Table 1. DOE-2 Macro Input Variables Used in the *Home Energy Saver*

Unconditional Variable Name	Conditional Variable Name	Variable Description	Range or List of Values	Units	Origin of Value
session_id		Individual user session identification number	(N/A)	(N/A)	Assigned in the *Home Energy Saver*
altitude		Elevation of the corresponding weather location	(Refer to Table 2)	ft	Assigned in the *Home Energy Saver*
floor_cons		Floor (over foundation) construction type	(Refer to Table 4)	(N/A)	User-defined
wall_cons_f		Exterior wall construction type on the front side of the house	(Refer to Table 4)	(N/A)	User-defined
wall_cons_l		Exterior wall construction type on the left side of the house	(Refer to Table 4)	(N/A)	User-defined
wall_cons_b		Exterior wall construction type on the back side of the house	(Refer to Table 4)	(N/A)	User-defined
wall_cons_r		Exterior wall construction type on the right side of the house	(Refer to Table 4)	(N/A)	User-defined
ceil_cons		Ceiling construction type	(Refer to Table 4)	(N/A)	User-defined
roof_cons		Roof construction type	(Refer to Table 4)	(N/A)	User-defined
wall_rough_f		Exterior wall roughness on the front side of the house	(Refer to Table 5)	(N/A)	Derived from wall_cons_f
wall_rough_l		Exterior wall roughness on the left side of the house	(Refer to Table 5)	(N/A)	Derived from wall_cons_l
wall_rough_b		Exterior wall roughness on the back side of the house	(Refer to Table 5)	(N/A)	Derived from wall_cons_b
wall_rough_r		Exterior wall roughness on the right side of the house	(Refer to Table 5)	(N/A)	Derived from wall_cons_r
roof_rough		Exterior roof roughness	(Refer to Table 5)	(N/A)	Derived from roof_cons
wall_abs_f		Exterior wall absorptance on the front side of the house	(Refer to Table 6)	-	User-defined
wall_abs_l		Exterior wall absorptance on the left side of the house	(Refer to Table 6)	-	User-defined
wall_abs_b		Exterior wall absorptance on the back side of the house	(Refer to Table 6)	-	User-defined
wall_abs_r		Exterior wall absorptance on the right side of the house	(Refer to Table 6)	-	User-defined

Table 1. DOE-2 Macro Input Variables Used in the *Home Energy Saver* (continued)

Unconditional Variable Name	Conditional Variable Name	Variable Description	Range or List of Values	Units	Origin of Value
roof_abs		Exterior roof absorptance	(Refer to Table 6)	-	User-defined
door_f		Number of doors on the front side of the house	0:4	(N/A)	User-defined
door_l		Number of doors on the left side of the house	0:4	(N/A)	User-defined
door_b		Number of doors on the back side of the house	0:4	(N/A)	User-defined
door_r		Number of doors on the right side of the house	0:4	(N/A)	User-defined
door_type_f		Door type on the front side of the house	(Refer to Table 7), user	(N/A)	User-defined
door_type_l		Door type on the left side of the house	(Refer to Table 7), user	(N/A)	User-defined
door_type_b		Door type on the back side of the house	(Refer to Table 7), user	(N/A)	User-defined
door_type_r		Door type on the right side of the house	(Refer to Table 7), user	(N/A)	User-defined
	door_u_f	Door U-factor on the front side of the house	0.00:5.00	$Btu/h \cdot ft^2 \cdot °F$	User-defined if door_type_f = user
	door_u_l	Door U-factor on the left side of the house	0.00:5.00	$Btu/h \cdot ft^2 \cdot °F$	User-defined if door_type_l = user
	door_u_b	Door U-factor on the back side of the house	0.00:5.00	$Btu/h \cdot ft^2 \cdot °F$	User-defined if door_type_b = user
	door_u_r	Door U-factor on the right side of the house	0.00:5.00	$Btu/h \cdot ft^2 \cdot °F$	User-defined if door_type_r = user
window_area_f		Window area on the front side of the house	0.00:300.00	ft^2	User-defined
window_area_l		Window area on the left side of the house	0.00:300.00	ft^2	User-defined
window_area_b		Window area on the back side of the house	0.00:300.00	ft^2	User-defined
window_area_r		Window area on the right side of the house	0.00:300.00	ft^2	User-defined

Table 1. DOE-2 Macro Input Variables Used in the *Home Energy Saver* (continued*)*

Unconditional Variable Name	Conditional Variable Name	Variable Description	Range or List of Values	Units	Origin of Value
skylt_area		Skylight area	0.00:300.00	ft^2	User-defined
window_type_f		Window type on the front side of the house	(Refer to Table 8), user	(N/A)	User-defined
window_type_l		Window type on the left side of the house	(Refer to Table 8), user	(N/A)	User-defined
window_type_b		Window type on the back side of the house	(Refer to Table 8), user	(N/A)	User-defined
window_type_r		Window type on the right side of the house	(Refer to Table 8), user	(N/A)	User-defined
skylt_type		Skylight type	(Refer to Table 8), user	(N/A)	User-defined
	window_u_f	Window U-factor on the front side of the house	0.00:5.00	$Btu/h \cdot ft^2 \cdot °F$	User-defined if window_type_f = user
	window_u_l	Window U-factor on the left side of the house	0.00:5.00	$Btu/h \cdot ft^2 \cdot °F$	User-defined if window_type_l = user
	window_u_b	Window U-factor on the back side of the house	0.00:5.00	$Btu/h \cdot ft^2 \cdot °F$	User-defined if window_type_b = user
	window_u_r	Window U-factor on the right side of the house	0.00:5.00	$Btu/h \cdot ft^2 \cdot °F$	User-defined if window_type_r = user
	skylt_u	Skylight U-factor	0.00:5.00	$Btu/h \cdot ft^2 \cdot °F$	User-defined if skylt_type = user
	window_shgc_f	Window solar heat gain coefficient on the front side of the house	0.00:1.00	-	User-defined if window_type_f = user
	window_shgc_l	Window solar heat gain coefficient on the left side of the house	0.00:1.00	-	User-defined if window_type_l = user
	window_shgc_b	Window solar heat gain coefficient on the back side of the house	0.00:1.00	-	User-defined if window_type_b = user
	window_shgc_r	Window solar heat gain coefficient on the right side of the house	0.00:1.00	-	User-defined if window_type_r = user
	skylt_shgc	Skylight solar heat gain coefficient	0.00:1.00	-	User-defined if skylt_type = user
window_ins_f		Movable window insulation level on the front side of the house	0.0:12.0	$h \cdot ft^2 \cdot °F/Btu$	User-defined
window_ins_l		Movable window insulation level on the left side of the house	0.0:12.0	$h \cdot ft^2 \cdot °F/Btu$	User-defined

Table 1. DOE-2 Macro Input Variables Used in the *Home Energy Saver* (continued*)*

Unconditional Variable Name	Conditional Variable Name	Variable Description	Range or List of Values	Units	Origin of Value
window_ins_b		Movable window insulation level on the back side of the house	0.0:12.0	$h \cdot ft^2 \cdot °F/Btu$	User-defined
window_ins_r		Movable window insulation level on the right side of the house	0.0:12.0	$h \cdot ft^2 \cdot °F/Btu$	User-defined
skylt_ins		Movable skylight insulation level	0.0:12.0	$h \cdot ft^2 \cdot °F/Btu$	User-defined
window_shd_f		Movable window shade type on the front side of the house	(Refer to Table 9)	(N/A)	User-defined
window_shd_l		Movable window shade type on the left side of the house	(Refer to Table 9)	(N/A)	User-defined
window_shd_b		Movable window shade type on the back side of the house	(Refer to Table 9)	(N/A)	User-defined
window_shd_r		Movable window shade type on the right side of the house	(Refer to Table 9)	(N/A)	User-defined
skylt_shd		Movable skylight shade type	(Refer to Table 9)	(N/A)	User-defined
orientation		Compass direction the front of the house faces		°	User-defined
		North	0		
		Northeast	45		
		East	90		
		Southeast	135		
		South	180		
		Southwest	225		
		West	270		
		Northwest	315		
house_geom		House geometry or shape	(Refer also to Figures 1 and 2)	(N/A)	User-defined
		Rectangular	rectangle		
		L-shaped	L_shape		
		Forward-S-shaped	for_S		
		Backward-S-shaped	back_S		
		T-shaped	T_shape		
		U-shaped	U_shape		
		Split-level or tri-level	split		
		Townhouse	town		

Table 1. DOE-2 Macro Input Variables Used in the *Home Energy Saver* (continued*)*

Unconditional Variable Name	Conditional Variable Name	Variable Description	Range or List of Values	Units	Origin of Value
	front	Front side of the house	side1, side2, side3, side4	(N/A)	User-defined if house_geom ≠ rectangle, town
d1		House dimension	1.00:200.00	ft	User-defined
d2		House dimension	1.00:200.00	ft	User-defined
	d1a	House dimension	1.00:200.00	ft	User-defined if house_geom ≠ rectangle, town
	d2a	House dimension	1.00:200.00	ft	User-defined if house_geom ≠ rectangle, split, town
	d1c	House dimension	1.00:200.00	ft	User-defined if house_geom ≠ rectangle, L_shape, split, town
	d2c	House dimension	1.00:200.00	ft	User-defined if house_geom ≠ rectangle, L_shape, split, town
	town_pos	Townhouse position in the building	left, middle, right	(N/A)	User-defined if house_geom = town
stories		Number of stories in the house	1:4	(N/A)	User-defined
ceil_height		Average floor-to-ceiling height in the house	6.00:20.00	ft	User-defined
found_type		Foundation type	(Refer to Table 10)	(N/A)	User-defined
found_ins		Foundation insulation level	(Refer to Table 10)	(N/A)	User-defined
attic_type		Attic/roof type		(N/A)	User-defined
		Unconditioned attic	uncond_attic		
		Conditioned attic	cond_attic		
		Cathedral ceiling	cath_ceil		
roof_pitch		Units of roof rise per 12 units of roof run		-	User-defined
		0:12 (flat)	0		
		1:12	1		
		2:12	2		
		3:12	3		
		4:12	4		
		5:12	5		
		6:12 (steep)	6		
		7:12	7		

Table 1. DOE-2 Macro Input Variables Used in the *Home Energy Saver* (continued*)*

Unconditional Variable Name	Conditional Variable Name	Variable Description	Range or List of Values	Units	Origin of Value
		8:12 (very steep)	8		
		9:12	9		
		10:12	10		
roof_ovhg_f		Overhang extension on the front side of the house	0.50:50.00	ft	User-defined
roof_ovhg_l		Overhang extension on the left side of the house	0.50:50.00	ft	User-defined
roof_ovhg_b		Overhang extension on the back side of the house	0.50:50.00	ft	User-defined
roof_ovhg_r		Overhang extension on the right side of the house	0.50:50.00	ft	User-defined
tree_f		Shade tree height in front of the house	0, 6:200	ft	User-defined
tree_l		Shade tree height to the left of the house	0, 6:200	ft	User-defined
tree_b		Shade tree height in back of the house	0, 6:200	ft	User-defined
tree_r		Shade tree height to the right of the house	0, 6:200	ft	User-defined
neighbor_f		Number of stories in the neighboring house in front	0:4	(N/A)	User-defined
neighbor_l		Number of stories in the neighboring house to the left	0:4	(N/A)	User-defined
neighbor_b		Number of stories in the neighboring house in back	0:4	(N/A)	User-defined
neighbor_r		Number of stories in the neighboring house to the right	0:4	(N/A)	User-defined
occupants		Number of occupants in the house	1:20	(N/A)	User-defined
lights_kWh		Internal gains from lighting	0.0:5,000.0	kWh	Sent from Lighting module
equip_kWh		Internal gains from equipment (appliances)	0.0:25,000.0	kWh	Sent from Appliances and Miscellaneous Equipment modules
airtight		Application of airsealing to the house	no, yes, user	(N/A)	User-defined

Table 1. DOE-2 Macro Input Variables Used in the *Home Energy Saver* (continued*)*

Unconditional Variable Name	Conditional Variable Name	Variable Description	Range or List of Values	Units	Origin of Value
	frac_leak_area	Fractional leakage area of the house	0.000000:1.000000	-	Derived from airtight if airtight = no, yes
	Q50ip	Measured or estimated air leakage rate through the house	0.00:25,000.00	ft^3/min	User-defined if airtight = user
heat_type		Heating system type	(Refer to Table 11)	(N/A)	User-defined
	comb_bl	Boiler/water heater combination type	separate, tankless, indirect	(N/A)	User-defined if heat_type = gbl, obl
	dhw_draw	Daily domestic hot water draw	0:1,000	gal	Sent from Appliances module if heat_type = gbl, obl and comb_bl = tankless, indirect
	dhw_loss	Instantaneous domestic hot water tank loss	0.00:1.00	-	Sent from Appliances module if heat_type = gbl, obl and comb_bl = tankless, indirect
cool_type		Cooling system type	(Refer to Table 11)	(N/A)	User-defined
heat_cap		Heating system capacity	0, 1,000:400,000	Btu/h	User-defined
cool_cap		Cooling system capacity	0, 1,000:400,000	Btu/h	User-defined
heat_eff		Heating system efficiency	0:100 (AFUE), 1.00:20.00 (HSPF)	(N/A)	User-defined
cool_eff		Cooling system efficiency	1.00:20.00	(N/A)	User-defined
duct_loc		Location of the majority of the ducts in the house		(N/A)	User-defined
		Conditioned space	cond		
		Unconditioned basement, unvented crawlspace	uncond_base		
		Vented crawlspace	vent_crawl		
		Unconditioned attic	uncond_attic		
		Unknown	unknown		
duct_ins		Presence of duct insulation		(N/A)	User-defined
		R-0 (no insulation)	no		
		R-6	yes		
duct_seal		Application of duct sealing	no, yes	(N/A)	User-defined
duct_eff		Duct efficiency	0.000:1.000	-	Derived from duct_loc, duct_ins, and duct_seal

Table 1. DOE-2 Macro Input Variables Used in the *Home Energy Saver* (continued)

Unconditional Variable Name	Conditional Variable Name	Variable Description	Range or List of Values	Units	Origin of Value
pipe_ins		Presence of pipe insulation	no, yes	(N/A)	User-defined if heat_type = gbl, obl
tstat_type		Thermostat type		(N/A)	User-defined
		Standard	standard		
		Programmable	program		
	h_h_wd_d	Weekday daytime heating setpoint start time	0:24	hour	User-defined if tstat_type = standard
	h_h_wd_n	Weekday nighttime heating setpoint start time	0:24	hour	User-defined if tstat_type = standard
	h_h_weh_d	Weekend/holiday daytime heating setpoint start time	0:24	hour	User-defined if tstat_type = standard
	h_h_weh_n	Weekend/holiday nighttime heating setpoint start time	0:24	hour	User-defined if tstat_type = standard
	c_h_wd_d	Weekday daytime cooling setpoint start time	0:24	hour	User-defined if tstat_type = standard
	c_h_wd_n	Weekday nighttime cooling setpoint start time	0:24	hour	User-defined if tstat_type = standard
	c_h_weh_d	Weekend/holiday daytime cooling setpoint start time	0:24	hour	User-defined if tstat_type = standard
	c_h_weh_n	Weekend/holiday nighttime cooling setpoint start time	0:24	hour	User-defined if tstat_type = standard
	h_t_wd_d	Weekday daytime heating setpoint	40:100	°F	User-defined if tstat_type = standard
	h_t_wd_n	Weekday nighttime heating setpoint	40:100	°F	User-defined if tstat_type = standard
	h_t_weh_d	Weekend/holiday daytime heating setpoint	40:100	°F	User-defined if tstat_type = standard
	h_t_weh_n	Weekend/holiday nighttime heating setpoint	40:100	°F	User-defined if tstat_type = standard
	c_t_wd_d	Weekday daytime cooling setpoint	40:100	°F	User-defined if tstat_type = standard
	c_t_wd_n	Weekday nighttime cooling setpoint	40:100	°F	User-defined if tstat_type = standard

Table 1. DOE-2 Macro Input Variables Used in the *Home Energy Saver* (continued*)*

