

**LLumar<sup>®</sup> Neutral Series**

Note: Click on "Show/Hide ¶" button to reveal "Specifier Notes" throughout section. Delete this text when editing is complete.

**PART 1 - GENERAL****1.1 CONDITIONS AND REQUIREMENTS**

- A. The General Conditions, Supplementary Conditions, and Division 01 – General Requirements apply.

**1.2 SECTION INCLUDES**

- A. Solar control films.
- B. [Insert item description.]

**1.3 RELATED SECTIONS**

- A. Section 08 80 00 - Glazing: Substrate for application of solar control film.
- B. Section [xxxxx] – [Section Title]: [Include brief description of work specified in another section that is related to the work of this section.]

**1.4 REFERENCES**

- A. ASTM International (ASTM):
  1. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
  2. ASTM E903 - Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres.

**1.5 DEFINITIONS**

- A. Neutral Solar Control Films: Film products that have a very uniform (flat) transmission throughout the visible portion of the solar spectrum, resulting in excellent transmitted color balance and no region of the color spectrum being preferentially transmitted over the others.

**1.6 PERFORMANCE REQUIREMENTS**

- A. Neutral solar control film products shall help improve solar heat and UV reduction, glare reduction, privacy, fade protection, and aesthetic characteristics when applied to glass surfaces
- B. Ultraviolet Transmission: Provide solar control films with UV absorbing materials that limit the weighted UV Transmission to one (1) percent or less when measured according to ASTM E903.
- C. Provide solar control films that do not have a masking sheet.
- D. Product Standard: Comply with NFRC 302 for window film energy performance ratings.

- E. Window Film Energy Performance Certification: NFRC certified with label attached to each product package.

## 1.7 SUBMITTALS

- A. Submit under provisions of Section [01 33 00] [\_\_\_\_\_].
- B. Product Data: Submit for each product specified indicating:
  - 1. Performance properties.
  - 2. Preparation and installation instructions and recommendations.
  - 3. Storage and handling recommendations.
- C. Samples: For each type of solar control film specified, two (2) samples, 12 inches square.
- D. Qualification Data: Submit documentation indicating qualifications of solar control film manufacturer.
- E. Operation and Maintenance Data: Submit for solar control film to include in maintenance manuals.
- F. Warranty: Submit sample special warranty specified in this section.

## 1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that has a minimum of 10 years of documented experience manufacturing solar control films similar to be used for this project.
- B. Installer Qualifications: A firm that is authorized by solar control film manufacturer to install film in accordance with guidelines set forth by the manufacturer.
- C. Source Limitations: Obtain each type of solar control film from same manufacturer.
- D. Mock-ups: Build mock-ups to verify selections made under sample submittals and to evaluate surface preparation techniques and application workmanship.
  - 1. Construct mock-ups in the location and of the size indicated or, if not indicated, as directed by Architect.
  - 2. Approved mock-ups may become part of the completed work if undisturbed at time of Substantial Completion.
- E. Pre-installation Conference: Conduct conference at project site to discuss methods and procedures relating to installation of the solar control films.

## 1.9 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle materials in manufacturer's protective packaging.
- B. Store and protect materials according to manufacturer's written recommendations to prevent damage from condensation, temperature changes, direct exposure to sun, or other causes.

## 1.10 SITE CONDITIONS

- A. Ambient Conditions: Maintain temperature, humidity, and ventilation within limits recommended by manufacturer.

## 1.11 LIMITED WARRANTY

- A. Manufacturer's Limited Warranty: Certain restrictions apply. The Manufacturer's Limited Warranty can be viewed in full by [clicking here](#).

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Product: The design for neutral solar control films is based on LLumar® Neutral Series Solar Control Films manufactured by an Eastman Chemical Company business: CPFilms Inc., 575 Maryville Centre Drive, St. Louis, Missouri 63141; Telephone: 800-255-8627; Email address: commercialalerts@eastman.com; Web Site: www.llumar.com.
- B. Representative: [Insert contact information.]
- C. Substitutions will be considered, subject to compliance with requirements of this section, under provisions of Section 01 60 00.

### 2.2 SOLAR CONTROL FILMS

- A. Solar Control Film: LLumar® Neutral N1020SRCDF Solar Control Film with the following performance characteristics when applied to the interior surface of single-pane, 1/4-inch clear glass:

% Total Solar Transmittance	20
% Total Solar Reflectance	24
% Total Solar Absorptance	56
% Visible Light Transmission	23
% Visible Light Reflection - Exterior	29
% Visible Light Reflection - Interior	27
Winter U-Value	1.01
Shading Coefficient	0.43
% Ultraviolet Ray Protection (280nm-380nm)	>99
Emissivity	0.82
Solar Heat Gain Coefficient	0.37
% Total Solar Energy Rejected	63
Light-to-Solar Heat Gain Ratio	0.62
% Summer Solar Heat Reduction	55
% Winter Heat Loss Reduction	2
% Glare Reduction	74
Thickness without Liner	43 μ
Film Color	Neutral

