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 ft^2.

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 6.8.1. List equipment in the table below.
- ☐ (c) The system has an air economizer as required by Table 6.5.1, with controls as required in Tables 6.5.1.1.3A and 6.5.1.1.3B. The economizer has either barometric or powered relief sized to prevent overpressurization of the building. Outdoor 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 6.3.2. 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 outdoor air quantity is less than or equal to 3,000 cfm and less than or 70% of the supply air quantity at minimum outdoor air design conditions.
  - ☐ Exception: An energy recovery ventilation system is provided in accordance with the requirements in § 6.5.6.
- ☐ (f) The system shall be controlled by a manual changeover or dual setpoint 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 switch 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 both a cooling or heating capacity less than 15,000 Btu/h and a supply fan motor power greater than 3/4 hp.
- ☐ (j) Piping is insulated in accordance with Table 6.8.3. 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 6.8.2A and 6.8.2B and sealed in accordance with Tables 6.4.4.2A and 6.4.4.2B.
- ☐ (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.	Equipment Type	Heating			Cooling			
			Rated Capacity	Rated Efficiency	Minimum Efficiency	Rated Capacity	Rated Efficiency	Minimum Efficiency	Econ. Min. Efficiency

HVAC Mandatory Provisions

Project Name:			
Project Address:			Date:
HVAC System Designer of Record:			Telephone:
Contact Person:			Telephone:
City:	Climate Zone:		
Zip:	1% Summer DB Temp:	1% Summer WB Temp:	99.6% Winter Temp:

Mandatory Equipment Efficiency Worksheet (§ 6.4.1.1)

System Tag	Equipment Type (Tables 6.8.1A through G)	Size Category (Tables 6.8.1A through G)	Sub-Category or Rating Condition (Tables 6.8.1A through G)	Units of Efficiency (Tables 6.8.1A through G)	Minimum Efficiency (Tables 6.8.1A through G) Rated ≥ Required
					≥
					≥
					≥
					≥
					≥
					≥
					≥

Mandatory Non-Standard Centrifugal Chiller Worksheet (§ 6.4.1.1)

System Tag	Leaving CHW Temperature (°F)	Entering CW Temperature (°F)	Condenser Flow Rate (gpm/ton)	Size Category (Tables 6.8.1H through J)	Minimum Efficiency (Tables 6.8.1H through J) Rated ≥ Required
					≥
					≥
					≥
					≥

General Mandatory Requirements

- ☐ Load calculations are provided for selection of all equipment and systems (§ 6.4.2).
- ☐ 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 climate zones 1–3.
  - ☐ Exception: No vents are required as these systems ventilate unconditioned zones.
- ☐ Piping insulation meets or exceeds the requirements of the Standard (§ 6.4.4.1.3).
- ☐ Construction documents require record drawings (§ 6.7.2.1), manuals (§ 6.7.2.2), system balancing (§ 6.7.2.3) and system commissioning (§ 6.7.2.4).

Special Mandatory Requirements

- ☐ Freeze protection or snow/ice melting systems (if any) have controls to prevent operation in warm weather (§ 6.4.3.7).
- ☐ Independent perimeter heating systems (if any) comply with the control requirements of § 6.4.3.1.1 and § 6.4.3.2.
- ☐ Independent heating and cooling thermostatic controls (if any) are interlocked to prevent crossover of set points (§ 6.4.3.2).

Project Name:	
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Systems Worksheet (§ 6.4)

System Tag						
Supply CFM						
Supply ESP (in. w.c.)						
Fan System HP						
OA CFM (i.e. Outdoor Air CFM)						
Automatic Shutdown (§ 6.4.3.2.1)						
Deadband (§ 6.4.3.1.2)						
Setback Controls (§ 6.4.3.2.2)						
Setup Controls (§ 6.4.3.2.2)						
Optimum Start (§ 6.4.3.1.3)						
Zone Isolation (§ 6.4.3.1.4)						
Shutoff Dampers (§ 6.4.3.3.3)						
Heat Pump Aux Heat (§ 6.4.3.4)						
Humidifier Preheat (§ 6.4.3.5)						
Humidification/Dehumidification Deadband (§ 6.4.3.6)						
Ventilation Control (§ 6.4.3.8)						
Duct/Plenum Insulation (§ 6.4.4.2.1)						
Duct Sealing Levels (§ 6.4.4.2.1) Supply/Return						
Duct Leakage Test (§ 6.4.4.2.2)						

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

Shutdown
- *C1 Complying nonresidential time switch with override*
- *C2 Complying residential time switch with override*
- *N1 N/A continuous operation*
- *N2 N/A ≤15 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 ≤15 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 ≤15 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 ≤15 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 ≤15 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 ≤15 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 electric 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*

