

## Baseline Standard

S/N	Component	Baseline standard	Minimum Requirement												
1	Building Envelope Design	BCA Approved Document	<p>a) ETTV shall not exceed 50W/m<sup>2</sup></p> <p>b) For roof with skylight, RTTV shall not exceed 50W/m<sup>2</sup></p> <p>c) For roof without skylight, the average U-value of the gross area of the roof shall not exceed the limit below:</p> <p><b>Maximum thermal transmittance for roof of air-conditioned building</b></p> <table border="1"> <thead> <tr> <th>Weight group</th> <th>Weight range (kg/m<sup>2</sup>)</th> <th>Maximum thermal transmittance (W/m<sup>2</sup>°K)</th> </tr> </thead> <tbody> <tr> <td>Light</td> <td>Under 50</td> <td>0.5</td> </tr> <tr> <td>Medium</td> <td>50 to 230</td> <td>0.8</td> </tr> <tr> <td>Heavy</td> <td>Over 230</td> <td>1.2</td> </tr> </tbody> </table> <p>d) All windows on the building envelope shall not exceed the air leakage rates specified in SS 212 – Specification for Aluminium Alloy Windows.</p> <p>e) Where the door opening of any commercial unit is located along the perimeter of the building envelope, that unit shall :-</p> <ul style="list-style-type: none"> <li>(i) be completely separated from the other parts of the building; and</li> <li>(ii) has its air-conditioning system separated from and independent of the central system.</li> </ul>	Weight group	Weight range (kg/m <sup>2</sup> )	Maximum thermal transmittance (W/m <sup>2</sup> °K)	Light	Under 50	0.5	Medium	50 to 230	0.8	Heavy	Over 230	1.2
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2	Chiller Efficiency	SS530:2006	Minimum energy efficiency stated in the SS.												

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3	Pump Efficiency (Chilled water, Condenser water,	CP13:1999 (cl 7.11.6 – Pump system design criteria)	<p>Chilled Water Pump energy consumption shall not exceed 0.033 kW/kW</p> <p>Condenser Water Pump energy consumption shall not exceed 0.025 kW/kW</p> <p><u>7.11.6 Pumping system design criteria</u></p> <p>(a) Piping systems should be designed at a friction pressure loss rate of no more than 4.0m of water per 100 equivalent metre of pipe.</p> <p>(b) The water transport factor shall not be less than 30 for chilled water and 40 for the condensing water circuit, whether open or closed.</p> <p>(c) Water transport factor = Heat transfer to circulating water / (Pump power input)</p>
4	Cooling Tower	SS530:2006	<p>Performance requirement for heat rejection equipment.</p> <p><u>Propeller or axial fan cooling towers</u> Cooling Tower performance shall not be less than 3.23 L/s / kW.</p> <p><u>Centrifugal fan cooling towers</u> Cooling Tower performance shall not be less than 1.7 L/s / kW.</p>
5	Mechanical Fans	CP13:1999 (cl 7.11.5 – Fan system design criteria)	<p>Fan power shall not exceed 0.47 W per m<sup>3</sup>/h and 0.74 W per m<sup>3</sup>/h for CAV and VAV system respectively.</p> <p><u>7.11.5 Fan system design criteria</u></p> <p>(a) For fan systems which provide a constant air volume whenever the fans are running, the power required by the motor for the combined fan system at design conditions shall not exceed 0.47 W per m<sup>3</sup>/h of supply air.</p>

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			(b) For fan systems which are able to vary system air volume automatically as a function of load, the power required by the motors for the combined fan system at design conditions shall not exceed 0.74 W per m <sup>3</sup> /h of supply air.
6	Lighting	SS530:2006	Lighting power budget

**Notes**

1. Where no Baseline Standard is available, eg. building with air-conditioned atrium space, receptacle loads, lift & escalator, Sanitary & plumbing,
  - a. the same input parameters for good design practice should apply to both the Reference and Proposed Models.
  - b. applicants must provide detail calculations to justify the savings in energy consumption by salient energy efficient features/equipment, eg if sensors or VVVF motors are used in the Proposed Models.
2. For receptacle loads, Table A below is for reference.

<b>Table A: Receptacle Loads</b>	Source:-	Nominal Values
a. Computer intensive Offices	ASHRAE STD	22.0 W/m <sup>2</sup>
b. General Office Areas	90.1:1989	16.0 W/m <sup>2</sup>
c. Large Conference areas		11.0 W/m <sup>2</sup>
d. Server/Computer rooms		540.0 W/m <sup>2</sup>