

Energy transmission loss calculations									
Church complex					to outside	to heated	to unheated	toward ground	
current	Walls excl windows								
location	B.part label	area (m ²)	area (a) (m ²)	Fxi	U-Wert (W/m ² K)	Hi (W/K)	dgeree (°CK)	Tmission (kW)	Tmission (kWh)
Nave roof to outside	R1	105.38		1.0	1.258	132.55	893.01	118.37	2840.84
Nave roof to unheated	R2	70.30		0.8	1.258	70.75	893.01	63.18	1516.26
Nave walls east+west	WW1/WE1	114.08		1.0	1.308	149.23	893.01	133.26	3198.34
Nave wall south to vestry	WS3 (1)	5.66							
Nave wall south to vestry, unheated	WS3 (2)	5.66		0.5	1.390	3.94	893.01	3.51	84.34
Nave wall south to vestibule	WS2 (1)	4.58							
Nave wall south to vestibule	WS2 (2)	9.89		0.5	1.390	6.88	893.01	6.14	147.36
Nave wall south above arch to roof	WS7	10.59		0.5	1.308	6.93	893.01	6.18	148.42
Nave door south to vestibule	DS1	1.60			1.390				
Nave wall north	WN1	59.78		1.0	1.193	71.33	893.01	63.70	1528.83
Nave+vestry floor	F1/F2	112.18		0.6	1.396	93.95	893.01	83.89	2013.46
Vestry ceiling (volume)	C2	8.84		0.5	1.626	7.19	893.01	6.42	154.02
Vestry door to outside	WED	2.20		1.0	2.000	4.40	893.01	3.93	94.30
Vestry wall east	WE2	9.93		1.0	1.633	16.21	893.01	14.48	347.41
Vestry wall north	WN2	7.75		1.0	1.633	12.65	893.01	11.30	271.19
Vestry wall south to U-hall	WS5	6.50			1.308				
Vestry wall south to entry	WS4	3.25		1.0	1.308	4.25	893.01	3.80	91.12
Alter wall west to vestibule	WW2 (1)	5.68			1.633				
Alter wall east to vestry	WE3 (1)	7.51			1.633				
Alter wall east, vestry+up	WE3 (2)	12.92		0.5	1.633	10.55	893.01	9.42	226.05
Alter wall west upwards	WW2 (2)	14.73		0.5	1.633	12.02	893.01	10.74	257.72
Alter wall south to hall	WS1 (1)	20.06			0.847				
Alter wall south to hall roof	WS1 (2)	9.89		1.0	1.193	11.80	893.01	10.54	252.91
Alter floor	F3	13.23		0.6	1.396	11.08	893.01	9.89	237.43
Church windows	W0	21.12		1.0	3.000	63.36	893.01	56.58	1357.95
		591.71			1.165	689.05		615.33	14767.97

Chaplain's house				to outside	to heated	to unheated	to ground	
current	Walls excl windows							
location	area (i) (m ²)	remarks	Fxi	U-Wert (W/m ² K)	Hi (W/K)	HGT (°CK)	T'mission (kW)	T'mission (kWh)
Wall east	27.45		1	1.319	36.20	3512.93	127	3052.36
Wall south	30.72		1	1.319	40.53	3512.93	142	3416.69
Wall west	25.37		1	1.319	33.47	3512.93	118	2821.48
Wall north to UH	30.00		0.5	0.520	7.80	3512.93	27	657.69
Wall north to office	26.13							
Windows 1st+ ground floor	23.22		1	3.000	69.67	3512.93	245	5873.76
Ceiling 1st floor to attic	71.00		0.8	0.362	20.55	3512.93	72	1732.76
Ceiling ground floor	87.50							
Floor ground floor	87.50		0.6	1.225	64.30	3512.93	226	5420.85
Roof pitch 1st floor	26.44	estim U-val	1	1.500	39.65	3512.93	139	3343.11
Roof over office/out. office/archive	49.23		1	0.315	15.53	3512.93	55	1309.45
Wall east+west office/outer office/archive	20.02		1	0.711	14.23	3512.93	50	1200.11
Wall north, office/outer office/archive	13.11		1	0.289	3.78	3512.93	13	319.03
Wall north, against church wall	37.45		0.5					
Floor office/outer office/archive	49.50		0.5	0.362	8.96	3512.93	31	755.03
Entry door ground floor	1.80		1	2.000	3.60	3512.93	13	303.52
Total	455.36			0.787	358.27		1258.58	30205.84

