Halton Marine – **HVAC for Ship building & Energy Industries** Catalogue

Enabling Wellbeing

Halton

Halton - Enabling Wellbeing

Halton is passionate about indoor environments. We offer business enhancing solutions for comfortable, energy-efficient and safe environments, for companies that value wellbeing and productivity of their customers and personnel.

Halton Marine concentrates in providing safety and comfort in demanding conditions. We develop, manufacture and market reliable, high-quality ventilation solutions specifically designed for ships, offshore oil & gas, heavy industry and offshore wind applications. We offer you excellent service and reliable products for the best indoor air on the open sea.

The Halton Scope

Halton Marine's demand-based cabin ventilation system provides substantial savings in energy consumption.

UV-light, Capture Jet™ and M.A.R.V.E.L. – Halton provides real technological advantages for galley ventilation.

As smoke and toxic gases can be more dangerous than the fire itself it is essential that the fire dampers also prevent smoke from spreading.

Halton Marine is the world's leading supplier in its main product groups for the most recognized cruise ships in the world.


FPSO AKPO - photo courtesy of Total

Halton Marine has supplied its high-quality products and solutions for more than 200 major oil & gas projects.


HMS Dauntless - photo courtesy of Bae Systems

Shock-tested products for naval applications, ships and submarines, have been in Halton Marine's scope of supply for many years.

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Halton Marine's sales offices, distributors and agents are listed at www.halton.com

About us

Halton Marine

Halton Marine, one of the world's leading suppliers of marine HVAC, develops, manufacturers and markets reliable, high-quality ventilation solutions specifically designed for shipbuilding, oil & gas, energy and naval applications. Our track record includes deliveries to over 150 major cruise ships, 200 oil & gas projects and 100 naval vessels.

Halton Group

Halton Group specializes in indoor environment solutions, ranging from public and commercial buildings to foodservice facilities. Founded in Finland in 1969, Halton operates today in over 30 countries around the world, with annual sales of €205 million and over 1500 employees. The company has production facilities in Brazil, Canada, China, France, Finland, Germany, Malaysia, United Kingdom and USA.

Contents – Halton Marine Product Catalogue, 01/2021

More products and solutions www.halton.com

FCE FIRE DAMPER (EI 60 S)

For industrial ventilation systems

MATERIALS

PART	MATERIAL	FINISHING
Frame	Carbon steel (3 mm) Steel (1 mm)	Hot-dip galvanized / ISO 1464 Z275 / EN 10346:2015
Frame	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316), EN 1.4432 (AISI316L)	(3 mm) Pickling / (1 mm) N/A
Blades	Steel	Z275 / EN 10346:2015
Blades	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316), EN 1.4432 (AISI316L)	-
Blade insulation	Calcium silicate (EI 60 S) Ceramic wool (E 120 S)	-
Maintenance-free bearings	Oil bronze	-
Bearings	EN 1.4404 (AISI316) (Available as an option)	
Shafts	Stainless steel EN 1.4404 (AISI316)	-

FCE PRODUCT OPTIONS

Halton FCE is available with following actuators:

- FCE-EL: Electrical spring return motor; standard actuators being 24 V to 230 V. The motor contains built-in open-closed limit switches. Separate junction box included in the EL-model. A wide range of Ex actuators available.

HSO: Halton Smart Override function for HVAC damper black-start available. With automatic reset function when power is reinstated.

A wide range of accessories available.

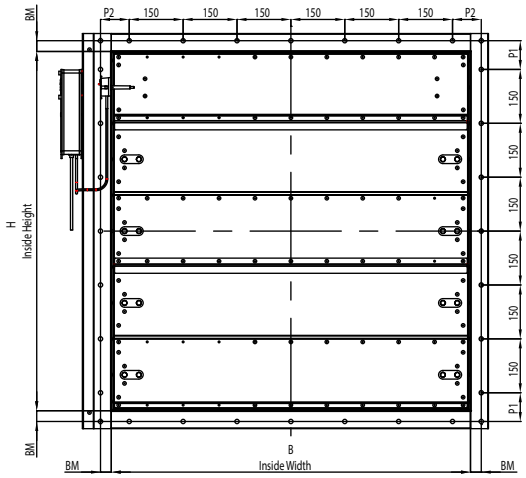
APPLICATIONS

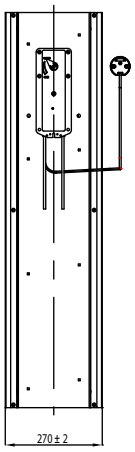
Halton FCE fire dampers are CE-marked according EN 15650:2010 and tested according to EN 1366-2 standard. Halton FCE fire dampers are used as safety-related components in ventilation systems to prevent fire and smoke spreading through ducting.
The FCE fire damper can be installed in rectangular ducts in solid walls, ceilings and lightweight partition wall. During normal operation, the fire damper is in the open position and does not cause significant pressure loss, noise or flow disturbance.

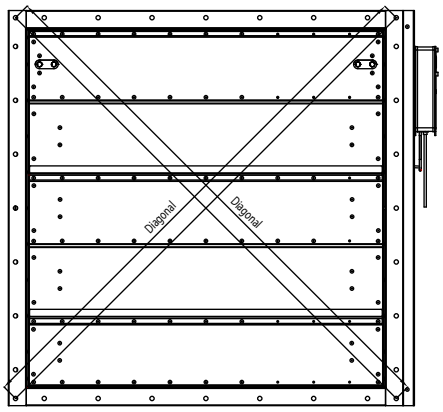
FEATURES

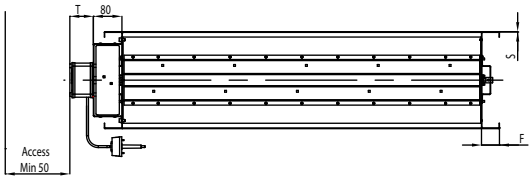
- Certified by Centrum Techniki Okretowej S.A.
- Automatic electrical operation system.
- Blades contain silicone seals (effective up to 300 °C) for low leakage in normal conditions and thermal expansion graphite seals (effective from 150 °C) to increase tightness in a case of fire
- Blades contain ceramic wool insulation or calcium silicate fire protective board depending on fire resistance class
- Low weight due to double skin blade structure
- Closed blade leakage to EN 1751, Class 3 size >=200x200
- Casing leakage to EN 1751, Class C
- Maximum duct pressure for damper construction 5000 Pa (3mm casing), 3000 Pa (1mm casing) and maximum air velocity 15 m/s
- Normal operation temperature for damper between -30 °C to +50 °C. Actuator and component selection can have an effect on this temperature range. Other temperatures available on request
- Option of circular connection
- Available as ATEX certified

GENERAL FCE DRAWINGS









ACTUATOR	T	T (External limit switch)
Belimo BF	112	163
Schischek BF	132	184
QT.Ex-MFD	95	197

DIMENSIONS	ØC	F	P1	P2	BM
If longest side ≤ 350	10	50	75...150	75...150	20
If longest side 351...1000	12	50	75...150	75...150	30

FCE DIMENSIONS AND MATERIAL THICKNESS

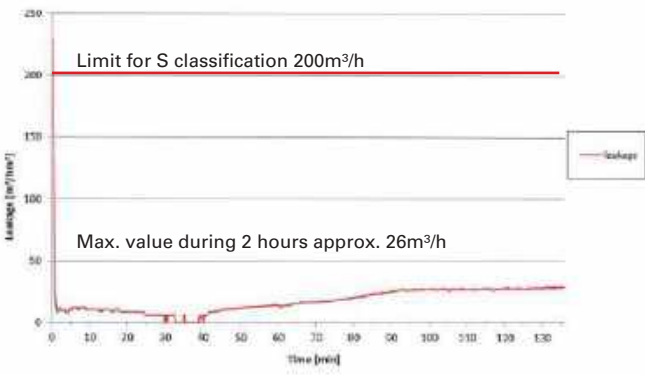
The FCE fire dampers meet international standards for both rectangular (width B 150-1000 mm with 25 mm division and height H 150-1000 mm with 50 mm division) and circular ducts (Ø100-1000 mm).
Standard flanges height 50 mm and drilling according to ISO 15138 standards. Frame thickness 1 mm to 3 mm.
Blades are made of two sheets, each of being 1 mm thick (sandwich design).

OPERATION PRINCIPLE

If temperature increases (≥72°C) in case of fire or hot gases the damper blade closes automatically.
Alternatively, the FCE damper may be released by a local switch or common building automation system.

FCE LEAKAGE IN FIRE CONDITIONS

Test pressure 300 Pa. Damper size 1000x1000 mm. Test according to EN 1366-2.



FIRE CLASSIFICATION ACCORDING TO EN 13501-3

EI 60 (ve ho i ↔ o) S
E 120 (ve ho i ↔ o) S

E: Integrity (against flames & hot gases)
I: Insulation (against heat)
S: Smoke leakage (against gases & smoke)
ve: Vertical installation
ho: Horizontal installation
i ↔ o: Fire direction, outside & inside duct
60 Minutes integrity and insulation
120 Minutes integrity

WEIGHTS ACCORDING TO FIRE RESISTANCE CLASS ES 120

STANDARD HALTON MARINE FCE DAMPERS (KG), WITHOUT AN ACTUATOR, FRAME THICKNESS 1 mm

H /	B / WIDTH (mm)																	
mm	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
150	7	7	8	9	10	11	11	12	13	14	15	16	16	17	18	19	20	21
200	7	8	9	10	11	11	12	13	14	15	16	17	17	18	19	20	21	22
250	8	9	10	11	11	12	13	14	15	16	17	17	18	19	20	21	22	22
300	10	11	12	13	14	15	16	18	19	20	21	22	23	24	25	26	27	28
350	11	12	13	14	15	16	18	19	20	21	22	23	24	25	26	27	28	29
400	12	13	14	15	17	18	19	20	21	22	23	24	25	26	27	28	29	30
450	14	16	17	18	20	21	22	23	25	26	27	29	30	31	33	34	35	36
500	16	17	18	19	21	22	23	25	26	27	29	30	31	32	34	35	36	38
550	17	18	19	21	22	23	24	26	27	28	30	31	32	34	35	36	37	39
600	18	19	20	22	23	24	26	27	28	29	31	32	33	35	36	37	39	40
650	20	21	23	24	26	28	29	31	32	34	35	37	38	40	41	43	44	46
700	21	23	24	26	27	29	30	32	33	35	36	38	39	41	42	44	45	47
750	22	24	25	27	28	30	31	33	34	36	37	39	40	42	43	45	47	48
800	23	25	26	28	29	31	32	34	35	37	38	40	42	43	45	46	48	49
850	25	27	29	31	32	34	36	38	39	41	43	45	46	48	50	52	53	55
900	27	28	30	32	34	35	37	39	41	42	44	46	48	49	51	53	55	56
950	28	29	31	33	35	36	38	40	42	43	45	47	49	50	52	54	56	57
1000	29	30	32	34	36	37	39	41	43	44	46	48	50	51	53	55	57	58

STANDARD HALTON MARINE FCE DAMPERS (KG), WITHOUT AN ACTUATOR, FRAME THICKNESS 3 mm

H /	B / WIDTH (mm)																	
mm	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
150	12	12	14	15	16	18	19	20	21	22	23	25	26	27	28	29	31	32
200	12	14	15	16	17	19	20	21	22	24	25	26	27	28	29	31	32	33
250	14	15	16	17	18	20	21	22	24	25	26	27	28	29	31	32	33	34
300	16	17	19	20	22	23	25	26	28	29	30	32	33	35	36	37	39	40
350	17	19	20	22	23	25	26	28	29	30	32	33	35	36	38	39	40	42
400	19	20	22	23	24	26	28	29	31	32	33	35	36	38	39	40	42	43
450	22	23	25	27	28	30	32	33	35	36	38	40	41	43	45	46	48	50
500	23	25	26	28	30	31	33	35	36	38	40	41	43	44	46	48	49	51
550	25	26	28	30	31	33	34	36	38	39	41	43	44	46	48	49	51	52
600	26	28	29	31	33	34	36	38	39	41	42	44	46	47	49	51	52	54
650	29	30	32	34	36	38	40	42	43	45	47	49	51	53	55	56	58	60
700	30	32	34	36	37	39	41	43	45	47	49	51	52	54	56	58	60	62
750	32	33	35	37	39	41	43	45	46	48	50	52	54	56	58	59	61	63
800	33	35	37	39	40	42	44	46	48	50	52	53	55	57	59	61	63	65
850	35	38	40	42	44	46	48	50	52	54	56	58	60	63	65	67	69	71
900	37	39	41	43	45	47	49	51	54	56	58	60	62	64	66	68	70	72
950	38	40	43	45	47	49	51	53	55	57	59	61	63	65	68	70	72	74
1000	40	42	44	46	48	50	52	54	56	59	61	63	65	67	69	71	73	75

Actuator options	Closing time	Material	Weight (appr.)
Ex/InMax-BF	3/10 seconds	Aluminium	3,5 kg
Ex/InMax-BF	3/10 seconds	Stainless steel	7 kg
QT.Ex-MFD	3 seconds	High Tech Polymer	4,1 kg
BF230-T	16 seconds	Steel	3,1 kg
BF24-T	16 seconds	Steel	2,8 kg

WEIGHTS ACCORDING TO FIRE RESISTANCE CLASS EI 60 S

STANDARD HALTON MARINE FCE DAMPERS (KG), WITHOUT AN ACTUATOR, FRAME THICKNESS 1 mm

H /	B / WIDTH (mm)																	
mm	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
150	7	8	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
200	8	9	10	11	11	12	13	14	15	16	17	18	19	20	21	22	23	24
250	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
300	11	12	13	14	16	17	18	19	21	22	23	25	26	27	28	30	31	32
350	12	13	14	16	17	18	20	21	22	24	25	26	27	29	30	31	33	34
400	13	14	16	17	18	20	21	22	24	25	26	28	29	30	32	33	34	36
450	15	17	18	20	22	23	25	26	28	30	31	33	34	36	38	39	41	42
500	16	18	20	21	23	25	26	28	29	31	33	34	36	38	39	41	42	44
550	18	19	21	23	24	26	28	29	31	33	34	36	38	39	41	43	44	46
600	19	21	22	24	26	27	29	31	32	34	36	38	39	41	43	44	46	48
650	21	23	25	27	29	31	33	35	37	39	41	43	45	47	48	50	52	54
700	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56
750	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58
800	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	56	58	60
850	27	29	32	34	36	39	41	43	46	48	50	52	55	57	59	62	64	66
900	28	31	33	35	38	40	42	45	47	49	52	54	56	59	61	63	66	68
950	29	32	34	37	39	41	44	46	48	51	53	56	58	60	63	65	67	70
1000	31	33	36	38	40	43	45	48	50	52	55	57	60	62	64	67	69	72

STANDARD HALTON MARINE FCE DAMPERS (KG), WITHOUT AN ACTUATOR, FRAME THICKNESS 3 mm

H /	B / WIDTH (mm)																	
mm	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
150	12	13	14	15	17	18	20	21	22	23	25	26	27	29	30	31	32	34
200	13	14	15	17	18	20	21	22	24	25	26	28	29	30	32	33	34	36
250	14	15	17	18	19	21	23	24	25	27	28	29	31	32	33	35	36	37
300	16	18	20	21	23	25	27	28	30	31	33	35	36	38	39	41	43	44
350	18	20	21	23	25	27	28	30	32	33	35	37	38	40	41	43	45	46
400	20	21	23	25	26	28	30	32	33	35	37	38	40	42	43	45	47	48
450	23	25	26	28	30	32	34	36	38	40	42	44	46	48	50	52	53	55
500	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58
550	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
600	27	29	31	33	35	37	39	41	43	46	48	50	52	54	56	58	60	62
650	30	32	34	37	39	41	44	46	48	50	53	55	57	60	62	64	66	69
700	31	34	36	38	41	43	45	48	50	52	55	57	59	62	64	66	68	71
750	33	35	38	40	42	45	47	49	52	54	56	59	61	63	66	68	71	73
800	35	37	39	42	44	46	49	51	54	56	58	61	63	65	68	70	73	75
850	37	40	42	45	48	50	53	56	58	61	63	66	69	71	74	77	79	82
900	39	41	44	47	49	52	55	57	60	63	65	68	71	73	76	79	81	84
950	40	43	46	48	51	54	56	59	62	65	67	70	73	75	78	81	83	86
1000	42	44	47	50	53	55	58	61	64	66	69	72	75	77	80	83	86	88

Actuator options	Closing time	Material	Weight (appr.)
Ex/InMax-BF	3/10 seconds	Aluminium	3,5 kg
Ex/InMax-BF	3/10 seconds	Stainless steel	7 kg
QT.Ex-MFD	3 seconds	High Tech Polymer	4,1 kg
BF230-T	16 seconds	Steel	3,1 kg
BF24-T	16 seconds	Steel	2,8 kg

FDA A0(A60) FIRE AND GAS DAMPER

For offshore, marine and navy ventilation systems

APPLICATIONS

Halton FDA fire dampers are type-approved class A0(A60) fire and gas dampers for use in offshore, marine and navy ventilation systems. The FDA can be installed in rectangular or circular ducts. All fire dampers have a fusible link and they prevent the spread of fire and gases within the ventilation ductwork. When the blades are in the open position, the device does not cause significant pressure loss, noise or flow disturbance. An open-closed indicator is visible on the outside of the damper. Fire dampers with non-standard dimensions can be supplied on request.

MATERIALS

PART	MATERIAL	FINISHING
Frame	Carbon steel	Painted or galvanised
Frame	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316L), EN 1.4432 (AISI316L)	-
Blades	Steel	Galvanized
Blades	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316L), EN 1.4432 (AISI316L)	-
Maintenance-free bearings	Oil bronze. Stainless steel EN 1.4404 (AISI316L) available as an option	-
Shafts	Stainless steel EN 1.4404 (AISI316L)	-

FEATURES

- Type-approved by most recognized classification societies: A0 without insulation, A-15 to A-60 when suitably insulated
- Available as ATEX certified
- Blades contain stainless spring steel seals for low leakage in normal conditions and thermal expansion graphite seals (effective from 150°C) to seal the damper in case of fire.
- Closed damper fulfills the requirement of leakage class 3 (EN1751:2014) for size ≥ 300x300 mm and for size ≥ 200x200 mm (silicon seals). Casing leakage class C.
- Nominal strip fuse release temperature 50°C, 74°C or 100°C. Other temperatures available.
- Nominal glass bulb fuse release available as an option with temperatures 68°C or 93°C. Other temperatures available.
- Low weight due to double skin blade structure
- Electrical or pneumatic operation system
- Maximum duct pressure for damper construction 5000 Pa and maximum air velocity 15 m/s
- Normal operation temperature for damper between -50°C to +80°C. Actuator and component selection can have an effect on this temperature range. Other temperatures available on request

FDA PRODUCT OPTIONS

Halton FDA is available with following actuators:

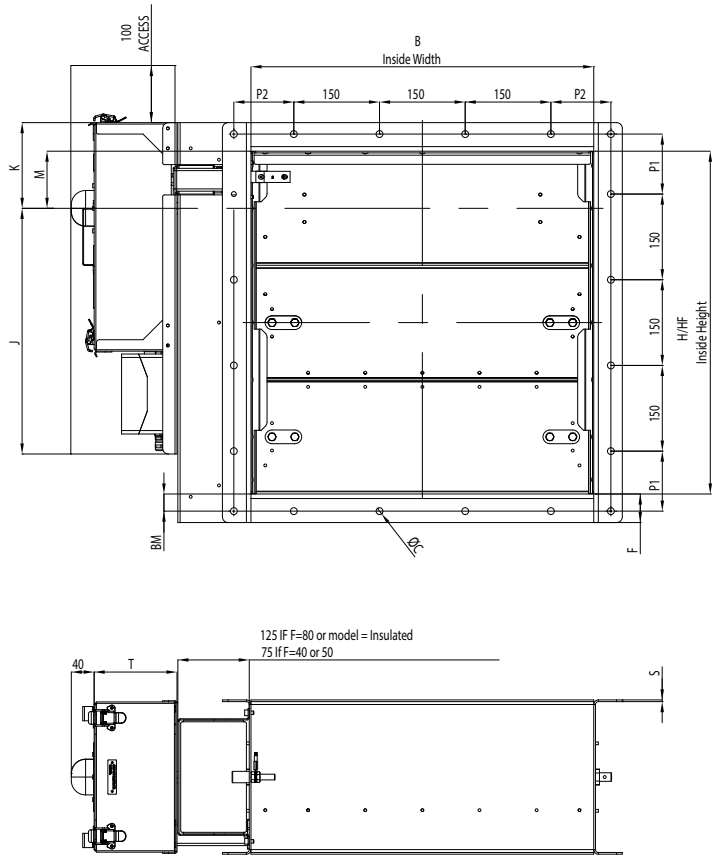
- FDA-EL: Electrical spring return actuator; standard actuators being 24 VAC/DC or 230 VAC or 120 VAC. Depending of the choice of actuator, the actuator might contain built-in open-closed limit switches. Separate junction box included in the EL-model. A wide range of Ex actuators available, including a one second closing time function as an option.
- FDA-PNR: Pneumatic rotating actuator

HSO: Halton Smart Override function for HVAC damper black-start available for PNR and EL models. With automatic reset function when power and/or pneumatic air supply is reinstated.

A wide range of accessories available.

