

SAP WorkSheet: New dwelling design stage

Heat loss parameter (HLP), W/m²K

$$(40)m = (39)m + (4)$$

(40)m=	1.34	1.34	1.33	1.33	1.32	1.32	1.32	1.32	1.32	1.32	1.33	1.33	
	Average = Sum(40) _{1..12} / 12 =												1.33 (40)

Number of days in month (Table 1a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(41)m=	31	28	31	30	31	30	31	31	30	31	30	31	(41)

4 Water heating energy requirement

kWh/year

Assumed occupancy, N

3.52 (42)

if TFA > 13.9, N = 1 + 1.76 x [1 - exp(-0.000349 x (TFA - 13.9)²)] + 0.0013 x (TFA - 13.9)

if TFA ≤ 13.9, N = 1

Annual average hot water usage in litres per day Vd, average = (25 x N) + 36

117.83 (43)

Reduce the annual average hot water usage by 5% if the dwelling is designed to achieve a water use target of not more than 125 litres per person per day (all water use, hot and cold)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Hot water usage in litres per day for each month Vd,m = factor from Table 1c x (43)

(44)m=	129.61	124.9	120.18	115.47	110.76	106.04	106.04	110.76	115.47	120.18	124.9	129.61	
	Total = Sum(44) _{1..12} =												1413.91 (44)

Energy content of hot water used - calculated monthly = 4.190 x Vd,m x nm x DTm / 3600 kWh/month (see Tables 1b, 1c, 1d)

(45)m=	192.21	168.1	173.47	151.23	145.11	125.22	116.04	133.15	134.74	157.03	171.41	186.14	
	Total = Sum(45) _{1..12} =												1853.86 (45)

If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61)

(46)m=	28.83	25.22	26.02	22.69	21.77	18.78	17.41	19.97	20.21	23.55	25.71	27.92	(46)
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Water storage loss:

Storage volume (litres) including any solar or WWHRS storage within same vessel

500 (47)

If community heating and no tank in dwelling, enter 110 litres in (47)

Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47)

Water storage loss:

a) If manufacturer's declared loss factor is known (kWh/day):

3.5 (48)

Temperature factor from Table 2b

0.54 (49)

Energy lost from water storage, kWh/year

(48) x (49) = 1.89 (50)

b) If manufacturer's declared cylinder loss factor is not known:

Hot water storage loss factor from Table 2 (kWh/litre/day)

0 (51)

If community heating see section 4.3

Volume factor from Table 2a

0 (52)

Temperature factor from Table 2b

0 (53)

Energy lost from water storage, kWh/year

(47) x (51) x (52) x (53) = 0 (54)

Enter (50) or (54) in (55)

1.89 (55)

Water storage loss calculated for each month

$$((56)m = (55) \times (41)m$$

(56)m=	58.59	52.92	58.59	56.7	58.59	56.7	58.59	58.59	56.7	58.59	56.7	58.59	(56)
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If cylinder contains dedicated solar storage, (57)m = (56)m x [(50) - (H11)] + (50), else (57)m = (56)m where (H11) is from Appendix H

(57)m=	58.59	52.92	58.59	56.7	58.59	56.7	58.59	58.59	56.7	58.59	56.7	58.59	(57)
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Primary circuit loss (annual) from Table 3

0 (58)

Primary circuit loss calculated for each month (59)m = (58) ÷ 365 × (41)m

(modified by factor from Table H5 if there is solar water heating and a cylinder thermostat)

(59)m=	23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26	(59)
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SAP WorkSheet: New dwelling design stage

Combi loss calculated for each month (61)m = (60) ÷ 365 × (41)m

(61)m=	0	0	0	0	0	0	0	0	0	0	0	0	(61)
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Total heat required for water heating calculated for each month (62)m = 0.85 × (45)m + (46)m + (57)m + (59)m + (61)m

(62)m=	274.06	242.04	255.32	230.45	226.97	204.43	197.89	215.01	213.96	238.88	250.62	267.99	(62)
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Solar DHW input calculated using Appendix G or Appendix H (negative quantity) (enter '0' if no solar contribution to water heating)

(add additional lines if FGHS and/or VVHRS applies, see Appendix G)

(63)m=	0	0	0	0	0	0	0	0	0	0	0	0	(63)
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Output from water heater

(64)m=	274.06	242.04	255.32	230.45	226.97	204.43	197.89	215.01	213.96	238.88	250.62	267.99	
Output from water heater (annual) _{1...12}												2817.61	(64)

Heat gains from water heating, kWh/month 0.25 × [0.85 × (45)m + (61)m] + 0.8 × [(46)m + (57)m + (59)m]

(65)m=	129.39	115.04	123.16	113.66	113.73	105.01	104.06	109.76	108.17	117.69	120.36	127.37	(65)
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include (57)m in calculation of (65)m only if cylinder is in the dwelling or hot water is from community heating

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m=	211.27	211.27	211.27	211.27	211.27	211.27	211.27	211.27	211.27	211.27	211.27	211.27	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

(67)m=	149.58	132.85	108.04	81.79	61.14	51.62	55.78	72.5	97.31	123.56	144.21	153.73	(67)
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Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

(68)m=	1001.66	1012.05	985.86	930.1	859.71	793.56	749.36	738.97	765.16	820.92	891.31	957.46	(68)
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Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

(69)m=	59.65	59.65	59.65	59.65	59.65	59.65	59.65	59.65	59.65	59.65	59.65	59.65	(69)
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Pumps and fans gains (Table 5a)