Unconditional Variable Name	Conditional Variable Name	Variable Description	Range or List of Values	Units	Origin of Value
	c_t_weh_d	Weekend/holiday daytime cooling setpoint	40:100	°F	User-defined if tstat_type = standard
	c_t_weh_n	Weekend/holiday nighttime cooling setpoint	40:100	°F	User-defined if tstat_type = standard
	h_h_wd_w	Weekday waking time heating setpoint start time	0:24	hour	User-defined if tstat_type = program
	h_h_wd_l	Weekday leaving time heating setpoint start time	0:24	hour	User-defined if tstat_type = program
	h_h_wd_e	Weekday evening heating setpoint start time	0:24	hour	User-defined if tstat_type = program
	h_h_wd_s	Weekday bedtime heating setpoint start time	0:24	hour	User-defined if tstat_type = program
	h_h_weh_w	Weekend/holiday waking time heating setpoint start time	0:24	hour	User-defined if tstat_type = program
	h_h_weh_l	Weekend/holiday leaving time heating setpoint start time	0:24	hour	User-defined if tstat_type = program
	h_h_weh_e	Weekend/holiday evening heating setpoint start time	0:24	hour	User-defined if tstat_type = program
	h_h_weh_s	Weekend/holiday bedtime heating setpoint start time	0:24	hour	User-defined if tstat_type = program
	c_h_wd_w	Weekday waking time cooling setpoint start time	0:24	hour	User-defined if tstat_type = program
	c_h_wd_l	Weekday leaving time cooling setpoint start time	0:24	hour	User-defined if tstat_type = program
	c_h_wd_e	Weekday evening cooling setpoint start time	0:24	hour	User-defined if tstat_type = program
	c_h_wd_s	Weekday bedtime cooling setpoint start time	0:24	hour	User-defined if tstat_type = program
	c_h_weh_w	Weekend/holiday waking time cooling setpoint start time	0:24	hour	User-defined if tstat_type = program
	c_h_weh_l	Weekend/holiday leaving time cooling setpoint start time	0:24	hour	User-defined if tstat_type = program

Table 1. DOE-2 Macro Input Variables Used in the *Home Energy Saver* (continued*)*

Unconditional Variable Name	Conditional Variable Name	Variable Description	Range or List of Values	Units	Origin of Value
	c_h_weh_e	Weekend/holiday evening cooling setpoint start time	0:24	hour	User-defined if tstat_type = program
	c_h_weh_s	Weekend/holiday bedtime cooling setpoint start time	0:24	hour	User-defined if tstat_type = program
	h_t_wd_w	Weekday waking time heating setpoint	40:100	°F	User-defined if tstat_type = program
	h_t_wd_l	Weekday leaving time heating setpoint	40:100	°F	User-defined if tstat_type = program
	h_t_wd_e	Weekday evening heating setpoint	40:100	°F	User-defined if tstat_type = program
	h_t_wd_s	Weekday bedtime heating setpoint	40:100	°F	User-defined if tstat_type = program
	h_t_weh_w	Weekend/holiday waking time heating setpoint	40:100	°F	User-defined if tstat_type = program
	h_t_weh_l	Weekend/holiday leaving time heating setpoint	40:100	°F	User-defined if tstat_type = program
	h_t_weh_e	Weekend/holiday evening heating setpoint	40:100	°F	User-defined if tstat_type = program
	h_t_weh_s	Weekend/holiday bedtime heating setpoint	40:100	°F	User-defined if tstat_type = program
	c_t_wd_w	Weekday waking time cooling setpoint	40:100	°F	User-defined if tstat_type = program
	c_t_wd_l	Weekday leaving time cooling setpoint	40:100	°F	User-defined if tstat_type = program
	c_t_wd_e	Weekday evening cooling setpoint	40:100	°F	User-defined if tstat_type = program
	c_t_wd_s	Weekday bedtime cooling setpoint	40:100	°F	User-defined if tstat_type = program
	c_t_weh_w	Weekend/holiday waking time cooling setpoint	40:100	°F	User-defined if tstat_type = program
	c_t_weh_l	Weekend/holiday leaving time cooling setpoint	40:100	°F	User-defined if tstat_type = program

Table 1. DOE-2 Macro Input Variables Used in the *Home Energy Saver* (continued*)*

Unconditional Variable Name	Conditional Variable Name	Variable Description	Range or List of Values	Units	Origin of Value
	c_t_weh_e	Weekend/holiday evening cooling setpoint	40:100	°F	User-defined if tstat_type = program
	c_t_weh_s	Weekend/holiday bedtime cooling setpoint	40:100	°F	User-defined if tstat_type = program

Table 2. Weather Data Files Used in the *Home Energy Saver*

Location	File Type	Latitude (°)	Longitude (°)	Time Zone (h)	Elevation (ft)	Heating Degree-Days (°F-days)	Cooling Degree-Days (°F-days)
Alabama							
Birmingham	TMY2	33.57	-86.75	-6	630	2,985	1,991
Huntsville	TMY2	34.65	-86.77	-6	623	3,652	1,866
Mobile	TMY2	30.68	-88.25	-6	220	1,877	2,704
Montgomery	TMY2	32.30	-86.40	-6	203	2,328	2,400
Alaska							
Adak NAS	TMY	51.88	-176.65	-10	16	8,892	0
Anchorage	TMY2	61.17	-150.02	-9	115	10,331	44
Annette	TMY2	55.03	-131.57	-9	112	7,177	33
Barrow	TMY2	71.30	-156.78	-9	13	20,445	0
Bethel	TMY2	60.78	-161.80	-9	151	13,202	29
Bettles	TMY2	66.92	-151.52	-9	673	15,860	99
Big Delta	TMY2	64.00	-145.73	-9	1,273	13,600	90
Cold Bay	TMY2	55.20	-162.72	-9	95	9,515	0
Fairbanks	TMY2	64.82	-147.87	-9	453	14,274	165
Gulkana	TMY2	62.15	-145.45	-9	1,578	13,944	59
Homer	TMY	59.65	-151.48	-9	82	10,340	2
Juneau	TMY	58.35	-134.58	-9	10	9,236	15
King Salmon	TMY2	58.68	-156.65	-9	49	11,401	26
Kodiak	TMY2	57.75	-152.33	-9	112	8,859	7
Kotzebue	TMY2	66.87	-162.63	-9	16	15,787	15
McGrath	TMY2	62.97	-155.62	-9	338	14,243	60
Nome	TMY2	64.50	-165.43	-9	23	13,898	7
St. Paul Island	TMY2	57.15	-170.22	-10	23	11,022	0
Summit	TMY	63.33	-149.13	-9	2,408	14,546	11
Talkeetna	TMY2	62.30	-150.10	-9	344	11,511	60
Yakutat	TMY2	59.52	-139.67	-9	30	9,607	4

Table 2. Weather Data Files Used in the *Home Energy Saver* (continued)

Location	File Type	Latitude (°)	Longitude (°)	Time Zone (h)	Elevation (ft)	Heating Degree-Days (°F-days)	Cooling Degree-Days (°F-days)
Arizona							
Flagstaff	TMY2	35.13	-111.67	-7	7,005	7,621	458
Phoeniz	TMY2	33.43	-112.02	-7	1,112	1,483	4,515
Prescott	TMY2	34.65	-112.43	-7	5,023	4,812	1,410
Tucson	TMY2	32.12	-110.93	-7	2,556	1,956	3,331
Winslow	TMY	35.03	-110.71	-7	4,888	5,100	1,622
Yuma MCAS	TMY	32.66	-114.60	-7	203	1,122	4,660
Arkansas							
Fort Smith	TMY2	35.33	-94.37	-6	463	3,604	2,176
Little Rock	TMY2	34.73	-92.23	-6	266	3,373	2,185
California							
Arcata	TMY2	40.98	-124.10	-8	226	5,120	26
Bakersfield	TMY2	35.42	-119.05	-8	492	2,339	2,675
Barstow-Daggett	TMY2	34.87	-116.78	-8	1,929	2,134	3,305
China Lake NAF	TMY	35.68	-117.68	-8	2,218	2,695	3,388
El Centro	CTZ	32.77	-115.57	-8	-30	1,397	4,847
El Toro MCAS	TMY	33.66	-117.73	-8	381	2,090	1,065
Fresno	TMY2	36.77	-119.72	-8	328	2,933	2,304
Long Beach	TMY2	33.82	-118.15	-8	56	1,610	1,058
Los Angeles	TMY2	33.93	-118.40	-8	105	1,547	654
Mount Shasta	TMY	41.33	-122.33	-8	3,533	5,747	805
Oakland	TMY	37.71	-122.21	-8	3	3,080	202
Oxnard-Point Mugu NAWS	TMY	34.11	-119.11	-8	10	2,306	400
Pasadena	CTZ	34.15	-118.15	-8	864	2,139	1,302
Red Bluff	TMY	40.15	-122.25	-8	348	3,208	2,229
Riverside-March AFB	CTZ	33.88	-117.27	-8	1,539	2,776	1,842
Sacramento	TMY2	38.52	-121.50	-8	26	3,294	1,388
San Diego	TMY2	32.73	-117.17	-8	30	1,212	931

Table 2. Weather Data Files Used in the *Home Energy Saver* (continued)

Location	File Type	Latitude (°)	Longitude (°)	Time Zone (h)	Elevation (ft)	Heating Degree-Days (°F-days)	Cooling Degree-Days (°F-days)
San Francisco	TMY2	37.62	-122.38	-8	16	3,518	229
Santa Maria	TMY2	34.90	-120.45	-8	236	3,736	330
Santa Rosa	CTZ	38.45	-122.72	-8	167	3,865	1,340
Sunnyvale-Moffett NAS	TMY	37.42	-122.05	-8	39	2,917	445
Colorado							
Alamosa	TMY2	37.45	-105.87	-7	7,536	9,223	422
Boulder	TMY2	40.02	-105.25	-7	5,361	6,429	995
Colorado Springs	TMY2	38.82	-104.72	-7	6,171	6,820	774
Denver-Stapleton AP	TMY	39.76	-104.86	-7	5,285	6,501	948
Eagle	TMY2	39.65	-106.92	-7	6,512	8,912	572
Grand Junction	TMY2	39.12	-108.53	-7	4,839	6,002	1,445
Pueblo	TMY2	38.28	-104.52	-7	4,721	5,683	1,435
Connecticut							
Bridgeport	TMY2	41.17	-73.13	-5	7	5,658	935
Hartford	TMY2	41.93	-72.68	-5	180	6,349	1,006
Cuba							
Guantanamo Bay NAS	TMY	19.90	-75.15	-6	56	0	5,692
Delaware							
Wilmington	TMY2	39.67	-75.60	-5	79	5,126	1,318
Florida							
Apalachicola	TMY	29.73	-85.03	-5	20	1,479	2,926
Daytona Beach	TMY2	29.18	-81.05	-5	39	997	3,067
Jacksonville	TMY2	30.50	-81.70	-5	30	1,635	2,862
Key West	TMY2	24.55	-81.75	-5	3	70	5,010
Miami	TMY2	25.80	-80.27	-5	7	203	4,431
Orlando	TMY	28.55	-81.33	-5	105	753	3,397
Tallahassee	TMY2	30.38	-84.37	-5	69	1,982	2,656
Tampa	TMY2	27.97	-82.53	-5	10	867	3,491

Table 2. Weather Data Files Used in the *Home Energy Saver* (continued)

Location	File Type	Latitude (°)	Longitude (°)	Time Zone (h)	Elevation (ft)	Heating Degree-Days (°F-days)	Cooling Degree-Days (°F-days)
West Palm Beach	TMY2	26.68	-80.10	-5	20	301	4,063
Georgia							
Athens	TMY2	33.95	-83.32	-5	801	2,988	1,839
Atlanta	TMY2	33.65	-84.43	-5	1,033	3,210	1,784
Augusta	TMY2	33.37	-81.97	-5	148	3,159	2,022
Columbus	TMY2	32.52	-84.95	-5	446	2,565	2,367
Macon	TMY2	32.70	-83.65	-5	361	2,592	2,290
Savannah	TMY2	32.13	-81.20	-5	52	2,127	2,510
Guam							
Anderson AFB	TMY2	13.55	144.83	10	361	2	5,329
Hawaii							
Ewa-Barbers Point NAS	TMY	21.32	-158.07	-10	49	24	4,028
Hilo	TMY2	19.72	-155.07	-10	36	16	3,225
Honolulu	TMY2	21.33	-157.92	-10	16	15	4,416
Kahului	TMY2	20.90	-156.43	-10	49	42	4,068
Lihue	TMY2	21.98	-159.35	-10	148	22	3,991
Idaho							
Boise	TMY2	43.57	-116.22	-7	2,867	6,244	1,061
Lewiston	TMY	46.36	-117.01	-8	1,434	5,639	964
Pocatello	TMY2	42.92	-112.60	-7	4,478	7,509	810
Illinois							
Chicago-Midway AP	TMY	41.78	-87.75	-6	614	6,241	1,203
Chicago-O'Hare AP	TMY2	41.78	-87.75	-6	623	6,552	1,030
Moline	TMY2	41.45	-90.52	-6	594	6,404	1,190
Peoria	TMY2	40.67	-89.68	-6	653	6,437	1,177
Rockford	TMY2	42.20	-89.10	-6	725	7,023	895
Springfield	TMY2	39.83	-89.67	-6	614	5,977	1,406

Table 2. Weather Data Files Used in the *Home Energy Saver* (continued)

Location	File Type	Latitude (°)	Longitude (°)	Time Zone (h)	Elevation (ft)	Heating Degree-Days (°F-days)	Cooling Degree-Days (°F-days)
Indiana							
Evansville	TMY2	38.05	-87.53	-6	387	4,860	1,560
Fort Wayne	TMY2	41.00	-85.20	-5	827	6,523	918
Indianapolis	TMY2	39.73	-86.28	-5	807	5,846	1,177
South Bend	TMY2	41.70	-86.32	-5	774	6,363	1,052
Iowa							
Burlington	TMY	40.78	-91.13	-6	699	6,206	1,201
Des Moines	TMY2	41.53	-93.65	-6	965	6,626	1,164
Mason City	TMY2	43.15	-93.33	-6	1,224	8,309	763
Sioux City	TMY2	42.40	-96.38	-6	1,102	6,943	1,160
Waterloo	TMY2	42.55	-92.40	-6	869	7,399	821
Kansas							
Dodge City	TMY2	37.77	-99.97	-6	2,582	5,727	1,665
Goodland	TMY2	39.37	-101.70	-7	3,688	6,624	1,177
Topeka	TMY2	39.07	-95.63	-6	886	5,480	1,571
Wichita	TMY2	37.65	-97.42	-6	1,339	5,113	1,852
Kentucky							
Covington-Cincinnati AP	TMY2	39.07	-84.67	-5	889	5,322	1,265
Lexington	TMY2	38.03	-84.60	-5	988	5,064	1,217
Louisville	TMY2	38.18	-85.73	-5	489	4,552	1,577
Louisiana							
Baton Rouge	TMY2	30.53	-91.15	-6	75	1,820	2,730
Lake Charles	TMY2	30.12	-93.22	-6	10	1,855	2,796
New Orleans	TMY2	29.98	-90.25	-6	10	1,551	2,832
Shreveport	TMY2	32.47	-93.82	-6	259	2,411	2,535
Maine							
Bangor	TMY	44.80	-68.80	-5	184	8,140	449
Caribou	TMY2	46.87	-68.02	-5	623	9,568	280

Table 2. Weather Data Files Used in the *Home Energy Saver* (continued)

Location	File Type	Latitude (°)	Longitude (°)	Time Zone (h)	Elevation (ft)	Heating Degree-Days (°F-days)	Cooling Degree-Days (°F-days)
Portland	TMY2	43.65	-70.32	-5	62	7,438	521
Marshall Islands							
Kwajalein Atoll	TMY	8.73	167.73	12	7	0	6,391
Maryland							
Baltimore	TMY2	39.18	-76.67	-5	154	4,983	1,377
Patuxent River NAS	TMY	38.30	-76.41	-5	46	4,083	1,483
Massachusetts							
Boston-City WSO	TMY	42.35	-71.07	-5	20	5,894	832
Boston-Logan AP	TMY2	42.37	-71.03	-5	16	5,909	785
Worchester	TMY2	42.27	-71.87	-5	988	7,047	592
Michigan							
Alpena	TMY2	45.07	-83.57	-5	689	8,468	425
Detroit-Metro AP	TMY2	42.42	-83.02	-5	627	6,785	796
Flint	TMY2	42.97	-83.73	-5	764	7,064	720
Grand Rapids	TMY2	42.88	-85.52	-5	804	7,254	779
Houghton	TMY2	47.17	-88.50	-5	1,079	8,525	469
Lansing	TMY2	42.78	-84.60	-5	840	7,176	847
Muskegon	TMY2	43.17	-86.25	-5	627	7,071	719
Sault Ste. Marie	TMY2	46.47	-84.37	-5	725	9,231	288
Traverse City	TMY2	44.73	-85.58	-5	630	7,797	698
Minnesota							
Duluth	TMY2	46.83	-92.18	-6	1,417	10,232	315
International Falls	TMY2	48.57	-93.38	-6	1,184	10,507	339
Minneapolis-St. Paul	TMY2	44.88	-93.22	-6	837	8,037	876
Rochester	TMY2	43.92	-92.50	-6	1,319	8,331	702
St. Cloud	TMY2	45.55	-94.07	-6	1,027	9,003	665
Mississippi							
Jackson	TMY2	32.32	-90.08	-6	331	2,708	2,433

Table 2. Weather Data Files Used in the *Home Energy Saver* (continued)

