Part J6 Air-conditioning and ventilation

NT Part J6

Introduction to this Part

This Part contains *Deemed-to-Satisfy Provisions* for compliance with Part J1. It sets out the provisions for the efficiency and control of *air-conditioning*, space heating and ventilation equipment, the efficiency, sealing and insulation requirements for ductwork systems containing fans, and for the efficiency and insulation of pipework and pump systems.

Notes

From 1 May 2023 to 30 September 2023 Section J of NCC 2019 Volume One Amendment 1 may apply instead of Section J of NCC 2022 Volume One. From 1 October 2023 Section J of NCC 2022 Volume One applies.

Notes: New South Wales Section J Energy Efficiency

(1) For a Class 2 building or a Class 4 part of a building, where a relevant *development consent* or an application for a complying development certificate requires compliance with a BASIX Single Dwelling or Multi Dwelling Certificate issued under Version 3.0 or earlier, NSW Section J of NCC 2019 Volume One Amendment 1 applies.

(2) For a Class 2 building or a Class 4 part of a building, where a relevant *development consent* or an application for a complying development certificate requires compliance with a BASIX Single Dwelling or Multi Dwelling Certificate issued under Version 4.0 or later, Section J of NCC 2022 Volume One applies.

(3) For a Class 2 building or a Class 4 part of a building, where a relevant *development consent* or an application for a complying development certificate requires compliance with a BASIX Alterations and Additions Certificate, NSW Section J of NCC 2019 Volume One Amendment 1 applies.

(4) For a Class 3 building or Class 5 to 9 building:

(i) From 1 May 2023 to 30 September 2023 NSW Section J of NCC 2019 Volume One Amendment 1 may apply instead of Section J of NCC 2022 Volume One.

(ii) From 1 October 2023 Section J of NCC 2022 Volume One applies.

Notes: Tasmania Section J Energy Efficiency

In Tasmania, for a Class 2 building and Class 4 part of a building, Section J is replaced with Section J of BCA 2019 Amendment 1.

Deemed-to-Satisfy Provisions

J6D1 Deemed-to-Satisfy Provisions

[2019: J5.0]

NSW J6D1(1)

(1) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* J1P1 to J1P4 are satisfied by complying with—

(a) J2D2; and

(b) J3D2 to J3D15; and

(c) J4D2 to J4D7; and

(d) J5D2 to J5D8; and

(e) J6D2 to J6D13; and

(f) J7D2 to J7D9; and

(g) J8D2 to J8D4; and

(h) J9D2 to J9D5.

(2) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2G2(3) and A2G4(3) as applicable.

NSW J6D2

J6D2 Application of Part

[2019: J5.1]

The *Deemed-to-Satisfy Provisions* of this Part do not apply to a Class 8 *electricity network substation*.

J6D3 Air-conditioning system control

[2019: J5.2]

(1) An *air-conditioning* system—

(a) must be capable of being deactivated when the building or part of a building served by that system is not occupied; and

(b) when serving more than one *air-conditioning* zone or area with different heating or cooling needs, must—

(i) thermostatically control the temperature of each zone or area; and

(ii) not control the temperature by mixing actively heated air and actively cooled air; and

(iii) limit reheating to not more than—

(A) for a fixed supply air rate, a 7.5 K rise in temperature; and

(B) for a variable supply air rate, a 7.5 K rise in temperature at the nominal supply air rate but increased or decreased at the same rate that the supply air rate is respectively decreased or increased; and

(c) which provides the *required* mechanical ventilation, other than in *climate zone* 1 or where dehumidification control is needed, must have an *outdoor air economy cycle* if the total air flow rate of any airside component of an *air-conditioning* system is greater than or equal to the flow rates in Table J6D3; and

(d) which contains more than one water heater, chiller or coil, must be capable of stopping the flow of water to those not operating; and

(e) with an airflow of more than 1000 L/s, must have a variable speed fan when its supply air quantity is capable of being varied; and

(f) when serving a *sole-occupancy unit* in a Class 3 building, must not operate when any external door of the *sole-occupancy unit* that opens to a balcony or the like, is open for more than one minute; and

(g) must have the ability to use direct signals from the control components responsible for the delivery of comfort conditions in the building to regulate the operation of central plant; and

(h) must have a control dead band of not less than 2°C, except where a smaller range is *required* for specialised applications; and

(i) must be provided with balancing dampers and balancing valves, as *required* to meet the needs of the system at its maximum operating condition, that ensure the maximum design air or fluid flow is achieved but not exceeded by more than 15% above design at each—

(i) component; or

(ii) group of components operating under a common control in a system containing multiple components; and

(j) must ensure that each independently operating space of more than 1 000 m^2 and every separate floor of the building has provision to terminate airflow independently of the remainder of the system sufficient to allow for different operating times; and

(k) must have automatic variable temperature operation of heated water and chilled water circuits; and

(l) when deactivated, must close any motorised outdoor air or return air damper that is not otherwise being actively controlled.