(70)m=	10	10	10	10	10	10	10	10	10	10	10	10	(70)
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Losses e.g. evaporation (negative values) (Table 5)

(71)m=	-140.84	-140.84	-140.84	-140.84	-140.84	-140.84	-140.84	-140.84	-140.84	-140.84	-140.84	-140.84	(71)
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Water heating gains (Table 5)

(72)m=	173.91	171.19	165.54	157.85	152.87	145.84	139.87	147.52	150.24	158.19	167.17	171.2	(72)
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Total internal gains = (66)m + (67)m + (68)m + (69)m + (70)m + (71)m + (72)m

(73)m=	1465.22	1456.17	1399.51	1309.82	1213.79	1131.09	1085.08	1099.06	1152.78	1242.74	1342.76	1422.47	(73)
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6. Solar gains

Solar gains are calculated using solar flux from Table 6a and associated equations to convert to the applicable orientation.

Orientation:	Access Factor Table 6d			Area m ²		Flux Table 6a		g _L Table 6b		FF Table 6c		Gains (W)	
North	0.9x	0.77	x	1.61	x	10.63	x	0.63	x	0.7	=	5.23	(74)
North	0.9x	0.77	x	0.36	x	10.63	x	0.63	x	0.7	=	2.34	(74)
North	0.9x	0.77	x	0.8	x	10.63	x	0.63	x	0.7	=	5.2	(74)
North	0.9x	0.77	x	0.64	x	10.63	x	0.63	x	0.7	=	4.16	(74)
North	0.9x	0.77	x	14.11	x	10.63	x	0.63	x	0.7	=	45.85	(74)

SAP WorkSheet: New dwelling design stage

North	0.9x	0.77	x	1.61	x	20.32	x	0.63	x	0.7	=	10	(74)
North	0.9x	0.77	x	0.36	x	20.32	x	0.63	x	0.7	=	4.47	(74)
North	0.9x	0.77	x	0.8	x	20.32	x	0.63	x	0.7	=	9.94	(74)
North	0.9x	0.77	x	0.64	x	20.32	x	0.63	x	0.7	=	7.95	(74)
North	0.9x	0.77	x	14.11	x	20.32	x	0.63	x	0.7	=	87.63	(74)
North	0.9x	0.77	x	1.61	x	34.53	x	0.63	x	0.7	=	16.99	(74)
North	0.9x	0.77	x	0.36	x	34.53	x	0.63	x	0.7	=	7.6	(74)
North	0.9x	0.77	x	0.8	x	34.53	x	0.63	x	0.7	=	16.88	(74)
North	0.9x	0.77	x	0.64	x	34.53	x	0.63	x	0.7	=	13.51	(74)
North	0.9x	0.77	x	14.11	x	34.53	x	0.63	x	0.7	=	148.9	(74)
North	0.9x	0.77	x	1.61	x	55.46	x	0.63	x	0.7	=	27.29	(74)
North	0.9x	0.77	x	0.36	x	55.46	x	0.63	x	0.7	=	12.2	(74)
North	0.9x	0.77	x	0.8	x	55.46	x	0.63	x	0.7	=	27.12	(74)
North	0.9x	0.77	x	0.64	x	55.46	x	0.63	x	0.7	=	21.7	(74)
North	0.9x	0.77	x	14.11	x	55.46	x	0.63	x	0.7	=	239.17	(74)
North	0.9x	0.77	x	1.61	x	74.72	x	0.63	x	0.7	=	36.76	(74)
North	0.9x	0.77	x	0.36	x	74.72	x	0.63	x	0.7	=	16.44	(74)
North	0.9x	0.77	x	0.8	x	74.72	x	0.63	x	0.7	=	36.53	(74)
North	0.9x	0.77	x	0.64	x	74.72	x	0.63	x	0.7	=	29.23	(74)
North	0.9x	0.77	x	14.11	x	74.72	x	0.63	x	0.7	=	322.19	(74)
North	0.9x	0.77	x	1.61	x	79.99	x	0.63	x	0.7	=	39.36	(74)
North	0.9x	0.77	x	0.36	x	79.99	x	0.63	x	0.7	=	17.6	(74)
North	0.9x	0.77	x	0.8	x	79.99	x	0.63	x	0.7	=	39.11	(74)
North	0.9x	0.77	x	0.64	x	79.99	x	0.63	x	0.7	=	31.29	(74)
North	0.9x	0.77	x	14.11	x	79.99	x	0.63	x	0.7	=	344.91	(74)
North	0.9x	0.77	x	1.61	x	74.68	x	0.63	x	0.7	=	36.74	(74)
North	0.9x	0.77	x	0.36	x	74.68	x	0.63	x	0.7	=	16.43	(74)
North	0.9x	0.77	x	0.8	x	74.68	x	0.63	x	0.7	=	36.52	(74)
North	0.9x	0.77	x	0.64	x	74.68	x	0.63	x	0.7	=	29.21	(74)
North	0.9x	0.77	x	14.11	x	74.68	x	0.63	x	0.7	=	322.02	(74)
North	0.9x	0.77	x	1.61	x	59.25	x	0.63	x	0.7	=	29.15	(74)
North	0.9x	0.77	x	0.36	x	59.25	x	0.63	x	0.7	=	13.04	(74)
North	0.9x	0.77	x	0.8	x	59.25	x	0.63	x	0.7	=	28.97	(74)
North	0.9x	0.77	x	0.64	x	59.25	x	0.63	x	0.7	=	23.18	(74)
North	0.9x	0.77	x	14.11	x	59.25	x	0.63	x	0.7	=	255.48	(74)
North	0.9x	0.77	x	1.61	x	41.52	x	0.63	x	0.7	=	20.43	(74)
North	0.9x	0.77	x	0.36	x	41.52	x	0.63	x	0.7	=	9.14	(74)
North	0.9x	0.77	x	0.8	x	41.52	x	0.63	x	0.7	=	20.3	(74)
North	0.9x	0.77	x	0.64	x	41.52	x	0.63	x	0.7	=	16.24	(74)
North	0.9x	0.77	x	14.11	x	41.52	x	0.63	x	0.7	=	179.03	(74)
North	0.9x	0.77	x	1.61	x	24.19	x	0.63	x	0.7	=	11.9	(74)

