Interstitial Surface Temps

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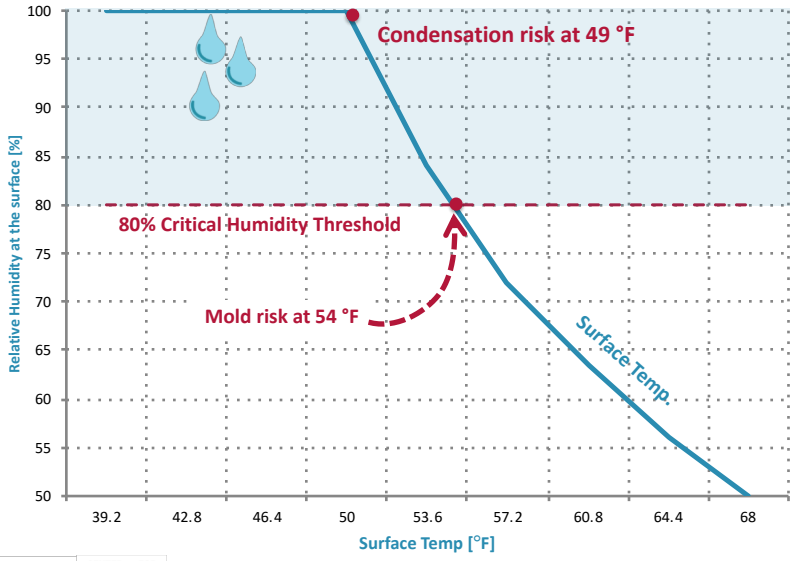
Surface Temp, RH & Mold



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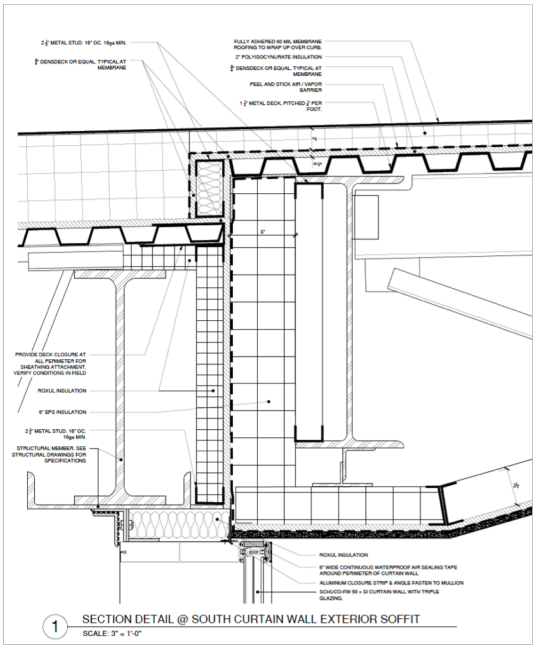

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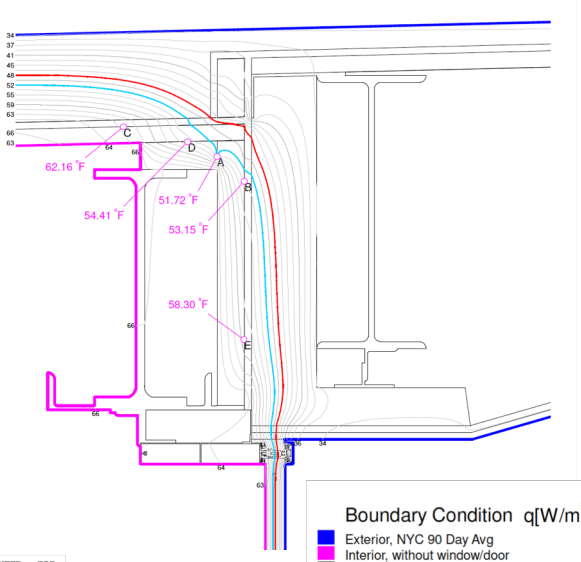
Interstitial Surface Temps



Boundary Condition	q[W/m^2]	θ[°F]	R[(m^2·K)/W]	ε
Exterior, NYC 90 Day Avg		33.494	0.040	
Interior, without window/door		68.000	0.250	
Symmetry/Model section	0.000			

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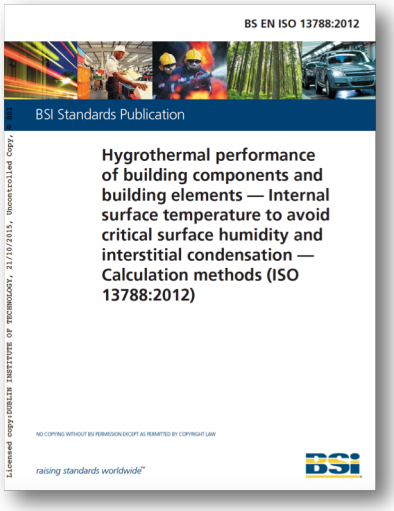
But Remember!