(2) When two or more *air-conditioning* systems serve the same space they must use control sequences that prevent the

systems from operating in opposing heating and cooling modes.

(3) Time switches — the following applies:

(a) A time switch must be provided to control—

(i) an *air-conditioning* system of more than 2 kWr; and

(ii) a heater of more than 1 $kW_{heating}$ used for *air-conditioning*.

(b) The time switch must be capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days.

(c) The requirements of (a) and (b) do not apply to—

(i) an *air-conditioning* system that serves—

(A) only one *sole-occupancy unit* in a Class 2, 3 or 9c building; or

(B) a Class 4 part of a building; or

(ii) a *conditioned space* where *air-conditioning* is needed for 24 hour continuous use.

Table J6D3: Requirement for an outdoor air economy cycle

Climate zone	Total air flow rate *requiring* an economy cycle (L/s)
2	9000
3	7500
4	3500
5	3000
6	2000
7	2500
8	4000

J6D4 Mechanical ventilation system control

[2019: J5.3]

(1) General — A mechanical ventilation system, including one that is part of an *air-conditioning* system, except where the mechanical system serves only one *sole-occupancy unit* in a Class 2 building or serves only a Class 4 part of a building, must—

(a) be capable of being deactivated when the building or part of the building served by that system is not occupied; and

(b) when serving a *conditioned space*, except in periods when evaporative cooling is being used—

(i) where specified in Table J6D4, have—

(A) an energy reclaiming system that preconditions *outdoor air* at a minimum sensible heat transfer effectiveness of 60%; or

(B) demand control ventilation in accordance with AS 1668.2 if appropriate to the application; and

(ii) not exceed the minimum *outdoor air* quantity *required* by Part F6 by more than 20%, except where—

(A) additional unconditioned *outdoor air* is supplied for free cooling; or

(B) additional mechanical ventilation is needed to balance the *required* exhaust or process exhaust; or

(C) an energy reclaiming system preconditions all the *outdoor air*; and

(c) for an airflow of more than 1000 L/s, have a variable speed fan unless the downstream airflow is *required* by Part F6 to be constant.

(2) Exhaust systems — An exhaust system with an air flow rate of more than 1000 L/s must be capable of stopping the motor when the system is not needed, except for an exhaust system in a *sole-occupancy unit* in a Class 2, 3 or 9c building.

(3) *Carpark* exhaust systems — *Carpark* exhaust systems must have a control system in accordance with—

(a) clause 4.11.2 of AS 1668.2; or

(b) clause 4.11.3 of AS 1668.2.

(4) Time switches — The following applies:

(a) A time switch must be provided to a mechanical ventilation system with an air flow rate of more than 1000 L/s.

(b) The time switch must be capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days.

(c) The requirements of (a) and (b) do not apply to—

(i) a mechanical ventilation system that serves—

(A) only one *sole-occupancy unit* in a Class 2, 3 or 9c building; or

(B) a Class 4 part of a building; or

(ii) a building where mechanical ventilation is needed for 24 hour occupancy.

Table J6D4: Required outdoor air treatment

Climate zone	*Outdoor air* flow (L/s)	*Required* measure
1	>500	Modulating control
2	Not applicable	No *required* measure
3	>1000	Modulating control
4 and 6	>500	Modulating control or energy reclaiming system
5	>1000	Modulating control or energy reclaiming system
7 and 8	>250	Modulating control or energy reclaiming system

J6D5 Fans and duct systems

[2019: J5.4]

(1) Fans, ductwork and duct components that form part of an *air-conditioning* system or mechanical ventilation system must—

(a) separately comply with (2), (3), (4) and (5); or

(b) achieve a fan motor input power per unit of flowrate lower than the fan motor input power per unit of flowrate achieved when applying (2), (3), (4) and (5) together.