- B. Solar Control Film: LLumar® Neutral N1040SRCDF Solar Control Film with the following performance characteristics when applied to the interior surface of single-pane, 1/4-inch clear glass:

% Total Solar Transmittance	31
% Total Solar Reflectance	15
% Total Solar Absorptance	54
% Visible Light Transmission	36
% Visible Light Reflection - Exterior	19
% Visible Light Reflection - Interior	16
Winter U-Value	1.03
Shading Coefficient	0.55
% Ultraviolet Ray Protection (280nm-380nm)	>99

Emissivity	0.85
Solar Heat Gain Coefficient	0.48
% Total Solar Energy Rejected	52
Light-to-Solar Heat Gain Ratio	0.75
% Summer Solar Heat Reduction	41
% Winter Heat Loss Reduction	0
% Glare Reduction	59
Thickness without Liner	43 μ
Film Color	Neutral

- C. Solar Control Film: LLumar® Neutral N1050SRCDF Solar Control Film with the following performance characteristics when applied to the interior surface of single-pane, 1/4-inch clear glass:

% Total Solar Transmittance	42
% Total Solar Reflectance	11
% Total Solar Absorptance	47
% Visible Light Transmission	48
% Visible Light Reflection - Exterior	14
% Visible Light Reflection - Interior	11
Winter U-Value	1.05
Shading Coefficient	0.65
% Ultraviolet Ray Protection (280nm-380nm)	>99
Emissivity	0.89
Solar Heat Gain Coefficient	0.56
% Total Solar Energy Rejected	44
Light-to-Solar Heat Gain Ratio	0.86
% Summer Solar Heat Reduction	32
% Winter Heat Loss Reduction	-2
% Glare Reduction	45
Thickness without Liner	43 μ
Film Color	Neutral

- D. Solar Control Film: LLumar® Neutral N1065SRCDF Solar Control Film with the following performance characteristics when applied to the interior surface of single-pane, 1/4-inch clear glass:

% Total Solar Transmittance	59
% Total Solar Reflectance	8
% Total Solar Absorptance	33
% Visible Light Transmission	67
% Visible Light Reflection - Exterior	10
% Visible Light Reflection - Interior	8
Winter U-Value	1.06
Shading Coefficient	0.79
% Ultraviolet Ray Protection (280nm-380nm)	>99
Emissivity	0.90
Solar Heat Gain Coefficient	0.69
% Total Solar Energy Rejected	31
Light-to-Solar Heat Gain Ratio	0.97
% Summer Solar Heat Reduction	16
% Winter Heat Loss Reduction	-3

% Glare Reduction	24
Thickness without Liner	43 $\mu$

- E. Solar Control Film: LLumar® Neutral N1020BSRCDF Solar Control Film with the following performance characteristics when applied to the interior surface of single-pane, 1/4-inch clear glass:

% Total Solar Transmittance	12
% Total Solar Reflectance	41
% Total Solar Absorptance	47
% Visible Light Transmission	20
% Visible Light Reflection - Exterior	36
% Visible Light Reflection - Interior	34
Winter U-Value	0.89
Shading Coefficient	0.28
% Ultraviolet Ray Protection (280nm-380nm)	>99
Emissivity	0.59
Solar Heat Gain Coefficient	0.25
% Total Solar Energy Rejected	75
Light-to-Solar Heat Gain Ratio	0.80
% Summer Solar Heat Reduction	70
% Winter Heat Loss Reduction	14
% Glare Reduction	77
Thickness without Liner	43 $\mu$
Film Color	Bronze

- F. Solar Control Film: LLumar® Neutral N1035BSRCDF Solar Control Film with the following performance characteristics when applied to the interior surface of single-pane, 1/4-inch clear glass:

% Total Solar Transmittance	24
% Total Solar Reflectance	32
% Total Solar Absorptance	44
% Visible Light Transmission	36
% Visible Light Reflection - Exterior	25
% Visible Light Reflection - Interior	23
Winter U-Value	0.90
Shading Coefficient	0.41
% Ultraviolet Ray Protection (280nm-380nm)	>99
Emissivity	0.61
Solar Heat Gain Coefficient	0.36
% Total Solar Energy Rejected	64
Light-to-Solar Heat Gain Ratio	1.00
% Summer Solar Heat Reduction	56
% Winter Heat Loss Reduction	13
% Glare Reduction	59
Thickness without Liner	43 $\mu$
Film Color	Bronze

- G. Solar Control Film: Vista™ by LLumar® Neutral Soft Horizons V33SRCDF Solar Control Film with the following performance characteristics when applied to the interior surface of single-pane, 1/4-inch clear glass:

