

Private: Halton Max Flex Circular (MFC) – Airflow management damper -> Terminated



Overview

Terminated as of March 1st 2021 – replaced with Halton Max One Circular (MOC)

Circular airflow management damper for standard VAV applications. Easy and convenient adjustment of airflow rate limits on site with a mobile application or a dial.

- Averaging cross measurement tubes, actuators adjustable on site, 1-10 m/s airflow velocity
- Suitable for both supply and exhaust installations

Product models and options

- Models with blade gasket (EN 1751, class 4 tightness) and/or external insulation available
- Several connection sizes between 100-630 mm
- Galvanised steel and stainless steel (EN 1.4404, AISI 316L) as material options
- Several actuator options
- Sound attenuators and reheat coils available as accessory

Other product characteristics

- Maximum differential pressure: 1000 Pa over the damper
- Operating range: ambient temperature of 0-50 °C
- Ambient relative humidity: < 95%, non-condensing

Related products and solutions: Halton Max One Circular (MOC)

Product Models

The Halton Max Flex Circular airflow control dampers are available in four product models: G, H, I and J:

- Product models G and I include a blade gasket for airtight shut-off operation.
- Product models I and J include a 50 mm insulation for sound attenuation.

Feature	Product model G	Product model H	Product model I	Product model J
Blade gasket	x		x	
50 mm external insulation			x	x
Tightness EN 1751, class C and class 4	x		x	
Tightness EN 1751, class C		x		x
Minimum torque 5 Nm	Sizes 100-250	Sizes 100-630	Sizes 100-250	Sizes 100-630
Minimum torque 10 Nm	Sizes 315-630		Sizes 315-630	
Complete shut-off function	x		x	

Quick Selection

Airflow ranges for Halton Max Flex Circular with an air velocity of 1-10 m/s.
Applies to dampers with blade gasket (models G and I).

NS (mm)	qv min-max (l/s)	qv min-max (m³/h)
100	8 – 79	28 – 283
125	12 – 123	44 – 442
160	20 – 201	72 – 724
200	31 – 314	113 – 1131
250	49 – 491	177 – 1767
315	78 – 779	281 – 2806
400	126 – 1257	452 – 4524
500	296 – 1964	707 – 7069
630	312 – 3117	1122 – 11222

Airflow ranges for Halton Max Flex Circular with an air velocity of 2-10 m/s.
Applies to models without blade gasket (models H and J).

NS (mm)	qv min-max (l/s)	qv min-max (m³/h)
100	16 – 79	57 – 283
125	25 – 123	88 – 442
160	40 – 201	145 – 724
200	63 – 314	226 – 1131
250	98 – 491	353 – 1767
315	156 – 779	561 – 2806
400	251 – 1257	905 – 4524
500	393 – 1964	1414 – 7069
630	623 – 3117	2244 – 11222

Material

Part	Material option: Galvanised steel (order code MA=CS)	Material option: Stainless steel (order code MA=AS)
Casing	Galvanised steel	Stainless steel (EN 1.4404/AISI 316L)
Damper blade	Galvanised steel	Stainless steel (EN 1.4404/AISI 316L)
Shaft	Galvanised steel	Stainless steel
Blade gasket (models G and I)	EPDM Rubber	EPDM Rubber
Duct gaskets (vulcanised to the casing)	1C-polyurethane hybrid	1C-polyurethane hybrid
Measurement probe	Aluminium	Stainless steel
External insulation (models I and J)	Mineral wool	Mineral wool
Measurement tubes	PU plastic	PU plastic



Fig.1. Halton Max Flex Circular, stainless steel model (EN 1.4404/AISI 316L)

Actuators

A range of actuators are available for various application needs.

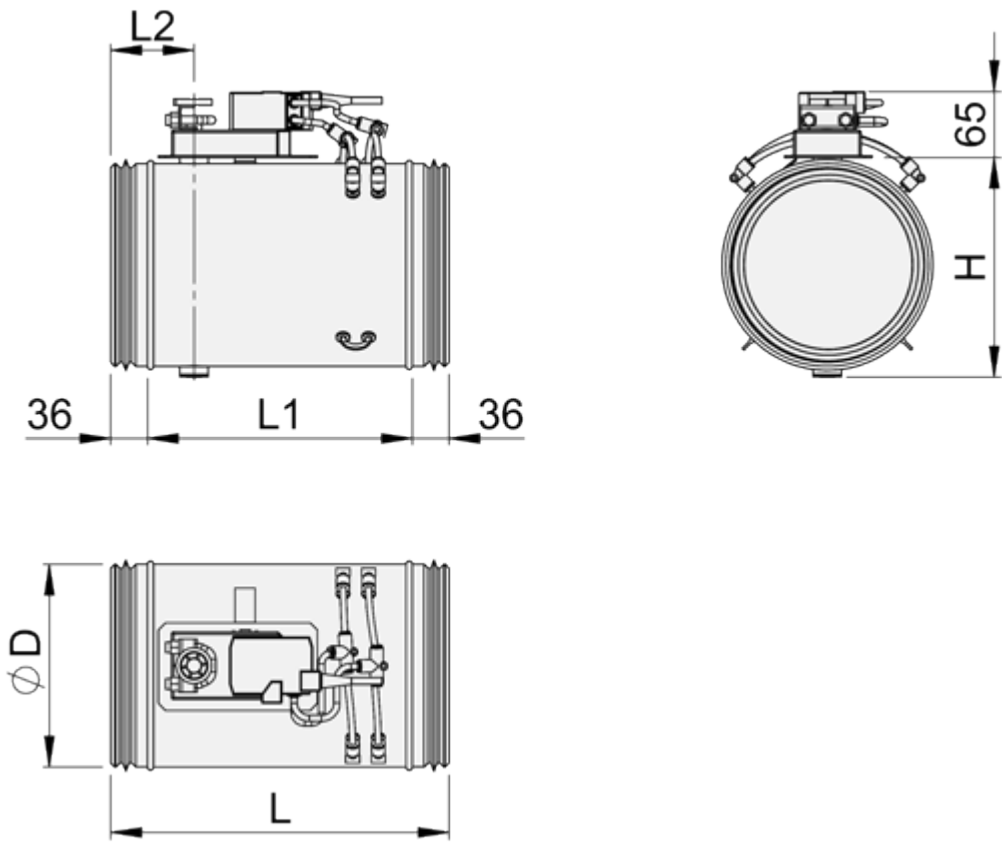
All actuators include an integrated dynamic differential pressure sensor. The pressure sensor has a low bypass airflow rate through the sensor element.

