

PROJECT: Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories

OTTV CALCULATION

Introduction

For simplicity, the structural beams and columns are neglected and replaced by wall panels in the OTTV calculation. i.e., the building envelop is built up by concrete wall panels and windows only. Based on this assumption, the calculated OTTV value should greater than the actual value of the building. Thus as the calculated values are not greater than 50W/m² for building tower, and so as the actual values.

Breakdown of Wall, Glass & Roof Area

Ref.:

BD 2/9048/18

Building Address:

Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T5)

		Gla	ss, Wall, & R	oof Area (sq.	meter)				
Facing Orientation/Direction	N	NE	E	SE	S	sw	W	NW	Roof
W1 External Concrete Wall Area	1.2	0.7	1.1	5.0	24.8	87.0	3.7	4.4	0.0
R1 Concrete Roof Area	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	501.8
F1 Glass Wall Area	74.1	119.7	51.3	11.4	0.0	0.0	11.4	29.8	0.0

Assumed Construction Details

W1 Concrete Wall: -

10mm light grey oil paint on mosaic tile cladding (External Finish Material)

- + 25mm cement/sand plaster/render (1st Intermediate Material)
- + 25mm white semi gloss paint on gypsum plaster/render (Internal Finish Material)

90mm normal weight aggregate concrete (2nd Intermediate Component)

R1 Roof Panel: -

20mm light grey oil paint on concrete flat roof tiles or slabs (External Finish Material)

- + 50mm polystyrene expanded insulation (2nd Intermediate Component)
- + 20mm plaster/render cement/sand (4th Intermediate Component)
- + 150mm white semi-gloss paint on normal weight aggregate concrete (Internal Finish Material)

+ 40mm plaster/render cement/sand (1st Intermediate Component)

+ 20mm asphalt, mastic with 20% grit (3rd Intermediate Component)

Notes:

1. Shading Coefficient (SC) of fenestration are listed as follows: -- (Glass Information refers to Appendix A1)

Shading Coefficient (SC) Window Type
0.93 F1
0.97 F2

- 2. External Shading Multiplier (ESM) is assumed to be 1 for all directions.
- 3. Façade Orientation markup refers to Appendix A2

Calculation of 'U' Value of Composite Wall/Roof and Details of Other Values

1 Ref.: BD 2/9048/18
Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T5)
*Wall/Reof Sheet No. A Building Address: Physical data of Opaque: Facade Orientation Facing

Facade Orientation Facing:	N	Solar Factor (SF) is	104

Facade Orientation Facing:		N		Solar Factor (SF) is _	104
*Wall/Roof Code N	lo.	*W1/ R1	*W2/ R2	*W3/ R3	
Location of Wall/Roof		Concrete wall			
External Surface Film	R _o	0.044			
External Finish Material		Mosaic tile cladding			
Conductivity	W/m°C	1.5			
Density	kg/m³	2500			
Thickness	m	0.005			
Material/Paint		White mosaic tiles			
Absorptivity	(a)	0.58			
		Plaster/render -			
Intermediate Component		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Air Space Resistance	R _a				
		Concrete - normal			
Intermediate Component		weight aggregate			
Conductivity	W/m°C	2.16			
Density	kg/m³	2400			
Thickness	m	0.125			
Intermediate Component					
Conductivity	W/m°C				
Density	kg/m³				
Thickness	m				
		Plaster/render -			
Internal Finish Material		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Material/Paint		White gloss paint			
Absorptivity	(α)	0.25			
Internal Surface Film	R _i	0.299			
U' Value of Composite		2 21			
*Wall/ Roof		2.31			
Area of *Wall/ Roof	m²	1.17			
Density of Composite *Wall/ Roof	kg/m²	349.70			
Equivalent Temperature Difference	(TD _{EQ})	2.72			

Sheet No. A	2	Ref.: BD	Ref.: BD 2/9048/18		
Building Address:	Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T5)				
Physical data of Opaque:	*Wall/ Roof				
Facade Orientation Facing:	NE	Solar Factor (SF) is	138		

radac orientation rading	•			30181 1 80101 (31) 13	130
*Wall/Roof Code N	No.	*W1/ R1	*W2/ R2	*W3/ R3	
Location of Wall/Roof		Concrete wall			
External Surface Film	R _o	0.044			
External Finish Material		Mosaic tile cladding			
Conductivity	W/m°C	1.5			
Density	kg/m³	2500			
Thickness	m	0.005			
Material/Paint		White mosaic tiles			
Absorptivity	(a)	0.58			
Intermediate Component		Plaster/render - cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Air Space Resistance	R _a				
Intermediate Component		Concrete - normal weight aggregate			
Conductivity	W/m°C	2.16			
Density	kg/m³	2400			
Thickness	m	0.125		+	
Intermediate Component		0.123			
Conductivity	W/m°C				
Density	kg/m³				
Thickness	m				
Internal Finish Material		Plaster/render - cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Material/Paint	- / \	White gloss paint			
Absorptivity	(α)	0.25		-	
Internal Surface Film	Ri	0.299	TI TI		
U' Value of Composite *Wall/ Roof		2.31			
Area of *Wall/Roof	m²	0.69			
Density of Composite *Wall/ Roof	kg/m²	349.70			
Equivalent Temperature Difference	(TD _{EQ})	2.72			

Sheet No. A	3	Ref. : BD	2/9048/18		
Building Address:	Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T5)				
Physical data of Opaque:	*Wall/ Roof				
Facade Orientation Facing	F	Solar Factor (SF) is	168		

Facade Orientation Facing	:	<u>E</u>		Solar Factor (SF) is	168
*Wall/Roof Code N	No.	*W1/ R1	*W2/ R2	*W3/ R3	
Location of Wall/Roof		Concrete wall			
External Surface Film	R _o	0.044			
External Finish Material		Mosaic tile cladding			
Conductivity	W/m°C	1.5			
Density	kg/m³	2500			
Thickness	m	0.005			
Material/Paint		White mosaic tiles			
Absorptivity	(a)	0.58			
		Plaster/render -			
Intermediate Component		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Air Space Resistance	Ra				
		Concrete - normal			
Intermediate Component		weight aggregate			
Conductivity	W/m°C	2.16			
Density	kg/m³	2400			
Thickness	m	0.125	-		
Intermediate Component					
Conductivity	W/m°C				
Density	kg/m³				
Thickness	m				
		Plaster/render -			
Internal Finish Material		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Material/Paint		White gloss paint			
Absorptivity	(a)	0.25			
Internal Surface Film	R_i	0.299			
U' Value of Composite		2.31			
*Wall/ Roof		2.31			
Area of *Wall/ Roof	m²	1.08			
Density of Composite	kg/m²	349.70			
*Wall/ Roof	νg/111	343.70			
Equivalent Temperature Difference	(TD_{EQ})	2.72			

Sheet No. A	4	Ref. : BD	2/9048/18		
Building Address:	Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T5)				
Physical data of Opaque:	*Wall/ Roof				
Facade Orientation Facing:	SE	Solar Factor (SF) is	197		

Facade Orientation Facing	:	SE		Solar Factor (SF) is	197
*Wall/Roof Code I	No.	*W1/ R1	*W2/ R2	*W3/ R3	
Location of Wall/Roof		Concrete wall			
External Surface Film	R _o	0.044			
External Finish Material		Mosaic tile cladding			
Conductivity	W/m°C	1.5	and the same of th		
Density	kg/m³	2500			
Thickness	m	0.005			
Material/Paint		White mosaic tiles			
Absorptivity	(a)	0.58			
		Plaster/render -			
Intermediate Component		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Air Space Resistance	R _a				
		Concrete - normal			
Intermediate Component		weight aggregate			
Conductivity	W/m°C	2.16			
Density	kg/m³	2400			
Thickness	m	0.125			
Intermediate Component					
Conductivity	W/m°C				
Density	kg/m³				
Thickness	m				×
Internal Finish Material		Plaster/render - cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Material/Paint		White gloss paint			
Absorptivity	(a)	0.25			
Internal Surface Film	Ri	0.299			
U' Value of Composite *Wall/ Roof		2.31			
Area of *Wall/Roof	m²	5.03			
Density of Composite *Wall/ Roof	kg/m²	349.70			
Equivalent Temperature Difference	(TD _{EQ})	2.72			

