

# Product Performance and Characteristics



All simulations completed with 2" airspace between shade and glass

**Compared to window w/o shade**

			% Total Solar Transmittance	% Total Solar Reflectance	% Total Solar Absorbance	% Visible Transmittance	% Visible Reflectance (exterior)	% Visible Reflectance (interior)	Winter U-value	Shading Coefficient	Solar Heat Gain Coefficient (SHGC)	% UV Rejected	% Glare Reduction	% Total Solar Energy Rejected	Light-to-Solar Heat Gain Ratio (LSG)	% Summer Solar Heat Gain Reduction	% Winter Heat Loss Reduction
<b>CHART 1: Single-Pane, 1/8 inch (3mm), Clear</b>																	
<b>Window without shade applied:</b>			83	8	9	90	8	8	1.03	1.00	0.87	29	-	13	1.03	-	-
<b>Window with shade applied:</b>																	
Neutral	RS-10 B/B	Bronze/Bronze	20	22	58	11	17	11	0.46	0.60	0.52	99.9	88	48	0.21	40	55
	RS-10 G/G	Grey/Grey	20	21	59	7	16	9	0.46	0.60	0.52	99.9	92	48	0.13	40	55
	RSN 1050	Light Grey/Light Grey	42	16	42	47	18	17	0.48	0.74	0.65	99.9	48	35	0.73	26	54
Silver	RS-2 B	Bronze/Silver	3	65	32	2	77	17	0.46	0.19	0.17	99.9	98	83	0.12	81	55
	RS-2 G	Grey/Silver	3	63	34	3	74	18	0.46	0.20	0.17	99.9	97	83	0.17	80	55
	RS-10 G/GO	Grey/Gold	6	48	46	5	47	15	0.45	0.33	0.28	99.9	94	72	0.18	67	56
Specialty	RS-4 BG/BG	Steel Blue/Steel Blue	19	19	62	4	13	7	0.48	0.62	0.54	99.9	96	46	0.07	38	54
	RS-0 WH/WH	White/White	0.1	81	19	0.1	99	98	0.50	0.10	0.09	100	100	91	0.01	90	52
<b>CHART 2: Single-Pane, 1/4 inch (6mm), Clear</b>																	
<b>Window without shade applied:</b>			77	7	16	88	8	8	1.03	0.94	0.82	38	-	18	1.08	-	-
<b>Window with shade applied:</b>																	
Neutral	RS-10 B/B	Bronze/Bronze	18	19	63	11	16	11	0.46	0.57	0.50	99.9	88	50	0.22	43	56
	RS-10 G/G	Grey/Grey	17	18	65	7	15	9	0.46	0.57	0.50	99.9	92	50	0.14	43	55
	RSN 1050	Light Grey/Light Grey	39	14	47	46	18	17	0.47	0.70	0.61	99.9	49	39	0.75	30	54
Silver	RS-2 B	Bronze/Silver	2	56	42	2	74	17	0.46	0.19	0.17	99.9	98	83	0.12	81	55
	RS-2 G	Grey/Silver	3	55	42	2	72	18	0.45	0.20	0.17	99.9	98	83	0.11	80	56
	RS-10 G/GO	Grey/Gold	6	41	53	5	46	15	0.44	0.32	0.28	99.9	94	72	0.18	68	57
Specialty	RS-4 BG/BG	Steel Blue/Steel Blue	17	16	67	4	13	7	0.47	0.59	0.52	99.9	96	48	0.08	41	54
	RS-0 WH/WH	White/White	0.1	81	19	0.1	99	98	0.50	0.10	0.09	100	100	91	0.01	90	52
<b>CHART 3: Dual-Pane, 1/8 Inch (3mm), Clear</b>																	
<b>Window without shade applied:</b>			70	13	17	81	15	15	0.48	0.88	0.77	44	-	23	1.06	-	-
<b>Window with shade applied:</b>																	
Neutral	RS-10 B/B	Bronze/Bronze	17	23	60	10	22	11	0.30	0.60	0.52	99.9	89	48	0.19	40	71
	RS-10 G/G	Grey/Grey	16	22	62	7	21	9	0.30	0.60	0.52	99.9	92	48	0.13	40	71
	RSN 1050	Light Grey/Light Grey	36	19	45	43	23	19	0.30	0.70	0.61	99.9	52	39	0.71	30	71
Silver	RS-2 B	Bronze/Silver	2	56	42	2	72	18	0.29	0.23	0.20	99.9	98	80	0.10	77	72
	RS-2 G	Grey/Silver	2	56	42	2	73	18	0.29	0.23	0.20	99.9	98	80	0.10	77	72
	RS-10 G/GO	Grey/Gold	5	42	53	4	48	15	0.29	0.37	0.32	99.9	96	68	0.13	63	72
Specialty	RS-4 BG/BG SR	Steel Blue/Steel Blue	16	20	64	3	19	7	0.30	0.63	0.54	99.9	97	46	0.06	37	71
	RS-0 WH/WH	White/White	0.1	81	19	0.1	99	98	0.50	0.10	0.09	100	100	91	0.01	90	52
<b>CHART 4: Dual-Pane, 1/4 Inch (6mm), Clear</b>																	
<b>Window without shade applied:</b>			61	11	28	79	14	14	0.47	0.81	0.70	54	-	30	1.12	-	-
<b>Window with shade applied:</b>																	
Neutral	RS-10 B/B	Bronze/Bronze	14	18	68	10	21	11	0.29	0.56	0.48	99.9	89	52	0.21	44	72
	RS-10 G/G	Grey/Grey	13	18	69	6	20	9	0.30	0.56	0.49	99.9	93	51	0.12	44	71
	RSN 1050	Light Grey/Light Grey	31	16	53	42	22	19	0.30	0.64	0.56	99.9	53	44	0.76	36	71
Silver	RS-2 B	Bronze/Silver	2	44	54	2	68	18	0.28	0.25	0.21	99.9	98	79	0.09	75	73
	RS-2 G	Grey/Silver	1	44	55	2	68	18	0.28	0.25	0.21	99.9	98	79	0.09	75	73
	RS-10 G/GO	Grey/Gold	4	33	63	4	45	15	0.29	0.37	0.32	99.9	96	68	0.13	64	72
Specialty	RS-4 BG/BG SR	Steel Blue/Steel Blue	12	16	72	3	18	7	0.30	0.58	0.50	99.9	97	50	0.06	42	71
	RS-0 WH/WH	White/White	0.1	81	19	0.1	99	98	0.50	0.10	0.09	100	100	91	0.01	90	52