Halton

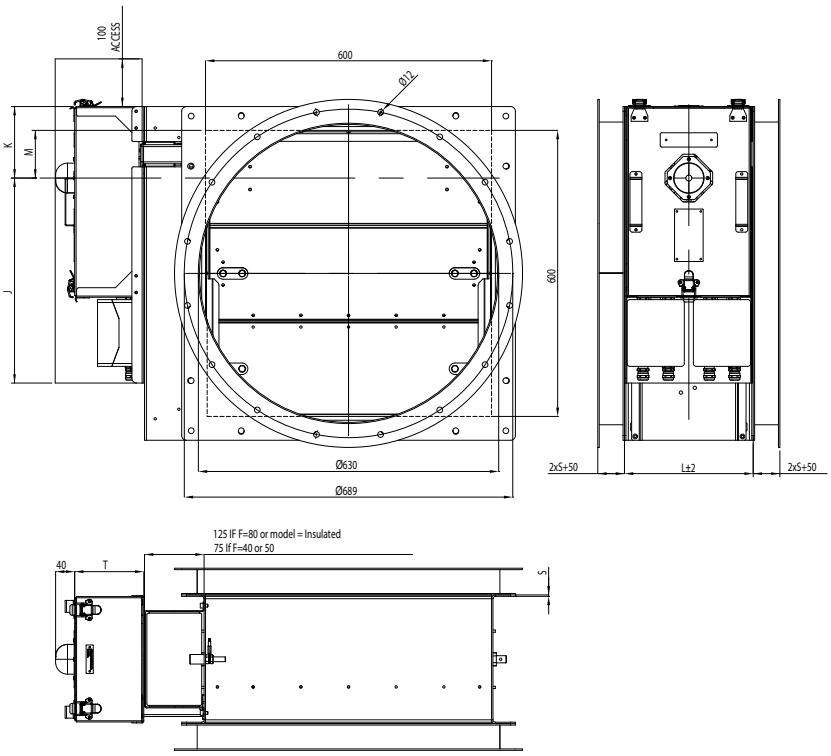
GENERAL FDA DRAWINGS



Actuator	J	K	T
AT100	430	150	145
AT100+Halton smart override	510	150	255
AT200	510	150	165
AT200+Halton smart override	510	150	275
AT300	510	180	190
AT300+Halton smart override	510	180	300
Belimo BF	430	150	125
Belimo BF (Damper height<200)	430	90	125
Schischek S	430	150	145
Schischek S (Damper height<200)	430	90	145
Schischek S+Halton smart override	440	220	235
Schischek M	510	150	175
Schischek M+Halton smart override	440	220	165

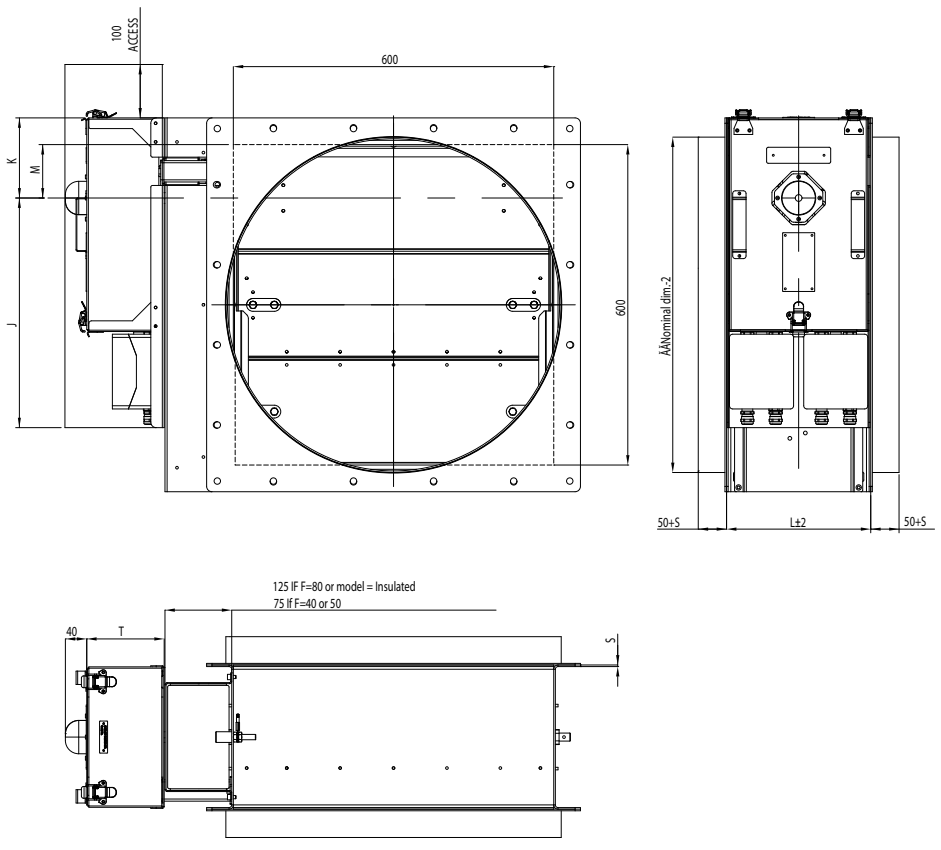
Material Thickness	Depth
S	L
3	270
4	272
5	275

H Nominal height	HF Free height	M Drive
200	200	100
250	250	125
300	250	125
350	250	125
400	400	100
450	450	125
500	500	125
550	500	125
600	600	100
650	650	125
700	700	125
750	750	125
800	800	100
850	850	125
900	900	125
950	950	125
1000	1000	125
1050	1050	125
1100	1100	125
1150	1150	125
1200	1200	125
1250	1250	125
1300	1300	125
1350	1350	125
1400	1400	125
1450	1450	125
1500	1500	125
1550	1500	125
1600	1500	125



Flange dimensions according to ISO 15138

Nominal Duct Size (Ø D)	Bolt Circle (Ø E)	Bolt hole Size (Ø C)	No. Of Bolts
100	145	10	4
125	170	10	4
150	195	10	4
160	205	10	4
200	245	10	8
250	295	10	8
275	320	10	8
300	345	10	8
315	360	10	8
355	400	10	8
400	459	12	8
450	509	12	12
500	559	12	12
560	619	12	12
600	659	12	16
630	689	12	16
700	759	12	16
710	769	12	16
800	859	12	24
900	959	12	24
1000	1059	12	24
1120	1209	14	24
1200	1289	14	32
1250	1339	14	32
1400	1489	14	32



FDA DIMENSIONS AND MATERIAL THICKNESS

FDA fire dampers meet international standards for both rectangular (width B 200-1200 mm with 25 mm division and height H 200-1600 mm with 50 mm division) and circular ducts (Ø200-1250 mm). Modular constructions up to 2500x2600 mm available.
Non-standard dimensions and flange drilling available on request. Standard flanges and drilling according to ISO 15138 standards. Frame thickness 3 mm or 3-5 mm according to SOLAS. Blades are made of two sheets, each of being 1 mm thick (sandwich design).

FRAME THICKNESS ACCORDING TO SOLAS

DIMENSIONS	S
If B or H ≥ 100 and ≤ 449	3
If B or H ≥ 450 and ≤ 649	4
If B or H ≥ 650	5

EDITION DEC. 2015

DIMENSIONS	S
If A < 0.075 m2	3
If A ≥ 0.075 and A ≤ 0.45 m2	4
If A > 0.45 m2	5

FLANGE DIMENSIONS ACCORDING TO ISO 15138

DIMENSIONS	ØC	F	P1	P2	BM
If longest side ≤ 350	10	40	75...150	75...150	20
If longest side 351...1000	12	50	75...150	75...150	30
If longest side ≥ 1001	14	80	75...150	75...150	40

CIRCULAR FLANGE DIMENSIONS ACCORDING TO ISO 15138

DIMENSIONS	Ø C	F
If Ø D ≤ 355	10	40
If Ø D 356...1000	12	50
If Ø D ≥ 1001	14	80

OPERATION PRINCIPLE

In the event of a temperature rise in ductwork:

- FDA-EL: fusible link releases and cuts off operating voltage to the spring return motor, allowing the spring to close the damper blades. The fire damper opens automatically when the fuse has been changed and the operating voltage to the motor is re-established.
- FDA-PNR: fusible link releases and cuts off operating pressure to the spring return actuator, allowing springs to close the damper blades. The fire damper opens automatically when the fuse has been changed and the pneumatic air supply is re-established.

WEIGHTS

STANDARD HALTON MARINE FDA DAMPERS (KG) without an actuator.
Frame thickness 3 mm.

H/HEIGHT	B / WIDTH (mm)										
mm	200	300	400	500	600	700	800	900	1000	1100	1200
200	18	20	23	26	29	32	35	38	40	43	46
300	21	24	27	29	32	35	38	41	44	47	49
400	26	29	33	36	39	42	46	49	52	56	59
500	30	33	36	40	43	46	50	53	56	59	63
600	35	39	42	46	50	54	57	61	65	69	72
700	39	42	46	50	54	57	61	65	69	72	76
800	44	48	52	56	60	65	69	73	77	81	86
900	47	52	56	60	64	68	73	77	81	85	89
1000	51	55	60	64	68	72	76	81	85	89	93
1100	56	61	66	70	75	80	84	89	93	98	103
1200	60	65	69	74	79	83	88	93	97	102	106
1300	65	70	75	80	86	91	96	101	106	111	116
1400	69	74	79	84	89	94	99	105	110	115	120
1500	73	78	83	88	93	98	103	108	113	119	124
1600	76	82	87	92	97	102	107	112	117	122	127

Approximate weights without an actuator. Flanges according to ISO 15138.

STANDARD HALTON MARINE FDA DAMPERS (KG) without an actuator.
Frame thickness according to SOLAS (based on longest duct side).

H/HEIGHT	B / WIDTH (mm)										
mm	200	300	400	500	600	700	800	900	1000	1100	1200
200	18	21	24	31	34	43	48	52	56	60	65
300	21	24	27	35	38	48	52	57	61	65	69
400	26	30	33	42	46	57	62	66	71	76	80
500	34	38	42	46	50	62	67	72	76	81	86
600	40	45	49	54	58	71	76	81	86	92	97
700	50	56	61	66	71	76	81	87	92	97	102
800	57	63	68	74	79	85	91	96	102	107	113
900	62	68	73	79	85	90	96	101	107	113	118
1000	68	73	79	84	90	95	101	107	112	118	123
1100	74	80	86	92	98	104	110	116	122	128	134
1200	79	85	91	97	103	110	116	122	128	134	140
1300	86	92	99	105	112	118	125	131	138	144	151
1400	91	98	104	111	117	124	130	137	143	150	156
1500	96	103	109	116	122	129	135	142	148	155	161
1600	102	108	115	121	128	134	141	147	154	160	166

Approximate weights without an actuator. Flanges according to ISO 15138.

STANDARD HALTON MARINE FDA DAMPERS (KG) without an actuator.
Frame thickness according to SOLAS Edition Dec. 2015 (based on duct cross-section area).

H/HEIGHT	B / WIDTH (mm)										
mm	200	300	400	500	600	700	800	900	1000	1100	1200
200	18	21	27	31	34	38	41	45	48	52	55
300	21	28	31	35	38	42	45	49	52	56	60
400	30	34	38	42	46	50	54	58	62	66	80
500	34	38	42	46	50	54	58	62	76	81	86
600	40	45	49	54	58	62	76	81	86	92	97
700	45	49	54	58	63	76	81	87	92	97	102
800	51	56	60	65	79	85	91	96	102	107	113
900	55	60	65	70	85	90	96	101	107	113	118
1000	60	65	70	84	90	95	101	107	112	118	123
1100	66	71	76	92	98	104	110	116	122	128	134
1200	70	75	91	97	103	110	116	122	128	134	140
1300	76	82	99	105	112	118	125	131	138	144	151
1400	80	86	104	111	117	124	130	137	143	150	156
1500	85	91	109	116	122	129	135	142	148	155	161
1600	90	108	115	121	128	134	141	147	154	160	166

Approximate weights without an actuator. Flanges according to ISO 15138.

PNEUMATIC ACTUATORS FOR FDA ACCORDING TO SIZE OF THE DAMPER

H/HEIGHT	B / WIDTH (mm)										
mm	200	300	400	500	600	700	800	900	1000	1100	1200
200	AT100	AT100	AT100	AT100	AT100	AT100	AT200	AT200	AT200	AT200	AT200
300	AT100	AT100	AT100	AT100	AT100	AT100	AT200	AT200	AT200	AT200	AT200
400	AT100	AT100	AT100	AT100	AT200	AT200	AT200	AT200	AT200	AT200	AT200
500	AT100	AT100	AT100	AT100	AT200	AT200	AT200	AT200	AT200	AT200	AT200
600	AT100	AT100	AT200	AT200	AT200	AT200	AT200	AT200	AT200	AT300	AT300
700	AT100	AT100	AT200	AT200	AT200	AT200	AT200	AT200	AT200	AT300	AT300
800	AT100	AT100	AT200	AT200	AT200	AT200	AT200	AT300	AT300	AT300	AT300
900	AT100	AT100	AT200	AT200	AT200	AT200	AT200	AT300	AT300	AT300	AT300
1000	AT100	AT100	AT200	AT200	AT200	AT200	AT200	AT300	AT300	AT300	AT300
1100	AT100	AT200	AT200	AT200	AT200	AT200	AT300	AT300	AT300	AT300	AT300
1200	AT100	AT200	AT200	AT200	AT200	AT200	AT300	AT300	AT300	AT300	AT300
1300	AT100	AT200	AT200	AT200	AT200	AT300	AT300	AT300	AT300	AT300	AT300
1400	AT100	AT200	AT200	AT200	AT200	AT300	AT300	AT300	AT300	AT300	AT300
1500	AT100	AT200	AT200	AT200	AT200	AT300	AT300	AT300	AT300	AT300	AT300
1600	AT100	AT200	AT200	AT200	AT200	AT300	AT300	AT300	AT300	AT300	AT300

Approximate weights of pneumatic rotary actuator AirTorque. FDA-PNR AT101 as aluminium +1,8 kg, AT104 as stainless steel 4,0 kg, AT201 as aluminium +3,2kg, AT204 as stainless steel +6,4 kg, AT301 as aluminium +6,0 kg, AT304 as stainless steel +13,3 kg.
Other actuators available on request.

ELECTRIC ACTUATORS FOR FDA ACCORDING TO SIZE OF THE DAMPER

H/HEIGHT	B / WIDTH (mm)										
mm	200	300	400	500	600	700	800	900	1000	1100	1200
200	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF
300	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF
400	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF
500	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF
600	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF
700	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF
800	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF
900	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF
1000	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF
1100	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF
1200	Ex/Inmax-15-SF	Ex/Inmax-15-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF
1300	Ex/Inmax-15-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF
1400	Ex/Inmax-15-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF
1500	Ex/Inmax-15-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF
1600	Ex/Inmax-15-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-30-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF

Electric rotary actuator Schischek ExMax or InMax.

Actuator options	Closing time	Material	Weight (appr.)
Ex/InMax-15-SF	3 seconds	Aluminium	3,5 kg
Ex/InMax-15-SF	3 seconds	Stainless steel	7,0 kg
Ex/InMax-15-SF1	1 second	Aluminium	3,5 kg

Electric rotary actuator Schischek ExMax or InMax.

Actuator options	Closing time	Material	Weight (appr.)
Ex/InMax-15-SF1	1 second	Stainless steel	7,0 kg
Ex/InMax-30-SF3	3 seconds	Aluminium	9,5 kg
Ex/InMax-50-SF3	3 seconds	Aluminium	9,5 kg

FDO A0(A60) FIRE AND GAS DAMPER

For offshore, marine and navy ventilation systems

APPLICATIONS

Halton FDO fire dampers are type-approved class A0(A60) fire dampers for use in in offshore, marine and navy ventilation systems. The FDO can be installed in circular ducts. All fire dampers have a fusible link and they prevent the spread of fire within the ventilation ductwork. When the blade is in the open position, the device does not cause significant pressure loss, noise or flow disturbance. Fire dampers are set from outside and can be installed in any position. An open-closed indicator is visible on the outside of the damper.

MATERIALS

PART	MATERIAL	FINISHING
Frame	Carbon steel	Painted or galvanised
Frame	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316L), EN 1.4432 (AISI316L)	-
Blades	Steel	Galvanized
Blades	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316L), EN 1.4432 (AISI316L)	-
Maintenance-free bearings	Stainless steel EN 1.4404 (AISI316L)	-
Shafts	Stainless steel EN 1.4404 (AISI316L)	-

FEATURES

- Type-approved by most recognized classification societies, class A0 - A60 fire damper when suitably insulated
- Availabe as ATEX approved
- Fixed frame of painted, galvanized or stainless steel. Blades stainless or galvanized steel. Flanges available as an option.
- Blade contains seals (effective up to 270 °C)
- Nominal fuse release temperature 50 °C, 74 °C or 100 °C. Other temperatures available.
- Very low leakage. See below table.
- Automatic electrical, pneumatic or spring operation system available
- Maximum duct pressure for damper construction 5000 Pa and maximum air velocity 15 m/s
- Normal operation temperature for damper between -50 °C to +80 °C. Actuator and component selection can have an effect on this temperature range. Other temperatures available on request

FDO PRODUCT OPTIONS

Halton FDO is available with following actuators:

- Halton FDO is available with following actuators:
- FDO-EL: Electrical spring return motor; standard actuators being 24 V or 230 V or 120 V. The motor contains built-in open-closed limit switches. Separate junction box included in the EL-model. A wide range of Ex actuators available, including a one second closing time function as an option.
- FDO-PNR: Pneumatic rotating actuator
- FDO-SP: Manual spring-actuated damper with fusible link

DOT: manual override function available for PNR and EL models.

HSO: Halton Smart Override function for HVAC damper black-start available for PNR and EL models. With automatic reset function when power and/or pneumatic air supply is reinstated.

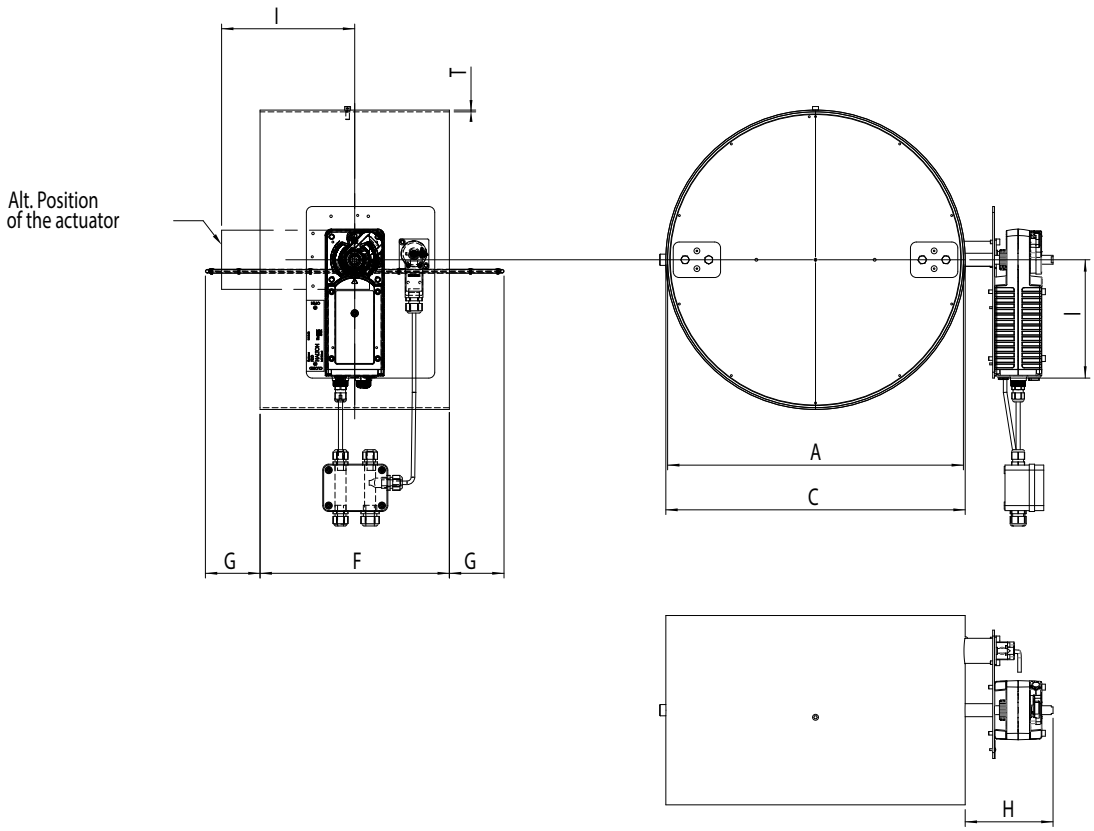
A wide range of accessories available.

FDO LEAKAGE CLASS ACCORDING TO STANDARD EN1751:2014

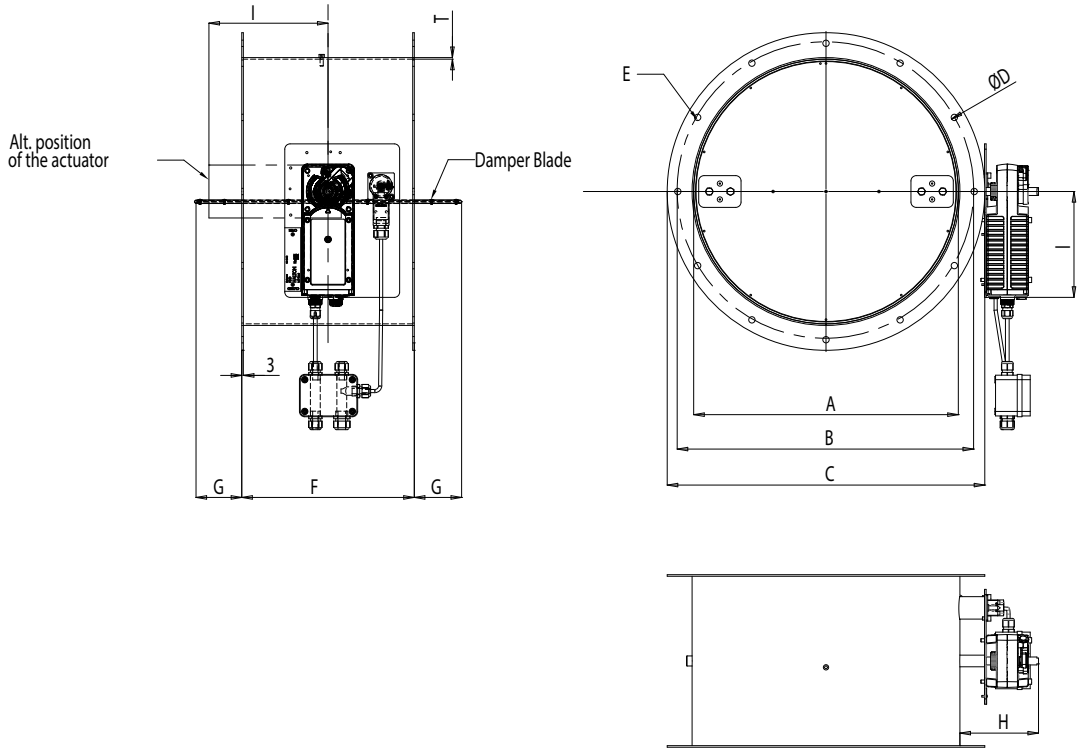
SIZE ØD (mm)	CLOSED DAMPER LEAKAGE	CASING LEAKAGE
100	2	C
125	2	C
160	3	C
200	3	C
250	3	C
315	3	C
400	3	C
500	4	C

GENERAL FDO DRAWINGS

WITHOUT FLANGES



WITH FLANGES



FDO DIMENSIONS AND MATERIAL THICKNESS

FDO fire dampers meet international standards for circular ducts (Ø100-500 mm). Sizes Ø100 and Ø125 are not available of stainless steel. Sizes starting from Ø160 can be manufactured with 1 mm division. Flanges and drilling available as an option and according to ISO 15138 standards. Special flanges and drilling available on request. Frame material thickness 3 mm or according to SOLAS. Flap is made of two sheets, each of being 1 mm thick (riveted together).

