

Building Energy Performance Characteristics
 For Compliance with Section 506, Total Building Performance, of 2009 IECC

Project:

Project Location:

See the instructions and disclaimer for this spreadsheet.

	Element	Chapter 5 2009 IECC Requirement	Values In Simulation for Proposed Building Design	Values Incorporated Into This Design
Total Building Performance Annual Energy Cost	For Standard Reference Design			
	For Proposed Building Design			
Section 502				
Building Envelope (Climate Zone 5A)				
Prescriptive Building Envelope Option				
Space-Conditioning Category (Nonresidential or Residential)				
Gross Roof Area				
Roofs: Minimum Assembly U-factor				
Roofs: Minimum Insulation R-Value				
Walls, Above-Grade: Maximum Assembly U-factor				
Walls, Above-Grade: Minimum Insulation R-Value				
Walls, Below-Grade: Maximum Assembly C-factor				
Walls, Below-Grade: Minimum Insulation R-Value				
Floors: Maximum Assembly U-factor				
Floors: Minimum Insulation R-Value				
Slab-On-Grade Floors: Maximum Assembly F-factor				
Slab-On-Grade Floors: Minimum Insulation R-Value				
Opaque Doors: Maximum Assembly U-factor				
Gross Wall Area				
Total Vertical Fenestration Area				
Vertical Glazing: Percent of Wall Area				
Vertical Glazing: Maximum Assembly U-factor				
Vertical Glazing: Maximum Assembly Solar Heat Gain Coefficient				
Total Skylight Area				
Skylight: Percent of Roof Area				
Skylight: Maximum Assembly U-factor				
Skylight: Maximum Assembly Solar Heat Gain Coefficient				
Maximum Assembly Air Leakage Rates				
Maximum Air Leakage Rates, Recessed Lighting Luminaires				
Building Envelope Sealing: Openings and Penetrations in Building Envelope				
Building Envelope Sealing: Joints and Seams				
Loading Dock Weatherseal Requirement				
Vestibule Requirement				
Section 503				
Heating, Ventilating and Air Conditioning				
Calculated Load	Heating			
	Cooling			
Equipment Capacity	Heating			
	Cooling			
Unitary Air Conditioners, Electrically Operated, Minimum Efficiency				
Condensing Units, Electrically Operated, Minimum Efficiency				
Unitary and Applied Heat Pumps, Electrically Operated, Minimum Cooling Mode Efficiency				
Unitary and Applied Heat Pumps, Electrically Operated, Minimum Heating Mode Efficiency				
Package Terminal Air Conditioners (Cooling Mode) Minimum Efficiency				
Package Terminal Heat Pumps (Cooling Mode) Minimum Efficiency				
Package Terminal Heat Pumps (Heating Mode) Minimum Efficiency				
Water Chilling Package, Electrically Operated, Maximum Efficiency - Compliance Path (A or B)				

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	Element	Chapter 5 2009 IECC Requirement	Values In Simulation for Proposed Building Design	Values Incorporated Into This Design
Water Chilling Package, Absorption, Minimum Efficiency - Compliance Path A				
Warm Air Furnaces Minimum Efficiency				
Boilers, Hot Water, Minimum Efficiency				
Duct Insulation For Supply Duct, Minimum R-Value				
Duct Insulation For Return Duct, Minimum R-Value				
Building Envelope Insulation Separating Duct and Plenum From Exterior, Minimum R-Value				
Duct Sealing Requirements				
Pipe Insulation for Heating Systems, Conductivity / Minimum Thickness				
Pipe Insulation for Cooling Systems, Conductivity / Minimum Thickness				
HVAC System Control	One Thermostatic Control per Zone			
	One Control Device per Humidification and/or Dehumidification System			
	Heat Pump Supplementary Heat Control			
	Setpoint Overlap Restriction			
	Automatic Off-Hour Shutdown			
	Automatic Off-Hour Setback			
	Automatic Damper Shut-off for Zone Isolation			
Ventilation System Controls	Stair and Shaft Vent Motorized Damper Controls			
	Ventilation Damper Controls			
	Shutoff Damper Controls			
	Motorized Damper Leakage Rate			
	Demand Control Ventilation			
Exhaust Air Energy Recovery				
HVAC System Economizer Cycle Requirement				
Snow and Ice Melting System Control				
Maximum Allowable Fan Horsepower (Nameplate Horsepower Option or Break Horsepower Option)				
Variable Air Volume System	Speed Control			
	Static Pressure Reset Control			
	Supply Air Temperature Reset			
	Air Reheating, Recooling and Mixing Limitations			

