, appearance and accessories.
			1. Locate mock-up in window designated by Architect.
			2. Do not proceed with remaining work until, mock-up is accepted by Architect.
	1. DELIVERY, STORAGE, AND HANDLING
		1. Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in the Window Treatment Schedule.
	2. PROJECT CONDITIONS
		1. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
	3. WARRANTY
		1. Roller Shade Hardware and Chain Warranty: Manufacturer's standard non-depreciating twenty-five year limited warranty.

\*\* NOTE TO SPECIFIER \*\* Delete one of the two following paragraphs unless both fabric types are required.

* + 1. Standard Shadecloth: Manufacturer's standard twenty-five year warranty.
		2. Ecoveil Shadecloth: Manufacturer's standard ten year warranty.
		3. Roller Shade Motors and Motor Control Systems: Manufacturer's standard non-depreciating five year warranty.
		4. Roller Shade Installation: One year from date of Substantial Completion, not including scaffolding, lifts or other means to reach inaccessible areas, which are deemed owners responsibility.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: Mecho; 42-03 35th Street, Long Island City, NY 11101. Tel: (718) 729-2020. Fax: (718) 729-2941. [www.mechoshade.com](http://www.mechoshade.com) as represented locally by Shannon Corporation, David Shannon, david.shannon@shannoncorporation.com

\*\* NOTE TO SPECIFIER \*\* Delete two of the following three paragraphs; coordinate with requirements of Division 1 section on product options and substitutions. If products with plastic components or products with lesser performance are acceptable, also consider specifying light-commercial grade MechoShade Suburban/2 line and reduce warranty provisions.

* + 1. Substitutions: Not permitted.
		2. Requests for substitutions will be considered in accordance with provisions of Section 01600.
	1. APPLICATIONS/SCOPE
		1. Roller Shade Schedule:

\*\* NOTE TO SPECIFIER \*\* Delete paragraphs below which are not applicable for the project. Coordinate shade types with designations used on the Drawings.

* + - 1. Shade Type 1: Manual operating, chain drive, sunscreen roller shades in all exterior windows of rooms and spaces shown on the Drawings.
			2. Shade Type 2: Manual operating interior, chain drive room darkening roller shades with blackout fabric in all exterior windows of rooms and spaces shown on Drawings, and related mounting systems and accessories.
			3. Shade Type 3: Manual operating interior, chain drive "double" solar and room darkening blackout roller shades, operating independently of each other, in all exterior windows of rooms and spaces shown on Drawings, and related mounting systems and accessories.
			4. Shade Type 4: Motorized interior solar roller shades in all exterior windows of rooms and spaces shown on Drawings, and related motor control systems.
			5. Shade Type 5: Motorized interior room darkening roller shades with blackout fabric in all exterior windows of rooms and spaces shown on Drawings, and related motor control systems.
			6. Shade Type 6: Motorized interior “double”, solar and room darkening blackout roller shades, operating independently of each other, in all exterior windows of rooms and spaces shown on Drawings, and related motor control systems.
	1. SHADECLOTH

\*\* NOTE TO SPECIFIER \*\* Delete choices below not required for selections made in paragraphs above. Yarns are opaque. Visible light transmission through the interstices of the fabric shall be in the 2-5 percent VL transmission range, which varies with color and is used as the guide for fabric selection. Non-opaque yarns in the 3 - 5 percent openness factor range generally have a 20 - 30 percent visible light transmission; this provides very high surface brightness shade bands. In that event the visible light transmission of the glazing plus the VLT of fabric shall be evaluated. Openness factor, the traditional means for matching shadecloth to glazing, is not appropriate for fabrics with non-opaque yarns and high visible light transmission regardless of openness factor. Visible light transmission, and ultimate surface brightness are the most accurate determinant of fabric selection.

