

# **Performance testing of products for residential ventilation**

**Decentralised mechanical exhaust ventilation system  
packages used in a single dwelling**

**(Version – 06 July 2007)**

## Test method for – Decentralised mechanical exhaust ventilation system packages used in a single dwelling

### 1 Introduction

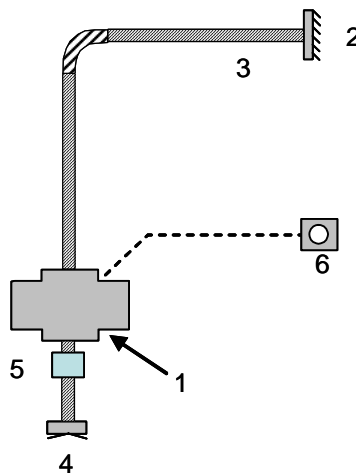
This test method has been developed by the Energy Saving Trust ([EST](#)), the Building Research Establishment ([BRE](#)), The Electric Heating and Ventilation Association ([TEHVA](#)) and the Residential Ventilation Association ([RVA](#)).

This test method is based closely on the European Standard BS EN 13141-6:2004 and must be read alongside this standard.

### 2 Scope

This test method specifies laboratory methods for measuring the aerodynamic performance of assembled exhaust ventilation packages for a single dwelling.

The object of this test method is to allow the flow rate at each application to be determined as required by the Building Regulations Approved Document F (Ventilation). The method also allows the effective power input to the fan to be determined at each application when the system is installed in accordance with the manufacturer's instructions.



- |   |                                  |   |                         |
|---|----------------------------------|---|-------------------------|
| 1 | Fan unit                         | 4 | Exhaust terminal device |
| 2 | Roof / wall outlet terminal      | 5 | Sound attenuator        |
| 3 | Duct from fan to outlet terminal | 6 | System controller       |

**Figure 1 Typical components that may form part of a decentralised mechanical exhaust ventilation system package**

### 3 Terms and definitions

The terms and definitions used in this test method are the same as those in European Standard BS EN 13141-6.

### 4 Performance testing of aerodynamic characteristics

#### 4.1 General

The following aerodynamic characteristic shall be determined for each application specified as being suitable by the manufacturer:

- Air volume flow rate

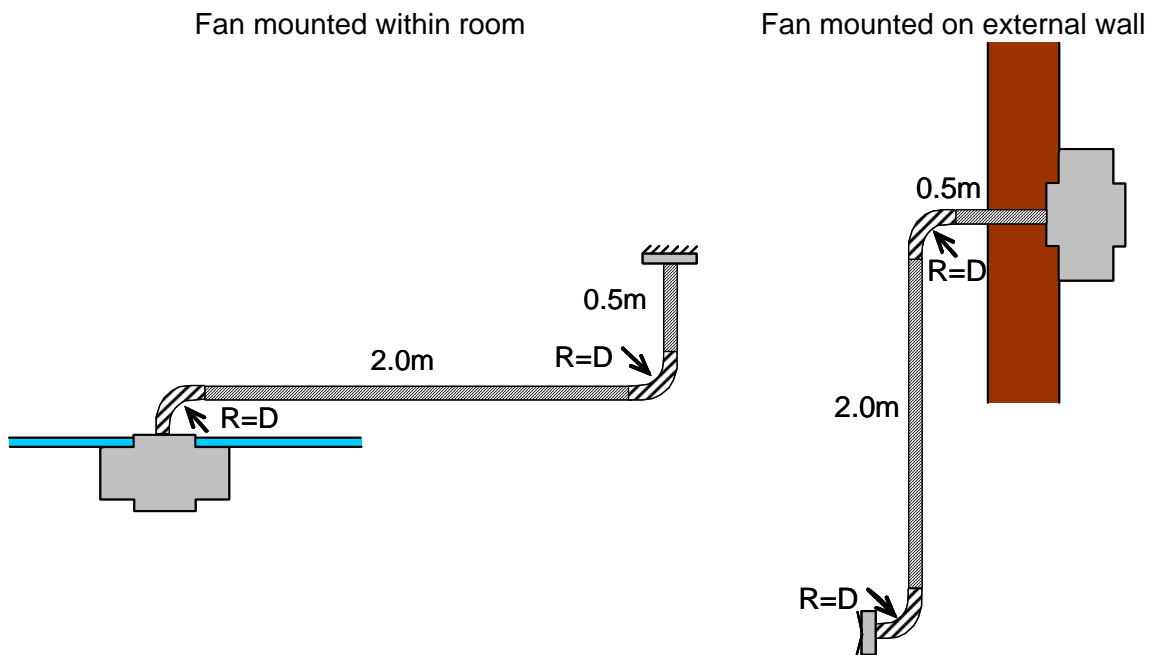
#### 4.2 Test installation and conditions

