Test Method: TESTM:02

SAP PCDB: TEST METHOD FOR DE-CENTRALISED MECHANICAL EXTRACT VENTILATION SYSTEM PACKAGES USED IN A SINGLE DWELLING

Issue 3.0

DOCUMENT REVISIONS

Documents will be revised by issue of updated editions or amendments. Revised documents will be posted on the website at www.ncm-pcdb.org.uk/sap.

Technical or other changes which affect product recognition requirements (for example) will result in a new issue. Minor or administrative changes (e.g. corrections of spelling and typographical errors, changes to address and copyright details, the addition of notes for clarification etc.) may be made as amendments.

The issue number will be given in decimal format with the integer part giving the issue number and the fractional part giving the number of amendments (e.g. Issue 3.2 indicates that the document is at Issue 3 with 2 amendments).

Users of this document should ensure that they possess the latest issue.

DOCUMENT REVISION LOG

DATE	ISSUE NO.	AMENDMENT DETAILS	APPROVED BY
06/07/2007	1.0	Test method for dMEV systems developed	-
15/10/2009	1.5	Test method updated for dMEV systems	-
15/01/2013	2.0	Test method updated for dMEV systems	MS
04/11/2021	3.0	Updated test method for SAP10	MS

TABLE OF CONTENTS

1. INTRODUCTION

This test method is based on the European Standards BS EN 13141-6:2014, BS EN13141-8:2014, BS EN 13141-4:2021 and BS EN 13141-7:2021. This report must be read in conjunction with these standards.

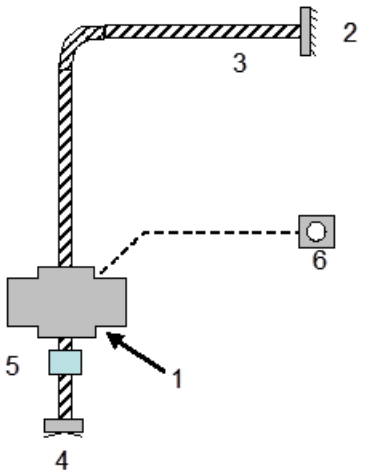
The National Calculation Methodology for energy rating of dwellings (SAP) defines Mechanical extract ventilation (MEV) as a fan driven ventilation system, which only extracts air from the dwelling[1]. A decentralised system is a sub-type, where the air is extracted by continuously running fans in each wet room and is referred to as decentralised mechanical extract ventilation (dMEV). Performance data for dMEV systems can be input within SAP 10 calculations via testing in accordance with this document and entry of such data into the Product Characteristics Database (PCDB).

2. SCOPE

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

The test method objective is to assess the ability of a ventilation package to provide the continuous extract air flow rates required by the Building Regulations Approved Document F Ventilation (2010 Edition). The method also determines the effective fan power input at each operating point flow rate when the system is installed in accordance with the manufacturer's instructions.

[1] The SAP calculation is based on a throughput of 0.5 air changes per hour through the mechanical system.



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 mechanical supply and extract ventilation system package with heat recovery

3. TERMS AND DEFINITIONS

The terms and definitions used in this test method are the same as those in European Standard BS EN 13141-6:2014 with the following addition.

3.1 Wind Condition

The limiting sensitivity of air flow to wind backpressure in this test methodology shall be Class S3, as defined in EN13141-8:2014 Clause 6.2. Table 8.

4. TEST METHODS

4.1 General

Tests shall be conducted with a unit containing all components as supplied for intended use, and installed according to the manufacturer's instructions.

When a single value is assigned by the manufacturer as rated voltage, this shall be the test voltage. Where a voltage range is assigned to the product by the manufacturer that includes 230 V, the test voltage shall be 230 V.

This test voltage shall be maintained to ± 1% throughout testing.

4.2 Performance testing of aerodynamic characteristics

4.2.1 Test installation

The following conditions must be satisfied:

- The test shall be undertaken with all components supplied by the manufacturer directly connected in accordance with the manufacturer's instructions.

- The test configurations shall include all combinations of room supply and extract air valve devices specified as being suitable by the manufacturer.

4.2.2 Normal extract conditions

The system shall be tested under the following supply and extract condition:
The pressure on the outdoor side of the exhaust terminal shall be 0 ± 0.5 Pa.

4.2.3 Temperature

The temperature of the test room shall be in accordance with EN 13141-7:2021 Clause 7.3.2, i.e. 20°C ± 1°C.

4.2.4 Air flow measurements

Air flow measurements shall be in accordance with EN 13141-4:2021, Clause 5.2.

