Errata as of September 25, 2008 for
Windows, Doors, and Skylights: Draft Criteria and Analysis
(August 6, 2008)

Altered, additional, or omitted text is in red.

Page 2

Original text: Setting the effective date for 2012 should provide manufacturers adequate time to design, test, and produce these new products.

Corrected text: Setting the effective date for 2013 should provide manufacturers adequate time to design, test, and produce these new products.

Page 4

Original text: 2) Invited and received input and recommendations from manufacturers, stakeholders, and 39 industry associations[6] (September 2007–July 2008).

Corrected text: 2) Invited and received input and recommendations from manufacturers, stakeholders, and industry associations[6] (September 2007–July 2008).

Page 24 (Table 9)

Original:

	ES1	ES2	ES3	ES4	ES5	ES5a
Spacer*	75% non-metal foam spacers 25% use stainless steel spacers	86% use metal-polymer spacers 14% use stainless steel spacers	30% use non-metal/foam spacers 25% use stainless steel spacers	30% use non-metal/foam spacers 21% use stainless steel spacers	30% use non-metal/foam spacers 20% use metal-polymer spacers	53% use non-metal/foam spacers 24% use stainless steel spacers

*Spacer construction was absent or ambiguous for about half of the products sampled.
D&R International, Ltd. 2008. Findings for ES1 and ES2 are based on analysis of the NFRC database. Findings for ES3, ES4, ES5, and ES5a are based on analysis of a sample of vertical sliders for sale with U-factors < 0.35. Data are consistent with manufacturer input.

Corrected:

	ES1	ES2	ES3	ES4	ES5	ES5a
Spacer*	46% foam spacers 29% tin-plated spacers 11% thermally improved spacers 8% stainless steel spacers	43% foam spacers 30% tin-plated spacers 12% thermally improved spacers 8% stainless steel spacers	30% non-metal/foam spacers 25% stainless steel spacers 16% metal-polymer 4% tin-plated	30% non-metal/foam spacers 21% stainless steel spacers 17% metal-polymer 5% tin-plated	30% non-metal/foam spacers 20% metal-polymer spacers 17% stainless steel 4% tin-plated	53% non-metal/foam spacers 24% stainless steel spacers

*Spacer construction was absent or ambiguous for 25% of products for sale data (ES3-ES5a). Spacers with frequencies less than 4% not reported.
D&R International, Ltd. 2008. Findings for ES1 and ES2 are based on analysis of the NFRC database. Findings for ES3, ES4, ES5, and ES5a are based on analysis of a sample of vertical sliders for sale with U-factors < 0.35. Data are consistent with manufacturer input.

Errata as of September 25, 2008, continued

Page 25 (Table 10)

Original:

Table 1: Potential Design Changes and Associated Performance Benefits

	Type of Change	U-Factor	SHGC
Spacer	Tin plated to stainless steel or foam, metal hybrid to polycarbonate or foam, etc.	-0.01 to -0.03	N/A
Gas Fill	Air to argon	-0.04	N/A
Glass	Higher to lower emissivity glass	-0.01	-0.05 to -0.10
	Lower to higher SHGC glass	0 to+0.02	+0.05 to +0.20
	Higher to lower SHGC glass	0 to -0.01*	-0.05 to -0.20
Frame Insulation	Inject large cavities with foam	+0.01 to +0.03	N/A
*If upgraded to triple silver-coated low-e or equivalent.			

Corrected:

Table 2: Potential Design Changes and Associated Performance Benefits

	Type of Change	U-Factor	SHGC
Spacer	Tin plated to stainless steel or foam, metal hybrid to polycarbonate or foam, etc.	-0.01 to -0.03	N/A
Gas Fill	Air to argon	-0.04	N/A
Glass	Higher to lower emissivity glass	-0.01	-0.05 to -0.10
	Lower to higher SHGC glass	0 to +0.02	+0.05 to +0.20
	Higher to lower SHGC glass	0 to -0.01*	-0.05 to -0.20
Frame Insulation	Inject large cavities with foam	-0.01 to -0.03	N/A
*If upgraded to triple silver-coated low-e or equivalent.			

Page 26

Original text: Although DOE expects marginal costs to be negligible in all regions except ES5a, even at a marginal cost of 4 percent, consumers will earn healthy returns on their investment in nearly all zones (Table 11).

