
Approved Document O report
Overheating risk in residential buildings
for
Charles Street PBSA Manchester

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Building details

Project name: Charles Street PBSA Manchester	Date: 01-12-2023 09:48:28
Location: Manchester Ap, United Kingdom	
Address: Manchester	
Building use: Student Accommodation	
Are there any security, noise, or pollution issues: No security issues as bedrooms are above ground level. Possible noise issues, the model has been simulated with windows shut to mitigate this.	

Designer's details

Designer's name: Hannah Ireland
Designer's organisation: Building Performance Prediction Ltd
Designer's address: Unit 6 Forestgrove Business Park, Newtownbreda, BT8 6AW

Dynamic thermal model

Software: IESVE version 2023.2.1.0	
Weather file: Manchester_DSY2_2050High50_.epw	
Results file: B1106-V8-1.aps	
Number of rooms analysed: 107	
TM59: summer elevated air speed: 0.1	
TM59: occupant category: Category II (normal)	
Overheating mitigation strategy: Closed windows with MVHR and active cooling.	
Has the building construction proposal been modelled accurately?	YES
Have the analysed rooms passed the assessment for Approved Doc O Dynamic Thermal Modelling Method (CIBSE TM 59)?	YES
Designer's signature: Hannah Ireland Building Performance Prediction Ltd 100% Carbon Footprint 100% Green Building 100% Green Building	

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Summary

CIBSE TM59 overheating methodology for predominantly naturally ventilated rooms assesses against two criteria, (a) and (b) (for Category I occupancy, T_{max} is reduced by 1K):

- Criterion (a) states that for living rooms, kitchens and bedrooms, the number of hours during which ΔT is greater than or equal to 1K from May to September (or November to March for southern hemisphere locations) shall not exceed 3% of occupied hours
- Criterion (b) states that the operative temperature of the bedrooms from 22:00-07:00 shall not exceed 26°C for more than 1% of annual hours (33 hours is therefore recorded as a fail). Approved document O applies limits to CIBSE TM59 section 3.3 (openings); these requirements are applied by appropriate assignment of MacroFlo types / scripted profiles in the model (see Modelled Openings Section).

CIBSE TM59 overheating methodology for predominantly mechanically ventilated rooms states the operative temperature of all rooms shall not exceed 26°C for more than 3% of annual occupied hours.

CIBSE TM59 also states that the inclusion of corridors in the overheating analysis is mandatory where community heating pipework runs through them. While there is no mandatory target for communal corridors, if an operative temperature of 28°C is exceeded for more than 3% of the total annual hours this should be identified as a significant risk.

Room name	Naturally ventilated Criterion a check	Naturally ventilated Criterion b check	Mechanically ventilated check	Corridor overheating risk check
144 Studio Bedroom	-	-	Pass	-
147 Studio Bedroom	-	-	Pass	-
150 Studio Bedroom	-	-	Pass	-
151 Studio Bedroom	-	-	Pass	-
164 Studio Bedroom	-	-	Pass	-
167 Studio Bedroom	-	-	Pass	-
170 Studio Bedroom	-	-	Pass	-
173 Studio Bedroom	-	-	Pass	-
176 Studio Bedroom	-	-	Pass	-
184 Studio Bedroom	-	-	Pass	-
187 Studio Bedroom	-	-	Pass	-
190 Studio Bedroom	-	-	Pass	-
193 Studio Bedroom	-	-	Pass	-
194 Studio Bedroom	-	-	Pass	-
207 Studio Bedroom	-	-	Pass	-
210 Studio Bedroom	-	-	Pass	-
213 Studio Bedroom	-	-	Pass	-
216 Studio Bedroom	-	-	Pass	-
219 Studio Bedroom	-	-	Pass	-
227 Studio Bedroom	-	-	Pass	-
230 Studio Bedroom	-	-	Pass	-
233 Studio Bedroom	-	-	Pass	-
236 Studio Bedroom	-	-	Pass	-
237 Studio Bedroom	-	-	Pass	-
250 Studio Bedroom	-	-	Pass	-
253 Studio Bedroom	-	-	Pass	-
256 Studio Bedroom	-	-	Pass	-
259 Studio Bedroom	-	-	Pass	-
262 Studio Bedroom	-	-	Pass	-