Chaplain's house				to outside	to heated	to unheated	to ground	
Insulated + windows		Walls excl windows						
location	area (m ²)	Remarks	Fxi	U-Wert (W/m ² K)	Hi (W/K)	HGT (°CK)	T'mission (kW)	T'mission (kWh)
Wall east	27.45		1	0.250	6.86	3512.93	24	578.49
Wall south	30.72		1	0.250	7.68	3512.93	27	647.54
Wall west	25.37		1	0.250	6.34	3512.93	22	534.74
Wall north to UH	30.00		0.5	0.520	7.80	3512.93	27	657.69
Wall north to office	26.13							
Windows 1st+ ground floor	23.22		1	1.000	23.22	3512.93	82	1957.92
Ceiling 1st floor to attic	71.00		0.8	0.362	20.55	3512.93	72	1732.76
Ceiling ground floor	87.50							
Floor ground floor	87.50		0.6	0.200	10.50	3512.93	37	885.26
Roof pitch 1st floor	26.44	estim. U-val	1	0.250	6.61	3512.93	23	557.19
Roof over office/out. office/archive	49.23		1	0.315	15.53	3512.93	55	1309.45
Wall east+west office/outer office/archive	20.02		1	0.711	14.23	3512.93	50	1200.11
Wall north, office/outer office/archive	13.11		1	0.289	3.78	3512.93	13	319.03
Wall north, against church wall	37.45		0.5					
Floor office/outer office/archive	49.50		0.5	0.362	8.96	3512.93	31	755.03
Entry door ground floor	1.80		1	2.000	3.60	3512.93	13	303.52
Total	455.36			0.298	135.67		476.61	11438.73

Halls-kitchen complex				to unheated	to outside	to heated	to ground	
current	Walls excl windows							
location	area (m ²)	remarks	Fxi	U-Wert (W/m ² K)	Hi (W/K)	HzGrad-h (°CK)	T'mission (kW)	T'mission (kWh)
Upper hall								
Windows Hall, kitchen, toilets	33.60		1	2.500	84.00	3512.93	295.09	7'082.06
Windows kitchen+toilets	4.86		1	2.500	12.15	3512.93	42.68	1'024.37
Windows Roof above staircase	0.60		1	1.300	0.78	3512.93	2.74	65.76
Ceiling to heated+unheated	101.38		0.5	0.260				
Ceiling to unheated	48.31		0.5	0.260	6.27	3512.93	22.04	529.01
Ceiling kitchen+toilettes	30.21	FR	0.8	0.372	8.98	3512.93	31.54	757.07
Floor Uhall + entrance	121.27			0.502				
Floor vestibule to stairway	5.73	FR	0.5	0.553	1.59	3512.93	5.57	133.64
Floor kitchen + toilets to heated	4.02							
Floor Kitchen + toilets to unheated	25.91	FR	0.5	0.553	7.17	3512.93	25.18	604.23
Floor office over uh	49.50							
Wall west kitchen_toilets	11.94	FR	1	0.381	4.54	3512.93	15.96	382.99
Wall north kitchen_toilets	10.61	FR	1	0.381	4.04	3512.93	14.19	340.51
Wall south, kitchen	6.33	FR	1	0.381	2.41	3512.93	8.46	203.09
Wall north to entrance door	3.19	FR	1	0.381	1.21	3512.93	4.26	102.35
Wall north to church up to roof	68.39		0.5	0.751	25.68	3512.93	90.23	2'165.48
Wall south to chapl. house	43.52	FR		0.665				
Wall east+entrance, excl. door	15.13		1	0.373	5.64	3512.93	19.81	475.54
Wall west, hall only	10.13		1	0.373	3.78	3512.93	13.26	318.29
Vestibule east to altar	6.23		0.5	1.644	5.12	3512.93	17.99	431.80
Vestibule north to church	4.58		0.5	1.644	3.77	3512.93	13.23	317.50
Vestibule ceiling	5.73		0.5	0.372	1.06	3512.93	3.74	89.75
Vestibule floor	5.65		0.6	0.553	1.88	3512.93	6.59	158.12
Entrance door east	2.00		1	2.000	4.00	3512.93	14.05	337.24
Roof kitchen	33.95		1	1.165				
Roof over staircase	18.94		1	0.255	4.83	3512.93	16.97	407.36