Corrected text: Although DOE expects marginal costs to be negligible in all regions except ES5a, even at a marginal cost of 3 percent, consumers will earn healthy returns on their investment in nearly all zones (Table 11).

Page 27 (Table 11)
Original:

Table 3 : Cost Effectiveness of Phase 1 ENERGY STAR Window Criteria for Twenty Representative Cities When Marginal Cost is Not Zero

Climate Zone	City	Annual Energy Cost Savings (dollars)	Marginal Cost Rate (percent)	Total Marginal Cost (dollars)	Savings to Cost Ratio (percent)	Simple Payback Period (years)
ES5a	Portland, OR	11.47	10	600	30	52.3
	Seattle, WA	10.94	10	600	29	54.8
ES5	Burlington, VT	85.95	4	180	752	2.1
	Madison, WI	68.11	4	180	596	2.6
	Minneapolis, MN	73.22	4	180	641	2.5
ES4	Boston, MA	85.49	4	180	748	2.1
	Chicago, IL	50.33	4	180	440	3.6
	Denver, CO	46.84	4	180	410	3.8
ES3	Albuquerque, NM	10.13	4	180	89	17.8
	Kansas City, MO	10.92	4	180	96	16.5
	San Francisco, CA	9.84	4	180	86	18.3
	Washington, DC	13.80	4	180	121	13.0
ES2	Atlanta, GA	33.85	4	180	296	5.3
	Ft Worth, TX	38.99	4	180	341	4.6
	Las Vegas, NV	43.69	4	180	382	4.1
	San Diego, CA	10.73	4	180	94	16.8
ES1	Tampa, FL	77.00	4	180	674	2.3
	Lake Charles, LA	75.74	4	180	663	2.4
	Phoenix, AZ	101.10	4	180	885	1.8

Source: D&R International, Ltd., 2008. Annual energy cost savings are the difference between the average of multiple simulations of Phase 2 ENERGY STAR and 2009 IECC reference skylights calculated using DOE2.E and RESFEN6 assumptions. DOE selected simulations that reflect the range of typical energy consumption of local housing stock for each city. Lifetime savings were calculated for 24 windows over 20 years at a 3-percent discount rate. Total marginal cost was calculated using the marginal cost rate for 24 windows with a base price of $250 per window. Total marginal cost is 3 percent of the window with a base price of $250 for all zones except ES5a, where it is 10 percent. Product price excludes installation. The savings-to-cost ratio is based on 20 years of annual energy cost savings, with a discount rate of 3 percent, over total marginal cost. The simple payback period is based on marginal cost divided by annual energy cost savings, with no discounting.

Corrected:

Table 4 : Cost Effectiveness of Phase 1 ENERGY STAR Window Criteria for Twenty Representative Cities When Marginal Cost is Not Zero

Climate Zone	City	Annual Energy Cost Savings (dollars)	Marginal Cost Rate (percent)	Total Marginal Cost (dollars)	Savings to Cost Ratio (percent)	Simple Payback Period (years)
ES5a	Portland, OR	11.47	10	600	30	52.3
	Seattle, WA	10.94	10	600	29	54.8
ES5	Burlington, VT	85.95	3	180	752	2.1
	Madison, WI	68.11	3	180	596	2.6
	Minneapolis, MN	73.22	3	180	641	2.5
ES4	Boston, MA	85.49	3	180	748	2.1
	Chicago, IL	50.33	3	180	440	3.6
	Denver, CO	46.84	3	180	410	3.8
ES3	Albuquerque, NM	10.13	3	180	89	17.8
	Kansas City, MO	10.92	3	180	96	16.5
	San Francisco, CA	9.84	3	180	86	18.3
	Washington, DC	13.80	3	180	121	13.0
ES2	Atlanta, GA	33.85	3	180	296	5.3
	Ft Worth, TX	38.99	3	180	341	4.6
	Las Vegas, NV	43.69	3	180	382	4.1
	San Diego, CA	10.73	3	180	94	16.8
ES1	Tampa, FL	77.00	3	180	674	2.3
	Lake Charles, LA	75.74	3	180	663	2.4
	Phoenix, AZ	101.10	3	180	885	1.8