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	Element	Chapter 5 2009 IECC Requirement	Values In Simulation for Proposed Building Design	Values Incorporated Into This Design
Hydronic System Control	Variable Flow			
	Chiller Isolation			
	Boiler Isolation			
	Water Temperature Reset			
Hydronic (Water Loop) Heat Pump System Control	Two Position Valve on Each Heat Pump			
	Automatic Isolation of Cooling Tower When Not Required			
Heat Rejection Equipment	Fan Speed Control			
Heat Recovery for Service Water Heating				
Cooling System Hot Gas Bypass Limitation: Maximum Percentage of Total Capacity				
Heating Outside a Building	Radiant Systems with Occupant Presence Control			
HVAC System Completion Requirement	Air System Ballancing			
	Hydronic System Balancing			
	Equipment Capacity Lists			
	Operation Manuals			
	Maintenance Manuals			
	System Control Information			
	System Narrative for Each System			
Section 504				
Service Water Heating				
Water Heater Required Performance				
Hot Water Supply Boiler Required Performance				
Pool Heater Required Performance				
Unfired Storage Tank Required Performance				
Service Water Temperature Control				
Service Water Heater Supply & Discharge Heat Traps				
Pipe Insulation for Service Hot-Water Systems, Conductivity / Minimum				
Automatic Circulating Service Hot Water System Shut Off Control				
Pool Heater Accessible On-Off Switch				
Swimming Pool Heater and Pump Time Switch				
Pool Cover for Heated Pools				
Section 505				
Electrical Power and Lighting				
Gross Lighted Floor Area				
Interior Lighting Power Allowance				
Equivalent Interior Lighting Power Density				
Interior Space Lighting Control				
Light Reduction Control				

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	Element	Chapter 5 2009 IECC Requirement	Values In Simulation for Proposed Building Design	Values Incorporated Into This Design
Automatic Interior Lighting Shut-off Control				
Lighting Controls in Daylight Zones				
Hotel & Motel Guest Room Lighting Control Device				
Automatic Exterior Lighting Control				
Luminaire Tandem Wiring				
Exit Sign: Maximum Wattage per Face				
Exterior Luminaire Minimum Lamp Efficacy Requirement				
Total Exterior Lighting Power Allowance				
Tradable Surface Exterior Lighting Power Allowance				
Non-Tradable Surface Exterior Lighting Power Allowance				

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	Element	Chapter 5 2009 IECC Requirement	Values In Simulation for Proposed Building Design	Values Incorporated Into This Design
Total Building Performance Annual Energy Cost	For Standard Reference Design			
	For Proposed Building Design			
Section 502				
Building Envelope (Climate Zone 5A)				
Prescriptive Building Envelope Option				
Space-Conditioning Category (Nonresidential or Residential)				
Gross Roof Area				
Roofs: Minimum Assembly U-factor	Insulation Entirely above Deck			
	Metal Building			
	Attic and Other			
Roofs: Minimum Insulation R-Value	Insulation Entirely above Deck			
	Metal Building			
	Attic and Other			
Walls, Above-Grade: Maximum Assembly U-factor	Mass			
	Metal Building			
	Metal Framed			
	Wood Framed and Other			
Walls, Above-Grade: Minimum Insulation R-Value	Mass			
	Metal Building			
	Metal Framed			
	Wood Framed and Other			
Walls, Below-Grade: Maximum Assembly C-factor				
Walls, Below-Grade: Minimum Insulation R-Value				
Floors: Maximum Assembly U-factor	Mass			
	Joist/Framing			
Floors: Minimum Insulation R-Value	Mass			
	Joist/Framing (steel/wood)			
Slab-On-Grade Floors: Maximum Assembly F-factor	Unheated Slabs			
	Heated Slabs			
Slab-On-Grade Floors: Minimum Insulation R-Value	Unheated Slabs			
	Heated Slabs			
Opaque Doors: Maximum Assembly U-factor	Swinging			
	Roll-up or Sliding			
Gross Wall Area				
Total Vertical Fenestration Area				
Vertical Glazing: Percent of Wall Area				
Vertical Glazing: Maximum Assembly U-factor	Nonmetal framing			
	Metal framing (curtainwall / storefront)			
	Metal framing (entrance doors)			
	Metal framing (all other)			
Vertical Glazing: Maximum Assembly Solar Heat Gain Coefficient	PF <0.25			
	0.25 ≤ PF <0.5			
	PF ≥0.5			