Location	File Type	Latitude (°)	Longitude (°)	Time Zone (h)	Elevation (ft)	Heating Degree-Days (°F-days)	Cooling Degree-Days (°F-days)
Meridian	TMY2	32.33	-88.75	-6	308	2,898	2,292
Missouri							
Columbia	TMY2	38.82	-92.22	-6	886	5,320	1,463
Kansas City	TMY2	39.30	-94.72	-6	1,033	5,280	1,714
Springfield	TMY2	37.23	-93.38	-6	1,270	4,834	1,555
St. Louis	TMY2	38.75	-90.38	-6	564	5,179	1,712
Montana							
Billings	TMY2	45.80	-108.53	-7	3,570	7,311	882
Cut Bank	TMY2	48.60	-112.37	-7	3,839	8,783	315
Dillon	TMY	45.25	-112.55	-7	5,240	8,558	486
Glasgow	TMY2	48.22	-106.62	-7	2,297	8,901	748
Great Falls	TMY2	47.48	-111.37	-7	3,661	7,900	689
Helena	TMY2	46.60	-112.00	-7	3,898	8,085	609
Kalispell	TMY2	48.30	-114.27	-7	2,966	8,545	434
Lewistown	TMY2	47.05	-109.45	-7	4,147	8,598	566
Miles City	TMY2	46.43	-105.87	-7	2,635	8,010	907
Missoula	TMY2	46.92	-114.08	-7	3,189	8,200	642
Nebraska							
Grand Island	TMY2	40.97	-98.32	-6	1,857	6,761	1,221
Norfolk	TMY2	41.98	-97.43	-6	1,545	7,073	1,254
North Platte	TMY2	41.13	-100.68	-6	2,785	7,207	1,144
Omaha	TMY2	41.37	-96.52	-6	1,325	6,219	1,316
Scottsbluff	TMY2	41.87	-103.60	-7	3,957	6,908	1,087
Nevada							
Elko	TMY2	40.83	-115.78	-8	5,075	7,671	885
Ely	TMY2	39.28	-114.85	-8	6,253	8,384	625
Las Vegas	TMY2	36.08	-115.17	-8	2,178	2,466	3,489
Lovelock	TMY	40.06	-118.55	-8	3,898	6,189	1,346

Table 2. Weather Data Files Used in the *Home Energy Saver* (continued)

Location	File Type	Latitude (°)	Longitude (°)	Time Zone (h)	Elevation (ft)	Heating Degree-Days (°F-days)	Cooling Degree-Days (°F-days)
Reno	TMY2	39.50	-119.78	-8	4,400	6,264	1,030
Tonopah	TMY2	38.07	-117.13	-8	5,423	5,808	1,239
Winnemucca	TMY2	40.90	-117.80	-8	4,341	6,657	1,188
Yucca Flats Test Site	TMY	36.95	-116.05	-8	3,924	5,153	1,883
New Hampshire							
Concord	TMY2	43.20	-71.50	-5	344	7,682	717
New Jersey							
Atlantic City	TMY2	39.45	-74.57	-5	66	5,234	1,157
Lakehurst NAS	TMY	40.03	-74.70	-5	112	5,447	1,153
Newark	TMY2	40.70	-74.17	-5	30	5,157	1,239
New Mexico							
Albuquerque	TMY2	35.05	-106.62	-7	5,312	4,699	1,512
Clayton	TMY	36.45	-103.15	-7	4,957	5,144	1,142
Roswell	TMY	33.30	-104.53	-7	3,648	3,910	2,169
Truth or Consequences	TMY	33.23	-107.25	-7	4,849	3,822	1,850
Tucumcari	TMY2	35.18	-103.60	-7	4,039	4,301	1,723
New York							
Albany	TMY2	42.75	-73.80	-5	292	7,121	812
Binghamton	TMY2	42.22	-75.98	-5	1,637	7,546	453
Buffalo	TMY2	42.93	-78.73	-5	705	6,758	730
Massena	TMY2	44.93	-74.85	-5	207	8,468	631
New York-Central Park	TMY2	40.78	-73.97	-5	187	5,108	1,162
New York-La Guardia AP	TMY	40.78	-73.88	-5	10	4,946	1,144
Rochester	TMY2	43.12	-77.67	-5	554	6,783	841
Syracuse	TMY2	43.12	-76.12	-5	407	7,080	735
North Carolina							
Asheville	TMY2	35.43	-82.53	-5	2,169	4,746	937
Cape Hatteras	TMY2	35.27	-75.55	-5	7	2,570	1,727

Table 2. Weather Data Files Used in the *Home Energy Saver* (continued)

Location	File Type	Latitude (°)	Longitude (°)	Time Zone (h)	Elevation (ft)	Heating Degree-Days (°F-days)	Cooling Degree-Days (°F-days)
Charlotte	TMY2	35.22	-80.93	-5	768	3,496	1,732
Cherry Point MCAS	TMY	34.90	-76.88	-5	36	2,651	1,951
Greensboro	TMY2	36.08	-79.95	-5	886	4,202	1,446
Raleigh-Durham	TMY2	35.87	-78.78	-5	440	3,701	1,573
Wilmington	TMY2	34.27	-77.90	-5	30	2,794	2,130
North Dakota							
Bismarck	TMY2	46.77	-100.75	-6	1,647	8,923	728
Fargo	TMY2	46.90	-96.80	-6	899	9,201	814
Minot	TMY2	48.27	-101.28	-6	1,713	9,343	592
Ohio							
Akron	TMY2	40.92	-81.43	-5	1,237	6,310	834
Cleveland	TMY2	41.40	-81.85	-5	804	6,149	900
Columbus	TMY2	40.00	-82.88	-5	833	5,645	1,060
Dayton	TMY2	39.90	-84.22	-5	1,004	6,048	962
Mansfield	TMY2	40.82	-82.52	-5	1,296	6,281	966
Toledo	TMY2	41.60	-83.80	-5	692	6,838	911
Youngstown	TMY2	41.27	-80.67	-5	1,184	6,776	737
Oklahoma							
Oklahoma City	TMY2	35.40	-97.60	-6	1,302	3,995	2,062
Tulsa	TMY2	36.20	-95.90	-6	676	4,015	2,180
Oregon							
Astoria	TMY2	46.15	-123.88	-8	23	5,221	82
Burns	TMY2	43.58	-119.05	-8	4,170	7,396	627
Eugene	TMY2	44.12	-123.22	-8	358	5,014	574
Medford	TMY2	42.37	-122.87	-8	1,299	5,348	1,069
North Bend	TMY2	43.42	-124.25	-8	16	4,646	42
Pendleton	TMY2	45.68	-118.85	-8	1,496	5,538	1,030
Portland	TMY2	45.60	-122.60	-8	39	4,721	533

Table 2. Weather Data Files Used in the *Home Energy Saver* (continued)

Location	File Type	Latitude (°)	Longitude (°)	Time Zone (h)	Elevation (ft)	Heating Degree-Days (°F-days)	Cooling Degree-Days (°F-days)
Redmond	TMY2	44.27	-121.15	-8	3,084	6,952	656
Salem	TMY2	44.92	-123.02	-8	200	5,229	552
Palau							
Koror Island	TMY	7.33	134.48	9	92	0	6,096
Pennsylvania							
Allentown	TMY2	40.65	-75.43	-5	384	5,945	962
Bradford	TMY2	41.80	-78.63	-5	1,969	8,252	376
Erie	TMY2	42.08	-80.18	-5	738	6,785	686
Harrisburg	TMY2	40.22	-76.85	-5	348	5,568	1,225
Philadelphia	TMY2	39.88	-75.25	-5	30	5,251	1,243
Pittsburgh	TMY2	40.50	-80.22	-5	1,224	6,022	935
Wilkes Barre-Scranton	TMY2	41.33	-75.73	-5	948	6,737	766
Williamsport	TMY2	41.27	-77.05	-5	797	6,206	898
Puerto Rico							
San Juan	TMY2	18.43	-66.00	-4	62	0	5,474
Rhode Island							
Providence	TMY2	41.73	-71.43	-5	62	6,039	843
South Carolina							
Charleston	TMY2	32.90	-80.03	-5	39	2,369	2,200
Columbia	TMY2	33.95	-81.12	-5	226	3,003	2,198
Greenville-Spartanburg	TMY2	34.90	-82.22	-5	971	3,516	1,665
South Dakota							
Huron	TMY2	44.38	-98.22	-6	1,289	8,483	889
Pierre	TMY2	44.38	-100.28	-6	1,726	7,561	1,133
Rapid City	TMY2	44.05	-103.07	-7	3,169	7,579	785
Sioux Falls	TMY2	43.57	-96.73	-6	1,427	7,988	1,078
Tennessee							
Bristol	TMY2	36.48	-82.40	-5	1,506	4,521	1,091

Table 2. Weather Data Files Used in the *Home Energy Saver* (continued)

Location	File Type	Latitude (°)	Longitude (°)	Time Zone (h)	Elevation (ft)	Heating Degree-Days (°F-days)	Cooling Degree-Days (°F-days)
Chattanooga	TMY2	35.03	-85.20	-5	689	3,762	1,830
Knoxville	TMY2	35.82	-83.98	-5	981	3,817	1,549
Memphis	TMY2	35.05	-89.98	-6	285	3,175	2,312
Nashville	TMY2	36.12	-86.68	-6	591	4,130	1,978
Texas							
Abilene	TMY2	32.43	-99.68	-6	1,752	2,853	2,620
Amarillo	TMY2	35.23	-101.70	-6	3,602	5,005	1,622
Austin	TMY2	30.30	-97.70	-6	620	1,852	3,228
Beaumont-Port Arthur	TMY2	29.95	-94.02	-6	23	1,639	2,886
Brownsville	TMY2	25.90	-97.43	-6	20	779	3,811
Corpus Christi	TMY2	27.77	-97.50	-6	43	1,025	3,551
Del Rio-Laughlin AFB	TMY	29.36	-100.78	-6	1,073	1,610	3,366
El Paso	TMY2	31.80	-106.40	-7	3,917	2,781	2,655
Fort Worth	TMY2	32.83	-97.05	-6	538	2,473	2,752
Houston-Intercontinental AP	TMY2	29.98	-95.37	-6	108	1,731	3,102
Kingsville NAS	TMY	27.50	-97.82	-6	49	1,028	3,852
Laredo AFB	TMY	27.53	-99.46	-6	499	1,041	4,347
Lubbock	TMY2	33.65	-101.82	-6	3,241	3,830	1,885
Lufkin	TMY2	31.23	-94.75	-6	315	2,139	2,774
Midland-Odessa	TMY2	31.93	-102.20	-6	2,858	3,087	2,425
San Angelo	TMY	31.37	-100.50	-6	1,909	2,464	2,983
San Antonio	TMY2	29.53	-98.47	-6	794	1,828	3,192
Sherman-Perrin AFB	TMY	33.72	-96.67	-6	764	2,867	2,623
Victoria	TMY2	28.85	-96.92	-6	105	1,300	3,199
Waco	TMY2	31.62	-97.22	-6	509	2,325	2,882
Wichita Falls	TMY2	33.97	-98.48	-6	1,030	3,331	2,724
United States Minor Outlying Islands							
Wake Island	TMY	19.28	166.65	12	13	0	5,562

Table 2. Weather Data Files Used in the *Home Energy Saver* (continued)

Location	File Type	Latitude (°)	Longitude (°)	Time Zone (h)	Elevation (ft)	Heating Degree-Days (°F-days)	Cooling Degree-Days (°F-days)
Utah							
Bryce Canyon	TMY	37.70	-112.15	-7	7,585	9,421	326
Cedar City	TMY2	37.70	-113.10	-7	5,617	6,360	1,102
Salt Lake City	TMY2	40.77	-111.97	-7	4,226	5,872	1,355
Vermont							
Burlington	TMY2	44.47	-73.15	-5	341	7,872	647
Virginia							
Lynchburg	TMY2	37.33	-79.20	-5	915	4,554	1,291
Norfolk	TMY2	36.90	-76.20	-5	30	3,569	1,665
Richmond	TMY2	37.50	-77.33	-5	164	4,176	1,545
Roanoke	TMY2	37.32	-79.97	-5	1,175	4,358	1,303
Sterling-Washington, D.C.-Dulles AP	TMY2	38.95	-77.45	-5	269	5,300	1,291
Washington							
Olympia	TMY2	46.97	-122.90	-8	200	5,678	431
Quillayute	TMY2	47.95	-124.55	-8	180	5,896	92
Seattle-Tacoma	TMY2	47.45	-122.30	-8	400	5,075	306
Spokane	TMY2	47.63	-117.53	-8	2,365	7,016	684
Whidbey Island NAS	TMY	48.35	-122.66	-8	33	5,315	73
Yakima	TMY2	46.57	-120.53	-8	1,066	6,266	838
West Virginia							
Charleston	TMY2	38.37	-81.60	-5	951	4,779	1,186
Elkins	TMY2	38.88	-79.85	-5	1,949	6,472	621
Huntington	TMY2	38.37	-82.55	-5	837	4,675	1,280
Wisconsin							
Eau Claire	TMY2	44.87	-91.48	-6	896	8,598	757
Green Bay	TMY2	44.48	-88.13	-6	702	8,343	665
La Crosse	TMY2	43.87	-91.25	-6	673	7,768	869
Madison	TMY2	43.13	-89.33	-6	860	7,535	816

Table 2. Weather Data Files Used in the *Home Energy Saver* (continued)

Location	File Type	Latitude (°)	Longitude (°)	Time Zone (h)	Elevation (ft)	Heating Degree-Days (°F-days)	Cooling Degree-Days (°F-days)
Milwaukee	TMY2	42.95	-87.90	-6	692	7,572	671
Wyoming							
Casper	TMY2	42.92	-106.47	-7	5,289	7,991	713
Cheyenne	TMY2	41.15	-104.82	-7	6,142	7,616	587
Lander	TMY2	42.82	-108.73	-7	5,564	8,056	684
Rock Springs	TMY2	41.60	-109.07	-7	6,745	8,666	548
Sheridan	TMY2	44.77	-106.97	-7	3,967	7,938	766

Table 3. Construction Materials Modeled in the *Home Energy Saver*

Construction Material Type	Thickness (in)	Density (lb/ft^3)	Specific Heat (Btu/lb·°F)	Conductance ($Btu/h \cdot ft^2 \cdot °F$)	Data Source	DOE-2 Code Name
Damp soil	6.000	115.0000	0.2800	1.0000	Winkelmann (1998)	dampsoil
Poured concrete	(Variable)	140.0000	0.2150	0.9250	ASHRAE (2001a)	conc140
Lightweight concrete block	8.000	79.0000	0.2100	0.2867	ASHRAE (2001a)	concbllw
Common structural brick	8.000	150.0000	0.1900	0.7750	ASHRAE (2001a)	brik
Pine or fir beam	(Variable)	27.9500	0.3900	0.0683	ASHRAE (2001a)	woodbeam
Wood underlayment	0.750	40.0000	0.2900	0.0635	ASHRAE (2001a)	woodund
Wood subfloor[a]	0.750	40.0000	0.3300	0.0663	ASHRAE (2001a)	woodsub
Fiberboard sheathing	0.500	18.0000	0.3100	0.0317	ASHRAE (2001a)	fibrshth
Plywood sheathing	(Variable)	34.0000	0.2900	0.0667	ASHRAE (2001a)	plywshth
Lapped wood siding[b]	0.500	18.0000	0.2800	0.0513	ASHRAE (2001a)	woodsid
Stucco finish	1.000	100.0000	0.2100	0.5583	ASHRAE (2001a)	stucsid
Vinyl siding[c]	0.125	30.0000	0.2900	0.0171	ASHRAE (2001a)	vinlsid
Aluminum siding	0.125	171.0000	0.2140	0.0171	ASHRAE (2001a)	alumsid
Face brick veneer	4.000	110.0000	0.1900	0.4500	ASHRAE (2001a)	briksid
Asphalt composition roof shingle	0.250	70.0000	0.3000	0.0473	ASHRAE (2001a)	comproof
Wood roof shake[b]	0.250	18.0000	0.2800	0.0175	ASHRAE (2001a)	woodroof
Clay roof tile[d]	0.500	110.0000	0.2100	0.3125	ASHRAE (2001a)	clayroof
Lightweight concrete roof tile	0.250	79.0000	0.2100	0.2867	ASHRAE (2001a)	concroof
Tar roofing	0.375	70.0000	0.3500	0.0938	ASHRAE (2001a)	tarroof
Gravel roofing	0.500	55.0000	0.4000	0.8333	Winkelmann et al. (1993a)	gravroof
Gypsum wallboard	0.500	50.0000	0.2600	0.0925	ASHRAE (2001a)	gypboard
Carpet and fibrous pad[e]	0.500	18.0000	0.3400	0.0200	ASHRAE (2001a)	carppad
Felt building membrane[b, f, g]	0.125	10.0000	0.3400	0.1740	ASHRAE (2001a)	feltmem
Straw bale	23.000	11.1652	0.2991	0.0347	U.S. DOE (1995)	strwbale
R-3 mineral fiber batt insulation[h]	1.000	1.2000	0.1700	0.0278	ASHRAE (2001a)	mbatin03
R-7 mineral fiber batt insulation[h]	2.000	1.2000	0.1700	0.0238	ASHRAE (2001a)	mbatin07
R-11 mineral fiber batt insulation[h]	3.500	1.2000	0.1700	0.0265	ASHRAE (2001a)	mbatin11
R-13 mineral fiber batt insulation[h]	3.500	1.2000	0.1700	0.0224	ASHRAE (2001a)	mbatin13
R-15 mineral fiber batt insulation[h]	3.500	1.4000	0.1700	0.0194	ASHRAE (2001a)	mbatin15
R-19 mineral fiber batt insulation[h]	5.500	1.2000	0.1700	0.0241	ASHRAE (2001a)	mbatin19
R-21 mineral fiber batt insulation[h]	5.500	0.8000	0.1700	0.0218	ASHRAE (2001a)	mbatin21
R-25 mineral fiber batt insulation[h]	7.000	1.2000	0.1700	0.0233	ASHRAE (2001a)	mbatin25