SAP WorkSheet: New dwelling design stage

North	0.9x	0.77	x	0.36	x	24.19	x	0.63	x	0.7	=	5.32	(74)
North	0.9x	0.77	x	0.8	x	24.19	x	0.63	x	0.7	=	11.83	(74)
North	0.9x	0.77	x	0.64	x	24.19	x	0.63	x	0.7	=	9.46	(74)
North	0.9x	0.77	x	14.11	x	24.19	x	0.63	x	0.7	=	104.31	(74)
North	0.9x	0.77	x	1.61	x	13.12	x	0.63	x	0.7	=	6.45	(74)
North	0.9x	0.77	x	0.36	x	13.12	x	0.63	x	0.7	=	2.89	(74)
North	0.9x	0.77	x	0.8	x	13.12	x	0.63	x	0.7	=	6.41	(74)
North	0.9x	0.77	x	0.64	x	13.12	x	0.63	x	0.7	=	5.13	(74)
North	0.9x	0.77	x	14.11	x	13.12	x	0.63	x	0.7	=	56.57	(74)
North	0.9x	0.77	x	1.61	x	8.86	x	0.63	x	0.7	=	4.36	(74)
North	0.9x	0.77	x	0.36	x	8.86	x	0.63	x	0.7	=	1.95	(74)
North	0.9x	0.77	x	0.8	x	8.86	x	0.63	x	0.7	=	4.33	(74)
North	0.9x	0.77	x	0.64	x	8.86	x	0.63	x	0.7	=	3.47	(74)
North	0.9x	0.77	x	14.11	x	8.86	x	0.63	x	0.7	=	38.23	(74)
South	0.9x	0.77	x	1.61	x	46.75	x	0.63	x	0.7	=	23	(78)
South	0.9x	0.77	x	8.72	x	46.75	x	0.63	x	0.7	=	124.59	(78)
South	0.9x	0.77	x	30.79	x	46.75	x	0.63	x	0.7	=	439.93	(78)
South	0.9x	0.77	x	3.97	x	46.75	x	0.63	x	0.7	=	56.72	(78)
South	0.9x	0.77	x	2.66	x	46.75	x	0.63	x	0.7	=	38.01	(78)
South	0.9x	0.77	x	6.08	x	46.75	x	0.63	x	0.7	=	86.87	(78)
South	0.9x	0.77	x	8.39	x	46.75	x	0.63	x	0.7	=	119.88	(78)
South	0.9x	0.77	x	0.25	x	46.75	x	0.63	x	0.7	=	3.57	(78)
South	0.9x	0.77	x	0.64	x	46.75	x	0.63	x	0.7	=	18.29	(78)
South	0.9x	0.77	x	0.72	x	46.75	x	0.63	x	0.7	=	10.29	(78)
South	0.9x	0.77	x	1.61	x	76.57	x	0.63	x	0.7	=	37.67	(78)
South	0.9x	0.77	x	8.72	x	76.57	x	0.63	x	0.7	=	204.05	(78)
South	0.9x	0.77	x	30.79	x	76.57	x	0.63	x	0.7	=	720.49	(78)
South	0.9x	0.77	x	3.97	x	76.57	x	0.63	x	0.7	=	92.9	(78)
South	0.9x	0.77	x	2.66	x	76.57	x	0.63	x	0.7	=	62.24	(78)
South	0.9x	0.77	x	6.08	x	76.57	x	0.63	x	0.7	=	142.27	(78)
South	0.9x	0.77	x	8.39	x	76.57	x	0.63	x	0.7	=	196.33	(78)
South	0.9x	0.77	x	0.25	x	76.57	x	0.63	x	0.7	=	5.85	(78)
South	0.9x	0.77	x	0.64	x	76.57	x	0.63	x	0.7	=	29.95	(78)
South	0.9x	0.77	x	0.72	x	76.57	x	0.63	x	0.7	=	16.85	(78)
South	0.9x	0.77	x	1.61	x	97.53	x	0.63	x	0.7	=	47.99	(78)
South	0.9x	0.77	x	8.72	x	97.53	x	0.63	x	0.7	=	259.92	(78)
South	0.9x	0.77	x	30.79	x	97.53	x	0.63	x	0.7	=	917.78	(78)
South	0.9x	0.77	x	3.97	x	97.53	x	0.63	x	0.7	=	118.34	(78)
South	0.9x	0.77	x	2.66	x	97.53	x	0.63	x	0.7	=	79.29	(78)
South	0.9x	0.77	x	6.08	x	97.53	x	0.63	x	0.7	=	181.23	(78)
South	0.9x	0.77	x	8.39	x	97.53	x	0.63	x	0.7	=	250.09	(78)