Sheet No. A	5	Ref. : BD	2/9048/18	
Building Address:	Proposed Residential Dev	elopment at 23 On Hei Street, Sai Kung, New Te	rritories (T5)	
Physical data of Opaque:	*Wall/ Roof			
Facade Orientation Facing:	S	Solar Factor (SF) is	191	

Facade Orientation Facing:	:	<u>S</u>		Solar Factor (SF) is	191
*Wall/Roof Code N	10.	*W1/ R1	*W2/ R2	*W3/ R3	
Location of Wall/Roof		Concrete wall			
External Surface Film	R _o	0.044			
External Finish Material		Mosaic tile cladding			
Conductivity	W/m°C	1.5			
Density	kg/m³	2500			
Thickness	m	0.005			
Material/Paint		White mosaic tiles			
Absorptivity	(a)	0.58			
		Plaster/render -			
Intermediate Component		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Air Space Resistance	Ra				
		Concrete - normal	6		
Intermediate Component		weight aggregate		1	
Conductivity	W/m°C	2.16			
Density	kg/m³	2400			
Thickness	m	0.125			
Intermediate Component					
Conductivity	W/m°C				
Density	kg/m³				
Thickness	m				
		Plaster/render -			
Internal Finish Material		cement/sand			_
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Material/Paint		White gloss paint			
Absorptivity	(a)	0.25			
Internal Surface Film	R_i	0.299			
U' Value of Composite		2.24			
*Wall/ Roof		2.31		276-22	
Area of *Wall/ Roof	m²	24.83			
Density of Composite	leg/m²	240.70			
*Wall/ Roof	kg/m²	349.70			
Equivalent Temperature	(TD _{EQ})	2.72			
Difference	(I DEC)	2.72			

Sheet No. A	6 Ref.: BD 2/9048/18					
Building Address:	Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T5)					
Physical data of Opaque:	*Wall/ Roof					
Facade Orientation Facing:	SW	Solar Factor (SF) is	202			

racade Orientation Facing		5VV		Solar Factor (SF) is _	202
****-!!/D£-C!		******	*****	******	
*Wall/Roof Code N Location of Wall/Roof	10.	*W1/ R1	*W2/ R2	*W3/ R3	-
		Concrete wall			
External Surface Film	R _o	0.044			
External Finish Material		Mosaic tile cladding			
Conductivity	W/m°C	1.5			
Density	kg/m³	2500			
Thickness	m	0.005			
Material/Paint		White mosaic tiles	2-11-11-11		
Absorptivity	(a)	0.58			
		Plaster/render -			
Intermediate Component		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Air Space Resistance	R_a				
		Concrete - normal			
Intermediate Component		weight aggregate			
Conductivity	W/m°C	2.16			
Density	kg/m³	2400			
Thickness	m	0.125			
Intermediate Component					
Conductivity	W/m°C				
Density	kg/m³				
Thickness	m				
		Plaster/render -			
Internal Finish Material		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Material/Paint		White gloss paint			
Absorptivity	(a)	0.25			
Internal Surface Film	Ri	0.299			
U' Value of Composite		A 1200/00/20			
*Wall/ Roof		2.31			
Area of *Wall/Roof	m²	87.00			
Density of Composite *Wall/ Roof	kg/m²	349.70			,
Equivalent Temperature Difference	(TD _{EQ})	2.72			

Sheet No. A	7 Ref.: BD 2/9048/18					
Building Address:	Proposed Residential Deve	Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T5)				
Physical data of Opaque:	*Wall/ Roof					
Facade Orientation Facing:	W	Solar Factor (SF) is	175			

Facade Orientation Facing	į.	W		Solar Factor (SF) is _	1/5
*Wall/Roof Code No.		*W1/ R1	*W2/ R2	*W3/ R3	
Location of Wall/Roof		Concrete wall			
External Surface Film	R_o	0.044			
External Finish Material		Mosaic tile cladding			
Conductivity	W/m°C	1.5			
Density	kg/m³	2500			
Thickness	m	0.005			
Material/Paint		White mosaic tiles			
Absorptivity	(a)	0.58			
		Plaster/render -			
Intermediate Component		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Air Space Resistance	R _a				
		Concrete - normal			
Intermediate Component		weight aggregate			
Conductivity	W/m°C	2.16			
Density	kg/m³	2400			
Thickness	m	0.125			
Intermediate Component					
Conductivity	W/m°C				
Density	kg/m³				
Thickness	m				
		Plaster/render -			
Internal Finish Material		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Material/Paint		White gloss paint	-		
Absorptivity	(α)	0.25			
Internal Surface Film	R _i	0.299			
U' Value of Composite		2.31			
*Wall/ Roof		2.51			
Area of *Wall/ Roof	m²	3.69			
Density of Composite *Wall/ Roof	kg/m²	349.70		_	
Equivalent Temperature Difference	(TD _{EQ})	2.72			

Calculation of 'U' Value of Composite Wall/Roof and Details of Other Values

8 Ref.: BD 2/9048/18
Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T5)
*Wall/Reof Sheet No. A

Building Address: Physical data of Opaque: Facade Orientation Facing: NW Solar Factor (SF) is

racade Orientation racing		1444		Solal Factor (SI) is	
*Wall/Roof Code	No.	*W1/ R1	*W2/ R2	*W3/ R3	
Location of Wall/Roof		Concrete wall			
External Surface Film	R _o	0.044			
External Finish Material		Mosaic tile cladding			
Conductivity	W/m°C	1.5			
Density	kg/m³	2500			
Thickness	m	0.005			
Material/Paint		White mosaic tiles			
Absorptivity	(a)	0.58			
		Plaster/render -			
Intermediate Component		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860		110	
Thickness	m	0.01			
Air Space Resistance	R_a				
		Concrete - normal			
Intermediate Component		weight aggregate			
Conductivity	W/m°C	2.16			
Density	kg/m³	2400			
Thickness	m	0.125			
Intermediate Component					
Conductivity	W/m°C				
Density	kg/m³				
Thickness	m				
		Plaster/render -			
Internal Finish Material		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Material/Paint		White gloss paint			
Absorptivity	(a)	0.25			
Internal Surface Film	Ri	0.299			
U' Value of Composite		2.31			
*Wall/ Roof		2.51			
Area of *Wall/ Roof	m²	4.38			
Density of Composite	kg/m²	349.70			
*Wall/ Roof	vR/III	343.70			
Equivalent Temperature	(TD_{EQ})	2.72			
Difference	(, DEQ)	2.72			

Sheet No. A	9	Ref.: BD 2	/9048/18	
Building Address:	Proposed Residential Deve	lopment at 23 On Hei Street, Sai Kung, New Terr	itories (T5)	
Physical data of Opaque:	*Wall/Roof			
Facade Orientation Facing	Roof	Solar Factor (SF) is	264	

Facade Orientation Facing:		Roof		Solar Factor (SF) is	264
*Wall/Roof Code N	lo.	* W1 /R1	* W2 /R2		
Location of Wall/Roof		Roof			
External Surface Film	R _o	0.055			
		Concrete - flat roof			
External Finish Material		tiles or slabs			
Conductivity	W/m°C	1.1			
Density	kg/m³	2100			
Thickness	m	0.01			
Material/Paint		White mosaic tiles			
Absorptivity	(a)	0.58			
Intermediate Component		Concrete - lightweight aggregate			
Conductivity	W/m°C	0.44			
Density	kg/m³	1300			
Thickness	m	0.075			
		Insulating materials -			
Intermediate Component		polyurethane foam			
Conductivity	W/m°C	0.026			
Density	kg/m³	30			
Thickness	m	0.05			
		Plaster/render -			
Intermediate Component		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.025			
		Concrete - normal			
Intermediate Component		weight aggregate			
Conductivity	W/m°C	2.16			
Density	kg/m³	2400			
Thickness	m	0.15			
Material/Paint	<i>,</i> ,	White gloss paint			
Absorptivity	(α)	0.25			
Internal Surface Film	Ri	0.299			
U' Value of Composite * Wall /Roof		0.39			
Area of *Wall/Roof	m²	501.79			
Density of Composite * Wall /Roof	kg/m²	526.50			
Equivalent Temperature Difference	(TD _{EQ})	9.75			