Table 3. Construction Materials Modeled in the *Home Energy Saver* (continued)

Construction Material Type	Thickness (in)	Density (lb/ft^3)	Specific Heat (Btu/lb·°F)	Conductance ($Btu/h \cdot ft^2 \cdot °F$)	Data Source	DOE-2 Code Name
R-27 mineral fiber batt insulation[h]	7.500	1.2000	0.1700	0.0231	ASHRAE (2001a)	mbatin27
R-30 mineral fiber batt insulation[h]	8.500	1.2000	0.1700	0.0236	ASHRAE (2001a)	mbatin30
R-33 mineral fiber batt insulation[h]	9.500	1.2000	0.1700	0.0240	ASHRAE (2001a)	mbatin33
R-38 mineral fiber batt insulation[h]	11.500	1.2000	0.1700	0.0252	ASHRAE (2001a)	mbatin38
R-2.8 fiberglass fill wall insulation	0.750	2.7500	0.1700	0.0223	ASHRAE (2001a)	fwalin03
R-5.6 fiberglass fill wall insulation	1.750	2.7500	0.1700	0.0260	ASHRAE (2001a)	fwalin06
R-3 fiberglass fill ceiling insulation	1.000	1.3000	0.1700	0.0278	ASHRAE (2001a)	ffilin03
R-6 fiberglass fill ceiling insulation	2.000	1.3000	0.1700	0.0278	ASHRAE (2001a)	ffilin06
R-9 fiberglass fill ceiling insulation	3.000	1.3000	0.1700	0.0278	ASHRAE (2001a)	ffilin09
R-11 fiberglass fill ceiling insulation	3.500	1.3000	0.1700	0.0265	ASHRAE (2001a)	ffilin11
R-19 fiberglass fill ceiling insulation	6.500	1.3000	0.1700	0.0285	ASHRAE (2001a)	ffilin19
R-21 fiberglass fill ceiling insulation	7.500	1.3000	0.1700	0.0298	ASHRAE (2001a)	ffilin21
R-25 fiberglass fill ceiling insulation	9.000	1.3000	0.1700	0.0300	ASHRAE (2001a)	ffilin25
R-30 fiberglass fill ceiling insulation	10.500	1.3000	0.1700	0.0292	ASHRAE (2001a)	ffilin30
R-38 fiberglass fill ceiling insulation	13.000	1.3000	0.1700	0.0285	ASHRAE (2001a)	ffilin38
R-44 fiberglass fill ceiling insulation	15.000	1.3000	0.1700	0.0284	ASHRAE (2001a)	ffilin44
R-49 fiberglass fill ceiling insulation	16.500	1.3000	0.1700	0.0281	ASHRAE (2001a)	ffilin49
R-60 fiberglass fill ceiling insulation	20.000	1.3000	0.1700	0.0278	ASHRAE (2001a)	ffilin60
Expanded polystyrene sheathing	(Variable)	2.6500	0.2900	0.0167	ASHRAE (2001a)	epsin05
Radiant barrier[i]	3.500	0.0750	0.2400	0.0911	ASHRAE (2001a)	radbar
0.75-in vertical air space	0.750	0.0750	0.2400	0.0694	Winkelmann et al. (1993a)	vair0075
1.50-in vertical air space	1.500	0.0750	0.2400	0.1404	Winkelmann et al. (1993a)	vair0150
1.75-in vertical air space	1.750	0.0750	0.2400	0.1639	Winkelmann et al. (1993a)	vair0175
2.00-in vertical air space	2.000	0.0750	0.2400	0.1873	Winkelmann et al. (1993a)	vair0200
2.50-in vertical air space	2.500	0.0750	0.2400	0.2341	Winkelmann et al. (1993a)	vair0250
3.50-in vertical air space	3.500	0.0750	0.2400	0.3277	Winkelmann et al. (1993a)	vair0350
5.00-in vertical air space	5.000	0.0750	0.2400	0.4529	Winkelmann et al. (1993a)	vair0500
2.00-in sloped air space	2.000	0.0750	0.2400	0.1916	Winkelmann et al. (1993a)	sair0200
3.50-in sloped air space	3.500	0.0750	0.2400	0.3352	Winkelmann et al. (1993a)	sair0350
0.50-in horizontal air space	0.500	0.0750	0.2400	0.0508	Winkelmann et al. (1993a)	hair0050
1.50-in horizontal air space	1.500	0.0750	0.2400	0.1437	Winkelmann et al. (1993a)	hair0150
2.50-in horizontal air space	2.500	0.0750	0.2400	0.2395	Winkelmann et al. (1993a)	hair0250

Table 3. Construction Materials Modeled in the *Home Energy Saver* (continued)

Construction Material Type	Thickness (in)	Density (lb/ft^3)	Specific Heat (Btu/lb·°F)	Conductance ($Btu/h \cdot ft^2 \cdot °F$)	Data Source	DOE-2 Code Name
3.00-in horizontal air space	3.000	0.0750	0.2400	0.2874	Winkelmann et al. (1993a)	hair0300
3.50-in horizontal air space	3.500	0.0750	0.2400	0.3352	Winkelmann et al. (1993a)	hair0350
4.50-in horizontal air space	4.500	0.0750	0.2400	0.4076	Winkelmann et al. (1993a)	hair0450
5.75-in horizontal air space	5.750	0.0750	0.2400	0.5208	Winkelmann et al. (1993a)	hair0575
6.00-in horizontal air space	6.000	0.0750	0.2400	0.5435	Winkelmann et al. (1993a)	hair0600
8.00-in horizontal air space	8.000	0.0750	0.2400	0.7246	Winkelmann et al. (1993a)	hair0800
11.50-in horizontal air space	11.500	0.0750	0.2400	1.0417	Winkelmann et al. (1993a)	hair1150

[a]The density of wood subfloors is assumed similar to that of wood underlayments.
[b]The densities of vinyl siding and felt building membranes are estimated.
[c]The densities of lapped wood siding and wood roof shakes are assumed similar to that of fiberboard sheathing.
[d]The density of clay roof tile is assumed similar to that of face brick veneer.
[e]The density of carpets and pads is assumed similar to that of fiberboard sheathing.
[f]A measurable thickness is assigned to felt building membranes to prevent WALFERF errors.
[g]The specific heat of felt building membranes is assumed similar to that of carpets and pads.
[h]The specific heat of mineral fiber batt insulation is assumed similar to that of fiberglass fill ceiling insulation.
[i]An equivalent air space is used to represent radiant barriers as material layers of measurable thickness to prevent WALFERF errors.

Table 4. Constructions Modeled in the *Home Energy Saver*

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
Slab-on-Grade Floors				
1	(1) Fictitious insulation	(N/A)	0 or 5	sflrcon
	(2) 6-in damp soil			
	(3) 4-in poured concrete			
	(4) 0.5-in carpet and fibrous pad			
Basement Floors				
2	(1) Fictitious insulation	(N/A)	0	bflrcon
	(2) 6-in damp soil			
	(3) 4-in poured concrete			
Raised Basement Floors				
3	(Refer to construction no. 2)	(N/A)	0	bflrrcon
Crawlspace Floors				
4	(1) Fictitious insulation	(N/A)	0	cflrcon
	(2) 6-in damp soil			
Basement Walls below Grade				
5	(1) Fictitious insulation	(N/A)	0	bbwallcon
	(2) 6-in damp soil			
	(3) 10-in poured concrete			
6	(1) Fictitious insulation	(N/A)	11	bbwallcon
	(2) 6-in damp soil			
	(3) 10-in poured concrete			
	(4) 4-in (R-11) mineral fiber batt insulation			
7	(1) Fictitious insulation	(N/A)	19	bbwallcon
	(2) 6-in damp soil			
	(3) 10-in poured concrete			
	(4) 6-in (R-19) mineral fiber batt insulation			
Raised Basement Walls below Grade				
8	(Refer to construction no. 5)	(N/A)	0	bbwallrcn

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
9	(Refer to construction no. 6)	(N/A)	11	bbwallrcn
10	(Refer to construction no. 7)	(N/A)	19	bbwallrcn
Basement or Crawlspace Walls above Grade				
11	(1) 10-in poured concrete	(N/A)	0	bawallcon
12	(1) 10-in poured concrete	(N/A)	11	bawallcon
	(2) 4-in (R-11) mineral fiber batt insulation			
13	(1) 10-in poured concrete	(N/A)	19	bawallcon
	(2) 6-in (R-19) mineral fiber batt insulation			
Raised Basement Walls above Grade				
14	(Refer to construction no. 11)	(N/A)	0	bawallrcn
15	(Refer to construction no. 12)	(N/A)	11	bawallrcn
16	(Refer to construction no. 13)	(N/A)	19	bawallrcn
Floors above Basements and Crawlspaces				
17	(1a) 11.5-in wood floor joists @ 24 in o.c.	10.0	0	efwf00ca
	(1b) 11.5-in horizontal air spaces			
	(2) 0.75-in wood underlayment			
	(3) 0.75-in wood subfloor			
	(4) 0.5-in carpet and fibrous pad			
18	(1a) 11.5-in wood floor joists @ 24 in o.c.	10.0	11	efwf11ca
	(1b) 8-in horizontal air spaces + 3.5-in (R-11) mineral fiber batt insulation			
	(2) 0.75-in wood underlayment			
	(3) 0.75-in wood subfloor			
	(4) 0.5-in carpet and fibrous pad			
19	(1a) 11.5-in wood floor joists @ 24 in o.c.	10.0	13	efwf13ca
	(1b) 8-in horizontal air spaces + 3.5-in (R-13) mineral fiber batt insulation			
	(2) 0.75-in wood underlayment			
	(3) 0.75-in wood subfloor			
	(4) 0.5-in carpet and fibrous pad			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
20	(1a) 11.5-in wood floor joists @ 24 in o.c.	10.0	15	efwf15ca
	(1b) 8-in horizontal air spaces + 3.5-in (R-15) mineral fiber batt insulation			
	(2) 0.75-in wood underlayment			
	(3) 0.75-in wood subfloor			
	(4) 0.5-in carpet and fibrous pad			
21	(1a) 11.5-in wood floor joists @ 24 in o.c.	10.0	19	efwf19ca
	(1b) 6-in horizontal air spaces + 5.5-in (R-19) mineral fiber batt insulation			
	(2) 0.75-in wood underlayment			
	(3) 0.75-in wood subfloor			
	(4) 0.5-in carpet and fibrous pad			
22	(1a) 11.5-in wood floor joists @ 24 in o.c.	10.0	21	efwf21ca
	(1b) 6-in horizontal air spaces + 5.5-in (R-21) mineral fiber batt insulation			
	(2) 0.75-in wood underlayment			
	(3) 0.75-in wood subfloor			
	(4) 0.5-in carpet and fibrous pad			
23	(1a) 11.5-in wood floor joists @ 24 in o.c.	10.0	25	efwf25ca
	(1b) 4-in horizontal air spaces + 7.5-in (R-25) mineral fiber batt insulation			
	(2) 0.75-in wood underlayment			
	(3) 0.75-in wood subfloor			
	(4) 0.5-in carpet and fibrous pad			
24	(1a) 11.5-in wood floor joists @ 24 in o.c.	10.0	30	efwf30ca
	(1b) 2-in horizontal air spaces + 9.5-in (R-30) mineral fiber batt insulation			
	(2) 0.75-in wood underlayment			
	(3) 0.75-in wood subfloor			
	(4) 0.5-in carpet and fibrous pad			
25	(1a) 11.5-in wood floor joists @ 24 in o.c.	10.0	38	efwf38ca
	(1b) 11.5-in (R-30) mineral fiber batt insulation			
	(2) 0.75-in wood underlayment			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(3) 0.75-in wood subfloor			
	(4) 0.5-in carpet and fibrous pad			
Wood Frame Walls				
26	(1) 0.5-in lapped wood siding	25.0	0	ewwf00wo
	(2) 0.5-in fiberboard sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 3.5-in vertical air spaces			
	(4) 0.5-in gypsum wallboard			
27	(1) 1-in stucco finish	25.0	0	ewwf00st
	(2) 0.625-in plywood sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 3.5-in vertical air spaces			
	(4) 0.5-in gypsum wallboard			
28	(1) 0.125-in vinyl siding	25.0	0	ewwf00vi
	(2) 0.5-in fiberboard sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 3.5-in vertical air spaces			
	(4) 0.5-in gypsum wallboard			
29	(1) 0.125-in aluminum siding	25.0	0	ewwf00al
	(2) 0.5-in fiberboard sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 3.5-in vertical air spaces			
	(4) 0.5-in gypsum wallboard			
30	(1) 4-in face brick veneer	25.0	0	ewwf00br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 0.5-in plywood sheathing			
	(4a) 3.5-in wood studs @ 16 in o.c.			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(4b) 3.5-in vertical air spaces			
	(5) 0.5-in gypsum wallboard			
31	(1) 0.5-in lapped wood siding	25.0	3	ewwf03wo
	(2) 0.5-in fiberboard sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 2.5-in vertical air spaces + 1-in (R-3) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
32	(1) 1-in stucco finish	25.0	3	ewwf03st
	(2) 0.625-in plywood sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 2.5-in vertical air spaces + 1-in (R-3) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
33	(1) 0.125-in vinyl siding	25.0	3	ewwf03vi
	(2) 0.5-in fiberboard sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 2.5-in vertical air spaces + 1-in (R-3) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
34	(1) 0.125-in aluminum siding	25.0	3	ewwf03al
	(2) 0.5-in fiberboard sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 2.5-in vertical air spaces + 1-in (R-3) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
35	(1) 4-in face brick veneer	25.0	3	ewwf03br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 0.5-in plywood sheathing			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 2.5-in vertical air spaces + 1-in (R-3) mineral fiber batt insulation			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(5) 0.5-in gypsum wallboard			
36	(1) 0.5-in lapped wood siding	25.0	7	ewwf07wo
	(2) 0.5-in fiberboard sheathing			
	(3a) 1.5-in X 3.5-in wood studs @ 16 in o.c.			
	(3b) 1.5-in vertical air spaces + 2-in (R-7) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
37	(1) 1-in stucco finish	25.0	7	ewwf07st
	(2) 0.625-in plywood sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 1.5-in vertical air spaces + 2-in (R-7) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
38	(1) 0.125-in vinyl siding	25.0	7	ewwf07vi
	(2) 0.5-in fiberboard sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 1.5-in vertical air spaces + 2-in (R-7) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
39	(1) 0.125-in aluminum siding	25.0	7	ewwf07al
	(2) 0.5-in fiberboard sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 1.5-in vertical air spaces + 2-in (R-7) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
40	(1) 4-in face brick veneer	25.0	7	ewwf07br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 0.5-in plywood sheathing			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 1.5-in vertical air spaces + 2-in (R-7) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
41	(1) 0.5-in lapped wood siding	25.0	11	ewwf11wo
	(2) 0.5-in fiberboard sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 3.5-in (R-11) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
42	(1) 1-in stucco finish	25.0	11	ewwf11st
	(2) 0.625-in plywood sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 3.5-in (R-11) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
43	(1) 0.125-in vinyl siding	25.0	11	ewwf11vi
	(2) 0.5-in fiberboard sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 3.5-in (R-11) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
44	(1) 0.125-in aluminum siding	25.0	11	ewwf11al
	(2) 0.5-in fiberboard sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 3.5-in (R-11) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
45	(1) 4-in face brick veneer	25.0	11	ewwf11br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 0.5-in plywood sheathing			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 3.5-in (R-11) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
46	(1) 0.5-in lapped wood siding	25.0	13	ewwf13wo

