Private: Halton Vita Lab VKR – Airflow management damper (draft)

Overview

Halton Vita Lab

VKR – airflow management damper

Halton VKR is a galvanised steel damper for Halton Vita Lab Room and Zone solutions:

- Halton Vita Lab Room
  - For supply and exhaust installations, for controlling room supply or exhaust airflow
- Halton Vita Lab Zone
  - For exhaust installations, to control zonal exhaust pressure
  - The addition of a static pressure measuring unit (MSS) is recommended for measuring the static pressure
- Delivered with an integrated control box containing a differential pressure sensor for airflow

measurement, a Halton VLC controller and a fast actuator

Product characteristics

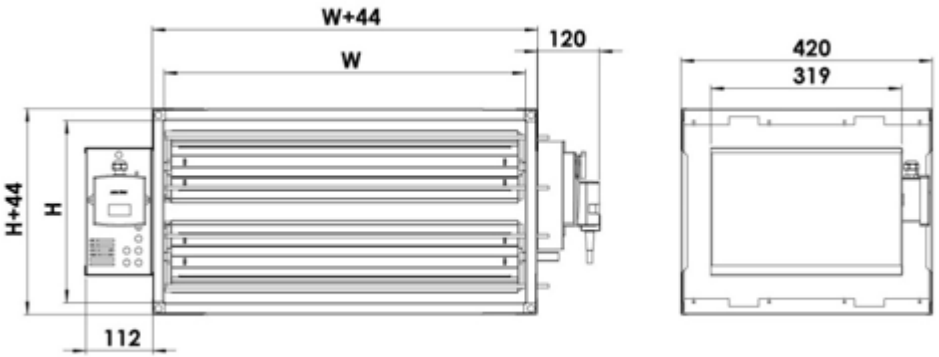
- Rectangular inlet, rectangular outlet
- Pressure independent operation
- Complete shut-off function
- Shut-off operation complies with EN 1751, class 1
- Casing tightness complies with EN 1751, class B
- Maximum differential pressure over the damper of 1000 Pa
- Operating range : ambient temperature of 0 to 50 °C
- Ambient relative humidity <95%, non-condensing

Product models and options

- Separate supply (VKR/S) and exhaust (VKR/E) models
- Available with 25mm insulation or without insulation
- Sizes : from 200mm x150mm to 800mm x 400mm (width options at 100mm and height at 50mm intervals)

The Halton Vita Lab Solo and Halton Vita Lab Room Design Guides available from Halton Sales provide you with more information about selecting the right configuration and damper for your Halton Vita Lab solution. However, as all designs vary, close cooperation with Halton is recommended in order to ensure the best results.

Dimensions



W = Width 200-800mm, at 100mm intervals

H = Height 150-400mm, at 50mm intervals

Airflow ranges per size

Minimum and maximum airflow ranges for the different sizes for Halton VKR in l/s and m³/h (max is based on damper velocity of 8 m/s):

Airflow range when the minimum airflow is 1m/s

Size	W						
H	**200**	**300**	**400**	**500**	**600**	**700**	**800**
150	30 l/s	45 l/s	60 l/s	75 l/s	90 l/s	105 l/s	120 l/s
	108 m^3/h	162 m^3/h	216 m^3/h	270 m^3/h	324 m^3/h	378 m^3/h	432 m^3/h
200	40 l/s	60 l/s	80 l/s	100 l/s	120 l/s	140 l/s	160 l/s
	144 m^3/h	216 m^3/h	288 m^3/h	360 m^3/h	432 m^3/h	504 m^3/h	576 m^3/h
250	50 l/s	75 l/s	100 l/s	125 l/s	150 l/s	175 l/s	200 l/s
	180 m^3/h	270 m^3/h	360 m^3/h	450 m^3/h	540 m^3/h	630 m^3/h	720 m^3/h
300	60 l/s	90 l/s	120 l/s	150 l/s	180 l/s	210 l/s	240 l/s
	216 m^3/h	324 m^3/h	432 m^3/h	540 m^3/h	648 m^3/h	756 m^3/h	864 m^3/h
350	70 l/s	105 l/s	140 l/s	175 l/s	210 l/s	245 l/s	280 l/s
	252 m^3/h	378 m^3/h	504 m^3/h	630 m^3/h	756 m^3/h	882 m^3/h	1008 m^3/h
400	80 l/s	120 l/s	160 l/s	200 l/s	240 l/s	280 l/s	320 l/s
	288 m^3/h	432 m^3/h	576 m^3/h	720 m^3/h	864 m^3/h	1008 m^3/h	1152 m^3/h

