

Mandatory Equipment Efficiency Worksheet (6.4.1.1)

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

Mandatory Non-Standard Centrifugal Chiller Worksheet (6.4.1.1)

Chiller Tag	Leaving Evaporator Temperature (°F)	Leaving Condenser Temperature (°F)	Factors for Adjusted Efficiency from 6.4.1.2 A/B	Type and Size Category (Table 6.8.1C)	Path (A or B)	Table 6.8.1C Minimum Efficiency & Adjusted Efficiency	Minimum Efficiency (Tables 6.8.1H through J)		
						Table 6.8.1C Value/Adjusted value	Rated	≥	Required
			/			/		≥	
			/			/		≥	
			/			/		≥	
			/			/		≥	

General Mandatory Requirements

- All heating and cooling equipment meet minimum efficiencies as required in Tables 6.8.1 (A through K) (6.4.1).
- Load calculations are provided for selection of all equipment and systems (6.4.2.1).
- Pump head calculations are provided for selection of all pumps (6.4.2.2).
- Zone control complies with the requirements of 6.4.3.1.1
- Stair and elevator shaft vents provided with motorized dampers (6.4.3.4.1)
- Ventilation fans with motors greater than 0.75 hp (1.0 kW) have automatic controls complying with Section 6.4.3.4.4.

- Enclosed parking garage ventilation systems meet the requirements of (6.4.3.4.5).
- Freeze protection or snow-melting systems meet the requirements of 6.4.3.8
- Piping insulation meets or exceeds the requirements of section 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).

- Independent perimeter heating systems (if any) comply with the control requirements of 6.4.3.1.1.
- Independent heating and cooling thermostatic controls (if any) are interlocked to prevent crossover of set points (6.4.3.2).
- Sensible heating panels are insulated per 6.4.4.1.3
- Radiant floor heating is insulated per 6.4.4.1.5

Special Mandatory Requirements

- Freeze protection or snow/ice melting systems (if any) have controls to prevent operation in warm weather (6.4.3.8).

Project Name:	
Contact Person:	Telephone:

Systems Worksheet (6.4)

System Tag					
Supply CFM					
DX Cooling Capacity					
Supply Motor HP					
OA CFM (i.e. Outdoor Air CFM)					
Deadband (6.4.3.1.2)					
Automatic Shutdown (6.4.3.3.1)					
Setback Controls (6.4.3.3.2)					
Setup Controls (6.4.3.3.2)					
Optimum Start (6.4.3.3.3)					
Zone Isolation (6.4.3.3.4)					
OSA Shutoff Dampers (6.4.3.4.2)					
Exhaust/Relief Shutoff Dampers (6.4.3.4.2)					
Damper Leakage (6.4.3.4.3)					
Heat Pump Aux Heat (6.4.3.5)					
Humidifier Preheat (6.4.3.6)					
Humidification/Dehumidification Deadband (6.4.3.7)					
Ventilation Control for High Occupancy Areas (6.4.3.9)					
Single Zone Fan Control (6.4.3.10)					
Duct/Plenum Insulation (6.4.4.1.2)					
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:

Dead Band (6.4.3.1.2)

- C1 Dual setpoint control
- C2 Manual change over control
- N1 N/A special occupancy (requires approval)
- N2 N/A heating or cooling only

Automatic Shutdown (6.4.3.3.1)

- C1 Complying 7-day timeclock with override
- C2 Complying Occupant sensor
- C3 Complying manually operated timeswitch
- C4 Complying security system interlock
- C5 Complying residential system with 2-day timeclock
- N1 N/A continuous operation
- N2 N/A heating and cooling ≤15 kbtu/h (4.4 kW) and manual on/off

Setback Controls (6.4.3.3.2)

- C1 Setback provided (down to 55F (13C))
- N1 N/A continuous operation
- N2 N/A heating and cooling ≤15 kbtu/h (4.4 kW) and manual on/off
- N3 N/A not in climate zone 2 to 8
- N4 N/A radiant heating
- N5 N/A no heating

Setup Controls (6.4.3.3.2)

- C1 Setup provided (up to 90F (32C))
- N1 N/A continuous operation
- N2 N/A heating and cooling ≤15 kbtu/h (4.4 kW) and manual on/off
- N3 N/A not in climate zone 1b, 2b or 3b
- N4 N/A no cooling