(2) Fans:

(a) Fans in systems that have a static pressure of not more than 200 Pa must have an efficiency at the full load operating point not less than the efficiency calculated with the following formula:

$$\eta_{min} = 0.13 \times \ln(p) - 0.3$$

(b) In the formula at (a)—

(i) η_{min} = the minimum *required* system static efficiency for installation type A or C or the minimum *required* system total efficiency installation type B or D; and

(ii) p = the static pressure of the system (Pa); and

(iii) $\ln$ = natural logarithm.

(c) Fans in systems that have a static pressure above 200 Pa must have an efficiency at the full load operating point not less than the efficiency calculated with the following formula:

$$\eta_{min} = 0.85 \times (a \times \ln(P) - b + N)/100$$

(d) In the formula at (c)—

(i) η_{min} = the minimum *required* system static efficiency for installation type A or C or the minimum *required* system total efficiency installation type B or D; and

(ii) P = the motor input power of the fan (kW); and

(iii) N = the minimum performance grade obtained from Table J6D5a; and

(iv) a = regression coefficient a, obtained from Table J6D5b; and

(v) b = regression coefficient b, obtained from Table J6D5c; and

(vi) $\ln$ = natural logarithm.

(e) The requirements of (a), (b), (c) and (d) do not apply to fans that need to be explosion proof.

(3) Ductwork:

(a) The pressure drop in the index run across all straight sections of rigid ductwork and all sections of flexible ductwork must not exceed 1 Pa/m when averaged over the entire length of straight rigid duct and flexible duct. The pressure drop of flexible ductwork sections may be calculated as if the flexible ductwork is laid straight.

(b) Flexible ductwork must not account for more than 6 m in length in any duct run.

(c) The upstream connection to ductwork bends, elbows and tees in the index run must have an equivalent diameter to the connected duct.

(d) Turning vanes must be included in all rigid ductwork elbows of 90° or more acute than 90° in the index run except where—

(i) the inclusion of turning vanes presents a fouling risk; or

(ii) a long radius bend in accordance with AS 4254.2 is used.

(4) Ductwork components in the index run:

(a) The pressure drop across a coil must not exceed the value specified in Table J6D5d.

(b) A high efficiency particulate arrestance (HEPA) air filter must not exceed the higher of—

(i) a pressure drop of 200 Pa when clean; or

(ii) the filter design pressure drop when clean at an air velocity of 1.5 m/s.

(c) Any other air filter must not exceed—

(i) the pressure drop specified in Table J6D5e when clean; or

(ii) the filter design pressure drop when clean at an air velocity of 2.5 m/s.

(d) The pressure drop across intake louvres must not exceed the higher of—

(i) for single stage louvres, 30 Pa; and

(ii) for two stage louvres, 60 Pa; and

(iii) for acoustic louvres, 50 Pa; and

(iv) for other non-weatherproof louvres, 30 Pa.

(e) The pressure drop across a variable air volume box, with the damper in the fully open position, must not exceed—

(i) for units with electric reheat, 100 Pa; and

(ii) for other units, 25 Pa not including coil pressure losses.

(f) Rooftop cowls must not exceed a pressure drop of 30 Pa.

(g) Attenuators must not exceed a pressure drop of 40 Pa.

(h) Fire dampers must not exceed a pressure drop of 15 Pa when open.

(i) Balancing and control dampers in the index run must not exceed a pressure drop of 25 Pa when in the fully open position.

(j) Supply air diffusers and grilles must not exceed a pressure drop of 40 Pa.

(k) Exhaust grilles must not exceed a pressure drop of 30 Pa.

(l) Transfer ducts must not exceed a pressure drop of 12 Pa.

(m) Door grilles must not exceed a pressure drop of 12 Pa.

(n) Active chilled beams must not exceed a pressure drop of 150 Pa.

(5) The requirements of (1), (2), (3) and (4) do not apply to—

(a) fans in unducted *air-conditioning* systems with a supply air capacity of less than 1000 L/s; and

(b) smoke spill fans, except where also used for *air-conditioning* or ventilation; and

(c) the power for process-related components; and

(d) kitchen exhaust systems.

