

ASHRAE 90.1 - 2007 (90.1 ASHRAE 2004)

Climate Zone	Roof (Conditioned)		Roof (Semi-Heated)		Walls (Conditioned)		Walls (Semi-Heated)	
	Performance	Prescriptive	Performance	Prescriptive	Performance	Prescriptive	Performance	Prescriptive
1	.065 ^a	R-19	1.280	NR	0.113	R-13	1.180	NR
2	.065 ^a	R-19	0.167	R-6	0.113	R-13	0.184	R-6
3	.065 ^a	R-19	0.097	R-10	0.113	R-13	0.184	R-6
4	.065	R-19	0.097	R-10	0.113	R-13	0.134	R-10
5	.065	R-19	0.097	R-10	0.113	R-13	0.123	R-11
6	.065	R-19	0.097	R-10	0.113	R-13	0.113	R-13
7	.065	R-19	0.097	R-10	0.057	R-13 + R-13	0.113	R-13
8	.049	R-13 + R-19	0.072	R-16	0.057	R-13 + R-13	0.113	R-13

Climate Zones 1-8 are standing seam roofs with a 1" thick thermal spacer block. NR= No Requirement

a. For Metal Building roof panels installed directly above conditioned spaces that are not cooled, where the exterior surface has a Solar Reflectance of 0.70 and a minimum Thermal Emittance of 0.75 or a Solar Reflectance Index of 82, the roof insulation shall comply with a maximum U-Factor of 0.084 for Climate Zone 1, U-Factor of 0.078 for Climate Zone 2 and a U-Factor of 0.076 for Climate Zone 3.

ASHRAE 90.1 - 2010 (90.1 - 2007 addendum g)

Climate Zone	Roof (Conditioned)		Roof (Semi-Heated)		Walls (Conditioned)		Walls (Semi-Heated)	
	Performance	Prescriptive	Performance	Prescriptive	Performance	Prescriptive	Performance	Prescriptive
1	.065 ^a	R-19	0.167	R-6	0.093	R-16	0.113	R-13
2	.055 ^a	R-13 + R-13	0.097	R-10	0.093	R-16	0.113	R-13
3	.055 ^a	R-13 + R-13	0.097	R-10	0.084	R-19	0.113	R-13
4	.055	R-13 + R-13	0.097	R-10	0.084	R-19	0.113	R-13
5	.055	R-13 + R-13	0.083	R-13	0.069	R-13 + R-5.6 ci	0.113	R-13
6	.049	R-13 + R-19	0.072	R-16	0.069	R-13 + R-5.6 ci	0.113	R-13
7	.049	R-13 + R-19	0.072	R-16	0.057	R-19 + R-5.6 ci	0.113	R-13
8	.035	R-11 + R-19 LS	0.065	R-19	0.057	R-19 + R-5.6 ci	0.113	R-13

Climate Zones 1-8 are standing seam roofs with minimum R-3.5 thermal spacer block. L=Liner System, ci=Continuous Insulation

a. Metal Building roof panels installed directly above cooled conditioned spaces in Climate Zone 1, shall comply with a minimum 3-year aged Solar Reflectance of 0.55 and a minimum 3-year aged Thermal Emittance of 0.75 or a minimum 3-year aged Solar Reflectance Index of 64, if not, the roof insulation must be increased by installing a system with a maximum U-Factor of 0.028.

ASHRAE 90.1 - 2013, 2016, 2019 & 2022

Climate Zone	Roof (Conditioned)		Roof (Semi-Heated)		Walls (Conditioned)		Walls (Semi-Heated)	
	Performance	Prescriptive	Performance	Prescriptive	Performance	Prescriptive	Performance	Prescriptive
0 & 1*	0.041 ^a	R-10 + R-19 FC	0.115	R-10	0.094	R-0 + R-9.8 ci	0.352	NR
2	0.041 ^a	R-10 + R-19 FC	0.096	R-16	0.094	R-0 + R-9.8 ci	0.162	R-13
3	0.041 ^a	R-10 + R-19 FC	0.096	R-16	0.094	R-0 + R-9.8 ci	0.162	R-13
4	0.037	R-19 + R-11 LS or R-25 + R-8 LS	0.082	R-19	0.060	R-0 + R-15.8 ci	0.162	R-13
5	0.037	R-19 + R-11 LS or R-25 + R-8 LS	0.082	R-19	0.050	R-0 + R-19.0 ci	0.094	R-0 + R-9.8 ci
6	0.031	R-25 + R-11 LS	0.060	R-19 + R-19	0.050	R-0 + R-19.0 ci	0.094	R-0 + R-9.8 ci
7	0.029	R-30 + R-11 LS	0.037	R-19 + R-11 LS or R-25 + R-8 LS	0.044	R-0 + R-22.1 ci	0.072	R-0 + R-13 ci
8	0.026	R-25 + R-11 + R-11 LS	0.037	R-19 + R-11 LS or R-25 + R-8 LS	0.039	R-0 + R-25 ci	0.060	R-0 + R-15.8 ci