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(2) 0.5-in fiberboard sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 3.5-in (R-13) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
47	(1) 1-in stucco finish	25.0	13	ewwf13st
	(2) 0.625-in plywood sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 3.5-in (R-13) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
48	(1) 0.125-in vinyl siding	25.0	13	ewwf13vi
	(2) 0.5-in fiberboard sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 3.5-in (R-13) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
49	(1) 0.125-in aluminum siding	25.0	13	ewwf13al
	(2) 0.5-in fiberboard sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 3.5-in (R-13) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
50	(1) 4-in face brick veneer	25.0	13	ewwf13br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 0.5-in plywood sheathing			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 3.5-in (R-13) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
51	(1) 0.5-in lapped wood siding	25.0	15	ewwf15wo
	(2) 0.5-in fiberboard sheathing			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 3.5-in (R-15) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
52	(1) 1-in stucco finish	25.0	15	ewwf15st
	(2) 0.625-in plywood sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 3.5-in (R-15) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
53	(1) 0.125-in vinyl siding	25.0	15	ewwf15vi
	(2) 0.5-in fiberboard sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 3.5-in (R-15) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
54	(1) 0.125-in aluminum siding	25.0	15	ewwf15al
	(2) 0.5-in fiberboard sheathing			
	(3a) 3.5-in wood studs @ 16 in o.c.			
	(3b) 3.5-in (R-15) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
55	(1) 4-in face brick veneer	25.0	15	ewwf15br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 0.5-in plywood sheathing			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 3.5-in (R-15) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
56	(1) 0.5-in lapped wood siding	25.0	19	ewwf19wo
	(2) 0.5-in fiberboard sheathing			
	(3a) 5.5-in wood studs @ 16 in o.c.			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(3b) 5.5-in (R-19) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
57	(1) 1-in stucco finish	25.0	19	ewwf19st
	(2) 0.625-in plywood sheathing			
	(3a) 5.5-in wood studs @ 16 in o.c.			
	(3b) 5.5-in (R-19) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
58	(1) 0.125-in vinyl siding	25.0	19	ewwf19vi
	(2) 0.5-in fiberboard sheathing			
	(3a) 5.5-in wood studs @ 16 in o.c.			
	(3b) 5.5-in (R-19) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
59	(1) 0.125-in aluminum siding	25.0	19	ewwf19al
	(2) 0.5-in fiberboard sheathing			
	(3a) 5.5-in wood studs @ 16 in o.c.			
	(3b) 5.5-in (R-19) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
60	(1) 4-in face brick veneer	25.0	19	ewwf19br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 0.5-in plywood sheathing			
	(4a) 5.5-in wood studs @ 16 in o.c.			
	(4b) 5.5-in (R-19) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
61	(1) 0.5-in lapped wood siding	25.0	21	ewwf21wo
	(2) 0.5-in fiberboard sheathing			
	(3a) 5.5-in wood studs @ 16 in o.c.			
	(3b) 5.5-in (R-21) mineral fiber batt insulation			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(4) 0.5-in gypsum wallboard			
62	(1) 1-in stucco finish	25.0	21	ewwf21st
	(2) 0.625-in plywood sheathing			
	(3a) 5.5-in wood studs @ 16 in o.c.			
	(3b) 5.5-in (R-21) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
63	(1) 0.125-in vinyl siding	25.0	21	ewwf21vi
	(2) 0.5-in fiberboard sheathing			
	(3a) 5.5-in wood studs @ 16 in o.c.			
	(3b) 5.5-in (R-21) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
64	(1) 0.125-in aluminum siding	25.0	21	ewwf21al
	(2) 0.5-in fiberboard sheathing			
	(3a) 5.5-in wood studs @ 16 in o.c.			
	(3b) 5.5-in (R-21) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
65	(1) 4-in face brick veneer	25.0	21	ewwf21br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 0.5-in plywood sheathing			
	(4a) 5.5-in wood studs @ 16 in o.c.			
	(4b) 5.5-in (R-21) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
Wood Frame Walls with Insulated Headers				
66	(Refer to construction no. 26)	22.5	0	ewih00wo
67	(Refer to construction no. 27)	22.5	0	ewih00st
68	(Refer to construction no. 28)	22.5	0	ewih00vi
69	(Refer to construction no. 29)	22.5	0	ewih00al

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
70	(Refer to construction no. 30)	22.5	0	ewih00br
71	(Refer to construction no. 31)	22.5	3	ewih03wo
72	(Refer to construction no. 32)	22.5	3	ewih03st
73	(Refer to construction no. 33)	22.5	3	ewih03vi
74	(Refer to construction no. 34)	22.5	3	ewih03al
75	(Refer to construction no. 35)	22.5	3	ewih03br
76	(Refer to construction no. 36)	22.5	7	ewih07wo
77	(Refer to construction no. 37)	22.5	7	ewih07st
78	(Refer to construction no. 38)	22.5	7	ewih07vi
79	(Refer to construction no. 39)	22.5	7	ewih07al
80	(Refer to construction no. 40)	22.5	7	ewih07br
81	(Refer to construction no. 41)	22.5	11	ewih11wo
82	(Refer to construction no. 42)	22.5	11	ewih11st
83	(Refer to construction no. 43)	22.5	11	ewih11vi
84	(Refer to construction no. 44)	22.5	11	ewih11al
85	(Refer to construction no. 45)	22.5	11	ewih11br
86	(Refer to construction no. 46)	22.5	13	ewih13wo
87	(Refer to construction no. 47)	22.5	13	ewih13st
88	(Refer to construction no. 48)	22.5	13	ewih13vi
89	(Refer to construction no. 49)	22.5	13	ewih13al
90	(Refer to construction no. 50)	22.5	13	ewih13br
91	(Refer to construction no. 51)	22.5	15	ewih15wo
92	(Refer to construction no. 52)	22.5	15	ewih15st
93	(Refer to construction no. 53)	22.5	15	ewih15vi
94	(Refer to construction no. 54)	22.5	15	ewih15al
95	(Refer to construction no. 55)	22.5	15	ewih15br
96	(Refer to construction no. 56)	22.5	19	ewih19wo
97	(Refer to construction no. 57)	22.5	19	ewih19st

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
98	(Refer to construction no. 58)	22.5	19	ewih19vi
99	(Refer to construction no. 59)	22.5	19	ewih19al
100	(Refer to construction no. 60)	22.5	19	ewih19br
101	(Refer to construction no. 61)	22.5	21	ewih21wo
102	(Refer to construction no. 62)	22.5	21	ewih21st
103	(Refer to construction no. 63)	22.5	21	ewih21vi
104	(Refer to construction no. 64)	22.5	21	ewih21al
105	(Refer to construction no. 65)	22.5	21	ewih21br
Wood Frame Walls with Expanded Polystyrene Sheathing				
106	(1) 0.5-in lapped wood siding	25.0	0 + 5	ewps00wo
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 3.5-in vertical air spaces			
	(5) 0.5-in gypsum wallboard			
107	(1) 1-in stucco finish	25.0	0 + 5	ewps00st
	(2) 0.625-in plywood sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 3.5-in vertical air spaces			
	(5) 0.5-in gypsum wallboard			
108	(1) 0.125-in vinyl siding	25.0	0 + 5	ewps00vi
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 3.5-in vertical air spaces			
	(5) 0.5-in gypsum wallboard			
109	(1) 0.125-in aluminum siding	25.0	0 + 5	ewps00al

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 3.5-in vertical air spaces			
	(5) 0.5-in gypsum wallboard			
110	(1) 4-in face brick veneer	25.0	0 + 5	ewps00br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 1-in expanded polystyrene insulation			
	(4) 0.5-in plywood sheathing			
	(5a) 3.5-in wood studs @ 16 in o.c.			
	(5b) 3.5-in vertical air spaces			
	(6) 0.5-in gypsum wallboard			
111	(1) 0.5-in lapped wood siding	25.0	3 + 5	ewps03wo
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 2.5-in vertical air spaces + 1-in (R-3) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
112	(1) 1-in stucco finish	25.0	3 + 5	ewps03st
	(2) 0.625-in plywood sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 2.5-in vertical air spaces + 1-in (R-3) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
113	(1) 0.125-in vinyl siding	25.0	3 + 5	ewps03vi
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 2.5-in vertical air spaces + 1-in (R-3) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
114	(1) 0.125-in aluminum siding	25.0	3 + 5	ewps03al
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 2.5-in vertical air spaces + 1-in (R-3) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
115	(1) 4-in face brick veneer	25.0	3 + 5	ewps03br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 1-in expanded polystyrene insulation			
	(4) 0.5-in plywood sheathing			
	(5a) 3.5-in wood studs @ 16 in o.c.			
	(5b) 2.5-in vertical air spaces + 1-in (R-3) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
116	(1) 0.5-in lapped wood siding	25.0	7 + 5	ewps07wo
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 1.5-in vertical air spaces + 2-in (R-7) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
117	(1) 1-in stucco finish	25.0	7 + 5	ewps07st
	(2) 0.625-in plywood sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 1.5-in vertical air spaces + 2-in (R-7) mineral fiber batt insulation			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(5) 0.5-in gypsum wallboard			
118	(1) 0.125-in vinyl siding	25.0	7 + 5	ewps07vi
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 1.5-in vertical air spaces + 2-in (R-7) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
119	(1) 0.125-in aluminum siding	25.0	7 + 5	ewps07al
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 1.5-in vertical air spaces + 2-in (R-7) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
120	(1) 4-in face brick veneer	25.0	7 + 5	ewps07br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 1-in expanded polystyrene insulation			
	(4) 0.5-in plywood sheathing			
	(5a) 3.5-in wood studs @ 16 in o.c.			
	(5b) 1.5-in vertical air spaces + 2-in (R-7) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
121	(1) 0.5-in lapped wood siding	25.0	11 + 5	ewps11wo
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 3.5-in (R-11) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
122	(1) 1-in stucco finish	25.0	11 + 5	ewps11st

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(2) 0.625-in plywood sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 3.5-in (R-11) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
123	(1) 0.125-in vinyl siding	25.0	11 + 5	ewps11vi
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 3.5-in (R-11) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
124	(1) 0.125-in aluminum siding	25.0	11 + 5	ewps11al
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 3.5-in (R-11) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
125	(1) 4-in face brick veneer	25.0	11 + 5	ewps11br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 1-in expanded polystyrene insulation			
	(4) 0.5-in plywood sheathing			
	(5a) 3.5-in wood studs @ 16 in o.c.			
	(5b) 3.5-in (R-11) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
126	(1) 0.5-in lapped wood siding	25.0	13 + 5	ewps13wo
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 3.5-in (R-13) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
127	(1) 1-in stucco finish	25.0	13 + 5	ewps13st
	(2) 0.625-in plywood sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 3.5-in (R-13) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
128	(1) 0.125-in vinyl siding	25.0	13 + 5	ewps13vi
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 3.5-in (R-13) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
129	(1) 0.125-in aluminum siding	25.0	13 + 5	ewps13al
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 3.5-in (R-13) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
130	(1) 4-in face brick veneer	25.0	13 + 5	ewps13br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 1-in expanded polystyrene insulation			
	(4) 0.5-in plywood sheathing			
	(5a) 3.5-in wood studs @ 16 in o.c.			
	(5b) 3.5-in (R-13) mineral fiber batt insulation			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(6) 0.5-in gypsum wallboard			
131	(1) 0.5-in lapped wood siding	25.0	15 + 5	ewps15wo
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 3.5-in (R-15) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
132	(1) 1-in stucco finish	25.0	15 + 5	ewps15st
	(2) 0.625-in plywood sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 3.5-in (R-15) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
133	(1) 0.125-in vinyl siding	25.0	15 + 5	ewps15vi
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 3.5-in (R-15) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
134	(1) 0.125-in aluminum siding	25.0	15 + 5	ewps15al
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 3.5-in wood studs @ 16 in o.c.			
	(4b) 3.5-in (R-15) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
135	(1) 4-in face brick veneer	25.0	15 + 5	ewps15br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(3) 1-in expanded polystyrene insulation			
	(4) 0.5-in plywood sheathing			
	(5a) 3.5-in wood studs @ 16 in o.c.			
	(5b) 3.5-in (R-15) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
136	(1) 0.5-in lapped wood siding	25.0	19 + 5	ewps19wo
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 5.5-in wood studs @ 16 in o.c.			
	(4b) 5.5-in (R-19) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
137	(1) 1-in stucco finish	25.0	19 + 5	ewps19st
	(2) 0.625-in plywood sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 5.5-in wood studs @ 16 in o.c.			
	(4b) 5.5-in (R-19) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
138	(1) 0.125-in vinyl siding	25.0	19 + 5	ewps19vi
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 5.5-in wood studs @ 16 in o.c.			
	(4b) 5.5-in (R-19) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
139	(1) 0.125-in aluminum siding	25.0	19 + 5	ewps19al
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 5.5-in wood studs @ 16 in o.c.			
	(4b) 5.5-in (R-19) mineral fiber batt insulation			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(5) 0.5-in gypsum wallboard			
140	(1) 4-in face brick veneer	25.0	19 + 5	ewps19br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 1-in expanded polystyrene insulation			
	(4) 0.5-in plywood sheathing			
	(5a) 5.5-in wood studs @ 16 in o.c.			
	(5b) 5.5-in (R-19) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
141	(1) 0.5-in lapped wood siding	25.0	21 + 5	ewps21wo
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 5.5-in wood studs @ 16 in o.c.			
	(4b) 5.5-in (R-21) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
142	(1) 1-in stucco finish	25.0	21 + 5	ewps21st
	(2) 0.625-in plywood sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 5.5-in wood studs @ 16 in o.c.			
	(4b) 5.5-in (R-21) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
143	(1) 0.125-in vinyl siding	25.0	21 + 5	ewps21vi
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 5.5-in wood studs @ 16 in o.c.			
	(4b) 5.5-in (R-21) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
144	(1) 0.125-in aluminum siding	25.0	21 + 5	ewps21al

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(2) 0.5-in fiberboard sheathing			
	(3) 1-in expanded polystyrene insulation			
	(4a) 5.5-in wood studs @ 16 in o.c.			
	(4b) 5.5-in (R-21) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
145	(1) 4-in face brick veneer	25.0	21 + 5	ewps21br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 1-in expanded polystyrene insulation			
	(4) 0.5-in plywood sheathing			
	(5a) 5.5-in wood studs @ 16 in o.c.			
	(5b) 5.5-in (R-21) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
Wood Frame Walls with Insulated Headers and Expanded Polystyrene Sheathing				
146	(Refer to construction no. 121)	22.5	11 + 5	ewph11wo
147	(Refer to construction no. 122)	22.5	11 + 5	ewph11st
148	(Refer to construction no. 123)	22.5	11 + 5	ewph11vi
149	(Refer to construction no. 124)	22.5	11 + 5	ewph11al
150	(Refer to construction no. 125)	22.5	11 + 5	ewph11br
151	(Refer to construction no. 126)	22.5	13 + 5	ewph13wo
152	(Refer to construction no. 127)	22.5	13 + 5	ewph13st
153	(Refer to construction no. 128)	22.5	13 + 5	ewph13vi
154	(Refer to construction no. 129)	22.5	13 + 5	ewph13al
155	(Refer to construction no. 130)	22.5	13 + 5	ewph13br
156	(Refer to construction no. 131)	22.5	15 + 5	ewph15wo
157	(Refer to construction no. 132)	22.5	15 + 5	ewph15st
158	(Refer to construction no. 133)	22.5	15 + 5	ewph15vi
159	(Refer to construction no. 134)	22.5	15 + 5	ewph15al

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation (h·ft^2·°F/Btu)	DOE-2 Code Name
No.	Layers			
160	(Refer to construction no. 135)	22.5	15 + 5	ewph15br
161	(Refer to construction no. 136)	22.5	19 + 5	ewph19wo
162	(Refer to construction no. 137)	22.5	19 + 5	ewph19st
163	(Refer to construction no. 138)	22.5	19 + 5	ewph19vi
164	(Refer to construction no. 139)	22.5	19 + 5	ewph19al
165	(Refer to construction no. 140)	22.5	19 + 5	ewph19br
166	(Refer to construction no. 141)	22.5	21 + 5	ewph21wo
167	(Refer to construction no. 142)	22.5	21 + 5	ewph21st
168	(Refer to construction no. 143)	22.5	21 + 5	ewph21vi
169	(Refer to construction no. 144)	22.5	21 + 5	ewph21al
170	(Refer to construction no. 145)	22.5	21 + 5	ewph21br
Wood Frame Walls with Expanded Polystyrene Sheathing and Optimum Value Engineering				
171	(Refer to construction no. 181)	12.5	19 + 5	ewop19wo
172	(Refer to construction no. 182)	12.5	19 + 5	ewop19st
173	(Refer to construction no. 183)	12.5	19 + 5	ewop19vi
174	(Refer to construction no. 184)	12.5	19 + 5	ewop19al
175	(Refer to construction no. 185)	12.5	19 + 5	ewop19br
176	(Refer to construction no. 186)	12.5	21 + 5	ewop21wo
177	(Refer to construction no. 187)	12.5	21 + 5	ewop21st
178	(Refer to construction no. 188)	12.5	21 + 5	ewop21vi
179	(Refer to construction no. 189)	12.5	21 + 5	ewop21al
180	(Refer to construction no. 190)	12.5	21 + 5	ewop21br
Wood Frame Walls with Optimum Value Engineering				
181	(1) 0.5-in lapped wood siding	12.5	19	ewov19wo
	(2) 0.5-in fiberboard sheathing			
	(3a) 5.5-in wood studs @ 24 in o.c.			
	(3b) 5.5-in (R-19) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
182	(1) 1-in stucco finish	12.5	19	ewov19st
	(2) 0.625-in plywood sheathing			
	(3a) 5.5-in wood studs @ 24 in o.c.			
	(3b) 5.5-in (R-19) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
183	(1) 0.125-in vinyl siding	12.5	19	ewov19vi
	(2) 0.5-in fiberboard sheathing			
	(3a) 5.5-in wood studs @ 24 in o.c.			
	(3b) 5.5-in (R-19) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
184	(1) 0.125-in aluminum siding	12.5	19	ewov19al
	(2) 0.5-in fiberboard sheathing			
	(3a) 5.5-in wood studs @ 24 in o.c.			
	(3b) 5.5-in (R-19) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
185	(1) 4-in face brick veneer	12.5	19	ewov19br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 0.5-in plywood sheathing			
	(4a) 5.5-in wood studs @ 24 in o.c.			
	(4b) 5.5-in (R-19) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
186	(1) 0.5-in lapped wood siding	12.5	21	ewov21wo
	(2) 0.5-in fiberboard sheathing			
	(3a) 5.5-in wood studs @ 24 in o.c.			
	(3b) 5.5-in (R-21) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
187	(1) 1-in stucco finish	12.5	21	ewov21st