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	Element	Chapter 5 2009 IECC Requirement	Values In Simulation for Proposed Building Design	Values Incorporated Into This Design
Total Skylight Area				
Skylight: Percent of Roof Area				
Skylight: Maximum Assembly U-factor				
Skylight: Maximum Assembly Solar Heat Gain Coefficient				
Maximum Air Leakage Rates	Window and Door Assemblies			
	Curtain Wall, Storefront Glazing and Commercial Entrance Doors			
	Outdoor Air Intakes and Exhaust Openings			
	Recessed Lighting Luminaires			
Building Envelope Sealing: Openings and Penetrations in Building Envelope				
Building Envelope Sealing: Joints and Seams				
Loading Dock Weatherseal Requirement				
Vestibule Requirement				
Section 503				
Heating, Ventilating and Air Conditioning				
Calculated Load	Heating			
	Cooling			
Equipment Capacity	Heating			
	Cooling			
Unitary Air Conditioners, Electrically Operated, Minimum Efficiencies	Air Cooled, Split System <65,000 Btu/h			
	Air Cooled, Single Package <65,000 Btu/h			
	Air Cooled, Through-the-Wall Split System ≤30,000Btu/h			
	Air Cooled, Through-the-Wall Single Package ≤30,000Btu/h			
	Air Cooled ≥65,000 Btu/h and <135,000 Btu/h			
	Air Cooled ≥135,000 Btu/h and <240,000 Btu/h			
	Air Cooled ≥240,000 Btu/h and <760,000 Btu/h			
	Air Cooled ≥760,000 Btu/h			

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	Element	Chapter 5 2009 IECC Requirement	Values In Simulation for Proposed Building Design	Values Incorporated Into This Design
	Water and Evaporatively Cooled <65,000 Btu/h			
	Water and Evaporatively Cooled ≥65,000 Btu/h and <135,000 Btu/h			
	Water and Evaporatively Cooled ≥135,000 Btu/h and <240,000 Btu/h			
	Water and Evaporatively Cooled Air Conditioners ≥240,000 Btu/h			
Condensing Units, Electrically Operated, Minimum Efficiencies	Air Cooled ≥135,000 Btu/h			
	Water or Evaporatively Cooled ≥135,000 Btu/h			
Unitary and Applied Heat Pumps, Electrically Operated, Minimum Cooling Mode Efficiencies	Air Cooled, Split Systems <65,000 Btu/h			
	Air Cooled, Single Package <65,000 Btu/h			
	Air Cooled Through-the-Wall Split System ≤30,000Btu/h			
	Air Cooled Through-the-Wall Single Package ≤30,000Btu/h			
	Air Cooled ≥65,000 Btu/h and <135,000 Btu/h			
	Air Cooled ≥135,000 Btu/h and <240,000 Btu/h			
	Air Cooled ≥240,000 Btu/h			
	Water Source <17,000 Btu/h			
	Water Source ≥17,000 Btu/h and <135,000 Btu/h			
	Groundwater Source <135,000 Btu/h			