FDO DIMENSIONS WITHOUT FLANGES (STANDARD)

						FDO-EL				FDO-PNR				FDO-SP	
Damper size	Inside dimensions	Outside dimensions	Material thickness	Housing Lenght	Blade	Elodrive CSQP /Schischek		Belimo BF		Air Torque AT50		Air Torque AT100		Spring	
Ø	A	C	T	F	G	H	I	H	I	H	I	H	I	H	I
100	100,8	108	3,6	200	-	150	200	115	200	145	215	165	215	150	115
125	125	133	4	200	-	150	200	115	200	145	215	165	215	150	115
160	160	166	3	200	-	150	200	115	200	145	215	165	215	150	115
200	200	206	3	320	-	150	200	115	200	145	215	165	215	150	115
250	250	256	3	320	-	150	200	115	200	145	215	165	215	150	115
315	315	321	3	320	-	150	200	115	200	145	215	165	215	150	115
400	400	408	4	320	43	150	200	115	200	145	215	165	215	150	115
500	500	508	4	320	93	150	200	115	200	145	215	165	215	150	115

FDO DIMENSIONS WITH FLANGES (AS AN OPTION)

									FDO-EL				FDO-PNR		FDO-SP	
Damper size	Inside dimensions	Bolt circle	Outside dimensions	Material thickness	Bolt holes	Bolt holes Qty	Housing Lenght	Blade	Elodrive CSQP/ Schischek		Belimo BF		Air Torque AT 50		Spring	
Ø	A	B	C	T	D	E	F	G	H	I	H	I	H	I	H	I
100	100,8	120	200	3,6	8,5	4	206	-	150	200	115	200	135	105	150	115
125	125	150	225	4	8,5	4	206	-	150	200	115	200	135	105	150	115
160	160	185	260	3	8,5	4	206	-	150	200	115	200	135	105	150	115
200	200	225	300	3	8,5	4	326	-	150	200	115	200	135	105	150	115
250	250	280	350	3	12	4	326	-	150	200	115	200	135	105	150	115
315	315	355	415	3	12	8	326	-	150	200	115	200	135	105	150	115
400	400	450	500	3	12	8	326	40	150	200	115	200	135	105	150	115
500	500	560	600	3	12	12	326	90	150	200	115	200	135	105	150	115

OPERATION PRINCIPLE

In the event of a temperature rise in ductwork:

- FDO-EL: fusible link releases and cuts off operating voltage to the spring return motor, allowing the spring to close the damper blades. The fire damper opens automatically when the fuse has been changed and the operating voltage to the motor is re-established.
- FDO-PNR: fusible link releases and cuts off operating pressure to the spring return actuator, allowing springs to close the damper blades. The fire damper opens automatically when the fuse has been changed and the pneumatic air supply is re-established.
- FDO-SP: fusible link releases allowing the spring to close the damper blades. When the fuse has been changed, the fire damper must be reset into open position manually.

WEIGHTS

STANDARD HALTON MARINE FDO DAMPERS (KG) without an actuator

FDO WEIGHT WITHOUT FLANGES	
Size ØD (mm)	KG
100	4
125	4,5
160	4,6
200	7,5
250	9
315	12
400	17
500	22,5

FDO WEIGHT WITH FLANGES	
Size ØD (mm)	KG
100	5
125	5,7
160	6,1
200	9,5
250	11
315	14,5
400	20,1
500	26,3

Weights stated above do not include flanges or any actuator.
Examples of actuator weights: **FDO-EL** CSQP +3,5 kg, BF230 +3,2 kg, BLF230 +1,7 kg, ExMax or RedMax or InMax +3,5 kg, **FDO-PNR** AT100 (AISI) +6,2 kg, AT50 (AISI) +3 kg, **FDO-SP** +1 kg.

FDB2 A0(A60) FIRE AND GAS DAMPER

For offshore, marine and navy ventilation systems

MATERIALS

PART	MATERIAL	FINISHING
Frame	Carbon steel	Painted or galvanised
Frame	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316L), EN 1.4432 (AISI316L)	-
Blades	Steel	Galvanized
Blades	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316L), EN 1.4432 (AISI316L)	-
Maintenance-free bearings	Stainless steel EN 1.4404 (AISI316L)	-
Shafts	Stainless steel EN 1.4404 (AISI316L)	-

FDB2 PRODUCT OPTIONS

Halton FDB2 is available with following actuators:

- FDB2-EL: Electrical spring return motor; standard actuators being 24 V or 230 V or 120 V. The motor contains built-in open-closed limit switches. Separate junction box included in the EL-model. A wide range of Ex actuators available, including a one second closing time function as an option.
- FDB2-PNR: Pneumatic rotating actuator
- FDB2-SP: Manual spring-actuated damper with fusible link

DOT: manual override function available for PNR and EL models.

HSO: Halton Smart Override function for HVAC damper black-start available for PNR and EL models. With automatic reset function when power and/or pneumatic air supply is reinstated.

A wide range of accessories available.

APPLICATIONS

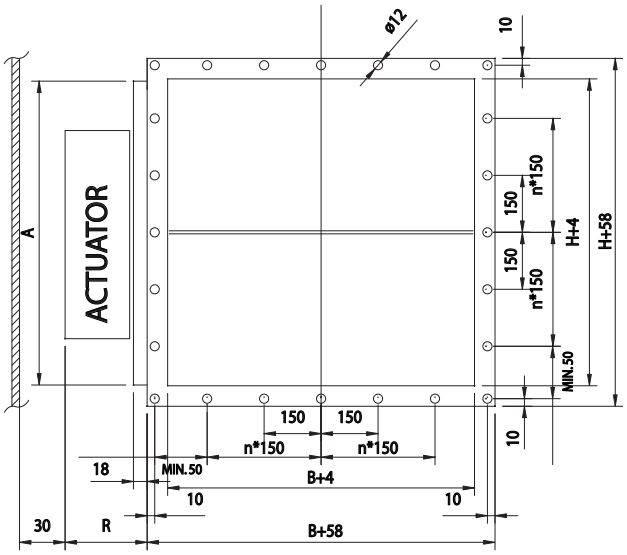
Halton FDB2 fire dampers are type-approved class A0(A60) fire and gas dampers for use in offshore, marine and navy ventilation systems. The FDB2 can be installed in rectangular or circular ducts. All fire dampers have a fusible link and they prevent the spread of fire and gases within the ventilation ductwork. When the blades are in the open position, the device does not cause significant pressure loss, noise or flow disturbance. Fire dampers are set from outside and can be installed in any position. An open-closed indicator is visible on the outside of the damper. Fire dampers with non-standard dimensions can be supplied on request.

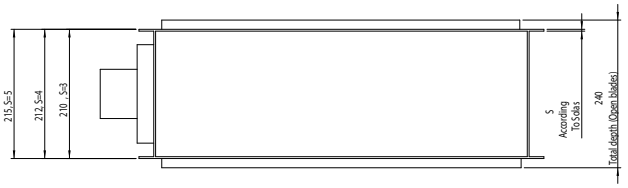
FEATURES

- Type-approved by most recognized classification societies: class A0 without insulation, A15-A60 when suitably insulated
- Available as ATEX certified
- Shock and vibration tested
- Blades contain silicone seals (effective up to 300 °C) for low leakage in normal conditions and thermal expansion graphite seals (effective from 150 °C) to increase tightness even up to 50% in a case of fire.
- Closed damper fulfills the requirement of leakage (EN1751:2014) from class 1 to class 3 depending on size. Details available from Halton Marine.
- Casing leakage (EN1751:2014) class B
- Nominal fuse release temperature 50 °C, 74 °C or 100 °C. Other temperatures available.
- Low weight due to patented double skin blade structure
- Automatic electrical, pneumatic or spring operation system available
- Maximum duct pressure for damper construction 5000 Pa and maximum air velocity 15 m/s
- Normal operation temperature for damper between -50 °C to +80 °C. Actuator and component selection can have an effect on this temperature range. Other temperatures available on request

Halton

GENERAL FDB2 DRAWINGS





DAMPER HEIGHT	TOTAL DEPTH WITH BLADES OPEN
< 250 mm	210 mm
≥ 250 mm < 300 mm	250 mm
≥ 300 mm < 349 mm	210 mm
≥ 350 mm	240 mm

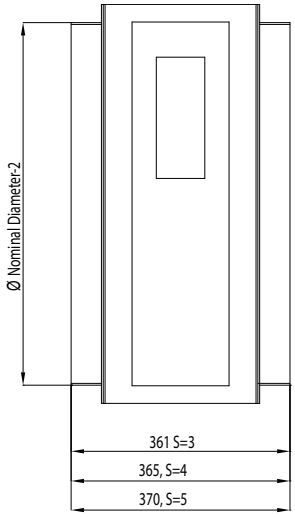
FDB2 DIMENSIONS AND MATERIAL THICKNESS

FDB2 fire dampers meet international standards for both rectangular (width B 100-1200 mm and height H 100-1600 mm, 1 mm division) and circular ducts (Ø100-1250 mm). Modular constructions are available for bigger sizes. Non-standard dimensions and flange drilling available on request. Standard flange width 27 mm. Flanges and drilling also available according to ISO 15138 standards. Frame thickness 3 mm or 3-5 mm according to SOLAS. Also 6, 8 and 10 mm frame thicknesses are available on request. Blades are made of two sheets, each of them being 1 mm thick (sandwich design).

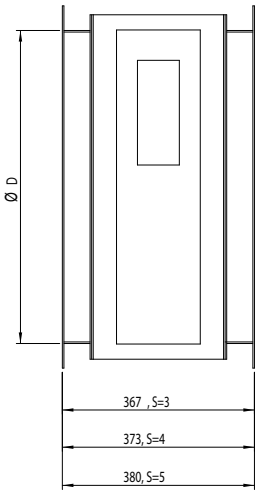
FRAME THICKNESS ACCORDING TO SOLAS

DIMENSIONS	S
If B or H ≥ 100 and ≤ 449	3
If B or H ≥ 450 and ≤ 649	4
If B or H ≥ 650	5

FDB2 CIRCULAR CONNECTIONS



FDB2 CIRCULAR, WITH CONNECTION FLANGES



ACTUATOR EFFECT ON DIMENSIONS

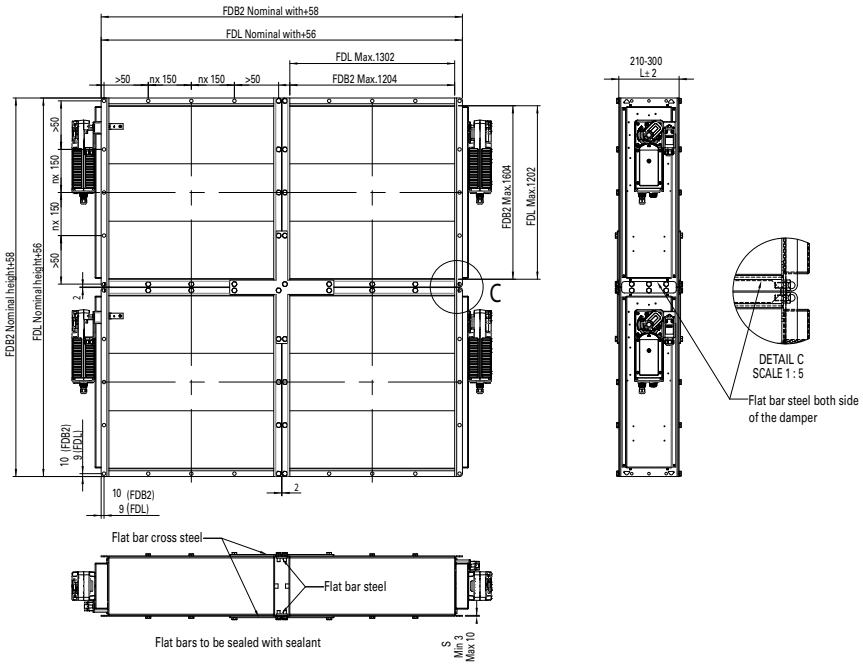
ACTUATOR		DIMENSIONS	
		R	A
Electrical	BF230, BF24, BF120	100	H ≤ 300 = 300 H > 300 = H
Pneumatic PNR	Pneumatic rotating actuator AT100	170	H ≤ 300 = 300 H > 300 = H
Pneumatic PNR	Pneumatic rotating actuator AT200	190	H ≤ 350 = 350 H > 350 = H
Spring	Spring	140	H

The above table contains only some examples of actuators and their effect on dimensions.

EDITION DEC. 2015

DIMENSIONS	S
If A < 0.075 m2	3
If A ≥ 0.075 and A ≤ 0.45 m2	4
If A > 0.45 m2	5

GENERAL FDB2 MODULE ASSEMBLY



Size limitation: nominal width 2060 mm x nominal height 3260 mm or nominal width 2460 mm x nominal height 2860 mm

OPERATION PRINCIPLE

In the event of a temperature rise in ductwork:

- FDB2-EL: fusible link releases and cuts off operating voltage to the spring return motor, allowing the spring to close the damper blades. The fire damper opens automatically when the fuse has been changed and the operating voltage to the motor is re-established.
- FDB2-PNR: fusible link releases and cuts off operating pressure to the spring return actuator, allowing springs to close the damper blades. The fire damper opens automatically when the fuse has been changed and the pneumatic air supply is re-established.
- FDB2-SP: fusible link releases allowing the spring to close the damper blades. When the fuse has been changed, the fire damper must be reset into open position manually.

WEIGHTS

STANDARD HALTON MARINE FDB2 DAMPERS (KG) without an actuator

H/HEIGHT	B / WIDTH (mm)													
mm	100	200	300	400	500	600	700	800	900	1000	1100	1200	D2 ØD	WEIGHT
100	5 (5)	7 (7)	9 (9)	10 (10)	12 (13)	14 (15)	15 (22)	17 (25)	19 (27)	20 (30)	22 (32)	24 (35)	mm	kg
200	7 (7)	9 (9)	11 (11)	12 (12)	14 (16)	16 (18)	18 (26)	20 (28)	22 (31)	23 (34)	25 (36)	27 (39)	100	8 (8)
300	9 (9)	11 (11)	13 (13)	15 (15)	17 (19)	19 (21)	21 (30)	23 (32)	25 (35)	27 (38)	29 (41)	31 (43)	125	8 (8)
400	11 (11)	13 (13)	15 (15)	17 (17)	20 (22)	22 (24)	24 (33)	26 (36)	28 (39)	30 (42)	32 (45)	34 (48)	160	12 (12)
500	13 (16)	16 (19)	18 (22)	21 (25)	23 (27)	25 (30)	28 (38)	30 (41)	32 (44)	35 (47)	37 (50)	39 (54)	200	13 (13)
600	15 (18)	18 (21)	20 (24)	23 (27)	25 (30)	28 (33)	30 (41)	33 (45)	35 (48)	38 (51)	40 (55)	43 (58)	250	19 (19)
700	18 (25)	21 (28)	23 (32)	26 (35)	29 (39)	32 (42)	34 (46)	37 (50)	40 (53)	42 (57)	45 (60)	48 (64)	315	20 (20)
800	20 (27)	23 (31)	25 (35)	28 (38)	31 (42)	34 (46)	37 (50)	40 (53)	43 (57)	46 (61)	49 (64)	51 (68)	400	27 (27)
900	22 (31)	25 (35)	28 (39)	32 (42)	35 (46)	38 (50)	41 (54)	44 (58)	47 (62)	50 (66)	53 (70)	56 (74)	500	35 (43)
1000	24 (33)	27 (37)	31 (41)	34 (45)	37 (50)	40 (54)	44 (58)	47 (62)	50 (66)	53 (70)	57 (74)	60 (78)	630	46 (62)
1100	26 (36)	30 (41)	33 (45)	37 (49)	40 (54)	44 (58)	47 (62)	51 (67)	54 (71)	58 (75)	61 (79)	65 (84)	800	62 (89)
1200	28 (39)	32 (44)	36 (48)	39 (52)	43 (57)	46 (61)	50 (66)	54 (70)	57 (75)	61 (79)	65 (84)	68 (88)	1000	83 (118)
1300	31 (42)	35 (47)	38 (52)	42 (56)	46 (61)	50 (66)	54 (70)	58 (75)	62 (80)	65 (84)	69 (89)	73 (94)	1250	113 (162)
1400	32 (45)	37 (50)	41 (55)	45 (59)	49 (64)	53 (69)	57 (74)	61 (79)	65 (84)	69 (88)	73 (93)	77 (98)		
1500	35 (48)	39 (53)	43 (58)	48 (63)	52 (68)	56 (73)	60 (78)	65 (83)	69 (89)	73 (94)	77 (99)	82(104)		
1600	36 (51)	41 (56)	45 (61)	50 (66)	54 (72)	59 (77)	63 (82)	67 (87)	72 (92)	76 (98)	81 (103)	85 (108)		

(Frame thickness according to SOLAS)

Examples of actuator weights: **FDB2-EL** GGA 326.1E 2,3 kg, GNA 326.1E 1,3 kg, BF230 +3,2 kg, BLF230 +1,7 kg, ExMax/Redmax +3,5 kg, CSQP +3 kg, **FDB2-PNR** AT100 +2,1 kg, AT100 as AISI316 4,4 kg, AT200 +3,2kg, AT200 as AISI316 +6,2 kg, **FDB2-SP** +1 kg.
Control enclosure +4 kg.

FDL A0(A60) FIRE DAMPER

For offshore, marine and navy ventilation systems

APPLICATIONS

Halton FDL fire dampers are type-approved class A0(A60) fire dampers for use in offshore, marine and navy ventilation systems. The FDL can be installed in rectangular or circular ducts. The FDL dampers are used to prevent the spread of fire within the ventilation ductwork. All fire dampers have a fusible link and spring return actuator. When the blades are in the open position, the device does not cause significant pressure loss or flow disturbance. Fire dampers are set from outside and can be installed in any position. An open-closed indicator is visible on the outside of the damper. Fire dampers with non-standard dimensions can also be supplied on request.

MATERIALS

PART	MATERIAL	FINISHING
Frame	Carbon steel	Painted or galvanised
Frame	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316L), EN 1.4432 (AISI316L)	-
Blades	Steel	Galvanized
Blades	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316L), EN 1.4432 (AISI316L)	-
Maintenance-free bearings	Stainless steel EN 1.4404 (AISI316L)	-
Shafts	Stainless steel EN 1.4404 (AISI316L)	-

FEATURES

- Type-approved by most recognized classification societies: class A0 without insulation, A15-A60 when suitably insulated
- Available as ATEX approved
- Shock and vibration tested
- Blades with intumescent seals
- Closed damper fulfills the requirement of leakage class (EN1751:2014) from class 1 to class 2 depending on the size. Details available from Halton Marine.
- Casing leakage (EN1751:2014) class B
- Nominal fuse release temperature 50 °C, 74 °C or 100 °C. Other temperatures available.
- Can be installed in any position
- Automatic electrical, pneumatic or spring operation system available
- Maximum duct pressure for damper construction 5000 Pa and maximum air velocity 15 m/s
- Normal operation temperature for damper between -50 °C to +80 °C. Actuator and component selection can have an effect on this temperature range. Other temperatures available on request

FDL PRODUCT OPTIONS

Halton FDL is available with following actuators:

- FDL-EL: Electrical spring return motor; standard actuators being 24 V or 230 V or 120 V. The motor contains built-in open-closed limit switches. Separate junction box included in the EL-model. A wide range of Ex actuators available, including a one second closing time function as an option.
- FDL-PNR: Pneumatic rotating actuator
- FDL-SP: Manual spring-actuated damper with fusible link

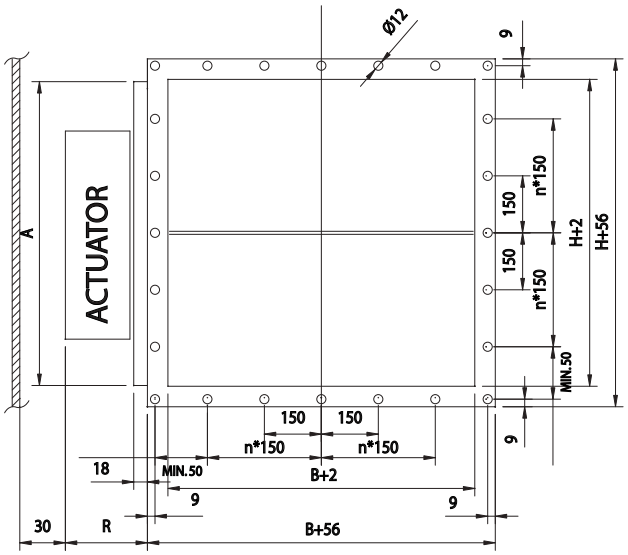
DOT: manual override function available forPNR and EL models.