Source: D&R International, Ltd., 2008. Annual energy cost savings are the difference between the average of multiple simulations of Phase 1 ENERGY STAR and 2006 IECC reference windows calculated using DOE2.E and RESFEN6 assumptions. DOE selected simulations that reflect the range of typical energy consumption of local housing stock for each city. Lifetime savings were calculated for 24 windows over 20 years at a 3-percent discount rate. Total marginal cost was calculated using the marginal cost rate for 24 windows with a base price of $250 per window. Total marginal cost is 3 percent of the window with a base price of $250 for all zones except ES5a, where it is 10 percent. Product price excludes installation. The savings-to-cost ratio is based on 20 years of annual energy cost savings, with a discount rate of 3 percent, over total marginal cost. The simple payback period is based on marginal cost divided by annual energy cost savings, with no discounting.

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Original text: [Footnote 14] Ducker Research, 2008. Exhibit D.5 Conventional Residential Window Usage. *Study of the U.S. Market for Windows, Doors, and Skylights*, published by the American Architectural Manufacturers Association.

Corrected text: [Footnote 14] Ducker Research, 2008. Exhibit D.5 Conventional Residential Window Usage. *Study of the U.S. Market for Windows, Doors, and Skylights*, published by the American Architectural Manufacturers Association and the Window and Door Manufacturers Association.

Errata as of September 25, 2008, continued

Page 30

Original text: DOE expects current ENERGY STAR market share to decrease to 35 percent to 40 percent in Phase 1, with Phase 2 market share dropping further to 25 percent only in ES4 and ES5, where price premiums are highest.

Corrected text: DOE has assumed in its energy savings model that current ENERGY STAR market share will decrease to 45 percent in Phase 1, with Phase 2 market share dropping further to 25 percent only in ES4 and ES5, where price premiums are highest.

Page 34

Original text: However, there are glass products available with similar emittance but notably higher solar transmittance, e.g. emittance/solar transmittance 0.27/0.40, 0.35/0.43 that manufacturers might use to raise SHGC with little impact on U-factor (Figure 10).

Corrected text: However, there are glass products available with similar emittance but notably higher solar transmittance, e.g. whole window U-factor/SHGC of 0.27/0.40, 0.35/0.43 that manufacturers might use to raise SHGC with little impact on U-factor (Figure 11).

Errata as of September 25, 2008, continued

Page 41 (Table 23)

Original:

Table 5: Cost Effectiveness of Phase 2 ENERGY STAR Window Criteria in Twenty Representative Cities for Homeowners That Do Not Sell Their Homes

Climate Zone	City	Annual Home Savings (dollars)	Marginal Cost Rate (percent)	Total Marginal Cost (dollars)	Savings to Cost Ratio (percent)	Simple Payback Period (years)
ES5	Portland, OR	60.39	15	900	106	14.9
	Seattle, WA	57.57	15	900	101	15.6
	Burlington, VT	124.90	15	900	219	7.2
	Madison, WI	101.32	15	900	177	8.9
	Minneapolis, MN	105.92	15	900	185	8.5
ES4	Boston, MA	123.15	15	900	216	7.3
	Chicago, IL	74.72	15	900	131	12.0
	Denver, CO	70.38	15	900	123	12.8
ES3	Albuquerque, NM	25.32	5	300	133	11.8
	Kansas City, MO	27.30	5	300	143	11.0
	San Francisco, CA	24.59	5	300	129	12.2
	Washington, DC	34.49	5	300	181	8.7
ES2	Atlanta, GA	70.80	5	300	372	4.2
	Ft Worth, TX	64.63	5	300	339	4.6
	Las Vegas, NV	76.39	5	300	401	3.9
	San Diego, CA	16.10	5	300	85	18.6
ES1	Tampa, FL	93.35	5	300	490	3.2
	Lake Charles, LA	93.03	5	300	488	3.2
	Phoenix, AZ	122.70	5	300	644	2.4

Source: D&R International, Ltd., 2008. Annual energy cost savings are the difference between the average of multiple simulations of Phase 2 ENERGY STAR and 2009 IECC reference skylights calculated using DOE2.E and RESFEN6 assumptions. DOE selected simulations to reflect the range of typical energy consumption of local housing stock for each city. Lifetime savings were calculated for 24 windows over 20 years at a 3-percent discount rate. Total marginal cost was calculated using the marginal cost rate for 24 windows with a base price of $250 per window. Total marginal cost is 5 percent of the window with a base price of $250 for all zones except ES4 and ES5, where it is 15 percent. Product price excludes installation. The savings-to-cost ratio is based on 20 years of annual energy cost savings, with a discount rate of 3 percent, over total marginal cost. The simple payback period is based on marginal cost divided by annual energy cost savings, with no discounting.