Depending on the model, airflow rate limits are adjusted on site with a mobile application or a dial.

Actuator	Notes	Torque Nm	Damper size	Communication interface	Order code
Halton EC	Actuator with NFC connectivity for mobile onsite parameter adjustment (Belimo Assistant App). Analogue or MPbus. Manufacturer: Belimo	5	100-250	Belimo MP bus or 0..10V/2..10V	EC= LMV-D3-MP-F.1 HI
Halton EE	Actuator with NFC connectivity for mobile onsite parameter adjustment (Belimo Assistant App). Analogue or MPbus. Manufacturer: Belimo	10	315-630	Belimo MP bus or 0..10V/2..10V	EE= NMV-D3-MP-F.1 HI
Halton EO	Rotary actuator with screwdriver dial for onsite parameter adjustment. Analogue or Modbus. Manufacturer: Grüner	5	100-250	Modbus or 0..10V/2..10V	EO= 227VMZ-024-05-MByEx
Halton EP	Rotary actuator with screwdriver dial for onsite parameter adjustment. Analogue or Modbus. Manufacturer: Grüner	10	315-630	Modbus or 0..10V/2..10V	EP= 227VMZ-024-10-MByEx

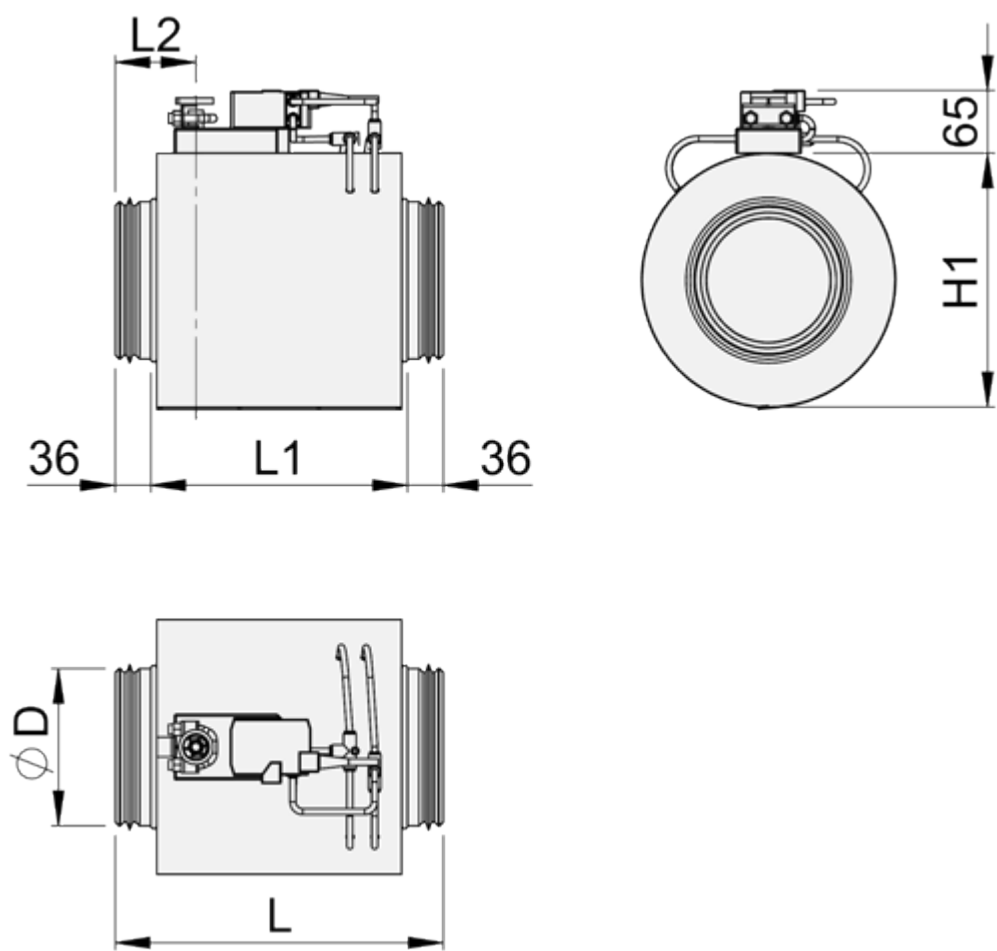
Dimensions

Halton Max Flex Circular, models G and H (non insulated)