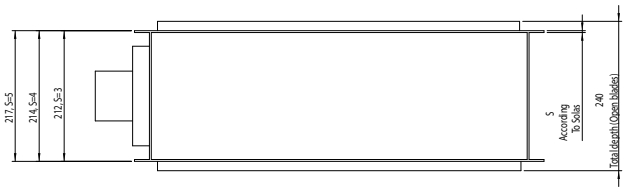
HSO: Halton Smart Override function for HVAC damper black-start available for PNR and EL models. With automatic reset function when power and/or pneumatic air supply is reinstated.

A wide range of accessories available.

Halton

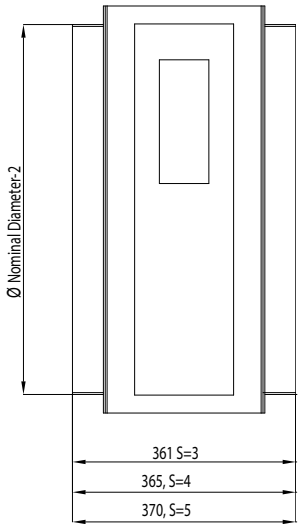
GENERAL FDL DRAWINGS



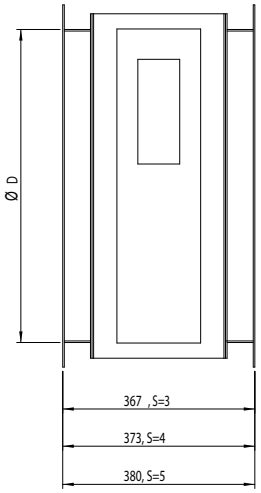


DAMPER H	TOTAL DEPTH WITH BLADES OPEN
< 250 mm	212 mm
≥ 250 < 300 mm	250 mm
≥ 300 < 350	212 mm
≥ 350	240 mm

FDL CIRCULAR CONNECTIONS



FDL CIRCULAR, WITH CONNECTION FLANGES



FDL DIMENSIONS AND MATERIAL THICKNESS

The Halton FDL fire dampers are manufactured according to international standards for both rectangular (width B 100-1300 mm and height H 100-1200 mm, 1 mm division) and circular ducts (Ø100-1250 mm). Modular constructions are available for bigger sizes. Modular construction sizes up to 2660x2460 mm. Non-standard dimensions and flange drilling are available on request. Standard flange width 27 mm. Flanges and drilling also available according to ISO 15138 standards. Frame material thickness 3 mm or 3-5 mm according to SOLAS. Blades are made of two sheets, each of being 1 mm thick (sandwich design).

ACTUATOR EFFECT ON DIMENSIONS

ACTUATOR		DIMENSIONS	
		R	A
Electrical	BF230, BF24, BF120	100	H ≤ 300 = 300 H > 300 = H
Pneumatic PNR	Pneumatic rotating actuator AT100	170	H ≤ 300 = 300 H > 300 = H
Pneumatic PNR	Pneumatic rotating actuator AT200	190	H ≤ 350 = 350 H > 350 = H
Spring	Spring	140	H

The above table contains only some examples of actuators and their effect on dimensions.

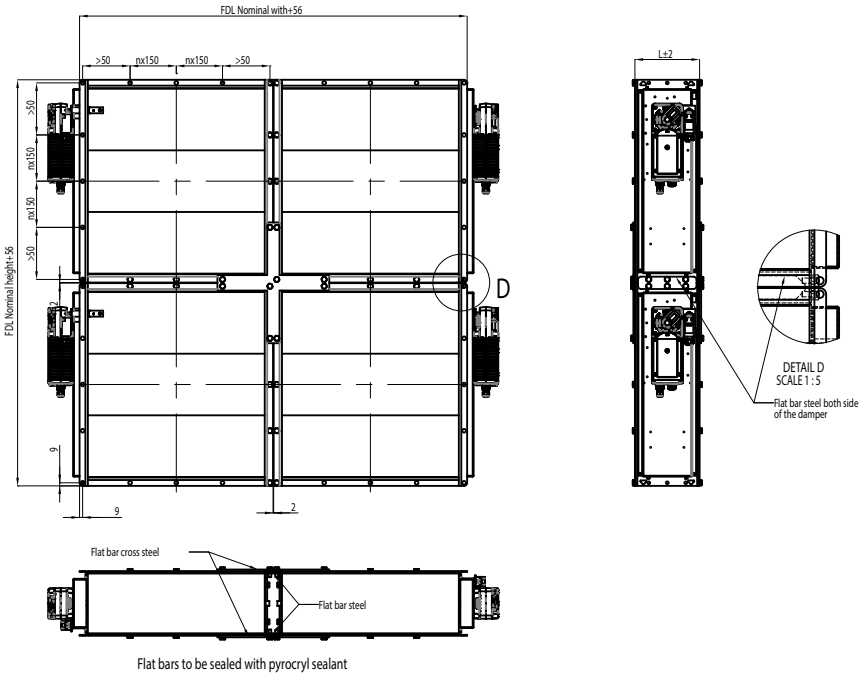
FRAME THICKNESS ACCORDING TO SOLAS

DIMENSIONS	S
If B or H ≥ 100 and ≤ 449	3
If B or H ≥ 450 and ≤ 649	4
If B or H ≥ 650	5

EDITION DEC. 2015

DIMENSIONS	S
If A < 0.075 m2	3
If A ≥ 0.075 and A ≤ 0.45 m2	4
If A > 0.45 m2	5

GENERAL FDL MODULE ASSEMBLY



FDL size limitation: Nominal width 2660 mm x nominal height 2460 mm

OPERATION PRINCIPLE

In the event of a temperature rise in ductwork:

- FDL-EL: fusible link releases and cuts off operating voltage to the spring return motor, allowing the spring to close the damper blades. The fire damper opens automatically when the fuse has been changed and the operating voltage to the motor is re-established.
- FDL-PNR: fusible link releases and cuts off operating pressure to the spring return actuator, allowing springs to close the damper blades. The fire damper opens automatically when the fuse has been changed and the pneumatic air supply is re-established.
- FDL-SP: fusible link releases allowing the spring to close the damper blades. When the fuse has been changed, the fire damper must be reset into open position manually.

WEIGHTS

STANDARD HALTON MARINE FDL DAMPERS (KG) without an actuator

H/HEIGTH	B / WIDTH (mm)														
mm	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	D2 ØD	WEIGHT
100	5 (5)	7 (7)	9 (9)	10 (10)	12 (13)	14 (15)	15 (22)	17 (25)	19 (27)	20 (30)	22 (32)	24 (35)	25 (37)	mm	kg
200	7 (7)	9 (9)	11 (11)	12 (12)	14 (16)	16 (18)	18 (26)	20 (28)	22 (31)	23 (34)	25 (36)	27 (39)	29 (41)	100	8 (8)
300	9 (9)	11 (11)	13 (13)	15 (15)	17 (19)	19 (21)	21 (30)	23 (32)	25 (35)	27 (38)	29 (41)	31 (43)	33 (46)	125	8 (8)
400	11 (11)	13 (13)	15 (15)	17 (17)	20 (22)	22 (24)	24 (33)	26 (36)	28 (39)	30 (42)	32 (45)	34 (48)	37 (51)	160	12 (12)
500	13 (16)	16 (19)	18 (22)	21 (25)	23 (27)	25 (30)	28 (38)	30 (41)	32 (44)	35 (47)	37 (50)	39 (54)	42 (57)	200	13 (13)
600	15 (18)	18 (21)	20 (24)	23 (27)	25 (30)	28 (33)	30 (41)	33 (45)	35 (48)	38 (51)	40 (55)	43 (58)	46 (61)	250	19 (19)
700	18 (25)	21 (28)	23 (32)	26 (35)	29 (39)	32 (42)	34 (46)	37 (50)	40 (53)	42 (57)	45 (60)	48 (64)	51 (67)	315	20 (20)
800	20 (27)	23 (31)	25 (35)	28 (38)	31 (42)	34 (46)	37 (50)	40 (53)	43 (57)	46 (61)	49 (64)	51 (68)	54 (72)	400	27 (27)
900	22 (31)	25 (35)	28 (39)	32 (42)	35 (46)	38 (50)	41 (54)	44 (58)	47 (62)	50 (66)	53 (70)	56 (74)	59 (78)	500	35 (43)
1000	24 (33)	27 (37)	31 (41)	34 (45)	37 (50)	40 (54)	44 (58)	47 (62)	50 (66)	53 (70)	57 (74)	60 (78)	63 (82)	630	46 (62)
1100	26 (36)	30 (41)	33 (45)	37 (49)	40 (54)	44 (58)	47 (62)	51 (67)	54 (71)	58 (75)	61 (79)	65 (84)	68 (88)	800	62 (89)
1200	28 (39)	32 (44)	36 (48)	39 (52)	43 (57)	46 (61)	50 (66)	54 (70)	57 (75)	61 (79)	65 (84)	68 (88)	72 (92)	1000	83 (118)
														1250	113(162)

(Frame thickness according to SOLAS)

Examples of actuator weights: **FDL-EL** BF230 +3,2 kg, BFN +1,4 kg, ExMax /Redmax +3,5 kg, CSQP +3 kg, **FDL-PNR** AT100 +2,1 kg, AT100 as AISI316 +4,4 kg, AT200 +3,2 kg, AT200 as AISI316 +6,2 kg, **FDL-SP** +1 kg. **Control enclosure** +4 kg.

FDH H0(H120) FIRE AND GAS DAMPER

For offshore and onshore ventilation systems

MATERIALS

PART	MATERIAL	FINISHING
Frame	Stainless steel EN 1.4404 (AISI316L), EN 1.4432 (AISI316L)	-
Blades	Stainless steel EN 1.4404 (AISI316L), EN 1.4432 (AISI316L)	-
Maintenance-free bearings	Stainless steel EN 1.4404 (AISI316L)	-
Shafts	Stainless steel EN 1.4404 (AISI316L)	-

FDH PRODUCT OPTIONS

Halton FDH is available with following actuators:

- FDH-EL: Electrical spring return motor; standard actuators being 24 VAC/DC or 230 VAC or 120 VAC. Depending of the choice of actuator, the actuator might contain built-in open-closed limit switches. Separate junction box included in the EL-model. A wide range of ex-proof actuators available, including a one second closing time function as an option.
- FDH-PNR: Pneumatic rotating actuator. Junction box available as an option.

HSO: Halton Smart Override function for HVAC damper black-start available for PNR and EL models. With automatic reset function when power and/or pneumatic air supply is reinstated.

A wide range of accessories available.

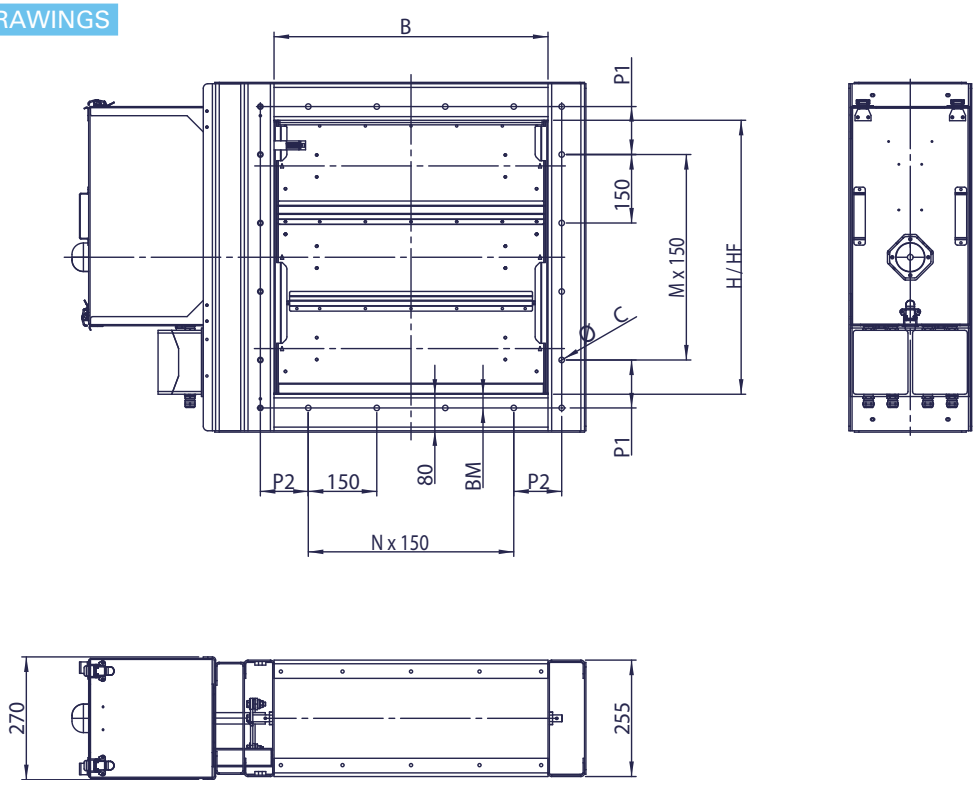
APPLICATIONS

Halton FDH fire and gas dampers are type-approved class H0(H120) fire and gas dampers for use in offshore and onshore ventilation systems. FDH dampers are used to protect the integrity of bulkheads and decks where they are penetrated by ventilation ducts. The Halton FDH dampers can be installed in rectangular or circular ducts. Dampers have a fusible link and they prevent the spread of fire and gases within the ventilation ductwork. When the blades are in a open position, the device does not cause significant pressure loss, noise or flow disturbance. An open-closed beacon is visible on the outside of the damper.

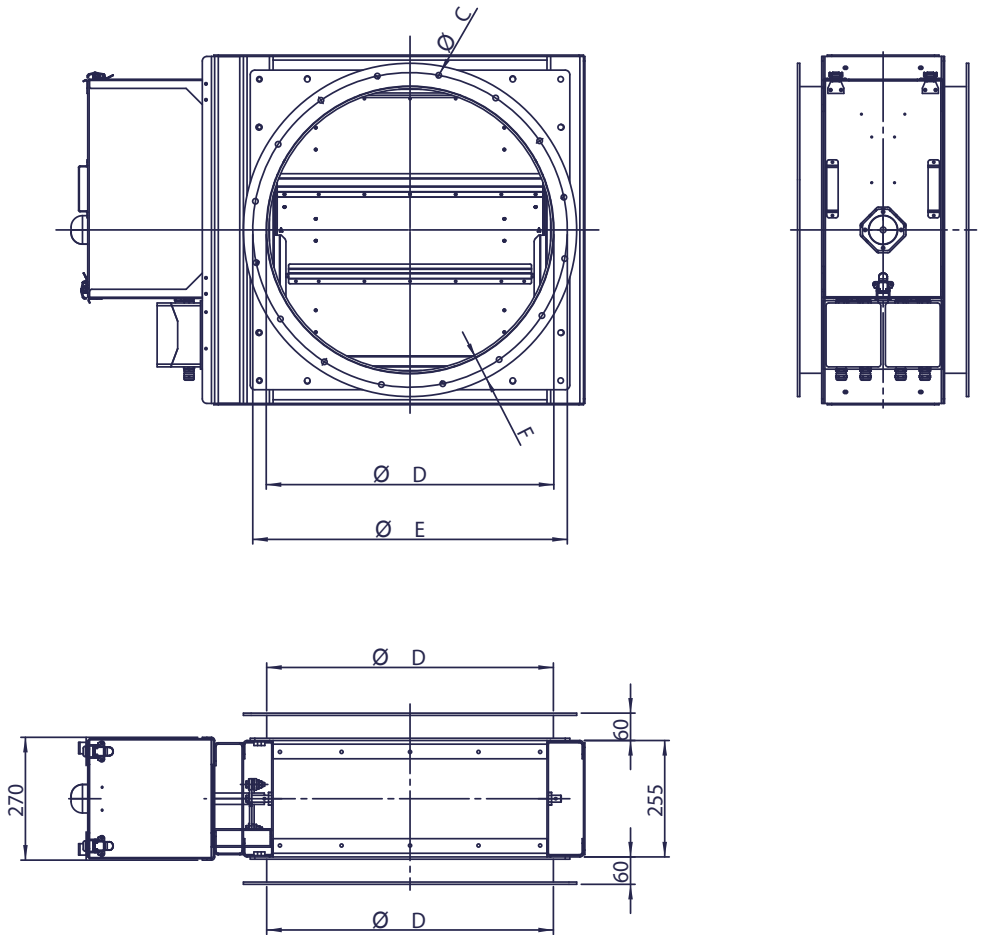
FEATURES

- Type approved by most recognized classification societies, class H0(H120) fire damper when suitably insulated. Pre-insulated H0(H60) with ceramic wool at the factory. H0(H120) with additional insulation on site. Blades insulated with ceramic wool
- Blades contain stainless spring steel seals for low leakage in normal conditions and thermal expansion graphite seals (effective from 150 °C) to seal the damper in case of fire
- Closed damper fulfills the requirement of leakage class 3 (EN1751:2014) for size > 300x300 mm. Casing leakage class C.
- Fixed frame and blades of stainless steel
- Available as ATEX certified
- Nominal fuse release temperature 50 °C, 74 °C or 100 °C. Other temperatures available.
- With automatic electrical or pneumatic operation system
- Maximum duct pressure for damper construction 5000 Pa and maximum air velocity 15 m/s

GENERAL FDH DRAWINGS



FDH CIRCULAR CONNECTIONS



FDH DIMENSIONS AND MATERIAL THICKNESS

FDH fire dampers are manufactured for both rectangular (width B 200-1200 mm with 25 mm division and height H 200-1200 mm with 50 mm division) and circular ducts (Ø200-1250 mm).
Non-standard dimensions and flange drilling available on request. Standard flanges and drilling according to ISO 15138 standards.
Standard frame material thickness 3 mm for size < 600 mm and 5 mm for sizes over 600 mm. Blades are made of two sheets each of them being 1 mm thick. Blades are pre-insulated with ceramic wool.

OPERATION PRINCIPLE

In the event of a temperature rise in ductwork:

- FDH-EL: fusible link releases and cuts off operating voltage to the spring return motor, allowing the spring to close the damper blades. The fire damper opens automatically when the fuse has been changed and the operating voltage to the motor is re-established.
- FDH-PNR: fusible link releases and cuts off operating pressure to the spring return actuator, allowing springs to close the damper blades. The fire damper opens automatically when the fuse has been changed and the pneumatic air supply is re-established.

STANDARD FDH DIMENSIONS (BxH)

B	H	HF	B	H	HF	B	H	HF
200	200	200	700	700	700	1200	1200	1200
250	250	250	750	750	750			
300	300	250	800	800	800			
350	350	250	850	850	850			
400	400	400	900	900	900			
450	450	400	950	950	950			
500	500	400	1000	1000	1000			
550	550	550	1050	1050	1050			
600	600	600	1100	1100	1100			
650	650	650	1150	1150	1150			

H = nominal height, HF = free height
Blades sizes 150/200/250, 1-6 pcs depending on the size

FLANGE DIMENSIONS ACCORDING TO ISO 15138

DIMENSIONS	Ø C	F	P1	P2	BM
If longest side ≤ 350	10	80	75...150	75...150	20
If longest side 351...1000	12	80	75...150	75...150	30
If longest side ≥ 1001	14	80	75...150	75...150	40

CIRCULAR FLANGE DIMENSIONS ACCORDING TO ISO 15138

DIMENSIONS	Ø C	F
If Ø D ≤ 355	10	40
If Ø D 356...1000	12	50
If Ø D ≥ 1001	14	80

WEIGHTS

STANDARD HALTON MARINE FDH DAMPERS (KG) without an actuator

H/HEIGHT mm	200	300	400	500	600	700	800	900	1000	1100	1200
200	35	41	46	51	57	76	83	90	97	103	110
300	41	46	51	57	62	83	90	97	103	110	117
400	48	54	59	65	71	94	102	109	116	124	131
500	55	61	68	74	81	105	113	121	129	137	145
600	60	67	73	80	86	112	120	128	136	144	152
700	81	90	98	107	115	123	132	140	149	157	165
800	88	97	105	113	122	130	139	147	155	164	172
900	96	105	114	123	132	141	150	159	168	177	186
1000	103	112	121	130	139	148	157	166	175	184	193
1100	112	121	131	140	150	159	169	178	188	197	207
1200	119	128	138	147	157	166	176	185	195	204	214

Approximate weights without an actuator.
Flanges according to ISO 15138.
Frame thickness 3 mm (longest side up to 600 mm), frame thickness 5 mm (longest side 601 mm or more).

Approximate weights of pneumatic rotary actuator AirTorque. FDH-PNR AT101 as aluminium +1,8 kg, AT104 as stainless steel 4,0 kg, AT201 as aluminium +3,2kg, AT204 as stainless steel +6,4 kg, AT301 as aluminium +6,0 kg, AT304 as stainless steel +13,3 kg.
Other actuators available on request.

Electric rotary actuator Schischek ExMax or InMax.

Actuator options	Closing time	Material	Weight (appr.)
Ex/InMax-15-SF	3 seconds	Aluminium	3,5 kg
Ex/InMax-15-SF	3 seconds	Stainless steel	7,0 kg
Ex/InMax-15-SF1	1 second	Aluminium	3,5 kg

Electric rotary actuator Schischek ExMax or InMax.