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Room name	Naturally ventilated Criterion a check	Naturally ventilated Criterion b check	Mechanically ventilated check	Corridor overheating risk check
270 Studio Bedroom	-	-	Pass	-
273 Studio Bedroom	-	-	Pass	-
276 Studio Bedroom	-	-	Pass	-
279 Studio Bedroom	-	-	Pass	-
280 Studio Bedroom	-	-	Pass	-
293 Studio Bedroom	-	-	Pass	-
296 Studio Bedroom	-	-	Pass	-
299 Studio Bedroom	-	-	Pass	-
302 Studio Bedroom	-	-	Pass	-
305 Studio Bedroom	-	-	Pass	-
313 Studio Bedroom	-	-	Pass	-
316 Studio Bedroom	-	-	Pass	-
319 Studio Bedroom	-	-	Pass	-
322 Studio Bedroom	-	-	Pass	-
323 Studio Bedroom	-	-	Pass	-
335 Studio Bedroom	-	-	Pass	-
338 Studio Bedroom	-	-	Pass	-
341 Studio Bedroom	-	-	Pass	-
344 Studio Bedroom	-	-	Pass	-
352 Studio Bedroom	-	-	Pass	-
355 Studio Bedroom	-	-	Pass	-
359 Studio Bedroom	-	-	Pass	-
369 Studio Bedroom	-	-	Pass	-
372 Studio Bedroom	-	-	Pass	-
375 Studio Bedroom	-	-	Pass	-
378 Studio Bedroom	-	-	Pass	-
386 Studio Bedroom	-	-	Pass	-
389 Studio Bedroom	-	-	Pass	-
393 Studio Bedroom	-	-	Pass	-
403 Studio Bedroom	-	-	Pass	-
406 Studio Bedroom	-	-	Pass	-
409 Studio Bedroom	-	-	Pass	-
412 Studio Bedroom	-	-	Pass	-
420 Studio Bedroom	-	-	Pass	-
423 Studio Bedroom	-	-	Pass	-
427 Studio Bedroom	-	-	Pass	-
437 Studio Bedroom	-	-	Pass	-
440 Studio Bedroom	-	-	Pass	-
443 Studio Bedroom	-	-	Pass	-
446 Studio Bedroom	-	-	Pass	-
454 Studio Bedroom	-	-	Pass	-
457 Studio Bedroom	-	-	Pass	-

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Room name	Naturally ventilated Criterion a check	Naturally ventilated Criterion b check	Mechanically ventilated check	Corridor overheating risk check
461 Studio Bedroom	-	-	Pass	-
471 Studio Bedroom	-	-	Pass	-
474 Studio Bedroom	-	-	Pass	-
477 Studio Bedroom	-	-	Pass	-
480 Studio Bedroom	-	-	Pass	-
488 Studio Bedroom	-	-	Pass	-
491 Studio Bedroom	-	-	Pass	-
495 Studio Bedroom	-	-	Pass	-
505 Studio Bedroom	-	-	Pass	-
508 Studio Bedroom	-	-	Pass	-
511 Studio Bedroom	-	-	Pass	-
514 Studio Bedroom	-	-	Pass	-
522 Studio Bedroom	-	-	Pass	-
525 Studio Bedroom	-	-	Pass	-
529 Studio Bedroom	-	-	Pass	-
53 Studio Bedroom	-	-	Pass	-
56 Studio Bedroom	-	-	Pass	-
59 Studio Bedroom	-	-	Pass	-
62 Studio Bedroom	-	-	Pass	-
65 Studio Bedroom	-	-	Pass	-
78 Studio Bedroom	-	-	Pass	-
81 Studio Bedroom	-	-	Pass	-
84 Studio Bedroom	-	-	Pass	-
87 Studio Bedroom	-	-	Pass	-
90 Studio Bedroom	-	-	Pass	-
98 Studio Bedroom	-	-	Pass	-
101 Studio Bedroom	-	-	Pass	-
104 Studio Bedroom	-	-	Pass	-
107 Studio Bedroom	-	-	Pass	-
108 Studio Bedroom	-	-	Pass	-
121 Studio Bedroom	-	-	Pass	-
124 Studio Bedroom	-	-	Pass	-
127 Studio Bedroom	-	-	Pass	-
130 Studio Bedroom	-	-	Pass	-
133 Studio Bedroom	-	-	Pass	-
141 Studio Bedroom	-	-	Pass	-

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Naturally ventilated rooms – criterion (a)

Criterion (a) states that for living rooms, kitchens and bedrooms, the number of hours during which ΔT is greater than or equal to 1K from May to September (or November to March for southern hemisphere locations) shall not exceed 3% of occupied hours.

Room name	Occupied hours	No. hours $\Delta T \geq 1^\circ\text{K}$	% Occupied hours $\Delta T \geq 1^\circ\text{K}$	Criterion a check
No nat vent rooms	N/A	N/A	N/A	N/A

Naturally ventilated rooms – criterion (b)

Criterion (b) states that the operative temperature of the bedrooms from 22:00-07:00 shall not exceed 26°C for more than 1% of annual hours (33 hours is therefore recorded as a fail). Any rooms that are not bedrooms are therefore not assessed, hence the corresponding N/A values.

