

Project Name:			
Project Address:		Date:	
Designer of Record:		Telephone:	
Contact Person:		Telephone:	
City:	HDD65:	CDD50:	Criteria Table:

Mandatory Provisions Checklist

Insulation (§ 5.2.1)

- Insulation Materials are installed in accordance with manufacturer's recommendations and in such a manner as to achieve rated *R*-value of insulation
 - Exception: for metal building roofs or metal building walls.
- Loose-fill insulation is not used in attic roof spaces when the slope of the ceiling is more than three in twelve.
- Attic eave vents have baffling to deflect the incoming air above the surface of the insulation.
- Insulation is installed in a permanent manner in substantial contact with the inside surface.
- Batt insulation installed in floor cavities is supported in a permanent manner by supports no greater than 24 in. o.c.
- Lighting fixtures; HVAC; and other equipment are not be recessed in ceilings in such a manner to affect the insulation thickness unless.

Exceptions:

- The recessed area is less than one percent
- The entire roof, wall, or floor is covered with insulation to the full depth required
- The effects of reduced insulation are included in calculations using an area weighted averages
- Roof insulation is not installed over suspended ceiling with removable ceiling panels.
- Exterior insulation is covered with a protective material to prevent damage. Insulation is protected in attics and mechanical rooms where access is needed. .
- Foundation vents do not interfere with the insulation.
- Insulation materials in ground contact have a water absorption rate no greater than 0.3 percent.

Fenestration and Doors (§ 5.2.2)

- U*-factors are determined in accordance with NFRC 100. *U*-factors for skylights shall be determined for a slope of 20° above the horizontal.

Exceptions:

- U*-factors are taken from A.8.1 for glazed wall systems in vertical fenestration and/or skylights.
- U*-factors are taken from A.8.2 other fenestration products
- U*-factors are taken from A.7 for opaque doors
- U*-factors are derived from NAGDM 105 for garage doors.
- Solar heat gain coefficient (SHGC) is determined in accordance with NFRC 200.

Exceptions:

- SHGC is determined by multiplying the shading coefficient (SC) by 0.86. Shading coefficient is determined using a spectral data file determined in accordance with NFRC 300.
- SHGC for the center of glass is used. SHGC is determined using a spectral data file determined in accordance with NFRC 300.
- SHGC is taken from A.8.1 for glazed wall systems in vertical fenestration and skylights.
- Visible light transmittance is determined in accordance with NFRC 200.

Air Leakage (§ 5.2.3)

- The *building envelope* is sealed, caulked, gasketed, and/or weather-stripped to minimize air leakage
- Air leakage through fenestration and doors is less than 0.4 cfm/ft² (1.0 cfm/ft² for glazed swinging entrance doors and for revolving doors) when tested in accordance with NFRC 400.

Exceptions:

- Field fabricated fenestration and doors
- For garage *doors* tested in accordance with NAGDM 105
- Cargo doors and loading dock doors are equipped with weatherseals in climates with more than 3,600 HDD65
- Entrance doors have vestibules

Exceptions:

- Climates has less than 1800 HDD65
- Building is less than four stories
- Doors not intended as building entrance
- Doors open from dwelling unit(s)
- Doors open from spaces smaller than 3,000 ft²
- Building has revolving doors
- Doors for vehicular movement or material handling

Building Envelope Compliance Documentation

Project Name:

Contact Person:

Telephone:

Fenestration

Description/ Name	Class (Pick one)					NFR Rating Appendix A Defaults	Proposed Fenestration						Criteria			
	Window, North, Operable	Window, North, Fixed	Window, Other, Operable	Window, Other, Fixed	Skylight, Curb, Glass		Skylight, Curb, Plastic	Skylight, No Curb	Area	U-factor	Solar Heat Gain Coefficient (SHGC)	Overhang	Projection Factor	Overhang Multiplier	Adjusted Solar Heat Gain Coefficient (SHGC)	U-factor
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HVAC Simplified Approach Option

Part I

Project Name:	
Project Address:	Date:
City:	Zip:
HVAC System Designer of Record:	Telephone:
Contact Person:	Telephone:

Qualification

- The building is 2 stories or less in height and has a gross floor area is less than 25,000 ft².

