TOTAL UA CALCULATIONS FOR EXTERIOR WALLS TEMPLATE — INSTRUCTIONS

Purpose of Template:

This template is being provided as a calculation tool only to organize wall area summary information in conjunction with the Energy Analysis and the Supporting Documentation.

In addition to wall area information, it also provides useful percentages and ratios, including, but not limited to:

- Total proposed area-weighted U-Factor of opaque above-grade walls **/** code U-Factor (for the purposes of this template, this is indicated as **Ratio 1**)
- Total proposed area-weighted U-Factor of opaque above-grade walls plus vertical fenestrations **/**code U-Factor (**Ratio 2**)
- Total above-grade vertical fenestration **/** gross wall area (**Ratio 3**)

(I) USE RATIOS 1 & 2 TO DETERMINE ELIGIBILITY FOR WALL AREA DEDUCTION OF FLOOR AREA

Although this is a Zoning Resolution requirement, and not an Energy Code requirement, this template may also be used to help determine whether this deduction can be claimed. As per ZR 12-10(12)(ii), items (1) and (2), in order to claim exterior wall thickness deduction of floor area, up to eight inches, the following two conditions must be met:

Ratio 1: U-factor (all proposed ***opaque*** above-grade exterior wall assemblies) **≤ 80%** U-factor (NYCECC), and
Ratio 2: U-factor (all proposed ***opaque*** above-grade exterior wall assemblies **+ *vertical fenestrations***) **≤ 90%** U-factor (NYCECC)
(Note: All U-Factors are total area-weighted)

When these two conditions are met, this floor area deduction can be claimed. If only one meets the requirement, the deduction cannot be claimed. The Ratio 1 and Ratio 2 fields are auto populated. The red-outlined fields in the same row as the ratio indicate the values used to determine that ratio.

(II) USE RATIO 3 (WWR) TO DETERMINE WHAT COMPLIANCE PATH TO FOLLOW

The Window-to-Wall Ratio information below can be found on [BE-5] here:
2020 NYCECC How-To-Guide, Supporting Documents, Building Envelope Section

Maximum Vertical Fenestration Area *(when following ECC C402.4)*
- Maximum WWR (vertical fenestration area / gross above-grade wall area): 30%
- Maximum WWR: 40% permitted with certain requirements including daylight responsive controls
- When WWR > 40%: ASHRAE must be chosen as Code Compliance Path, as ECC does not allow WWR > 40%.

Maximum Vertical Fenestration Area *(when following ASHRAE 5.5.4.2)*
- Maximum WWR (vertical fenestration area / gross wall area): 40%
- When WWR > 40%: Energy Code compliance may be demonstrated through either

a) COMcheck (with envelope tradeoff) envelope analysis, or
b) Energy Modeling (total building performance) energy analysis.

The red-outlined fields in the same column as Ratio 3 indicate the values used to determine that ratio.

Below is a partial view of a **sample** filled-in template.

	TOTAL UA CALCULATIONS FOR EXTERIOR WALLS (see separate instructions)				North[f]		West[f]		South[f]		East[f]		Total[g]		Area[h]	Code Values[i]	
Ref[a]	Opaque Wall Type[b]	$c\alpha$[c]	c_i[d]	U-Factor[e]	Area	UA	Area	UA	Area	UA	Area	UA	Area	UA		U	UA
wt-1	Steel-framed	19	10	0.052	1308	68.02	0	0.00	1570	81.64	0	0.00	2,878.00	149.66	18%	0.064	184.19
wt-1a	Steel framed @ slab		10	0.072	77	5.54	0	0.00	200	14.40	0	0.00	277.00	19.94	2%	0.113	31.30
	Steel framed @ bulkhead	19		0.109	180	19.62	270	29.43	180	19.62	90	0.00	720.00	78.48	4%	0.064	46.08
	Balcony edge			0	75	0.00	0	0.00	0	0.00	0	0.00	75.00	0.00	0%	0.090	0.00
	8" cmu	13	5	0.053	0	0.00	4590	243.27	0	0.00	3690	18.02	8,280.00	438.84	51%	0.090	745.20
	Slab @ 8" cmu	0	5	0.113	0	0.00	514	58.08	0	0.00	340	133.34	854.00	96.50	5%	0.090	76.86
	Concrete @ stair		5	0.113	0	0.00	0	0.00	0	0.00	1180	0.00	1,180.00	133.34	7%	0.090	106.20
	Spandrel	19		0.109	150	16.35	0	0.00	0	0.00	0	0.00	150.00	16.35	1%	0.064	9.60
	Below grade @ areaway	13		0.071	160	11.36	0	0.00	0	0.00	0	0.00	160.00	11.36	1%	0.090	14.40
	Louver			0.05	0	0.00	0	0.00	0	0.00	0	0.00	0.00	0.00	0%	0.064	0.00
				16													
	Opaque Assembly				1,950.00	120.89	5,374.00	330.78	1,950.00	115.66	5,300.00	151.36	14,574.00	944.47			1,213.83
	Weighted U					0.062		0.062		0.059		0.029		0.065			0.083

RATIO 1: 77.81%

HOW TO USE THIS TEMPLATE

- The designations and values inputted in the template should exactly match those in the Energy Analysis and the Supporting Documentation.
- Note that information is entered in the red fields while the green and blue fields are auto populated.
- Column widths and row heights may be increased, as needed, taking care not to delete the formulas. Do not delete or add any columns or rows as these will affect the formulas.
- For above-grade walls, only include those portions of walls located above the grade adjoining such wall [as per ZR 12-10(12)(ii)], when calculating for Ratio 1 and Ratio 2.
- For the purposes of calculating the area-weighted average U-factor, the amount of fenestration shall equal the amount of fenestration provided in such exterior walls, or an amount equal to the maximum fenestration area referenced in the NYCECC for the calculation of the baseline energy code requirement, whichever is less [as per ZR 12-10(12)(ii), item (2)], when calculating for Ratio 1 and Ratio 2.

a. Ref (Reference)

The line item designation should exactly match the nomenclature of the wall assembly type, window type, etc. shown in COMcheck, the EN1 and Supporting Documentation submitted to the Department.

b. Assembly wall type

For this column, enter the description as shown in the Energy Analysis and Supporting Documentation, whether opaque wall or glazing type.

c. ca (Cavity Insulation)

Indicate the cavity insulation R-value as shown in the Energy Analysis and Supporting Documentation of this line item.

d. c.i. (Continuous Insulation)

Indicate the continuous insulation value as shown in the Energy Analysis and Supporting Documentation of this line item.

e. U-Factor

Provide the proposed U-Factor as shown in the Energy Analysis and Supporting Documentation of this line item.

f. Wall Orientation

Provide the area of the line item found in each orientation, if required. Only one row should be used for each assembly type. Depending on your project, you wouldn't need to do the UA for each elevation, just total wall type area and then U-Factor. The UA values are auto populated based on the U-Factor entered in column e.

g. Total Area and UA value

The total area and UA value of the line item proposed are auto populated.

h. Area

The wall area of the line item, expressed as a percentage of all above-grade walls, is auto populated.

i. Code Values

Enter the code prescribed U-Factor of the line item, depending on which code version is used. The UA value will be auto populated.