Room name	No. hours > 26°C 22:00-24:00	No. hours > 26°C 00:00-07:00	Total hours > 26°C	Criterion b check
No nat vent rooms	N/A	N/A	N/A	N/A

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Mechanically ventilated rooms

CIBSE TM59 overheating methodology for predominantly mech. vent. rooms states the operative temperature of all rooms shall not exceed 26°C for more than 3% of annual occupied hours.

Room name	No. hours > 26°C	% Annual hours > 26°C	Mechanically ventilated check
144 Studio Bedroom	0	0.0	Pass
147 Studio Bedroom	0	0.0	Pass
150 Studio Bedroom	0	0.0	Pass
151 Studio Bedroom	0	0.0	Pass
164 Studio Bedroom	0	0.0	Pass
167 Studio Bedroom	0	0.0	Pass
170 Studio Bedroom	0	0.0	Pass
173 Studio Bedroom	0	0.0	Pass
176 Studio Bedroom	0	0.0	Pass
184 Studio Bedroom	0	0.0	Pass
187 Studio Bedroom	0	0.0	Pass
190 Studio Bedroom	0	0.0	Pass
193 Studio Bedroom	0	0.0	Pass
194 Studio Bedroom	0	0.0	Pass
207 Studio Bedroom	0	0.0	Pass
210 Studio Bedroom	0	0.0	Pass
213 Studio Bedroom	0	0.0	Pass
216 Studio Bedroom	0	0.0	Pass
219 Studio Bedroom	0	0.0	Pass
227 Studio Bedroom	0	0.0	Pass
230 Studio Bedroom	0	0.0	Pass
233 Studio Bedroom	0	0.0	Pass
236 Studio Bedroom	0	0.0	Pass
237 Studio Bedroom	0	0.0	Pass
250 Studio Bedroom	0	0.0	Pass
253 Studio Bedroom	0	0.0	Pass
256 Studio Bedroom	0	0.0	Pass
259 Studio Bedroom	0	0.0	Pass
262 Studio Bedroom	0	0.0	Pass
270 Studio Bedroom	0	0.0	Pass
273 Studio Bedroom	0	0.0	Pass
276 Studio Bedroom	0	0.0	Pass
279 Studio Bedroom	0	0.0	Pass
280 Studio Bedroom	0	0.0	Pass
293 Studio Bedroom	0	0.0	Pass
296 Studio Bedroom	0	0.0	Pass
299 Studio Bedroom	0	0.0	Pass

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Room name	No. hours > 26°C	% Annual hours > 26°C	Mechanically ventilated check
302 Studio Bedroom	0	0.0	Pass
305 Studio Bedroom	0	0.0	Pass
313 Studio Bedroom	0	0.0	Pass
316 Studio Bedroom	0	0.0	Pass
319 Studio Bedroom	0	0.0	Pass
322 Studio Bedroom	0	0.0	Pass
323 Studio Bedroom	0	0.0	Pass
335 Studio Bedroom	0	0.0	Pass
338 Studio Bedroom	0	0.0	Pass
341 Studio Bedroom	0	0.0	Pass
344 Studio Bedroom	0	0.0	Pass
352 Studio Bedroom	0	0.0	Pass
355 Studio Bedroom	0	0.0	Pass
359 Studio Bedroom	0	0.0	Pass
369 Studio Bedroom	0	0.0	Pass
372 Studio Bedroom	0	0.0	Pass
375 Studio Bedroom	0	0.0	Pass
378 Studio Bedroom	0	0.0	Pass
386 Studio Bedroom	0	0.0	Pass
389 Studio Bedroom	0	0.0	Pass
393 Studio Bedroom	0	0.0	Pass
403 Studio Bedroom	0	0.0	Pass
406 Studio Bedroom	0	0.0	Pass
409 Studio Bedroom	0	0.0	Pass
412 Studio Bedroom	0	0.0	Pass
420 Studio Bedroom	0	0.0	Pass
423 Studio Bedroom	0	0.0	Pass
427 Studio Bedroom	0	0.0	Pass
437 Studio Bedroom	0	0.0	Pass
440 Studio Bedroom	0	0.0	Pass
443 Studio Bedroom	0	0.0	Pass
446 Studio Bedroom	0	0.0	Pass
454 Studio Bedroom	0	0.0	Pass
457 Studio Bedroom	0	0.0	Pass
461 Studio Bedroom	0	0.0	Pass
471 Studio Bedroom	0	0.0	Pass
474 Studio Bedroom	0	0.0	Pass
477 Studio Bedroom	0	0.0	Pass
480 Studio Bedroom	0	0.0	Pass
488 Studio Bedroom	0	0.0	Pass
491 Studio Bedroom	0	0.0	Pass
495 Studio Bedroom	0	0.0	Pass