* + 1. Visually Transparent Single-Fabric Shadecloth: Mecho, ThermoVeil group, single thickness, opaque non-raveling 0.035-inch (0.762 mm) thick vinyl fabric, woven from 0.018-inch (0.457 mm) diameter extruded vinyl yarn comprising of 25 percent polyester and 75 percent reinforced vinyl, in colors selected from manufacturer's available range:
			1. Dense Linear Weave, 1000 series: 3 percent open, dense linear-weave pattern. VLT\_range 1 to 7 percent.
			2. Extra - Dense Linear Weave, 0900 series: 0 to 1 percent visually translucent linear weave pattern. VLT range 0 to 4 percent.
			3. Open Basket Weave, 2100 series: 10 percent open, 2 by 2 open basket-weave pattern. VLT\_range 12 to 18 percent.
			4. Dense Basket Weave, 1300 series: 5 percent open, 2 by 2 dense basket-weave pattern. VLT\_range 7 to 11 percent.
			5. Dense Basket Weave, 1500 series: 3 percent open, 2 by 2 dense basket-weave pattern. VLT\_range 5 to 11 percent.
			6. Dense, 3000 Satin Texture series: visually translucent, twill-weave pattern all at 2 percent open. VLT\_range 1 to 6 percent.
			7. Dense, 3200 Diamond Pastel series: visually translucent, twill-weave pattern all at 2 percent open. VLT\_range 1 to 6 percent.
			8. Dense, 3300 Diamond Earthtone series: visually translucent, twill-weave pattern all at 2 percent open. VLT\_range 1 to 6 percent.

\*\* NOTE TO SPECIFIER \*\* Delete color option not required.

* + - 1. Color: Selected from manufacturer's standard colors.
			2. Color: \_\_\_\_\_.
		1. Visually Transparent Single-Fabric Shadecloth: Mecho, SoHo "1100" or "1600" and "1900" Series: 0.010 diameter (0.254 mm), Opaque, non-raveling 76 percent vinyl / 24 percent polyester yarn, fabric thickness range from 0.024 to 0.026 inches (0.609 to 0.660 mm):
			1. 2 x 2 basket weave, SoHo 1100 series, 1 percent open, VLT range 0 to 15 percent.
			2. 2 x 2 basket weave, SoHo 1600 series, 3 percent open, VLT range 4 to 18 percent.
			3. 2 x 2 basket weave, SoHo 1900 series, 5 percent open, VLT range 6 to 22 percent.

\*\* NOTE TO SPECIFIER \*\* Delete color option not required.

* + - 1. Color: Selected from manufacturer's standard colors.
			2. Color: \_\_\_\_\_.
		1. Visually Transparent Single-Fabric Shadecloth: Mecho, EuroVeil "5300" or EuroTwill "6000" Series: 0.010 diameter (0.254 mm), Opaque, non-raveling vinyl/polyester yarn, fabric thickness 0.025 inches (0.635 mm):
			1. Dense Basket Weave, 5300 series: 5 percent open. VLT\_range 7 to 13 percent.
			2. Extra Dense, reversible Twill Weave, 6000 series: 3 percent open. VLT range 4 to 11 percent.
			3. Extra Dense, reversible Twill Weave, 6200 series: 1 percent open. VLT range 2 to 5 percent.

\*\* NOTE TO SPECIFIER \*\* Delete color option not required.

* + - 1. Color: Selected from manufacturer's standard colors.
			2. Color: \_\_\_\_\_.
		1. Visually Transparent Single-Fabric Shadecloth: Mecho, EuroTwill, Reversible, BrokenTwill, "6450" Series: 0.010 diameter (0.254 mm), Opaque, non-raveling vinyl/polyester yarn, fabric thickness 0.025 inches (0.635 mm):
			1. Dense BrokenTwill Weave, 6450 series: 3 percent open. VLT range 4 to 17 percent.

\*\* NOTE TO SPECIFIER \*\* Delete color option not required.

* + - 1. Color: Selected from manufacturer's standard colors.
			2. Color: \_\_\_\_\_.
		1. Vinyl Room Darkening Shadecloth (Single-Fabric): Mecho, "0700 series," blackout material, washable and colorfast laminated and embossed vinyl coated fabric, 0.015 inches thick (0.30 mm) blackout material and weighing 0.78 lbs per sq yd (0.42 kg per sq m), with a minimum of 62 threads per square inch:

\*\* NOTE TO SPECIFIER \*\* Delete color option not required.

* + - 1. Color: Selected from manufacturer's standard colors.
			2. Color: \_\_\_\_\_.
		1. Midnite 0200, Blackout Shadecloth with Opaque Acrylic Backing. PVC-Free, white color reverse side (for exterior). Comprised of 27 percent polyester yarn, 73 percent acrylic backing:

\*\* NOTE TO SPECIFIER \*\* Delete color option not required.