Table J6D5a: Minimum fan performance grade

Fan type	Installation type A or C	Installation type B or D
Axial — as a component of an air handling unit or fan coil unit	46.0	51.5
Axial — other	42.0	61.0
Mixed flow — as a component of an air handling unit or fan coil unit	46.0	51.5
Mixed flow — other	52.5	65.0
Centrifugal forward — curved	46.0	51.5
Centrifugal radial bladed	46.0	51.5
Centrifugal backward-curved	64.0	64.0

Table Notes

(1) Installation type A means an arrangement where the fan is installed with free inlet and outlet conditions.

(2) Installation type B means an arrangement where the fan is installed with a free inlet and a duct at its outlet.

(3) Installation type C means an arrangement where the fan is installed with a duct fitted to its inlet and with free outlet conditions.

(4) Installation type D means an arrangement where the fan is installed with a duct fitted to its inlet and outlet.

Table J6D5b: Fan regression coefficient a

Fan type	Fan motor input power < 10 kW	Fan motor input power ≥ 10 kW
Axial	2.74	0.78
Mixed flow	4.56	1.1
Centrifugal forward-curved	2.74	0.78
Centrifugal radial bladed	2.74	0.78
Centrifugal backward-curved	4.56	1.1

Table J6D5c: Fan regression coefficient b

Fan type	Fan motor input power < 10 kW	Fan motor input power ≥ 10 kW
Axial	6.33	1.88
Mixed flow	10.5	2.6
Centrifugal forward-curved	6.33	1.88
Centrifugal radial bladed	6.33	1.88
Centrifugal backward-curved	10.5	2.6

Table J6D5d: Maximum coil pressure drop

Number of rows	Maximum pressure drop (Pa)
1	30

Number of rows	Maximum pressure drop (Pa)
2	50
4	90
6	130
8	175
10	220

Table J6D5e: Maximum clean filter pressure drop

Filter minimum efficiency reporting value	Maximum pressure drop (Pa)
9	55
11	65
13	95
14	110

J6D6 Ductwork insulation

[2019: J5.5]

(1) Ductwork and fittings in an *air-conditioning* system must be provided with insulation—
  (a) complying with AS/NZS 4859.1; and
  (b) having an insulation *R-Value* greater than or equal to—
    (i) for flexible ductwork, 1.0; or
    (ii) for cushion boxes, that of the connecting ductwork; or
    (iii) that specified in Table J6D6.

(2) Insulation must—
  (a) be protected against the effects of weather and sunlight; and
  (b) be installed so that it—
    (i) abuts adjoining insulation to form a continuous barrier; and
    (ii) maintains its position and thickness, other than at flanges and supports; and
  (c) when conveying cooled air—
    (i) be protected by a vapour barrier on the outside of the insulation; and
    (ii) where the vapour barrier is a membrane, be installed so that adjoining sheets of the membrane—
      (A) overlap by at least 50 mm; and
      (B) are bonded or taped together.

(3) The requirements of (1) do not apply to—
  (a) ductwork and fittings located within the only or last room served by the system; or
  (b) fittings that form part of the interface with the *conditioned space*; or
  (c) return air ductwork in, or passing through, a *conditioned space*; or
  (d) ductwork for *outdoor air* and exhaust air associated with an *air-conditioning* system; or
  (e) the floor of an in-situ air-handling unit; or
  (f) packaged air conditioners, split systems, and variable refrigerant flow *air-conditioning* equipment complying with *MEPS*; or
  (g) flexible fan connections.

(4) For the purposes of (1), (2) and (3), fittings—
  (a) include non-active components of a ductwork system such as cushion boxes; and

(b) exclude active components such as air-handling unit components.

Table J6D6: Ductwork and fittings – Minimum insulation R-Value

Location of ductwork and fittings	*Climate zone* 1, 2, 3, 4, 5, 6 or 7	*Climate zone* 8
Within a conditioned space	1.2	2.0
Where exposed to direct sunlight	3.0	3.0
All other locations	2.0	3.0

J6D7 Ductwork sealing

[2019: J5.6]

Ductwork in an *air-conditioning* system with a capacity of 3000 L/s or greater, not located within the only or last room served by the system, must be sealed against air loss in accordance with the duct sealing requirements of AS 4254.1 and AS 4254.2 for the static pressure in the system.

J6D8 Pump systems

[2019: J5.7]

(1) General — Pumps and pipework that form part of an *air-conditioning* system must either—

(a) separately comply with (2), (3) and (4); or

(b) achieve a pump motor power per unit of flowrate lower than the pump motor power per unit of flowrate achieved when applying (2), (3) and (4) together.

