

## 4 ENERGY USE

### 4.2 ENERGY EFFICIENT SYSTEMS

#### EU 4 VENTILATION SYSTEM IN CAR PARKS

<b>EXCLUSIONS</b>	Buildings without carpark or carpark area less than 10% CFA.	1
<b>OBJECTIVE</b>	Encourage energy efficient design and control of ventilation systems in large mechanically ventilated car parks.	
<b>CREDITS ATTAINABLE</b>	2	
<b>PREREQUISITES</b>	Compliance with the Building (Ventilating Systems) Regulations, Chapter 123J Regulation 4.	
<b>CREDIT REQUIREMENT</b>	1 credit for ventilation systems that will consume less electricity than those meeting the zero credit requirements (baseline) by 20% or more. 2 credits where the consumption is reduced by 25% or more.	
<b>ASSESSMENT</b>	<p>The baseline (zero credit) performance criteria for mechanical ventilation systems shall be determined based on the following:</p> <ul style="list-style-type: none"> <li>a mechanical ventilation system that consumes a fan power of 2 W per l/s of the total ventilation flow rate maintained in the ventilated spaces in the building; and</li> <li>where a space is served by both a supply and an extraction system, the system fan power shall be the sum of the fan power of the supply and the extraction system whilst the ventilation flow rate shall either be the total supply or the total extraction flow rate, whichever is the larger.</li> </ul> <p>Besides reduction, it is required to demonstrate that the control systems for regulating the operation of the ventilation systems(s) are provided to reduce energy use whenever conditions permit.</p> <p>Examples of control systems referred to in the credit requirements include variable fan speed control, duty cycling of multiple ventilation fans according to the CO concentration in car parks, etc.</p> <p>The Client shall submit the following information to demonstrate that the installations meet the basic requirements and the requirements for credits:</p> <ul style="list-style-type: none"> <li>the criteria adopted in the design of the ventilation systems;</li> <li>If natural ventilation is adopted, proof must be provided to ensure that CO and other relevant pollutant concentrations in the car park should meet the requirements set out in ProPECC PN 2/96[1];</li> <li>the calculated ventilation rates;</li> <li>the design performance and operating patterns of the ventilation equipment;</li> <li>the energy use predictions for the zero-credit case and the as designed case for the ventilation system installation;</li> <li>reports of air leakage tests on selected ducting systems (to be confirmed subsequently if the assessment is conducted prior to on-site testing and commissioning of the ventilation systems); and</li> <li>the specified performance of any air-conditioning equipment for the building.</li> </ul>	<p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p> <p>7</p> <p>8</p> <p>9</p> <p>10</p>

1 Environmental Protection Department. Practice Note for Professional Persons – Control of Air Pollution in Car Parks 1996). [http://www.epd.gov.hk/epd/english/resources\\_pub/publications/files/pn96\\_2.pdf](http://www.epd.gov.hk/epd/english/resources_pub/publications/files/pn96_2.pdf)

The air leakage limit on ductwork shall conform to the criteria given in the Code of Practice for Energy Efficiency of Air Conditioning Installations [2], and the test method shall be based on DW143 [3], SMACNA [4] or equal equivalent method.

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Where there is a need to take into account trade-off of performance between the mechanical ventilation and the lighting installations, the submitted calculations shall show that the extra energy used due to non-fulfillment of one criterion has been more than compensated by the extra energy saving due to a better performance over and above the other criterion.

- 2 Electrical and Mechanical Services Department. Code of Practice for Energy Efficiency of Air Conditioning Installations (2007 Edition) and the subsequent amendment. [http://www.emsd.gov.hk/emsd/e\\_download/pee/accop\\_2007.pdf](http://www.emsd.gov.hk/emsd/e_download/pee/accop_2007.pdf)
- 3 Heating and Ventilation Contractors Association, UK. DW143 A Practical Guide to Ductwork Leakage Testing. 2000.
- 4 Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction. <http://www.smacna.org/>

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BEAM Plus EB Version 1.1 & 1.2

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**EU 4 (NB) Ventilation Systems in Car Parks**  
**EU 3 (EB) Ventilated Systems in Car Parks**

The Circular Letter announces the following requirements on ventilation system in carpark:-

1. The exclusion of the captioned credit has been revised as follows:

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- a. Building without carpark;
- b. Carpark area less than 10% CFA;
- c. Developments with open-air carpark;
- d. Carport<sup>1</sup>; and
- e. Carpark adopting full natural ventilation.

For developments with carport and carpark adopting full natural ventilation, the Applicant shall also provide evidences (e.g. CFD simulation, pollutant calculation, etc) to demonstrate that CO and other relevant pollutant concentrations meets the requirements set out in ProPECC PN2/96 to qualify for the exclusion.

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2. Baseline (zero credit) performance criteria for mechanical ventilation systems is further clarified as below:

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- i. Exhaust air flow rate or fresh air flow rate (whichever the larger) should be used to calculate for the energy consumption for carpark ventilation in the baseline performance criteria.
- ii. Jet fans flow rate shall be excluded for the baseline performance criteria since this is for circulation purpose.

3. Energy saving features for Public Transport Interchanges (PTI): The provisions of air pollutant sensors coupled with multi-speed ventilation fans<sup>2</sup> can be classified as an energy saving feature for PTI under this credit and its interrelated credits. To qualify for energy saving, the Applicant should provide evidences (e.g. CFD simulation, pollutant calculation, etc.) to demonstrate that these provisions meet the requirement set out in ProPECC PN 1/98<sup>3</sup>.

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Chairperson of Standards Sub-committee

<sup>1</sup> Carport is defined as a roofed structure for automobile storage, with the structure generally having one or more sides fully open to outdoor to facilitate natural ventilation.

<sup>2</sup> Multi-speed ventilation fans include fans with variable speed drive (VSD), fans with stage configuration, etc.

<sup>3</sup> ProPECC PN1/98 is the Professional Persons Environmental Consultative Committee Practice Notes (ProPECCPNs) on the control of air pollution in semi-confined public transport interchange published by the Environmental Protection Department.