Guide Specifications
Section 08 87 13

SOLAR CONTROL FILMS
LLumar® Reflective 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 RELATED DOCUMENT

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)

1.5 DEFINITIONS

A. Reflective Solar Control Films: Film products that feature reflectance on building interiors and exteriors that reduces summer cooling costs while also providing a high level of glare and heat control. Film products are scratch-resistant and shield surfaces from UV rays.

1.6 PERFORMANCE REQUIREMENTS

A. Reflective solar control film products shall improve solar heat and UV reduction, glare reduction, privacy, fade protection, and aesthetic characteristics when applied to glass surfaces.

B. Provide solar control films that do not have a masking sheet.

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 reflective solar control films is based on LLumar® Reflective 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® Reflective One-Way Mirror RN07GSRCDF with the following performance characteristics when applied to the interior surface of single-pane, 1/4-inch clear glass:

% Total Solar Transmittance	6
% Total Solar Reflectance	49
% Total Solar Absorptance	45
% Visible Light Transmission	6
% Visible Light Reflection - Exterior	59
% Visible Light Reflection - Interior	13
Winter U-Value	0.87
Shading Coefficient	0.21
% Ultraviolet Ray Protection (280nm-380nm)	>99
Emissivity	0.54
Solar Heat Gain Coefficient	0.18
% Total Solar Energy Rejected	82
Light-to-Solar Heat Gain Ratio	0.33
% Summer Solar Heat Reduction	78
% Winter Heat Loss Reduction	16
% Glare Reduction	93
Thickness without Liner	60 µ
Film Color	Gray

B. Solar Control Film: LLumar® Reflective R15BSRCDF 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	7
% Total Solar Reflectance	32
% Total Solar Absorptance	61
% Visible Light Transmission	7
% Visible Light Reflection - Exterior	19
% Visible Light Reflection - Interior	63
Winter U-Value	0.91
Shading Coefficient	0.28

% Ultraviolet Ray Protection (280nm-380nm)	>99
Emissivity	0.62
Solar Heat Gain Coefficient	0.24
% Total Solar Energy Rejected	76
Light-to-Solar Heat Gain Ratio	0.29
% Summer Solar Heat Reduction	71
% Winter Heat Loss Reduction	12
% Glare Reduction	92
Thickness without Liner	60 µ
Film Color	Bronze

C. Solar Control Film: LLumar® Reflective R15BLSRPS 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	8
% Total Solar Reflectance	35
% Total Solar Absorptance	57
% Visible Light Transmission	9
% Visible Light Reflection - Exterior	26
% Visible Light Reflection - Interior	62
Winter U-Value	0.91
Shading Coefficient	0.28
% Ultraviolet Ray Protection (280nm-380nm)	>99
Emissivity	0.63
Solar Heat Gain Coefficient	0.24
% Total Solar Energy Rejected	76
Light-to-Solar Heat Gain Ratio	0.38
% Summer Solar Heat Reduction	71
% Winter Heat Loss Reduction	12
% Glare Reduction	90
Thickness without Liner	60 µ
Film Color	Blue

D. Solar Control Film: LLumar® Reflective R15GSRCDF 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	7
% Total Solar Reflectance	29
% Total Solar Absorptance	64
% Visible Light Transmission	6
% Visible Light Reflection - Exterior	13
% Visible Light Reflection - Interior	62
Winter U-Value	0.91
Shading Coefficient	0.28
% Ultraviolet Ray Protection (280nm-380nm)	>99
Emissivity	0.62
Solar Heat Gain Coefficient	0.25
% Total Solar Energy Rejected	75
Light-to-Solar Heat Gain Ratio	0.24
% Summer Solar Heat Reduction	70

% Winter Heat Loss Reduction	12
% Glare Reduction	93
Thickness without Liner	60 µ
Film Color	Gray

E. Solar Control Film: LLumar® Reflective R15GOSRPS 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	9
% Total Solar Reflectance	45
% Total Solar Absorptance	46
% Visible Light Transmission	13
% Visible Light Reflection - Exterior	50
% Visible Light Reflection - Interior	63
Winter U-Value	0.91
Shading Coefficient	0.25
% Ultraviolet Ray Protection (280nm-380nm)	>99
Emissivity	0.62
Solar Heat Gain Coefficient	0.22
% Total Solar Energy Rejected	78
Light-to-Solar Heat Gain Ratio	0.59
% Summer Solar Heat Reduction	73
% Winter Heat Loss Reduction	12
% Glare Reduction	85
Thickness without Liner	60 µ
Film Color	Gold

F. Solar Control Film: LLumar® Reflective R20SRCDF 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	10
% Total Solar Reflectance	50
% Total Solar Absorptance	40
% Visible Light Transmission	15
% Visible Light Reflection - Exterior	61
% Visible Light Reflection - Interior	63
Winter U-Value	0.89
Shading Coefficient	0.24
% Ultraviolet Ray Protection (280nm-380nm)	>99
Emissivity	0.58
Solar Heat Gain Coefficient	0.21
% Total Solar Energy Rejected	79
Light-to-Solar Heat Gain Ratio	0.71
% Summer Solar Heat Reduction	74
% Winter Heat Loss Reduction	14
% Glare Reduction	83
Thickness without Liner	60 µ
Film Color	Silver

G. Solar Control Film: LLumar® Reflective R35SRCDF Solar Control Film with the following performance Reflective R20SRCDF when applied to the interior surface of single-pane, 1/4-inch clear glass:

% Total Solar Transmittance	21
% Total Solar Reflectance	37
% Total Solar Absorptance	42
% Visible Light Transmission	29
% Visible Light Reflection - Exterior	44
% Visible Light Reflection - Interior	45
Winter U-Value	0.90
Shading Coefficient	0.37
% Ultraviolet Ray Protection (280nm-380nm)	>99
Emissivity	0.61
Solar Heat Gain Coefficient	0.32
% Total Solar Energy Rejected	68
Light-to-Solar Heat Gain Ratio	0.91
% Summer Solar Heat Reduction	61
% Winter Heat Loss Reduction	13
% Glare Reduction	67
Thickness without Liner	60 µ
Film Color	Silver

H. Solar Control Film: LLumar® Reflective R50SRCDF 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	35
% Total Solar Reflectance	25
% Total Solar Absorptance	40
% Visible Light Transmission	47
% Visible Light Reflection - Exterior	26
% Visible Light Reflection - Interior	26
Winter U-Value	0.94
Shading Coefficient	0.53
% Ultraviolet Ray Protection (280nm-380nm)	99
Emissivity	0.67
Solar Heat Gain Coefficient	0.46
% Total Solar Energy Rejected	54
Light-to-Solar Heat Gain Ratio	1.02
% Summer Solar Heat Reduction	44
% Winter Heat Loss Reduction	9
% Glare Reduction	47
Thickness without Liner	60 µ
Film Color	Silver

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: Films with CDF designation utilize a water-activated, dry-adhesive system that forms a molecular bond between the film and glass. Films with a PS designation utilize a pressure sensitive adhesive which is activated by pressure and water. It is characterized by its permanently tacky nature and its installation ease. 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 a manufacturer-recommended solution for the 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

For inquiries inside the U.S. and Canada

Eastman Chemical Company
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.