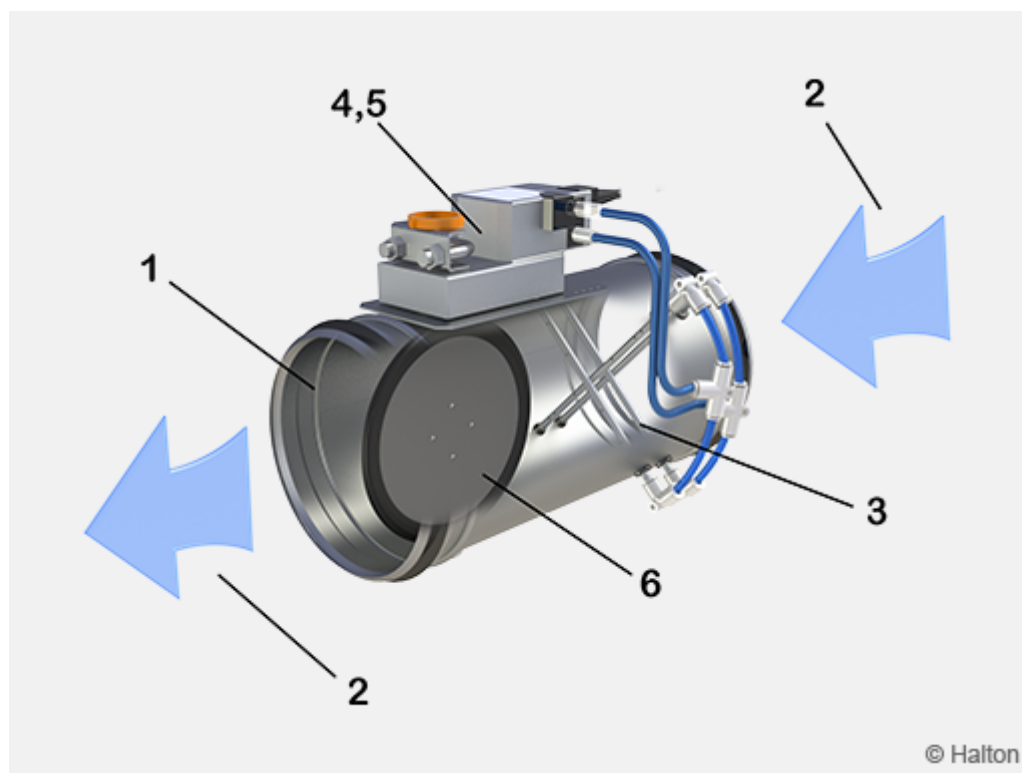
NS	D	L	L1	L2	H
100	99	248	176	82	110
125	124	248	176	82	135
160	159	331	259	82	170
200	199	331	259	82	210
250	249	331	259	82	260
315	314	331	259	82	325
400	399	500	428	82	410
500	499	630	558	149	508
630	629	630	558	149	638

Halton Max Flex Circular, models I and J (insulated)



NS	D	L	L1	L2	H1
100	99	248	176	82	200
125	124	248	176	82	225
160	159	331	259	82	260
200	199	331	259	82	300
250	249	331	259	82	350
315	314	331	259	82	415
400	399	500	428	82	500
500	499	630	558	149	600
630	629	630	558	149	730

Function



Key

1. Damper
2. Airflow direction
3. Measurement probe
4. VAV airflow controller
5. Actuator
6. Blade

The damper contains a cross-type airflow measurement probe, a VAV airflow controller, an actuator and a blade (with or without gasket). Depending on the actuator model, the VAV controller is a separate unit or integrated into the actuator.

The damper can function either as a supply or an exhaust unit. It maintains the required airflow through accurate measurement and airflow control, regardless of variations in the room conditions or duct pressure. The airflow measurement is based on a differential pressure generated by high-precision pickup tubes of the measurement probe. The tubes are engineered for sensitivity in low airflows and for low noise generation in high airflows.

Changes in room conditions can be adjusted manually from an end-user interface or by different sensors such as occupancy or room pressure sensors, thermostats or timers. The conditions can also be managed remotely from a building management system (BMS). The control signal and the airflow measurement data from the pickup tubes are processed in the VAV controller. The VAV controller gives the actuator a command to change the position of the damper blade, in order to keep the airflow at the predefined setpoint.

The airflow setpoint can be modified between minimum and maximum settings from the room

controller interface or a BMS. The VAV controller can also send actual value data back to the room interface controller. The communication protocol used for the signal between the room control interface and the VAV controller depends on the actuator model.

For more information about the available actuator models, see section Actuators.

Installation

Safety distances

Disturbances in the ductwork such as duct bends, T-branches and sound attenuators cause turbulence and an uneven airflow. This can lead to fluctuation and inaccuracy in measurement values.

In order to ensure the accuracy of the airflow measurement, the minimum safety distances between the measuring unit and airflow disturbances must be respected.

For airflow control applications, the minimum safety distance is $1 \times D$ after an elbow bend and $3 \times D$ for T-branches. The safety distance between the damper and a sound attenuator is $2 \times D$.

Install the unit into the ductwork so that the safety distances and direction of the airflow are as indicated in the following figures. Please refer to project-specific job drawings for more details.

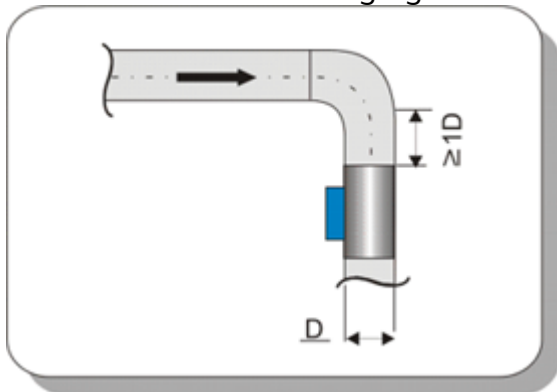


Fig.1. Bend (90° elbow)