SAP WorkSheet: New dwelling design stage

South	0.9x	0.77	x	0.25	x	97.53	x	0.63	x	0.7	=	7.45	(78)
South	0.9x	0.77	x	0.64	x	97.53	x	0.63	x	0.7	=	38.15	(78)
South	0.9x	0.77	x	0.72	x	97.53	x	0.63	x	0.7	=	21.46	(78)
South	0.9x	0.77	x	1.61	x	110.23	x	0.63	x	0.7	=	54.24	(78)
South	0.9x	0.77	x	8.72	x	110.23	x	0.63	x	0.7	=	293.77	(78)
South	0.9x	0.77	x	30.79	x	110.23	x	0.63	x	0.7	=	1037.29	(78)
South	0.9x	0.77	x	3.97	x	110.23	x	0.63	x	0.7	=	133.75	(78)
South	0.9x	0.77	x	2.66	x	110.23	x	0.63	x	0.7	=	89.61	(78)
South	0.9x	0.77	x	6.08	x	110.23	x	0.63	x	0.7	=	204.83	(78)
South	0.9x	0.77	x	8.39	x	110.23	x	0.63	x	0.7	=	282.65	(78)
South	0.9x	0.77	x	0.25	x	110.23	x	0.63	x	0.7	=	8.42	(78)
South	0.9x	0.77	x	0.64	x	110.23	x	0.63	x	0.7	=	43.12	(78)
South	0.9x	0.77	x	0.72	x	110.23	x	0.63	x	0.7	=	24.26	(78)
South	0.9x	0.77	x	1.61	x	114.87	x	0.63	x	0.7	=	56.52	(78)
South	0.9x	0.77	x	8.72	x	114.87	x	0.63	x	0.7	=	306.13	(78)
South	0.9x	0.77	x	30.79	x	114.87	x	0.63	x	0.7	=	1080.92	(78)
South	0.9x	0.77	x	3.97	x	114.87	x	0.63	x	0.7	=	139.37	(78)
South	0.9x	0.77	x	2.66	x	114.87	x	0.63	x	0.7	=	93.38	(78)
South	0.9x	0.77	x	6.08	x	114.87	x	0.63	x	0.7	=	213.45	(78)
South	0.9x	0.77	x	8.39	x	114.87	x	0.63	x	0.7	=	294.54	(78)
South	0.9x	0.77	x	0.25	x	114.87	x	0.63	x	0.7	=	8.78	(78)
South	0.9x	0.77	x	0.64	x	114.87	x	0.63	x	0.7	=	44.94	(78)
South	0.9x	0.77	x	0.72	x	114.87	x	0.63	x	0.7	=	25.28	(78)
South	0.9x	0.77	x	1.61	x	110.55	x	0.63	x	0.7	=	54.39	(78)
South	0.9x	0.77	x	8.72	x	110.55	x	0.63	x	0.7	=	294.6	(78)
South	0.9x	0.77	x	30.79	x	110.55	x	0.63	x	0.7	=	1040.24	(78)
South	0.9x	0.77	x	3.97	x	110.55	x	0.63	x	0.7	=	134.13	(78)
South	0.9x	0.77	x	2.66	x	110.55	x	0.63	x	0.7	=	89.87	(78)
South	0.9x	0.77	x	6.08	x	110.55	x	0.63	x	0.7	=	205.41	(78)
South	0.9x	0.77	x	8.39	x	110.55	x	0.63	x	0.7	=	283.45	(78)
South	0.9x	0.77	x	0.25	x	110.55	x	0.63	x	0.7	=	8.45	(78)
South	0.9x	0.77	x	0.64	x	110.55	x	0.63	x	0.7	=	43.24	(78)
South	0.9x	0.77	x	0.72	x	110.55	x	0.63	x	0.7	=	24.33	(78)
South	0.9x	0.77	x	1.61	x	108.01	x	0.63	x	0.7	=	53.15	(78)
South	0.9x	0.77	x	8.72	x	108.01	x	0.63	x	0.7	=	287.85	(78)
South	0.9x	0.77	x	30.79	x	108.01	x	0.63	x	0.7	=	1016.37	(78)
South	0.9x	0.77	x	3.97	x	108.01	x	0.63	x	0.7	=	131.05	(78)
South	0.9x	0.77	x	2.66	x	108.01	x	0.63	x	0.7	=	87.81	(78)
South	0.9x	0.77	x	6.08	x	108.01	x	0.63	x	0.7	=	200.7	(78)
South	0.9x	0.77	x	8.39	x	108.01	x	0.63	x	0.7	=	276.95	(78)
South	0.9x	0.77	x	0.25	x	108.01	x	0.63	x	0.7	=	8.25	(78)