% Total Solar Transmittance	28
% Total Solar Reflectance	17
% Total Solar Absorptance	55
% Visible Light Transmission	33
% Visible Light Reflection - Exterior	21
% Visible Light Reflection - Interior	18
Winter U-Value	1.03
Shading Coefficient	0.52
% Ultraviolet Ray Protection (280nm-380nm)	>99
Emissivity	0.86
Solar Heat Gain Coefficient	0.45
% Total Solar Energy Rejected	55
Light-to-Solar Heat Gain Ratio	0.73
% Summer Solar Heat Reduction	45
% Winter Heat Loss Reduction	0
% Glare Reduction	63
Thickness without Liner	42 μ
Film Color	Neutral

- H. Solar Control Film: Vista™ LLumar® Neutral Dayview V45SRCDF Solar Control Film with the following performance characteristics when applied to the interior surface of single-pane, 1/4-inch clear glass:

% Total Solar Transmittance	39
% Total Solar Reflectance	12
% Total Solar Absorptance	49
% Visible Light Transmission	46
% Visible Light Reflection - Exterior	15
% Visible Light Reflection - Interior	12
Winter U-Value	1.05
Shading Coefficient	0.63
% Ultraviolet Ray Protection (280nm-380nm)	>99
Emissivity	0.89
Solar Heat Gain Coefficient	0.54
% Total Solar Energy Rejected	46
Light-to-Solar Heat Gain Ratio	0.85
% Summer Solar Heat Reduction	34
% Winter Heat Loss Reduction	-2
% Glare Reduction	48
Thickness without Liner	42 μ
Film Color	Neutral

- I. Solar Control Film: Vista™ by LLumar® Neutral Crystal Elegance V58SRCDF Solar Control Film with the following performance characteristics when applied to the interior surface of single-pane, 1/4-inch clear glass:

% Total Solar Transmittance	51
% Total Solar Reflectance	9
% Total Solar Absorptance	40
% Visible Light Transmission	59
% Visible Light Reflection - Exterior	11
% Visible Light Reflection - Interior	9

Winter U-Value	1.05
Shading Coefficient	0.73
% Ultraviolet Ray Protection (280nm-380nm)	>99
Emissivity	0.90
Solar Heat Gain Coefficient	0.64
% Total Solar Energy Rejected	36
Light-to-Solar Heat Gain Ratio	0.92
% Summer Solar Heat Reduction	22
% Winter Heat Loss Reduction	-2
% Glare Reduction	33
Thickness without Liner	42 $\mu$
Film Color	Neutral

### 2.3 SOLAR CONTROL FILM ACCESSORIES

- A. General: Provide accessories either manufactured by or acceptable to solar control film manufacturer for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Adhesive: Water-activated, dry-adhesive system that forms a molecular bond between the film and glass. Protect adhesive from contamination by applying a release liner that will be removed and discarded at installation.
- C. Cleaners, Primers, and Sealers: Types recommended by solar control film manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates for compliance with requirements and for conditions affecting performance of solar control film including glass that is broken, chipped, cracked, abraded, or damaged in any way.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean substrates thoroughly prior to installation. Provide additional scrubbing of perimeter area with X-100® solution.
- B. Prepare substrates using methods recommended by film manufacturer to achieve the best results for the substrate under project conditions.
- C. Protect window frames and surrounding surfaces to prevent damage during installation.

### 3.3 INSTALLATION

- A. Install in accordance with manufacturer's written instructions.
- B. Install with no gaps or overlaps.
- C. If seamed, make seams non-overlapping.
- D. Do not remove release liner from film until just before each piece of film is cut and ready for installation.
- E. Custom cut to the glass with neat, square corners and edges to within 1/8-inch of the window frame. Use manufacturer recommended solution for application.

- F. Remove air bubbles, blisters, and other defects. Be careful to remove “fingers” to eliminate any contamination or excess water pockets. It is crucial to remove as much water as possible during installation.

### 3.4 FIELD QUALITY CONTROL

- A. After installation, view film from a distance of 10 feet against a bright uniform sky or background. Film shall appear uniform in appearance with no visible streaks, wrinkles, banding, thin spots or pinholes.
- B. If installed film does not meet these criteria, remove and replace with new film.

### 3.5 CLEANING AND PROTECTION

- A. Remove excess mounting solution at finished seams, perimeter edges, and adjacent surfaces.
- B. Use cleaning methods recommended by solar control film manufacturer.
- C. Replace films that cannot be cleaned.
- D. Protect installed products until completion of project.
- E. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

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**EASTMAN**



**For inquiries inside the U.S. and Canada**

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Advanced Materials - Performance Films  
P.O. Box 5068  
Martinsville, Virginia 24115  
1-800-2LLUMAR  
www.llumar.com

**For inquiries outside the U.S. and Canada**

Contact your regional technical services representative or visit [www.llumar.com](http://www.llumar.com).

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