Window / Rooflight Schedule

Sheet No. B	1		Ref.: BD 2/9048/18				
Building Address:	Proposed Residential Developm	nent at 23 On Hei Street, Sai	nt at 23 On Hei Street, Sai Kung, New Territories (T5)				
Physical data on *window/ rooflight							
Facade Orientation Facing:	N		Solar Factor (SF) is	104			
*Wall/Roof Code No.	*F1/ RL1	*F2/ RL2	*F3/ RL3	*F4/RL4			
Location of *Window/Rooflight	Ground Level	Ground Level					
Glazing Type	Tinted	Tinted					
Thickness m	0.016	0.016					
Shading Coefficient (SC)	0.93	0.97					
Type of Shading Device	N/A	N/A					
External Shading Multiplier (ESM)	1	1					
Area of Glazing m ²	53.37	20.76					
Physical data on *window/ rooflight Facade Orientation Facing:	NE		Solar Factor (SF) is	138			
*Wall/Roof Code No.	*F1/ RL1	*F2/ RL2	*F3/RL3	*F4/RL4			
Location of *Window/Rooflight	Ground Level	Ground Level	13,112	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
tocation of window/noombire	Ologija Ecvel	Ground Level					
Glazing Type	Tinted	Tinted	1				
	Tinted 0.016	Tinted 0.016					
Thickness m	0.016	7inted 0.016 0.97					
Thickness m Shading Coefficient (SC)	0.016 0.93	0.016 0.97					
	0.016	0.016					

^{*}Delete as appropriate

Window / Rooflight Schedule

Sheet No. B	2	Ref.: BD 2/9048/18				
Building Address:	Proposed Residential Developm	ment at 23 On Hei Street, Sai Kung, New Territories (T5)				
Physical data on *window/ rooflight						
Facade Orientation Facing:	E		Solar Factor (SF) is	168		
*Wall/Roof Code No.	*F1/ RL1	*F2/ RL2	*F3/ RL3	*F4/RL4		
Location of *Window/Rooflight	Ground Level	Ground Level				
Glazing Type	Tinted	Tinted				
Thickness m	0.016	0.016				
Shading Coefficient (SC)	0.93	0.97				
Type of Shading Device	N/A	N/A				
External Shading Multiplier (ESM)	1	1				
Area of Glazing m ²	36.95	14.37				
Physical data on *window/ rooflight						
Facade i irientation Facing:	SE		Solar Factor (SE) is	197		
Facade Orientation Facing:	SE		Solar Factor (SF) is	197		
	*F1/ RL1	*F2/ RL2	Solar Factor (SF) is *F3/RL3	197*F4/RL4		
*Wall/Roof Code No. Location of *Window/ Rooflight		*F2/ RL2 Ground Level				
*Wall/Roof Code No.	*F1/ RL1					
*Wall/Roof Code No. Location of *Window/ Rooflight Glazing Type	*F1/ RL1 Ground Level	Ground Level				
*Wall/Roof Code No. Location of *Window/ Rooflight Glazing Type Thickness m	*F1/ RL1 Ground Level Tinted	Ground Level Tinted				
*Wall/Roof Code No. Location of *Window/ Rooflight Glazing Type Thickness m Shading Coefficient (SC)	*F1/ RL1 Ground Level Tinted 0.016	Ground Level Tinted 0.016				
*Wall/Roof Code No. Location of *Window/ Rooflight Glazing Type Thickness m	*F1/ RL1 Ground Level Tinted 0.016 0.93	Ground Level Tinted 0.016 0.97				

^{*}Delete as appropriate

Window / Rooflight Schedule

Sheet No. B	3	Ref.: BD 2/9048/18				
Building Address:	Proposed Residential Developme	ent at 23 On Hei Street, Sai Kung, New Territories (T5)				
Physical data on *window/ rooflight						
Facade Orientation Facing:	S		Solar Factor (SF) is	191		
*Wall/Roof Code No.	*F1/ RL1	*F2/ RL2	*F3/RL3	*F4/RL4		
Location of *Window/Rooflight	Ground Level					
Glazing Type	Tinted					
Thickness m	0.016					
Shading Coefficient (SC)	0.93					
Type of Shading Device	N/A					
External Shading Multiplier (ESM)	1					
Area of Glazing m ²	0.00					
Physical data on *window/ rooflight			6.1.5.4.7.651.5	202		
Facade Orientation Facing:	SW		Solar Factor (SF) is	202		
		*52/012	*F3/RL3	*F4/RL4		
*Wall/Roof Code No.	*F1/ RL1	*F2/ RL2	F5/KL5	14/114		
Location of *Window/Rooflight	Ground Level					
Glazing Type	Tinted					
Thickness m	0.016					
Shading Coefficient (SC)	0.93					
Type of Shading Device	N/A					
External Shading Multiplier (ESM)	1					
Area of Glazing m ²	0.00					

^{*}Delete as appropriate

Window / Rooflight Schedule

Sheet No. B	4	Ref.: BD 2/9048/18				
Building Address:	Proposed Residential Developm	ent at 23 On Hei Street, Sai	eet, Sai Kung, New Territories (T5)			
Physical data on *window/ rooflight						
Facade Orientation Facing:	W		Solar Factor (SF) is	175		
*Wall/Roof Code No.	*F1/ RL1	*F2/ RL2	*F3/RL3	*F4/RL4		
Location of *Window/Rooflight	Ground Level	Ground Level				
Glazing Type	Tinted	Tinted				
Thickness m	0.016	0.016				
Shading Coefficient (SC)	0.93	0.97				
Type of Shading Device	N/A	N/A				
External Shading Multiplier (ESM)	1	1				
Area of Glazing m ²	8.21	3.19				
Physical data on *window/ rooflight Facade Orientation Facing:	NW		Solar Factor (SF) is	138		
*Wall/Roof Code No.	*F1/ RL1	*F2/ RL2	*F3/RL3	*F4/RL4		
Location of *Window/Rooflight	Ground Level	Ground Level				
Glazing Type	Tinted	Tinted				
Thickness m	0.016	0.016				
Shading Coefficient (SC)	0.93	0.97				
Type of Shading Device	N/A	N/A				
External Shading Multiplier (ESM)	1	1				
Area of Glazing m ²	25.02	4.79				

^{*}Delete as appropriate

Calculation of OTTV of Individual Façade in Building Envelope

Sheet No. C **Building Address:**

1 Ref.: BD 2/9048/18
Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T5)
N (Including Curved Face)

Façade Orientation Facing

Opaque *Walls/Roofs

Code No.	Description	*Aw/ Ar	U	а	TDeq	SUM
W1	Concrete wall	1.17	2.31	0.58	2.72	4.3
	Subtotals	1.17	(A)		Heat Gain	4.3

Fenestration

Code No.	Description	*Afw/ Afr	SC	ESM	SF	SUM
F1	Tinted	53.37	0.93	1	104	5162.0
F2	Tinted	20.76	0.97	1	104	2093.8
	-					
	Subtotals	74.13	(B)		Heat Gain	7255.8

Gross Heat Gain (C + D) Gross Area (A + B) OTTV = (E / F)=

7260.08 (E)

75.30 (F) 96.42 W / sq. meter

^{*}Delete as appropriate

Calculation of OTTV of Individual Façade in Building Envelope

Sh	e	et	No.	С	
	2100	2000		100011000	

Ref.: BD 2/9048/18

Building Address:

Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T5)

NE (Including Curved Face)

Façade Orientation Facing

Opaque *Walls/Roofs

Code No.	Description	*Aw/ Ar	U	a	TDeq	SUM
W1	Concrete wall	0.69	2.31	0.58	2.72	2.5
	Subtotals	0.69	(A)		Heat Gain	2.5