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Room name	No. hours > 26°C	% Annual hours > 26°C	Mechanically ventilated check
505 Studio Bedroom	0	0.0	Pass
508 Studio Bedroom	0	0.0	Pass
511 Studio Bedroom	0	0.0	Pass
514 Studio Bedroom	0	0.0	Pass
522 Studio Bedroom	0	0.0	Pass
525 Studio Bedroom	0	0.0	Pass
529 Studio Bedroom	0	0.0	Pass
53 Studio Bedroom	0	0.0	Pass
56 Studio Bedroom	0	0.0	Pass
59 Studio Bedroom	0	0.0	Pass
62 Studio Bedroom	0	0.0	Pass
65 Studio Bedroom	0	0.0	Pass
78 Studio Bedroom	0	0.0	Pass
81 Studio Bedroom	0	0.0	Pass
84 Studio Bedroom	0	0.0	Pass
87 Studio Bedroom	0	0.0	Pass
90 Studio Bedroom	0	0.0	Pass
98 Studio Bedroom	0	0.0	Pass
101 Studio Bedroom	0	0.0	Pass
104 Studio Bedroom	0	0.0	Pass
107 Studio Bedroom	0	0.0	Pass
108 Studio Bedroom	0	0.0	Pass
121 Studio Bedroom	0	0.0	Pass
124 Studio Bedroom	0	0.0	Pass
127 Studio Bedroom	0	0.0	Pass
130 Studio Bedroom	0	0.0	Pass
133 Studio Bedroom	0	0.0	Pass
141 Studio Bedroom	0	0.0	Pass

Communal corridors

CIBSE TM59 states that whilst there is no mandatory target for communal corridors, if an operative temperature of 28°C is exceeded for more than 3% of annual hours, then this should be identified as a significant risk within the TM59 overheating report.

Room name	No. hours > 28°C	% Annual hours > 28°C	Corridor overheating risk check
No corridors	N/A	N/A	N/A

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Modelled details & overheating mitigation strategy

Approved document O: Providing Information & Appendix B requires information about the model and the overheating mitigation strategy. The following tables detail the modelling method and mitigation strategies applied to each analysed room. Where multiple active openings per space (windows & louvres) exist they are all listed. Occupancy, equipment and lighting profiles for occupied rooms comply with TM59 section 5.

Modelled occupancy

Room name	Floor area m ²	Thermal template	Occupancy profile	Equipment profile	Lighting profile
144 Studio Bedroom	16.21	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
147 Studio Bedroom	16.85	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
150 Studio Bedroom	19.86	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
151 Studio Bedroom	17.0	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
164 Studio Bedroom	16.94	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
167 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
170 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
173 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
176 Studio Bedroom	17.18	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
184 Studio Bedroom	19.86	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
187 Studio Bedroom	16.21	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
190 Studio Bedroom	16.85	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
193 Studio Bedroom	19.86	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
194 Studio Bedroom	17.0	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
207 Studio Bedroom	16.94	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
210 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
213 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
216 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
219 Studio Bedroom	17.18	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
227 Studio Bedroom	19.86	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
230 Studio Bedroom	16.21	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
233 Studio Bedroom	16.85	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
236 Studio Bedroom	19.86	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
237 Studio Bedroom	17.0	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
250 Studio Bedroom	16.94	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
253 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
256 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
259 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
262 Studio Bedroom	17.18	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
270 Studio Bedroom	19.86	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
273 Studio Bedroom	16.21	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
276 Studio Bedroom	16.85	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
279 Studio Bedroom	19.86	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
280 Studio Bedroom	17.0	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
293 Studio Bedroom	16.94	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
296 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h

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Room name	Floor area m ²	Thermal template	Occupancy profile	Equipment profile	Lighting profile
299 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
302 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
305 Studio Bedroom	17.18	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
313 Studio Bedroom	19.86	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
316 Studio Bedroom	16.21	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
319 Studio Bedroom	16.85	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
322 Studio Bedroom	19.86	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
323 Studio Bedroom	17.0	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
335 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
338 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
341 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
344 Studio Bedroom	17.18	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
352 Studio Bedroom	20.85	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
355 Studio Bedroom	21.91	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
359 Studio Bedroom	18.92	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
369 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
372 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
375 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
378 Studio Bedroom	17.18	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
386 Studio Bedroom	20.85	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
389 Studio Bedroom	21.91	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
393 Studio Bedroom	18.92	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
403 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
406 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
409 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
412 Studio Bedroom	17.18	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
420 Studio Bedroom	20.85	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
423 Studio Bedroom	21.91	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
427 Studio Bedroom	18.92	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
437 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
440 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
443 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
446 Studio Bedroom	17.18	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
454 Studio Bedroom	20.85	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
457 Studio Bedroom	21.91	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
461 Studio Bedroom	18.92	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
471 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
474 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
477 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
480 Studio Bedroom	17.18	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
488 Studio Bedroom	20.85	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
491 Studio Bedroom	21.91	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
495 Studio Bedroom	18.92	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h