Actuator options	Closing time	Material	Weight (appr.)
Ex/InMax-15-SF1	1 second	Stainless steel	7,0 kg
Ex/InMax-30-SF3	3 seconds	Aluminium	9,5 kg
Ex/InMax-50-SF3	3 seconds	Aluminium	9,5 kg

FD-CON-2 FIRE DAMPER CONTROL UNIT

For Halton Marine fire dampers

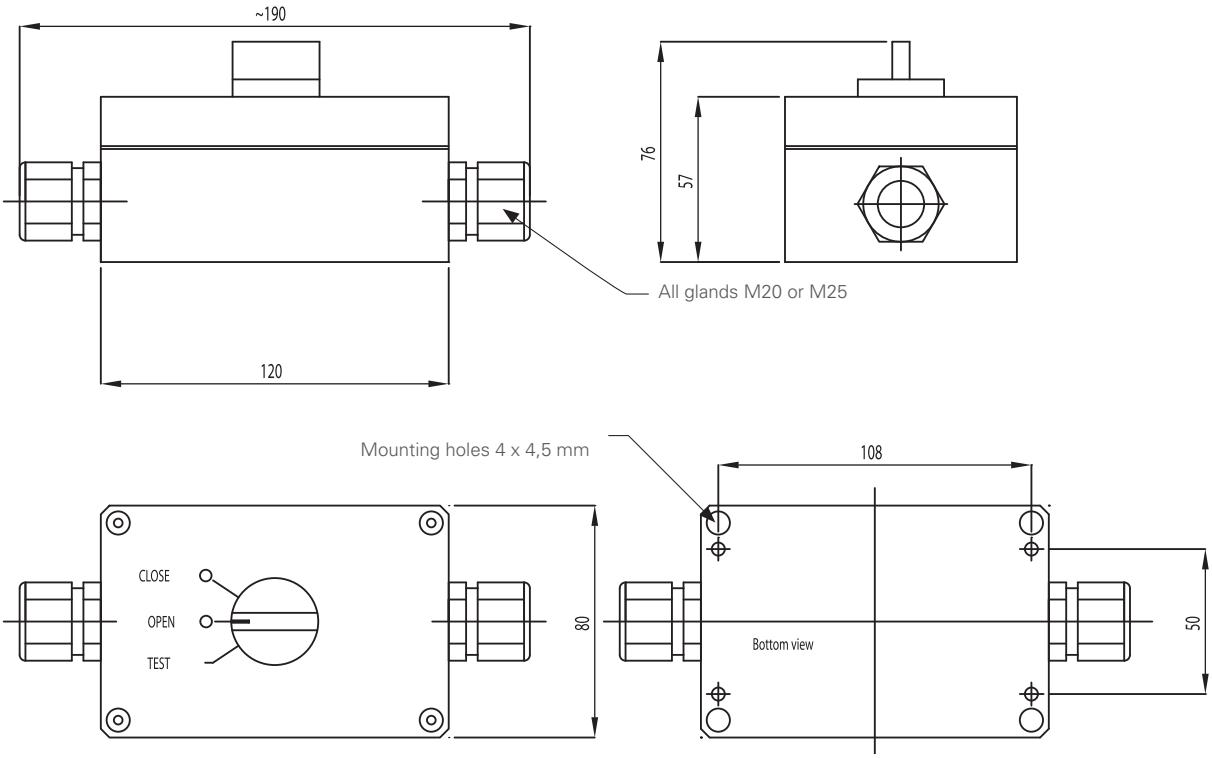
APPLICATIONS

The FD-CON-2 fire damper switch is a control unit for Halton fire dampers. The control unit is installed near the damper in a place where personnel has easy and logical access to it. Two or more FD-CON-2 units can be connected in series. This allows the damper to be locally controlled from both sides of the bulkhead or deck as per SOLAS regulation.
The FD-CON-2 is mainly intended for electrically operated dampers, but it can also be used for pneumatic dampers. In this case the FD-CON-2 unit controls the solenoid valve that controls the supply air to the damper actuator.

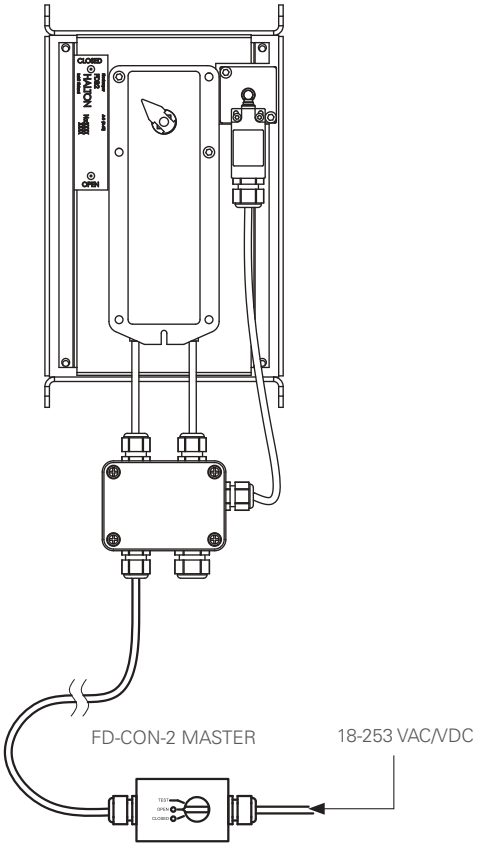
FEATURES

- Single or multiple controllers per damper with easy jumper based master/slave configuration
- Protection marking IP67
- Polycarbonate box with M20 cable glands (M25 on request)
  - M20 cable gland, cable diameter Ø 7-13 mm
  - M25 cable gland, cable diameter Ø 10-17 mm
- CE certified product
- Operating range: 18 - 28 VDC 1A, 18 - 253 VAC 50/60Hz 125 mA
- LED lights indicate the damper open and closed positions
- Test switch for indication LED lights

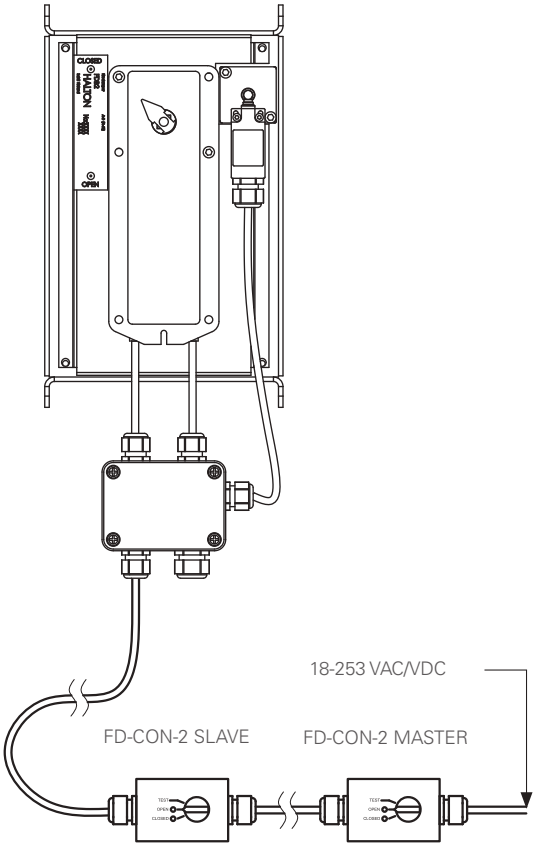
GENERAL FD-CON-2 DRAWINGS



CONTROLLER SETUP, ELECTRICAL DAMPERS



Single controller



Master / Slave controllers

FD-CON-A ADVANCED FIRE DAMPER CONTROL UNIT

For Halton Marine fire dampers

APPLICATIONS

The FD-CON-A advanced fire damper switch is a control unit for Halton fire dampers with additional features. The control unit is installed near the damper in a place where personnel has easy and logical access to it. Two or more FD-CON-A units can be connected in series. This allows the damper to be locally controlled from both sides of the bulkhead or deck as per SOLAS regulation.
The FD-CON-A is mainly intended for electrically operated dampers, but it can also be used for pneumatic dampers. In this case the FD-CON-A unit controls the solenoid valve that controls the supply air to the damper actuator.

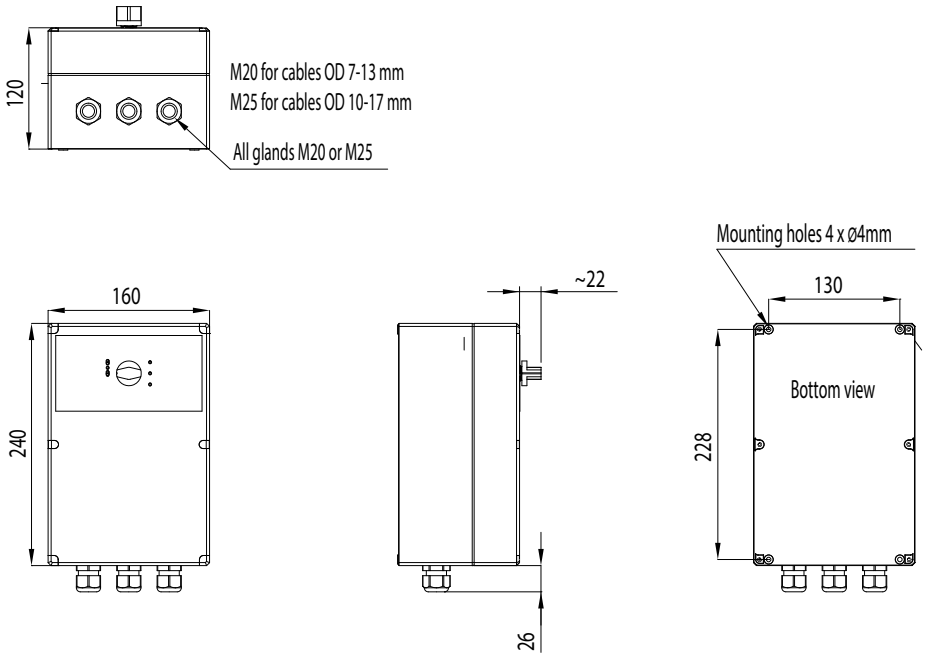
FEATURES

- Single or multiple controllers per damper with easy jumper based master/slave configuration
- Protection marking IP67
- Polycarbonate box with M20 cable glands (M25 on request)
  - M20 Cable gland, cable diameter Ø7-13mm
  - M25 Cable gland, cable diameter Ø10-17mm
- CE certified product
- Operating range: 24-230 V UC, +/-10%, 16A

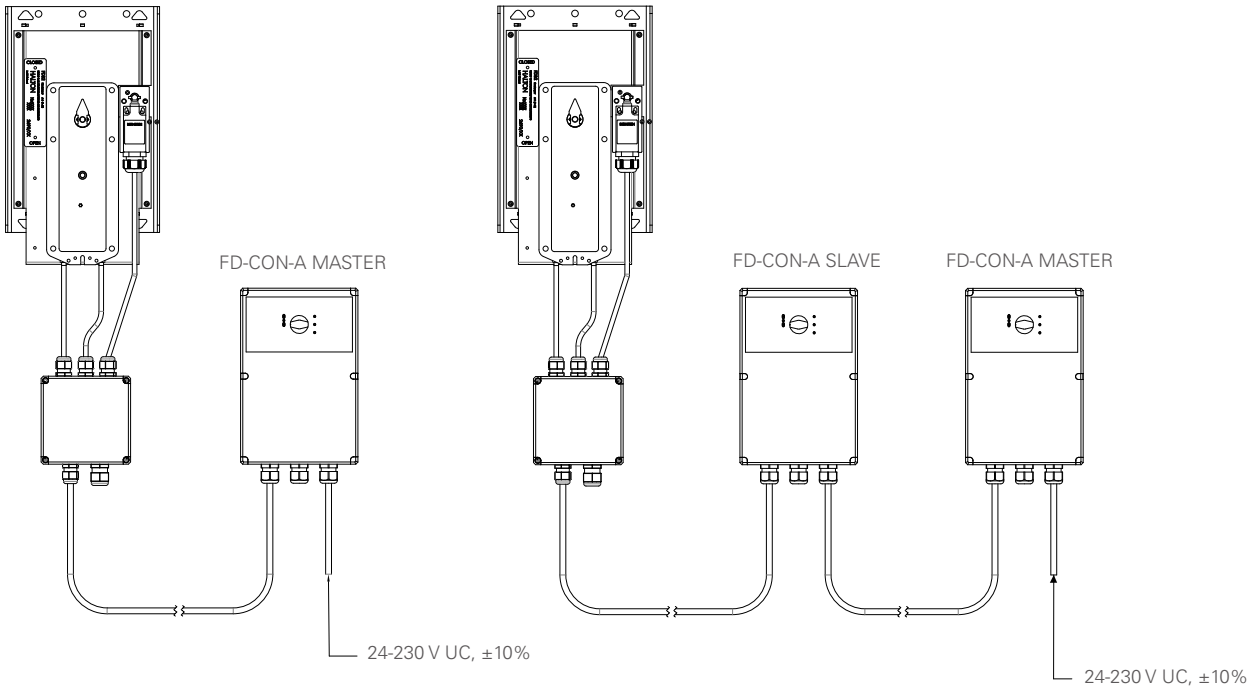
Additional features compared to FD-CON-2 model

- Remotely and locally operated
- LED lights indicate the damper open, middle and closed positions
- Open and close indication LED lights interchangeable between green and red with a jumper
- Test switch and remote command for indication LED lights
- More spacious box for cable installation 270 x 160 x 145 mm (L x W x H)
- Spring terminal block connections
- Suitable for modular dampers
- Outputs for power supply on, damper closed and damper opened

GENERAL FD-CON-A DRAWINGS



CONTROLLER SETUP, ELECTRICAL DAMPERS



HSO HALTON SMART OVERRIDE FUNCTION

For Halton Marine pneumatically and electrically operated dampers

APPLICATIONS

During a loss of power on an offshore platform the critical HVAC equipment such as fans will stop working and HVAC dampers will go to the closed position. Once the emergency generators start to produce the emergency power the fans will be one of the first HVAC components to start working again, this is important especially where pressure critical areas are necessary for safety. However, the HVAC dampers pneumatic supply to the actuator may not be reinstated for some minutes, this is a big problem because the fans will be running against closed HVAC dampers. Traditionally operators would manually open the dampers using a temporary pneumatic air supply from a portable compressed air bottle carried by the operator. This is known as HVAC damper black-start.

The Halton Smart Override (HSO) feature is a patented alternative method to manually open the HVAC damper for black-start without the need to carry a cumbersome portable compressed air bottle. By pulling the locking knob and rotating the handle the damper can be opened in seconds (this procedure disconnects the actuator from the damper drive shaft). Once the power and/or pneumatic air supply is reinstated the auto-reset functionality of the Halton Smart Override tool will then automatically reset the damper back to normal operation. This auto-reset feature is critical to ensure the HVAC damper cannot inadvertently be left open or disengaged in error.

This feature also helps during the construction phase when power is not available for the dampers and ventilation ducts need to be opened.

UTP BALANCING DAMPER

For high pressure ductworks

APPLICATIONS

Halton UTP dampers are used to balance airflow rates in high pressure ductwork. Dampers meet international standards for rectangular and round ducts. In the open position, the blades face the direction of flow and do not cause a significant pressure loss. The UTP is used as a balancing damper in applications where reliability is important.

MATERIALS

PART	MATERIAL	FINISHING
Frame	Carbon steel	Painted or galvanised
Frame	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316L), EN 1.4432 (AISI316L)	-
Blades	Steel	Galvanized
Blades	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316L), EN 1.4432 (AISI316L)	-
Maintenance-free bearings	Stainless steel EN 1.4404 (AISI316L)	-
Shafts	Stainless steel EN 1.4404 (AISI316L)	-

FEATURES

- For balancing of air intake and exhaust
- Available as ATEX certified
- Shock tested
- Leakage class of a closed damper according to EN 1751:2014 class 1. Tested size 1000x1000 mm
- Classification of casing leakage (EN 1751:2014) class B
- Outer frame of galvanized, painted or stainless steel. Blades of galvanized or stainless steel with double sheet construction. Maintenance-free stainless steel bearings and shafts.
- Electrical, pneumatic or manual operation system available
- UTP dampers can be supplied with connection pieces for round duct
- Maximum duct pressure for damper construction 5000 Pa and maximum air velocity 15 m/s. In case of high duct pressure, contact Halton Marine for finding the most suitable solution.
- Temperature operation range up to +100°C, optionally up to +180°C

UTP PRODUCT OPTIONS

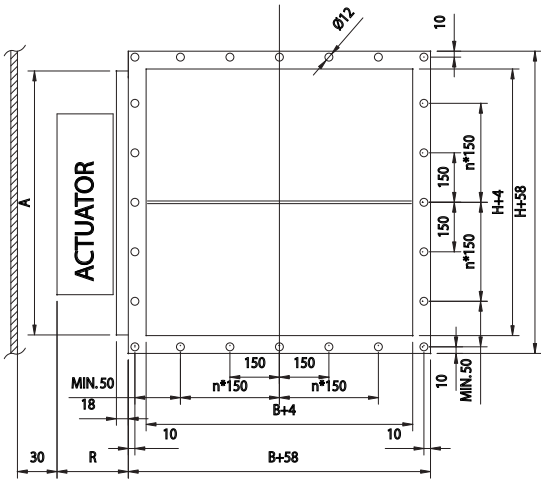
Halton UTP is available with following actuators:

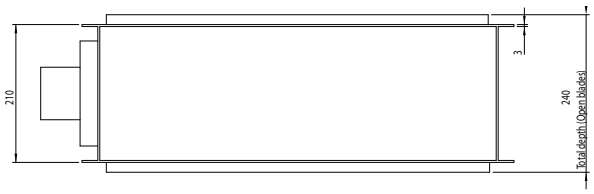
- UTP-EL: Electrical spring return actuator; standard actuators being 24 VAC/DC or 230 VAC or 120 VAC. Depending on the choice of actuator, the actuator might contain built-in open-closed limit switches. A wide range of Ex actuators available, including a one second closing time function as an option (for limited sizes).
- UTP-PNR: Pneumatic rotating actuator
- UTP-MAN: Manual handle

HSO: Halton Smart Override function for HVAC damper black-start available for PNR and EL models. With automatic reset function when power and/or pneumatic air supply is reinstated.

A wide range of accessories available.

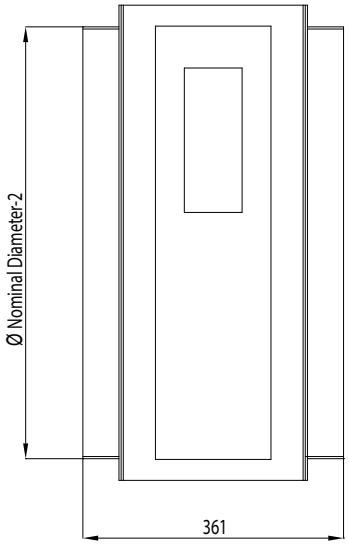
GENERAL UTP DRAWINGS



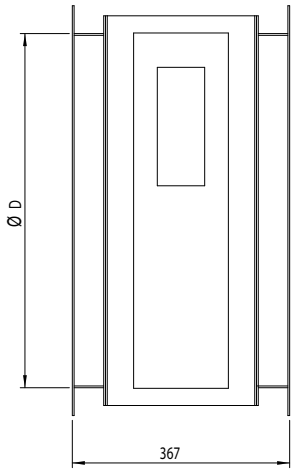


DAMPER H	TOTAL DEPTH WHEN BLADES OPEN
< 350 mm	210 mm
≥ 350 mm	240 mm

UTP CIRCULAR CONNECTIONS



UTP CIRCULAR, WITH CONNECTION FLANGES



UTP DIMENSIONS AND MATERIAL THICKNESS

UTP balancing dampers are manufactured to international standards for both rectangular (width B 100-1200 mm and height H 100-1600 mm, 1 mm division) and circular ducts (Ø100-1250 mm). Non-standard dimensions available on request. Modular construction sizes available up to 2400x3200 mm. Standard flange width 27 mm. Flanges and drilling also available according to ISO 15138 standards. Frame thicknesses from 3 mm to 10 mm. Standard frame thickness is 3 mm. Blades are made of two sheets, each of being 1 mm thick (sandwich design).

ACTUATOR EFFECT ON DIMENSIONS

ACTUATOR		DIMENSIONS	
		R	A
Manual	Handle	95	H
Electrical	BF230, BF24, BF120	100	H ≤ 300 = 300 H > 300 = H
Pneumatic PNR	Pneumatic rotating actuator AT100	170	H ≤ 300 = 300 H > 300 = H

The above table contains only some examples of actuators and their effect on dimensions.

WEIGHTS

STANDARD HALTON MARINE UTP DAMPERS (KG) without an actuator. Frame thickness 3 mm.

H/HEIGHT	B / WIDTH (mm)													
mm	100	200	300	400	500	600	700	800	900	1000	1100	1200	D2 øD	WEIGHT
100	4	6	7	9	10	12	13	15	16	17	19	20	mm	kg
200	6	8	9	11	13	14	16	17	19	21	22	24	100	7
300	8	10	12	14	15	17	19	21	22	24	26	28	125	8
400	10	12	14	16	18	20	22	23	25	27	29	31	160	11
500	13	15	17	19	21	23	25	28	30	32	34	36	200	12
600	15	17	19	21	24	26	28	30	33	35	37	39	250	17
700	17	20	22	25	27	29	32	34	37	39	42	44	315	19
800	19	22	24	27	29	32	35	37	40	43	45	48	400	26
900	21	24	27	30	33	36	38	41	44	47	50	53	500	34
1000	23	26	29	32	35	38	41	44	47	50	53	56	630	44
1100	26	29	32	35	38	42	45	48	51	55	58	61	800	59
1200	27	31	34	37	41	44	48	51	54	58	61	64	1000	80
1300	30	33	37	41	44	48	51	55	58	62	66	69	1250	110
1400	32	35	39	43	47	50	54	58	61	65	69	73		
1500	34	38	42	46	50	54	58	62	66	70	74	77		
1600	36	40	44	48	52	56	60	65	69	73	77	81		

Examples of actuator weights: **UTP-EL** BF230 +3,2 kg, ExMax/Redmax +3,5 kg, CSQP +3 kg, **UTP-PNR** AT100 +2,1 kg, AT100 as AISI316 4,4 kg, AT50 1,2 kg, **UTP-MAN** +1 kg. **Control enclosure** +4 kg.

Halton

UTA GAS TIGHT SHUT-OFF DAMPER

For high pressure ductworks

APPLICATIONS

Halton UTA dampers are used to shut-off and balance airflow rates in high pressure ductworks. Dampers meet international standards for rectangular and round ducts. In the open position, the blades face the direction of flow and do not cause a significant pressure loss.
The UTA is used as a shut-off, gas and balancing damper in applications where tightness and reliability are important.