In some *(many!)* cases, **airflow** from the interior of the building into the structure is the major mechanism for moisture transport, which can increase the risk of condensation problems very significantly. This International Standard **does not address this issue**; where it is felt to be important, more advanced assessment methods should be considered.



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IBC 1202.3 (IRC 806)

1202.3 Unvented attic and unvented enclosed rafter assemblies

Unvented *attics* and unvented enclosed roof framing assemblies created by ceilings applied directly to the underside of the roof framing members/rafters and the structural roof sheathing at the top of the roof framing members shall be permitted where all of the following conditions are met:

1. The unvented *attic* space is completely within the *building thermal envelope*.
2. No interior Class I vapor retarders are installed on the ceiling side (*attic* floor) of the unvented *attic* assembly or on the ceiling side of the unvented enclosed roof framing assembly.
3. Where wood shingles or shakes are used, not less than a $^{1}/_{4}$-inch (6.4 mm) vented airspace separates the shingles or shakes and the roofing underlayment above the structural sheathing.
4. In Climate Zones 5, 6, 7 and 8, any air-impermeable insulation shall be a Class II vapor retarder or shall have a Class II vapor retarder coating or covering in direct contact with the underside of the insulation.

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IBC 1202.3 (IRC 806)

5. Insulation shall be located in accordance with the following:

5.1. Item 5.1.1, 5.1.2, 5.1.3 or 5.1.4 shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.

5.1.4. Alternatively, sufficient rigid board or sheet insulation shall be installed directly above the structural roof sheathing to maintain the monthly average temperature of the underside of the structural roof sheathing above 45°F (7°C). For calculation purposes, an interior air temperature of 68°F (20°C) is assumed and the exterior air temperature is assumed to be the monthly average outside air temperature of the three coldest months.

accordance with Item 5.1.1 and shall be in accordance with the R-values in Table 1202.3 for condensation control. The *air-permeable insulation* shall be installed directly under the *air-impermeable insulation*.

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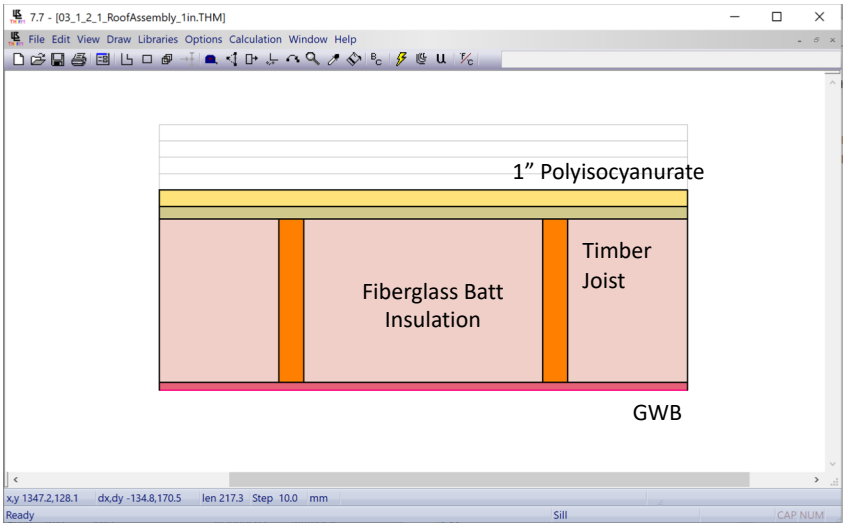
2x10 Roof Assembly (1” Ext)



