

# Advanced Energy Design Guide

## Small Office Buildings Compliance Sheet

Climate Zone **5 - Denver, Colorado**

	Item	Component	Recommendation	Project Design	Meets Requirement?
<b>Envelope</b>	Roof	Insulation entirely above deck	R-20 c.i.	R-30 c.i.	Yes
		Metal building	R-13 + R-19	N.A.	
		Attic and other	R-38	N.A.	
		Single rafter	R-38 + R-5 c.i.	N.A.	
		Surface reflectance/emittance	No recommendation	N.A.	
	Walls	Mass (HC > 7 Btu/sf)	R-11.4 c.i.	N.A.	
		Metal building	R-13 + R-13	N.A.	
		Steel framed	R-13 + R-7.5 c.i.	R-15 + 7.5 c.i.	Yes
		Wood framed and other	R-13 + R-3.8 c.i.	N.A.	
		Below-grade walls	R-7.5 c.i.	N.A.	
	Floors	Mass	R-10.4 c.i.	N.A.	
		Steel framed	R-30	N.A.	
		Wood framed and other	R-30	N.A.	
	Slabs	Unheated	No recommendation	Unheated / Uninsulated	Yes
		Heated	R-10 for 36 in.	N.A.	
	Doors	Swinging	U-0.70	U-0.55	Yes
		Non-swinging	U-0.50	N.A.	
	Vertical Glazing	Window to wall ratio (WWR)	20% to 40% maximum	35%	Yes
		Thermal transmittance	U-0.42	U-0.29	Yes
		Solar heat gain coefficient (SHGC)	N, S, E, W - 0.46 N only - 0.46	SHGC - 0.29	Yes
Window orientation		(AN * SHGCN + AS * SHGCS) > (AE * SHGCE + AW * SHGCW)	Area North - 1,700 Area South - 1,300 Area East - 900 Area West - 800		Yes

	Skylights	Exterior sun control (S, E, W only)	Projection factor 0.5	PF - 0.5	Yes
		Maximum percent of roof area	3%	0%	Yes
		Thermal transmittance	U-0.69	N.A	
		Solar heat gain coefficient (SHGC)	0.39	N.A.	
Lighting	Interior Lighting	Lighting power density (LPD)	0.9 W/ft2	0.85 W/ft2	Yes
		Light source (linear fluorescent ballast)	90 mean lumens/watt	88 mean lumens/watt	Yes
		Dimming controls for daylight	Electronic ballast Dim fixtures within 12 ft of N/S window wall or within 8 ft of skylight edge	Electronic ballast	Yes
		Harvesting for WWR 25% or higher		Daylighting control in perimeter spaces	Yes
		Occupancy controls	Auto-off all unoccupied rooms 80%+ on ceilings, 70%+ on walls and vertical partitions	Occupancy sensors throughout	Yes
		Interior room surface reflectances		90% ceilings + 90% Walls	Yes
HVAC	HVAC	Air Conditioner (0-65 Kbtuh)	13.0 SEER	N.A.	
		Air Conditioner (> 65 - 135 Kbtuh)	11.0 EER/11.4 IPLV	11 EER	Yes
		Air conditioner (>135 - 240 Kbtuh)	10.8 EER/11.2 IPLV	N.A.	
		Air conditioner (>240 Kbtuh)	10.0 EER/10.4 IPLV	N.A.	
		Gas furnace (0-225 Kbtuh - SP)	80% AFUE or Et	N.A.	
		Gas furnace (0-225 Kbtuh - Split)	90% AFUE or Et	N.A.	
		Gas furnace (>225 Kbtuh)	80% Ec	N.A.	
		Heat pump (0-65 Kbtuh)	13.0 SEER/7.7 HSPF	N.A.	
		Heat pump (>65-135 Kbtuh)	10.6 EER/11.0 IPLV/3.2 COP	N.A.	
	Heat pump (>135 Kbtuh)	10.1 EER/11.0 IPLV/3.1 COP	N.A.		
	Economizer	Air conditioners & heat pumps - SP	Cooling capacity > 54 Kbtuh	Fixed dry bulb economizer	Yes
	Ventilation	Outdoor air damper	Motorized control	Motorized control Demand Control	Yes
		Demand control	CO2 sensors	Ventilation	Yes
	Ducts	Friction rate	0.08 in. w.c./100 feet	0.08 in.wc./100 feet	Yes
		Sealing	Seal class B	Seal Class B	Yes
Location		Interior only	No exterior ducts	Yes	

		Insulation level	R-6	R-6	Yes
SWH	Service Water Heating	Gas Storage	90% Et	98% Efficient	Yes
		Gas instantaneous	0.81 EF or 81% Et	N.A.	
		Electric storage 12 kW	EF > 0.99 – 0.0012xVolume	N.A.	
		Pipe insulation (d<1.5 in./ d>1.5 in.)	1 in./ 1½ in.	1 inch	Yes