Lower hall								
Windows	25.13	1	2.500	62.83	3512.93	220.70	5'296.79	
Floor Lhall + entrance	119.32	0.6	0.699	50.06	3512.93	175.86	4'220.71	
Ceiling Lhall	118.66							
Wall north to air heating room	20.13	0.6	1.062	12.83	3512.93	45.08	1'081.82	
Wall north to garden tools	3.96	0.6	1.062	2.52	3512.93	8.87	212.78	
Wall north to earth	9.94	0.6	0.699	4.17	3512.93	14.65	351.70	
Wall west hall+shower	13.87	1	0.373	5.17	3512.93	18.16	435.77	
Wall south to chapl. house	32.43		0.665					
Wall east inkl. entrance	14.50	1	0.373	5.40	3512.93	18.98	455.57	
Total UH	284.47			188.90		663.59	15926.15	
Total LH	206.85			142.99		502.30	12055.14	
Total	491.32		0.675	331.89		1165.89	27981.30	

Halls-kitchen complex					to unheated	to outside	to heated	to ground
Insulated+windows		Walls excl windows						
location	area (i) (m ²)	remarks	Fxi	U-Wert (W/m ² K)	Hi (W/K)	HzGrad-h (°CK)	T'mission (kW)	T'mission (kWh)
Upper hall								
Windows Hall, kitchen, toilets	33.60		1	1.000	33.60	1313.78	44.14	1'059.43
Windows kitchen+toilets	4.86			2.500	12.15	1313.78	15.96	383.10
Windows Roof above staircase	0.60			1.300	0.78	1313.78	1.02	24.59
Ceiling Uhall heated+unheated	101.38		0.5	0.260				
Ceiling Uhall to unheated	48.31		0.5	0.260	6.27	1313.78	8.24	197.84
Ceiling kitchen+toilets	30.21	FR	0.8	0.372	8.98	1313.78	11.80	283.13
Floor Uhall+entrance	121.27			0.502				
Floor vestibule	5.73		0.5	0.553	1.59	1313.78	2.08	49.98
Floor Kitchen + toilets to heated	4.02							
Floor Kitchen + toilets to unheated	25.91		0.5	0.553	7.17	1313.78	9.42	225.97
Floor Office over uh	49.50							
Wall west kitchen_toilets	11.94		1	0.381	4.54	1313.78	5.97	143.23
Wall north kitchen_toilets	10.61		1	0.381	4.04	1313.78	5.31	127.35
Wall south, kitchen	6.33		1	0.381	2.41	1313.78	3.16	75.95
Wall north to entrance door	3.19		1	0.381	1.21	1313.78	1.59	38.28
Wall north to church up to roof	68.39	FR	0.5	0.751	25.68	1313.78	33.74	809.86
Wall south to chapl. house	43.52			0.665				
Wall east+entrance, excl. door	15.13	10 cm XPS	1	0.193	2.92	1313.78	3.84	92.06
Wall west, hall only	10.13		1	0.373	3.78	1313.78	4.96	119.03
Vestibule east to altar	6.23		0.5	1.644	5.12	1313.78	6.73	161.49
Vestibule north to church	4.58		0.5	1.644	3.77	1313.78	4.95	118.74
Vestibule ceiling	5.73		0.5	0.372	1.06	1313.78	1.40	33.56
Vestibule floor	5.65		0.6	0.553	1.88	1313.78	2.46	59.14
Entrance door east	2.00		1	2.000	4.00	1313.78	5.26	126.12
Roof kitchen	33.95		1	1.165				
Roof over staircase	18.94		1	0.255	4.83	1313.78	6.35	152.35