* + - 1. Color: Selected from manufacturer's standard colors.
			2. Color: \_\_\_\_\_.
		1. Room Darkening (PVC Free) Shadecloth with Opaque Acrylic Backing: Mecho, "Equinox 0100 series," 0.008 inches thick (0.19 mm) blackout material and weighing 0.94 lbs per sq yd (0.51 kg per sq m), comprising of 53 percent fiberglass, 45 percent acrylic, 2 percent poly finish:

\*\* NOTE TO SPECIFIER \*\* Delete color option not required.

* + - 1. Color: Selected from manufacturer's standard colors.
			2. Color: \_\_\_\_\_.
		1. Room Darkening (PVC Free) Shadecloth with Opaque Acrylic Backing: Mecho, "Chelsea 0250 series," 0.015 inches thick (0.381 mm) blackout material and weighing 0.663 lbs per sq yd (0.36 kg per sq m), comprising of 50 percent polyester, 50 percent acrylic foam backing. Neutral, graphite color back facing the window:

\*\* NOTE TO SPECIFIER \*\* Delete color option not required.

* + - 1. Color: Selected from manufacturer's standard colors.
			2. Color: \_\_\_\_\_.
		1. Distinctive 0800 Room Darkening Shadecloth: A 2x2 basket-weave woven of heavy-duty fiberglass yarn and laminated vinyl back. Content: 63 percent vinyl (coating), 37 percent fiberglass (base). Thickness 0.023 inches (0.584 mm) blackout material and weighing 1.238 lbs per sq yd (0.67 kg per sq m):

\*\* NOTE TO SPECIFIER \*\* Delete color option not required.

* + - 1. Color: Selected from manufacturer's standard colors.
			2. Color: \_\_\_\_\_.
		1. AcoustiVeil 0890, Dimout, 0 to 1 percent open, Fabric, Sound-Absorbing, with Noise Reduction Coefficient (NRC) of 0.575, to Aid in Reducing Echoes, 100 percent Polyester, PVC-Free with a Declare Label. Thickness 0.020 inches (0.508 mm) translucent material and weighing 0.478 lbs per sq yd (0.26 kg per sq m):

\*\* NOTE TO SPECIFIER \*\* Delete color option not required.

* + - 1. Color: Selected from manufacturer's standard colors.
			2. Color: \_\_\_\_\_.
		1. Environmentally Cradle to Cradle Certified Shadecloth: Mecho, EcoVeil 0950 Series, 1 X 1 Basket-Weave, 1 percent open, fabricated from TPO for both core yarn and jacket, single thickness, 0.018 opaque coated reinforced yarn, non-raveling 0.032 inch (0.813 mm) thick fabric and 0.718 lbs per sq yd (0.39 kg per sq m). VLT range 1 to 12 percent:
			1. Warranty: 10 year limited warranty.

\*\* NOTE TO SPECIFIER \*\* Delete color option not required.

* + - 1. Color: Selected from manufacturer's standard colors.
			2. Color: \_\_\_\_\_.
		1. Environmentally Cradle to Cradle Certified Shadecloth: Mecho, EcoVeil Sheer 6870 Series, 1 percent open, or EcoVeil Sheer 6770 Series, 3 percent open, Broken Twill Weave, fabricated from 100 percent polyester, visually transparent. Thickness; 0.0189-inch (0.480 mm) fabric and 0.488 lbs per sq yd (0.26 kg per sq m):
			1. Warranty: 10-year limited warranty.

\*\* NOTE TO SPECIFIER \*\* Delete color option not required.

* + - 1. Color: Selected from manufacturer's standard colors.
			2. Color: \_\_\_\_\_.
		1. Environmentally Cradle to Cradle Certified Shadecloth: Mecho, EcoVeil group, 1350 or 1550 Series, fabricated from TPO for both core yarn and jacket, single thickness, 0.018 opaque coated reinforced yarn, non-raveling 0.030 inch (0.762 mm) thick fabric:
			1. Basket Weave: 5 percent open 2x2 basket weave.
			2. Dense Basket Weave: 3 percent open 2x2 basket weave.
			3. Warranty: 10 year limited warranty.