Requirements

- (a) All systems serve a single HVAC zone.
- (b) Cooling (if any) is provided by a unitary packaged or split-system air conditioner that is either air-cooled or evaporatively cooled and meets the efficiency requirements shown in Table 6.2.1. List equipment in the table below.
- (c) The system has an air economizer as required by Table 6.3.1, with controls as required in Tables 6.3.1.1.3A and 6.3.1.1.3B. The economizer has either barometric or powered relief sized to prevent overpressurization of the building. Outside air dampers for the economizer use are provided with blade and jamb seals.
 - Exception: The cooling efficiency meets or exceeds the efficiency requirement in Table 6.1.3. Document in table below.
- (d) Heating (if any) shall be provided by a unitary packaged or split-system heat pump, a fuel-fired furnace, an electric resistance heater or a baseboard system connected to a boiler. All heating equipment meets the efficiency requirements of the Standard. List equipment in table below.
- (e) The outside air quantity is less than or equal to 3000 cfm and less than or 70% of the supply air quantity at minimum outside air design conditions.

- Exception: An energy recovery ventilation system is provided in accordance with the requirements in § 6.3.6.
- (f) The system shall be controlled by a manual changeover or dual set-point thermostat.
- (g) Heat pumps equipped with auxiliary internal electric resistance heaters (if any) have controls to prevent supplemental heater operation when the heating load can be met by the heat pump alone.
- (h) The system controls do not permit reheat or any other form of simultaneous heating and cooling for humidity control.
- (i) Systems are provided with a time clock that (1) can start and stop the system under different schedules for seven different day-types per week; (2) is capable of retaining programming and time setting during a loss of power for a period of at least 10 h; (3) includes an accessible manual override that allows temporary operation of the system for up to 2 h; (4) is capable of temperature setback down to 55°F during off hours; and (5) is capable of temperature setup to 90°F during off hours.
 - Exception: System serves hotel/motel guest rooms.
 - Exception: System operates continuously.
 - Exception: System has a cooling or heating capacity less than 65,000 Btu/h and a supply fan motor power greater than 3/4 hp.
- (j) Piping is insulated in accordance with Table 6.2.4.5. Insulation exposed to weather is suitable for outdoor service. Cellular foam insulation is protected from water and solar radiation.
 - Exception: Piping is located within manufactured HVAC units.
- (k) Ductwork and plenums are insulated in accordance with Tables 6.2.4.2A and 6.2.4.2B and sealed in accordance with Table 6.2.4.3A.
- (l) Construction documents require air systems to be balanced in accordance with industry accepted procedures to within 10% of design airflow rates.
- (m) Where separate heating and cooling equipment serve the same temperature zone, thermostats are interlocked to prevent simultaneous heating and cooling.
- (n) Exhausts are equipped with gravity or motorized dampers that will automatically shut when systems are not in use.
 - Exception: Design capacity is less than 300 cfm.
 - Exception: System operates continuously.
- (o) Systems have optimum start controls.
 - Exception: Supply air capacity is less than 10,000 cfm.

Equipment Efficiency

System Tag(s)	Mfg. & Model No.	Equip.Type	Heating			Cooling			
			Rated Capacity	Rated Efficiency	Minimum Efficiency	Rated Capacity	Rated Efficiency	Minimum Efficiency	Econ. Min. Efficiency



Project Name:				
Project Address:			Date:	
HVAC System Designer of Record:			Telephone:	
Contact Person:			Telephone:	
City:	CDD50:	HDD65:	No. Hours 8am-4pm 55<Tdb<69:	
Zip:	1% Summer DB Temp:	1% Summer WB Temp:	Climate Type (Tbl 6.3.1.1.3A):	99.6% Winter Temp:

Mandatory Equipment Efficiency Worksheet (§6.2.1)

System Tag	Equipment Type (Tables 6.2.1 A through G)	Size Category (Tables 6.2.1 A through G)	Sub-Category or Rating Condition (Tables 6.2.1 A through G)	Units of Efficiency (Tables 6.2.1 A through G)	Minimum Efficiency (Tables 6.2.1 A through G)		
					Rated	≤	Required
						≤	
						≤	
						≤	
						≤	
						≤	
						≤	
						≤	

Mandatory Non-Standard Centrifugal Chiller Worksheet (§6.2.1)

System Tag	Leaving CHW Temperature (°F)	Entering CW Temperature (°F)	Condenser Flow Rate (gpm/ton)	Size Category (Tables 6.2.1 H through J)	Minimum Efficiency (Tables 6.2.1 H through J)		
					Rated	≤	Required
						≤	
						≤	
						≤	
						≤	

General Mandatory Requirements

- Load calculations are provided for selection of all equipment and systems (§6.2.2).
- Stair vents, elevator shaft vents, gravity hoods, gravity vents and gravity ventilations are provided with motorized dampers.
 - Exception: Gravity dampers are used since the building is less than 3 stories or in a climate with <2700 HDD65.
 - Exception: No vents are required as these systems ventilate unconditioned zones.