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(2) 0.625-in plywood sheathing			
	(3a) 5.5-in wood studs @ 24 in o.c.			
	(3b) 5.5-in (R-21) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
188	(1) 0.125-in vinyl siding	12.5	21	ewov21vi
	(2) 0.5-in fiberboard sheathing			
	(3a) 5.5-in wood studs @ 24 in o.c.			
	(3b) 5.5-in (R-21) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
189	(1) 0.125-in aluminum siding	12.5	21	ewov21al
	(2) 0.5-in fiberboard sheathing			
	(3a) 5.5-in wood studs @ 24 in o.c.			
	(3b) 5.5-in (R-21) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
190	(1) 4-in face brick veneer	12.5	21	ewov21br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 0.5-in plywood sheathing			
	(4a) 5.5-in wood studs @ 24 in o.c.			
	(4b) 5.5-in (R-21) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
191	(1) 0.5-in lapped wood siding	12.5	27	ewov27wo
	(2) 0.5-in fiberboard sheathing			
	(3a) 7.5-in wood studs @ 24 in o.c.			
	(3b) 7.5-in (R-27) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
192	(1) 1-in stucco finish	12.5	27	ewov27st
	(2) 0.625-in plywood sheathing			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(3a) 7.5-in wood studs @ 24 in o.c.			
	(3b) 7.5-in (R-27) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
193	(1) 0.125-in vinyl siding	12.5	27	ewov27vi
	(2) 0.5-in fiberboard sheathing			
	(3a) 7.5-in wood studs @ 24 in o.c.			
	(3b) 7.5-in (R-27) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
194	(1) 0.125-in aluminum siding	12.5	27	ewov27al
	(2) 0.5-in fiberboard sheathing			
	(3a) 7.5-in wood studs @ 24 in o.c.			
	(3b) 7.5-in (R-27) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
195	(1) 4-in face brick veneer	12.5	27	ewov27br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 0.5-in plywood sheathing			
	(4a) 7.5-in wood studs @ 24 in o.c.			
	(4b) 7.5-in (R-27) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
196	(1) 0.5-in lapped wood siding	12.5	33	ewov33wo
	(2) 0.5-in fiberboard sheathing			
	(3a) 9.5-in wood studs @ 24 in o.c.			
	(3b) 9.5-in (R-33) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
197	(1) 1-in stucco finish	12.5	33	ewov33st
	(2) 0.625-in plywood sheathing			
	(3a) 9.5-in wood studs @ 24 in o.c.			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(3b) 9.5-in (R-33) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
198	(1) 0.125-in vinyl siding	12.5	33	ewov33vi
	(2) 0.5-in fiberboard sheathing			
	(3a) 9.5-in wood studs @ 24 in o.c.			
	(3b) 9.5-in (R-33) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
199	(1) 0.125-in aluminum siding	12.5	33	ewov33al
	(2) 0.5-in fiberboard sheathing			
	(3a) 9.5-in wood studs @ 24 in o.c.			
	(3b) 9.5-in (R-33) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
200	(1) 4-in face brick veneer	12.5	33	ewov33br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 0.5-in plywood sheathing			
	(4a) 9.5-in wood studs @ 24 in o.c.			
	(4b) 9.5-in (R-33) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
201	(1) 0.5-in lapped wood siding	12.5	38	ewov38wo
	(2) 0.5-in fiberboard sheathing			
	(3a) 11.5-in wood studs @ 24 in o.c.			
	(3b) 11.5-in (R-38) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
202	(1) 1-in stucco finish	12.5	38	ewov38st
	(2) 0.625-in plywood sheathing			
	(3a) 11.5-in wood studs @ 24 in o.c.			
	(3b) 11.5-in (R-38) mineral fiber batt insulation			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(4) 0.5-in gypsum wallboard			
203	(1) 0.125-in vinyl siding	12.5	38	ewov38vi
	(2) 0.5-in fiberboard sheathing			
	(3a) 11.5-in wood studs @ 24 in o.c.			
	(3b) 11.5-in (R-38) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
204	(1) 0.125-in aluminum siding	12.5	38	ewov38al
	(2) 0.5-in fiberboard sheathing			
	(3a) 11.5-in wood studs @ 24 in o.c.			
	(3b) 11.5-in (R-38) mineral fiber batt insulation			
	(4) 0.5-in gypsum wallboard			
205	(1) 4-in face brick veneer	12.5	38	ewov38br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 0.5-in plywood sheathing			
	(4a) 11.5-in wood studs @ 24 in o.c.			
	(4b) 11.5-in (R-38) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
Structural Brick Walls				
206	(1) 8-in common structural brick	(N/A)	0	ewbr00nn
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 0.5-in gypsum wallboard			
207	(1) 8-in common structural brick	(N/A)	5	ewbr05nn
	(2) 1-in expanded polystyrene insulation			
	(3a) 0.75-in wood furring			
	(3b) 0.75-in vertical air spaces			
	(4) 0.5-in gypsum wallboard			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
208	(1) 8-in common structural brick	(N/A)	10	ewbr10nn
	(2) 2-in expanded polystyrene insulation			
	(3a) 0.75-in wood furring			
	(3b) 0.75-in vertical air spaces			
	(4) 0.5-in gypsum wallboard			
Concrete Block Walls				
209	(1) 1-in stucco finish	(N/A)	0	ewcb00st
	(2a) 8-in concrete block			
	(2b) 5-in vertical air spaces			
	(3a) 0.75-in wood furring			
	(3b) 0.75-in vertical air spaces			
	(4) 0.5-in gypsum wallboard			
210	(1) 4-in face brick veneer	(N/A)	0	ewcb00br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3a) 8-in concrete block			
	(3b) 5-in vertical air spaces			
	(4a) 0.75-in wood furring			
	(4b) 0.75-in vertical air spaces			
	(5) 0.5-in gypsum wallboard			
211	(1a) 8-in concrete block	(N/A)	0	ewcb00nn
	(1b) 5-in vertical air spaces			
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3) 0.5-in gypsum wallboard			
212	(1) 1-in stucco finish	(N/A)	2.8	ewcb03st
	(2a) 8-in concrete block			
	(2b) 5-in vertical air spaces			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(3a) 0.75-in wood furring			
	(3b) 0.75-in (R-2.8) fiberglass fill wall insulation			
	(4) 0.5-in gypsum wallboard			
213	(1) 4-in face brick veneer	(N/A)	2.8	ewcb03br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3a) 8-in concrete block			
	(3b) 5-in vertical air spaces			
	(4a) 0.75-in wood furring			
	(4b) 0.75-in (R-2.8) fiberglass fill wall insulation			
	(5) 0.5-in gypsum wallboard			
214	(1a) 8-in concrete block	(N/A)	2.8	ewcb03nn
	(1b) 5-in vertical air spaces			
	(2a) 0.75-in wood furring			
	(2b) 0.75-in (R-2.8) fiberglass fill wall insulation			
	(3) 0.5-in gypsum wallboard			
215	(1) 1-in stucco finish	(N/A)	5.6	ewcb06st
	(2a) 8-in concrete block			
	(2b) 5-in vertical air spaces			
	(3a) 1.75-in wood furring			
	(3b) 1.75-in (R-5.6) fiberglass fill wall insulation			
	(4) 0.5-in gypsum wallboard			
216	(1) 4-in face brick veneer	(N/A)	5.6	ewcb06br
	(2a) 0.75-in wood furring			
	(2b) 0.75-in vertical air spaces			
	(3a) 8-in concrete block			
	(3b) 5-in vertical air spaces			
	(4a) 1.75-in wood furring			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(4b) 1.75-in (R-5.6) fiberglass fill wall insulation			
	(5) 0.5-in gypsum wallboard			
217	(1a) 8-in concrete block	(N/A)	5.6	ewcb06nn
	(1b) 5-in vertical air spaces			
	(2a) 1.75-in wood furring			
	(2b) 1.75-in (R-5.6) fiberglass fill wall insulation			
	(3) 0.5-in gypsum wallboard			
Straw Bale Walls				
218	(1) 1-in stucco finish	(N/A)	55.2	ewsb00st
	(2) 23-in straw bale			
	(3) 1-in stucco finish			
Interior Partition Half-Floors				
219	(1a) 5.75-in wood floor joists @ 24 in o.c.	10.0	0	ifwf00ca
	(1b) 5.75-in horizontal air spaces			
	(2) 0.75-in wood underlayment			
	(3) 0.75-in wood subfloor			
	(4) 0.5-in carpet and fibrous pad			
Interior Partition Half-Walls				
220	(1a) 1.75-in wood studs @ 16 in o.c.	25.0	0	iwwf00
	(1b) 1.75-in vertical air spaces			
	(2) 0.5-in gypsum wallboard			
Interior Partition Half-Ceilings				
221	(1a) 5.75-in wood ceiling joists @ 24 in o.c.	10.0	0	icwf00
	(1b) 5.75-in horizontal air spaces			
	(2) 0.5-in gypsum wallboard			
Ceilings below Attics				
222	(1a) 3.5-in wood ceiling joists @ 24 in o.c.	10.0	0	ecwf00
	(1b) 3.5-in air spaces			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(2) 0.5-in gypsum wallboard			
223	(1a) 3.5-in wood ceiling joists @ 24 in o.c.	10.0	3	ecwf03
	(1b) 2.5-in air spaces + 1-in (R-3) fiberglass fill ceiling insulation			
	(2) 0.5-in gypsum wallboard			
224	(1a) 3.5-in wood ceiling joists @ 24 in o.c.	10.0	6	ecwf06
	(1b) 1.5-in air spaces + 2-in (R-6) fiberglass fill ceiling insulation			
	(2) 0.5-in gypsum wallboard			
225	(1a) 3.5-in wood ceiling joists @ 24 in o.c.	10.0	9	ecwf09
	(1b) 0.5-in air spaces + 3-in (R-9) fiberglass fill ceiling insulation			
	(2) 0.5-in gypsum wallboard			
226	(1a) 3.5-in wood ceiling joists @ 24 in o.c.	10.0	11	ecwf11
	(1b) 3.5-in (R-11) fiberglass fill ceiling insulation			
	(2) 0.5-in gypsum wallboard			
227	(1a) 3.5-in wood ceiling joists @ 24 in o.c.	10.0	19	ecwf19
	(1b) 6.5-in (R-19) fiberglass fill ceiling insulation			
	(2) 0.5-in gypsum wallboard			
228	(1a) 3.5-in wood ceiling joists @ 24 in o.c.	10.0	21	ecwf21
	(1b) 7.5-in (R-21) fiberglass fill ceiling insulation			
	(2) 0.5-in gypsum wallboard			
229	(1a) 3.5-in wood ceiling joists @ 24 in o.c.	10.0	25	ecwf25
	(1b) 9-in (R-25) fiberglass fill ceiling insulation			
	(2) 0.5-in gypsum wallboard			
230	(1a) 3.5-in wood ceiling joists @ 24 in o.c.	10.0	30	ecwf30
	(1b) 10.5-in (R-30) fiberglass fill ceiling insulation			
	(2) 0.5-in gypsum wallboard			
231	(1a) 3.5-in wood ceiling joists @ 24 in o.c.	10.0	38	ecwf38
	(1b) 13-in (R-38) fiberglass fill ceiling insulation			
	(2) 0.5-in gypsum wallboard			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
232	(1a) 3.5-in wood ceiling joists @ 24 in o.c.	10.0	44	ecwf44
	(1b) 15-in (R-44) fiberglass fill ceiling insulation			
	(2) 0.5-in gypsum wallboard			
233	(1a) 3.5-in wood ceiling joists @ 24 in o.c.	10.0	49	ecwf49
	(1b) 16.5-in (R-49) fiberglass fill ceiling insulation			
	(2) 0.5-in gypsum wallboard			
234	(1a) 3.5-in wood ceiling joists @ 24 in o.c.	10.0	60	ecwf60
	(1b) 20-in (R-60) fiberglass fill ceiling insulation			
	(2) 0.5-in gypsum wallboard			
Roofs				
235	(1) 0.25-in asphalt composition shingles	10.0	0	rfwf00co
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4a) 3.5-in wood roof rafters @ 24 in o.c.			
	(4b) 3.5-in sloped air spaces			
236	(1) 0.25-in wood roof shakes	10.0	0	rfwf00wo
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4a) 3.5-in wood roof rafters @ 24 in o.c.			
	(4b) 3.5-in sloped air spaces			
237	(1) 0.5-in clay roof tile	10.0	0	rfwf00rc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4a) 3.5-in wood roof rafters @ 24 in o.c.			
	(4b) 3.5-in sloped air spaces			
238	(1) 0.25-in lightweight concrete roof tile	10.0	0	rfwf00lc
	(2) 0.125-in felt building membrane			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(3) 1-in plywood sheathing			
	(4a) 3.5-in wood roof rafters @ 24 in o.c.			
	(4b) 3.5-in sloped air spaces			
239	(1) 0.5-in gravel roofing	10.0	0	rfwf00tg
	(2) 0.375-in tar roofing			
	(3) 0.125-in felt building membrane			
	(4) 1-in plywood sheathing			
	(5a) 3.5-in wood roof rafters @ 24 in o.c.			
	(5b) 3.5-in sloped air spaces			
240	(1) 0.25-in asphalt composition shingles	10.0	11	rfwf11co
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4a) 5.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 3.5-in (R-11) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
241	(1) 0.25-in wood roof shakes	10.0	11	rfwf11wo
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4a) 5.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 3.5-in (R-11) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
242	(1) 0.5-in clay roof tile	10.0	11	rfwf11rc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4a) 5.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 3.5-in (R-11) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
243	(1) 0.25-in lightweight concrete roof tile	10.0	11	rfwf11lc

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4a) 5.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 3.5-in (R-11) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
244	(1) 0.5-in gravel roofing	10.0	11	rfwf11tg
	(2) 0.375-in tar roofing			
	(3) 0.125-in felt building membrane			
	(4) 1-in plywood sheathing			
	(5a) 5.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 3.5-in (R-11) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
245	(1) 0.25-in asphalt composition shingles	10.0	13	rfwf13co
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4a) 5.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 3.5-in (R-13) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
246	(1) 0.25-in wood roof shakes	10.0	13	rfwf13wo
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4a) 5.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 3.5-in (R-13) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
247	(1) 0.5-in clay roof tile	10.0	13	rfwf13rc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4a) 5.5-in wood roof rafters @ 24 in o.c.			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(4b) 2-in sloped air spaces + 3.5-in (R-13) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
248	(1) 0.25-in lightweight concrete roof tile	10.0	13	rfwf13lc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4a) 5.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 3.5-in (R-13) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
249	(1) 0.5-in gravel roofing	10.0	13	rfwf13tg
	(2) 0.375-in tar roofing			
	(3) 0.125-in felt building membrane			
	(4) 1-in plywood sheathing			
	(5a) 5.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 3.5-in (R-13) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
250	(1) 0.25-in asphalt composition shingles	10.0	15	rfwf15co
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4a) 5.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 3.5-in (R-15) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
251	(1) 0.25-in wood roof shakes	10.0	15	rfwf15wo
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4a) 5.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 3.5-in (R-15) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
252	(1) 0.5-in clay roof tile	10.0	15	rfwf15rc

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4a) 5.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 3.5-in (R-15) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
253	(1) 0.25-in lightweight concrete roof tile	10.0	15	rfwf15lc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4a) 5.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 3.5-in (R-15) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
254	(1) 0.5-in gravel roofing	10.0	15	rfwf15tg
	(2) 0.375-in tar roofing			
	(3) 0.125-in felt building membrane			
	(4) 1-in plywood sheathing			
	(5a) 5.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 3.5-in (R-15) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
255	(1) 0.25-in asphalt composition shingles	10.0	19	rfwf19co
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4a) 7.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 5.5-in (R-19) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
256	(1) 0.25-in wood roof shakes	10.0	19	rfwf19wo
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4a) 7.5-in wood roof rafters @ 24 in o.c.			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(4b) 2-in sloped air spaces + 5.5-in (R-19) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
257	(1) 0.5-in clay roof tile	10.0	19	rfwf19rc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4a) 7.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 5.5-in (R-19) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
258	(1) 0.25-in lightweight concrete roof tile	10.0	19	rfwf19lc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4a) 7.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 5.5-in (R-19) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
259	(1) 0.5-in gravel roofing	10.0	19	rfwf19tg
	(2) 0.375-in tar roofing			
	(3) 0.125-in felt building membrane			
	(4) 1-in plywood sheathing			
	(5a) 7.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 5.5-in (R-19) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
260	(1) 0.25-in asphalt composition shingles	10.0	21	rfwf21co
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4a) 7.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 5.5-in (R-21) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
261	(1) 0.25-in wood roof shakes	10.0	21	rfwf21wo