Airflow range when the minimum airflow is 8 m/s

Size	W						
H	**200**	**300**	**400**	**500**	**600**	**700**	**800**
150	240 l/s	360 l/s	480 l/s	600 l/s	720 l/s	840 l/s	960 l/s
	864 m^3/h	1296 m^3/h	1728 m^3/h	2160 m^3/h	2592 m^3/h	3024 m^3/h	3456 m^3/h
200	320 l/s	480 l/s	640 l/s	800 l/s	960 l/s	1120 l/s	1280 l/s
	1152 m^3/h	1728 m^3/h	2304 m^3/h	2880 m^3/h	3456 m^3/h	4032 m^3/h	4608 m^3/h
250	400 l/s	600 l/s	800 l/s	1000 l/s	1200 l/s	1400 l/s	1600 l/s
	1440 m^3/h	2160 m^3/h	2880 m^3/h	3600 m^3/h	4320 m^3/h	5040 m^3/h	5760 m^3/h
300	480 l/s	720 l/s	960 l/s	1200 l/s	1440 l/s	1680 l/s	1920 l/s
	1728 m^3/h	2592 m^3/h	3456 m^3/h	4320 m^3/h	5184 m^3/h	6048 m^3/h	6912 m^3/h
350	560 l/s	840 l/s	1120 l/s	1400 l/s	1680 l/s	1960 l/s	2240 l/s
	2016 m^3/h	3024 m^3/h	4032 m^3/h	5040 m^3/h	6048 m^3/h	7056 m^3/h	8064 m^3/h
400	640 l/s	960 l/s	1280 l/s	1600 l/s	1920 l/s	2240 l/s	2560 l/s
	2304 m^3/h	3456 m^3/h	4608 m^3/h	5760 m^3/h	6912 m^3/h	8064 m^3/h	9216 m^3/h

Material

Part	Material
Casing	Galvanised steel
Damper blade	Galvanised steel
Damper blade insulation	Polyurethane
Damper blade gaskets	Silicone
Slide bearing	Alloy of polyamide and molybdenum suphide
Rectangular drive shaft	Galvanised steel
Measurement probe	Aluminium
Tube Connectors	Polyacetal
Flexible tubes	Silicone
External insulation	Mineral wool (model with insulation)
Control Box	Galvanised steel (Control option : CB = CB1)

Function

Depending on the application, the damper maintains the required airflow in the fume cupboard, the room and/or the duct. A stable airflow is achieved through accurate measurement and airflow control, regardless of the variation in the conditions.

The damper is controlled by the Halton VLC controller (premounted on the unit in the control box). The VLC retrieves the measured sensor values of the Halton Vita Lab system and compares them with the assigned setpoint. The differential pressure sensor integrated in the damper measures the

