

# BRE Test Report

**Test DucoBox Silent UK with KlimaConnect 90 semi-rigid layout to SAP test methodology for listing on PCBD of NCM (SAP)**

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Date: 30<sup>th</sup> September 2019  
Report Number: P115900-1002

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## Table of Contents

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<b>1</b>	<b>Introduction</b>	<b>3</b>
<b>2</b>	<b>Details of tests carried out</b>	<b>7</b>
<b>3</b>	<b>Test results</b>	<b>8</b>
<b>4</b>	<b>Results to be used for PCDB</b>	<b>9</b>



## 1 Introduction

Sodac requested BRE undertake testing of an MEV product to the test method for inclusion in the PCDB of the NCM, SAP. Sodac requested that the MEV unit was installed with semi-rigid duct

The test methodology used for the testing of mechanical extract ventilation products for domestic applications, is; *Test method for central exhaust ventilation system packages used in a single dwelling*, dated 15/01/2013, Version 2.0.

The product tested was

Product manufacturer	Sodac Distribution
Product name	KlimaConnect 90
MEV manufacturer and product name	Duco – DucoBox Silent UK
Product serial number of MEV	1938461-190823-001
Semi-Rigid duct Manufacturer	Klimaflex
Semi-Rigid duct O/D	90 mm
Date received at BRE	2/9/2019



Figure 1 MEV product label



### Configuration of MEV product tested

The spigot sizes and locations of the product tested are detailed in Table 1 and shown in Figure 2.

Spigot	Size (mm)	Location
Kitchen and wet room extracts	125 mm	One three sides of the casing
Exhaust	125 mm	One end of casing

Table 1. Location and sizes of spigots

### APPENDIX 2 KLIMACONNECT 90

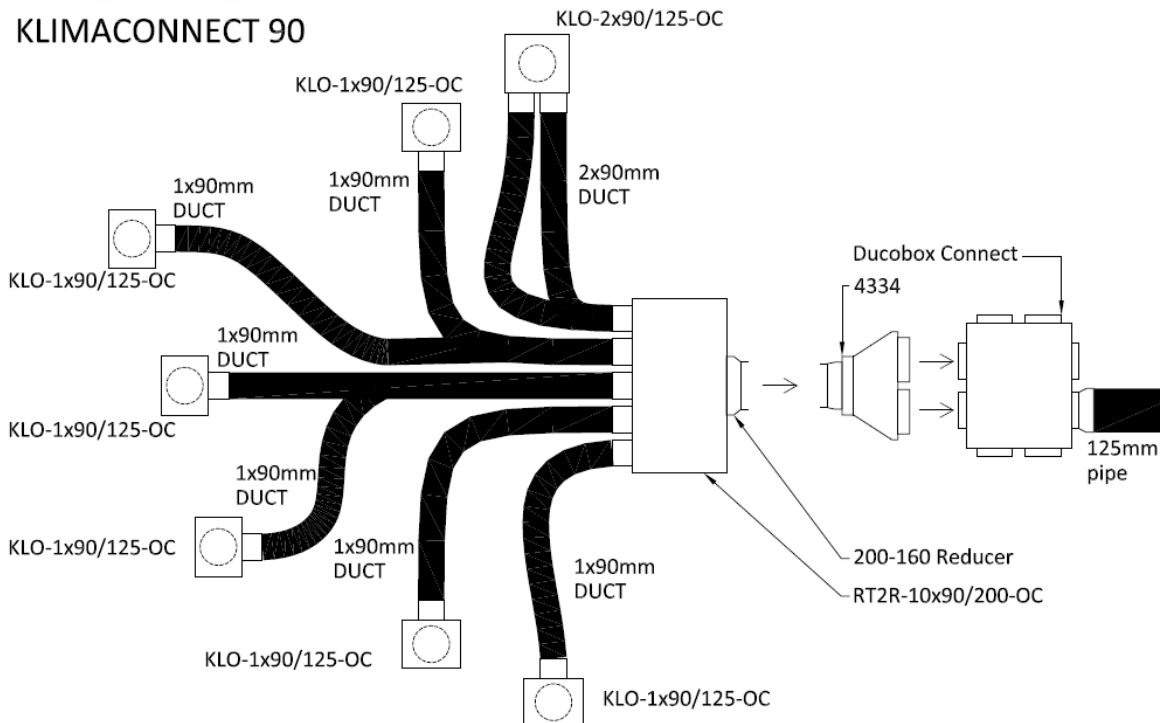
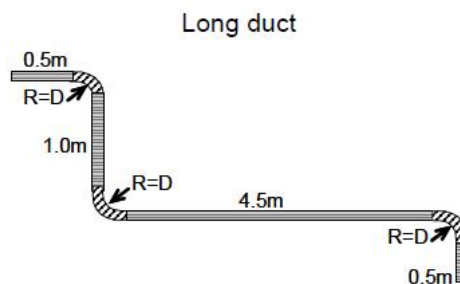


Figure 2 Schematic of test layout of MEV and Semi-Rigid duct detailing parts used during test.