MATERIALS

PART	MATERIAL	FINISHING
Frame	Carbon steel	Painted or galvanised
Frame	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316L), EN 1.4432 (AISI316L)	Painted as an option
Blades	Steel	Galvanized
Blades	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316L), EN 1.4432 (AISI316L)	-
Maintenance-free bearings	Oil bronze. Stainless steel EN 1.4404 (AISI316L) available as an option	-
Shafts	Stainless steel EN 1.4404 (AISI316L)	-

FEATURES

- For shut-off and balancing of air intake and exhaust ducts
- Available as ATEX certified
- Closed damper fullfils the requirement of leakage class 3 (EN1751:2014) for size ≥ 300x300 mm (stainless steel seals) and for size ≥ 150x150 mm (silicon seals).
- Classification of casing leakage (EN1751:2014) class C
- Outer frame of galvanized, painted or stainless steel. Blades of galvanized or stainless steel with double sheet construction. Blades contain stainless spring steel seals or silicon seals.
- Earthing stud as standard
- Electrical, pneumatical or manual operation system available
- UTA dampers can be supplied with connection pieces for round duct
- Maximum duct pressure for damper construction 5000 Pa and maximum air velocity 15 m/s.
- Normal operation temperature for damper between -50°C to +80°C. Actuator and component selection can have an effect on this temperature range. Other temperatures available on request

UTA PRODUCT OPTIONS

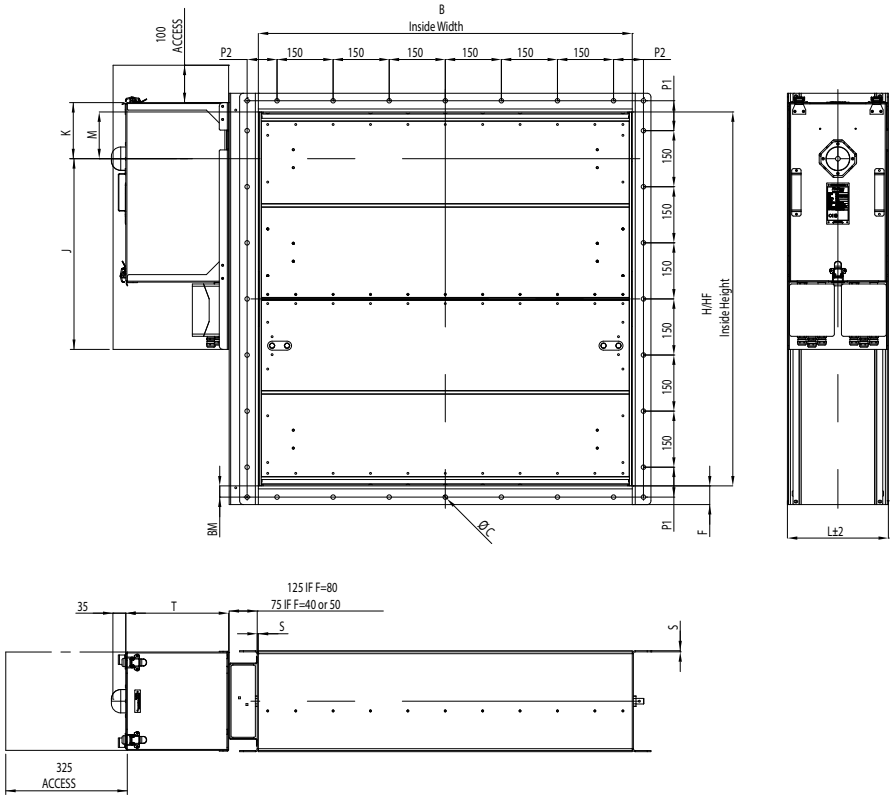
Halton UTA is available with following actuators:

- UTA-EL: Electrical spring return actuator; standard actuators being 24 VAC/DC, 230 VAC or 120 VAC. Depending on the choice of actuator, the actuator might contain built-in open-closed limit switches. A wide range of Ex actuators available, including a one second closing time function as an option (for limited sizes).
- UTA-PNR: Pneumatic rotating actuator
- UTA-MAN: Manual handle

HSO: Halton Smart Override function for HVAC damper black-start available for PNR and EL models. With automatic reset function when power and/or pneumatic air supply is reinstated.

A wide range of accessories available.

GENERAL UTA DRAWINGS



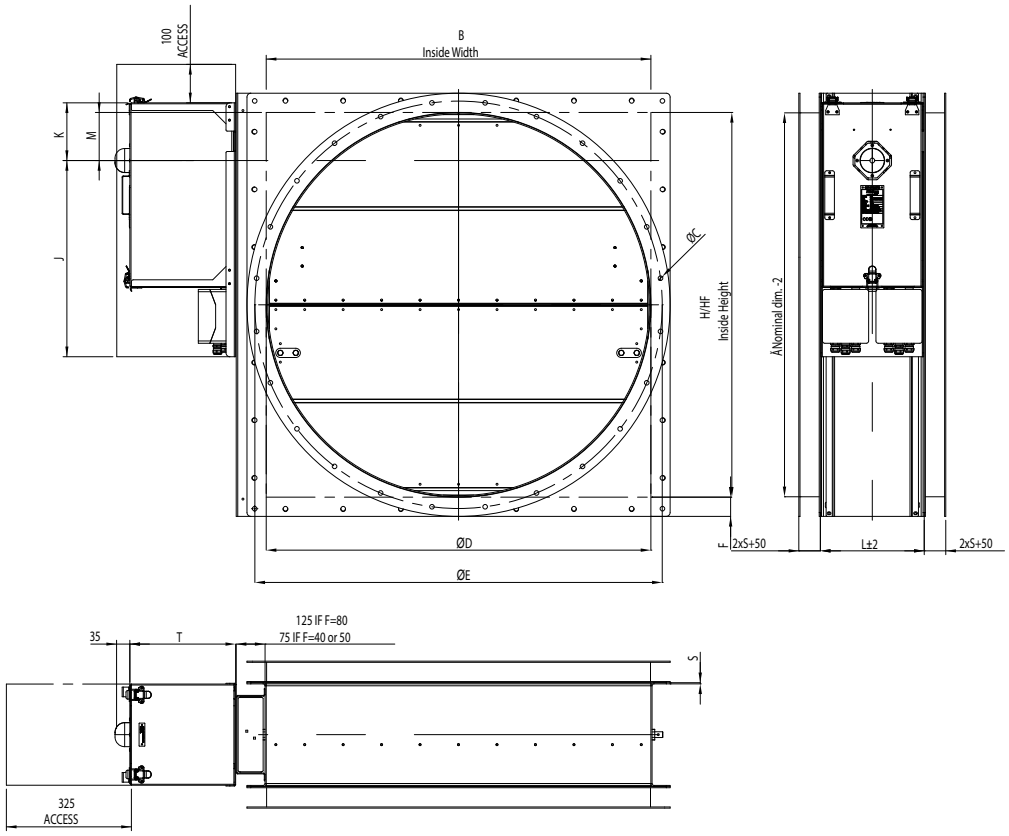
Actuator	J	K	T
AT100	430	150	145
AT100+Halton smart override	510	150	255
AT200	510	150	165
AT200+Halton smart override	510	150	275
AT300	510	180	190
AT300+Halton smart override	510	180	300
Belimo BF	430	150	125
Belimo BF (Damper height<200)	430	90	125
Schischek S	430	150	145
Schischek S (Damper height<200)	430	90	145
Schischek S+Halton smart override	440	220	235
Schischek M	510	150	175
Schischek M+Halton smart override	440	220	165

H Nominal height	HF Free height	M Drive
100	100	50
150	150	75
200	200	100
250	250	125
300	250	125
350	250	125
400	400	100
450	450	125
500	500	125
550	500	125
600	600	100
650	650	125
700	700	125
750	750	125
800	800	100
850	850	125
900	900	125
950	950	125
1000	1000	125
1050	1050	125
1100	1100	125
1150	1150	125
1200	1200	125
1250	1250	125
1300	1300	125
1350	1350	125
1400	1400	125
1450	1450	125
1500	1500	125
1550	1500	125
1600	1500	125

Material Thickness	Depth
S	L
3	270
5	275

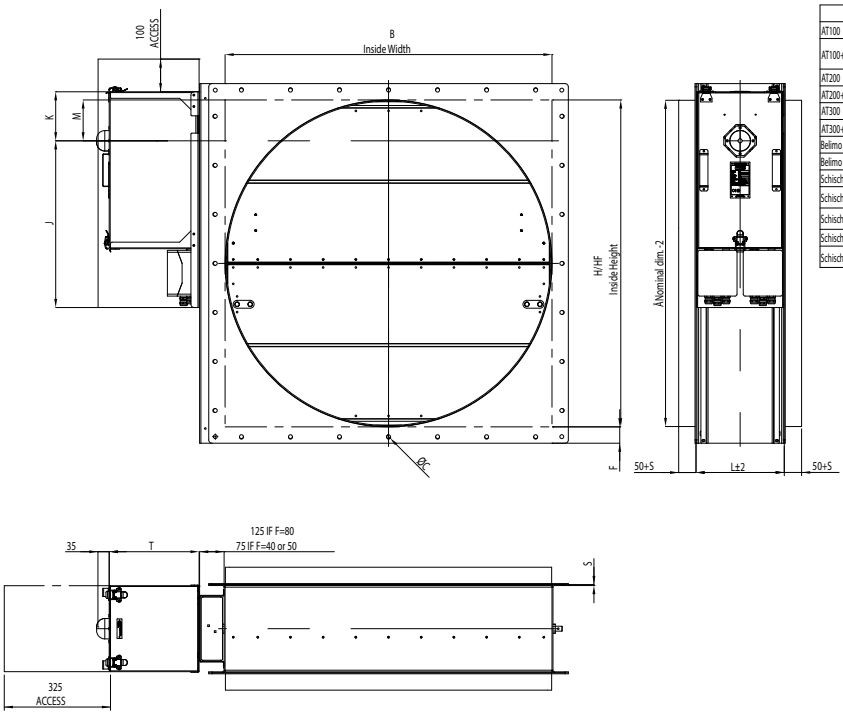
Flange dimensions according to ISO 15138

DIMENSIONS	Ø C	F	P1	P2	BM
If longest side ≤ 350	10	40	75...150	75...150	20
If longest side 351...1000	12	50	75...150	75...150	30
If longest side ≥ 1001	14	80	75...150	75...150	40



Flange dimensions according to ISO 15138

Nominal Duct Size (Ø D)	Bolt Circle (Ø E)	Bolt hole Size	No. Of Bolts
100	145	10	4
125	170	10	4
150	195	10	4
160	205	10	4
200	245	10	8
250	295	10	8
275	320	10	8
300	345	10	8
315	360	10	8
355	400	10	8
400	459	12	8
450	509	12	12
500	559	12	12
560	619	12	12
600	659	12	16
630	689	12	16
700	759	12	16
710	769	12	16
800	859	12	24
900	959	12	24
1000	1059	12	24
1120	1209	14	24
1200	1289	14	32
1250	1339	14	32
1400	1489	14	32



Actuator	J	K	T
AT100	430	150	145
AT100+Halton smart override	510	150	255
AT200	510	150	165
AT200+Halton smart override	510	150	275
AT300	510	180	190
AT300+Halton smart override	510	180	300
Belimo BF	430	150	125
Belimo BF (Damper height<200)	430	90	125
Schischek S	430	150	145
Schischek S (Damper height<200)	430	90	145
Schischek S+Halton smart override	440	220	235
Schischek M	510	150	175
Schischek M+Halton smart override	440	220	165

H Nominal height	HF Free height	M Drive
100	100	50
150	150	75
200	200	100
250	250	125
300	250	125
350	250	125
400	400	100
450	450	125
500	500	125
550	500	125
600	600	100
650	650	125
700	700	125
750	750	125
800	800	100
850	850	125
900	900	125
950	950	125
1000	1000	125
1050	1050	125
1100	1100	125
1150	1150	125
1200	1200	125
1250	1250	125
1300	1300	125
1350	1350	125
1400	1400	125
1450	1450	125
1500	1500	125
1550	1500	125
1600	1500	125

Halton

UTA DIMENSIONS AND MATERIAL THICKNESS

UTA dampers meet international standards for both rectangular (width B 100-1200 mm with 25 mm division and height H 100-1600 mm with 50 mm division) and circular ducts (Ø200-1250 mm). Modular constructions up to 2500x2600 mm available. For bigger sizes, contact Halton Marine.

Non-standard dimensions and flange drilling available on request. Standard flanges and drilling according to ISO 15138 standards. Frame thickness 3 or 5 mm.

FLANGE DIMENSIONS ACCORDING TO ISO 15138

DIMENSIONS	ØC	F	P1	P2	BM
If longest side ≤ 350	10	40	75...150	75...150	20
If longest side 351...1000	12	50	75...150	75...150	30
If longest side ≥ 1001	14	80	75...150	75...150	40

CIRCULAR FLANGE DIMENSIONS ACCORDING TO ISO 15138

DIMENSIONS	Ø C	F
If Ø D ≤ 355	10	40
If Ø D 356...1000	12	50
If Ø D ≥ 1001	14	80

WEIGHTS

STANDARD HALTON MARINE UTA DAMPERS (KG) without an actuator. Frame thickness 3 mm.

H/HEIGHT	B / WIDTH (mm)													
mm	100	200	300	400	500	600	700	800	900	1000	1100	1200	D2 ØD	WEIGHT
100	7,5	10,3	13,2	16,0	18,8	21,7	24,5	27,4	30,2	33,0	35,9	38,7	mm	kg
200	10,8	13,6	16,5	19,3	22,2	25,0	27,8	30,7	33,5	36,4	39,2	42,0	100	9
300	14,1	17,0	19,8	22,7	25,5	28,3	31,2	34,0	36,9	39,7	42,5	45,4	125	10
400	18,7	22,0	25,3	28,6	31,9	35,2	38,5	41,8	45,1	48,4	51,6	54,9	160	14
500	22,5	25,8	29,1	32,4	35,7	39,0	42,3	45,6	48,8	52,1	55,4	58,7	200	18
600	27,1	30,9	34,6	38,3	42,1	45,8	49,6	53,3	57,0	60,8	64,5	68,3	250	22
700	30,9	34,6	38,4	42,1	45,9	49,6	53,3	57,1	60,8	64,6	68,3	72,0	315	25
800	35,5	39,7	43,9	48,1	52,3	56,5	60,7	64,8	69,0	73,2	77,4	81,6	400	38
900	39,3	43,5	47,7	51,9	56,1	60,2	64,4	68,6	72,8	77,0	81,2	85,4	500	47
1000	43,1	47,3	51,5	55,6	59,8	64,0	68,2	72,4	76,6	80,8	85,0	89,2	630	59
1100	47,7	52,3	57,0	61,6	66,2	70,9	75,5	80,2	84,8	89,4	94,1	98,7	800	86
1200	51,5	56,1	60,7	65,4	70,0	74,7	79,3	83,9	88,6	93,2	97,9	102,5	1000	109
1300	56,1	61,2	66,2	71,3	76,4	81,5	86,6	91,7	96,8	101,9	107,0	112,1	1250	148
1400	59,8	64,9	70,0	75,1	80,2	85,3	90,4	95,5	100,6	105,7	110,7	115,8		
1500	63,6	68,7	73,8	78,9	84,0	89,1	94,2	99,3	104,3	109,4	114,5	119,6		
1600	67,4	72,5	77,6	82,7	87,8	92,9	97,9	103,0	108,1	113,2	118,3	123,4		

Flanges according to ISO 15138.

STANDARD HALTON MARINE UTA DAMPERS (KG) without an actuator. Frame thickness 5 mm.

H/HEIGHT	B / WIDTH (mm)													
mm	100	200	300	400	500	600	700	800	900	1000	1100	1200	D2 ØD	WEIGHT
100	9,0	13,2	17,5	21,7	26,0	30,2	34,5	38,7	42,9	47,2	51,4	55,7	mm	kg
200	13,7	18,0	22,2	26,5	30,7	34,9	39,2	43,4	47,7	51,9	56,2	60,4	100	12
300	18,5	22,7	26,9	31,2	35,4	39,7	43,9	48,2	52,4	56,7	60,9	65,2	125	13
400	24,5	29,2	33,9	38,5	43,2	47,9	52,6	57,3	62,0	66,7	71,4	76,1	160	19
500	29,6	34,3	39,0	43,7	48,4	53,1	57,8	62,5	67,2	71,9	76,6	81,3	200	24
600	35,7	40,8	46,0	51,1	56,2	61,4	66,5	71,7	76,8	82,0	87,1	92,3	250	26
700	40,8	46,0	51,1	56,3	61,4	66,6	71,7	76,9	82,0	87,2	92,3	97,5	315	36
800	46,9	52,5	58,0	63,6	69,2	74,8	80,4	86,0	91,6	97,2	102,8	108,4	400	54
900	52,0	57,6	63,2	68,8	74,4	80,0	85,6	91,2	96,8	102,4	108,0	113,6	500	68
1000	57,2	62,8	68,4	74,0	79,6	85,2	90,8	96,4	102,0	107,6	113,2	118,8	630	84
1100	63,2	69,3	75,3	81,4	87,4	93,5	99,5	105,6	111,6	117,7	123,7	129,7	800	121
1200	68,4	74,5	80,5	86,6	92,6	98,7	104,7	110,7	116,8	122,8	128,9	134,9	1000	154
1300	74,4	80,9	87,4	93,9	100,4	106,9	113,4	119,9	126,4	132,9	139,4	145,9	1250	212
1400	79,6	86,1	92,6	99,1	105,6	112,1	118,6	125,1	131,6	138,1	144,6	151,1		
1500	84,8	91,3	97,8	104,3	110,8	117,3	123,8	130,3	136,8	143,3	149,8	156,3		
1600	90,0	96,5	103,0	109,5	116,0	122,5	129,0	135,5	142,0	148,5	155,0	161,4		

Flanges according to ISO 15138.

PNEUMATIC ACTUATORS FOR UTA ACCORDING TO SIZE OF THE DAMPER.

DAMPER BLADES WITH STAINLESS STEEL SEALS

H/HEIGHT	B / WIDTH (mm)											
mm	100	200	300	400	500	600	700	800	900	1000	1100	1200
100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT200	AT200	AT200	AT200	AT200
200	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT200	AT200	AT200	AT200	AT200
300	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT200	AT200	AT200	AT200	AT200
400	AT100	AT100	AT100	AT100	AT100	AT200	AT200	AT200	AT200	AT200	AT200	AT200
500	AT100	AT100	AT100	AT100	AT100	AT200	AT200	AT200	AT200	AT200	AT200	AT200
600	AT100	AT100	AT100	AT200	AT200	AT200	AT200	AT200	AT200	AT200	AT300	AT300
700	AT100	AT100	AT100	AT200	AT200	AT200	AT200	AT200	AT200	AT200	AT300	AT300
800	AT100	AT100	AT100	AT200	AT200	AT200	AT200	AT200	AT300	AT300	AT300	AT300
900	AT100	AT100	AT100	AT200	AT200	AT200	AT200	AT200	AT300	AT300	AT300	AT300
1000	AT100	AT100	AT100	AT200	AT200	AT200	AT200	AT200	AT300	AT300	AT300	AT300
1100	AT100	AT100	AT200	AT200	AT200	AT200	AT200	AT300	AT300	AT300	AT300	AT300
1200	AT100	AT100	AT200	AT200	AT200	AT200	AT200	AT300	AT300	AT300	AT300	AT300
1300	AT100	AT100	AT200	AT200	AT200	AT200	AT300	AT300	AT300	AT300	AT300	AT300
1400	AT100	AT100	AT200	AT200	AT200	AT200	AT300	AT300	AT300	AT300	AT300	AT300
1500	AT100	AT100	AT200	AT200	AT200	AT200	AT300	AT300	AT300	AT300	AT300	AT300
1600	AT100	AT100	AT200	AT200	AT200	AT200	AT300	AT300	AT300	AT300	AT300	AT300

Approximate weights of pneumatic rotary actuator AirTorque. UTA-PNR AT101 as aluminium +1,8 kg, AT104 as stainless steel 4,0 kg, AT201 as aluminium +3,2kg, AT204 as stainless steel +6,4 kg, AT301 as aluminium +6,0 kg, AT304 as stainless steel +13,3 kg. Other actuators available on request.

PNEUMATIC ACTUATORS FOR UTA ACCORDING TO SIZE OF THE DAMPER.

DAMPER BLADES WITH SILICON SEALS.

H/HEIGHT	B / WIDTH (mm)											
mm	100	200	300	400	500	600	700	800	900	1000	1100	1200
100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100
200	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100
300	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100
400	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100
500	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100
600	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100
700	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100
800	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100
900	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100
1000	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100
1100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100
1200	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100	AT100
1300	AT100	AT100	AT200	AT200	AT200	AT200	AT200	AT200	AT200	AT200	AT200	AT200
1400	AT100	AT100	AT200	AT200	AT200	AT200	AT200	AT200	AT200	AT200	AT200	AT200
1500	AT100	AT100	AT200	AT200	AT200	AT200	AT200	AT200	AT200	AT200	AT200	AT200
1600	AT100	AT100	AT200	AT200	AT200	AT200	AT200	AT200	AT200	AT200	AT200	AT200

Approximate weights of pneumatic rotary actuator AirTorque. UTA-PNR AT101 as aluminium +1,8 kg, AT104 as stainless steel 4,0 kg, AT201 as aluminium +3,2kg, AT204 as stainless steel +6,4 kg, AT301 as aluminium +6,0 kg, AT304 as stainless steel +13,3 kg. Other actuators available on request.

ELECTRIC ACTUATORS FOR UTA ACCORDING TO SIZE OF THE DAMPER.

BLADES WITH STAINLESS STEEL SEALS.