Optimum Start (6.4.3.3.3)

- C1 Optimum start provided
- N1 N/A continuous operation
- N2 N/A heating and cooling ≤15 kbtu/h (4.4 kW) and manual on/off
- N3 N/A supply ≤10,000 cfm (4,700 l/s)

OSA Shutoff Dampers (6.4.3.4.2)

- C1 Motorized shutoff dampers
- C2 Gravity shutoff dampers on OA and building in climate zone 1, 2 or 3
- N1 N/A OA ≤300 cfm (142 l/s)

Exhaust/Relief Shutoff Dampers (6.4.3.4.2)

- C1 Motorized shutoff dampers on exhaust and relief
- C2 Gravity shutoff dampers on exhaust and relief and the building is less than three stories in height

Damper Leakage (6.4.3.4.3)

- C1 OSA, exhaust and relief dampers comply with Table 6.4.3.4.3

Zone Isolation (6.4.3.3.4)

- C1 Isolation areas provided
- N1 N/A continuous operation
- N2 N/A ≤15 kbtu/h (4.4 kW) or ≤3/4 hp (0.56 kW)
- N3 N/A all zones on same schedule
- N4 N/A OA/EA ≤5,000 cfm (2,360 l/s)

Heat Pump Aux Heat (6.4.3.5)

- 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 (6.4.3.6)

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

Humidification/Dehumidification Dead Band (6.4.3.7)

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

Ventilation Control for High Occupancy Areas (6.4.3.9)

- C1 All zones comply with 6.4.3.9
- N1 N/A exhaust air energy recovery complies with 6.5.6.1
- N2 N/A system is multiple zone and has pneumatic controls
- N3 N/A design OSA <1,200 cfm (570 l/s)
- N4 N/A design OSA minus transfer (or make up air) <1,200 cfm (570 l/s)

Single Zone Fan Control (6.4.3.10)

- C1 Complies with 6.4.3.10
- N1 N/A CHW unit with supply motor hp <5hp (3.7 kW)
- N2 N/A DX unit with cooling capacity < 110 kbtu/h (32 kW)
- N3 N/A multiple Zone Unit

Duct/Plenum Insulation (6.4.4.1.2)

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

Duct Sealing (6.4.4.2.1)

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

Duct Leakage Test (6.4.4.2.2)

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

Project Name:	
Contact Person:	Telephone:

Prescriptive Checklist

Prescriptive Air-System Requirements

- All systems comply with simultaneous heating and cooling limitations (6.5.2).

Prescriptive Hydronic System Requirements

- Hydronic systems meet the variable flow requirements of 6.5.4.1
- Chillers and boilers in parallel have isolation controls per 6.5.4.2
- Chilled and hot water systems meet the temperature reset requirements of 6.5.4.3

- Hydronic heat pump systems and water cooled AC units comply with the requirements of 6.5.4.4.

- Chilled and condenser water piping systems are sized in compliance with 6.5.4.5

Prescriptive Special System Requirements

- Heat rejection systems comply with section 6.5.5
- Kitchen exhaust systems comply with 6.5.7.1
- Laboratory exhaust systems comply with 6.5.7.2

- Radiant heating systems comply with 6.5.8

- 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 (1,758 kW), and have a design service water heating load exceeding 1,000,000 Btu/h (293 kW). The heat recovery system (if any) complies with 6.5.6.2.

- The cooling equipment with hot-gas bypass controls (if any) meets the unloading requirements of 6.5.9.

Project Name:	
Contact Person:	Telephone:

Systems Worksheet (6.5)

System Tag					
Supply CFM					
Cooling Capacity					
Heating Capacity					
OA CFM (i.e. Outdoor Air CFM)					
Economizer (6.5.1)					
Dehumidification (6.5.2.3)					
Humidification (6.5.2.4)					
VAV Fan Control (6.5.3.2.1)					
VAV Fan Static Pressure Control (6.5.3.2.2 and 6.5.3.2.3)					
Multiple Zone VAV System Ventilation Control (6.5.3.3)					
Supply air temperature reset control (6.5.3.4)					
Exhaust air energy recovery (6.5.6.1)					

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

Economizer (6.5.1)

