

BEC 2012 Vs BEC 2015 - Summary of Major Amendments

Note:

1. The following summary table includes the major amendments, with requirements tightened in general for enhanced energy efficiency. Please refer to BEC 2015 for the detailed requirements.
2. This serves the purpose of ease of reference only. The Code should take preference over any discrepancy if identified.

Section 1 to Section 4	<u>BEC 2012</u>	<u>BEC 2015</u>
1) Definition of direct digital control	Not specified	New definition added in section 2
2) Definition of unitary air-conditioner	Not explicitly related to multiple indoor units	Explicitly related also to multi-split indoor terminal units and tally with the TG-BEC
3) VRF System with definition not relating to unitary air-conditioner	Refer to variable refrigerant flow of an unitary air conditioner	Redefined with reference to ASHRAE standard.

Section 5 Lighting Installation	<u>BEC 2012</u>	<u>BEC 2015</u>
1) Lighting installation not governed under LPD requirement	Does not exceed 100W	Does not exceed 70W
2) Max allowable lighting power density (LPD)		
<u>Type of space</u>	(clause 5.4) LPD (W/m ²)	(clause 5.4) LPD (W/m ²)
Computer Room / Data Centre	LPD requirement not specified	15
Court Room		15
Passenger Terminal Building		13 - 18
Refuge Floor		11
School Hall		14
Server Room / Hub Room		10
Classroom / Training Rm	15 (revised to 13 in 2014)	12
Loading & Unloading Area	11 (revised to 10 in 2014)	8
Office, open plan or with internal floor area above 15m ²	15 (revised to 13 in 2014) (open plan or enclosed not specified)	12 for office above 15m ² (office at or below 15m ² : - 13 W/m ²)
Plant Rm/ Machine Rm/ Switch Rm	12 (revised to 11 in 2014)	10
Workshop	14 (no change in 2014)	13
3) Min quantity of lighting control points		
A control point covers not more than 500 m ² for spaces other than for office use.	Only space for office use with no. of control point specified	New requirements (clause 5.5)
4) Automatic Lighting Control		
<u>Type of space</u>	Not specified	New Requirement (clause 5.6 and Table 5.4)
Atrium		Automatic lighting control and daylight responsive control where applicable.
Carpark		
Classroom / Training Room		
Computer Room / Data Centre		
Conference / Seminar Room		
Corridor		
Court Room		
Dormitory		

Entrance Lobby		
Gymnasium / Exercise Room		
Lecture Theatre		
Lift Lobby		
Loading and Unloading Area		
Office, enclosed or open plan		
Public Circulation Area		
Refuge Floor		
School Hall		
Storeroom / Cleaner		
Toilet / Washroom / Shower Room		
Lift Car	Not specified	New requirement (clause 8.5.6)
5) Automatic lighting control including daylight responsive controls	Not specified	Introduced a new section 5.6

Section 6 Air-conditioning Installation	<u>BEC 2012</u>	<u>BEC 2015</u>
1) CAV with low-speed operation set at not exceeding 66% of full speed and drawing no more than 40% full speed power.	Requirement not specified	New requirement under clause 6.7.4 and the sub-clauses.
2) VAV with minimum speed not exceeding 50% of the full speed and drawing no more than 30% full speed power.	Motor for VAV application to demand no more than 55% of design input power at 50% of design flow	Clause 6.7.4
3) Exemption requirement on system fan power revised	Less than 5.0 kW	Less than 2.5 kW (clause 6.7.5)
4) Mechanical ventilation system with system fan motor power of not exceeding 1.1 W per L/s	Requirement not specified	New requirement (clause 6.7.6)
5) Pumping system variable flow: Multiple chiller sequencing on/off added, exemption requirement based on chiller plant capacity.	Not specified in original clause 6.8.1	Revised clause 6.8.1
6) A chilled water pump motor >3.7kW should consume $\leq 30\%$ of design input power at 50% of design water flow	A variable speed pump motor $\geq 5\text{kW}$ should demand $\leq 55\%$ of design input power at 50% design water flow	Revise existing clause 6.8.2
7) Chiller isolation	Not specified	New requirement clause 6.8.3
8) Pipe sizing to consider variable flow condition	Variable flow condition not specified	Revised clause 6.9 ≤ 3.0 m/s velocity for variable flow condition; ≤ 2.5 m/s velocity for non-variable flow condition
9) Automatic damper at FA intake and EA discharge for conditioned space	Requirement not specified	New requirement (clause 6.10.4.4)
10) Isolation of zones	Requirement not specified	New requirement (clause 6.10.5)
11) VAV static pressure set point limit and reset	Requirement not specified	New requirement (clause 6.10.6)