\*\* NOTE TO SPECIFIER \*\* Delete color option not required.

* + - 1. Color: Selected from manufacturer's standard colors.
			2. Color: \_\_\_\_\_.
	1. SHADE BAND
		1. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem-pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.
			1. Hem Pockets and Hem Weights: Fabric hem pocket with RF-welded seams (including welded ends) and concealed hem weights. Hem weights shall be of appropriate size and weight for shade band. Hem weight shall be continuous inside a sealed hem pocket. Hem pocket construction and hem weights shall be similar, for all shades within one room. Sewn seams or hem pockets with open ends will not be accepted.
			2. Shade band and Shade Roller Attachment:
				1. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection. Roller tubes less than 1.55 inch (39.37 mm) in diameter for manual shades, and less than 2.55 inches (64.77 mm) for motorize shades are not acceptable.
				2. Provide for positive mechanical engagement with drive / brake mechanism.
				3. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a "snap-on" snap-off" spline mounting, without having to remove shade roller from shade brackets.
				4. Mounting spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.
				5. Any method of attaching shade band to roller tube that requires the use of: adhesive, adhesive tapes, staples, and/or rivets are not acceptable.
	2. SHADE FABRICATION
		1. Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise.
		2. Fabricate shadecloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch (3.18 mm) in either direction per 8 feet (2438 mm) of shade height due to warp distortion or weave design. Fabricate hem as follows:

\*\* NOTE TO SPECIFIER \*\* Delete four of five hem types from list below which are not applicable for the project.

* + - 1. Bottom hem weights.
			2. Concealed hemtube.
			3. Exposed hemtube.
			4. Exposed blackout hembar with light seal.
			5. Exposed blackout hembar with polybond seal.

\*\* NOTE TO SPECIFIER \*\* Manufacturer states that batten design and its use is similar to requirements from the sailing industry. Other manufacturers may indicate that they do not require the batten design, when in fact they do in order to provide a product that will last to meet the minimum warranty requirements in this Section.

* + 1. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shadebands. Contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shadecloth within specified standards. Battens shall be roll-formed stainless steel or tempered steel, as required.
		2. For railroaded shadebands, provide seams in railroaded multi-width shadebands as required to meet size requirements and in accordance with seam alignment as acceptable to Architect. Seams shall be properly located. Furnish battens in place of plain seams when the width, height, or weight of the shade exceeds manufacturer's standards. In absence of such standards, assure proper use of seams or battens as required to, and assure the proper tracking of the railroaded multi-width shadebands.
		3. Provide battens for railroaded shades when width-to-height (W:H) ratios meet or exceed manufacturer's standards. In absence of manufacturer's standards, be responsible for proper use and placement of battens to assure proper tracking and roll of shadebands.
		4. Blackout shadebands, when used inside channels, shall have horizontally mounted, roll-formed stainless steel or tempered-steel battens not more than 3 feet (115 mm) on center extending fully into the side channels. Battens shall be concealed in a integrally-colored fabric to match the inside and outside colors of the shadeband, in accordance with manufacturer's published standards for spacing and requirements.
			1. Battens shall be roll formed of stainless steel or tempered steel and concave to match the contour of the roller tube.
			2. Batten pockets shall be self-colored fabric front and back RF welded into the shadecloth. A self-color opaque liner shall be provided front and back to eliminate any see through of the batten pocket that shall not exceed 1-1/2 inches (38.1 mm) high and be totally opaque. A see-through moiré effect, which occurs with multiple layers of transparent fabrics, shall not be acceptable.
	1. COMPONENTS

\*\* NOTE TO SPECIFIER \*\* Retain paragraph below for both manual and motorized shades as it is required by the manufacturer to assure proper maintenance.

* + 1. Access and Material Requirements:
			1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
			2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.
			3. Use only Delrin engineered plastics by DuPont for all plastic components of shade hardware. Styrene based plastics, and /or polyester, or reinforced polyester will not be acceptable.

\*\* NOTE TO SPECIFIER \*\* Delete below if no motorized shades.