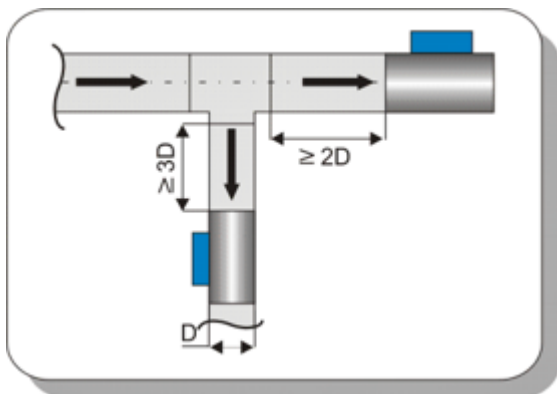


Fig.2. T-branch

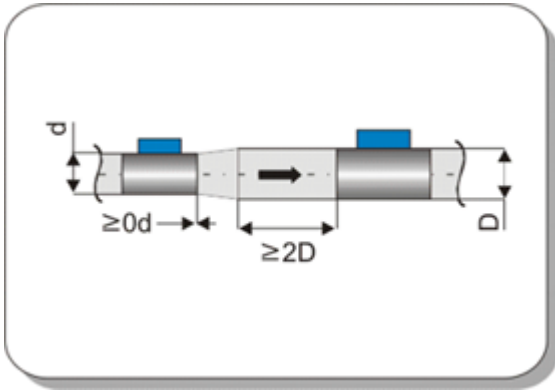


Fig.3. With sound attenuator

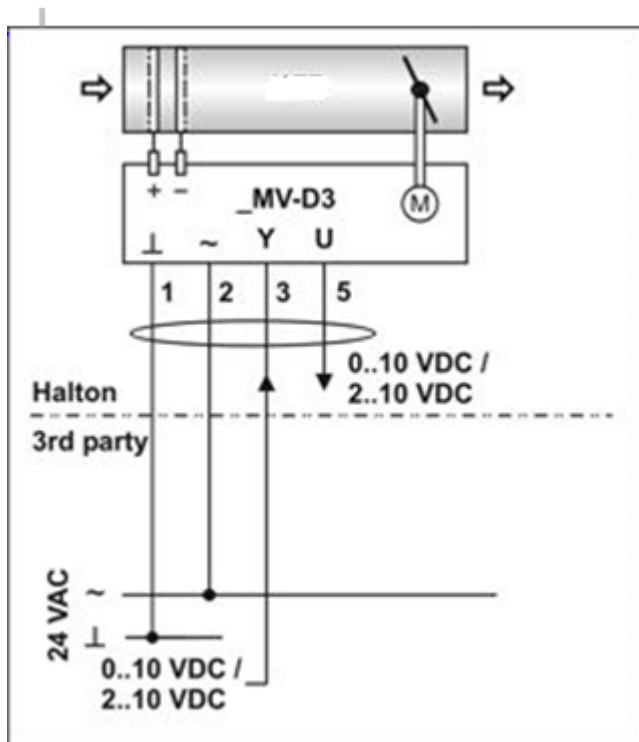
Space requirements

Sufficient space must be reserved to allow access to accessories during commissioning and maintenance.

Wiring

The wiring must be carried out by professional technicians in accordance with local regulations. For the power supply, a safety-isolating transformer must be used.

The responsibilities between Halton and 3rd party are specified in the following example wiring diagram for a typical variable airflow control application:



Key

- 1 (G0) 24 VAC system neutral
- 2 (~) 24 VAC live
- 3 (w) 2...10- or 0...10-VDC airflow setpoint signal input

5 (U5) 2...10- or 0...10-VDC airflow feedback signal output

Commissioning

Airflow control

The airflow rate limits for Halton Max Flex Circular are adjusted on site with a mobile application or a dial, depending on actuator model

The nominal airflow rates in the following table are given with a pressure level of 150 Pa. Applies to Halton Max Flex Circular EC and EE actuators.

	Vnom (l/s) @ 150 Pa	Vnom (m ³ /h) @ 150 Pa
100	78	282
125	123	441
160	221	794
200	353	1270
250	574	2068
315	881	3170
400	1484	5344
500	2387	8593
630	3895	14021

The nominal airflow rates for Halton Max Flex Circular dampers with the Halton EO and EP actuators are given for a pressure level of 250 Pa.

	Vnom (l/s) @ 250 Pa	Vnom (m ³ /h) @ 250 Pa
100	101	364
125	158	569
160	285	1025
200	455	1639
250	742	2670
315	1137	4092
400	1916	6899
500	3082	11094
630	5028	18101

The actual airflow rate is calculated as a function of differential pressure at the measurement probe and the measurement probe k factor.

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

where

- **q_v** Actual airflow rate [l/s]
- **k** k factor
- **Δp_m** Differential pressure of measurement probe [Pa]

The actuators are equipped with a pressure sensor, and there is a very low airflow through the differential pressure sensor of the controller. Therefore, a manual differential measurement manometer can be connected in parallel to the airflow controller (for example with tube T-branches) and both measurements can operate in parallel with continuous control.

The k factors for the different sizes are listed in the following table:

NS	k factor (l/s)
100	6.4
125	10.0
160	18.0
200	28.8
250	46.9
315	71.9
400	121.2
500	194.9
630	318.0