Each of the extract ducts followed the layout for a Long Duct, as set out in Figure 2. of; *Test method for central exhaust ventilation system packages used in a single dwelling*, dated 15/01/2013, Version 2.0.



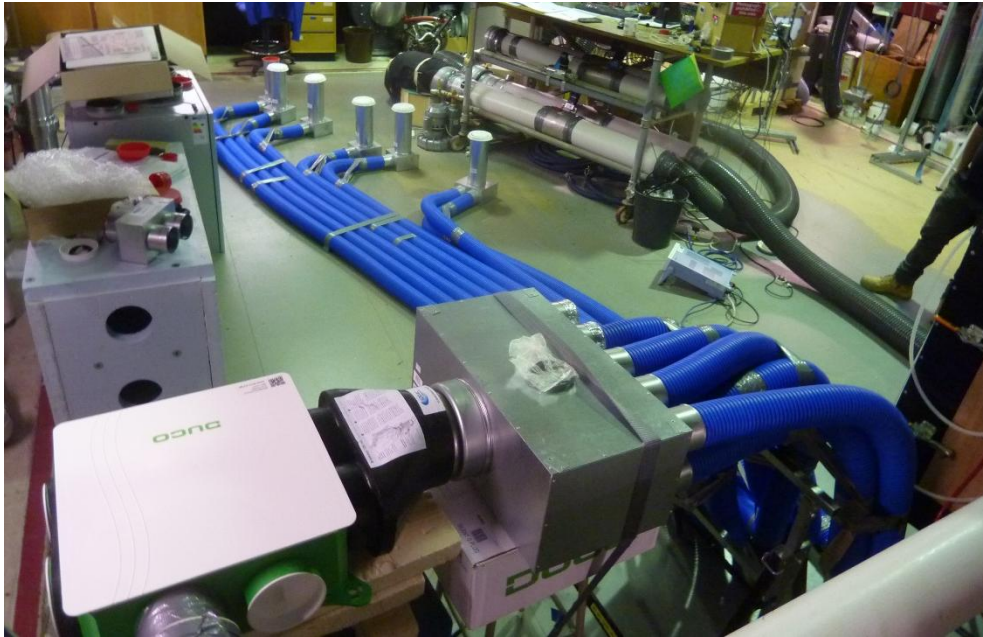


Figure 3 Semi-Rigid duct and plenum installed on MEV unit.



## Fan speed control

The fan was controlled from the control board using a stepper set at approximately 3 m<sup>3</sup>/h steps. The room air flow rates were then balanced by opening/closing the room valves to obtain the balance of air distribution between the different wet rooms.