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	Element	Chapter 5 2009 IECC Requirement	Values In Simulation for Proposed Building Design	Values Incorporated Into This Design
	Ground Source <135,000 Btu/h			
Unitary and Applied Heat Pumps, Electrically Operated, Minimum Heating Mode Efficiencies	Air Cooled Split System (Cooling Capacity) <65,000 Btu/h			
	Air Cooled Single Package (Cooling Capacity) <65,000 Btu/h			
	Air Cooled Through-the-Wall Split System (Cooling Capacity) ≤30,000Btu/h			
	Air Cooled Through-the-Wall Single Package (Cooling Capacity) ≤30,000Btu/h			
	Air Cooled (Cooling Capacity) ≥65,000 Btu/h and <135,000 Btu/h			
	Air Cooled (Cooling Capacity) ≥135,000 Btu/h			
	Water Source (Cooling Capacity) <135,000 Btu/h			
	Groundwater Source (Cooling Capacity) <135,000 Btu/h			
	Ground Source (Cooling Capacity) <135,000 Btu/h			
	Package Terminal Air Conditioners (Cooling Mode) Minimum Efficiencies	New Construction		
Replacement				
Package Terminal Heat Pumps (Cooling Mode) Minimum Efficiencies	New Construction			
	Replacement			
Package Terminal Heat Pumps (Heating Mode) Minimum Efficiencies	New Construction			
	Replacement			
Water Chilling Package, Air Cooled, Electrically Operated, Maximum Efficiencies - Compliance Path A	<150 tons			
	≥150 tons			
Water Chilling Package, Water Cooled, Electrically Operated, Positive Displacement, Maximum Efficiencies - Compliance Path (A or B)	<75 tons			
	≥75 & <150 tons			
	≥150 & <300 tons			
	≥300 tons			
Water Chilling Package, Water Cooled, Electrically Operated, Centrifugal, Maximum Efficiencies - Compliance Path (A or B)	<150 tons			
	≥150 & <300 tons			
	≥300 & <600 tons			
	≥600 tons			
Water Chilling Package, Air Cooled Absorption, Single Effect, Minimum Efficiency - Compliance Path A	All Capacities			

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	Element	Chapter 5 2009 IECC Requirement	Values In Simulation for Proposed Building Design	Values Incorporated Into This Design
Water Chilling Package, Water Cooled Absorption, Single Effect, Minimum Efficiency - Compliance Path A	All Capacities			
Water Chilling Package, Absorption, Double Effect, Indirect-Fired, Minimum Efficiency - Compliance Path A	All Capacities			
Water Chilling Package, Absorption, Double Effect, Direct-Fired, Minimum Efficiency - Compliance Path A	All Capacities			
Warm Air Furnaces and Combination Warm Air Furnaces/Air-conditioning Units Minimum Efficiencies	Gas-fired <225,000 Btu/h			
	Gas-fired ≥225,000 Btu/h			
	Oil-fired <225,000 Btu/h			
	Oil-fired ≥225,000 Btu/h			
Warm Air Duct Furnaces Minimum Efficiency	Gas-fired			
Warm Air Unit Heaters Minimum Efficiencies	Gas-fired			
	Oil-fired			
Boilers, Hot Water, Minimum Efficiencies	Gas-fired <300,000 Btu/h			
	Gas-fired ≥300,000 Btu/h and ≤2,500,000 Btu/h			
	Gas-fired >2,500,000 Btu/h			
	Oil-fired <300,000 Btu/h			
	Oil-fired ≥300,000 Btu/h and ≤2,500,000 Btu/h			
	Oil-fired >2,500,000 Btu/h			
Duct Insulation For Supply Duct Location, R-Values	Unconditioned Space			
	Outside Building			
Duct Insulation For Return Duct Location, R-Values	Unconditioned Space			
	Outside Building			
Building Envelope Insulation Separating Duct and Plenum From Exterior, Minimum R-Value				
Duct Sealing Requirements	Low-Pressure Duct Systems			
	Medium-pressure Duct Systems			
	High-pressure Duct Systems			
Pipe Insulation for Heating Systems, Conductivity / Minimum Thickness	Nominal Size ≤1.5"			
	Nominal Size >1.5"; Steam			
	Nominal Size ≤1.5"; Hot Water			
	Nominal Size >1.5"; Hot Water			
Pipe Insulation for Cooling Systems, Conductivity / Minimum Thickness	Nominal Size ≤1.5"			