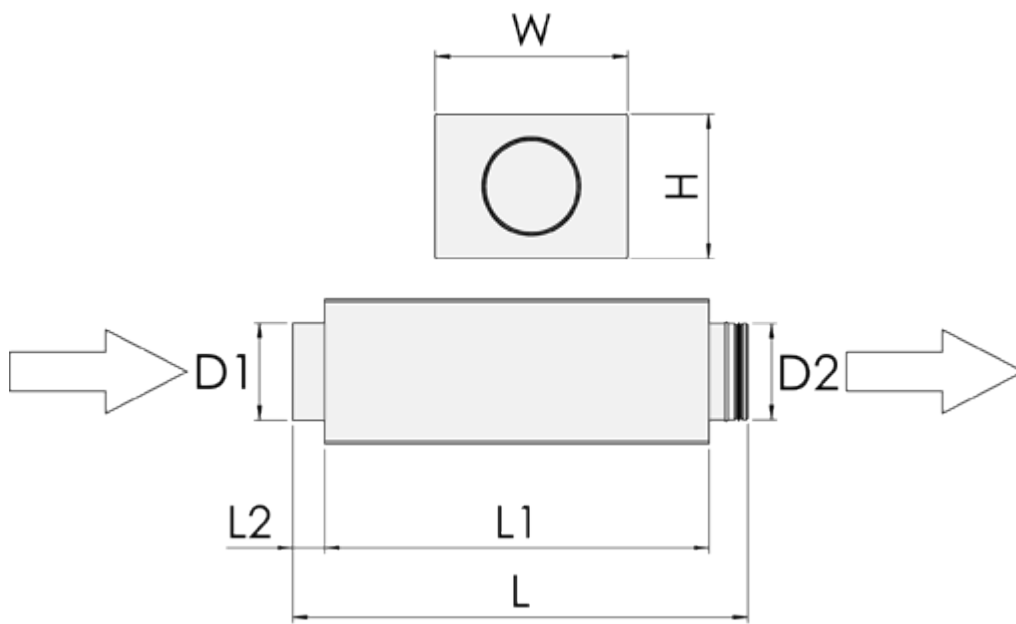
Sound Attenuators

Description

Halton offers high-quality rectangular sound attenuators with round duct connection for reducing noise levels in the duct. Sound attenuators are available as accessory and the following options are available:

- Three lengths: 600, 1000 and 1250 mm
- Connection types
 - D2=D1
The duct (D2) and damper (D1) connections are the same size
 - D2>D1
The duct connection (D2) is one size larger than the damper (D1) connection
- Insulation material options:
 - Polyester fibre (PEF), tested according to ISO 7235, class C tightness level
 - Mineral wool (MW), class C tightness level
- Available with or without access panel for maintenance purposes

Technical data



D1 is connected directly to the damper with female-type connection. D2 is attached to the duct with male-type connection. The above picture depicts supply air installations. In exhaust installations, the airflow direction is from D2 to D1. The damper is always connected to D1.

Dimensions (mm) and weights

D1	D2	W	H	L	L1	L2	kg
H1 (MW)							
100	100	252	154	626	600	22	6,2
125	125	263	177	626	600	22	6,7
160	160	280	212	626	600	22	7,5
200	200	361	253	626	600	22	9,5
250	250	431	303	626	600	32	11,9
315	315	458	368	626	600	32	14,6
400	400	518	453	626	600	57	18,3
500	500	702	555	626	600	57	26,0

H3 (PEF)							
100	100	252	154	626	600	22	5,7
125	125	263	177	626	600	22	6,1
160	160	280	212	626	600	22	6,7
200	200	361	253	626	600	22	8,6
250	250	431	303	626	600	32	10,7
315	315	458	368	626	600	32	13,1
400	400	518	453	626	600	57	18,3
500	500	702	555	626	600	57	26,0

H5 (MW)							
100	125	263	177	626	600	22	6,7
125	160	280	212	626	600	22	7,5
160	200	361	253	626	600	22	9,5
200	250	431	303	626	600	32	11,9
250	315	458	368	626	600	32	14,6
315	400	518	453	626	600	57	18,3
400	500	702	555	626	600	57	26,0
500	630	851	684	626	600	67	33,7

H7 (PEF)							
100	125	263	177	626	600	22	6,1
125	160	280	212	626	600	22	6,7
160	200	361	253	626	600	22	8,6
200	250	431	303	626	600	32	10,7
250	315	458	368	626	600	32	13,1
315	400	518	453	626	600	57	18,3
400	500	702	555	626	600	57	26,00
500	630	851	684	626	600	67	33,7

H11 (MW)							
100	100	252	154	626	600	22	6,2
125	125	263	177	626	600	22	6,7
160	160	280	212	626	600	22	7,5
200	200	361	253	626	600	22	9,5
250	250	431	303	626	600	32	11,9
315	315	458	368	626	600	32	14,6
400	400	518	453	626	600	57	18,3
500	500	702	555	626	600	57	26,0

H13 (PEF)							
100	100	252	154	626	600	22	5,7
125	125	263	177	626	600	22	6,1
160	160	280	212	626	600	22	6,7
200	200	361	253	626	600	22	8,6
250	250	431	303	626	600	32	10,7
315	315	458	368	626	600	32	13,1
400	400	518	453	626	600	57	18,3
500	500	702	555	626	600	57	26,0

H15 (MW)							
100	125	263	177	626	600	22	6,7
125	160	280	212	626	600	22	7,5
160	200	361	253	626	600	22	9,5
200	250	431	303	626	600	32	11,9
250	315	458	368	626	600	32	14,6
315	400	518	453	626	600	57	18,3
400	500	702	555	626	600	57	26,0
500	630	851	684	626	600	67	33,7

H17 (PEF)							
100	125	263	177	626	600	22	6,1
125	160	280	212	626	600	22	6,7

D1	D2	W	H	L	L1	L2	kg
H2 (MW)							
100	100	252	154	1036	1000	22	9,7
125	125	263	177	1036	1000	22	10,5
160	160	280	212	1036	1000	22	11,4
200	200	361	253	1036	1000	22	13,9
250	250	431	303	1036	1000	32	16,6
315	315	458	368	1036	1000	32	20,5
400	400	518	453	1036	1000	57	26,4
500	500	702	555	1286	1250	57	37,4

H4 (PEF)							
100	100	252	154	1036	1000	22	8,9
125	125	263	177	1036	1000	22	9,5
160	160	280	212	1036	1000	22	10,1
200	200	361	253	1036	1000	22	12,3
250	250	431	303	1036	1000	32	14,6
315	315	458	368	1036	1000	32	18,0
400	400	518	453	1036	1000	57	26,4
500	500	702	555	1286	1250	57	37,4