SAP WorkSheet: New dwelling design stage

South	0.9x	0.77	x	0.64	x	108.01	x	0.63	x	0.7	=	42.25	(78)
South	0.9x	0.77	x	0.72	x	108.01	x	0.63	x	0.7	=	23.77	(78)
South	0.9x	0.77	x	1.61	x	104.89	x	0.63	x	0.7	=	51.61	(78)
South	0.9x	0.77	x	8.72	x	104.89	x	0.63	x	0.7	=	279.54	(78)
South	0.9x	0.77	x	30.79	x	104.89	x	0.63	x	0.7	=	987.04	(78)
South	0.9x	0.77	x	3.97	x	104.89	x	0.63	x	0.7	=	127.27	(78)
South	0.9x	0.77	x	2.66	x	104.89	x	0.63	x	0.7	=	85.27	(78)
South	0.9x	0.77	x	6.08	x	104.89	x	0.63	x	0.7	=	194.91	(78)
South	0.9x	0.77	x	8.39	x	104.89	x	0.63	x	0.7	=	268.96	(78)
South	0.9x	0.77	x	0.25	x	104.89	x	0.63	x	0.7	=	8.01	(78)
South	0.9x	0.77	x	0.64	x	104.89	x	0.63	x	0.7	=	41.03	(78)
South	0.9x	0.77	x	0.72	x	104.89	x	0.63	x	0.7	=	23.08	(78)
South	0.9x	0.77	x	1.61	x	101.89	x	0.63	x	0.7	=	50.13	(78)
South	0.9x	0.77	x	8.72	x	101.89	x	0.63	x	0.7	=	271.52	(78)
South	0.9x	0.77	x	30.79	x	101.89	x	0.63	x	0.7	=	958.73	(78)
South	0.9x	0.77	x	3.97	x	101.89	x	0.63	x	0.7	=	123.62	(78)
South	0.9x	0.77	x	2.66	x	101.89	x	0.63	x	0.7	=	82.83	(78)
South	0.9x	0.77	x	6.08	x	101.89	x	0.63	x	0.7	=	189.32	(78)
South	0.9x	0.77	x	8.39	x	101.89	x	0.63	x	0.7	=	261.24	(78)
South	0.9x	0.77	x	0.25	x	101.89	x	0.63	x	0.7	=	7.78	(78)
South	0.9x	0.77	x	0.64	x	101.89	x	0.63	x	0.7	=	39.86	(78)
South	0.9x	0.77	x	0.72	x	101.89	x	0.63	x	0.7	=	22.42	(78)
South	0.9x	0.77	x	1.61	x	82.59	x	0.63	x	0.7	=	40.64	(78)
South	0.9x	0.77	x	8.72	x	82.59	x	0.63	x	0.7	=	220.09	(78)
South	0.9x	0.77	x	30.79	x	82.59	x	0.63	x	0.7	=	777.12	(78)
South	0.9x	0.77	x	3.97	x	82.59	x	0.63	x	0.7	=	100.2	(78)
South	0.9x	0.77	x	2.66	x	82.59	x	0.63	x	0.7	=	67.14	(78)
South	0.9x	0.77	x	6.08	x	82.59	x	0.63	x	0.7	=	153.45	(78)
South	0.9x	0.77	x	8.39	x	82.59	x	0.63	x	0.7	=	211.76	(78)
South	0.9x	0.77	x	0.25	x	82.59	x	0.63	x	0.7	=	6.31	(78)
South	0.9x	0.77	x	0.64	x	82.59	x	0.63	x	0.7	=	32.31	(78)
South	0.9x	0.77	x	0.72	x	82.59	x	0.63	x	0.7	=	18.17	(78)
South	0.9x	0.77	x	1.61	x	55.42	x	0.63	x	0.7	=	27.27	(78)
South	0.9x	0.77	x	8.72	x	55.42	x	0.63	x	0.7	=	147.68	(78)
South	0.9x	0.77	x	30.79	x	55.42	x	0.63	x	0.7	=	521.47	(78)
South	0.9x	0.77	x	3.97	x	55.42	x	0.63	x	0.7	=	67.24	(78)
South	0.9x	0.77	x	2.66	x	55.42	x	0.63	x	0.7	=	45.05	(78)
South	0.9x	0.77	x	6.08	x	55.42	x	0.63	x	0.7	=	102.97	(78)
South	0.9x	0.77	x	8.39	x	55.42	x	0.63	x	0.7	=	142.09	(78)
South	0.9x	0.77	x	0.25	x	55.42	x	0.63	x	0.7	=	4.23	(78)
South	0.9x	0.77	x	0.64	x	55.42	x	0.63	x	0.7	=	21.68	(78)