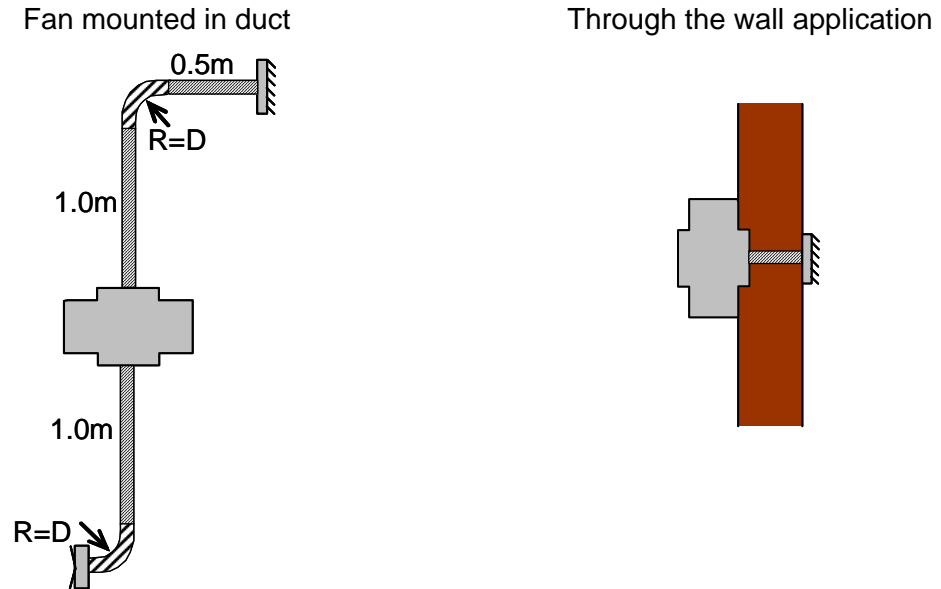
##### 4.2.1 Test installation

The test shall be carried out with all components supplied by the manufacturer directly linked in accordance with the manufacturer's instructions.

##### 4.2.2 Installation configuration of the fan unit

The fan unit shall be connected in accordance with one of the configurations detailed in Figure 2.





**Figure 2 Examples of decentralised fan installation configurations**

Ducts shall be made using components provided or specified by the manufacturer or supplier.

When flexible ducts are provided or specified, they shall be extended to 90% of their maximum length and shall be supported to prevent sagging and to maintain the specified elbow radius. The diameter of the flexible duct used for testing shall be the same as the fan spigots, unless adaptors are supplied packaged with the fan.

#### 4.2.3 Test conditions

##### 4.2.3.1 Exhaust air flow rates

If the air flow rate is set after installation, (e.g. by fan speed selection) the fan should be set to deliver a minimum air flow rate for each application which shall be:

Kitchen	13l/s
Additional wet rooms	8 l/s

If the system is configured to self regulate air flow rates by the manufacturer, the air flow rate shall be that set by the manufacturer but shall be a minimum of the air flow rates above.

#### **4.2.3.2 Exhaust conditions**

##### **4.2.3.2.1 Normal conditions**

The system shall be tested under the following exhaust condition:

The pressure difference between the pressure upstream of the exhaust and the pressure downstream of the outlet shall be  $0 \pm 2$  Pa.

##### **4.2.3.2.2 Wind conditions**

To test the wind effect, a counter pressure at the exhaust terminal of +5Pa shall be applied to the normal conditions for the connection to outlet.

The air flow rate at the fan shall be measured.

##### **4.2.3.3 Temperature**

The temperature of the test room shall be in accordance with BS EN 13141-6 Clause 4.2.5.2.

##### **4.2.3.4 Electrical conditions**

The electrical conditions for the test shall be in accordance with BS EN 13141-6 Clause 4.2.5.3.

#### **4.3 Test procedure**

##### **4.3.1 Air flow measurements**

The air flow measurements shall be in accordance with BS EN 13141-6 Clause 4.3.1.

### **5 Electrical power**

#### **5.1 Method**

The electrical power of the ventilation systems package shall be determined according to ISO 5801 for each application assessed in 4.1.

#### **5.2 Analysis of results**

The electrical power input shall be used to calculate the 'specific fan power', the energy consumption per unit of total air flow rate using the test minimum air flow rates specified in 4.2.3.1.

## 6 Fan identification

The fan unit must be permanently labelled so that it can be identified. If the labelling is not permanently visible, the cover shall be removable without the need for tools.

## 7 Presentation of results

The manufacturer, product model and serial number, the test installation configuration and duct type and size shall be clearly detailed.

Aerodynamic and wind condition data shall be presented in accordance with Table 1 for each application specified as being suitable by the manufacturer.

Unit configuration	Location	Fan speed setting	Flow rate (l/s)	Flow rate – wind condition (l/s)	% reduction of total flow rate (%)
In room	Kitchen				
	Wet room				
In duct	Kitchen				
	Wet room				
Through wall	Kitchen				
	Wet room				

**Table 1 Presentation of aerodynamic and wind condition test results - example**

Specific fan power data shall be presented in accordance with Table 2, for each application specified as being suitable by the manufacturer.

Unit configuration	Location	Fan speed setting	Specific fan power (W/l/s)
In room	Kitchen		
	Wet room		
In duct	Kitchen		
	Wet room		
Through wall	Kitchen		
	Wet room		

**Table 2 Presentation of specific fan power test results - example**

## **8 Application of results**

### **8.1 Building Regulations ADF**

Assessment of the performance of a MEV system for compliance with the requirements of Building Regulations ADF requires that the minimum air flow rates defined in 4.2.3.1 are achieved for each application specified as being suitable by the manufacturer.

The effect of wind on the performance of a MEV system shall not reduce the air flow rate by more than 10%. If the reduction in air flow rate is greater than 10%, the system is considered as unsuitable for application as an exhaust ventilation system for a single dwelling

### **8.2 Building Regulations ADL - SAP Appendix Q**

Results that are to be used for assessing compliance with the requirements of Building Regulations ADL through SAP Appendix Q require that the aerodynamic and electrical power characteristics are determined for each application specified as being suitable by the manufacturer.

If the air flow rate is not pre-set by the manufacturer, one of the following must be provided to ensure effective commissioning can be undertaken on site:

- a fan speed readout or indicator that will allow the fan speed to be set in increments not exceeding 5%, or;
- a means of determining the air flow rate to within  $\pm 10\%$ .

If neither of these are provided, the fan is considered as unsuitable for SAP Appendix Q listing.