H/HEIGHT mm	B / WIDTH (mm) 100	200	300	400	500	600	700	800	900	1000	1100	1200
100	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF
200	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF
300	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF
400	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF
500	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF
600	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF
700	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF
800	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-50-SF	Ex/Inmax-50-SF
900	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-50-SF	Ex/Inmax-50-SF
1000	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-50-SF	Ex/Inmax-50-SF
1100	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF
1200	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF
1300	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF
1400	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF
1500	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF
1600	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-30-SF Belimo EF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF	Ex/Inmax-50-SF

Actuator options	Closing time	Material	Weight (appr.)
ExMax 8-SF1	1 second	Aluminium	3,5 kg
Ex/InMax-15-SF	3 seconds	Aluminium	3,5 kg
Ex/InMax-15-SF	3 seconds	Stainless steel	7,0 kg
Ex/InMax-15-SF1	1 second	Aluminium	3,5 kg
Ex/InMax-15-SF1	1 second	Stainless steel	7,0 kg
Ex/InMax-30-SF3	3 seconds	Aluminium	9,5 kg
Ex/InMax-50-SF3	3 seconds	Aluminium	9,5 kg

NOTE! Schischek

15 Nm > 0,09 m2
8 Nm < 0,09 m2

Actuator options	Material	Weight (appr.)
Ex/InMax-15-F	Aluminium	3,5 kg
Ex/InMax-30-F	Aluminium	9,5 kg
Ex/InMax-50-F	Aluminium	9,5 kg
Ex/InMax-15-F	Stainless steel	7,0 kg
Belimo BF	Steel	3,1 kg
Belimo EF	Steel	4,2 kg

Halton

ELECTRIC ACTUATORS FOR UTA ACCORDING TO SIZE OF THE DAMPER.

BLADES WITH SILICON SEALS.

H/HEIGHT	B / WIDTH (mm)											
mm	100	200	300	400	500	600	700	800	900	1000	1100	1200
100	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF
200	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF
300	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF
400	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF
500	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF
600	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF
700	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF
800	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF
900	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF
1000	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF
1100	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF
1200	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF
1300	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF
1400	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF
1500	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF
1600	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF	Ex/Inmax-15-SF Belimo BF

Actuator options	Closing time	Material	Weight (appr.)
ExMax 8-SF1	1 second	Aluminium	3,5 kg
Ex/InMax-15-SF	3 seconds	Aluminium	3,5 kg
Ex/InMax-15-SF	3 seconds	Stainless steel	7,0 kg
Ex/InMax-15-SF1	1 second	Aluminium	3,5 kg
Ex/InMax-15-SF1	1 second	Stainless steel	7,0 kg
Ex/InMax-30-SF3	3 seconds	Aluminium	9,5 kg
Ex/InMax-50-SF3	3 seconds	Aluminium	9,5 kg

NOTE! Schischek F1 model (1 sec.)
15 Nm > 0,36 m2
8 Nm < 0,36 m2

Actuator options	Material	Weight (appr.)
Ex/InMax-15-F	Aluminium	3,5 kg
Ex/InMax-30-F	Aluminium	9,5 kg
Ex/InMax-50-F	Aluminium	9,5 kg
Ex/InMax-15-F	Stainless steel	7,0 kg
Belimo BF	Steel	3,1 kg
Belimo EF	Steel	4,2 kg

UTG GAS TIGHT SHUT-OFF DAMPER

For high pressure ductworks

APPLICATIONS

Halton UTG dampers are used to shut-off and balance airflow rates in high pressure ductworks. Dampers meet international standards for rectangular and round ducts. In the open position, the blades face the direction of flow and do not cause a significant pressure loss.
The UTG is used as a shut-off, gas and balancing damper in applications where tightness and reliability are important.

MATERIALS

PART	MATERIAL	FINISHING
Frame	Carbon steel	Painted or galvanised
Frame	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316L), EN 1.4432 (AISI316L)	-
Blades	Steel	Galvanized
Blades	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316L), EN 1.4432 (AISI316L)	-
Maintenance-free bearings	Stainless steel EN 1.4404 (AISI316L)	-
Shafts	Stainless steel EN 1.4404 (AISI316L)	-

FEATURES

- For shut-off and balancing of air intake and exhaust ducts
- Available as ATEX certified
- Shock tested
- Closed damper fullfils the requirement of leakage class up to class 3 (EN1751:2014). Details available from Halton.
- Classification of casing leakage (EN 1751:2014) class B
- Outer frame of galvanized, painted or stainless steel. Blades of galvanized or stainless steel with double sheet construction, silicon sealings. Maintenance-free stainless steel bearings and shafts.
- Electrical, pneumatical or manual operation system available
- UTG dampers can be supplied with connection pieces for round duct
- Maximum duct pressure for damper construction 5000 Pa and maximum air velocity 15 m/s. In case of high duct pressure, contact Halton Marine for finding the most suitable solution.
- Temperature operation range up to +100°C, optionally up to +180°C

UTG PRODUCT OPTIONS

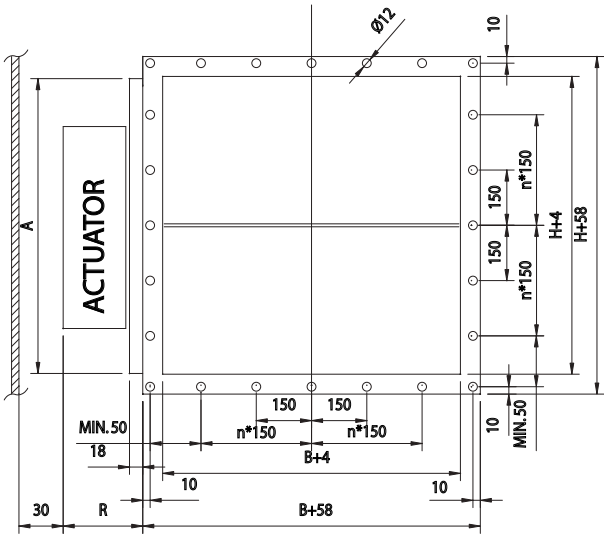
Halton UTG is available with following actuators:

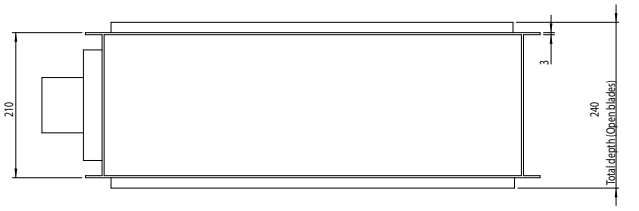
- UTG-EL: Electrical spring return actuator; standard actuators being 24 VAC/DC or 230 VAC or 120 VAC. Depending on the choice of actuator, the actuator might contain built-in open-closed limit switches. A wide range of Ex actuators available, including a one second closing time function as an option (for limited sizes).
- UTG-PNR: Pneumatic rotating actuator
- UTG-MAN: Manual handle

HSO: Halton Smart Override function for HVAC damper black-start available for PNR and EL models. With automatic reset function when power and/or pneumatic air supply is reinstated.

A wide range of accessories available.

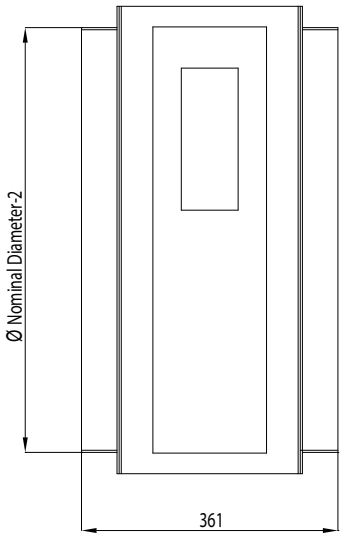
GENERAL UTG DRAWINGS



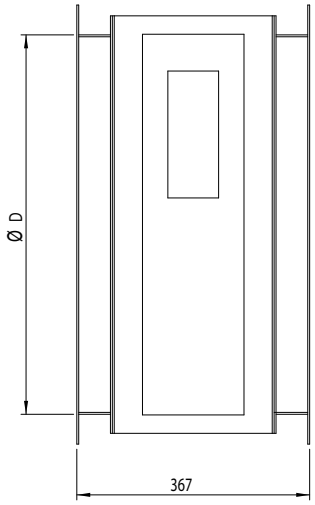


DAMPER H	TOTAL DEPTH WHEN BLADES OPEN
< 350 mm	210 mm
≥ 350 mm	240 mm

UTG CIRCULAR CONNECTIONS



UTG CIRCULAR, WITH CONNECTION FLANGES



UTG DIMENSIONS AND MATERIAL THICKNESS

UTG shut-off, gas and balancing dampers meet international standards for both rectangular (width B 100-1200 mm and height H 100-1600 mm, 1 mm division) and circular ducts (Ø100-1250 mm). Non-standard dimensions are available on request. Standard flange width 27 mm. Flanges and drilling also available according to ISO 15138 standards. Modular construction sizes available up to 2400X3200 mm. Frame thicknesses from 3 mm to 10 mm. Standard frame thickness is 3 mm. Blades are made of two sheets, each of being 1 mm thick (sandwich design).

ACTUATOR EFFECT ON DIMENSIONS

ACTUATOR		DIMENSIONS	
		R	A
Manual	Handle	95	H
Electrical	BF230, BF24, BF120	100	H ≤ 300 = 300 H > 300 = H
Pneumatic PNR	Pneumatic rotating actuator AT100	170	H ≤ 300 = 300 H > 300 = H
Pneumatic PNR	Pneumatic rotating actuator AT200	190	H ≤ 350 = 350 H > 350 = H

The above table contains only some examples of actuators and their effect on dimensions.

WEIGHTS

STANDARD HALTON MARINE UTG DAMPERS (KG) without an actuator. Frame thickness 3 mm.

H/HEIGHT	B / WIDTH (mm)													
mm	100	200	300	400	500	600	700	800	900	1000	1100	1200	D2 ⌀D	WEIGHT
100	4	6	7	9	10	12	13	15	16	17	19	20	mm	kg
200	6	8	9	11	13	14	16	17	19	21	22	24	100	7
300	8	10	12	14	15	17	19	21	22	24	26	28	125	8
400	10	12	14	16	18	20	22	23	25	27	29	31	160	11
500	13	15	17	19	21	23	25	28	30	32	34	36	200	12
600	15	17	19	21	24	26	28	30	33	35	37	39	250	17
700	17	20	22	25	27	29	32	34	37	39	42	44	315	19
800	19	22	24	27	29	32	35	37	40	43	45	48	400	26
900	21	24	27	30	33	36	38	41	44	47	50	53	500	34
1000	23	26	29	32	35	38	41	44	47	50	53	56	630	44
1100	26	29	32	35	38	42	45	48	51	55	58	61	800	59
1200	27	31	34	37	41	44	48	51	54	58	61	64	1000	80
1300	30	33	37	41	44	48	51	55	58	62	66	69	1250	110
1400	32	35	39	43	47	50	54	58	61	65	69	73		
1500	34	38	42	46	50	54	58	62	66	70	74	77		
1600	36	40	44	48	52	56	60	65	69	73	77	81		

Examples of actuator weights: **UTG-EL** BF230 +3,2 kg, ExMax/Redmax +3,5 kg, CSQP +3 kg, **UTG-PNR** AT100 +2,1 kg, AT100 as AISI316 4,4 kg, AT50 1,2 kg, **UTG-MAN** + 1 kg. **Control enclosure** +4 kg.

UTK, UTT AIRFLOW DAMPERS

For rectangular ducts

MATERIALS

PART	MATERIAL	NOTE
Casing	Galvanized steel	Available as an option: stainless steel EN 1.4404 (AISI316L)
Blades (sandwitch design)	Galvanized steel	-Available as an option: stainless steel EN 1.4404 (AISI316L)
Blades insulation (only UTT)	Polyurethane	CFC free
Blade gaskets	Silicon	Heet proof model: LTE rubber
Gasket inside the casing (only UTT)	Silicon	Fixed in an aluminium profile. Heet proof model: LTE rubber
Duct gasket	Rubber compound	Circular connections
Slide bearings	Alloy of polyamide and molybdenum sulphide	Self-lubricated. Heat-proof model stainless steel EN 1.4404 (AISI316L) also available
Drive shaft	Galvanized steel	Rectangular (15x15 mm) bar

PRODUCT MODELS AND ACCESSORIES

- Model with stainless steel EN 1.4404 (AISI316L) design
- Model with mineral wool (20 mm) insulated casing
- Model with heat-proof design
- Circular duct connections
- Several actuator options

APPLICATIONS

Halton UTK dampers are used to shut off, adjust or control airflow in ductwork in applications where damper leakage does not have significant importance. In the closed position the UTK damper leakage class is 1 in accordance with the EN1751:2014 standard.
Halton UTT dampers are used to shut off or control airflow in ductwork where tightness, thermal insulation and reliability are important. In the closed position the UTT damper leakage class is up to 3 in accordance with the EN1751:2014 standard (tested size 1000x1000 mm).
In the open position the blades are turned in the direction of flow and do not cause significant pressure losses.
Damper sizes conform with the international standards EN 1505, EN1506 and ISO 1707 for rectangular and circular ducts.

UTK, UTT

- Temperature operation range up to +100°C, optionally up to +180°C
- Classification of casing leakage EN1751:2014 class B

UTK

- Shut-off, adjustment, balancing, adjustment or control damper with opposed blade construction
- Tightness in closed position fulfills EN1751:2014 class 1 requirements

UTT

- Shut-off and balancing damper for outdoor air intake and exhaust air with opposed blade design
- Damper blades comprise thermal insulation
- Tightness in closed position up to class 3 (EN1751:2014). Details available from Halton.

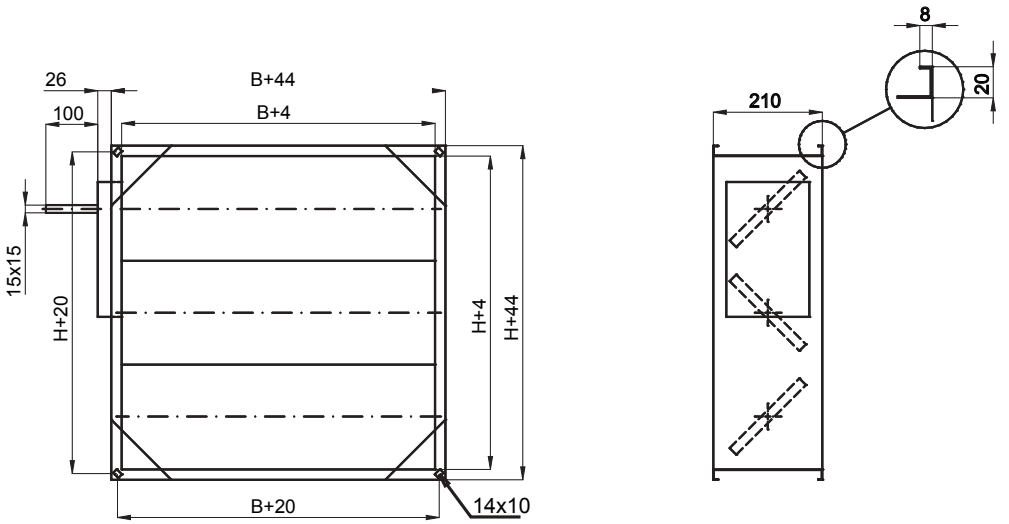
UTK, UTT DIMENSIONS AND MATERIAL THICKNESS

UTK and UTT dampers are manufactured for both rectangular (width B 100-2400 mm and height H 100-2400 mm, 1 mm division) and circular ducts (Ø100-1250 mm). Special non-standard dimensions and flange drilling available on request. Modular construction sizes up to 4900x4900 mm are available. Standard frame material thickness 1 mm.

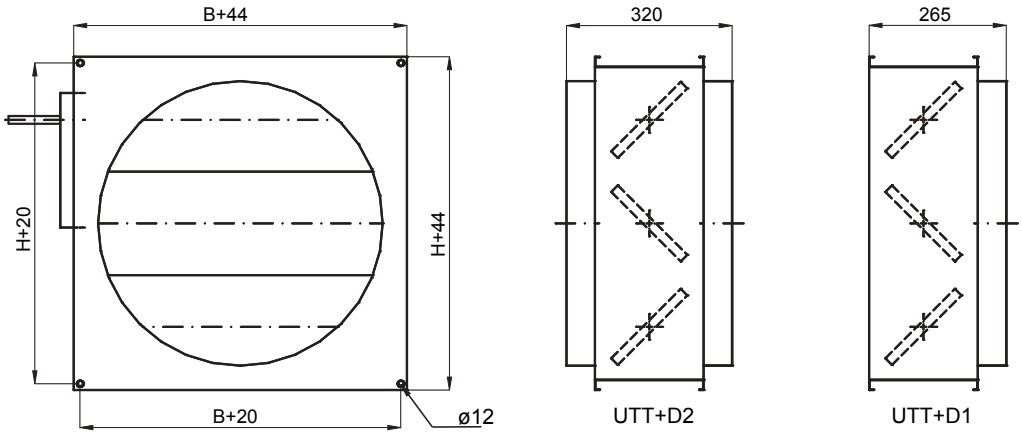
CIRCULAR CONNECTIONS

ØD	WxH (mm)
100	150x150
125	150x150
160	200x200
200	200x200
250	250x250
315	300x300
400	400x400
500	500x500
630	600x600
800	800x800
1000	1000x1000
1250	1250X1250

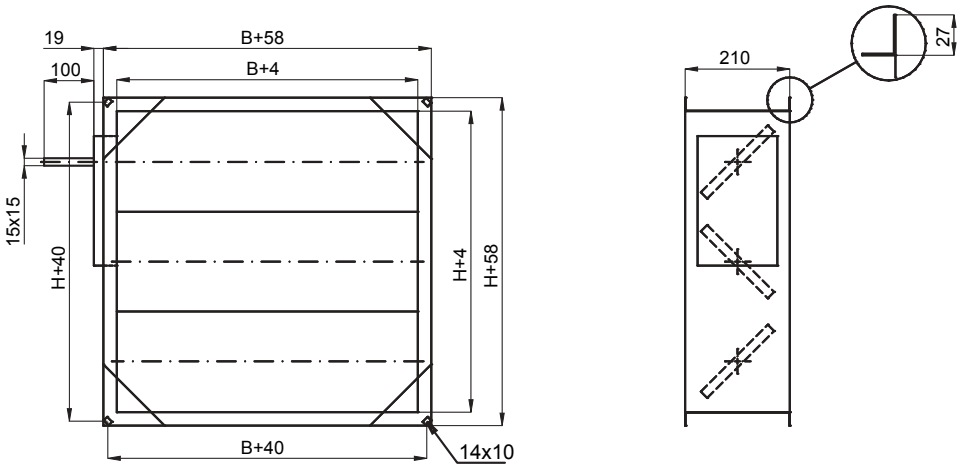
GENERAL UTK, UTT DRAWINGS



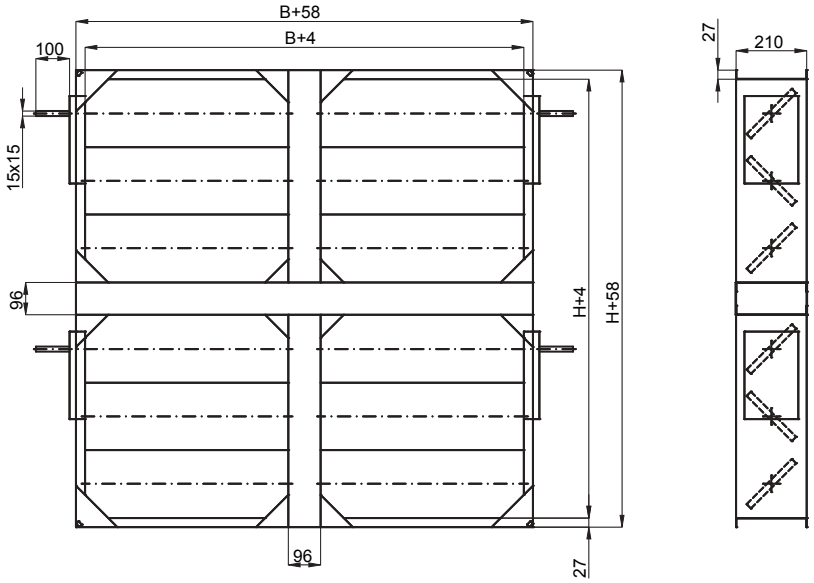
UTK, UTT DRAWING, CIRCULAR CONNECTIONS



UTK, UTT DRAWING, FLANGE CONNECTION



GENERAL UTK, UTT MODULE ASSEMBLY



THE ADJUSTMENT AND CONTROL OPTIONS

TYPE	CODE	NOTE
Manual handle adjustment	MO = MA	
Manual extension bar adjustment	AC = BA	Handle extension arrangement
Actuator operation	MO=	A wide range of actuators available

WEIGHTS

STANDARD HALTON UTK DAMPERS (KG) without an actuator

H/HEIGHT	B / WIDTH (mm)											
mm	100	200	300	400	500	600	700	800	900	1000	1100	1200
200	3	3	4	5	6	6	7	8	8	9	10	16
300	4	5	6	6	7	8	9	9	10	11	12	18
400	5	5	6	7	8	9	10	10	11	12	13	20
500	5	6	7	8	9	10	11	12	13	14	15	21
600	6	7	8	9	10	11	12	13	14	15	17	23
700	7	8	9	9	11	12	13	15	16	17	18	25
800	7	9	10	11	12	14	15	16	18	19	20	27
900	8	9	11	12	13	15	16	18	19	20	22	29
1000	9	10	12	13	15	16	18	19	21	22	24	31
1100	9	11	13	14	16	17	19	20	22	24	25	32
1200	10	12	14	15	17	19	20	22	24	25	27	35
1300	11	13	14	16	18	20	22	23	25	27	29	36
1400	12	14	16	17	19	21	23	25	27	29	31	38
1500	12	14	161	18	20	22	24	26	28	30	32	40
1600	13	15	17	20	22	24	26	28	30	32	34	42
1700	14	16	18	20	23	25	27	29	31	34	36	44
1800	15	17	19	22	24	26	29	31	33	35	38	46
1900	15	18	20	22	25	27	30	32	34	37	39	47
2000	16	19	21	24	26	29	30	34	36	39	41	49
2100	17	19	22	25	27	30	32	35	38	40	43	51
2200	18	20	23	26	28	31	34	37	39	42	45	53
2300	18	21	24	27	29	32	35	38	41	44	46	55
2400	19	22	25	28	31	34	37	40	42	45	48	57