H6 (MW)							
100	125	263	177	1036	1000	22	10,5
125	160	280	212	1036	1000	22	11,4
160	200	361	253	1036	1000	22	13,9
200	250	431	303	1036	1000	32	16,6
250	315	458	368	1036	1000	32	20,5
315	400	518	453	1036	1000	57	26,4
400	500	702	555	1286	1250	57	37,4
500	630	851	684	1286	1250	67	48,1

H8 (PEF)							
100	125	263	177	1036	1000	22	9,5
125	160	280	212	1036	1000	22	10,1
160	200	361	253	1036	1000	22	12,3
200	250	431	303	1036	1000	32	14,6
250	315	458	368	1036	1000	32	18,00
315	400	518	453	1036	1000	57	26,4
400	500	702	555	1286	1250	57	37,4
500	630	851	684	1286	1250	67	48,1

H12 (MW)							
100	100	252	154	1036	1000	22	9,7
125	125	263	177	1036	1000	22	10,5
160	160	280	212	1036	1000	22	11,4
200	200	361	253	1036	1000	22	13,9
250	250	431	303	1036	1000	32	16,6
315	315	458	368	1036	1000	32	20,5
400	400	518	453	1036	1000	57	26,4
500	500	702	555	1286	1250	57	37,4

H14 (PEF)							
100	100	252	154	1036	1000	22	8,9
125	125	263	177	1036	1000	22	9,5
160	160	280	212	1036	1000	22	10,1
200	200	361	253	1036	1000	22	12,3
250	250	431	303	1036	1000	32	14,6
315	315	458	368	1036	1000	32	18,0
400	400	518	453	1036	1000	57	26,4
500	500	702	555	1286	1250	57	37,4

H16 (MW)							
100	125	263	177	1036	1000	22	10,5
125	160	280	212	1036	1000	22	11,4
160	200	361	253	1036	1000	22	13,9
200	250	431	303	1036	1000	32	16,6
250	315	458	368	1036	1000	32	20,5
315	400	518	453	1036	1000	57	26,4
400	500	702	555	1286	1250	57	37,4
500	630	851	684	1286	1250	67	48,1

H18 (PEF)							
100	125	263	177	1036	1000	22	9,5
125	160	280	212	1036	1000	22	10,1

Key

- MW Mineral wool
- PEF Polyester fibre

Examples of attenuation data:

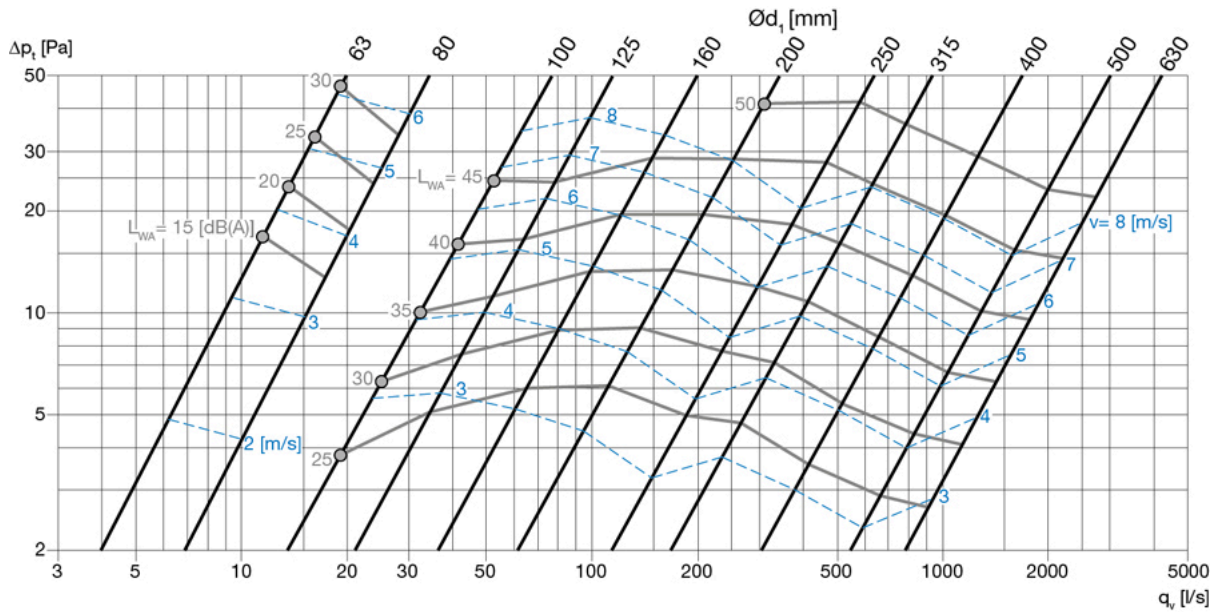


Fig.1. Attenuation data, $L = 600$ mm, material = PEF

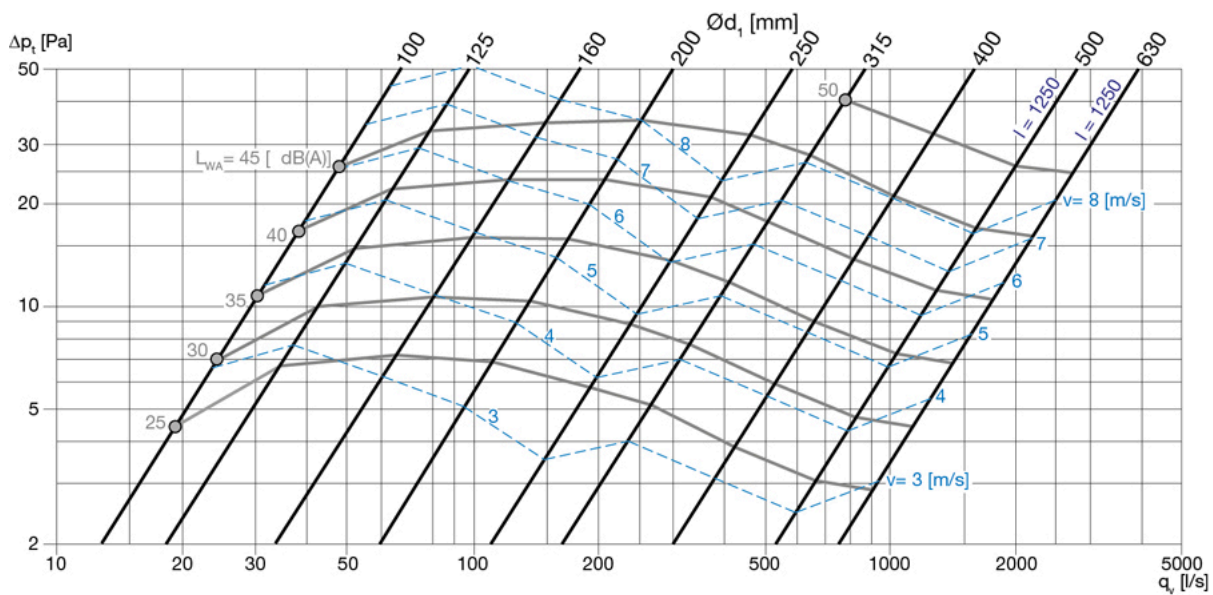


Fig.2. Attenuation data, $L = 1000$ mm, material = PEF

For further information, contact Halton sales.

Order code

SA = choose model code from column Code, H1 – H18.

Code	Length (mm)	Connection type	Insulation material	Access panel
H1	600	D2=D1	MW	No
H2	1000/1250*	D2=D1	MW	No
H3	600	D2=D1	PEF	No
H4	1000/1250*	D2=D1	PEF	No
H5	600	D2>D1	MW	No
H6	1000/1250*	D2>D1	MW	No
H7	600	D2>D1	PEF	No
H8	1000/1250*	D2>D1	PEF	No
H11	600	D2=D1	MW	Yes
H12	1000/1250*	D2=D1	MW	Yes
H13	600	D2=D1	PEF	Yes
H14	1000/1250*	D2=D1	PEF	Yes
H15	600	D2>D1	MW	Yes
H16	1000/1250*	D2>D1	MW	Yes
H17	600	D2>D1	PEF	Yes
H18	1000/1250*	D2>D1	PEF	Yes

Key

- D1 Damper connection
- D2 Duct connection
- MW Mineral wool
- PEF Polyester fibre
- * For sizes øD 400 or 500. See Dimensions and Weight table.

Reheat Coils

Description

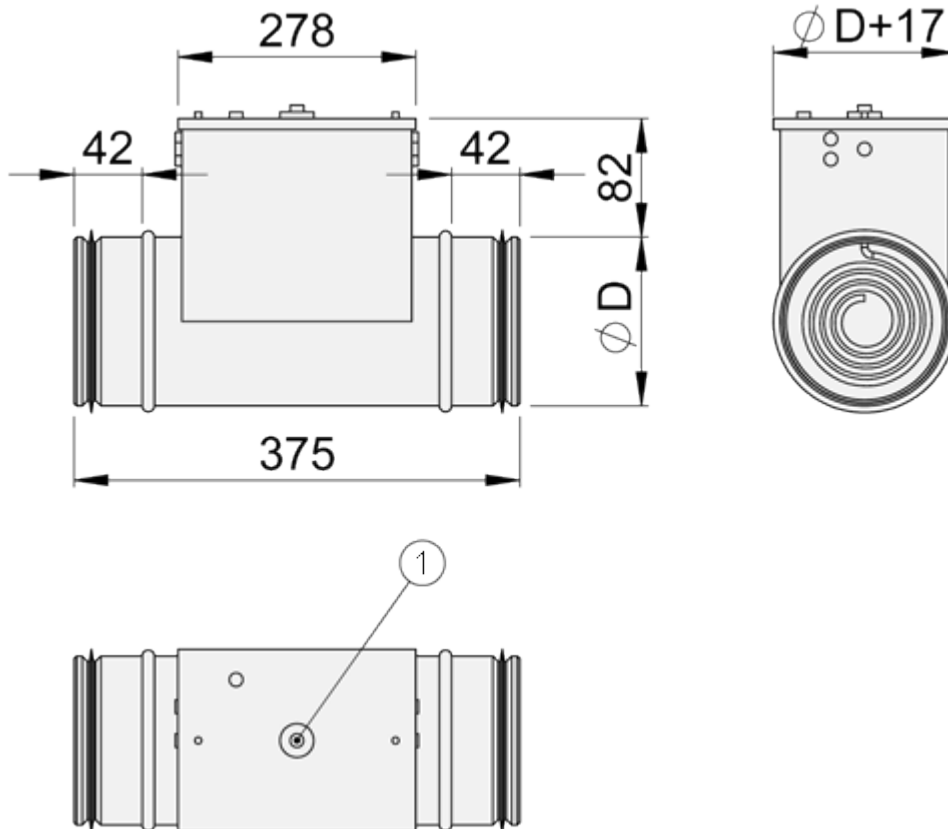
Reheat coils are available as accessory. Main features:

- Product models:
 - Model RM
Without internal heating controller, PWM control signal input
 - Model RC
With internal heating controller, 0...10-VAC control signal input. Built-in alarm relay with potential-free changeover contact for remote alarm monitoring. The alarm is

triggered by manual overheating protection or heater power loss.