(2) Circulator pumps — A glandless impeller pump, with a rated hydraulic power output of less than 2.5 kW and that is used in closed loop systems must have an energy efficiency index (EEI) not more than 0.27 calculated in accordance with European Union Commission Regulation No. 622/2012.

(3) Other pumps — Pumps that are in accordance with Articles 1 and 2 of European Union Commission Regulation No. 547/2012 must have a minimum efficiency index (MEI) of 0.4 or more when calculated in accordance with European Union Commission Regulation No. 547/2012.

(4) Pipework — Straight segments of pipework along the index run, forming part of an *air-conditioning* system—

(a) in pipework systems that do not have branches and have the same flow rate throughout the entire pipe network, must achieve an average pressure drop of not more than—

(i) for constant speed systems, the values nominated in Table J6D8a; or

(ii) for variable speed systems, the values nominated in Table J6D8b; or

(b) in any other pipework system, must achieve an average pressure drop of not more than—

(i) for constant speed systems, the values nominated in Table J6D8c; or

(ii) for variable speed systems, the values nominated in Table J6D8d.

(5) The requirements of (4) do not apply—

(a) to valves and fittings; or

(b) where the smallest pipe size compliant with (4) results in a velocity of 0.7 m/s or less at design flow.

Table J6D8a: Maximum pipework pressure drop – Non-distributive constant speed systems

Nominal pipe diameter (mm)	Maximum pressure drop in systems operating 5000 hours/annum or less (Pa/m)	Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)
Not more than 20	400	400
25	400	400
32	400	400

Nominal pipe diameter (mm)	Maximum pressure drop in systems operating 5000 hours/annum or less (Pa/m)	Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)
40	400	400
50	400	350
65	400	350
80	400	350
100	400	200
125	400	200
150 or more	400	200

Table J6D8b: Maximum pipework pressure drop – Non-distributive variable speed systems

Nominal pipe diameter (mm)	Maximum pressure drop in systems operating 5000 hours/annum or less (Pa/m)	Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)
Not more than 20	400	400
25	400	400
32	400	400
40	400	400
50	400	400
65	400	400
80	400	400
100	400	300
125	400	300
150 or more	400	300

Table J6D8c: Maximum pipework pressure drop – Distributive constant speed systems

Nominal pipe diameter (mm)	Maximum pressure drop in systems operating 2000 hours/annum or less (Pa/m)	Maximum pressure drop in systems operating between 2000 hours/annum and 5000 hrs/yr (Pa/m)	Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)
Not more than 20	400	300	150
25	400	220	100
32	400	220	100
40	400	220	100
50	400	220	100
65	400	400	170
80	400	400	170
100	400	400	170
125	400	400	170
150 or more	400	400	170

Table J6D8d: Maximum pipework pressure drop – Distributive variable speed systems

Nominal pipe diameter (mm)	Maximum pressure drop in systems operating 5000 hours/annum or less (Pa/m)	Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)
Not more than 20	400	250
25	400	180
32	400	180
40	400	180
50	400	180
65	400	300
80	400	300
100	400	300
125	400	300
150 or more	400	300

J6D9 Pipework insulation

[2019: J5.8]

(1) *Piping*, vessels, heat exchangers and tanks containing heating or cooling fluid, where the fluid is held at a heated or cooled temperature, that are part of an *air-conditioning* system, other than in appliances covered by *MEPS*, must be provided with insulation—

(a) complying with AS/NZS 4859.1; and

(b) for *piping* of heating and cooling fluids, having an insulation *R-Value* in accordance with Table J6D9a; and

(c) for vessels, heat exchangers or tanks, having an insulation *R-Value* in accordance with Table J6D9b; and

(d) for refill or pressure relief *piping*, having an insulation *R-Value* equal to the *required* insulation *R-Value* of the connected pipe, vessel or tank within 500 mm of the connection.

(2) Insulation must—

(a) be protected against the effects of weather and sunlight; and

(b) be able to withstand the temperatures within the *piping*, vessel, heat exchanger or tank.

(3) Insulation provided to *piping*, vessels, heat exchangers or tanks containing cooling fluid must be protected by a vapour barrier on the outside of the insulation.