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4a) 7.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 5.5-in (R-21) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
262	(1) 0.5-in clay roof tile	10.0	21	rfwf21rc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4a) 7.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 5.5-in (R-21) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
263	(1) 0.25-in lightweight concrete roof tile	10.0	21	rfwf21lc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4a) 7.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 5.5-in (R-21) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
264	(1) 0.5-in gravel roofing	10.0	21	rfwf21tg
	(2) 0.375-in tar roofing			
	(3) 0.125-in felt building membrane			
	(4) 1-in plywood sheathing			
	(5a) 7.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 5.5-in (R-21) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
265	(1) 0.25-in asphalt composition shingles	10.0	27	rfwf27co
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4a) 9.5-in wood roof rafters @ 24 in o.c.			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(4b) 2-in sloped air spaces + 7.5-in (R-27) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
266	(1) 0.25-in wood roof shakes	10.0	27	rfwf27wo
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4a) 9.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 7.5-in (R-27) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
267	(1) 0.5-in clay roof tile	10.0	27	rfwf27rc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4a) 9.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 7.5-in (R-27) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
268	(1) 0.25-in lightweight concrete roof tile	10.0	27	rfwf27lc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4a) 9.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 7.5-in (R-27) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
269	(1) 0.5-in gravel roofing	10.0	27	rfwf27tg
	(2) 0.375-in tar roofing			
	(3) 0.125-in felt building membrane			
	(4) 1-in plywood sheathing			
	(5a) 9.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 7.5-in (R-27) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
270	(1) 0.25-in asphalt composition shingles	10.0	33	rfwf33co

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4a) 11.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 9.5-in (R-33) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
271	(1) 0.25-in wood roof shakes	10.0	33	rfwf33wo
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4a) 11.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 9.5-in (R-33) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
272	(1) 0.5-in clay roof tile	10.0	33	rfwf33rc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4a) 11.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 9.5-in (R-33) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
273	(1) 0.25-in lightweight concrete roof tile	10.0	33	rfwf33lc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4a) 11.5-in wood roof rafters @ 24 in o.c.			
	(4b) 2-in sloped air spaces + 9.5-in (R-33) mineral fiber batt insulation			
	(5) 0.5-in gypsum wallboard			
274	(1) 0.5-in gravel roofing	10.0	33	rfwf33tg
	(2) 0.375-in tar roofing			
	(3) 0.125-in felt building membrane			
	(4) 1-in plywood sheathing			
	(5a) 11.5-in wood roof rafters @ 24 in o.c.			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(5b) 2-in sloped air spaces + 9.5-in (R-33) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
Roofs with Radiant Barriers				
275	(1) 0.25-in asphalt composition shingles	10.0	3.2	rfrb00co
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4a) 3.5-in wood roof rafters @ 24 in o.c.			
	(4b) 3.5-in (R-3.2) radiant barrier spaces			
276	(1) 0.25-in wood roof shakes	10.0	3.2	rfrb00wo
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4a) 3.5-in wood roof rafters @ 24 in o.c.			
	(4b) 3.5-in (R-3.2) radiant barrier spaces			
277	(1) 0.5-in clay roof tile	10.0	3.2	rfrb00rc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4a) 3.5-in wood roof rafters @ 24 in o.c.			
	(4b) 3.5-in (R-3.2) radiant barrier spaces			
278	(1) 0.25-in lightweight concrete roof tile	10.0	3.2	rfrb00lc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4a) 3.5-in wood roof rafters @ 24 in o.c.			
	(4b) 3.5-in (R-3.2) radiant barrier spaces			
279	(1) 0.5-in gravel roofing	10.0	3.2	rfrb00tg
	(2) 0.375-in tar roofing			
	(3) 0.125-in felt building membrane			
	(4) 1-in plywood sheathing			
	(5a) 3.5-in wood roof rafters @ 24 in o.c.			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(5b) 3.5-in (R-3.2) radiant barrier spaces			
Roofs with Expanded Polystyrene Insulation				
280	(1) 0.25-in asphalt composition shingles	10.0	0 + 5	rfps00co
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 3.5-in wood roof rafters @ 24 in o.c.			
	(5b) 3.5-in sloped air spaces			
281	(1) 0.25-in wood roof shakes	10.0	0 + 5	rfps00wo
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 3.5-in wood roof rafters @ 24 in o.c.			
	(5b) 3.5-in sloped air spaces			
282	(1) 0.5-in clay roof tile	10.0	0 + 5	rfps00rc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 3.5-in wood roof rafters @ 24 in o.c.			
	(5b) 3.5-in sloped air spaces			
283	(1) 0.25-in lightweight concrete roof tile	10.0	0 + 5	rfps00lc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 3.5-in wood roof rafters @ 24 in o.c.			
	(5b) 3.5-in sloped air spaces			
284	(1) 0.5-in gravel roofing	10.0	0 + 5	rfps00tg
	(2) 0.375-in tar roofing			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(3) 0.125-in felt building membrane			
	(4) 1-in plywood sheathing			
	(5) 1-in expanded polystyrene insulation			
	(6a) 3.5-in wood roof rafters @ 24 in o.c.			
	(6b) 3.5-in sloped air spaces			
285	(1) 0.25-in asphalt composition shingles	10.0	11 + 5	rfps11co
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 5.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 3.5-in (R-11) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
286	(1) 0.25-in wood roof shakes	10.0	11 + 5	rfps11wo
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 5.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 3.5-in (R-11) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
287	(1) 0.5-in clay roof tile	10.0	11 + 5	rfps11rc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 5.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 3.5-in (R-11) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
288	(1) 0.25-in lightweight concrete roof tile	10.0	11 + 5	rfps11lc
	(2) 0.125-in felt building membrane			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(3) 1-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 5.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 3.5-in (R-11) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
289	(1) 0.5-in gravel roofing	10.0	11 + 5	rfps11tg
	(2) 0.375-in tar roofing			
	(3) 0.125-in felt building membrane			
	(4) 1-in plywood sheathing			
	(5) 1-in expanded polystyrene insulation			
	(6a) 5.5-in wood roof rafters @ 24 in o.c.			
	(6b) 2-in sloped air spaces + 3.5-in (R-11) mineral fiber batt insulation			
	(7) 0.5-in gypsum wallboard			
290	(1) 0.25-in asphalt composition shingles	10.0	13 + 5	rfps13co
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 5.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 3.5-in (R-13) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
291	(1) 0.25-in wood roof shakes	10.0	13 + 5	rfps13wo
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 5.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 3.5-in (R-13) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
292	(1) 0.5-in clay roof tile	10.0	13 + 5	rfps13rc

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 5.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 3.5-in (R-13) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
293	(1) 0.25-in lightweight concrete roof tile	10.0	13 + 5	rfps13lc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 5.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 3.5-in (R-13) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
294	(1) 0.5-in gravel roofing	10.0	13 + 5	rfps13tg
	(2) 0.375-in tar roofing			
	(3) 0.125-in felt building membrane			
	(4) 1-in plywood sheathing			
	(5) 1-in expanded polystyrene insulation			
	(6a) 5.5-in wood roof rafters @ 24 in o.c.			
	(6b) 2-in sloped air spaces + 3.5-in (R-13) mineral fiber batt insulation			
	(7) 0.5-in gypsum wallboard			
295	(1) 0.25-in asphalt composition shingles	10.0	15 + 5	rfps15co
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 5.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 3.5-in (R-15) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
296	(1) 0.25-in wood roof shakes	10.0	15 + 5	rfps15wo
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 5.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 3.5-in (R-15) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
297	(1) 0.5-in clay roof tile	10.0	15 + 5	rfps15rc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 5.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 3.5-in (R-15) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
298	(1) 0.25-in lightweight concrete roof tile	10.0	15 + 5	rfps15lc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 5.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 3.5-in (R-15) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
299	(1) 0.5-in gravel roofing	10.0	15 + 5	rfps15tg
	(2) 0.375-in tar roofing			
	(3) 0.125-in felt building membrane			
	(4) 1-in plywood sheathing			
	(5) 1-in expanded polystyrene insulation			
	(6a) 5.5-in wood roof rafters @ 24 in o.c.			
	(6b) 2-in sloped air spaces + 3.5-in (R-15) mineral fiber batt insulation			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(7) 0.5-in gypsum wallboard			
300	(1) 0.25-in asphalt composition shingles	10.0	19 + 5	rfps19co
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 7.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 5.5-in (R-19) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
301	(1) 0.25-in wood roof shakes	10.0	19 + 5	rfps19wo
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 7.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 5.5-in (R-19) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
302	(1) 0.5-in clay roof tile	10.0	19 + 5	rfps19rc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 7.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 5.5-in (R-19) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
303	(1) 0.25-in lightweight concrete roof tile	10.0	19 + 5	rfps19lc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 7.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 5.5-in (R-19) mineral fiber batt insulation			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(6) 0.5-in gypsum wallboard			
304	(1) 0.5-in gravel roofing	10.0	19 + 5	rfps19tg
	(2) 0.375-in tar roofing			
	(3) 0.125-in felt building membrane			
	(4) 1-in plywood sheathing			
	(5) 1-in expanded polystyrene insulation			
	(6a) 7.5-in wood roof rafters @ 24 in o.c.			
	(6b) 2-in sloped air spaces + 5.5-in (R-19) mineral fiber batt insulation			
	(7) 0.5-in gypsum wallboard			
305	(1) 0.25-in asphalt composition shingles	10.0	21 + 5	rfps21co
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 7.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 5.5-in (R-21) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
306	(1) 0.25-in wood roof shakes	10.0	21 + 5	rfps21wo
	(2) 0.125-in felt building membrane			
	(3) 0.625-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 7.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 5.5-in (R-21) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
307	(1) 0.5-in clay roof tile	10.0	21 + 5	rfps21rc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 7.5-in wood roof rafters @ 24 in o.c.			

Table 4. Constructions Modeled in the *Home Energy Saver* (continued)

Construction Type		Framing Factor (%)	Total Insulation ($h \cdot ft^2 \cdot °F/Btu$)	DOE-2 Code Name
No.	Layers			
	(5b) 2-in sloped air spaces + 5.5-in (R-21) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
308	(1) 0.25-in lightweight concrete roof tile	10.0	21 + 5	rfps21lc
	(2) 0.125-in felt building membrane			
	(3) 1-in plywood sheathing			
	(4) 1-in expanded polystyrene insulation			
	(5a) 7.5-in wood roof rafters @ 24 in o.c.			
	(5b) 2-in sloped air spaces + 5.5-in (R-21) mineral fiber batt insulation			
	(6) 0.5-in gypsum wallboard			
309	(1) 0.5-in gravel roofing	10.0	21 + 5	rfps21tg
	(2) 0.375-in tar roofing			
	(3) 0.125-in felt building membrane			
	(4) 1-in plywood sheathing			
	(5) 1-in expanded polystyrene insulation			
	(6a) 7.5-in wood roof rafters @ 24 in o.c.			
	(6b) 2-in sloped air spaces + 5.5-in (R-21) mineral fiber batt insulation			
	(7) 0.5-in gypsum wallboard			

Table 5. Exterior Surface Roughnesses Modeled in the *Home Energy Saver*

Exterior Covering Type	Surface Roughness
Wood siding, stucco finish, wood roof shakes, tar and gravel roofing	1
Brick veneer, structural brick, concrete block	2
Poured concrete, asphalt composition roof shingles, clay roof tile, concrete roof tile	3
Vinyl siding	4
Aluminum siding	5

Table 6. Exterior Surface Absorptances Modeled in the *Home Energy Saver*

Surface Description	Wall Absorptance (-)	Roof Absorptance (-)
High-reflectance	-	0.40
White	0.35	0.50
Light	0.55	0.65
Medium	0.70	0.75
Medium dark	0.80	0.85
Dark	0.90	0.95

Table 7. Doors Modeled in the *Home Energy Saver*

Door Type			Door U-Factor		DOE-2
Core Type	Edge Type	Frame Type	Nominal (Btu/h·ft^2·°F)	DOE-2 (Btu/h·ft^2·°F)	Code Name
Wood	Wood	Wood	0.46	0.51	www
Insulated steel	Wood	Wood	0.16	0.17	sww
Insulated steel	Metal	Steel	0.37	0.40	sms
Cardboard honeycomb	Metal	Steel	0.61	0.69	cms

Table 8. Windows and Skylights Modeled in the *Home Energy Saver*

Window or Skylight Type			Window U-Factor		Skylight U-Factor		SHGC	SC	DOE-2
Glazing Type	Spacer Type	Frame Type	Nominal (Btu/h·ft^2·°F)	DOE-2 (Btu/h·ft^2·°F)	Nominal (Btu/h·ft^2·°F)	DOE-2 (Btu/h·ft^2·°F)	Nominal (-)	DOE-2 (-)	Code Name
Single-pane, clear	(N/A)	Aluminum	1.27	1.69	1.98	3.24	0.75	0.86	scna
Single-pane, clear	(N/A)	Wood or vinyl	0.89	1.08	1.47	2.06	0.64	0.74	scnw
Single-pane, tinted	(N/A)	Aluminum	1.27	1.69	1.98	3.24	0.64	0.74	stna
Single-pane, tinted	(N/A)	Wood or vinyl	0.89	1.08	1.47	2.06	0.54	0.62	stnw
Double-pane, clear	Aluminum	Aluminum	0.81	0.96	1.30	1.74	0.67	0.77	dcaa
Double-pane, clear	Aluminum	ATB[a]	0.60	0.68	1.10	1.40	0.67	0.77	dcab
Double-pane, clear	Aluminum	Wood or vinyl	0.51	0.57	0.84	1.01	0.56	0.64	dcaw
Double-pane, tinted	Aluminum	Aluminum	0.81	0.96	1.30	1.74	0.55	0.63	dtaa
Double-pane, tinted	Aluminum	ATB[a]	0.60	0.68	1.10	1.40	0.55	0.63	dtab
Double-pane, tinted	Aluminum	Wood or vinyl	0.51	0.57	0.84	1.01	0.46	0.53	dtaw
Double-pane, high-solar-gain low-E (e = 0.20 on surface 3)	Aluminum	Wood or vinyl	0.42	0.46	0.74	0.87	0.52	0.60	dpeaw
Double-pane, high-solar-gain low-E (e = 0.20 on surface 3), argon gas fill	Aluminum	ATB[a]	0.47	0.52	0.95	1.17	0.62	0.71	dpeaab
Double-pane, high-solar-gain low-E (e = 0.20 on surface 3), argon gas fill	Aluminum	Wood or vinyl	0.39	0.42	0.68	0.78	0.52	0.60	dpeaaw
Double-pane, low-solar-gain low-E (e = 0.05 on surface 2)	Aluminum	Aluminum	0.67	0.77	1.17	1.52	0.37	0.43	dseaa
Double-pane, low-solar-gain low-E (e = 0.05 on surface 2)	Aluminum	ATB[a]	0.47	0.52	0.98	1.21	0.37	0.43	dseab
Double-pane, low-solar-gain low-E (e = 0.05 on surface 2)	Aluminum	Wood or vinyl	0.39	0.42	0.71	0.82	0.31	0.36	dseaw
Double-pane, low-solar-gain low-E (e = 0.05 on surface 2), argon gas fill	Aluminum	Wood or vinyl	0.36	0.39	0.65	0.74	0.31	0.36	dseaaw
Triple-pane, moderate-solar-gain low-E (e = 0.10 on surfaces 3 and 5), argon gas fill	Butyl-metal	Wood or vinyl	0.27	0.29	0.47	0.52	0.31	0.36	thmabw

[a]ATB is an acronym for an aluminum window frame with a thermal break.

Table 9. Window and Skylight Shades Modeled in the *Home Energy Saver*

Shade Type	Applicability		Shading Multiplier (-)	DOE-2 Code Name
	Windows	Skylights		
(Unshaded)	•	•	1.00	none
Interior drapes	•		0.25	drapes
Interior roller shades	•	•	0.25	roller
Interior venetian blinds	•	•	0.25	int_blind
Exterior venetian blinds	•		0.15	ext_blind
Exterior sunscreens	•		0.50	screen

Table 10. Foundations Modeled in the *Home Energy Saver*

Foundation Type	DOE-2 Code Name	Insulation Position	Insulation Level ($h \cdot ft^2 \cdot °F/Btu$)	Effective U-Factor ($Btu/h \cdot ft \cdot °F$)
Slab-on-grade	slab	(Uninsulated)	0	0.77
		Perimeter[a] / gap[b]	5	0.54
Unconditioned basement	uncond_base	(Uninsulated)	0	1.94
Conditioned basement	cond_base	(Uninsulated)	0	1.94
		Wall inner surface	11	0.78
		Wall inner surface	19	0.78
Raised basement	cond_base	(Uninsulated)	0	1.61
		Wall inner surface	11	0.79
		Wall inner surface	19	0.79
Unvented crawlspace	unvent_crawl	(Uninsulated)	0	1.29
		Wall inner surface	11	0.91
		Wall inner surface	19	0.91
Vented crawlspace	vent_crawl	(Uninsulated)	0	1.29

[a]Insulation underneath the slab, extending from the exterior edge inward a minimum of 2 ft on all sides.