Fenestration

Code No.	Description	*Afw/ Afr	SC	ESM	SF	SUM
F1	Tinted	86.21	0.93	1	138	11064.7
F2	Tinted	33.53	0.97	1	138	4488.0
	Subtotals	119.74	/p\		Heat Gain	15552.8

Gross Heat Gain (C + D)	
Gross Area (A + B)	

Gross Area (A +)
OTTV = (E / F)=

15555.29 (E) 120.44 (F) 129.16 W / sq. meter

^{*}Delete as appropriate

Calculation of OTTV of Individual Façade in Building Envelope

S	he	et	No	. C

Building Address:

Ref.: BD 2/9048/18
Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T5)

E (Including Curved Face)

Façade Orientation Facing

Opaque *Walls/Roofs

Code No.	Description	*Aw/ Ar	U	а	TDeq	SUM
W1	Concrete wall	1.08	2.31	0.58	2.72	3.9
	1					
	Subtotals	1.077	(A)	l	Heat Gain	3.9

Fenestration

Code No.	Description	*Afw/ Afr	SC	ESM	SF	SUM
F1	Tinted	36.95	0.93	1	168	5772.9
F2	Tinted	14.37	0.97	1	168	2341.6
	Subtotals	51.32	(B)		Heat Gain	8114.5

Gross Heat Gain (C + D)
Gross Area (A + B)
OTTV = (E / F) =

8118.42 (E) 52.40 (F) 154.95 W / sq. meter

^{*}Delete as appropriate

Calculation of OTTV of Individual Façade in Building Envelope

Sheet No. C

Ref.: BD 2/9048/18

Building Address:

Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T5)

SE (Including Curved Face)

Façade Orientation Facing

Opaque *Walls/Roofs

Code No.	Description	*Aw/Ar	U	а	TDeq	SUM
W1	Concrete wall	5.03	2.31	0.58	2.72	18.4
	Subtotals	5.03375	(A)		Heat Gain	18.4

<u>Fenestration</u>

Code No.	Description	*Afw/ Afr	SC	ESM	SF	SUM
F1	Tinted	8.21	0.93	1	197	1504.3
F2	Tinted	3.19	0.97	1	197	610.2
	Subtotals	11.40	(B)		Heat Gain	2114

Gross Heat Gain (C + D)	
Gross Area (A + B)	

OTTV = (E / F)=

2132.87 (E) 16.44 (F) 129.75 W / sq. meter

^{*}Delete as appropriate

Calculation of OTTV of Individual Façade in Building Envelope

Sheet No. C

Ref.: BD 2/9048/18

Building Address:

Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T5)

S (Including Curved Face)

Façade Orientation Facing

Opaque *Walls/Roofs

Code No.	Description	*Aw/ Ar	U	а	TDeq	SUM
W1	Concrete wall	24.83	2.31	0.58	2.72	90.7
				1	1	
	Subtotals	24.8325	(A)		Heat Gain	90.7 (

Fenestration

Code No.	Description	*Afw/ Afr	SC	ESM	SF	SUM
F1	Tinted	0.00	0.93	1	191	0.0
	Subtotals		(B)		Heat Gain	0.0

Gross Heat Gain (C + D) Gross Area (A + B)

90.69 (E) 24.83 (F)

OTTV = (E / F)= 3.65 W / sq. meter

^{*}Delete as appropriate

Calculation of OTTV of Individual Façade in Building Envelope

Sheet No. C

Building Address:

6 Ref. : BD 2/9048/18 Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (TS)

Façade Orientation Facing sw (Including Curved Face)

Opaque *Walls/Roofs

Code No.	Description	*Aw/ Ar	U	а	TDeq	SUM
W1	Concrete wall	87.00	2.31	0.58	2.72	317.7
	Subtotals	87.003	(A)		Heat Gain	317.7

Fenestration

Code No.	Description	*Afw/ Afr	SC	ESM	SF	SUM
F1	Tinted	0.00	0.93	1	202	0.0
				1		
				l		
					Į.	
				1	1	
	Subtotals	0	(B)		Heat Gain	0.0

Gross Heat Gain (C + D) Gross Area (A + B)

317.74 (E) 87.00 (F)

OTTV = (E / F)=

3.65 W / sq. meter

^{*}Delete as appropriate

Calculation of OTTV of Individual Façade in Building Envelope

Sheet No. C	
Building Address:	

7 Ref.: BD 2/9048/18
Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T5)
W (Including Curved Face)

Façade Orientation Facing

Opaque *Walls/Roofs

Code No.	Description	*Aw/Ar	Ú	а	TDeq	SUM
W1	Concrete wall	3.69	2.31	0.58	2.72	13.5
	Subtotals	3.68975	(A)		Heat Gain	13.5

Fenestration

Code No.	Description	*Afw/ Afr	SC	ESM	SF	SUM
F1	Tinted	8.21	0.93	1	175	1336.3
F2	Tinted	3.19	0.97	1	175	542.0
	Subtotals	11.404	(B)		Heat Gain	1878.4

Gross Heat Gain (C + D) Gross Area (A + B) OTTV = (E / F)=

1891.83 (E) 15.09 (F) 125.34 W / sq. meter

*Delete as appropriate

Calculation of OTTV of Individual Façade in Building Envelope

Sheet No. C

Building Address:

8 Ref. : BD 2/9048/18 Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T5) NW

Façade Orientation Facing

(Including Curved Face)

Opaque *Walls/Roofs

Code No.	Description	*Aw/Ar	U	a	TDeq	SUM
W1	Concrete wall	4.38	2.31	0.58	2.72	16.0
	1					
	Subtotals	4.37675	(A)		Heat Gain	16.0

Fenestration

Code No.	Description	*Afw/ Afr	SC	ESM	SF	SUM
F1	Tinted	25.02	0.93	1	138	3210.6
F2	Tinted	4.79	0.97	1	138	641.1
	Subtotals	29.806	(D)		Heat Gain	3851.7

Gross Heat Gain (C + D) Gross Area (A + B)

3867.73 (E)

OTTV = (E / F)=

34.18 (F) 113.15 W / sq. meter

^{*}Delete as appropriate

Calculation of OTTV of Individual Façade in Building Envelope

Sheet No. C

Building Address:

9 Ref. : BD 2/9048/18
Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T5) Roof

Façade Orientation Facing

(Including Curved Face)

Opaque *Walls/Roofs

Code No.	Description	*Aw/Ar	U	а	TDeq	SUM
R1	Roof	501.79	0.39	0.58	9.75	1106.67
					1	
					1	
			4.1	l		11007
	Subtotals	501.79	I(A)		Heat Gain	1106.7

Fenestration

Code No.	Description	*Afw/Afr	SC	ESM	SF	SUM
R1	Roof	0.00	0.34	1	0	0.00
-						
	6.14.4.1-		(D)		Heat Gain	0.00
	Subtotals	U	(B)		neat Gain	0.00

Gross Heat Gain (C + D) Gross Area (A + B) OTTV = (E / F)=

1106.7 (E) 501.79 (F) 2.21 W / sq. meter

^{*}Delete as appropriate

Summary of OTTV of Building Envelope

Sheet No. D

Ref.: BD 2/9048/18

Building Address:

Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T5)
*(Tower/Podium)

Total Envelope Heat Gain

Façade Orientation	Gross Area from	Gross Heat Gain from
	Form OTTV3	Form OTTV3
	Walls	
N	75.30	7260.08
NE	120.44	15555.29
E	52.40	8118.42
SE	16.44	2132.87
S	24.83	90.69
SW	87.00	317.74
W	15.09	1891.83
NW	34.18	3867.73
Subto	otal 425.68 (G)	39234.64 (H)
	Roof	
	501.79	1106.67
l _e		
Subto	otal 501.79 (I)	1106.67 (J)

*Tower/Podium Walls OTTV

= H/G =

92.17 W/sq meter

*Tower/Podium Roof OTTV

= J/I=

2.21 W/sq meter

*Tower/Podium OTTV

= J+H/ G+I =

43.50 W/sq meter (<50W/sq meter, comply)

^{*}Delete as appropriate







PROJECT: Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories

OTTV CALCULATION

Introduction

For simplicity, the structural beams and columns are neglected and replaced by wall panels in the OTTV calculation. i.e., the building envelop is built up by concrete wall panels and windows only. Based on this assumption, the calculated OTTV value should greater than the actual value of the building. Thus as the calculated values are not greater than 50W/m² for building tower, and so as the actual values.