(4) The requirements of (1) and (2) do not apply to *piping*, vessels or heat exchangers—

(a) located within the only or last room served by the system and downstream of the control device for the regulation of heating or cooling service to that room; or

(b) encased within a concrete slab or panel which is part of a heating or cooling system; or

(c) supplied as an integral part of a chiller, *boiler* or unitary air-conditioner complying with the requirements of J6D10, J6D11 and J6D12; or

(d) inside an air-handling unit, fan-coil unit, or the like.

(5) For the purposes of (1), (2), (3) and (4)—

(a) heating fluids include refrigerant, heated water, steam and condensate; and

(b) cooling fluids include refrigerant, chilled water, brines and glycol mixtures, but do not include condenser cooling water.

Table J6D9a: Piping — Minimum insulation R-Value

Fluid temperature	Minimum insulation *R-Value* nominal pipe diameter ≤ 40 mm	Minimum insulation *R-Value* — nominal pipe diameter > 40 mm and ≤ 80 mm	Minimum insulation *R-Value* — nominal pipe diameter between > 80 mm and ≤ 150 mm	Minimum insulation *R-Value* — nominal pipe diameter > 150 mm
Low temperature chilled — ≤ 2°C	1.3	1.7	2.0	2.7
Chilled — > 2°C but ≤ 20°C	1.0	1.5	2.0	2.0
Heated — > 30°C but ≤ 85°C	1.7	1.7	1.7	1.7
High Temperature heated — > 85°C	2.7	2.7	2.7	2.7

Table Notes

The minimum *required R-Value* may be halved for *piping* penetrating a structural member.

Table J6D9b: Vessels, heat exchangers and tanks — Minimum insulation R-Value

Fluid temperature range	Minimum insulation *R-Value*
Low temperature chilled — ≤ 2°C	2.7
Chilled — > 2°C but ≤ 20°C	1.8
Heated — > 30°C but ≤ 85°C	3.0
High temperature heated — > 85°C	3.0

J6D10 Space heating

[2019: J5.9]

(1) A heater used for *air-conditioning* or as part of an *air-conditioning* system must be—

(a) a solar heater; or

(b) a gas heater; or

(c) a heat pump heater; or

(d) a heater using reclaimed heat from another process such as reject heat from a refrigeration plant; or

(e) an electric heater if—

(i) the heating capacity is not more than—

(A) 10 W/m^2 of the *floor area* of the *conditioned space* in *climate zone* 1; or

(B) 40 W/m^2 of the *floor area* of the *conditioned space* in *climate zone* 2; or

(C) the value specified in Table J6D10 where reticulated gas is not available at the allotment boundary; or

(ii) the annual energy consumption for heating is not more than 15 kWh/m^2 of the *floor area* of the *conditioned space* in *climate zones* 1, 2, 3, 4 and 5; or

(iii) the in-duct heater complies with J6D3(1)(b)(iii); or

(f) any combination of (a) to (e).

NSW J6D10(2)

(2) An electric heater may be used for heating a bathroom in a Class 2, 3, 9a or 9c building if the heating capacity is not more than 1.2 kW and the heater has a timer.

(3) A fixed heating or cooling appliance that moderates the temperature of an outdoor space must be configured to automatically shut down when—

(a) there are no occupants in the space served; or

(b) a period of one hour has elapsed since the last activation of the heater; or

(c) the space served has reached the design temperature.

(4) A gas water heater, that is used as part of an *air-conditioning* system, must—

(a) if rated to consume 500 MJ/hour of gas or less, achieve a minimum gross thermal efficiency of 86%; or

(b) if rated to consume more than 500 MJ/hour of gas, achieve a minimum gross thermal efficiency of 90%.

Table J6D10: Maximum electric heating capacity

Floor area of the *conditioned space*	W/m^2 of *floor area* in *climate zone* 3	W/m^2 of *floor area* in *climate zone* 4	W/m^2 of *floor area* in *climate zone* 5	W/m^2 of *floor area* in *climate zone* 6	W/m^2 of *floor area* in *climate zone* 7
≤ 500 m^2	50	60	55	65	70
> 500 m^2	40	50	45	55	60

J6D11 Refrigerant chillers

[2019: J5.10]

An *air-conditioning* system refrigerant chiller must comply with *MEPS* and the full load operation energy efficiency ratio and integrated part load energy efficiency ratio in Table J6D11a or Table J6D11b when determined in accordance with AHRI 551/591.