* + 1. Motorized Shade Hardware and Shade Brackets:
			1. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel, or heavier, thicker, as required to support 150 percent of the full weight of each shade.
			2. Provide shade hardware system that allows for field adjustment of motor or replacement of any operable hardware component without requiring removal of brackets, regardless of mounting position (inside, or outside mount).
			3. Provide shade hardware system that allows for operation of multiple shade bands offset by a maximum of 8-45 degrees from the motor axis between shade bands (4-22.5 degrees) on each side of the radial line, by a single shade motor (multi-banded shade, subject to manufacturer’s design criteria).
		2. Manual Operated Chain Drive Hardware and Brackets:
			1. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive end brackets. Universal offset shall be adjustable for future change.
			2. Provide hardware capable for installation of a removable fascia, for both regular and/or reverse roll, which shall be installed without exposed fastening devices of any kind.
			3. Provide shade hardware system that allows for removable regular and/or reverse roll fascias to be mounted continuously across two or more shade bands without requiring exposed fasteners of any kind.
			4. Provide shade hardware system that allows for operation of multiple shade bands (multi-banded shades) by a single chain operator, subject to manufacturer’s design criteria. Connectors shall be offset to assure alignment from the first to the last shade band.
			5. Provide shade hardware system that allows multi-banded manually operated shades to be capable of smooth operation when the axis is offset a maximum of 6 degrees on each side of the plane perpendicular to the radial line of the curve, for a 12 degrees total offset.
			6. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connectors for drive mechanism connection to shade roller tube are not acceptable
			7. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade.
			8. Drive Bracket / Brake Assembly:
				1. MechoShade Drive Bracket model M5 shall be fully integrated with all MechoShade accessories, including, but not limited to: SnapLoc fascia, room darkening side / sill channels, center supports and connectors for multi-banded shades.
				2. M5 drive sprocket and brake assembly shall rotate and be supported on a welded 3/8 inch (9.525 mm) steel pin.
				3. The brake shall be an over -running clutch design which disengages to 90 percent during the raising and lowering of a shade. The brake shall withstand a pull force of 50 lbs. (22 kg) in the stopped position.
				4. The braking mechanism shall be applied to an oil-impregnated hub on to which the brake system is mounted. The oil impregnated hub design includes an articulated brake assembly, which assures a smooth, non-jerky operation in raising and lowering the shades. The assembly shall be permanently lubricated. Products that require externally applied lubrication and or not permanently lubricated are not acceptable.
				5. The entire M5 assembly shall be fully mounted on the steel support bracket, and fully independent of the shade tube assembly, which may be removed and reinstalled without effecting the roller shade limit adjustments.
		3. Drive Chain: #10 qualified solid stainless steel chain rated to 90 lb. (41 kg) minimum breaking strength. Nickel plate chain or plastic chain shall not be accepted.

\*\* NOTE TO SPECIFIER \*\* Delete paragraphs below if no motor-operated roller shades.

* 1. WhisperShade IQ2 DC EDU system
		1. Shade Motors:
			1. WhisperShade IQ2 DC EDU intelligent, addressable, quiet, powerful low voltage motors.
			2. Power input: 24 VDC + 2.6/-1.0 VDC, 2A.
			3. Network: +13/-8 VDC Max unloaded MechoNet protocol.
			4. Switch input: 24 VDC, 5mA per switch contact
			5. DC Power Output: 24 VDC +2.6/-1.0 VDC, 200 mA.
			6. Torque: 35.4 in lb (4Nm)
			7. Lift Capacity: 28 lbs. (12.7 kg) on a 2.5 in. (63.5mm) diameter tube. Must be able to lift shades up to 600 sq. ft. (55.74 sq. m)
			8. Speed: 10.0 – 28.0 rpm Default is 25.0 rpm.
			9. Max number of rotations: 115
			10. Repeatability: +/-1/16 in. (+/- 1.6mm) on a 10 ft (3m) high shade (2 ½ in./63.5mm diameter tube.)
			11. Max continuous running time: 6 minutes.
			12. Max Controlling Weight per motor: 4 Nm:70.8 lbs./tube diameter (in.)
			13. Ultra-quiet operation: = or less than 38 dBA in shades up to 600 sq. ft (55.74 sq.m)
			14. Precise and repeatable alignment: +- 1/16 in. (=/- 1.6 mm.)
			15. Provide built in preventative maintenance feature.
			16. Agency Approvals: ETL Listed to UL STD 325, CSA STD C22 No. 247.
			17. Conceal motors inside shade roller tube.
		2. Intelligent Low Voltage Motor System: Specifications and design are based on the Intelligent motor control system, WhisperShade IQ2 DC EDU Motor System as manufactured by Mecho. Motor control systems not in complete compliance with these performance criteria shall not be accepted as equal systems.
			1. Upper and lower stopping points (operating limits) of shadeband’s shall be programmed into motors via a hand held removable program module / configurator. Basic motors without this capability will not be accepted.
			2. 5 alignment points, including 3 customizable preset positions.
			3. Provide one power panel for every 10 WhisperShade IQ2 DC motors.
			4. Network: Power panels to tie into Bi-directional MechoNet network for control, automation, and 3rd party integration. Includes 9 control addresses per motor, 133 alignment points (including 32 customizable preset positions.)
			5. Methods of control from MechoNet network:
				1. Cost effective, low voltage, hardwired dry-contact for local switch or 3rd party control operation.
				2. Two way communication network to support whole building, low voltage control and integration.
			6. Wall Switches:
				1. IQ-Switch: in 5 or 10 button, single gang, low voltage.
				2. Additional switch configuration available; multiple button personalities are supported by built in motor controller.
				3. Dry contact integration is available through motor splitter.
				4. RS232 integration available or supported via RS232 / MechoNet.
				5. Ethernet integration available or supported through IQ gateway.
				6. Bacnet integration is available or supported through SolarTrac pc.
				7. SolarLinc wireless daylight sensors shall be provided – which can ‘speak’ to MechoNet network.