Breakdown of Wall, Glass & Roof Area

Ref.:

BD 2/9048/18

Building Address:

Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T1)

		Gla	ss, Wall, & R	oof Area (sq.	meter)				
Facing Orientation/Direction	N	NE	E	SE	S	sw	W	NW	Roof
W1 External Concrete Wall Area	0.3	28.6	0.0	0.0	0.0	5.3	2.6	0.0	0.0
R1 Concrete Roof Area	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9
F1 Glass Wall Area	7.3	0.0	0.0	0.0	0.0	17.1	9.8	0.0	0.0

Assumed Construction Details

W1 Concrete Wall: -

10mm light grey oil paint on mosaic tile cladding (External Finish Material)

+ 25mm cement/sand plaster/render (1st Intermediate Material)

90mm normal weight aggregate concrete
 (2nd Intermediate Component)

+ 25mm white semi gloss paint on gypsum plaster/render (Internal Finish Material)

R1 Roof Panel: -

20mm light grey oil paint on concrete flat roof tiles or slabs (External Finish Material)

- + 50mm polystyrene expanded insulation (2nd Intermediate Component)
- + 20mm plaster/render cement/sand (4th Intermediate Component)
- + 150mm white semi-gloss paint on normal weight aggregate concrete (Internal Finish Material)

+ 40mm plaster/render cement/sand (1st Intermediate Component)

20mm asphalt, mastic with 20% grit (3rd Intermediate Component)

Notes:

Shading Coefficient (SC) of fenestration are listed as follows: -- (Glass Information refers to Appendix A1)
 Shading Coefficient (SC)
 Window Type
 0.93

- 2. External Shading Multiplier (ESM) is assumed to be 1 for all directions.
- 3. Façade Orientation markup refers to Appendix A2

Sheet No. A	1 Ref. : BD 2/9048/18					
Building Address:	Proposed Residential Develo	Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T1)				
Physical data of Opaque:	*Wall/ Roof					
Facade Orientation Facing:	N	Solar Factor (SF) is	104			

Tabada ariantation rading	•			30.0 40.0. (0.7.0	
*Wall/Roof Code N	No.	*W1/ R1	*W2/ R2	*W3/ R3	
Location of Wall/Roof		Concrete wall			
External Surface Film	R _o	0.044			
External Finish Material		Mosaic tile cladding			
Conductivity	W/m°C	1.5			
Density	kg/m³	2500			
Thickness	m	0.005			3-16
Material/Paint		White mosaic tiles			
Absorptivity	(a)	0.58			
II II		Plaster/render -			
Intermediate Component		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Air Space Resistance	R _a				
		Concrete - normal			
Intermediate Component		weight aggregate			
Conductivity	W/m°C	2.16			
Density	kg/m³	2400			
Thickness	m	0.125			
Intermediate Component					
Conductivity	W/m°C				
Density	kg/m³				
Thickness	m				
		Plaster/render -			
Internal Finish Material		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Material/Paint		White gloss paint			
Absorptivity	(a)	0.25			
Internal Surface Film	R_i	0.299			
U' Value of Composite		2.24			
*Wall/ Roof		2.31			
Area of *Wall/ Roof	m²	0.62			
Density of Composite	kg/m²	349.70			
*Wall/ Roof	KB/III-	549.70			
Equivalent Temperature	(TD _{EO})	2.72	<u> </u>		
Difference	(I DEQ)	2.72			

Sheet No. A	2 Ref. : BD 2/9048/18				
Building Address:	Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T1)				
Physical data of Opaque:	*Wall/ Roof				
Facade Orientation Facing:	NE	Solar Factor (SF) is	138		

*Wall/Roof Code N	o.	*W1/ R1	*W2/ R2	*W3/ R3	
Location of Wall/Roof		Concrete wall			
External Surface Film	R _o	0.044			
External Finish Material	0	Mosaic tile cladding			
Conductivity	W/m°C	1.5			
Density	kg/m³	2500			
Thickness	m	0.005			
Material/Paint	***	White mosaic tiles	8		
Absorptivity	(α)	0.58			
Absorptivity	(ω)	Plaster/render -		-	
Intermediate Component		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Air Space Resistance	R _a	0.01			
Air space Resistance	,,a	Concrete - normal			
Intermediate Component					
Conductivity	W/m°C	weight aggregate 2.16			
Density	kg/m³	2400			
Thickness	m m	0.125			
Intermediate Component	m	0.123			
Conductivity	W/m°C				
Density	kg/m³				
Thickness	m				-
HIICKHESS		Plaster/render -			
Internal Finish Material		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Material/Paint		White gloss paint			
Absorptivity	(a)	0.25			
Internal Surface Film	R _i	0.299			
U' Value of Composite		0.233			
*Wall/ Roof		2.31			
Area of *Wall/ Roof	m²	21.78			
Density of Composite		21.70			
*Wall/ Roof	kg/m²	349.70			
Equivalent Temperature					
Difference	(TD_{EQ})	2.72			
Diresence					

Sheet No. A	3	Ref.: BD 2	2/9048/18		
Building Address:	Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T1)				
Physical data of Opaque:	*Wall/ Roof				
Facade Orientation Facing	F	Solar Factor (SF) is	168		

racade Orientation racing:		<u> </u>		Solar Factor (Sr) is	100
*Wall/Roof Code N	lo.	*W1/ R1	*W2/ R2	*W3/ R3	
Location of Wall/Roof		Concrete wall			
External Surface Film	R _o	0.044			
External Finish Material		Mosaic tile cladding			
Conductivity	W/m°C	1.5			
Density	kg/m³	2500			
Thickness	m	0.005			
Material/Paint		White mosaic tiles			
Absorptivity	(a)	0.58			
Intermediate Component		Plaster/render - cement/sand			
Conductivity	W/m°C	0.72		 	
Density	kg/m³	1860			
Thickness	m M	0.01			
		0.01			
Air Space Resistance	R _a				
		Concrete - normal			
Intermediate Component	VV/ 96	weight aggregate			
Conductivity	W/m°C	2.16			
Density	kg/m³	2400			
Thickness	m	0.125			
Intermediate Component	1111 80				
Conductivity	W/m°C				
Density	kg/m³				
Thickness	m				
Internal Finish Material		Plaster/render - cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Material/Paint		White gloss paint			
Absorptivity	(a)	0.25			
Internal Surface Film	Ri	0.299			
U' Value of Composite *Wall/ Roof		2.31			
Area of *Wall/Roof	m²	0.00		-	
Density of Composite					
*Wall/ Roof	kg/m²	349.70			
Equivalent Temperature Difference	(TD_{EQ})	2.72		2	

Sheet No. A	4 Ref. : BD 2/9048/18					
Building Address:	Proposed Residential Develo	Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T1)				
Physical data of Opaque:	*Wall/ Roof					
Facade Orientation Facing:	SE	Solar Factor (SF) is	197			

*Wall/Roof Code N	No.	*W1/ R1	*W2/ R2	*W3/ R3	
Location of Wall/Roof		Concrete wall			
External Surface Film	R _o	0.044			
External Finish Material		Mosaic tile cladding			
Conductivity	W/m°C	1.5			
Density	kg/m³	2500			
Thickness	m	0.005			
Material/Paint		White mosaic tiles			
Absorptivity	(a)	0.58			
Intermediate Component		Plaster/render - cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Air Space Resistance	Ra		9		
		Concrete - normal			
Intermediate Component		weight aggregate			
Conductivity	W/m°C	2.16			
Density	kg/m³	2400			
Thickness	m	0.125			
Intermediate Component					
Conductivity	W/m°C				
Density	kg/m³				
Thickness	m				
Internal Finish Material		Plaster/render - cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Material/Paint		White gloss paint			
Absorptivity	(α)	0.25			
Internal Surface Film	Ri	0.299			
U' Value of Composite *Wall/ Roof		2.31			
Area of *Wall/ Roof	m²	0.00			
Density of Composite *Wall/ Roof	kg/m²	349.70			
Equivalent Temperature Difference	(TD _{EQ})	2.72			