Lower hall								
Windows	25.13		1	1.000	25.13	1313.78	33.02	792.37
Floor Lhall	119.32		0.6	0.699	50.06	1313.78	65.77	1'578.49
Ceiling Lhall	118.66							
Wall north to air heating room	20.13		0.6	1.062	12.83	1313.78	16.86	404.59
Wall north to garden tools	3.96		0.6	1.062	2.52	1313.78	3.32	79.58
Wall north to earth	9.94		0.6	0.699	4.17	1313.78	5.48	131.53
Wall west hall+shower	13.87		1	0.373	5.17	1313.78	6.79	162.97
Wall south to chapl. House	32.43	FR		0.665				
Wall east inkl. entrance	14.50		1	0.373	5.40	1313.78	7.10	170.38
Total UH	318.07				135.78		178.38	4281.21
Total LH	206.85				105.29		138.33	3319.90
Total	524.92			0.459	241.07		316.71	7601.11

Halls-kitchen complex				to unheated	to outside	to heated	to ground	
Usage based heating, together		Walls excl windows						
location	area (i) (m ²)	remarks	Fxi	U-Wert (W/m ² K)	Hi (W/K)	HzGrad-h (°CK)	T'mission (kW)	T'mission (kWh)
Upper hall								
Windows Hall, kitchen, toilets	33.60		1	2.500	84.00	1313.78	110.36	2'648.59
Windows kitchen+toilets	4.86		1	2.500	12.15	1313.78	15.96	383.10
Windows Roof above staircase	0.60		1	1.300	0.78	1313.78	1.02	24.59
Ceiling Uhall heated+unheated	101.38		0.5	0.260				
Ceiling Uhall to unheated	48.31		0.5	0.260	6.27	1313.78	8.24	197.84
Ceiling kitchen+toilettes	30.21	FR	0.8	0.372	8.98	1313.78	11.80	283.13
Floor Uhall+entrance	121.27			0.502				
Floor vestibule to staircase	5.73		0.5	0.553	1.59	1313.78	2.08	49.98
Floor kitchen + toilets to heated	4.02							
Floor Kitchen + toilets to unheated	25.91		0.5	0.553	7.17	1313.78	9.42	225.97
Floor Office over uh	49.50							
Wall west kitchen_toilets	11.94		1	0.381	4.54	1313.78	5.97	143.23
Wall north kitchen_toilets	10.61		1	0.381	4.04	1313.78	5.31	127.35
Wall south, kitchen	6.33		1	0.381	2.41	1313.78	3.16	75.95
Wall north to entrance door	3.19		1	0.381	1.21	1313.78	1.59	38.28
Wall north to church up to roof	68.39		0.5	0.751	25.68	1313.78	33.74	809.86
Wall south to chapl. house	43.52	FR		0.665				
Wall east+entrance, excl. door	15.13		1	0.373	5.64	1313.78	7.41	177.85
Wall west, hall only	10.13		1	0.373	3.78	1313.78	4.96	119.03
Vestibule east to altar	6.23		0.5	1.644	5.12	1313.78	6.73	161.49
Vestibule north to church	4.58		0.5	1.644	3.77	1313.78	4.95	118.74
Vestibule ceiling	5.73		0.5	0.372	1.06	1313.78	1.40	33.56
Vestibule floor	5.65		0.6	0.553	1.88	1313.78	2.46	59.14
Entrance door east	2.00		1	2.000	4.00	1313.78	5.26	126.12
Roof kitchen	33.95		1	1.165				
Roof over staircase	18.94		1	0.255	4.83	1313.78	6.35	152.35