- C1 System employs air-economizer complying with 6.5.1.1, 6.5.1.3 and 6.5.1.4
- C2 System employs water economizer complying with 6.5.1.2, 6.5.1.3 and 6.5.1.4
- N1 N/A size exception from Table 6.5.1A or 6.5.1B
- N2 N/A non-particulate air treatment per 6.2.1 of Standard 62.1
- N3 N/A per exception c to 6.5.1
- N4 N/A system employs heat recovery complying with 6.5.6.2
- N5 N/A system serves residential spaces with a system capacity less than 5 times that in Table 6.5.1A
- N6 N/A per exception f to 6.5.1
- N7 N/A system expected to operate < 20 hrs/wk
- N8 N/A system serves space with open refrigerated casework systems
- N9 N/A cooling efficiency exceeds the requirements of Table 6.3.2
- N10 N/A serves computer rooms and meets exception j to 6.5.1
- N11 N/A serves computer rooms and meets exception k to 6.5.1

Dehumidification (6.5.2.3)

- C1 System dehumidifies without employing reheating or recooling
- N1 N/A system does not have humidistatic controls
- N2 N/A system meets exception a to 6.5.2.3
- N3 N/A system meets exception b to 6.5.2.3
- N4 N/A system meets exception c to 6.5.2.3

- N5 N/A system meets exception d to 6.5.2.3
- N6 N/A system meets exception e to 6.5.2.3
- N7 N/A system meets exception f to 6.5.2.3

Humidification (6.5.2.4)

- C1 System humidifies to a dew point < 35F
- C2 System humidifies and does not have an economizer
- C3 System humidifies has a water-side economizer
- N1 N/A system does not have a humidifier controls

VAV Fan Control (6.5.3.2.1)

- C1 System has a variable speed drive
- C2 System has a vane-axial fan with variable pitch blades
- C3 System uses a control that complies with 6.5.3.2.1 c.
- N1 N/A system is constant volume
- N2 N/A system serves a single zone and complies with 6.4.3.10

VAV Fan Static Pressure Control (6.5.3.2.2 and 6.5.3.2.3)

- C1 Static pressure setpoint is < 1/3 of the fan design static
- C2 Static pressure setpoint is reset by zone demand per 6.5.3.2.3.
- N1 N/A system is constant volume
- N2 N/A system serves a single zone and complies with 6.4.3.10

Multiple Zone VAV System Ventilation Control (6.5.3.3)

- C1 System complies with 6.5.3.3
- N1 N/A system is constant volume
- N2 N/A system serves a single zone and complies with 6.4.3.10
- N3 N/A system is does not have DDC to the zone

Supply air temperature reset control (6.5.3.4)

- C1 System employs supply air temperature reset per 6.5.3.4
- N1 N/A system serves a single zone and complies with 6.4.3.10
- N2 N/A system is located in climate zone 1a, 2a or 3a
- N3 N/A system has no re-heating, re-cooling or mixing of heated and cooled supply air
- N4 N/A system has >75% of the energy for reheat from site recovered or site solar energy sources

Exhaust air energy recovery (6.5.6.1)

- C1 System employs an exhaust air energy recovery device that exceeds 50% energy recover effectiveness
- N1 N/A system is exempt per Table 6.5.6.1
- N2 N/A system serves a laboratory meeting 6.5.7.2
- N3 N/A system is heating only and the spaces are heated to <60F
- N4 N/A exhaust is toxic, flammable or corrosive
- N5 N/A system serves an area with commercial kitchen hoods
- N6 N/A >60% of the heating energy is from site-recovered or site-solar energy
- N7 N/A system meets exception f to 6.5.6.1
- N8 N/A system meets exception g to 6.5.6.1
- N9 N/A system meets exception h to 6.5.6.1
- N10 N/A system meets exception i to 6.5.6.1
- N11 N/A system meets exception j to 6.5.6.1

Option 1 – Nameplate Horsepower

Installed Nameplate Horsepower

Tag	Description	Supply	Return	Exhaust	Series FPB	Other	Nameplate Horsepower
		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

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 (P/D)	η_{Fan}	η_{Drive}	η_{Motor}	Brake Horsepower
		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>						
		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>						
		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>						
		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>						
		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>						