Climate Zone 1-8 are standing seam roofs with minimum R-3 thermal spacer block, except for the Filled Cavity (FC) systems which require a minimum R-5 thermal spacer block;

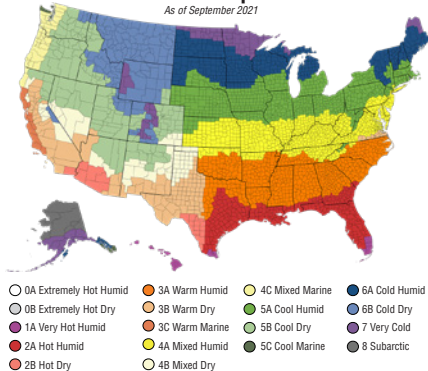
LS = Liner System, ci = Continuous Insulation

a. Metal Building roof panels installed directly above cooled conditioned spaces, shall comply with a minimum 3-year aged Solar Reflectance of 0.55 and a minimum 3-year aged Thermal Emittance of 0.75 or a minimum 3-year aged Solar Reflectance Index value of 64, if not, the roof insulation must be increased by installing a system with a maximum U-Factor of 0.028.

* Climate Zone 0 was added in 2019.

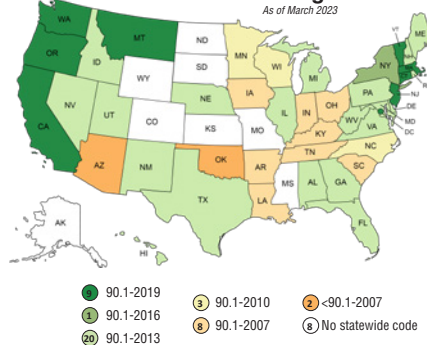
Climate Map

As of September 2021



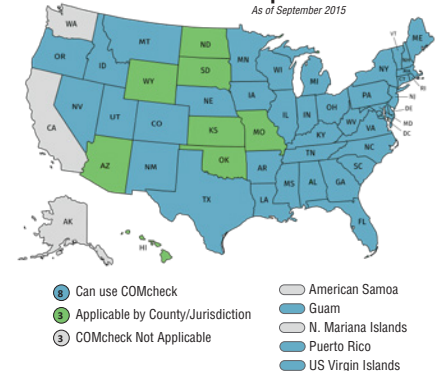
Commercial Buildings

As of March 2023



COMcheck Compliance

As of September 2015



IECC - 2009				
Climate Zone	Roof		Walls	
	Performance	Prescriptive	Performance	Prescriptive
1	0.065	R-19	0.093	R-16
2	0.055	R-13 + R-13	0.093	R-16
3	0.055	R-13 + R-13	0.084	R-19
4	0.055	R-13 + R-13	0.084	R-19
5	0.055	R-13 + R-13	0.069	R-13 + R-5.6 ci
6	0.049	R-13 + R-19	0.069	R-13 + R-5.6 ci
7	0.049	R-13 + R-19	0.057	R-19 + R-5.6 ci
8	0.035	R-11 + R-19	0.057	R-19 + R-5.6 ci

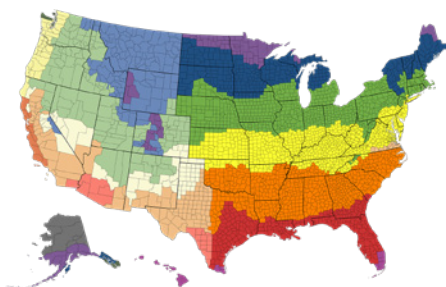
LS = Liner System, ci = Continuous Insulation
Roof assemblies are based on a standing seam roof with an R-5 thermal spacer block.