- Single-phase heater with 230 VAC, less than 16 A
- Increased heater safety with two internal overheating protection devices (automatic and manual), connected in series.
- EN 15727 class C tightness level
- Available for duct sizes 100 – 400 mm
- Power 600 – 3000 W

Technical data



Key

D 100, 125, 160, 200, 250, 315, 400 mm

1 Resetting of manual overheating protection

The heater can be installed in vertical or horizontal ducts. The safety distance is $2 \times D$.

The heater must always be interlocked towards the fan or towards the airflow going through the heater. The interlocking function is connected to the duct heater power supply or, if the heater has an internal heating controller (model RC), it can also be connected directly to the controller.

The power supply to the duct heater must be switched off when the fan is switched off or when the airflow rate is too low.

When selecting the airflow control damper and reheat coil, ensure that the airflow velocity is above 2 m/s in order to guarantee a proper control function.

Heating capacity with low air velocity of 2 m/s

NS	Power (W)	qv l/s	qv m ³ /h	dT(max) K
100	600	16	57	32
125	900	25	88	31
160	1500	40	145	31
200	2100	63	226	28
250	3000	98	353	25
315	3000	156	561	16
400	3000	251	905	10

Heating capacity with an air velocity of 6 m/s

NS	Power (W)	qv l/s	m ³ /h	dT(max) K
100	600	47	170	11
125	900	74	265	10
160	1500	121	434	10
200	2100	188	679	9
250	3000	295	1060	8
315	3000	468	1683	5
400	3000	754	2714	3

For further information, contact Halton Sales.

Order Code

RH=RM or RH=RC

Specification

Pressure-independent variable airflow control damper for supply and exhaust installations.

Construction

- Damper includes an airflow measurement probe, airflow controller and damper actuator.
- Duct connection includes integral airtight rubber gaskets.
- Damper with blade gasket: the tightness of the control damper in closed position conforms to standard EN1751 class 4 and casing tightness to EN 1751/C.
- Damper without blade gasket: the tightness of the control damper in closed position

conforms to standard EN1751/C.

- Damper with external insulation include a 50mm mineral wool or polyester fibre insulation layer.

Material

- Galvanised steel, with an airflow measurement probe of aluminium
- Stainless steel, with measurement probe of stainless steel (EN 1.4404/AISI 316L)

Electrical data

- Digital bus and/or analogue connection available, depending on the actuator
- Analogue airflow controller control signal input range is 0...10 VDC or 2 ...10 VDC and output range 0...10 VDC for airflow feedback
- Supply voltage 24 VAC

Parameter settings

- Controller settings are adjustable on site with a mobile application or a dial

Accessories

- Sound attenuator for noise reduction. An access panel can be added for easy maintenance.
- Electric reheat coil with internal heating controller. Power supply 230 VAC, less than 16A. A safety overheat thermostat with both automatic and manual reset as well as an alarm relay with the possibility of remote alarm monitoring are incorporated in the heater. A room controller is required to control the duct heater with a 0...10 VDC control signal.
- Electric reheat coil without internal heating controller. Power supply 230 VAC (pulse width modulation). A safety overheat thermostat with both automatic and manual reset is incorporated in the heater. A room controller required to control the duct heater with a 0...10 VDC control signal.

Order Code

MFC/S-D, MA-CU-FS-SA-RH-ZT

S = Model

- G With blade gasket
- H No blade gasket
- I With blade gasket and insulation (50 mm)
- J No blade gasket, with insulation (50 mm)

D = Connection size (mm)

100, 125, 160, 200, 250, 315, 400, 500, 630

Other Options and Accessories

MA = Material

CS Galvanised steel

AS Stainless steel (EN 1,4404/AISI 316L)

CU = Control unit

EC LMV-D3-MP-F1 HI (sizes 100-250)

EE NMV-D3-MP-F1 HI (sizes 315-630)

EO 227VMZ-024-05-MByEx (sizes 100-250)

EP 227VMZ-024-10-MByEx (sizes 315-630)

FS = Factory-set airflow limits

DS Default factory settings (Vnom)

DC Customer specified settings

SA = Sound attenuator (accessory)

NA Not assigned

H1 L = 600 mm; Outlet = Inlet; Mineral wool

H2 L = 1000/1250 mm; Outlet = Inlet; Mineral wool

H3 L = 600 mm; Outlet = Inlet; Polyester fibre

H4 L = 1000/1250 mm; Outlet = Inlet; Polyester fibre

H5 L = 600 mm; Outlet > Inlet; Mineral wool

H6 L = 1000/1250 mm; Outlet > Inlet; Mineral wool

H7 L = 600 mm; Outlet > Inlet; Polyester fibre

H8 L = 1000/1250 mm; Outlet > Inlet; Polyester fibre

H11 L = 600 mm; Outlet = Inlet; Mineral wool; Access panel

H12 L = 1000/1250 mm; Outlet = Inlet; Mineral wool; Access panel

H13 L = 600 mm; Outlet = Inlet; Polyester fibre; Access panel

H14 L = 1000/1250 mm; Outlet = Inlet; Polyester fibre; Access panel

H15 L = 600 mm; Outlet > Inlet; Mineral wool; Access panel

H16 L = 1000/1250 mm; Outlet > Inlet; Mineral wool; Access panel

H17 L = 600 mm; Outlet > Inlet; Polyester fibre; Access panel

H18 L = 1000/1250 mm; Outlet > Inlet; Polyester fibre; Access panel

RH = Electric reheat coil (accessory)

NA Not assigned

RM No internal heating controller,

PWM control signal input (230 VAC, pulse width modulation)

RC With internal heating controller (0...10-VAC control signal input)

ZT = Tailored product (ETO)

N No

Y Yes

Code example

MFC/G-100, MA=CS, CU=EC, FS=DS, SA=NA, RH=NA, ZY=N