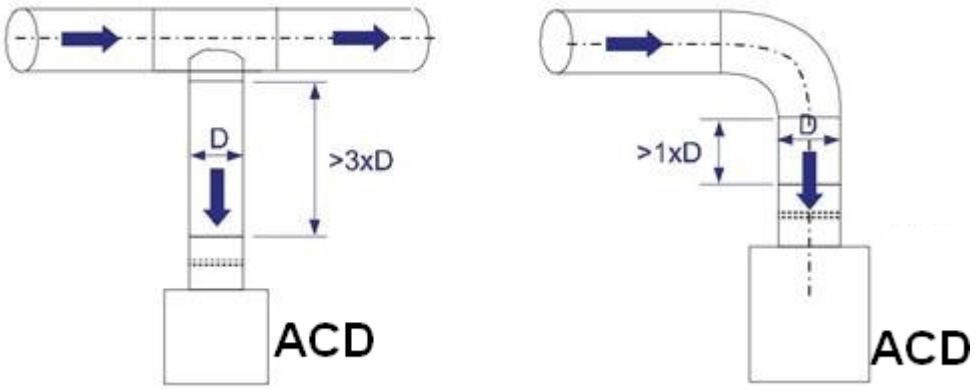
pressure with a measurement probe and calculates the airflow rate.

Based on the calculations, the VLC then adapts the damper position or frequency using a PID control in order to maintaina constant face velocity. If the airflow does not reach the predefined setpoint, an audio-visual alarm is triggered.
For more information about the operation of the damper as part of the Halton Vita Lab systems, see the Halton Vita Lab Solo Design Guide and the Halton Vita Lab Room Design Guide available from Halton Sales.

Installation

The damper can be installed horizontally, vertically or in any other position without impact on the measurement performance

The required safety distances must be taken into account when installing the damper. Install the unit into the ductwork so the airflow direction through the unit is as indicated:



In order to estimate the safety distance to be respected, the equivalent to the hydraulic diameter is calculated using the formula below:

$$d_{eq} = \frac{2 \times W \times H}{W + H}$$

d_{eq} Equivalent distance in mm
W Width in mm
H Height in mm

Static pressure measurement

When using the damper in Halton Vita Lab Zone applications, the addition of a static pressure measuring unit is recommended for increasing the accuracy of static pressure measurement.

In order to ensure the accuracy of the duct static pressure measurement, consider the safety

distances between the measuring unit and airflow disturbances as follows:

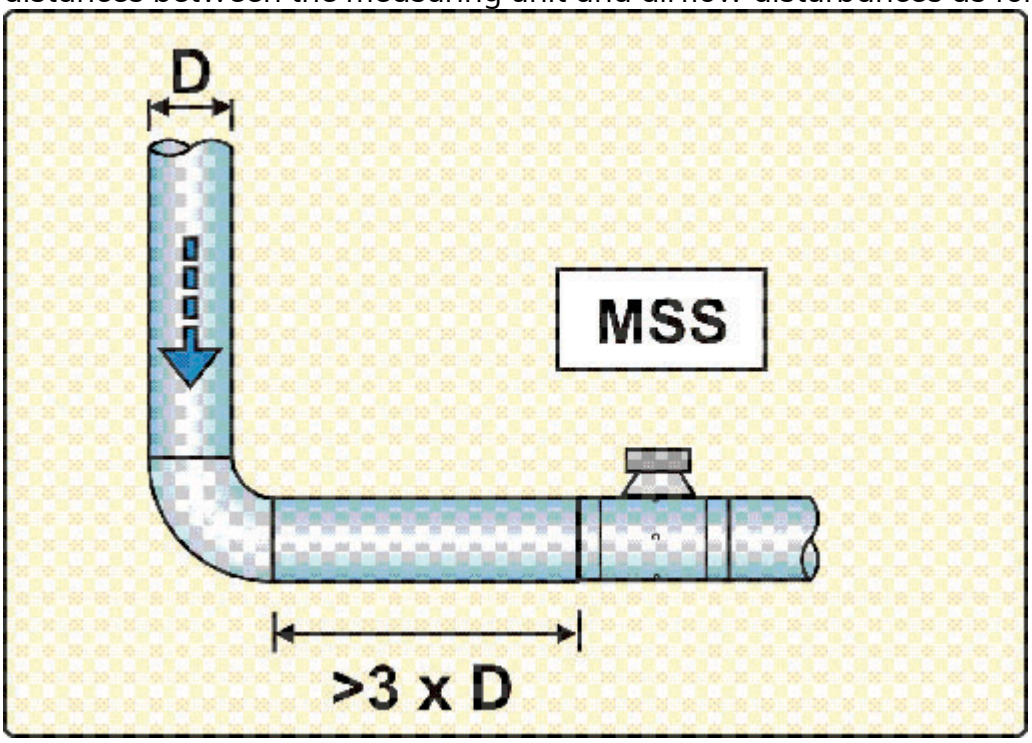


Fig.1. 90° elbow

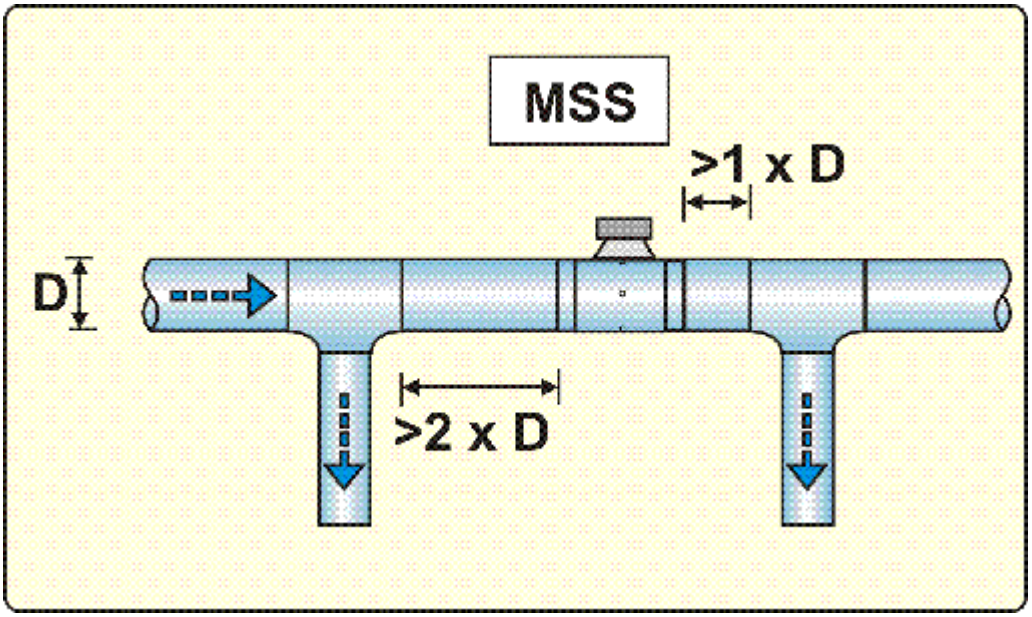


Fig.2. Branch on supply duct

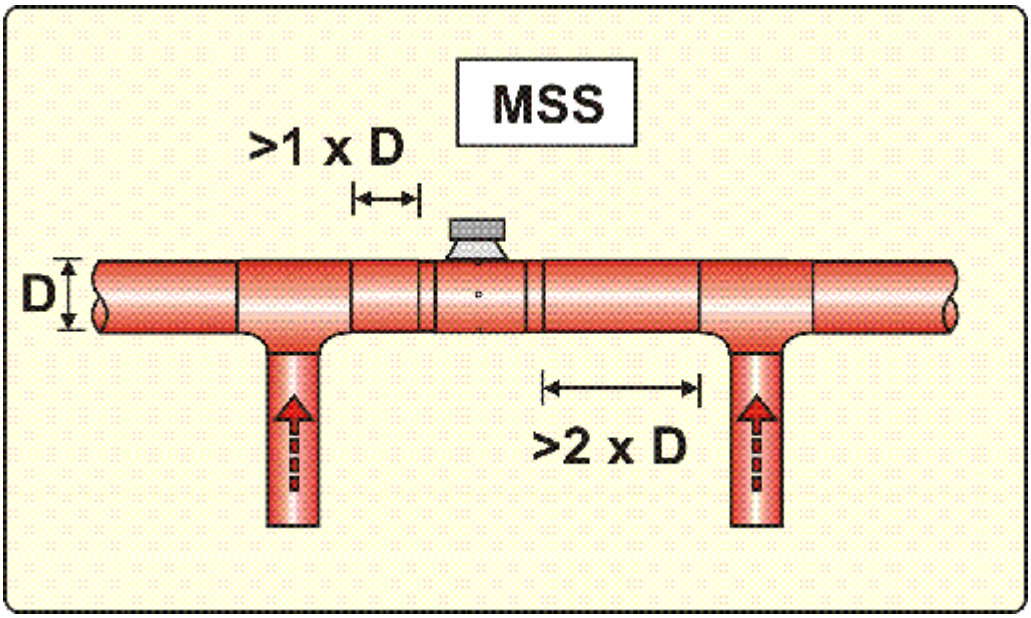


Fig.3. Branch on exhaust duct

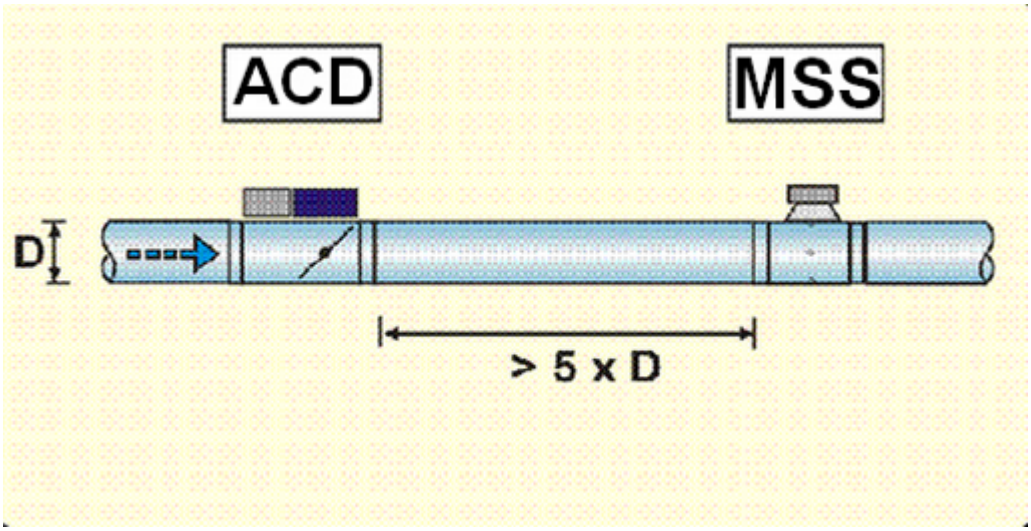


Fig.4. Safety distance between damper and MSS, straight duct

Installation instructions and project-specific wiring diagrams are provided by Halton for all Halton Vita Lab system configurations. For more information, see the relevant Halton Vita Lab Solo and Halton Vita Lab Room Design Guides available from Halton Sales

Commissioning

The actual airflow can be calculated as a function of the differential pressure at the measurement probe and the measurement probe k factor as follows:

$$q_v = k * \sqrt{\Delta p_m}$$

qv Actual airflow rate
k k-value of the product, with k = W (mm) x H (mm) x 0,001054
Δp_m Differential pressure of the measurement probe [Pa]

Specification

Damper for supply and/or exhaust installations in Halton Vita Lab Room and Vita Lab Zone applications.

Variable airflow control damper used for measuring and controlling the exhaust airflow of fume cupboards connected to a common exhaust fan or for controlling the airflow and pressure of the laboratory space or zone.

Damper made of galvanised steel with measurement probe pipes made of aluminium.

Pressure-independent damper equipped with

- a differential pressure sensor with auto-zero calibration and a digital display for airflow measurement
- an airflow controller
- a damper actuator using the LMS technology (Load Moment Stop) for extending product lifetime
- external insulation made of mineral wool as an option for air-radiated noise reduction

Compliance with standards:

- Tightness of the control damper in closed position (EN1751 class 1)
- Casing tightness (EN 1751 class B)

Product Code