Lower hall								
Windows	25.13		1	2.500	62.83	1313.78	82.54	1'980.92
Floor Lhall + entrance	119.32		0.6	0.699	50.06	1313.78	65.77	1'578.49
Ceiling Lhall	118.66							
Wall north to air heating room	20.13		0.6	1.062	12.83	1313.78	16.86	404.59
Wall north to garden tools	3.96		0.6	1.062	2.52	1313.78	3.32	79.58
Wall north to earth	9.94		0.6	0.699	4.17	1313.78	5.48	131.53
Wall west hall+shower	13.87		1	0.373	5.17	1313.78	6.79	162.97
Wall south to chapl. house	32.43	FR		0.665				
Wall east inkl. entrance	14.50		1	0.373	5.40	1313.78	7.10	170.38
Total UH	318.07				188.90		248.17	5956.15
Total LH	206.85				142.99		187.85	4508.45
Total	524.92			0.632	331.89		436.03	10464.60

Halls-kitchen complex					to unheated	to outside	to heated	to ground
Usage based heating, separated		Walls excl windows						
location	area (m ²)	remarks	Fxi	U-Wert (W/m ² K)	Hi (W/K)	HzGrad-h (°CK)	T'mission (kW)	T'mission (kWh)
Upper hall								
Windows Hall, kitchen, toilets	33.60		1	2.500	84.00	983.79	82.64	1'983.32
Windows kitchen+toilets	4.86		1	2.500	12.15	983.79	11.95	286.87
Windows Roof above staircase	0.60		1	1.300	0.78	983.79	0.77	18.42
Ceiling Uhall heated+unheated	101.38		0.5	0.260				
Ceiling Uhall to unheated	48.31		0.5	0.260	6.27	983.79	6.17	148.15
Ceiling kitchen+toilettes	30.21	FR	0.8	0.372	8.98	983.79	8.83	212.02
Floor Uhall+entrance	121.27		0.5	0.502	30.46	983.79	29.96	719.12
Floor vestibule to old staircase	5.73		0.5	0.553	1.59	983.79	1.56	37.42
Floor kitchen + toilets to heated	4.02							
Floor Kitchen + toilets to unheated	25.91		0.5	0.553	7.17	983.79	7.05	169.21
Floor Office over uh	49.50							
Wall west kitchen_toilets	11.94		1	0.381	4.54	983.79	4.47	107.26
Wall north kitchen_toilets	10.61		1	0.381	4.04	983.79	3.97	95.36
Wall south, kitchen	6.33		1	0.381	2.41	983.79	2.37	56.88
Wall north to entrance door	3.19		1	0.381	1.21	983.79	1.19	28.66
Wall north to church up to roof	68.39		0.5	0.751	25.68	983.79	25.27	606.44
Wall south to chapl. house	43.52	FR		0.665				
Wall east+entrance, excl. door	15.13		1	0.373	5.64	983.79	5.55	133.18
Wall west, hall only	10.13		1	0.373	3.78	983.79	3.71	89.14
Vestibule east to altar	6.23		0.5	1.644	5.12	983.79	5.04	120.93
Vestibule north to church	4.58		0.5	1.644	3.77	983.79	3.70	88.92
Vestibule ceiling	5.73		0.5	0.372	1.06	983.79	1.05	25.13
Vestibule floor	5.65		0.6	0.553	1.88	983.79	1.85	44.28
Entrance door east	2.00		1	2.000	4.00	983.79	3.94	94.44
Roof kitchen	33.95		1	1.165				
Roof over staircase	18.94		1	0.255	4.83	983.79	4.75	114.08

Lower hall								
Windows	25.13		1	2.500	62.83	1087.88	68.35	1'640.31
Floor Lhall + entrance	119.32		0.6	0.699	50.06	1087.88	54.46	1'307.07
Ceiling Lhall	118.66							
Wall north to air heating room	20.13		0.6	1.062	12.83	1087.88	13.96	335.02
Wall north to garden tools	3.96		0.6	1.062	2.52	1087.88	2.75	65.90
Wall north to earth	9.94		0.6	0.699	4.17	1087.88	4.54	108.91
Wall west hall+shower	13.87		1	0.373	5.17	1087.88	5.62	134.95
Wall south to chapl. house	32.43	FR		0.665				
Wall east inkl. entrance	14.50		1	0.373	5.40	1087.88	5.88	141.08
Total UH	439.33				219.36		215.80	5179.22
Total LH	328.12				173.44		185.51	4452.36
Total	767.45			0.512	392.80		401.32	9631.58