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Room name	Floor area m ²	Thermal template	Occupancy profile	Equipment profile	Lighting profile
505 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
508 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
511 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
514 Studio Bedroom	17.18	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
522 Studio Bedroom	20.85	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
525 Studio Bedroom	21.91	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
529 Studio Bedroom	18.92	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
53 Studio Bedroom	17.41	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
56 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
59 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
62 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
65 Studio Bedroom	17.18	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
78 Studio Bedroom	16.94	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
81 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
84 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
87 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
90 Studio Bedroom	17.18	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
98 Studio Bedroom	19.86	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
101 Studio Bedroom	16.21	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
104 Studio Bedroom	16.85	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
107 Studio Bedroom	19.86	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
108 Studio Bedroom	17.0	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
121 Studio Bedroom	16.94	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
124 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
127 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
130 Studio Bedroom	16.97	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
133 Studio Bedroom	17.18	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h
141 Studio Bedroom	19.86	TM59 - Studio	Studio Occupancy	Studio Equipment	18-23h

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Modelled openings

Room name	Window to wall ratio %	Window g-value (EN 410)	Opening gross area m ²	Opening free area (avg) %	Opening free area / floor area ratio %	Opening profile(s)
144 Studio Bedroom	34.93	0.3978, 0.3978	1.45, 1.75	0.0, 0.0	0.0	off continuously
147 Studio Bedroom	33.75	0.3978, 0.3978	1.44, 1.75	0.0, 0.0	0.0	off continuously
150 Studio Bedroom	12.89	0.3978, 0.3978	1.44, 1.75	0.0, 0.0	0.0	off continuously
151 Studio Bedroom	38.62	0.3978, 0.3978	1.77, 2.16	0.0, 0.0	0.0	off continuously
164 Studio Bedroom	38.57	0.3978, 0.3978	1.79, 2.12	0.0, 0.0	0.0	off continuously
167 Studio Bedroom	38.68	0.3978, 0.3978	1.77, 2.16	0.0, 0.0	0.0	off continuously
170 Studio Bedroom	38.63	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
173 Studio Bedroom	38.64	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
176 Studio Bedroom	19.02	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
184 Studio Bedroom	12.98	0.3978, 0.3978	1.45, 1.75	0.0, 0.0	0.0	off continuously
187 Studio Bedroom	34.93	0.3978, 0.3978	1.45, 1.75	0.0, 0.0	0.0	off continuously
190 Studio Bedroom	33.75	0.3978, 0.3978	1.44, 1.75	0.0, 0.0	0.0	off continuously
193 Studio Bedroom	12.89	0.3978, 0.3978	1.44, 1.75	0.0, 0.0	0.0	off continuously
194 Studio Bedroom	38.62	0.3978, 0.3978	1.77, 2.16	0.0, 0.0	0.0	off continuously
207 Studio Bedroom	38.57	0.3978, 0.3978	1.79, 2.12	0.0, 0.0	0.0	off continuously
210 Studio Bedroom	38.68	0.3978, 0.3978	1.77, 2.16	0.0, 0.0	0.0	off continuously
213 Studio Bedroom	38.63	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
216 Studio Bedroom	38.64	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
219 Studio Bedroom	19.02	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
227 Studio Bedroom	12.98	0.3978, 0.3978	1.45, 1.75	0.0, 0.0	0.0	off continuously
230 Studio Bedroom	34.93	0.3978, 0.3978	1.45, 1.75	0.0, 0.0	0.0	off continuously