# Definitions

Total Solar Spectrum Wavelength of 300-1200 Nanometers (nm) contains:

- Solar Ultraviolet Spectrum Wavelengths of 300-380 nm (causes fading/sunburn)
- Solar Visible Spectrum Wavelengths of 380-780 nm (what is seen by eyesight)
- Solar Infrared Spectrum Wavelengths of 780-2100 nm (causes temperature rise)

Solar Energy is transmitted through, absorbed by and/or reflected outwards as it relates to windows and window treatments.

- **Total Solar Transmittance:** Percentage of total solar energy that is allowed to pass through/transmitted into the interior of the space.
- **Total Solar Reflectance:** Percentage of total solar energy that is rejected/reflected back out rather than be transmitted to the interior of the space
- **Total Solar Absorptance:** Percentage of total solar energy impacting the shade which is absorbed by the film, which will enter the space through radiation primarily, and to a much lesser extent, through convection.
- **Visible Light Transmittance:** Percentage of the visible solar energy that is allowed to pass through/transmitted into the interior of the space.
- **Visible Light Transmittance:** Percentage of the visible solar energy that is allowed to pass through/transmitted into the interior of the space.
- **Visible Light Reflectance:** Percentage of the visible solar energy that is rejected/reflected from passing through/transmitted into or out of a space.
- **Winter U-Value:** factor indicating the film's ability to reflect heat back into a space (Thermal Resistance). The Lower the U-Value, the Higher the resistance to heat transfer.
- **Shading Coefficient:** a factor that defines the solar energy transmittance of the window glass only, and does not account the other parts of a window unit. Used for older windows and doors. The lower the value, the better the control.
- **Solar Heat Gain Coefficient (SHGC):** a factor that defines the solar energy transmittance of a window or door as a whole, including the window parts and the window treatment. Related to Shading Coefficient: (approximate)  $SHGC=SC * 0.87$
- **Ultraviolet Light Rejected:** Percentage of ultraviolet solar energy rejected by a window and associated window treatments
- **Glare Reduction:** Percentage of the visible solar energy that is not allowed (rejected) to pass through a window and associated window treatments. A near opposite of Visible Light Transmission.
- **Total Solar Energy Rejected:** Percentage of the total solar energy spectrum that is reflected or absorbed by the window and associated window treatments.

# Test Methods

- Total Solar Transmittance and Total Solar Reflectance were determined from spectrophotometric data on the glazing system. The solar spectrum at Air Mass 2 is given by Moon 1 (ASTM G 173-03) and the reflectance values corrected to absolute have been used.
- The Visible Light Transmittance and Visible Light Reflectance have been calculated from spectrophotometric data using the CIE standard (colorimetric) observer and  $D_{65}$  daylight illuminant.
- The Ultraviolet Transmittance has been calculated for the passage of solar ultraviolet radiation (300-380 nm) at Air Mass 2.
- The Shading Coefficient and Total Energy Reflected were calculated from summer conditions in accordance with test methods given by ASHRAE. The conditions used were: Indoor temperature of 75°F, Outdoor temperature of 90°F, Indoor air movement by natural convection, Outdoor air velocity of 6.3 mph, and Solar intensity of 248 Btu/hr-ft<sup>2</sup>.
- All of the data was obtained from typical production materials and are subject to normal film manufacturing tolerances. All of the values given are intended for design use only. Performance data was obtained from internal tests performed between Jan. 2003-June 2004, representing film specifications only (does not include glass). Where applicable, the film was tested with the surface facing outward.
- Performance numbers are for shade materials applied to specific window types: Residential single pane and dual pane 1/8" (3mm) clear glass, Commercial single pane and dual pane 1/4" (6mm) clear glass.
- Testing performed to ASTM Standards and performance values determined using LBNL Window v5.2 software.
- All films meet the requirements of NFPA 701 Test Method (1-2004 Edition).
- The gauge of the textured shades is specified before embossing.

ASTM: American Society for Testing and Materials

CIE: International Commission on Illumination

NFPA: National Fire Protection Association

ASHRAE: American Society of Heating, Refrigerating and Air Conditioning Engineers

LBNL: Lawrence Berkeley National Laboratory (U.S. Department of Energy)



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