* 1. ACCESSORIES

\*\* NOTE TO SPECIFIER \*\* See Mecho's full range of standard pockets and ElectroPockets for manual, motorized, motorized with Wired raceway, and double shades. Provide "ElectroPockets" with raceway where applicable. Delete pocket paragraph not required.

* + 1. Roller Shade Pocket: ElectroPocket and Non-ElectroPocket from Mecho. For recessed mounting in acoustical tile, or drywall ceilings as indicated on the Drawings. For manual and motorized shades.
			1. Provide either extruded aluminum and or formed steel shade pocket with extruded aluminum trim for all exposed components, sized to accommodate roller shades, with exposed extruded aluminum closure, tile support and removable closure panel to provide access to shades. The max roll diameter shall provide a minimum of clearance of 1/4 inch (6 mm) from the top and 2 sides of the pocket and 1/2 inch (13 mm) clear from the inside of the accessible pocket closure.

\*\* NOTE TO SPECIFIER \*\* Retain the vented pocket if thermal stress on the glass or if evacuation of heat gain between the shade and the window wall into the plenum is of concern.

* + - * 1. Provide "Vented Pocket" such that there will be a minimum 12 sq inch (7742 sq mm) of return air per lineal foot allowing the solar gain to flow above the ceiling line into the plenum or over the roller shades into the interior space.
			1. Provide ETL/UL 235 Approved extruded aluminum KD ElectroPocket, in 10 ft. (3048 mm) lengths assembled on job site, with an integrated wiring raceway and mounting clips for:
				1. Line Voltage disconnect connectors.
				2. Wireless receivers.
				3. Low Voltage splitters.
				4. Daisy chain non-plenum wiring raceway and integrated pocket assembly.
			2. Model: ElectroPocket 4155 with tile support.
				1. Dimensions: (W x H): 5-3/4 x 6-1/4 inch (146 x 159 mm).
				2. Maximum Roll Up Diameter: 4-1/4 inch (108 mm).
			3. Model: ElectroPocket Model 4156 without tile support.
				1. Dimensions: (W x H): 5-3/4 x 6-1/4 inch (146 x 159 mm).
				2. Maximum Roll Up Diameter: 4-1/4 inch (108 mm).
			4. Model: ElectroPocket Model 4165 with tile support.
				1. Dimensions (W x H): 6-5/8 x 6-1/4 inch (168 x 159 mm).
				2. Maximum Roll Up Diameter: 4-5/8 inch (117.5 mm)
			5. Model: ElectroPocket Model 4166 without tile support.
				1. Dimensions (W x H): 6-5/8 x 6-1/4 inch (168 x 159 mm).
				2. Maximum Roll Up Diameter: 4-5/8 inch (117.5 mm).
			6. Model: Non-ElectroPocket 4157 with tile support.
				1. Dimensions: (W x H): 5-3/4 x 6-1/4 inch (146 x 159 mm).
				2. Maximum Roll Up Diameter: 4-5/8 inch (117.5 mm).
			7. Model: Non-ElectroPocket without tile support.
				1. Dimensions (W x H): 5-3/4 x 6-1/4 inch (146 x 159 mm).
				2. Maximum Roll Up Diameter: 4-5/8 inch (117.5 mm).
			8. Model: Non-ElectroPocket with tile support.
				1. Dimensions (W x H): 6-5/8 x 6-1/4 inch (168 x 159 mm).
				2. Maximum Roll Up Diameter: 5-1/8 inch (130 mm).
			9. Model: Non-ElectroPocket 4168 without tile support.
				1. Dimensions (W x H): 6-5/8 x 6-1/4 inch (168 x 159 mm).
				2. Maximum Roll Up Diameter: 5-1/8 inch (130 mm).