SAP WorkSheet: New dwelling design stage

South	0.9x	0.77	x	0.72	x	55.42	x	0.63	x	0.7	=	12.19	(78)
South	0.9x	0.77	x	1.61	x	40.4	x	0.63	x	0.7	=	19.88	(78)
South	0.9x	0.77	x	8.72	x	40.4	x	0.63	x	0.7	=	107.66	(78)
South	0.9x	0.77	x	30.79	x	40.4	x	0.63	x	0.7	=	380.14	(78)
South	0.9x	0.77	x	3.97	x	40.4	x	0.63	x	0.7	=	49.01	(78)
South	0.9x	0.77	x	2.66	x	40.4	x	0.63	x	0.7	=	32.84	(78)
South	0.9x	0.77	x	6.08	x	40.4	x	0.63	x	0.7	=	75.06	(78)
South	0.9x	0.77	x	8.39	x	40.4	x	0.63	x	0.7	=	103.58	(78)
South	0.9x	0.77	x	0.25	x	40.4	x	0.63	x	0.7	=	3.09	(78)
South	0.9x	0.77	x	0.64	x	40.4	x	0.63	x	0.7	=	15.8	(78)
South	0.9x	0.77	x	0.72	x	40.4	x	0.63	x	0.7	=	8.89	(78)
West	0.9x	0.77	x	8.18	x	19.64	x	0.63	x	0.7	=	49.1	(80)
West	0.9x	0.77	x	9.63	x	19.64	x	0.63	x	0.7	=	57.8	(80)
West	0.9x	0.77	x	11.5	x	19.64	x	0.63	x	0.7	=	69.03	(80)
West	0.9x	0.77	x	5.75	x	19.64	x	0.63	x	0.7	=	34.51	(80)
West	0.9x	0.77	x	5.7	x	19.64	x	0.63	x	0.7	=	34.21	(80)
West	0.9x	0.77	x	2.45	x	19.64	x	0.63	x	0.7	=	14.71	(80)
West	0.9x	0.77	x	9.52	x	19.64	x	0.63	x	0.7	=	57.14	(80)
West	0.9x	0.77	x	10.42	x	19.64	x	0.63	x	0.7	=	62.54	(80)
West	0.9x	0.77	x	11.33	x	19.64	x	0.63	x	0.7	=	68.01	(80)
West	0.9x	0.77	x	2.8	x	19.64	x	0.63	x	0.7	=	16.81	(80)
West	0.9x	0.77	x	8.18	x	38.42	x	0.63	x	0.7	=	96.05	(80)
West	0.9x	0.77	x	9.63	x	38.42	x	0.63	x	0.7	=	113.07	(80)
West	0.9x	0.77	x	11.5	x	38.42	x	0.63	x	0.7	=	135.03	(80)
West	0.9x	0.77	x	5.75	x	38.42	x	0.63	x	0.7	=	67.52	(80)
West	0.9x	0.77	x	5.7	x	38.42	x	0.63	x	0.7	=	66.93	(80)
West	0.9x	0.77	x	2.45	x	38.42	x	0.63	x	0.7	=	28.77	(80)
West	0.9x	0.77	x	9.52	x	38.42	x	0.63	x	0.7	=	111.78	(80)
West	0.9x	0.77	x	10.42	x	38.42	x	0.63	x	0.7	=	122.35	(80)
West	0.9x	0.77	x	11.33	x	38.42	x	0.63	x	0.7	=	133.03	(80)
West	0.9x	0.77	x	2.8	x	38.42	x	0.63	x	0.7	=	32.88	(80)
West	0.9x	0.77	x	8.18	x	63.27	x	0.63	x	0.7	=	158.18	(80)
West	0.9x	0.77	x	9.63	x	63.27	x	0.63	x	0.7	=	186.22	(80)
West	0.9x	0.77	x	11.5	x	63.27	x	0.63	x	0.7	=	222.38	(80)
West	0.9x	0.77	x	5.75	x	63.27	x	0.63	x	0.7	=	111.19	(80)
West	0.9x	0.77	x	5.7	x	63.27	x	0.63	x	0.7	=	110.22	(80)
West	0.9x	0.77	x	2.45	x	63.27	x	0.63	x	0.7	=	47.38	(80)
West	0.9x	0.77	x	9.52	x	63.27	x	0.63	x	0.7	=	184.09	(80)
West	0.9x	0.77	x	10.42	x	63.27	x	0.63	x	0.7	=	201.49	(80)
West	0.9x	0.77	x	11.33	x	63.27	x	0.63	x	0.7	=	219.09	(80)
West	0.9x	0.77	x	2.8	x	63.27	x	0.63	x	0.7	=	54.14	(80)

SAP WorkSheet: New dwelling design stage

West	0.9x	0.77	x	8.18	x	92.28	x	0.63	x	0.7	=	230.69	(80)
West	0.9x	0.77	x	9.63	x	92.28	x	0.63	x	0.7	=	271.59	(80)
West	0.9x	0.77	x	11.5	x	92.28	x	0.63	x	0.7	=	324.32	(80)
West	0.9x	0.77	x	5.75	x	92.28	x	0.63	x	0.7	=	162.16	(80)
West	0.9x	0.77	x	5.7	x	92.28	x	0.63	x	0.7	=	160.75	(80)
West	0.9x	0.77	x	2.45	x	92.28	x	0.63	x	0.7	=	69.09	(80)
West	0.9x	0.77	x	9.52	x	92.28	x	0.63	x	0.7	=	268.48	(80)
West	0.9x	0.77	x	10.42	x	92.28	x	0.63	x	0.7	=	293.86	(80)
West	0.9x	0.77	x	11.33	x	92.28	x	0.63	x	0.7	=	319.53	(80)
West	0.9x	0.77	x	2.8	x	92.28	x	0.63	x	0.7	=	78.97	(80)
West	0.9x	0.77	x	8.18	x	113.09	x	0.63	x	0.7	=	282.72	(80)
West	0.9x	0.77	x	9.63	x	113.09	x	0.63	x	0.7	=	332.84	(80)
West	0.9x	0.77	x	11.5	x	113.09	x	0.63	x	0.7	=	397.47	(80)
West	0.9x	0.77	x	5.75	x	113.09	x	0.63	x	0.7	=	198.73	(80)
West	0.9x	0.77	x	5.7	x	113.09	x	0.63	x	0.7	=	197.01	(80)
West	0.9x	0.77	x	2.45	x	113.09	x	0.63	x	0.7	=	84.68	(80)
West	0.9x	0.77	x	9.52	x	113.09	x	0.63	x	0.7	=	329.04	(80)
West	0.9x	0.77	x	10.42	x	113.09	x	0.63	x	0.7	=	360.14	(80)
West	0.9x	0.77	x	11.33	x	113.09	x	0.63	x	0.7	=	391.59	(80)
West	0.9x	0.77	x	2.8	x	113.09	x	0.63	x	0.7	=	96.78	(80)
West	0.9x	0.77	x	8.18	x	115.77	x	0.63	x	0.7	=	289.42	(80)
West	0.9x	0.77	x	9.63	x	115.77	x	0.63	x	0.7	=	340.72	(80)
West	0.9x	0.77	x	11.5	x	115.77	x	0.63	x	0.7	=	406.88	(80)
West	0.9x	0.77	x	5.75	x	115.77	x	0.63	x	0.7	=	203.44	(80)
West	0.9x	0.77	x	5.7	x	115.77	x	0.63	x	0.7	=	201.67	(80)
West	0.9x	0.77	x	2.45	x	115.77	x	0.63	x	0.7	=	86.68	(80)
West	0.9x	0.77	x	9.52	x	115.77	x	0.63	x	0.7	=	336.83	(80)
West	0.9x	0.77	x	10.42	x	115.77	x	0.63	x	0.7	=	368.67	(80)
West	0.9x	0.77	x	11.33	x	115.77	x	0.63	x	0.7	=	400.87	(80)
West	0.9x	0.77	x	2.8	x	115.77	x	0.63	x	0.7	=	99.07	(80)
West	0.9x	0.77	x	8.18	x	110.22	x	0.63	x	0.7	=	275.54	(80)
West	0.9x	0.77	x	9.63	x	110.22	x	0.63	x	0.7	=	324.38	(80)
West	0.9x	0.77	x	11.5	x	110.22	x	0.63	x	0.7	=	387.37	(80)
West	0.9x	0.77	x	5.75	x	110.22	x	0.63	x	0.7	=	193.68	(80)
West	0.9x	0.77	x	5.7	x	110.22	x	0.63	x	0.7	=	192	(80)
West	0.9x	0.77	x	2.45	x	110.22	x	0.63	x	0.7	=	82.53	(80)
West	0.9x	0.77	x	9.52	x	110.22	x	0.63	x	0.7	=	320.67	(80)
West	0.9x	0.77	x	10.42	x	110.22	x	0.63	x	0.7	=	350.99	(80)
West	0.9x	0.77	x	11.33	x	110.22	x	0.63	x	0.7	=	381.64	(80)
West	0.9x	0.77	x	2.8	x	110.22	x	0.63	x	0.7	=	94.32	(80)
West	0.9x	0.77	x	8.18	x	94.68	x	0.63	x	0.7	=	236.68	(80)