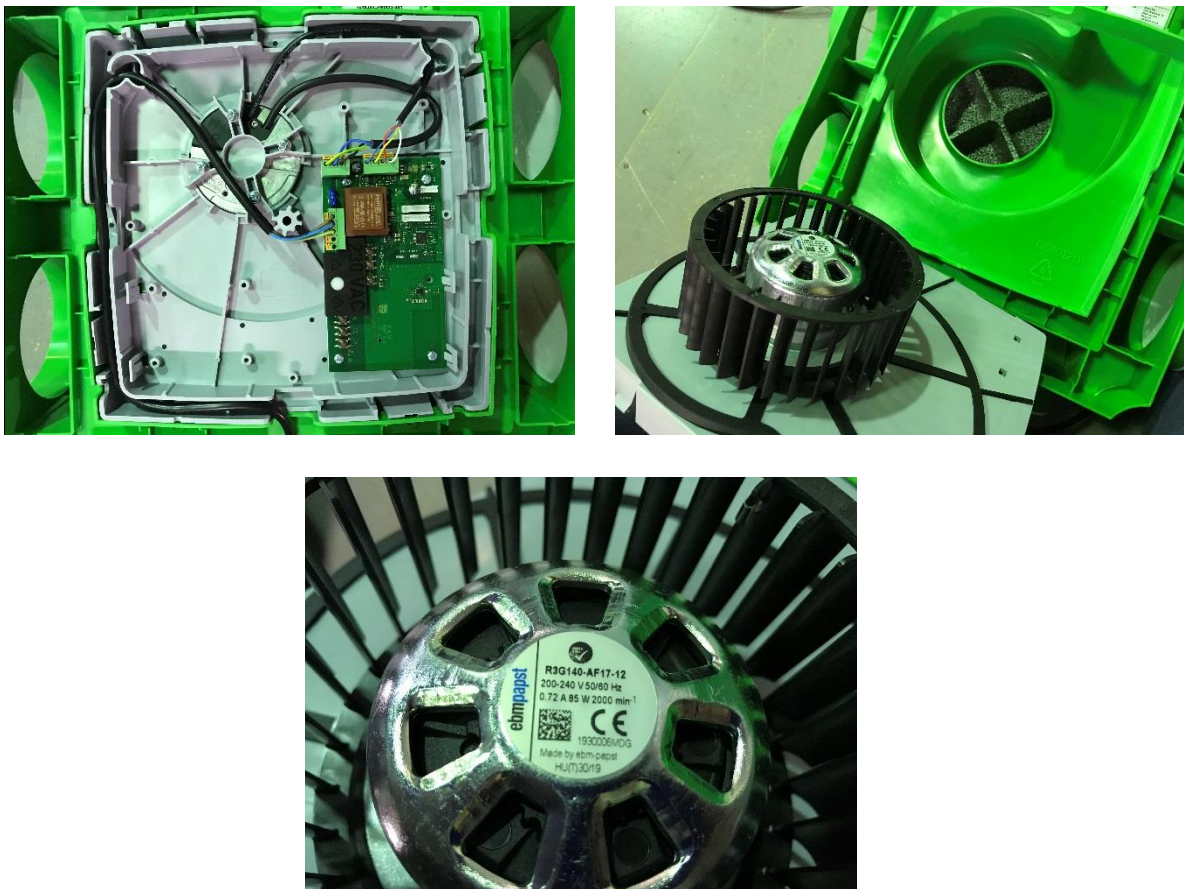


Figure 4 Fan speed control and fan installed in unit.



## 2 Details of tests carried out

All testing was undertaken at BRE's HVAC Engineering test laboratory, Building 47, Garston, Watford, UK. All tests were undertaken by Dr M Swainson, Principal Engineer, and Claudiu Manescu, Engineer, HVAC Engineering and Building Diagnostics.

The following tests were undertaken in accordance with the *Test method for central exhaust ventilation system packages used in a single dwelling*, dated 15/01/2013, Version 2.

### Determination of total air flow rate and electrical power - Clause 4.2.5 and 5

The electrical power at a range of air flow rate corresponding to a defined wet room configurations was determined following the method set out in Clause 4.2.5. The configuration of the extract ducts for each wet room configuration was as set out in Clause 4.2.4.

Variable	Instrument used for measurement	Calibration
Air flow rate	Hastings LFE LS-8S Chell Display CCD100	Chell (UKAS)
External plenum pressure	Furness Controls FCO16	BRE calibration (UKAS)
Air temperature readings	PT100 1/10th DIN probes	In-situ 5 point temperature calibration with Hewlett Packard Digital Quartz Thermometer type 2804A BRE Calibration Services (UKAS)
Absorbed electrical power	Yokogawa WT310E	Caltest (UKAS)





### 3 Test results

#### Clause 4.2.5 Test conditions and Clause 5 Electrical power

The tests were undertaken on 11<sup>th</sup> September 2019.

Variable	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Test point - kitchen plus (N <sup>o</sup> ) wet rooms	1	2	3	4	5	6
Fan speed setting	100% variable	100% variable	100% variable	100% variable	100% variable	100% variable
Exhaust air flow rate (l/s @ STP)	21.0	29.0	37.0	45.0	53.0	61.0
Total measured electrical power (W)	6.44	7.35	9.01	11.20	14.30	18.67
<b>Calculated SFP (W/l/s)</b>	<b>0.31</b>	<b>0.25</b>	<b>0.24</b>	<b>0.25</b>	<b>0.27</b>	<b>0.31</b>



## 4 Results to be used for PCDB

### Results for SAP calculations (at minimum flow rate condition)

**Table Q1** – Systems with **rigid** ductwork only

Exhaust terminal configuration	Fan speed setting	Specific fan power (W/l/s)
Kitchen +1 additional wet room	100% variable	<b>0.31</b>
Kitchen +2 additional wet rooms	100% variable	<b>0.25</b>
Kitchen +3 additional wet rooms	100% variable	<b>0.24</b>
Kitchen +4 additional wet rooms	100% variable	<b>0.25</b>
Kitchen +5 additional wet rooms	100% variable	<b>0.27</b>
Kitchen +6 additional wet rooms	100% variable	<b>0.31</b>



**Results for Approved Document F (at maximum flow rate condition)**

**Table Q3**

Exhaust terminal configuration	Fan speed setting	Total flow rate (l/s)	Total flow rate – wind condition (l/s)	% reduction of total flow rate
Kitchen + 1 additional wet room	100% variable	21	19.1	9
Kitchen + 2 additional wet rooms	100% variable	29	27.0	7
Kitchen + 3 additional wet rooms	100% variable	37	35.2	5
Kitchen + 4 additional wet rooms	100% variable	45	43.3	4
Kitchen + 5 additional wet rooms	100% variable	53	51.2	3
Kitchen + 6 additional wet rooms	100% variable	61	59.7	2