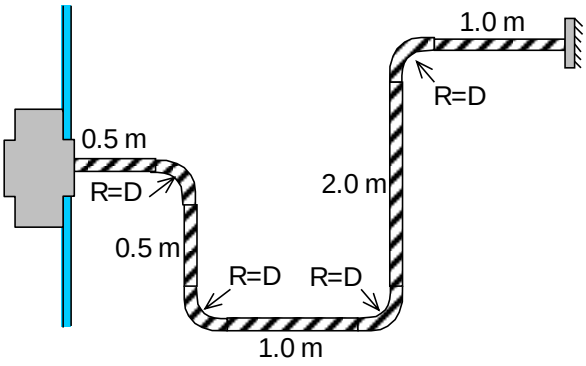
4.2.5 Electrical power measurement

The electrical power of the ventilation system package shall be determined in accordance with EN 13141-4:2021, Clause 6.1 for all assessed fan speed and installation configurations.

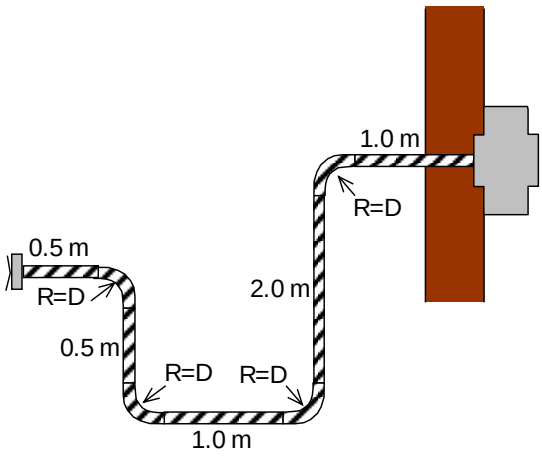
4.2.6 Installation of the fan unit

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

Fan mounted within room



Fan mounted on external wall



Fan mounted in duct

Through the wall application

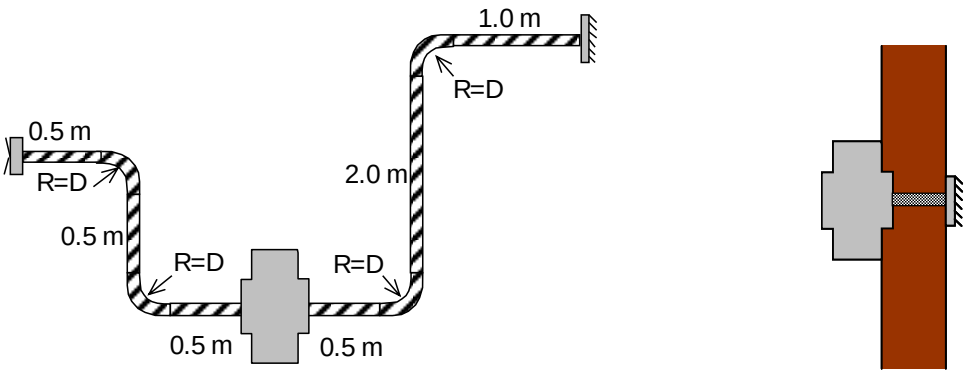


Figure 2 - Examples of decentralised fan installation configurations

Ductwork shall be made using components provided or specified by the manufacturer or supplier. Only rigid ductwork may be used.

4.2.7 Test conditions - Extract 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 air flow rates for each application as specified as being suitable by the manufacturer, which shall be:

Kitchen	From 8 to 16 l/s Test flow rates: 8, 11, 13 & 16 l/s
Additional wet rooms	From 5 to 11 l/s Test flow rates: 5, 8 & 11 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.

4.2.8 Wind conditions

To test the wind effect, a counter pressure at the exhaust terminal of +20 Pa shall be applied to the normal conditions for the outlet connection.

The air flow rate under wind condition shall be measured at each test flow rate.

4.2.9 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 at the air flow rates specified above.

5. 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.

Installation application	Test air flow rate (l/s)	Fan speed setting	Measured air flow rate (l/s)	Air flow rate – wind condition (l/s)	Reduction of air flow rate (%)
Wet rooms	5				
	8				
	11				
Kitchen	8				
	11				
	13				
	16				

Table 1 - Presentation of wind condition test results - example

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

Exhaust terminal configuration	Fan speed setting	Test air flow rate (l/s)	Measured air flow rate (l/s)	Specific fan power (W/l/s)
In room	Kitchen	13		
	Wet room	8		
In duct	Kitchen	13		
	Wet room	8		
Through wall	Kitchen	13		
	Wet room	8		

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

6. APPLICATION OF RESULTS

6.1 Building Regulations – Approved Document L (2013 Edition)

Results used for assessing compliance with the requirements of Building Regulations Approved Document L via SAP calculation require that the aerodynamic and electrical power characteristics are determined at each application specified as being suitable by the manufacturer.

The effect of wind on the performance of a dMEV system shall not reduce the air flow rate by more than 30%. If the reduction in air flow rate is greater than 30%, the system is considered as unsuitable for application as an exhaust ventilation system for a single dwelling

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 within ±10%.

If neither of these facilities are provided, the fan cannot be tested and therefore entered into the PCDB for building regulation compliance purposes.