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Room name	Window to wall ratio %	Window g-value (EN 410)	Opening gross area m ²	Opening free area (avg) %	Opening free area / floor area ratio %	Opening profile(s)
233 Studio Bedroom	33.75	0.3978, 0.3978	1.44, 1.75	0.0, 0.0	0.0	off continuously
236 Studio Bedroom	12.89	0.3978, 0.3978	1.44, 1.75	0.0, 0.0	0.0	off continuously
237 Studio Bedroom	38.62	0.3978, 0.3978	1.77, 2.16	0.0, 0.0	0.0	off continuously
250 Studio Bedroom	38.57	0.3978, 0.3978	1.79, 2.12	0.0, 0.0	0.0	off continuously
253 Studio Bedroom	38.68	0.3978, 0.3978	1.77, 2.16	0.0, 0.0	0.0	off continuously
256 Studio Bedroom	38.63	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
259 Studio Bedroom	38.64	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
262 Studio Bedroom	19.02	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
270 Studio Bedroom	12.98	0.3978, 0.3978	1.45, 1.75	0.0, 0.0	0.0	off continuously
273 Studio Bedroom	34.93	0.3978, 0.3978	1.45, 1.75	0.0, 0.0	0.0	off continuously
276 Studio Bedroom	33.75	0.3978, 0.3978	1.44, 1.75	0.0, 0.0	0.0	off continuously
279 Studio Bedroom	12.89	0.3978, 0.3978	1.44, 1.75	0.0, 0.0	0.0	off continuously
280 Studio Bedroom	38.62	0.3978, 0.3978	1.77, 2.16	0.0, 0.0	0.0	off continuously
293 Studio Bedroom	38.57	0.3978, 0.3978	1.79, 2.12	0.0, 0.0	0.0	off continuously
296 Studio Bedroom	38.68	0.3978, 0.3978	1.77, 2.16	0.0, 0.0	0.0	off continuously
299 Studio Bedroom	38.63	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
302 Studio Bedroom	38.64	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
305 Studio Bedroom	19.02	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
313 Studio Bedroom	12.98	0.3978, 0.3978	1.45, 1.75	0.0, 0.0	0.0	off continuously
316 Studio Bedroom	34.93	0.3978, 0.3978	1.45, 1.75	0.0, 0.0	0.0	off continuously
319 Studio Bedroom	33.75	0.3978, 0.3978	1.44, 1.75	0.0, 0.0	0.0	off continuously
322 Studio Bedroom	12.89	0.3978, 0.3978	1.44, 1.75	0.0, 0.0	0.0	off continuously
323 Studio Bedroom	38.62	0.3978, 0.3978	1.77, 2.16	0.0, 0.0	0.0	off continuously

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Room name	Window to wall ratio %	Window g-value (EN 410)	Opening gross area m ²	Opening free area (avg) %	Opening free area / floor area ratio %	Opening profile(s)
335 Studio Bedroom	38.68	0.3978, 0.3978	1.77, 2.16	0.0, 0.0	0.0	off continuously
338 Studio Bedroom	38.63	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
341 Studio Bedroom	38.64	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
344 Studio Bedroom	19.02	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
352 Studio Bedroom	26.73	0.3978, 0.3978, 0.3978, 0.3978	1.59, 1.92, 1.6, 1.92	0.0, 0.0, 0.0, 0.0	0.0	off continuously
355 Studio Bedroom	27.51	0.3978, 0.3978	1.79, 2.12	0.0, 0.0	0.0	off continuously
359 Studio Bedroom	16.22	0.3978, 0.3978	1.59, 1.89	0.0, 0.0	0.0	off continuously
369 Studio Bedroom	38.68	0.3978, 0.3978	1.77, 2.16	0.0, 0.0	0.0	off continuously
372 Studio Bedroom	38.63	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
375 Studio Bedroom	38.64	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
378 Studio Bedroom	19.02	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
386 Studio Bedroom	26.73	0.3978, 0.3978, 0.3978, 0.3978	1.59, 1.92, 1.6, 1.92	0.0, 0.0, 0.0, 0.0	0.0	off continuously
389 Studio Bedroom	27.51	0.3978, 0.3978	1.79, 2.12	0.0, 0.0	0.0	off continuously
393 Studio Bedroom	16.22	0.3978, 0.3978	1.59, 1.89	0.0, 0.0	0.0	off continuously
403 Studio Bedroom	38.68	0.3978, 0.3978	1.77, 2.16	0.0, 0.0	0.0	off continuously
406 Studio Bedroom	38.63	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
409 Studio Bedroom	38.64	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
412 Studio Bedroom	19.02	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
420 Studio Bedroom	26.73	0.3978, 0.3978, 0.3978, 0.3978	1.59, 1.92, 1.6, 1.92	0.0, 0.0, 0.0, 0.0	0.0	off continuously
423 Studio Bedroom	27.51	0.3978, 0.3978	1.79, 2.12	0.0, 0.0	0.0	off continuously