Sheet No. A	5	5 Ref. : BD 2/9048/18			
Building Address:	Proposed Residential Develo	Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T1)			
Physical data of Opaque:	*Wall/ Roof				
Facade Orientation Facing:	S	Solar Factor (SF) is	191		

racade Orientation racing.		<u> </u>		30iai 1 actor (31) is	101
*Wall/Roof Code N	lo.	*W1/ R1	*W2/ R2	*W3/ R3	
Location of Wall/Roof		Concrete wall			
External Surface Film	R _o	0.044			
External Finish Material		Mosaic tile cladding			
Conductivity	W/m°C	1.5			
Density	kg/m³	2500			
Thickness	m	0.005			
Material/Paint		White mosaic tiles			
Absorptivity	(a)	0.58			
Intermediate Component		Plaster/render - cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Air Space Resistance	R_a				
Intermediate Component		Concrete - normal			
Conductivity	W/m°C	weight aggregate 2.16			-
Density	kg/m³	2400			
Thickness	m M	0.125			
Intermediate Component		0.123			
Conductivity	W/m°C				
Density	kg/m³				
Thickness	m				
Internal Finish Material		Plaster/render - cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Material/Paint		White gloss paint			
Absorptivity	(α)	0.25			
Internal Surface Film	R _i	0.299			
U' Value of Composite *Wall/ Roof		2.31			
Area of *Wall/Roof	m²	0.00			
Density of Composite *Wall/ Roof	kg/m²	349.70			
Equivalent Temperature Difference	(TD _{EQ})	2.72			

Sheet No. A	6	Ref.: BD 2/9048/18			
Building Address:	Proposed Residential Devel	Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T1)			
Physical data of Opaque:	*Wall/ Roof				
Facade Orientation Facing:	SW	Solar Factor (SF) is 202			

*Wall/Roof Code N	lo.	*W1/ R1	*W2/ R2	*W3/ R3	
Location of Wall/Roof		Concrete wall			
External Surface Film	R _o	0.044			
External Finish Material	1.0	Mosaic tile cladding			
Conductivity	W/m°C	1.5			
Density	kg/m³	2500			
Thickness	m m	0.005			
Material/Paint	-111	White mosaic tiles			
Absorptivity	(α)	0.58			
Absorptivity	(α)	Plaster/render -			
Intermediate Component		cement/sand			1
Conductivity	W/m°C	0.72			
Density	kg/m³	1860		-	-
Thickness	m Kg/m	0.01			
		0.01			
Air Space Resistance	R _a				
		Concrete - normal			
Intermediate Component		weight aggregate			
Conductivity	W/m°C	2.16			
Density	kg/m³	2400			
Thickness	m	0.125			
Intermediate Component					
Conductivity	W/m°C				
Density	kg/m³				
Thickness	m				
		Plaster/render -			
Internal Finish Material		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Material/Paint		White gloss paint			
Absorptivity	(a)	0.25			
Internal Surface Film	R _i	0.299			
U' Value of Composite		2.31			
*Wall/ Roof		2.51			
Area of *Wall/Roof	m²	1.42			
Density of Composite	kg/m²	349.70			
*Wall/ Roof	vR\III.	349.70			
Equivalent Temperature	(TD _{EQ})	2.72			
Difference	, - EU/	701 7			

Calculation of 'U' Value of Composite Wall/Roof and Details of Other Values

Sheet No. A Building Address:

Ref.: BD 2/9048/18

Physical data of Opaque: Facade Orientation Facing:

Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T1)

Solar Factor (SF) is

racade Orientation Facing:		VV		Solar Factor (SF) is	1/3
*Wall/Roof Code No.		*W1/ R1	*W2/ R2	*W3/ R3	
Location of Wall/Roof		Concrete wall			
External Surface Film	R _o	0.044			
External Finish Material		Mosaic tile cladding			
Conductivity	W/m°C	1.5			
Density	kg/m³	2500			
Thickness	m	0.005			
Material/Paint		White mosaic tiles			
Absorptivity	(α)	0.58			
		Plaster/render -			
Intermediate Component		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Air Space Resistance	R_a	1			
		Concrete - normal			
Intermediate Component		weight aggregate			
Conductivity	W/m°C	2.16			
Density	kg/m³	2400			
Thickness	m	0.125			
Intermediate Component					
Conductivity	W/m°C				
Density	kg/m³				
Thickness	m				
		Plaster/render -			
Internal Finish Material		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860		and the second	
Thickness	m	0.01			
Material/Paint		White gloss paint			
Absorptivity	(α)	0.25			
Internal Surface Film	R _i	0.299			
U' Value of Composite		2.31			
*Wall/ Roof		2.51			
Area of *Wall/Roof	m²	0.80			
Density of Composite *Wall/ Roof	kg/m²	349.70			
Equivalent Temperature Difference	(TD _{EQ})	2.72			

Calculation of 'U' Value of Composite Wall/Roof and Details of Other Values

Sheet No. A Building Address: Physical data of Opaque:

8 Ref. : BD 2/9048/18 Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T1)

*Wall/Roof

Facade Orientation Facing:

NW

Solar Factor (SF) is

racade Offentation racing.		IVV		Solal Pactor (SF) is	
*Wall/Roof Code No.		*W1/ R1	*W2/ R2	*W3/ R3	
Location of Wall/Roof		Concrete wall			
External Surface Film	Ro	0.044			
External Finish Material		Mosaic tile cladding			
Conductivity	W/m°C	1.5			
Density	kg/m³	2500			
Thickness	m	0.005			
Material/Paint		White mosaic tiles			
Absorptivity	(α)	0.58			
Intermediate Component		Plaster/render - cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Air Space Resistance	R_a				
Intermediate Component		Concrete - normal weight aggregate			
Conductivity	W/m°C	2.16			
Density	kg/m³	2400			
Thickness	m	0.125			
Intermediate Component		0.1220			
Conductivity	W/m°C				
Density	kg/m³				
Thickness	m				
Internal Finish Material		Plaster/render - cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.01			
Material/Paint		White gloss paint			
Absorptivity	(α)	0.25			
Internal Surface Film	Ri	0.299			
U' Value of Composite *Wall/ Roof		2.31			
Area of *Wall/ Roof	m²	0.00			
Density of Composite *Wall/ Roof	kg/m²	349.70			
Equivalent Temperature Difference	(TD _{EQ})	2.72			

Calculation of 'U' Value of Composite Wall/Roof and Details of Other Values

Sheet No. A	9	Ref.: BD 2/9048/18	
Building Address:	Proposed Residential Development at	23 On Hei Street, Sai Kung, New Territories (T1)	
Physical data of Opaque:	*Wall/Roof		

Physical data of Opaque: *Wall/Roof
Facade Orientation Facing: Roof Solar Factor (SF) is 264

racade Orientation racing:		ROOT		Solar Factor (SF) is	
*Wall/Roof Code N	0.	* W1 /R1	* W2 /R2		
Location of Wall/Roof		Roof			
External Surface Film	R _o	0.055			
		Concrete - flat roof			
External Finish Material		tiles or slabs			
Conductivity	W/m°C	1.1			
Density	kg/m³	2100			
Thickness	m	0.01			
Material/Paint		White mosaic tiles			
Absorptivity	(a)	0.58			
Intermediate Component		Concrete - lightweight aggregate			
Conductivity	W/m°C	0.44			
Density	kg/m³	1300			
Thickness	m	0.075			
		Insulating materials -			
Intermediate Component		polyurethane foam			
Conductivity	W/m°C	0.026			
Density	kg/m³	30			
Thickness	m	0.05			
		Plaster/render -			
Intermediate Component		cement/sand			
Conductivity	W/m°C	0.72			
Density	kg/m³	1860			
Thickness	m	0.025			
		Concrete - normal			
Intermediate Component		weight aggregate			
Conductivity	W/m°C	2.16			
Density	kg/m³	2400			
Thickness	m	0.15			
Material/Paint		White gloss paint			
Absorptivity	(a)	0.25			
Internal Surface Film	Ri	0.299			
U' Value of Composite *Wall/Roof		0.39			
Area of *Wall/Roof	m²	4.87			
Density of Composite			-		
* Wall /Roof	kg/m²	526.50			
Equivalent Temperature Difference	(TD_{EQ})	9.75			