- Piping insulation meets or exceeds the requirements of the Standard (§6.2.4.5).
- Construction documents require record drawings (§6.2.5.1), manuals (§6.2.5.2), system balancing (§6.2.5.3) and system commissioning (§6.2.5.4).

Special Mandatory Requirements

- Freeze protection or snow/ice melting systems (if any) have controls to prevent operation in warm weather (§6.2.3.8).
- Independent perimeter heating systems (if any) comply with the control requirements of §6.2.3.1.1 and §6.2.3.1.3.
- Independent heating and cooling thermostatic controls (if any) are interlocked to prevent crossover of set points (§6.2.3.1.3).



Project Name:	
Contact Person:	Telephone:

Systems Worksheet (§6.2)

System Tag						
Supply CFM						
Supply ESP (in. w.c.)						
Fan System HP						
OSA CFM						
Automatic Shutdown (§6.2.3.2.1)						
Deadband (§6.2.3.1.2)						
Setback Controls (§6.2.3.2.2)						
Setup Controls (§6.2.3.2.2)						
Optimum Start (§6.2.3.2.3)						
Shutoff Dampers (§6.2.3.2.4)						
Zone Isolation (§6.2.3.2.5)						
Heat Pump Aux Heat (§6.2.3.4)						
Humidifier Preheat (§6.2.3.6)						
Humidification/Dehumidification Deadband (§6.2.3.7)						
Ventilation Control (§6.2.3.9)						
Duct/Plenum Insulation (§6.2.4.2)						
Duct Sealing Levels (§6.2.4.3) Supply/Return						
Duct Leakage Test (§6.2.4.4)						

In the table above, enter the appropriate codes from this list:

Shutdown

- C1 Complying time clock with override
- N1 N/A Continuous operation
- N2 N/A £65 kbtu/h or £3/4 hp
- N3 N/A Hotel/Motel Guestroom

Dead Band

- C1 Dual Setpoint Control
- C2 Manual Change Over Control
- N1 N/A Special Occupancy (requires approval)
- N2 N/A Heating or cooling only

Setback Controls

- C1 Setback Provided (down to 55F)
- N1 N/A Continuous operation
- N2 N/A £65 kbtu/h or £3/4 hp
- N3 N/A 99.6% Win DB>40F
- N4 N/A Radiant Heating
- N5 N/A No heating

Setup Controls

- C1 Setup Provided (up to 90F)
- N1 N/A Continuous operation

- N2 N/A £65 kbtu/h or £3/4 hp
- N3 N/A 1% Sum DB<=100F
- N4 N/A No cooling

Optimum Start

- C1 Optimum start provided
- N1 N/A Continuous operation
- N2 N/A £65 kbtu/h or £3/4 hp
- N3 N/A Supply<=10,000 cfm

Shutoff Dampers

- C1 Motorized shutoff dampers on OA and Exh
- C2 Gravity shutoff dampers on OA and Exh
- N1 N/A Continuous operation
- N2 N/A £65 kbtu/h or £3/4 hp
- N3 N/A OA/EA <=300 cfm

Zone Isolation

- C1 Isolation zones provided
- N1 N/A Continuous operation
- N2 N/A £65 kbtu/h or £3/4 hp
- N3 N/A All zones on same schedule
- N4 N/A OA/EA <=5,000 cfm

Heat Pump Aux Heat

- C1 Complying controls provided
- N1 N/A System is not a heat pump

- N2 N/A Auxiliary is not electric1 or is not provided
- N3 N/A Heat pump covered by NAECA

Humidifier Preheat

- C1 Complying controls provided
- N1 N/A no humidifier

Humidification/Dehumidification Dead Band

- C1 Complying controls provided
- N1 N/A no humidification and/or dehumidification

Duct/Plenum Insulation

- C1 Complying insulation provided
- N1 N/A all ducts located in conditioned space

Duct Sealing

- Enter highest seal level (A, B or C) for supply and return

Duct Leakage Test

- Y Ducts will be tested for leakage
- N Ducts will not be tested for leakage



Project Name:

Contact Person:

Telephone:

Prescriptive Checklist

Prescriptive Economizers (§6.3.1)

- Systems employ airside economizers (§6.3.1.1).
- Economizer provides up to 100% design air flow in outside air (§6.3.1.1.1).
- Economizer is integrated with the mechanical cooling system (§6.3.1.1.2 and §6.3.1.3).
- Economizer high limit shutoff complies with §6.3.1.1.3.
- Economizer dampers meet or exceed leakage requirements (§6.3.1.1.4).
- System provides relief for up to 100% design airflow in outside air (§6.3.1.1.5).
- Economizer complies with the heating system impact requirements (§6.3.1.4).
- Systems employ waterside economizers.
- Economizer can provide 100% of the load at either the outdoor conditions of 50°F db/45°F wb or 45°F db/40°F wb where required for dehumidification purposes (§6.3.1.2.1).
- Precooling coils and heat exchangers have either a ≤ 15 ft of WC pressure drop or are bypassed when economizer is not in use (§6.3.1.2.2).
- Economizer is integrated with the mechanical cooling system (§6.3.1.3).
- Economizer complies with the heating system impact requirements (§6.3.1.4).
- Systems are exempt from the economizer requirements.