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	Element	Chapter 5 2009 IECC Requirement	Values In Simulation for Proposed Building Design	Values Incorporated Into This Design
	Nominal Size >1.5"			
HVAC System Control	One Thermostatic Control per Zone			
	One Control Device per Humidification and/or Dehumidification System			
	Heat Pump Supplementary Heat Control			
	Setpoint Overlap Restriction			
	Automatic Off- Hour Shutdown			
	Automatic Off- Hour Setback			
	Automatic Damper Shut-off for Zone Isolation			
Ventilation System Controls	Stair and Shaft Vent Motorized Damper Controls			
	Ventilation Damper Controls			
	Shutoff Damper Controls			
	Motorized Damper Leakage Rate			
	Demand Control Ventilation			
Exhaust Air Energy Recovery				
HVAC System Economizer Cycle Requirement	Capacity Where Required			
	Controls			
Snow and Ice Melting System Control				
Maximum Allowable Fan Horsepower (Nameplate Horsepower Option or Break Horsepower Option)	Constant Volume			
	Variable Volume			
Variable Air Volume System	Speed Control			
	Static Pressure Reset Control			
	Supply Air Temperature Reset			
	Air Reheating, Recooling and Mixing Limitations			
Hydronic System Control	Variable Flow			
	Chiller Isolation			
	Boiler Isolation			
	Water Temperature Reset			
Hydronic (Water Loop) Heat Pump System Control	Two Position Valve on Each Heat Pump			

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	Element	Chapter 5 2009 IECC Requirement	Values In Simulation for Proposed Building Design	Values Incorporated Into This Design
	Automatic Isolation of Cooling Tower When Not Required			
Heat Rejection Equipment	Fan Speed Control			
Heat Recovery for Service Water Heating				
Cooling System Hot Gas Bypass Limitation: Maximum Percentage of Total Capacity				
Heating Outside a Building	Radiant Systems with Occupant Presence Control			
HVAC System Completion Requirement	Air System Ballancing			
	Hydronic System Balancing			
	Equipment Capacity Lists			
	Operation Manuals			
	Maintenance Manuals			
	System Control Information			
	System Narrative for Each System			
Section 504				
Service Water Heating				
Electric Water Heater Required Performance	Resistance ≤12 kW			
	Resistance >12 kW			
	Heat Pump			
Gas Storage Water Heater Required Performance	≤75,000 Btu/h			
	>75,000 Btu/h and ≤155,000 Btu/h			
	>155,000 Btu/h			
Gas Instantaneous Water Heater Required Performance	>50,000 Btu/h and <200,000 Btu/h			
	≥200,000 Btu/h and <10 gal			
	≥200,000 Btu/h and ≥10 gal			
Oil Storage Water Heater Required Performance	≤105,000 Btu/h			
	>105,000 Btu/h			
Oil Instantaneous Water Heater Required Performance	≤210,000 Btu/h			
	>210,000 Btu/h and <10 gal			
	>210,000 Btu/h and ≥10 gal			
Gas and Oil Hot Water Supply Boiler Required Performance	≥300,000 Btu/h and <12,500,000 Btu/h and <10 gal			
Gas Hot Water Supply Boiler Required Performance	≥300,000 Btu/h and <12,500,000 Btu/h and ≥10 gal			

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Oil Hot Water Supply Boiler Required Performance	>300,000 Btu/h and <12,500,000 Btu/h and >10 gal			
Gas and Oil Pool Heater Required Performance				
Heat Pump Pool Heater Required Performance				
Unfired Storage Tank Required Performance				
Service Water Temperature Control				
Service Water Heater Supply & Discharge Heat Traps				
Pipe Insulation for Service Hot-Water Systems, Conductivity / Thickness	Automatic- Circulating Systems			
	Noncirculating Systems			
Automatic Circulating Service Hot Water System Shut Off Control				
Pool Heater Accessible On-Off Switch				
Swimming Pool Heater and Pump Time Switch				
Pool Cover for Heated Pools				
Section 505				
Electrical Power and Lighting				
Gross Lighted Floor Area				
Interior Lighting Power Allowance				
Equivalent Interior Lighting Power Density				
Interior Space Lighting Control				
Light Reduction Control				
Automatic Interior Lighting Shut-off Control	Occupant Override			
	Holiday Scheduling			
Lighting Controls in Daylight Zones				
Hotel & Motel Guest Room Lighting Control Device				
Automatic Exterior Lighting Control				
Luminaire Tandem Wiring				
Exit Sign: Maximum Wattage per Face				
Exterior Luminaire Minimum Lamp Efficacy Requirement				
Total Exterior Lighting Power Allowance				
Tradable Surface Exterior Lighting Power Allowance				
Non-Tradable Surface Exterior Lighting Power Allowance				