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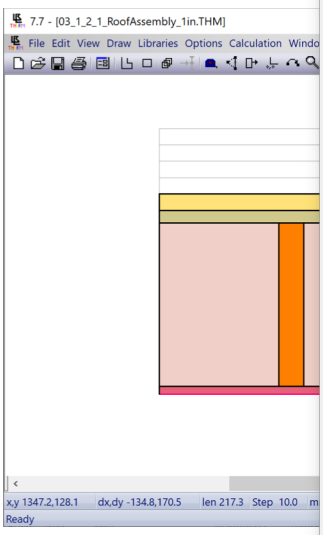
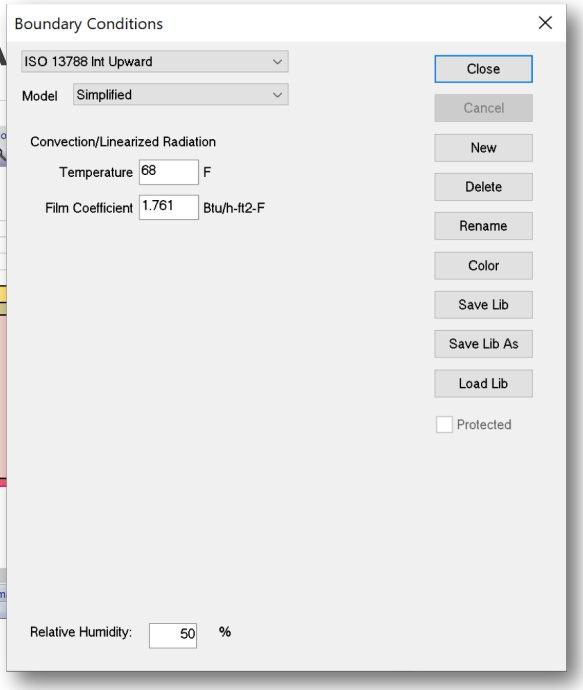
2x10 Roof A





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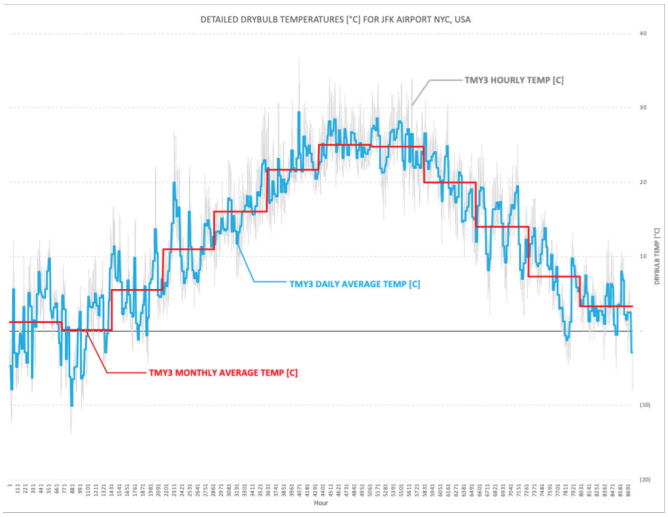
Boundary Conditions: NYC

Month	[°C]	[°F]
Jan	1.2	34.1
Feb	0.1	32.2
Mar	5.5	41.9
Apr	11.0	51.7
May	16.1	60.9
June	21.7	71.1
Jul	25.1	77.1
Aug	24.8	76.6
Sept	20.0	67.9
Oct	14.0	57.3
Nov	7.3	45.1
Dec	3.3	38.0
60d Avg:	0.65	33.2
90d Avg:	**1.53**	**34.8**



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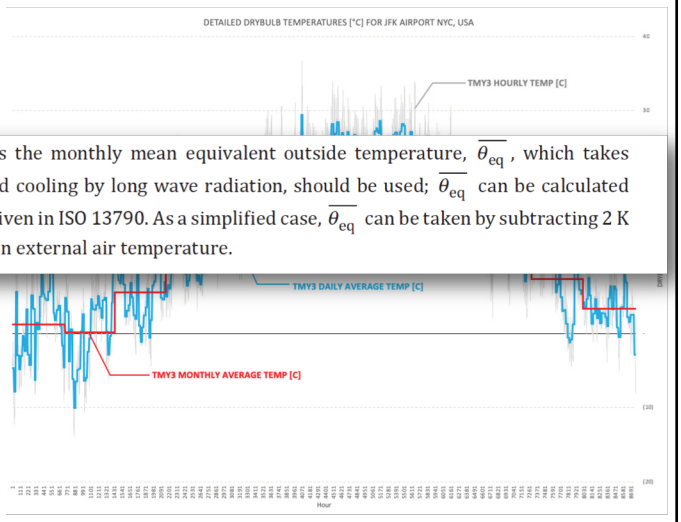
https://www.energyplus.net/weather-download/north_and_central_america_wmo_region_4/USA/NY/USA_NY_New.York-J.F.Kennedy.Intl.AP.744860_TMY3/all