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Room name	Window to wall ratio %	Window g-value (EN 410)	Opening gross area m ²	Opening free area (avg) %	Opening free area / floor area ratio %	Opening profile(s)
427 Studio Bedroom	16.22	0.3978, 0.3978	1.59, 1.89	0.0, 0.0	0.0	off continuously
437 Studio Bedroom	38.68	0.3978, 0.3978	1.77, 2.16	0.0, 0.0	0.0	off continuously
440 Studio Bedroom	38.63	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
443 Studio Bedroom	38.64	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
446 Studio Bedroom	19.02	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
454 Studio Bedroom	26.73	0.3978, 0.3978, 0.3978, 0.3978	1.59, 1.92, 1.6, 1.92	0.0, 0.0, 0.0, 0.0	0.0	off continuously
457 Studio Bedroom	27.51	0.3978, 0.3978	1.79, 2.12	0.0, 0.0	0.0	off continuously
461 Studio Bedroom	16.22	0.3978, 0.3978	1.59, 1.89	0.0, 0.0	0.0	off continuously
471 Studio Bedroom	38.68	0.3978, 0.3978	1.77, 2.16	0.0, 0.0	0.0	off continuously
474 Studio Bedroom	38.63	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
477 Studio Bedroom	38.64	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
480 Studio Bedroom	19.02	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
488 Studio Bedroom	26.73	0.3978, 0.3978, 0.3978, 0.3978	1.59, 1.92, 1.6, 1.92	0.0, 0.0, 0.0, 0.0	0.0	off continuously
491 Studio Bedroom	27.51	0.3978, 0.3978	1.79, 2.12	0.0, 0.0	0.0	off continuously
495 Studio Bedroom	16.22	0.3978, 0.3978	1.59, 1.89	0.0, 0.0	0.0	off continuously
505 Studio Bedroom	38.68	0.3978, 0.3978	1.77, 2.16	0.0, 0.0	0.0	off continuously
508 Studio Bedroom	38.63	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
511 Studio Bedroom	38.64	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
514 Studio Bedroom	19.02	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
522 Studio Bedroom	26.73	0.3978, 0.3978, 0.3978, 0.3978	1.59, 1.92, 1.6, 1.92	0.0, 0.0, 0.0, 0.0	0.0	off continuously

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Room name	Window to wall ratio %	Window g-value (EN 410)	Opening gross area m ²	Opening free area (avg) %	Opening free area / floor area ratio %	Opening profile(s)
525 Studio Bedroom	27.51	0.3978, 0.3978	1.79, 2.12	0.0, 0.0	0.0	off continuously
529 Studio Bedroom	16.22	0.3978, 0.3978	1.59, 1.89	0.0, 0.0	0.0	off continuously
53 Studio Bedroom	37.7	0.3978, 0.3978	1.79, 2.12	0.0, 0.0	0.0	off continuously
56 Studio Bedroom	38.68	0.3978, 0.3978	1.77, 2.16	0.0, 0.0	0.0	off continuously
59 Studio Bedroom	38.63	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
62 Studio Bedroom	38.64	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
65 Studio Bedroom	19.02	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
78 Studio Bedroom	38.57	0.3978, 0.3978	1.79, 2.12	0.0, 0.0	0.0	off continuously
81 Studio Bedroom	38.68	0.3978, 0.3978	1.77, 2.16	0.0, 0.0	0.0	off continuously
84 Studio Bedroom	38.63	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
87 Studio Bedroom	38.64	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
90 Studio Bedroom	19.02	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
98 Studio Bedroom	12.98	0.3978, 0.3978	1.45, 1.75	0.0, 0.0	0.0	off continuously
101 Studio Bedroom	34.93	0.3978, 0.3978	1.45, 1.75	0.0, 0.0	0.0	off continuously
104 Studio Bedroom	33.75	0.3978, 0.3978	1.44, 1.75	0.0, 0.0	0.0	off continuously
107 Studio Bedroom	12.89	0.3978, 0.3978	1.44, 1.75	0.0, 0.0	0.0	off continuously
108 Studio Bedroom	38.62	0.3978, 0.3978	1.77, 2.16	0.0, 0.0	0.0	off continuously
121 Studio Bedroom	38.57	0.3978, 0.3978	1.79, 2.12	0.0, 0.0	0.0	off continuously
124 Studio Bedroom	38.68	0.3978, 0.3978	1.77, 2.16	0.0, 0.0	0.0	off continuously
127 Studio Bedroom	38.63	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
130 Studio Bedroom	38.64	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
133 Studio Bedroom	19.02	0.3978, 0.3978	1.79, 2.13	0.0, 0.0	0.0	off continuously
141 Studio Bedroom	12.98	0.3978, 0.3978	1.45, 1.75	0.0, 0.0	0.0	off continuously