Window / Rooflight Schedule

Sheet No. B	1	Ref.: BD 2/9048/18				
Building Address:	Proposed Residential Developme	ent at 23 On Hei Street, Sai Kung, New Territories (T1)				
Physical data on *window/ rooflight						
Facade Orientation Facing:	N		Solar Factor (SF) is	104		
*Wall/Roof Code No.	*F1/ RL1	*F2/ RL2	*F3/ RL3	*F4/RL4		
Location of *Window/Rooflight	Ground Level					
Glazing Type	Tinted					
Thickness m	0.016					
Shading Coefficient (SC)	0.93					
Type of Shading Device	N/A					
External Shading Multiplier (ESM)	0.621					
Area of Glazing m ²	5.97					
Physical data on *window/ rooflight						
Facade Orientation Facing:						
	NE		Solar Factor (SF) is	138		
*Wall/Roof Code No.	NE *F1/ RL1	*F2/ RL2	Solar Factor (SF) is *F3/RL3	138 *F4/RL4		
*Wall/Roof Code No. Location of *Window/ Rooflight		*F2/ RL2				
	*F1/ RL1	*F2/ RL2				
Location of *Window/Rooflight	*F1/ RL1 Ground Level	*F2/ RL2				
Location of *Window/ Rooflight Glazing Type	*F1/ RL1 Ground Level Tinted	*F2/ RL2				
Location of *Window/ Rooflight Glazing Type Thickness m	*F1/ RL1 Ground Level Tinted 0.016	*F2/ RL2				
Location of *Window/ Reoflight Glazing Type Thickness m Shading Coefficient (SC)	*F1/RL1 Ground Level Tinted 0.016 0.93	*F2/ RL2				

^{*}Delete as appropriate

Window / Rooflight Schedule

Sheet No. B	2	Ref.: BD 2/9048/18				
Building Address:	Proposed Residential Developme	ment at 23 On Hei Street, Sai Kung, New Territories (T1)				
Physical data on *window/ rooflight						
Facade Orientation Facing:	E		Solar Factor (SF) is	168		
, acces						
*Wall/Roof Code No.	*F1/ RL1	*F2/ RL2	*F3/ RL3	*F4/RL4		
Location of *Window/Rooflight	Ground Level					
Glazing Type	Tinted					
Thickness m	0.016					
Shading Coefficient (SC)	0.93					
Type of Shading Device	N/A					
External Shading Multiplier (ESM)	1					
Area of Glazing m ²	0.00					
Physical data on *window/ rooflight			a management	700		
Facade Orientation Facing:	SE		Solar Factor (SF) is	197		
			4-2/2/2	*F4/DL4		
*Wall/Roof Code No.	*F1/ RL1	*F2/ RL2	*F3/RL3	*F4/RL4		
Location of *Window/Rooflight	Ground Level					
Glazing Type	Tinted					
Thickness m	0.016					
Shading Coefficient (SC)	0.93					
Type of Shading Device	N/A					
External Shading Multiplier (ESM)	1					
Area of Glazing m ²	0.00					

^{*}Delete as appropriate

Window / Rooflight Schedule

Sheet No. B	3	Ref.: BD 2/9048/18					
Building Address:	Proposed Residential Developme	nt at 23 On Hei Street, Sai	at 23 On Hei Street, Sai Kung, New Territories (T1)				
Physical data on *window/ rooflight							
Facade Orientation Facing:	<u>S</u>		Solar Factor (SF) is	191			
*Wall/Roof Code No.	*F1/ RL1	*F2/ RL2	*F3/RL3	*F4/RL4			
Location of *Window/Rooflight	Ground Level						
Glazing Type	Tinted						
Thickness m	0.016						
Shading Coefficient (SC)	0.93						
Type of Shading Device	N/A						
External Shading Multiplier (ESM)	1						
Area of Glazing m ²	0.00						
Physical data on *window/ rooflight							
Facade Orientation Facing:	SW		Solar Factor (SF) is	202			
*Wall/Roof Code No.	*F1/ RL1	*F2/ RL2	*F3/RL3	*F4/RL4			
Location of *Window/Rooflight	Ground Level						
Glazing Type	Tinted						
Thickness m	0.016						
Shading Coefficient (SC)	0.93						
Type of Shading Device	N/A						
External Shading Multiplier (ESM)	0.453						
Area of Glazing m ²	17.01						

^{*}Delete as appropriate

Window / Rooflight Schedule

Sheet No. B	4	Ref.: BD 2/9048/18				
Building Address:	Proposed Residential Developme	t at 23 On Hei Street, Sai Kung, New Territories (T1)				
Dhysical data as *window/souflight						
Physical data on *window/ rooflight Facade Orientation Facing:	W		Solar Factor (SF) is	175		
racade Orientation racing:	VV		30141 1 40101 (31 / 13			
*Wall/Roof Code No.	*F1/ RL1	*F2/ RL2	*F3/RL3	*F4/RL4		
Location of *Window/Rooflight	Ground Level					
Glazing Type	Tinted			1.00 Page 100 Page 10		
Thickness m	0.016					
Shading Coefficient (SC)	0.93					
Type of Shading Device	N/A					
External Shading Multiplier (ESM)	0.62					
Area of Glazing m ²	9.43					
Physical data on *window/ rooflight				400		
Facade Orientation Facing:	NW		Solar Factor (SF) is	138		
			1	*== 10.1		
*Wall/Roof Code No.	*F1/ RL1	*F2/ RL2	*F3/RL3	*F4/RL4		
Location of *Window/Rooflight	Ground Level					
Glazing Type	Tinted					
Thickness m	0.016					
Shading Coefficient (SC)	0.93					
Type of Shading Device	N/A					
External Shading Multiplier (ESM)	1					
Area of Glazing m ²	0.00					

^{*}Delete as appropriate

Calculation of OTTV of Individual Façade in Building Envelope

Sheet No. C	1	Ref.: BD 2/9048/18	
Building Address:	Proposed Residential Develo	opment at 23 On Hei Street, Sai Kung, New Territories (T1)	
Façade Orientation Facing	N	(Including Curved Face)	

Opaque *Walls/Roofs

Code No.	Description	*Aw/Ar	U	а	TDeq	SUM
W1	Concrete wall	0.62	2.31	0.58	2.72	2.3
	Subtotals	0.62	(A)		Heat Gain	2.3

<u>Fenestration</u>

Description	*Afw/ Afr	SC	ESM	SF	SUM
Clear Glass	5.97	0.93	0.621	104	358.6
C.I. i.I	F 07	(D)		Heat Cain	358.6
	Clear Glass	Clear Glass 5.97	Clear Glass 5.97 0.93	Clear Glass 5.97 0.93 0.621	Clear Glass 5.97 0.93 0.621 104

Gross Heat Gain (C + D)	360.84 (E)
Gross Area (A + B)	6.59 (F)
OTTV = (E / F)=	54.76 W / sq. meter

^{*}Delete as appropriate

Calculation of OTTV of Individual Façade in Building Envelope

Sheet No. C
Building Address:

Ref.: BD 2/9048/18

Façade Orientation Facing

Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T1)

NE (Including Curved Face)

Opaque *Walls/Roofs

Code No.	Description	*Aw/ Ar	U	а	TDeq	SUM
W1	Concrete wall	21.78	2.31	0.58	2.72	79.5
	Subtotals	21.78	(A)		Heat Gain	79.5