Specify economizer exemptions: _____

Prescriptive Air-System Requirements

- Simultaneous Heating and Cooling (§6.3.2.3).
- Zone minimums were set to meet the requirements of Standard 62.
- Zone minimums were set to ≤ 0.4 cfm/ft² of zone conditioned floor area.
- Zone minimums are less than 300 cfm.
- Other (requires special documentation and approval).
- Humidity controls (if any) comply with the requirements of §6.3.2.3.
- Systems that employ hydronic cooling and have humidification (if any) use a waterside economizer that complies with §6.3.1.
- Variable air volume fan controls comply with the requirements of §6.3.3.2.

Prescriptive Water-System Requirements

- Three-pipe systems are not used (§6.3.2.2.1).
- Two-pipe changeover heating/cooling systems (if any) comply with the requirements of §6.3.2.2.2.
- Hydronic (ground- or water-loop) heat pump systems that have equipment for both loop heat addition and loop heat rejection (if any) comply with the requirements of §6.3.2.2.3.

- System pumps greater than 10 hp employ variable flow controls (§6.3.4.1), pump isolation (§6.3.4.2) and temperature reset (§6.3.4.3).

Prescriptive Special System Requirements

- All heat rejection equipment with motors ≥ 7.5 hp employ controls that comply with §6.3.5.
- Exhaust Air Energy Recovery: all fan systems that have both a design supply capacity of ≥ 5000 cfm and a minimum outdoor air supply of $\geq 70\%$ of the design supply air employ an energy recovery system that complies with §6.3.6.1.
- Heat recovery for service water heating is provided for facilities that operate continuously, have a total water-cooled heat rejection capacity exceeding 6,000,000 btu/h, and have a design service water heating load exceeding 1,000,000 btu/h. The heat recovery system (if any) complies with §6.3.6.2.
- Kitchen hoods with exhaust flows > 5000 cfm comply with the requirements of §6.3.7.1.
- Fume hoods with a total exhaust system flow $> 15,000$ cfm comply with the requirements of §6.3.7.2.
- Radiant heaters complying with §6.3.8.1 are used to heat unenclosed spaces (if any).
- The cooling equipment with hot-gas bypass controls (if any) meets the unloading requirements of §6.3.9.



Project Name:	
Contact Person:	Telephone:

Complete one worksheet for each fan system > 5hp

Prescriptive Fan Power Limitations (§6.3.3.1)

Supply Fan			Return Fan		Exhaust Fan		Series-Style Fan-Powered Box		Total System Motor (hp)
Tag	Supply CFM	Motor (hp)	Tag	Motor (hp)	Tag	Motor (hp)	Tag	Motor (hp)	
← Total Supply CFM		Total System Motor HP →							

Table 6.3.3.1 Value		_____	hp/cfm	
Total Supply CFM	X	_____	cfm	
Constant	÷	1,000		
HP Allowance	=	_____	hp (=Value X CFM/1000)	≥ _____
Credits and/or adjustments* →			Adjusted HP Allowance*	≥ _____

* Attach calculations and documentation if credits or temperature adjustments are used. Refer to §6.3.3.1 for the formulas

Credits and adjustments are available for the following:

- Clean filter pressure drops in excess of 1 in. w.c.;
- Pressure drop due to heat recovery coils or devices or evaporative cooling equipment or devices;
- Relief fans that operate during peak cooling due to high ventilation rates; and
- Room to cooling air supply temperature differences that are greater than 20°F (e.g. low temperature supply).