SAP WorkSheet: New dwelling design stage

West	0.9x	0.77	x	9.63	x	94.68	x	0.63	x	0.7	=	278.64	(80)
West	0.9x	0.77	x	11.5	x	94.68	x	0.63	x	0.7	=	332.74	(80)
West	0.9x	0.77	x	5.75	x	94.68	x	0.63	x	0.7	=	166.37	(80)
West	0.9x	0.77	x	5.7	x	94.68	x	0.63	x	0.7	=	164.92	(80)
West	0.9x	0.77	x	2.45	x	94.68	x	0.63	x	0.7	=	70.89	(80)
West	0.9x	0.77	x	9.52	x	94.68	x	0.63	x	0.7	=	275.45	(80)
West	0.9x	0.77	x	10.42	x	94.68	x	0.63	x	0.7	=	301.49	(80)
West	0.9x	0.77	x	11.33	x	94.68	x	0.63	x	0.7	=	327.82	(80)
West	0.9x	0.77	x	2.8	x	94.68	x	0.63	x	0.7	=	81.02	(80)
West	0.9x	0.77	x	8.18	x	73.59	x	0.63	x	0.7	=	183.97	(80)
West	0.9x	0.77	x	9.63	x	73.59	x	0.63	x	0.7	=	216.58	(80)
West	0.9x	0.77	x	11.5	x	73.59	x	0.63	x	0.7	=	258.63	(80)
West	0.9x	0.77	x	5.75	x	73.59	x	0.63	x	0.7	=	129.32	(80)
West	0.9x	0.77	x	5.7	x	73.59	x	0.63	x	0.7	=	128.19	(80)
West	0.9x	0.77	x	2.45	x	73.59	x	0.63	x	0.7	=	55.1	(80)
West	0.9x	0.77	x	9.52	x	73.59	x	0.63	x	0.7	=	214.1	(80)
West	0.9x	0.77	x	10.42	x	73.59	x	0.63	x	0.7	=	234.34	(80)
West	0.9x	0.77	x	11.33	x	73.59	x	0.63	x	0.7	=	254.81	(80)
West	0.9x	0.77	x	2.8	x	73.59	x	0.63	x	0.7	=	62.97	(80)
West	0.9x	0.77	x	8.18	x	45.59	x	0.63	x	0.7	=	113.97	(80)
West	0.9x	0.77	x	9.63	x	45.59	x	0.63	x	0.7	=	134.17	(80)
West	0.9x	0.77	x	11.5	x	45.59	x	0.63	x	0.7	=	160.23	(80)
West	0.9x	0.77	x	5.75	x	45.59	x	0.63	x	0.7	=	80.11	(80)
West	0.9x	0.77	x	5.7	x	45.59	x	0.63	x	0.7	=	79.42	(80)
West	0.9x	0.77	x	2.45	x	45.59	x	0.63	x	0.7	=	34.13	(80)
West	0.9x	0.77	x	9.52	x	45.59	x	0.63	x	0.7	=	132.64	(80)
West	0.9x	0.77	x	10.42	x	45.59	x	0.63	x	0.7	=	145.18	(80)
West	0.9x	0.77	x	11.33	x	45.59	x	0.63	x	0.7	=	157.86	(80)
West	0.9x	0.77	x	2.8	x	45.59	x	0.63	x	0.7	=	39.01	(80)
West	0.9x	0.77	x	8.18	x	24.49	x	0.63	x	0.7	=	61.22	(80)
West	0.9x	0.77	x	9.63	x	24.49	x	0.63	x	0.7	=	72.07	(80)
West	0.9x	0.77	x	11.5	x	24.49	x	0.63	x	0.7	=	86.07	(80)
West	0.9x	0.77	x	5.75	x	24.49	x	0.63	x	0.7	=	43.03	(80)
West	0.9x	0.77	x	5.7	x	24.49	x	0.63	x	0.7	=	42.66	(80)
West	0.9x	0.77	x	2.45	x	24.49	x	0.63	x	0.7	=	18.34	(80)
West	0.9x	0.77	x	9.52	x	24.49	x	0.63	x	0.7	=	71.25	(80)
West	0.9x	0.77	x	10.42	x	24.49	x	0.63	x	0.7	=	77.99	(80)
West	0.9x	0.77	x	11.33	x	24.49	x	0.63	x	0.7	=	84.8	(80)
West	0.9x	0.77	x	2.8	x	24.49	x	0.63	x	0.7	=	20.96	(80)
West	0.9x	0.77	x	8.18	x	16.15	x	0.63	x	0.7	=	40.38	(80)
West	0.9x	0.77	x	9.63	x	16.15	x	0.63	x	0.7	=	47.53	(80)