Fenestration

Code No. F1	Description Clear Glass	*Afw/ Afr 8.17	SC	ESM	SF	SUM
F1	Clear Glass	8.17	0.00	THE SAMPLE CO.		
			0.93	0.537	104	424.3
	Subtotals	8.17 ((0)	}	Heat Gain	424.3

Gross Heat (Gain (C + D)
Gross Area (A + B)

503.88 (E)

OTTV = (E / F)=

29.95 (F) 16.82 W / sq. meter

^{*}Delete as appropriate

Calculation of OTTV of Individual Façade in Building Envelope

Sheet No. C	3	Ref.: BD 2/9048/18
Building Address:	Proposed Residential Development at 23 On Hei Street, Sai k	Kung, New Territories (T1)

Façade Orientation Facing E (Including Curved Face)

Opaque *Walls/Roofs

Code No.	Description	*Aw/ Ar	U	а	TDeq	SUM
W1	Concrete wall	0.00	2.31	0.58	2.72	0.0
						7
	Subtotals	0	(A)		Heat Gain	0.0

Fenestration

Code No.	Description	*Afw/ Afr	SC	ESM	SF	SUM
F1	Tinted	0.00	0.93	1	197	0.0
	Subtotals	0.00	(B)		Heat Gain	0.0

Gross Heat Gain (C + D)	0.00 (E)
Gross Area (A + B)	0.00 (F)
OTTV = (E / F)=	0.00 W / sq. meter

^{*}Delete as appropriate

Calculation of OTTV of Individual Façade in Building Envelope

Sheet No. C
Building Address:

Ref.: BD 2/9048/18 Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T1)

SE (Including Curved Face)

Façade Orientation Facing

Opaque *Walls/Roofs

Code No.	Description	*Aw/Ar	U	а	TDeq	SUM
W1	Concrete wall	0.00	2.31	0.58	2.72	0.0
	Subtotals	0	(A)		Heat Gain	0.0

<u>Fenestration</u>

Code No.	Description	*Afw/ Afr	SC	ESM	SF	SUM
F1	Tinted	0.00	0.93	1	197	0.0
	Subtotal	5 0.00	(B)		Heat Gain	0.0

Gross Heat	Gain (C + D)
Gross Area	(A + B)

0.00 (E)

OTTV = (E/F)=

0.00 (F) 0.00 W / sq. meter

^{*}Delete as appropriate

Calculation of OTTV of Individual Façade in Building Envelope

Sh	eet	No.	C	

Ref.: BD 2/9048/18

Building Address:

Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T1)

Façade Orientation Facing

(Including Curved Face)

Opaque *Walls/Roofs

Code No.	Description	*Aw/ Ar	U	а	TDeq	SUM
W1	Concrete wall	0.00	2.31	0.58	2.72	0.0
	Subtotals	0	(A)	L	Heat Gain	0.0

Fenestration

Code No.	Description	*Afw/ Afr	SC	ESM	SF	SUM
F1	Clear Glass	0.00	0.93	1	191	0.0
	Subtotals	0	(B)		Heat Gain	0.0

Gross	Heat	Gain	(C + D)
	A	/A . F	. 1

Gross Area (A + B) OTTV = (E / F)=

0.00 (E)

0.00 (F) 0.00 W / sq. meter

^{*}Delete as appropriate

Calculation of OTTV of Individual Façade in Building Envelope

Sheet No. C

6

Ref.: BD 2/9048/18

Building Address:

Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T1)

Façade Orientation Facing

SW (Including Curved Face)

Opaque *Walls/Roofs

Code No.	Description	*Aw/ Ar	Ü	а	TDeq	SUM
W1	Concrete wall	1.42	2.31	0.58	2.72	5.2
	1					
	Subtotals	1.42	(A)		Heat Gain	5.2

Fenestration

Code No.	Description	*Afw/ Afr	SC	ESM	SF	SUM
F1	Clear Glass	17.01	0.93	0.453	191	1368.7
	Subtotals	17.01 (Heat Gain	1368.7

Gross Heat Gain (C + D) Gross Area (A + B) OTTV = (E / F)= 1373.92 (E) 18.43 (F)

74.55 W / sq. meter

^{*}Delete as appropriate

Calculation of OTTV of Individual Façade in Building Envelope

Sheet No. C	7	Ref.: BD 2/9048/18
Building Address:	Proposed Residential	Development at 23 On Hei Street, Sai Kung, New Territories (T1)
Façade Orientation Facing	W	(Including Curved Face)

Opaque *Walls/Roofs

Code No.	Description	*Aw/ Ar	U	а	TDeq	SUM
W1	Concrete wall	0.80	2.31	0.58	2.72	2.9
	Subtotals	0.8	(0)		Heat Gain	2.9

<u>Fenestration</u>

Code No.	Description	*Afw/ Afr	SC	ESM	SF	SUM
F1	Clear Glass	9.43	0.93	0.62	202	1098.3
						ŀ
	Subtotals	9.43	(B)		Heat Gain	1098.3

Gross Heat Gain (C + D)	1101.26 (E)
Gross Area (A + B)	10.23 (F)
OTTV = (E / F)=	107.65 W / sq. meter

^{*}Delete as appropriate

Calculation of OTTV of Individual Façade in Building Envelope

Sheet No. C
Building Address

8 Ref. : BD 2/9048/18 Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T1)

Façade Orientation Facing

NW (Including Curved Face)

Opaque *Walls/Roofs

Code No.	Description	*Aw/Ar	U	а	TDeq	SUM
W1	Concrete wall	0.00	2.31	0.58	2.72	0.0
	Subtotals	0	(A)		Heat Gain	0.0

<u>Fenestration</u>

Code No.	Description	*Afw/ Afr	SC	ESM	SF	SUM
F1	Clear Glass	0.00	0.93	1	138	0.0
	Subtotals	0 ((P)		Heat Gain	0.0

Gross Heat Gain (C + D)
Gross Area (A + B)

0.00 (E) 0.00 (F)

OTTV = (E / F)=

0.00 (F)

^{*}Delete as appropriate

Calculation of OTTV of Individual Façade in Building Envelope

Sheet No. C Building Address: 9 Ref.: BD 2/9048/18 Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T1)

Façade Orientation Facing

Roof (Including Curved Face)

Opaque *Walls/Roofs

Code No.	Description	* Aw /Ar	U	а	TDeq	SUM
R1	Roof	4.87	0.39	0.58	9.75	10.75
					<u></u>	40-
	Subtotals	4.874	(A)		Heat Gain	10.7

Fenestration

Code No.	Description	*Afw/Afr	SC	ESM	SF	SUM
R1	Roof	0.00	0.34	1	0	0.00
	Subtotals	0	(B)		Heat Gain	0.00

Gross Heat Gain (C + D) Gross Area (A + B) OTTV = (E / F)= 10.7 (E) 4.874 (F) 2.21 W / sq. meter

^{*}Delete as appropriate

Summary of OTTV of Building Envelope

Sheet No. D

Ref.: BD 2/9048/18

Building Address:

Proposed Residential Development at 23 On Hei Street, Sai Kung, New Territories (T1) *(Tower/Podium)

Total Envelope Heat Gain

Façade Orientation	Gross Area from	Gross Heat Gain from
	Form OTTV3	Form OTTV3
	Walls	
N	6.59	360.84
NE	29.95	503.88
E	0.00	0.00
SE	0.00	0.00
S	0.00	0.00
SW	18.43	1373.92
W	10.23	1101.26
NW	0.00	0.00
Subto	tal 65.20	(G) 3339.90 (H)
	Roof	
	4.87	10.75
Subto	tal 4.87	(I) 10.75 (J)

*Tower/Podium Walls OTTV

= H/G =

51.23 W/sq meter

*Tower/Podium Roof OTTV

= J/I =

2.21 W/sq meter

*Tower/Podium OTTV

= J+H/ G+I =

47.82 W/sq meter (<50W/sq meter, comply)

^{*}Delete as appropriate