Boundary Conditions: NYC

Month	[°C]	[°F]
Jan	1.2	34.1
Feb	0.1	32.2
Sept	20.0	67.9
Oct	14.0	57.3
Nov	7.3	45.1
Dec	3.3	38.0
60d Avg:	0.65	33.2
90d Avg:	1.53	34.8
T_eq	**-0.47**	**31.2**



d) For calculations of roofs the monthly mean equivalent outside temperature, $\overline{\theta_{eq}}$, which takes account of solar gain and cooling by long wave radiation, should be used; $\overline{\theta_{eq}}$ can be calculated using the methodology given in ISO 13790. As a simplified case, $\overline{\theta_{eq}}$ can be taken by subtracting 2 K from every monthly mean external air temperature.

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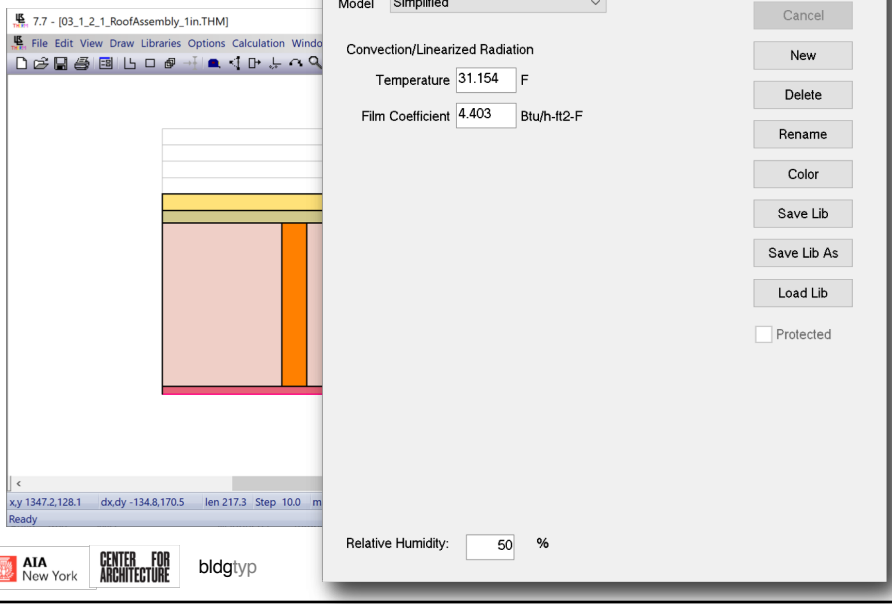
https://www.energyplus.net/weather-download/north_and_central_america_wmo_region_4/USA/NY/USA_NY_New.York-J.F.Kennedy.Intl.AP.744860_TMY3/all

2x10 Roof A



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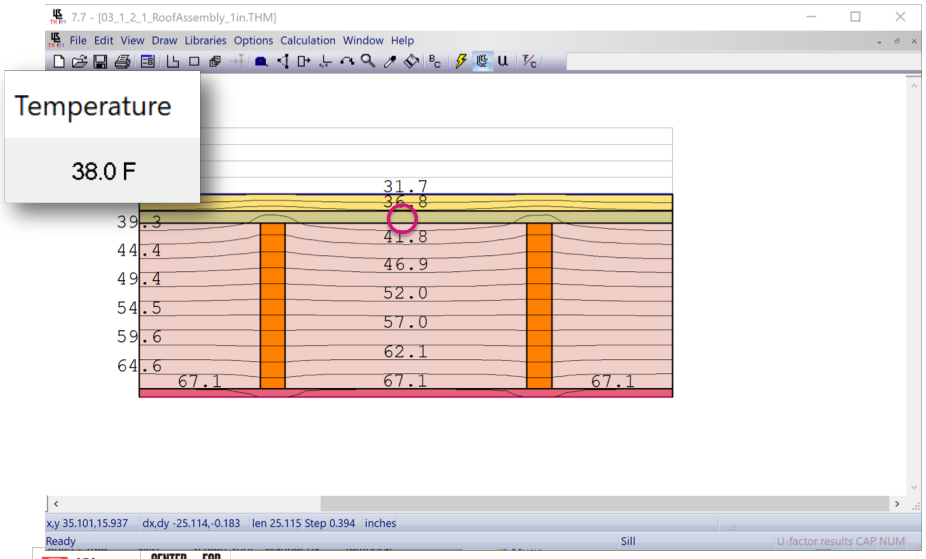
2x10 Roof Assembly (1” Ext)