Table J6D11a: Minimum energy efficiency ratio for refrigerant chillers – Option 1

Chiller type	Full load operation ($W_r/W_{input\ power}$)	Integrated part load ($W_r/W_{input\ power}$)
Air-cooled chiller with a capacity ≤ 528 kWr	2.985	4.048
Air-cooled chiller with a capacity > 528 kWr	2.985	4.137
Water-cooled positive displacement chiller with a capacity ≤ 264 kWr	4.694	5.867
Water-cooled positive displacement chiller with a capacity > 264 kWr but ≤ 528 kWr	4.889	6.286
Water-cooled positive displacement chiller with a capacity > 528 kWr but ≤ 1055 kWr	5.334	6.519
Water-cooled positive displacement chiller with a capacity > 1055 kWr but ≤ 2110 kWr	5.800	6.770
Water-cooled positive displacement chiller with a capacity > 2110 kWr	6.286	7.041
Water-cooled centrifugal chiller with a capacity ≤ 528 kWr	5.771	6.401
Water-cooled centrifugal chiller with a capacity > 528 kWr but ≤ 1055 kWr	5.771	6.519
Water-cooled centrifugal chiller with a capacity > 1055 kWr but ≤ 1407 kWr	6.286	6.770
Water-cooled centrifugal chiller with a capacity > 1407 kWr	6.286	7.041

Table J6D11b: Minimum energy efficiency ratio for refrigerant chillers – Option 2

Chiller type	Full load operation ($W_r/W_{input\ power}$)	Integrated part load ($W_r/W_{input\ power}$)
Air-cooled chiller with a capacity ≤ 528 kWr	2.866	4.669
Air-cooled chiller with a capacity > 528 kWr	2.866	4.758
Water-cooled positive displacement chiller with a capacity ≤ 264 kWr	4.513	7.041
Water-cooled positive displacement chiller with a capacity > 264 kWr but ≤ 528 kWr	4.694	7.184
Water-cooled positive displacement chiller with a capacity > 528 kWr but ≤ 1055 kWr	5.177	8.001
Water-cooled positive displacement chiller with a capacity > 1055 kWr but ≤ 2110 kWr	5.633	8.586
Water-cooled positive displacement chiller with a capacity > 2110 kWr	6.018	9.264
Water-cooled centrifugal chiller with a capacity ≤ 528 kWr	5.065	8.001
Water-cooled centrifugal chiller with a capacity > 528 kWr but ≤ 1055 kWr	5.544	8.001
Water-cooled centrifugal chiller with a capacity > 1055 kWr but ≤ 1407 kWr	5.917	9.027
Water-cooled centrifugal chiller with a capacity > 1407 kWr	6.018	9.264

J6D12 Unitary air-conditioning equipment

[2019: J5.11]

Unitary *air-conditioning* equipment including packaged air-conditioners, split systems, and variable refrigerant flow systems must comply with *MEPS* and for a capacity greater than or equal to 65 kWr—

(a) where water cooled, have a minimum energy efficiency ratio of 4.0 $W_r/W_{input\ power}$ for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1, where input power includes both compressor and fan input power; or

(b) where air cooled, have a minimum energy efficiency ratio of 2.9 $W_r/W_{input\ power}$ for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1, where input power includes both compressor and fan input power.

J6D13 Heat rejection equipment

[2019: J5.12]

(1) The motor rated power of a fan in a cooling tower, closed circuit cooler or evaporative condenser must not exceed the allowances in Table J6D13.

(2) The fan in an air-cooled condenser must have a motor rated power of not more than 42 W for each kW of heat rejected from the refrigerant, when determined in accordance with AHRI 460 except for—

(a) a refrigerant chiller in an *air-conditioning* system that complies with the energy efficiency ratios in J6D11; or

(b) packaged air-conditioners, split systems, and variable refrigerant flow *air-conditioning* equipment that complies with the energy efficiency ratios in J6D12.

Table J6D13: Maximum fan motor power – Cooling towers, closed circuit coolers and evaporative condensers

Type	Cooling tower maximum fan motor input power (W/kW_{rej})	Closed circuit cooler maximum fan motor input power (W/kW_{rej})	Evaporative condenser maximum fan motor input power (W/kW_{rej})
Induced draft	10.4	16.9	11.0
Forced draft	19.5	Note	11.0

Table Notes

A closed circuit, forced draft cooling tower must not be used.