SAP WorkSheet: New dwelling design stage

West	0.9x	0.77	x	11.5	x	16.15	x	0.63	x	0.7	=	56.76	(80)
West	0.9x	0.77	x	5.75	x	16.15	x	0.63	x	0.7	=	28.38	(80)
West	0.9x	0.77	x	5.7	x	16.15	x	0.63	x	0.7	=	28.14	(80)
West	0.9x	0.77	x	2.45	x	16.15	x	0.63	x	0.7	=	12.09	(80)
West	0.9x	0.77	x	9.52	x	16.15	x	0.63	x	0.7	=	46.99	(80)
West	0.9x	0.77	x	10.42	x	16.15	x	0.63	x	0.7	=	51.43	(80)
West	0.9x	0.77	x	11.33	x	16.15	x	0.63	x	0.7	=	55.93	(80)
West	0.9x	0.77	x	2.8	x	16.15	x	0.63	x	0.7	=	13.82	(80)
Rooflights	0.9x	1	x	21.7	x	26	x	0.63	x	0.8	=	255.92	(82)
Rooflights	0.9x	1	x	4.42	x	26	x	0.63	x	0.8	=	52.13	(82)
Rooflights	0.9x	1	x	2.38	x	26	x	0.63	x	0.8	=	28.07	(82)
Rooflights	0.9x	1	x	1.08	x	26	x	0.63	x	0.8	=	12.74	(82)
Rooflights	0.9x	1	x	21.7	x	54	x	0.63	x	0.8	=	531.53	(82)
Rooflights	0.9x	1	x	4.42	x	54	x	0.63	x	0.8	=	108.27	(82)
Rooflights	0.9x	1	x	2.38	x	54	x	0.63	x	0.8	=	58.3	(82)
Rooflights	0.9x	1	x	1.08	x	54	x	0.63	x	0.8	=	26.45	(82)
Rooflights	0.9x	1	x	21.7	x	96	x	0.63	x	0.8	=	944.94	(82)
Rooflights	0.9x	1	x	4.42	x	96	x	0.63	x	0.8	=	192.47	(82)
Rooflights	0.9x	1	x	2.38	x	96	x	0.63	x	0.8	=	103.64	(82)
Rooflights	0.9x	1	x	1.08	x	96	x	0.63	x	0.8	=	47.03	(82)
Rooflights	0.9x	1	x	21.7	x	150	x	0.63	x	0.8	=	1476.47	(82)
Rooflights	0.9x	1	x	4.42	x	150	x	0.63	x	0.8	=	300.74	(82)
Rooflights	0.9x	1	x	2.38	x	150	x	0.63	x	0.8	=	161.94	(82)
Rooflights	0.9x	1	x	1.08	x	150	x	0.63	x	0.8	=	73.48	(82)
Rooflights	0.9x	1	x	21.7	x	192	x	0.63	x	0.8	=	1889.88	(82)
Rooflights	0.9x	1	x	4.42	x	192	x	0.63	x	0.8	=	384.94	(82)
Rooflights	0.9x	1	x	2.38	x	192	x	0.63	x	0.8	=	207.28	(82)
Rooflights	0.9x	1	x	1.08	x	192	x	0.63	x	0.8	=	94.06	(82)
Rooflights	0.9x	1	x	21.7	x	200	x	0.63	x	0.8	=	1968.62	(82)
Rooflights	0.9x	1	x	4.42	x	200	x	0.63	x	0.8	=	400.98	(82)
Rooflights	0.9x	1	x	2.38	x	200	x	0.63	x	0.8	=	215.91	(82)
Rooflights	0.9x	1	x	1.08	x	200	x	0.63	x	0.8	=	97.98	(82)
Rooflights	0.9x	1	x	21.7	x	189	x	0.63	x	0.8	=	1860.35	(82)
Rooflights	0.9x	1	x	4.42	x	189	x	0.63	x	0.8	=	378.93	(82)
Rooflights	0.9x	1	x	2.38	x	189	x	0.63	x	0.8	=	204.04	(82)
Rooflights	0.9x	1	x	1.08	x	189	x	0.63	x	0.8	=	92.59	(82)
Rooflights	0.9x	1	x	21.7	x	157	x	0.63	x	0.8	=	1545.37	(82)
Rooflights	0.9x	1	x	4.42	x	157	x	0.63	x	0.8	=	314.77	(82)
Rooflights	0.9x	1	x	2.38	x	157	x	0.63	x	0.8	=	169.49	(82)
Rooflights	0.9x	1	x	1.08	x	157	x	0.63	x	0.8	=	76.91	(82)
Rooflights	0.9x	1	x	21.7	x	115	x	0.63	x	0.8	=	1131.96	(82)