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In previous articles we have discussed that the energy codes provide prescriptive solutions to allow simple compliance with the building envelope insulation requirements. However, many times the prescriptive solution may not be the most economical or in some cases may not be buildable. This is when utilizing the trade-off approach and COMcheck can offer opportunities not found with a simple prescriptive approach.

Single Layer R-38 w/Super Tall Clip & IMP

Over the last several months we have received feedback from Builders who have experienced success meeting the energy codes using the CBC Single Layer R-38 w/ Super Tall Clip (Tested System) and Insulated Metal Panel (IMP) Walls. They have been able to utilize this pairing of systems through the use of COMcheck and the trade off approach. This works because the superior thermal performance of simple-to-install insulated wall panels over performs in comparison to the prescriptive requirements for metal building walls, so that other roof solutions, which may be less cumbersome or expensive can be utilized.

To investigate the potential benefits of utilizing the CBC Single Layer R-38 w/ Super Tall Clip in combination with IMP walls a simple 5,000 sf building was created in COMcheck. The example building measured 50' x 100' x 14'. COMcheck was run for IECC 2018 and ASHRAE 90.1-2016, climate zones 5-7 since they have the most stringent thermal performance requirements typically encountered.

Results are displayed in the table below. Walkdoors and overhead doors were included in an effort to reflect more realistic results. The dimensions and thermal performance of the doors used can be found in the notes of the table below. U-factors input for both walkdoors and overhead doors are the COMcheck Budget U-factors used for software baseline calculations and are not code requirements.

It is important to note that results may vary from project to project. Differences including but not limited to building dimensions and the thermal performance of chosen doors and windows may have a significant impact on the performance of the envelope of the building.

IECC 2018					
Climate Zone	Required U-Factor (Table C402.1.4)		Proposed U-Factor (COMcheck)		COMcheck Envelope Pass/Fail%
	Roof	Wall	Roof	Wall	
5	0.035	0.052	0.041 (Super Tall Clip w/R-38)	0.041 (3", R24) IMP	+1.6
6	0.031	0.052	0.041 (Super Tall Clip w/R-38)	0.031 (4", R32) IMP	+4.4
7	0.029	0.052	0.041 (Super Tall Clip w/R-38)	0.031 (4", R32) IMP	+2.3
ASHRAE 90.1-2016					
Climate Zone	Required U-Factor (Table 5.5-5, 6, 7)		Proposed U-Factor (COMcheck)		COMcheck Envelope Pass/Fail%
	Roof	Wall	Roof	Wall	
5	0.037	0.050	0.041 (Super Tall Clip w/R-38)	0.041 (3", R24) IMP	+1.0
6	0.031	0.050	0.041 (Super Tall Clip w/R-38)	0.031 (4", R32) IMP	+1.0
7	0.029	0.044	0.041 (Super Tall Clip w/R-38)	0.031 (4", R32) IMP	-1.0

Example Building Info

(4) Walk Doors (COMcheck Budget U-0.370)

(6) 10x12 Roll Up Doors (IECC 2018 COMcheck Budget U-0.179, ASHRAE 90.1-2016 COMcheck Budget U-0.310)

50' x 100' x 14' (building dimensions)

In summary, the combination of the Single Layer R-38 w/ Super Tall Clip combined with either 3" or 4" IMP walls yielded effective results for IECC 2018 (CZ 5-7) and ASHRAE 90.1-2016 (CZ 5-6). Keeping this solution in mind may provide success when it comes to meeting energy codes on your next project.