\*\* NOTE TO SPECIFIER \*\* Delete below if not required.

* + 1. Roller Shade Pocket: For recessed mounting in acoustical tile, or drywall ceilings as indicated on the Drawings.
			1. Provide either extruded aluminum and or formed steel shade pocket, sized to accommodate roller shades, with exposed extruded aluminum closure mount, tile support and removable closure panel to provide access to shades.

\*\* NOTE TO SPECIFIER \*\* Delete pocket options not required. Retain the vented pocket if thermal stress on the glass or if evacuation of heat gain between the shade and the window wall into the plenum is of concern.

* + - * 1. Provide "Vented Pocket" such that there will be a minimum of four 1 inch (25.4 mm) diameter holes per foot allowing the solar gain to flow above the ceiling line.

\*\* NOTE TO SPECIFIER \*\* Delete below if not required.

* + 1. Pocket Accessories: As indicated on the Drawings.

\*\* NOTE TO SPECIFIER \*\* Delete below if not required.

* + 1. Fascia: (non-pocket conditions)
			1. Continuous removable extruded aluminum fascia that attaches to shade mounting brackets without the use of adhesives, magnetic strips, or exposed fasteners.
			2. Fascia shall be able to be installed across two or more shade bands in one piece.
			3. Fascia shall fully conceal brackets, shade roller and fabric on the tube.
			4. Provide bracket / fascia end caps where mounting conditions expose outside of roller shade brackets.
			5. Fascia shall include a channel for application of flexible material (shlegel) to closing off any light leakage between the fascia and a window frame, mullion, ceiling and/or any other horizontal surface.
			6. Fascia shall attach directly to the roller shade bracket without the need to install additional mounting hardware. Exposed fasteners shall not be allowed.
			7. Fascia shall positively lock in a top-down installation method to help prevent accidental detachment.

\*\* NOTE TO SPECIFIER \*\* Delete below if not required.

* + 1. Room Darkening Side and Sill Channels:

\*\* NOTE TO SPECIFIER \*\* Delete type below if not required.

* + - 1. Material: Extruded aluminum with polybond edge seals and SnapLoc mounting base and with concealed fastening. Exposed fasteners are not acceptable. Channels shall accept one-piece exposed blackout hembar with vinyl seal to assure side light control and sill light control.
			2. Mecho Side Channels: 1-15/16 inch (49 mm) wide by 1-3/16 inch (30 mm) deep, two-band center channels, 2-5/8 inch (67 mm) wide by 1-3/16 inch (30 mm) deep. The 2-5/8 inch (67 mm) double-center channels may be installed at center-support positions of multi-band-shade ElectroShades. Mecho side channels 2-5/8 inch (67 mm) may be used as center supports for ElectroShades; shade bands up to 8 high. For shade bands over 8 feet (2438 mm), provide ElectroShade side channels.
			3. ElectroShade Side Channels: 2-1/2 inch (64 mm) wide by 1-3/16 inch (30 mm) deep; two-band center channels 5 inch (127 mm) wide by 1-3/16 inch (30 mm) deep. The 2-5/8 inch (67 mm) double-center channels may be installed at center-support positions of multi-band-shade ElectroShades. Mecho side channels 2-5/8 inch (67 mm) may be used as center supports for ElectroShades. Also, provide for use with manually operated room darkening Mecho over 8 feet (2438 mm) in height.