Corrected:

Table 6: Cost Effectiveness of Phase 2 ENERGY STAR Window Criteria in Twenty Representative Cities for Homeowners That Do Not Sell Their Homes

Climate Zone	City	Annual Home Savings (dollars)	Marginal Cost Rate (percent)	Total Marginal Cost (dollars)	Savings to Cost Ratio (percent)	Simple Payback Period (years)
ES5	Portland, OR	60.39	15	900	106	14.9
	Seattle, WA	57.57	15	900	101	15.6
	Burlington, VT	124.90	15	900	219	7.2
	Madison, WI	101.32	15	900	177	8.9
	Minneapolis, MN	105.92	15	900	185	8.5
ES4	Boston, MA	123.15	15	900	216	7.3
	Chicago, IL	74.72	15	900	131	12.0
	Denver, CO	70.38	15	900	123	12.8
ES3	Albuquerque, NM	25.32	5	300	133	11.8
	Kansas City, MO	27.30	5	300	143	11.0
	San Francisco, CA	24.59	5	300	129	12.2
	Washington, DC	34.49	5	300	181	8.7
ES2	Atlanta, GA	70.80	5	300	372	4.2
	Ft Worth, TX	64.63	5	300	339	4.6
	Las Vegas, NV	76.39	5	300	401	3.9
	San Diego, CA	16.10	5	300	85	18.6
ES1	Tampa, FL	93.35	5	300	490	3.2
	Lake Charles, LA	93.03	5	300	488	3.2
	Phoenix, AZ	122.70	5	300	644	2.4

Source: D&R International, Ltd., 2008. Annual energy cost savings are the difference between the average of multiple simulations of Phase 2 ENERGY STAR and 2009 IECC reference windows calculated using DOE2.E and RESFEN6 assumptions. DOE selected simulations to reflect the range of typical energy consumption of local housing stock for each city. Lifetime savings were calculated for 24 windows over 20 years at a 3-percent discount rate. Total marginal cost was calculated using the marginal cost rate for 24 windows with a base price of $250 per window. Total marginal cost is 5 percent of the window with a base price of $250 for all zones except ES4 and ES5, where it is 15 percent. Product price excludes installation. The savings-to-cost ratio is based on 20 years of annual energy cost savings, with a discount rate of 3 percent, over total marginal cost. The simple payback period is based on marginal cost divided by annual energy cost savings, with no discounting.

Page 45

Original text: Unless glass technology changes dramatically, most windows will use glass products with emissivities < 0.40. These emissivity levels will yield whole-window SHGCs < 0.40, the level set under the current ENERGY STAR criteria to ensure solar control in the southern United States.

Corrected text: Unless glass technology changes dramatically, most windows will use glass products with solar transmittance ≤ 0.50. These solar transmittance levels will yield whole-window SHGCs ≤ 0.40, the level set under the current ENERGY STAR criteria to ensure solar control in the southern United States.

Errata as of September 25, 2008, continued

Page 48

Original text: Nearly 70,000 doors listed in the NFRC database already qualify under the Phase 1 and Phase 2 criteria, and manufacturers report many of those that do not can be upgraded at little cost (Table 29).

Corrected text: Nearly 70,000 doors listed in the NFRC database already qualify under Phase 1 and nearly 35,000 doors qualify for Phase 2. Manufacturers report many additional doors can be upgraded at little cost to qualify for Phase 1 (Table 29).

Page 60 (Table 38)

Original:

	Phase 1	**Phase 2**
Spacer	33% use stainless steel 31% use aluminum 2% use non-metal/foam	67% use stainless steel 21% use aluminum
Source: D&R International, Ltd., 2008. Based on data from manufacturer interviews and the NFRC Certified Product Directory.		

Corrected:

	Phase 1	**Phase 2**
Spacer	49% stainless steel 34% aluminum 11% tin-plated	75% stainless steel 21% aluminum
Spacers with frequencies less than 4% not reported. Source: D&R International, Ltd., 2008. Based on data from manufacturer interviews and the NFRC Certified Product Directory.		