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Modelled ventilation

Room name	Infiltration rate ACH	Mech vent flow rate ACH
144 Studio Bedroom	0.15	2.28
147 Studio Bedroom	0.15	2.2
150 Studio Bedroom	0.15	1.86
151 Studio Bedroom	0.15	2.18
164 Studio Bedroom	0.15	2.18
167 Studio Bedroom	0.15	2.18
170 Studio Bedroom	0.15	2.18
173 Studio Bedroom	0.15	2.18
176 Studio Bedroom	0.15	2.15
184 Studio Bedroom	0.15	1.86
187 Studio Bedroom	0.15	2.28
190 Studio Bedroom	0.15	2.2
193 Studio Bedroom	0.15	1.86
194 Studio Bedroom	0.15	2.18
207 Studio Bedroom	0.15	2.18
210 Studio Bedroom	0.15	2.18
213 Studio Bedroom	0.15	2.18
216 Studio Bedroom	0.15	2.18
219 Studio Bedroom	0.15	2.15
227 Studio Bedroom	0.15	1.86
230 Studio Bedroom	0.15	2.28
233 Studio Bedroom	0.15	2.2
236 Studio Bedroom	0.15	1.86
237 Studio Bedroom	0.15	2.18
250 Studio Bedroom	0.15	2.18
253 Studio Bedroom	0.15	2.18
256 Studio Bedroom	0.15	2.18
259 Studio Bedroom	0.15	2.18
262 Studio Bedroom	0.15	2.15
270 Studio Bedroom	0.15	1.86
273 Studio Bedroom	0.15	2.28
276 Studio Bedroom	0.15	2.2
279 Studio Bedroom	0.15	1.86
280 Studio Bedroom	0.15	2.18
293 Studio Bedroom	0.15	2.18
296 Studio Bedroom	0.15	2.18
299 Studio Bedroom	0.15	2.18
302 Studio Bedroom	0.15	2.18
305 Studio Bedroom	0.15	2.15
313 Studio Bedroom	0.15	1.86

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Room name	Infiltration rate ACH	Mech vent flow rate ACH
316 Studio Bedroom	0.15	2.28
319 Studio Bedroom	0.15	2.2
322 Studio Bedroom	0.15	1.86
323 Studio Bedroom	0.15	2.18
335 Studio Bedroom	0.15	2.18
338 Studio Bedroom	0.15	2.18
341 Studio Bedroom	0.15	2.18
344 Studio Bedroom	0.15	2.15
352 Studio Bedroom	0.15	1.77
355 Studio Bedroom	0.15	1.69
359 Studio Bedroom	0.15	1.95
369 Studio Bedroom	0.15	2.18
372 Studio Bedroom	0.15	2.18
375 Studio Bedroom	0.15	2.18
378 Studio Bedroom	0.15	2.15
386 Studio Bedroom	0.15	1.77
389 Studio Bedroom	0.15	1.69
393 Studio Bedroom	0.15	1.95
403 Studio Bedroom	0.15	2.18
406 Studio Bedroom	0.15	2.18
409 Studio Bedroom	0.15	2.18
412 Studio Bedroom	0.15	2.15
420 Studio Bedroom	0.15	1.77
423 Studio Bedroom	0.15	1.69
427 Studio Bedroom	0.15	1.95
437 Studio Bedroom	0.15	2.18
440 Studio Bedroom	0.15	2.18
443 Studio Bedroom	0.15	2.18
446 Studio Bedroom	0.15	2.15
454 Studio Bedroom	0.15	1.77
457 Studio Bedroom	0.15	1.69
461 Studio Bedroom	0.15	1.95
471 Studio Bedroom	0.15	2.18
474 Studio Bedroom	0.15	2.18
477 Studio Bedroom	0.15	2.18
480 Studio Bedroom	0.15	2.15
488 Studio Bedroom	0.15	1.77
491 Studio Bedroom	0.15	1.69
495 Studio Bedroom	0.15	1.95
505 Studio Bedroom	0.15	2.18
508 Studio Bedroom	0.15	2.18
511 Studio Bedroom	0.15	2.18

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Room name	Infiltration rate ACH	Mech vent flow rate ACH
514 Studio Bedroom	0.15	2.15
522 Studio Bedroom	0.15	1.77
525 Studio Bedroom	0.15	1.69
529 Studio Bedroom	0.15	1.95
53 Studio Bedroom	0.15	2.12
56 Studio Bedroom	0.15	2.18
59 Studio Bedroom	0.15	2.18
62 Studio Bedroom	0.15	2.18
65 Studio Bedroom	0.15	2.15
78 Studio Bedroom	0.15	2.18
81 Studio Bedroom	0.15	2.18
84 Studio Bedroom	0.15	2.18
87 Studio Bedroom	0.15	2.18
90 Studio Bedroom	0.15	2.15
98 Studio Bedroom	0.15	1.86
101 Studio Bedroom	0.15	2.28
104 Studio Bedroom	0.15	2.2
107 Studio Bedroom	0.15	1.86
108 Studio Bedroom	0.15	2.18
121 Studio Bedroom	0.15	2.18
124 Studio Bedroom	0.15	2.18
127 Studio Bedroom	0.15	2.18
130 Studio Bedroom	0.15	2.18
133 Studio Bedroom	0.15	2.15
141 Studio Bedroom	0.15	1.86