Section 6 Air-conditioning Installation			<u>BEC 2012</u>	<u>BEC 2015</u>
12) Demand control ventilation for carpark ventilation system and air-conditioning system with fresh air rate of 1400L/s or above			Requirement not specified	New requirement (clause 6.10.7)
13) Min allowable (COP) of Chiller				
<u>Equipment type / Capacity (kW)</u>			(clause 6.12, Table 6.12b)	
Water-cooled Chiller	Reciprocating / Scroll	< 500 kW	4.1 / 4.1 (COP figures shown as separated column)	4.2 (combined reciprocating and scroll as one)
		500 to 1000 kW	4.6 / 4.6 (COP figures shown as separated column)	4.7 (combined reciprocating and scroll as one)
		> 1000 kW	5.2 / 5.2 (COP figures shown as separated column)	5.3 (combined reciprocating and scroll as one)
	Screw	< 500 kW	4.6	4.8
		500 to 1000 kW	4.7	5.0
		> 1000 kW	5.5	5.5
	VSD Screw	< 500 kW	Requirement not specified	4.7 (6.1 at 75% load)
		500 to 1000 kW		4.9 (6.3 at 75% load)
		> 1000 kW		5.2 (6.7 at 75% load)
	Centrifugal	< 1000 kW	5.1 (< 500 kW)	5.4 (< 500 kW) 5.6 (\geq 500 kW to < 1000 kW)
		1000 to 3000 kW	5.6 (500 to 1000 kW)	5.7
		> 3000 kW	5.7 (> 1000 kW)	5.8
	VSD Centrifugal	< 1000 kW	Requirement not specified	5.1 (6.6 at 75% load)
		1000 to 3000 kW		5.5 (7.1 at 75% load)
		> 3000 kW		5.6 (7.2 at 75% load)
Air-cooled Chiller	Reciprocating	< 400 kW	2.6	2.8
		\geq 400 kW	2.8	2.9
	Scroll	< 400 kW	(All Ratings) 2.7	2.8
		\geq 400 kW		2.9
	Screw	< 500 kW	(All Ratings) 2.9	2.9
		\geq 500 kW		3.0
	VSD Screw	< 500 kW	Requirement not specified	2.8 (3.6 at 75% load)
		\geq 500 kW		2.9 (3.7 at 75% load)
	Centrifugal	All Ratings	2.8	3.2
	VSD Centrifugal	All Ratings	Requirement not specified	3.1 (4.0 at 75% load)
14) Min allowable (COP) of Unitary Air-conditioner (Table 6.12a (Part 1))				

Section 6 Air-conditioning Installation		<u>BEC 2012</u>	<u>BEC 2015</u>
Air-cooled unitary air-conditioner	Outside MEELS scope & of 7.5 kW & below	2.4 for split type 2.1 for non-split type 2.4 for heat pump (heat mode)	2.6 for split type 2.3 for non-split type 2.7 for heat pump (heat mode)
	Above 7.5 & Below 40 kW	2.4 3 for VRF 2.7 for heat pump (heat mode)	2.5 3 for varying refrigerant volume flow 3.1 for heat pump (heat mode)
	40 to 200 kW	2.4 2.9 for VRF 2.8 for heat pump (heat mode)	2.5 3.1 for varying refrigerant volume flow 3.1 for heat pump (heat mode)
	Above 200 kW	2.6 2.9 for VRF 2.9 for heat pump (heat mode)	2.6 3.1 for varying refrigerant volume flow 3.1 for heat pump (heat mode)
Water-cooled unitary air-conditioner	All ratings	3 Requirement on heat pump (heating mode) not specified	3.3 3.4 for heat pump (heating mode)
15) Min allowable COP of VRF System (shown in Table 6.12a (Part 2))		Shown as VRF of unitary air-conditioner	Table 6.12a introduced with part 2 for VRF system and the standard condition for the COP figure specified.
Air-cooled VRF System	Above 7.5 & Below 40 kW	N/A	3.3 3.8 for heat pump (heating mode)
	40 to 200 kW	N/A	3.3 3.6 for heat pump (heating mode)
	Above 200 kW	N/A	3.3 3.6 for heat pump (heating mode)
Water-cooled VRF System	All ratings	N/A	4.3 4.8 for heat pump (heating mode)
16) Open circuit cooling tower fan motor performance		Not specified	New requirement (clause 6.12.4)
17) Provision of metering for AHU in plant room		Not specified	New requirement (clause 613.5)
18) Direct digital control		Not specified	New requirement in clause 6.14