HVAC Prescriptive Requirements

Project Name:	
Contact Person:	Telephone:

Prescriptive Checklist

Prescriptive Economizers (§ 6.5.1)

- ☐ Systems employ airside economizers (§ 6.5.1.1).
- ☐ Economizer provides up to 100% design airflow in outdoor air (§ 6.5.1.1.1).
- ☐ Economizer is integrated with the mechanical cooling system (§ 6.5.1.1.2 and § 6.5.1.3).
- ☐ Economizer high limit shutoff complies with § 6.5.1.1.3.
- ☐ Economizer dampers meet or exceed leakage requirements (§ 6.5.1.1.4).
- ☐ System provides relief for up to 100% design airflow in outdoor air (§ 6.5.1.1.5).
- ☐ Economizer complies with the heating system impact requirements (§ 6.5.1.4).
- ☐ 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 (§ 6.5.1.2.1).
- ☐ Precooling coils and heat exchangers have either a ≤ 15 ft of WC pressure drop or are bypassed when economizer is not in use (§ 6.5.1.2.2).
- ☐ Economizer is integrated with the mechanical cooling system (§ 6.5.1.3).
- ☐ Economizer complies with the heating system impact requirements (§ 6.5.1.4).
- ☐ Systems are exempt from the economizer requirements.

Specify economizer exemptions:_____
_____
_____
_____
_____

Prescriptive Air-System Requirements

- ☐ Simultaneous Heating and Cooling (§ 6.5.2.3).
- ☐ Zone minimums were set to meet the requirements of *Standard 62*.
- ☐ Zone minimums were set to ≤0.4 cfm/ft^2 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 § 6.5.2.3.
- ☐ Systems that employ hydronic cooling and have humidification (if any) use a waterside economizer that complies with § 6.5.1.
- ☐ Variable air volume fan controls comply with the requirements of § 6.5.3.2.

Prescriptive Water-System Requirements

- ☐ Three-pipe systems are not used (§ 6.5.2.2.1).
- ☐ Two-pipe changeover heating/cooling systems (if any) comply with the requirements of § 6.5.2.2.2.
- ☐ 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 § 6.5.2.2.3.
- ☐ System pumps greater than 10 hp employ variable flow controls (§ 6.5.4.1), pump isolation (§ 6.5.4.2) and temperature reset (§ 6.5.4.3).

Prescriptive Special System Requirements

- ☐ All heat rejection equipment with motors ≥ 7.5 hp employ controls that comply with § 6.5.5.
- ☐ Exhaust Air Energy Recovery: all fan systems that have both a design supply capacity of ≥ 5,000 cfm and a minimum outdoor air supply of ≥ 70% of the design supply air employ an energy recovery system that complies with § 6.5.6.1.
- ☐ 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 § 6.5.6.2.
- ☐ Kitchen hoods with exhaust flows > 5000 cfm comply with the requirements of § 6.5.7.1.
- ☐ Fume hoods with a total exhaust system flow > 15,000 cfm comply with the requirements of § 6.5.7.2.
- ☐ Radiant heaters complying with § 6.5.8.1 are used to heat unenclosed spaces (if any).
- ☐ The cooling equipment with hot-gas bypass controls (if any) meets the unloading requirements of § 6.5.9.

Project Name:	
Contact Person:	Telephone:

Option 1 – Nameplate Horsepower

Installed Nameplate Horsepower

Tag	Description	Supply	Return	Exhaust	Series FPB	Other	Nameplate Horsepower
		○	○	○	○	○	
		○	○	○	○	○	
		○	○	○	○	○	
		○	○	○	○	○	
		○	○	○	○	○	

Allowed Nameplate Horsepower

Design Supply Airflow Rate (CFM_S)	
Fan Nameplate Horsepower Allowance from Table 6.5.3.1.1A	
Total Allowed Nameplate Horsepower	

Option 2 – Brake Horsepower

Allowed Fan Brake Horsepower

Design Supply Airflow Rate (CFM_S)	
Fan Brake Horsepower Allowance from Table 6.5.3.1.1A	
Base Allowance (Line1 x Line 2)	
Additional Brake Horsepower Allowance	
Total Allowed Brake Horsepower	

Pressure Drop Adjustments for Qualifying Devices

Tag	Device Description	Pressure Drop from Table 6.5.3.1.1B	CFM through Device	Additional Brake Horsepower Allowance

Installed Brake Horsepower

Tag	Description	Supply	Return	Exhaust	Series FPB	Other	CFM	Pressure Drop (PD)	η_{Fan}	η_{Drive}	η_{Motor}	Brake Horsepower
		○	○	○	○	○						
		○	○	○	○	○						
		○	○	○	○	○						
		○	○	○	○	○						
		○	○	○	○	○						