Service Water Heating Compliance Documentation

Project Name:	
Project Address:	Date:
Designer of Record:	Telephone:
Contact Person:	Telephone:
City:	

Mandatory Provisions Checklist

- Load calculations have been provided for sizing of systems and equipment (§7.2.1).
- Equipment efficiencies meet or exceed the requirements of Table 7.2.2 (§7.2.2).
- Circulating systems are fully insulated (per Table 6.2.4.5) and have automatic pump controls (§7.2.3 & §7.2.4.2).
- Non-circulating systems have insulated heat traps and outlet piping insulated (per Table 6.2.4.5) for 8' from the storage tank (§7.2.6).
- Tanks with remote heaters have circulation pump controls (§7.2.4.4).
- All water heating systems have temperature controls that are adjustable down to 120°F or lower (§7.2.4.1).
- Systems designed with pipe heating systems such as heat trace have temperature or time controls (§7.2.4.2).
- Public lavatories have outlet temperature controls that limit the discharge temperature to 110°F (§7.2.4.3).
- Pool heaters have readily accessible controls and gas-fired heaters do not have standing pilot lights (§7.2.5.1).
- Heated swimming pools have vapor retardant covers (§7.2.5.2).
- Pool heaters and circulation pumps have time switches (§7.2.5.3).

Equipment Efficiency Worksheet (§7.2.1)

System Tag	Equipment Type (From Table 7.2.2)	Sub-Category or Rating Condition (From Table 7.2.2)	Input Rating (Btu/h or kW)	Volume (gal)	Energy Factor or Et		Standby Loss	
					Rated	≤ Required	Rated	≤ Required
						≤		≤
						≤		≤
						≤		≤
						≤		≤

Combination Space and Water Heating Worksheet (§7.3.1)

System Tag	Standby Loss Method		or Energy Use Exception (attach calculations)		or Size Exception	
	Equipment	≤ Requirement	Equipment	≤ Requirement	Equipment	≤ Requirement
		≤		≤		≤ 150,000 Btu/h
		≤		≤		≤ 150,000 Btu/h
		≤		≤		≤ 150,000 Btu/h
		≤		≤		≤ 150,000 Btu/h



Project Name:	
Project Address:	Date:
Designer of Record:	Telephone:
Contact Person:	Telephone:
City:	

Mandatory Provisions Checklist

- Automatic lighting shutoff controls are provided based on either a scheduling device or an occupant sensor
 - Exception: Space is intended for 24-hour operation
 - Exception: Space is smaller than 5000 ft²
- Each space enclosed by ceiling-height partitions has an independent, accessible control that operates general lighting in the space
 - Exception: The control is located in a remote location for safety or security reasons
- For spaces less than or equal to 10,000 ft², a separate space control is provided for each 2500 ft² of area
- For spaces more than 10,000 ft², a separate space control is provided for each 10,000 ft² of area
- Either a photosensor or an astronomical time switch controls exterior lighting applications
 - Exception: Lights must remain on for safety, security or eye adaptation reasons
- Two-lamp tandem-wired ballasts
- Display lighting has a separate control
- Case lighting has a separate control
- Hotel/motel guest rooms have a master switch at the main entry
- Task lighting has a separate control
- Nonvisual lighting has a separate control
- Demonstration lighting has a separate control
- Exit signs larger than 20 W have an efficacy greater than or equal to 35 lumens/W
- Exterior luminaires greater than 100 W have lamps with minimum efficacy of 60 lumens/W
 - Exception: Luminaire is activated with a motion sensor

Interior Lighting Power Allowance (Building Area Method)

Building Type	Lighting Power Density (W/ft ²)	Building Area (ft ²)	Lighting Power Allowance (W)
Total			

Interior Lighting Power Allowance (Space-by-Space Method)

Building Type	Common/Specific Space Type	Lighting Power Density (W/ft ²)	Space Area (ft ²)	Lighting Power Allowance (W)
Total				



Project Name:	
Contact Person:	Telephone:

Energy Summary by End Use

End Use	Energy Type	Proposed Building		Budget Building		Proposed / Budget Energy (%)
		Energy (10 ³ Btu/h)	Peak (10 ³ Btu/h)	Energy (10 ³ Btu/h)	Peak (10 ³ Btu/h)	
Lighting - conditioned						
Lighting - unconditioned						
Space heating (1)						
Space heating (2)						
Space cooling						
Pumps						
Heat rejection						
Fans - interior ventilation						
Fans - interior exhaust						
Fans - parking garage						
Service water heating						
Office equipment						
Elevators & escalators						
Refrigeration (food, etc.)						
Cooking (commercial)						
Total Building Consumption						

Energy Summary by End Use

	Proposed Building		Budget Building		Proposed / Budget	
	Energy (10 ³ Btu/h)	Cost (\$/ft ²)	Energy (10 ³ Btu/h)	Cost (\$/ft ²)	Energy (%)	Cost (%)
Electricity						
Natural gas						
Other fossil fuel						
District steam						
Total Nonsolar						
Solar or site recovered						
Total Including Solar						

* These results use assumptions for showing compliance during a typical year; actual energy costs may be substantially different.