[b]Vertical insulation between the slab edge and footing stem.

Table 11. HVAC Systems Modeled in the *Home Energy Saver*

System Type	Measure of Efficiency	Comment	DOE-2 Code Name
Heating Systems			
(Unheated)	(N/A)	Simulated as a central gas furnace to prevent a DOE-2 error	non
Central gas furnace	AFUE		gfn
Gas wall furnace	AFUE	Simulated as a central gas furnace	gwf
Propane (LPG) furnace	AFUE	Simulated as a central gas furnace	pfn
Oil furnace	AFUE	Simulated as a central gas furnace	ofn
Electric furnace	AFUE	Simulated as a central gas furnace	efn
Electric heat pump	HSPF		ehp
Electric baseboard heater	AFUE	Simulated as a central gas furnace	ebb
Gas boiler	AFUE		gbl
Oil boiler	AFUE		obl
Cooling Systems			
(Uncooled)	(N/A)		non
Central air conditioner	SEER		cac
Window-mounted air conditioner	EER	Simulated as a central air conditioner	rac
Electric heat pump	SEER		ehp

Table 12. DOE-2 Outputs From the *Home Energy Saver*

DOE-2 Output Report	Outputs Captured
BEPS	Annual energy consumption by end use and utility type
PS-A	Monthly energy consumption by end use and utility type
SV-A	Capacities of HVAC systems other than boilers
PV-A	Capacities of boilers

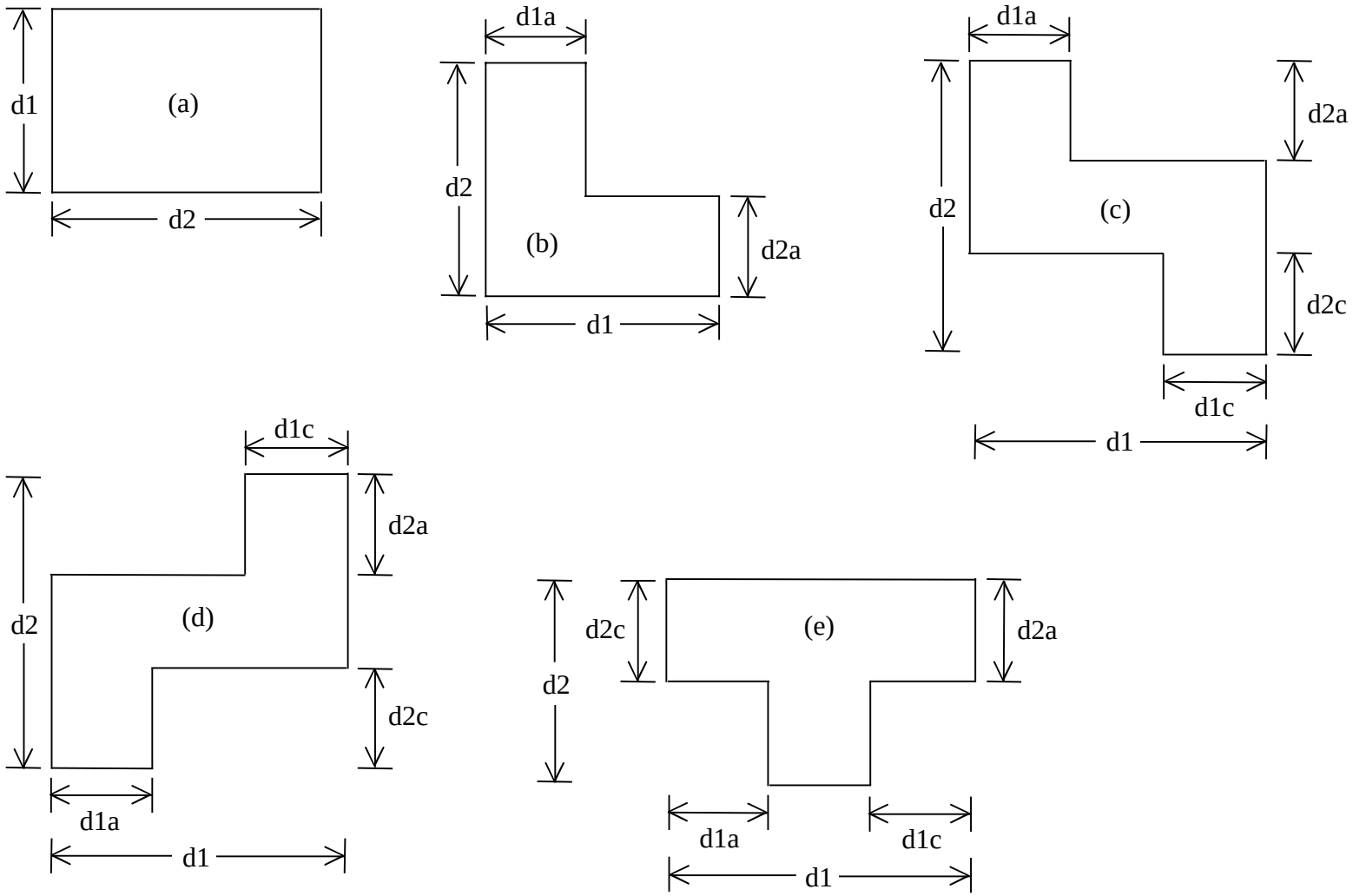

Figure 1. Input dimensions for the house floor plan types modeled in the *Home Energy Saver*: (a) rectangular; (b) L-shaped; (c) forward-S-shaped; (d) backward-S-shaped; and (e) T-shaped.

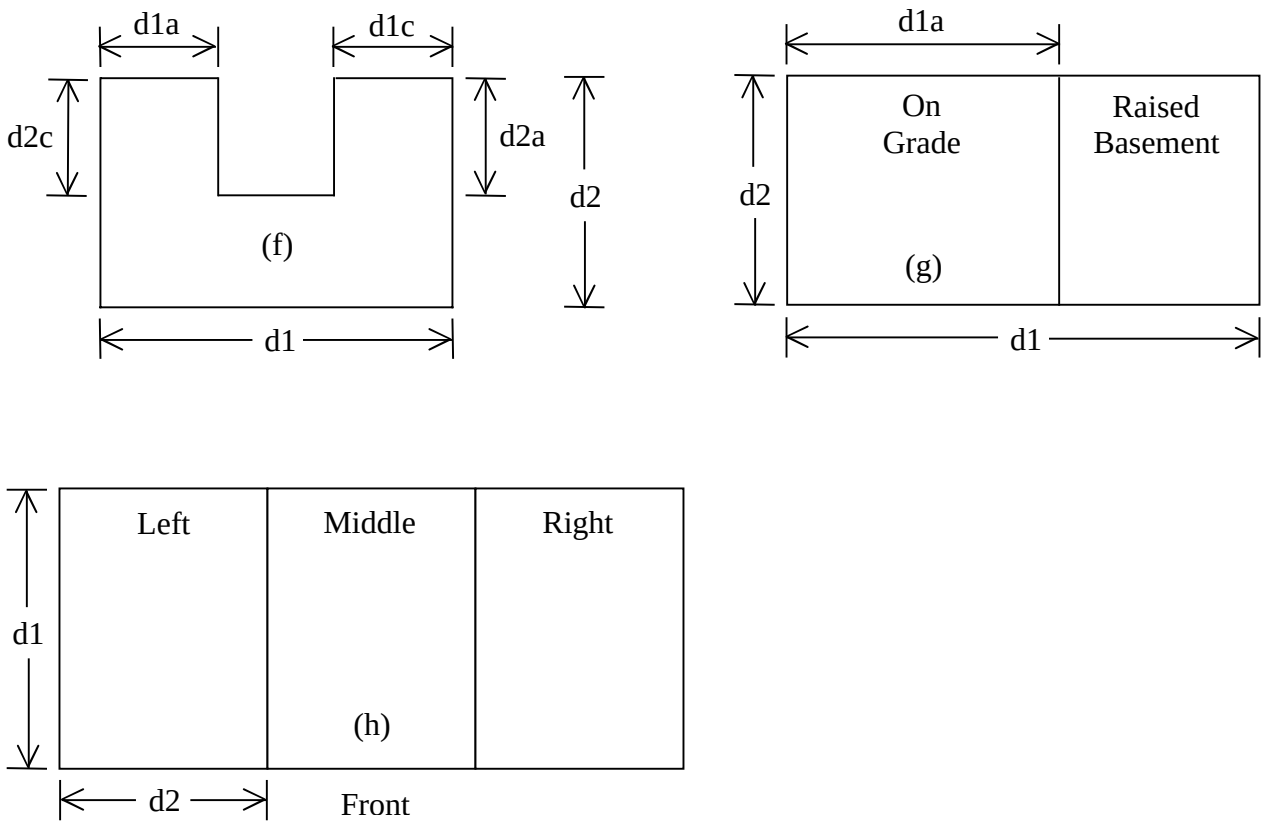

Figure 1 (continued). Input dimensions for the house floor plan types modeled in the *Home Energy Saver*: (f) U-shaped; (g) split-level; and (h) townhouse.

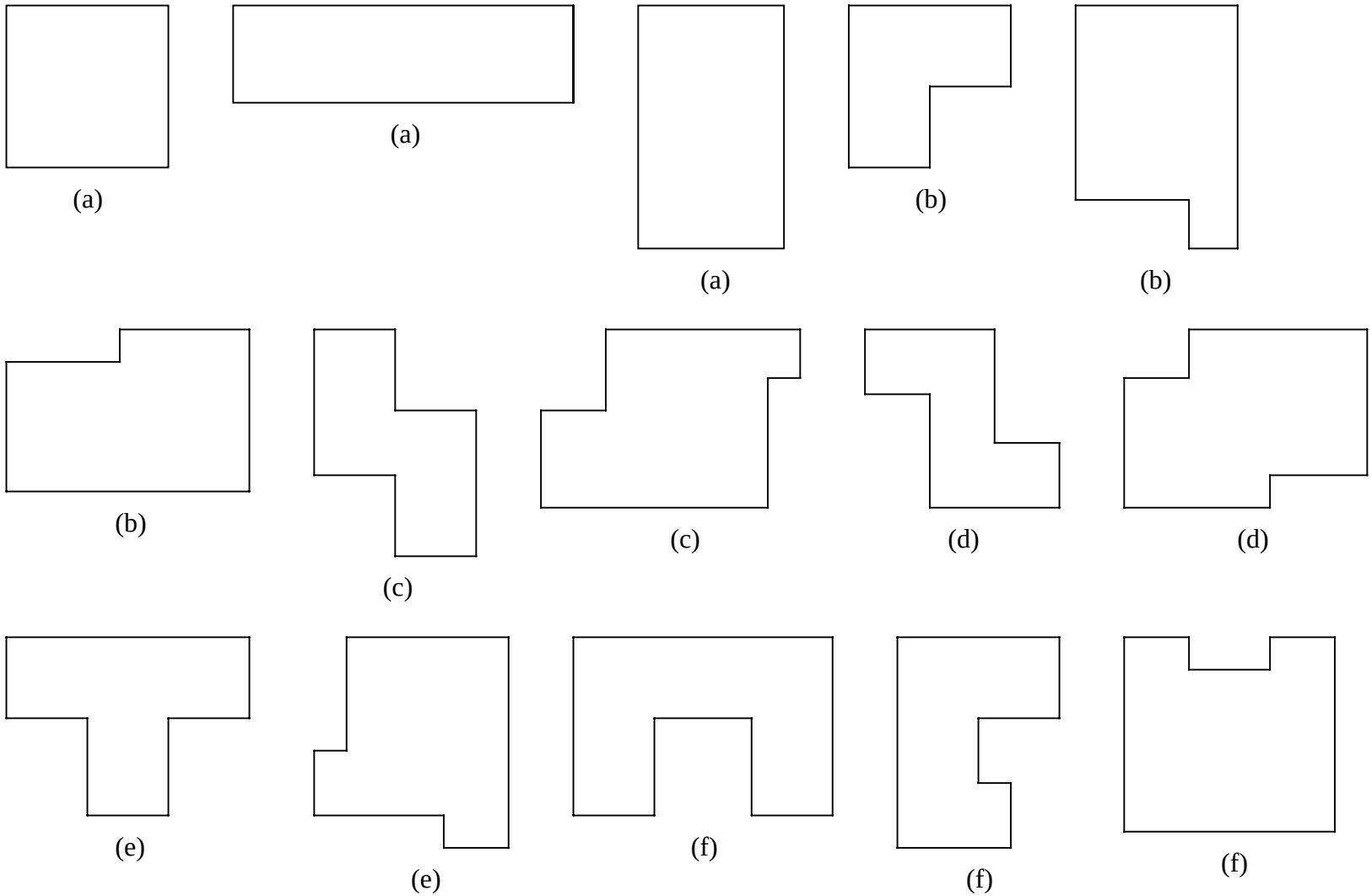

Figure 2. Examples of the variety of house floor plans that can be modeled in the *Home Energy Saver*: (a) rectangular; (b) L-shaped; (c) forward-S-shaped; (d) backward-S-shaped; (e) T-shaped; and (f) U-shaped.

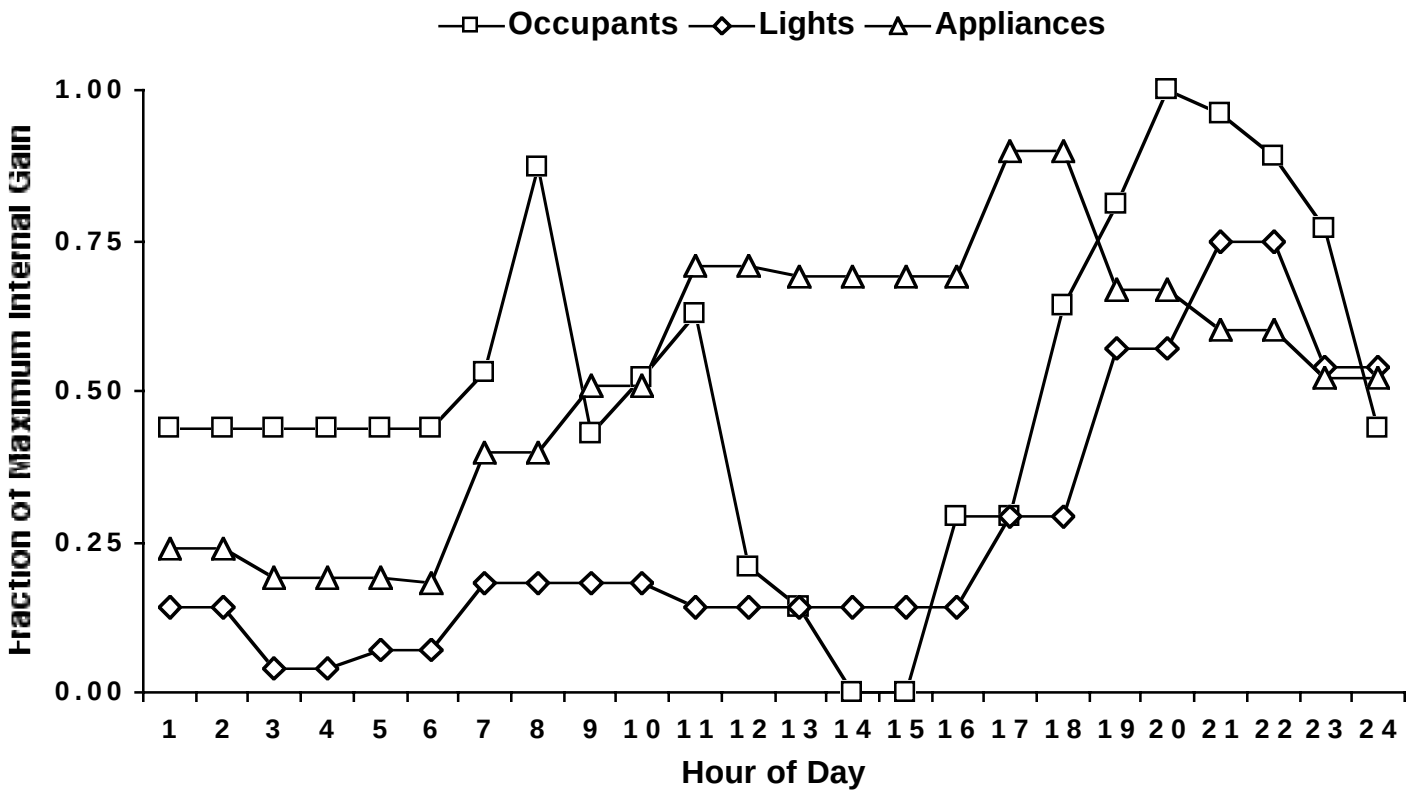

Figure 3. Daily profiles assumed in the *Home Energy Saver* for internal gains generated by occupants, lights, and appliances.