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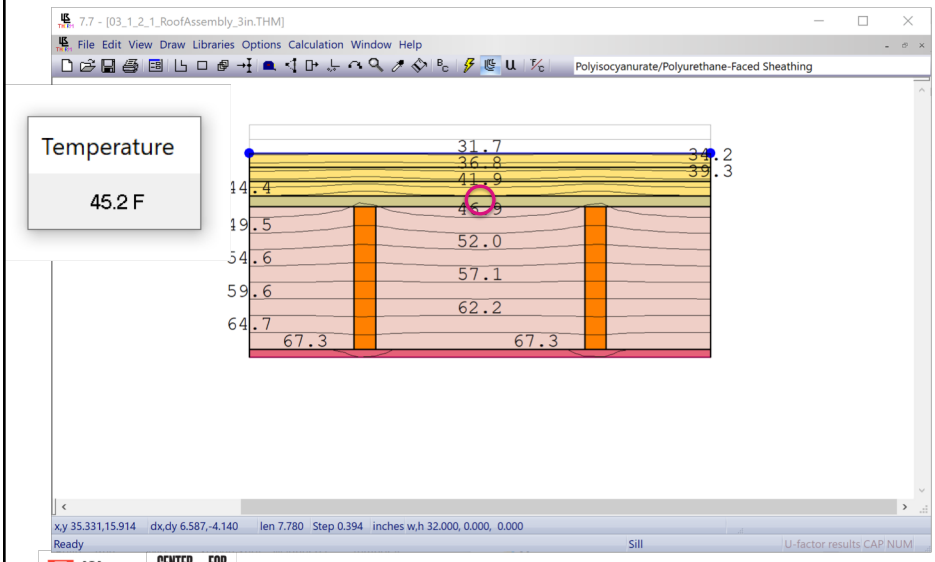
2x10 Roof Assembly (3” Ext)



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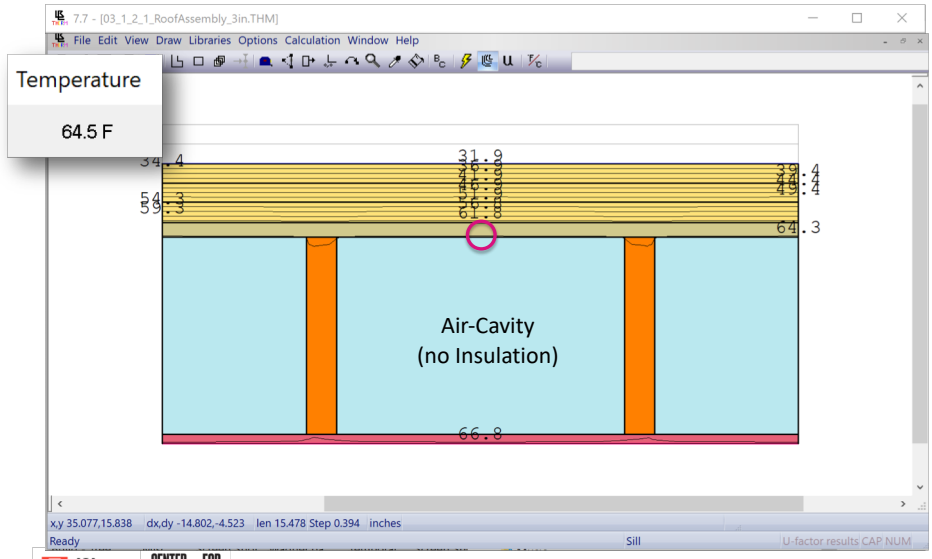
2x10 Roof Assembly (3” Ext)



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