

Tables

Table 1: Victorian terraced house construction details

Element	Details	U-Value (W/m ² K)
Main house walls	Solid brick (0.215m) with internal plaster (0.019m)	2.21
Rear extension walls	Brick (0.105m cavity (0.05m) block (0.1m) plaster (0.019m)	1.34
Roof	Red clay tiles with joist level glass fibre insulation (0.1m)	0.36
Internal partitions	Solid brick (0.105m) with plaster (0.019m) each side	
Ground floor main house	Suspended timber with underlay and carpet, cavity (0.3m) to ground (clay to 0.75m)	0.91
Ground floor extension	Solid concrete (0.1m) uninsulated to ground (clay to 0.75m)	0.89
Windows	Pre-2002 double glazing, plain float glass (6mm) with air gap (12mm). PVC frame (15% of window area). Crack flow coefficient $0.13 \text{ ls}^{-1}\text{m}^{-1}\text{Pa}^{-0.6}$	3.13 (inc. frame)
External doors	Wooden, crack flow coefficient $0.27 \text{ ls}^{-1}\text{m}^{-1}\text{Pa}^{-0.6}$	
Solar absorptivity	Roof tiles 0.7; brick walls 0.6	

Table 2: Modelled interventions for Victorian terraced house

Key	Intervention	Description	U-Value (W/m ² K)
S1	Loft Insulation	Increase loft insulation to 100mm	0.16
S2	Internal wall insulation	Addition of wall insulation to internal faces of external walls	0.35
S3	External wall insulation	Addition of wall insulation to exterior wall faces	0.35
S4	Internal blinds	Standard venetian blinds closed 0900-1800	
S5	External shutters	Total solar block shutters to windows, closed 0900-1800	
S6	Fixed shading	Overhangs, depth 1.0m over south-facing windows	
S7	Lighter (high albedo) walls	Reduce solar absorptivity of walls to 0.3 by painting a light colour	
S8	Lighter (high albedo) roof	Reduce solar absorptivity of roof to 0.3 by using light coloured tiles or coating	
S9	Change window opening rules	Prevent opening of windows if outside air temperature is greater than room dry resultant temperature	
S10	Night ventilation	Allow opening of ground floor windows for night ventilation	
S11	Low-e Double Glazing	Upgrade standard double glazing to low emissivity double glazing	1.95 (inc. frame)

Table 3: Key to clustered interventions for Victorian terraced house

Category	Code	Combinations
Solar	C1	S7 + S8
	C2	S5 + S7
	C3	S4 + S7
	C4	S6 + S7
	C5	S7 + S11
	C6	S5 + S7 + S8
Insulation	C7	S1 + S3
	C8	S1 + S2
Insulation + Ventilation	C9	S2 + S10
	C10	S3 + S10
Insulation + Solar	C11	S2 + S7
	C12	S3 + S7
	C13	S2 + S5
	C14	S3 + S5
	C15	S3 + S5 + S7
Full Measures	C16	S1 + S3 + S5 + S7 + S8 + S9 + S10

Table 4: Single intervention ranking

Degree hours over CIBSE threshold temperatures (percentage reduction in brackets)							
Bedrooms summer		Bedrooms heat wave		Living rooms summer		Living rooms heat wave	
Ext wall insulation	244 (31%)	Ext wall insulation	53 (32%)	Ext shutters	73 (51%)	Ext wall insulation	28 (43%)
Ext shutters	245 (30%)	Ext shutters	61 (22%)	Ext wall insulation	83 (45%)	Ext shutters	33 (33%)
High albedo walls	259 (26%)	Int wall insulation	63 (19%)	High albedo walls	94 (37%)	Window rules	39 (20%)
Int wall insulation	282 (20%)	High albedo walls	65 (17%)	Night ventilation	113 (25%)	High albedo walls	40 (18%)
High albedo roof	305 (13%)	Int blinds	71 (9%)	Window rules	117 (22%)	Night ventilation	41 (16%)
Int blinds	310 (12%)	High albedo roof	71 (9%)	Int blinds	118 (21%)	Int wall insulation	42 (14%)
Window rules	311 (12%)	Window rules	72 (8%)	Int wall insulation	130 (13%)	Int blinds	43 (12%)
Ext shading	318 (10%)	Ext shading	73 (6%)	Low-e glazing	137 (9%)	Low-e glazing	46 (6%)
Night ventilation	335 (5%)	Night ventilation	75 (4%)	Ext shading	140 (7%)	Ext shading	47 (4%)
Loft insulation	344 (2%)	Low-e glazing	76 (3%)	High albedo roof	142 (5%)	High albedo roof	48 (2%)
Low-e glazing	346 (2%)	Loft insulation	77(1%)	Loft insulation	146 (3%)	Loft insulation	48 (2%)
Base case	352 (0%)	Base case	78 (0%)	Base case	150 (0%)	Base case	49 (0%)

Table 5: Cluster intervention ranking

Degree hours over CIBSE threshold temperatures (percentage reduction in brackets)							
Bedrooms summer		Bedrooms heat wave		Living rooms summer		Living rooms heat wave	
C16	4 (99%)	C16	3 (96%)	C16	0 (100%)	C16	0 (100%)
C15	99 (72%)	C15	29 (63%)	C15	13 (91%)	C15	11 (78%)
C14	120 (66%)	C14	33 (58%)	C14	17 (89%)	C14	12 (76%)
C6	137 (61%)	C13	44 (44%)	C6	34 (77%)	C10	20 (59%)
C13	159 (55%)	C6	45 (42%)	C2	37 (75%)	C13	23 (53%)
C2	168 (52%)	C12	49 (37%)	C13	39 (74%)	C6	23 (53%)
C12	214 (39%)	C10	49 (37%)	C10	44 (71%)	C2	24 (51%)
C10	218 (38%)	C2	50 (36%)	C3	68 (55%)	C12	26 (47%)
C1	219 (38%)	C7	50 (36%)	C12	70 (53%)	C7	27 (45%)
C3	222 (37%)	C11	59 (24%)	C7	78 (48%)	C9	33 (33%)
C7	230 (35%)	C3	60(23%)	C5	81 (46%)	C3	34 (31%)
C4	233 (34%)	C9	60 (23%)	C4	86 (43%)	C5	36 (27%)
C5	251 (29%)	C1	60 (23%)	C9	87 (42%)	C4	38 (22%)
C11	251 (29%)	C4	61 (22%)	C1	87 (42%)	C1	38 (22%)
C9	256 (27%)	C8	62 (21%)	C11	115 (23%)	C11	40 (18%)
C8	271 (23%)	C5	64 (18%)	C8	124 (17%)	C8	41 (16%)
Base case	352 (0%)	Base case	78 (0%)	Base case	150 (0%)	Base case	49 (0%)