\*\* NOTE TO SPECIFIER \*\* Delete one of the two following paragraphs. Side and sill channels would not be different colors.

* + - 1. Channel Color: Selected from manufacturer's standard colors.
			2. Channel Color: Custom color.

\*\* NOTE TO SPECIFIER \*\* Delete below if not required.

* + 1. Room Darkening Shadeloc Channel system: Provides for shade-bands that lock into side channels to eliminate light gaps for room darkening, superior impact resistance and lower maintenance costs.

\*\* NOTE TO SPECIFIER \*\* Delete type below if not required.

* + - 1. Material: Extruded aluminum SnapLoc channel and mounting base with concealed fastening for face or side mount. Exposed fasteners are not acceptable. Channels shall accept one-piece exposed blackout hem bar with vinyl seal to assure side light control and sill light control.
			2. ElectroShade Side Channels:
				1. Single band channel is 2 inch (51 mm) wide by 1-3/4 inch (45 mm) deep.
				2. Multi-band center channel is 2.5 inch (64 mm) wide by 1-3/4 inch (44 mm) deep. The center channels may be installed at center-support positions of multi-band ElectroShades.
			3. ElectroShade double Side Channels:
				1. Single band channel is 2 inch (51 mm) wide by 3-7/16 inch (87 mm) deep.
				2. Multi-band center channel is 2.5 inch (64 mm) wide by 3-7/16 inch (87 mm) deep. The center channels may be installed at center-support positions of multi-band ElectroShades.

\*\* NOTE TO SPECIFIER \*\* Cover is optional. Delete if not required.

* + - 1. Cover: Provide cover to hide extrusion seams.
			2. Zipper guide: White or black plastic inserted to Shadeloc channel to smoothly guide fabric thought its ensure full up and full down travel. Furnish with rubber foam cushions to adjust for field conditions.
			3. S/L shade brackets:
				1. Single brackets: 5 inch (127 mm) wide by 5 inch (127 mm) deep x 1/8 inch (3 mm) thick plated steel brackets for ceiling, face or side mounting for precise alignment of Shadeloc channel.
				2. Double brackets: 7 inch (179 mm) wide by 7-1/4 inch (184 mm) deep x 1/8 inch (3 mm) thick plated steel brackets for ceiling, face or side mounting for precise alignment of Shadeloc channel.

\*\* NOTE TO SPECIFIER \*\* Delete one of the two following paragraphs. Side and sill channels would not be different colors.

* + - 1. Channel Color: Selected from manufacturer's standard colors.
			2. Channel Color: Custom color.
			3. Fabric: Furnished with zipper welded to the full height on both sides of the fabric as selected by architect from manufacturer's approved fabric offering.
1. EXECUTION
	1. EXAMINATION
		1. Do not begin installation until substrates have been properly prepared.
		2. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
	2. PREPARATION
		1. Clean surfaces thoroughly prior to installation.
		2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
	3. INSTALLATION
		1. Install roller shades level, plumb, square, and true according to manufacturer's written instructions, and located so shade band is not closer than 2 inches (50 mm) to interior face of glass. Allow proper clearances for window operation hardware.

\*\* NOTE TO SPECIFIER \*\* Delete paragraph below if motorized roller shades are not required and turnkey wiring is not included as part of roller shade installers work. Note that warranty is extended three years if this paragraph is retained.

* + - 1. Main Contractor shall provide power panels and circuits of sufficient size to accommodate roller shade manufacturer’s requirements, as indicated on the mechanical and electrical drawings.
			2. Main Contractor shall coordinate with requirements of roller shade installer/dealer, before inaccessible areas are constructed.
			3. Main Contractor shall provide conduit with pull wire in all areas, which might not be accessible to roller shade contractor due to building design, equipment location or schedule.
			4. Roller shade installing contractor shall meet at site with electrician as soon as possible to review wiring requirements for the specified control system.
			5. Shade manufacturer shall provide typical wiring diagrams for the specified control system.
			6. Wherever possible, slave shadebands together to minimize motors.
		1. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
		2. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
		3. Engage Installer to train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.
	1. PROTECTION
		1. Protect installed products until completion of project.
		2. Touch-up, repair or replace damaged products before Substantial Completion.
		3. END OF SECTION