Section 7 Electrical Installation	<u>BEC 2012</u>	<u>BEC 2015</u>
1) Min allowable motor efficiency (%): Motor rated output of 7.5 kW to 200 kW and above	(clause 7.5.1) IE2 (88.1% to 95.1%)	(clause 7.5.1) IE3 (90.1% to 96%)
2) Metering devices for circuits for CBSIs including chiller plant, heat pump plant, lift and escalators	Specified feeder circuit exceeding 200A to be provided with metering device	Specified each of the CBSI to be provided with metering device (clause 7.7.3)

Section 8 Lift and Escalator Installation	<u>BEC 2012</u>	<u>BEC 2015</u>
1) Max allowable traction lift electrical power reduced by 5% in general for <u>new</u> installation and 3% reduction for lift rated at <1600 kg and < 3.5 m/s	Specified in Table 8.4.1.	Table 8.4.1a for new installation only. Previous Table 8.4.1 labeled as Table 8.4.1b for major retrofitting works
2) Max allowable hydraulic lift electrical power reduced by 5% in general	Specified in Table 8.4.2	Revised Table 8.4.2
3) Max allowable electrical power of escalator and passenger conveyor reduced by 2% in general	Specified in Table 8.4.3 and Table 8.4.4	Resided Table 8.4.3 and 8.4.4.
4) Max allowable lift decoration load reduced by 10%	Equation in Table 8.5.2	Equation fine-tuned (Table 8.5.2)
5) Lift car ventilation fan power consumption	Not specified	New requirement (clause 8.5.4.3)
6) Regenerative braking for lift $\geq 3\text{m/s}$ and $\geq 1000\text{ kg}$.	Requirement not specified.	New requirement (clause 8.5.5)
7) Lift car automatic lighting control	Not specified	New requirement (clause 8.5.6)
8) Provision for the activation of automatic speed reduction mode of escalator	Requirement not specified.	New Requirement (clause 8.5.7)
9) Metering & monitoring facilities in electrical circuits of motor drive	Specified the metering device or the provision for measurement.	Provision for measurement removed (clause 8.7.2)

Section 9 Performance-based Approach (Also Appendix A)	<u>BEC 2012</u>	<u>BEC 2015</u>
1) Trade-off items covers most of the energy efficiency requirements in section 5 to section 8	Confined only to: <ul style="list-style-type: none"> ● System fan power; ● Chiller COP; and ● LPD only 	Table 9.4 revised.
2) Energy efficiency performance of trade-off not exceed 15% lower than prescriptive requirements	Not specified	Revised clause 9.4.2
3) Upper limit of contribution from better OTTV performance removed	Limited on 5% contribution	Revised clause 9.5.4.1
4) Items or installations involved in trade-off to be under same ownership other than source from remote plant or a service provider of district cooling system.	Same ownership specified	Revised clause 9.5.4.3
5) Simulation requirement in respect of automatic lighting control	Not specified	Revised clause A3.2.5 and A3.3.4

Section 10 Energy Requirements for Major Retrofitting Works	<u>BEC 2012</u>	<u>BEC 2015</u>
1) Direct digital control introduced as applicable BEC requirement	Not Specified	Table 10.1 revised.