IECC - 2012, 2015 & 2018				
Climate Zone	Roof ¹		Walls	
	Performance	Prescriptive	Performance	Prescriptive
1	0.035 ^{a,b}	R-19 + R-11 LS	0.079	R-13 + R-6.5 ci
2	0.035 ^b	R-19 + R-11 LS	0.079	R-13 + R-6.5 ci
3	0.035 ^b	R-19 + R-11 LS	0.079	R-13 + R-6.5 ci
4	0.035	R-19 + R-11 LS	0.052	R-13 + R-13 ci
5	0.035	R-19 + R-11 LS	0.052	R-13 + R-13 ci
6	0.031	R-25 + R-11 LS	0.052	R-13 + R-13 ci
7	0.029	R-30 + R-11 LS	0.052	R-13 + R-13 ci
8	0.029	R-30 + R-11 LS	0.052	R-13 + R-13 ci

LS = Liner System, ci = Continuous Insulation
1. See Section C402.2.1 for list of exceptions.
a. Climate Zone 1 is a thru-fastened roof without thermal spacer block. Roof assemblies in Climate Zone 2-8 are based on a standing seam roof with a thermal spacer block IECC-2012 = R-5, IECC-2015/IECC-2018 = R-3.
b. Metal Building roofs with a slope less than 2:12, installed directly above cooled conditioned spaces shall comply with one or more of the following options; 3-year aged Solar Reflective Index of 0.55 and a 3-year aged Thermal Emittance of 0.75, or a Solar Reflectance in accordance with Section C402.3.1 and a 3-year aged Thermal Emittance of 0.90, or a 3-year aged Solar Reflectance Index of 64, see Section C402.3 for a list of exceptions.

IECC - 2021				
Climate Zone	Roof ¹		Walls	
	Performance	Prescriptive	Performance	Prescriptive
0	0.035 ^{a,b}	R-19 + R-11 LS	0.079	R-13 + R-6.5 ci
1	0.035 ^b	R-19 + R-11 LS	0.079	R-13 + R-6.5 ci
2	0.035 ^b	R-19 + R-11 LS	0.079	R-13 + R-6.5 ci
3	0.035	R-19 + R-11 LS	0.079	R-13 + R-6.5 ci
4	0.035	R-19 + R-11 LS	0.052	R-13 + R-13 ci
5	0.035	R-19 + R-11 LS	0.050	R-13 + R-14 ci
6	0.031	R-25 + R-11 LS	0.050	R-13 + R-14 ci
7	0.029	R-30 + R-11 LS	0.044	R-13 + R-17 ci
8	0.026	R-25 + R-11 + R-11 LS	0.039	R-13 + R-19.5 ci

LS = Liner System, ci = Continuous Insulation
1. See Section C402.2.1 for list of exceptions.
a. Climate Zone 1 is a thru-fastened roof without thermal spacer block. Roof assemblies in Climate Zone 2-8 are based on a standing seam roof with a thermal spacer block IECC-2012 = R-5, IECC-2015/IECC-2018 = R-3.
b. Metal Building roofs with a slope less than 2:12, installed directly above cooled conditioned spaces shall comply with one or more of the following options; 3-year aged Solar Reflective Index of 0.55 and a 3-year aged Thermal Emittance of 0.75, or a Solar Reflectance in accordance with Section C402.3.1 and a 3-year aged Thermal Emittance of 0.90, or a 3-year aged Solar Reflectance Index of 64, see Section C402.3 for a list of exceptions.



Climate Map
As of September 2021

- 0A Extremely Hot Humid
- 0B Extremely Hot Dry
- 1A Very Hot Humid
- 2A Hot Humid
- 2B Hot Dry
- 3A Warm Humid
- 3B Warm Dry
- 3C Warm Marine
- 4A Mixed Humid
- 4B Mixed Dry
- 4C Mixed Marine
- 5A Cool Humid
- 5B Cool Dry
- 5C Cool Marine
- 6A Cold Humid
- 6B Cold Dry
- 7 Very Cold
- 8 Subarctic