H/HEIGHT	B / WIDTH (mm)											
mm	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
200	17	17	18	21	21	22	23	25	26	27	27	28
300	20	20	21	24	25	26	26	29	30	31	32	32
400	21	22	23	26	27	27	28	31	32	33	34	35
500	23	24	25	28	29	30	31	34	35	36	37	38
600	25	26	27	31	32	33	34	37	38	39	40	41
700	27	28	29	33	34	35	36	40	41	42	43	44
800	29	31	32	35	37	38	39	43	44	45	47	48
900	31	33	34	38	39	40	42	45	47	48	50	51
1000	34	35	37	40	42	43	45	49	50	52	53	55
1100	35	37	39	42	44	46	47	51	53	54	56	58
1200	38	40	41	45	47	49	51	54	56	58	60	62
1300	40	41	43	47	49	51	53	57	59	61	63	65
1400	42	44	46	50	52	54	56	60	62	64	66	68
1500	44	46	48	52	54	56	59	63	65	67	69	71
1600	46	48	51	55	57	59	62	66	68	70	73	75
1700	48	50	53	57	59	62	64	69	71	73	76	78
1800	50	53	55	60	62	65	67	72	74	77	79	82
1900	52	55	57	62	65	67	70	74	77	79	82	85
2000	55	57	60	65	67	70	73	78	80	83	86	88
2100	56	59	62	67	70	72	75	80	83	86	89	91
2200	59	62	65	70	73	76	78	83	86	89	92	95
2300	61	64	67	72	75	78	81	86	89	92	95	98
2400	63	66	69	75	78	81	84	89	92	95	99	102

UTK D1

D1 ØD	Weight	D1 ØD	Weight
mm	kg	mm	kg
160	4	500	12
200	4	630	16
250	5	800	23
315	7	1000	32
400	9	1250	51

UTK D2

D2 ØD	Weight	D2 ØD	Weight
mm	kg	mm	kg
160	4	500	15
200	5	630	21
250	6	800	30
315	9	1000	42
400	11	1250	66

STANDARD HALTON UTT DAMPERS (KG) without an actuator

H/HEIGHT	B / WIDTH (mm)											
mm	100	200	300	400	500	600	700	800	900	1000	1100	1200
200	3	3	4	5	6	7	7	8	9	9	10	16
300	4	5	6	7	7	8	9	10	11	11	12	19
400	5	6	6	7	8	9	10	11	12	13	13	20
500	5	6	7	8	9	10	11	12	13	14	15	22
600	6	7	8	9	11	12	13	14	15	16	17	24
700	7	8	9	10	11	13	14	15	16	18	19	26
800	8	9	10	12	13	14	16	17	18	20	21	28
900	8	10	11	12	14	15	17	18	20	21	23	30
1000	9	11	12	14	15	17	18	20	22	23	25	32
1100	10	11	13	15	16	18	20	21	23	25	26	34
1200	11	12	14	16	18	19	21	23	25	27	28	36
1300	11	13	15	17	19	21	22	24	26	28	30	38
1400	12	14	16	18	20	22	24	26	28	30	32	40
1500	13	15	17	19	21	23	25	27	30	32	34	42
1600	14	16	18	20	22	25	27	29	31	34	36	44
1700	14	16	19	21	23	26	28	30	33	35	38	46
1800	15	17	20	22	25	27	30	32	35	37	40	48
1900	16	18	21	23	26	28	31	34	36	39	41	50
2000	16	19	22	25	27	30	33	35	38	41	43	52
2100	17	20	23	25	28	31	34	37	39	42	45	54
2200	18	21	24	27	30	33	36	38	41	44	47	56
2300	19	22	25	28	31	34	37	40	43	46	49	58

H/HEIGHT	B / WIDTH (mm)											
mm	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
200	17	17	18	21	21	22	23	25	26	27	27	28
300	20	20	21	24	25	26	26	29	30	31	32	32
400	21	22	23	26	27	27	28	31	32	33	34	35
500	23	24	25	28	29	30	31	34	35	36	37	38
600	25	26	27	31	32	33	34	37	38	39	40	41
700	27	28	29	33	34	35	36	40	41	42	43	44
800	29	31	32	35	37	38	39	43	44	45	47	48
900	31	33	34	38	39	40	42	45	47	48	50	51
1000	34	35	37	40	42	43	45	49	50	52	53	55
1100	35	37	39	42	44	46	47	51	53	54	56	58
1200	38	40	41	45	47	49	51	54	56	58	60	62
1300	40	41	43	47	49	51	53	57	59	61	63	65
1400	42	44	46	50	52	54	56	60	62	64	66	68
1500	44	46	48	52	54	56	59	63	65	67	69	71
1600	46	48	51	55	57	59	62	66	68	70	73	75
1700	48	50	53	57	59	62	64	69	71	73	76	78
1800	50	53	55	60	62	65	67	72	74	77	79	82
1900	52	55	57	62	65	67	70	74	77	79	82	85
2000	55	57	60	65	67	70	73	78	80	83	86	88
2100	56	59	62	67	70	72	75	80	83	86	89	91
2200	59	62	65	70	73	76	78	83	86	89	92	95
2300	61	64	67	72	75	78	81	86	89	92	95	98
2400	63	66	69	75	78	81	84	89	92	95	99	102

UTT D1

D1 ØD	Weight	D1 ØD	Weight
mm	kg	mm	kg
160	4	500	12
200	4	630	17
250	5	800	24
315	7	1000	33
400	9	1250	52

UTT D2

D2 ØD	Weight	D2 ØD	Weight
mm	kg	mm	kg
160	4	500	15
200	5	630	21
250	6	800	30
315	9	1000	43
400	11	1250	67

MORE INFORMATION

For more detailed information visit: https://www.halton.com/en_GB/halton/products/-/product/UTT or download Halton HIT Design tool at: https://www.halton.com/en_GB/halton/products/halton-hit-design-tool

PRA AIRFLOW ADJUSTMENT AND MEASUREMENT UNIT

For circular ducts

APPLICATIONS

Halton PRA is an airflow balancing, adjustment and measurement unit for circular ducts.

FEATURES

- Airflow balancing, adjustment and measurement unit
- Manual adjustment, no tools required
- Accurate airflow measurement based on flow nozzle principle
- Minimised sound generation due to conical adjustment section
- Temperature operation range from -30 °C to +70 °C
- Self-locking adjustment mechanism, position can be ensured with locking screw
- Duct cleaning enabled through the unit up to size 315
- Adjustment position marker indicates proper position e.g. repositioning after cleaning
- Inlet and outlet spigots equipped with integral rubber gaskets
- Application option as supply air jet nozzle for air diffusion in large spaces
- Classification of casing leakage EN 1751 class C

MATERIALS

PART	MATERIAL	NOTE
Casing	Galvanized steel	-
Blades	Galvanized steel	-
Operating mechanism	ABS and PBT plastic	Sizes 100...315
Operating mechanism	Steel	Sizes 350...800
Duct gaskets	1C-polyurethane hybrid	-
Measurement taps	Polyurethane (PU)	-

PRA PRODUCT OPTIONS

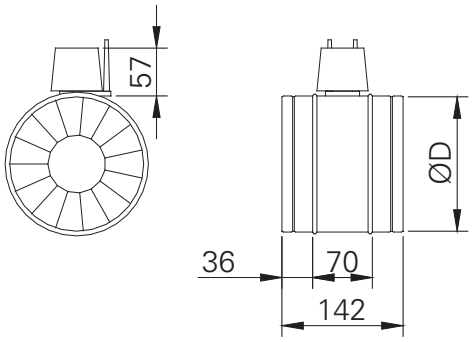
PRA -unit (PRA/R) integrated with cleaning access panel. RLA enables removal of the adjustment damper and access to ductwork for cleaning.

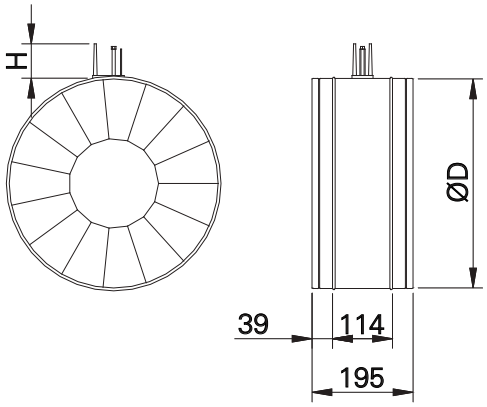
QUICK SELECTION

D	qmin		qmax	
[mm]	[l/s]	[m³/h]	[l/s]	[m³/h]
100	8	28	47	170
125	12	44	74	265
160	20	72	121	434
200	31	113	188	679
250	49	177	295	1060
315	78	281	468	1683
350	96	346	577	2078
400	126	452	754	2714
500	196	707	1178	4241
630	312	1122	1870	6733
800	503	1810	3016	10857

qmin 1 m/s duct velocity
qmax 6 m/s duct velocity - recommended maximum airflow for comfort applications

GENERAL PRA DRAWINGS





PRA 100...315

NS	ØD
100	99
125	124
160	159
200	199
250	249
315	314

PRA 350...800

NS	ØD	H
350	349	70
400	399	70
500	499	70
630	629	70
800	799	70

FUNCTION

The airflow rate is adjusted by turning the adjustment knob in order to change the aperture size of the adjustment cone formed by iris blades. Once the opening area is reduced, the airflow rate decreases and the total pressure loss caused by the device increases.
The airflow can be determined by measuring the differential pressure in the measurement taps.

PRA 100...315

The operating mechanism is positioned partly outside the device and between the adjustment cone and casing. The unit can be cleaned with normal duct sweeping equipment when the device is fully opened.

PRA 350...800

The operating mechanism is located partly outside the device and inside the adjustment cone. The device can be cleaned with normal duct sweeping equipment, when the device is fully opened and the cleaning equipment is passed carefully through the operating mechanism.

Supply air jet nozzle PRA/S

The PRA-unit can also be used as a supply air nozzle in e.g. industrial spaces. Refer to the technical data for PRA/S -model presented in the technical performance chapter.

MORE INFORMATION

For more detailed information visit: https://www.halton.com/en_GB/halton/products/-/product/PRA or download Halton HIT Design tool at: https://www.halton.com/en_GB/halton/products/halton-hit-design-tool

BLD NON-RETURN DAMPER

For offshore and marine ventilation systems

APPLICATIONS

Halton BLD non-return dampers are used in offshore and marine applications to prevent backflow through ventilation ductwork system. The BLD dampers do not need an actuator or motor. Non-return dampers can be installed in rectangular or circular ducts, horizontally or vertically. If required, they can easily be set by adjusting the weight of each damper/installation. When the blades are in the open position, the device does not cause significant pressure loss, noise or flow disturbance.

MATERIALS

PART	MATERIAL	FINISHING
Frame	Carbon steel	Painted or galvanised
Frame	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316L), EN 1.4432 (AISI316L)	-
Blades	Steel	Galvanized
Blades	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316L), EN 1.4432 (AISI316L)	-
Maintenance-free bearings	Stainless steel EN 1.4404 (AISI316L)	-
Shafts	Stainless steel EN 1.4404 (AISI316L)	-

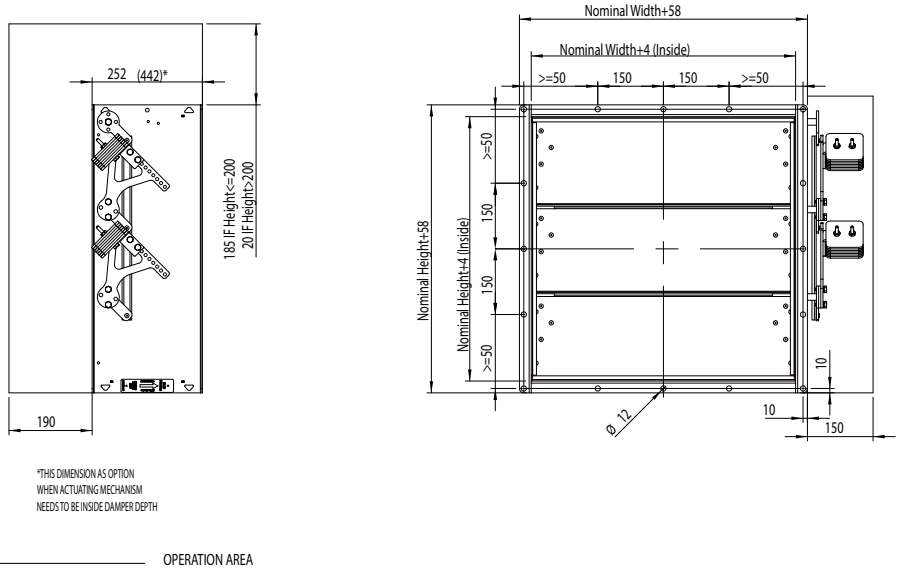
BLD PRODUCT OPTIONS

- Models for horizontal and vertical installation available
- Circular connection pieces are available.
- Standard construction places weights on the right hand side. Weights on the left hand side available as an option.

FEATURES

- Fixed frame in painted, galvanized or stainless steel. Blades of galvanized or stainless steel.
- Models for horizontal or vertical installation
- Available as ATEX certified
- Leakage class (EN1751:2014) of closed damper up to class 2. Details available from Halton.
- Blades contain silicone seal to lower the leakage through blades
- Blades linked and open in parallel
- Adjustable by changing the position of counterweights. Standard construction places weights on the right hand side, weights on the left hand side available as an option.
- Maximum duct pressure for damper construction 5000 Pa and maximum air velocity 15 m/s. In case of high duct pressure, contact Halton Marine for finding the most suitable solution.
- Temperature operation range up to +100°C, optionally up to +180°C

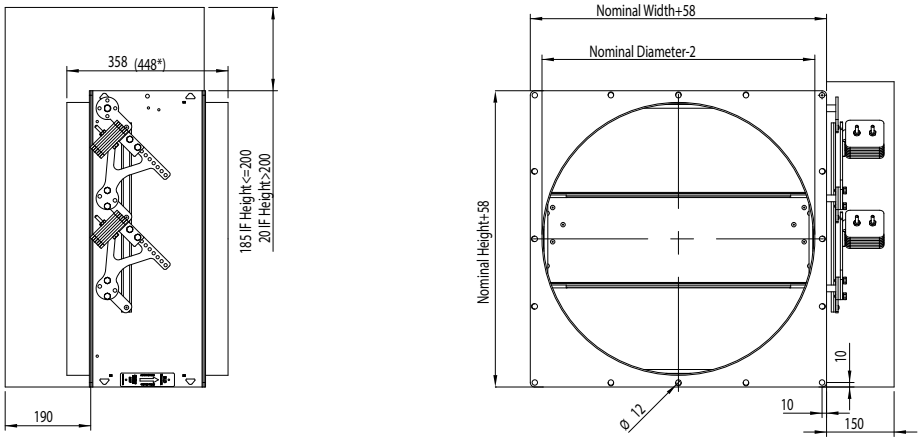
GENERAL BLD DRAWINGS



*THIS DIMENSION AS OPTION
WHEN ACTUATING MECHANISM
NEEDS TO BE INSIDE DAMPER DEPTH

OPERATION AREA

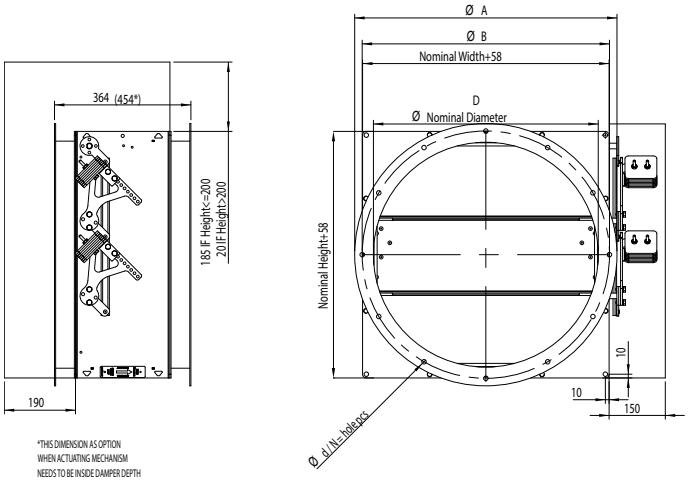
BLD DRAWING, CIRCULAR CONNECTIONS



*THIS DIMENSION AS OPTION
WHEN ACTUATING MECHANISM
NEEDS TO BE INSIDE DAMPER DEPTH

OPERATION AREA

BLD CIRCULAR, WITH CONNECTION FLANGES



*THIS DIMENSION AS OPTION
WHEN ACTUATING MECHANISM
NEEDS TO BE INSIDE DAMPER DEPTH

OPERATION AREA

D	B	A	d	N
200	225	300	8,5	4
250	280	350	12	4
315	355	415	12	8
400	450	500	12	8
500	560	600	12	12
630	690	730	12	12
800	860	900	12	16
1000	1070	1100	15	16
1250	1320	1350	15	20

BLD DIMENSIONS AND MATERIAL THICKNESS

BLD non-return dampers meet international standards for both rectangular (width B 150-1200 and height H 150-1400 mm, 1mm division) and circular ducts (Ø100 - 1250 mm). Non-standard dimensions are available on request. Standard flange width 27 mm. Flanges and drilling also available according to ISO 15138 standards. Modular construction sizes up to 2400x2800 mm. Standard frame material thickness 3 mm. Blades made of two sheets, each being 0.8 mm thick (sandwich design).

BLD OPERATION PRINCIPLE

Non-return damper will allow one-way airflow in the ductwork. This feature is based on imbalanced blades. When the pressure in the ductwork drops below minimum opening force required, the blades close and seal the duct to prevent backflow. The minimum opening force can be adjusted with weights.
Minimum opening pressure 30 Pa.

WEIGHTS

STANDARD HALTON MARINE BLD DAMPERS (KG) including counter weights. Frame thickness 3 mm.

H/HEIGHT	B / WIDTH (mm)													
mm	150	200	300	400	500	600	700	800	900	1000	1100	1200	D2 ØD	WEIGHT
150	8	9	11	13	15	16	18	20	22	24	25	27	mm	kg
200	10	12	12	14	16	19	20	22	24	26	28	29	100	12
300	12	13	15	18	20	21	24	26	29	31	34	35	160	12
400	14	15	18	20	23	25	28	30	33	36	37	40	200	15
500	17	17	21	24	27	29	32	35	37	40	43	45	250	17
600	19	20	24	26	29	32	36	39	42	45	47	51	315	21
700	21	23	26	30	33	37	40	43	47	50	53	57	400	26
800	22	24	27	33	36	40	43	47	51	54	58	62	500	36
900	26	28	32	36	39	44	48	52	56	60	63	67	630	45
1000	28	30	34	39	43	48	51	55	60	64	68	72	800	63
1100	31	33	38	42	47	51	56	60	65	70	72	78	1000	87
1200	33	35	40	45	50	54	59	64	69	74	78	84	1250	116
1300	36	38	44	48	53	58	64	69	74	79	83	89		
1400	38	40	46	51	56	62	67	73	78	83	88	94		

BRD PRESSURE-RELIEF DAMPER

For offshore and marine ventilation systems

APPLICATIONS

Halton BRD pressure-relief dampers are used in offshore and marine applications to regulate the pressure in the ductwork system. The Halton pressure relief dampers do not need an actuator or motor. The BRD dampers can be installed in rectangular or circular ducts horizontally or vertically. The damper is in closed position when the pressure in the duct is lower than the adjusted opening pressure. Opening pressure can easily be set by adjusting weight of each damper/installation. Weights are included in the delivery. Pressure relief dampers can be supplied with non-standard dimensions on request.

MATERIALS

PART	MATERIAL	FINISHING
Frame	Carbon steel	Painted or galvanised
Frame	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316L), EN 1.4432 (AISI316L)	-
Blades	Steel	Galvanized
Blades	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316L), EN 1.4432 (AISI316L)	-
Maintenance-free bearings	Stainless steel EN 1.4404 (AISI316L)	-
Shafts	Stainless steel EN 1.4404 (AISI316L)	-

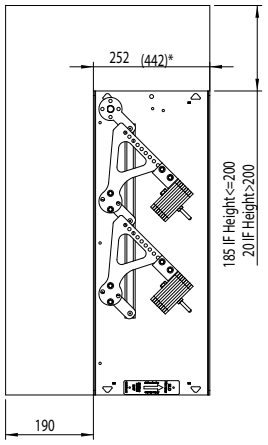
BRD PRODUCT OPTIONS

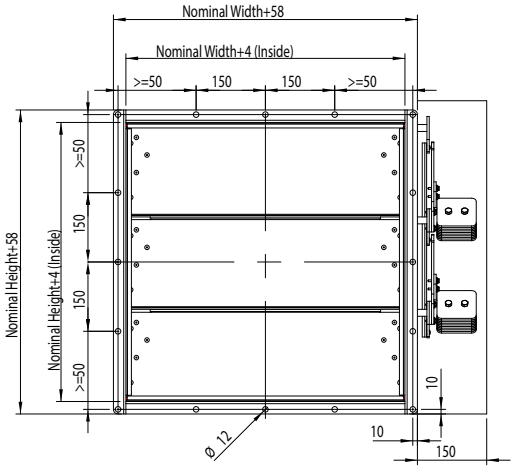
- Models for horizontal and vertical installation available
- Circular connection pieces are available.
- Standard construction places weights on the right hand side. Weights on the left hand side available as an option.

FEATURES

- Fixed frame in painted, galvanized or stainless steel. Blades of galvanized or stainless steel.
- Models for horizontal or vertical installation
- Blades contain silicone seal to lower the leakage through blades
- Available as ATEX certified
- Leakage class (EN1751:2014) of closed damper up to class 2. Contact Halton for more details.
- Blades linked and open in parallel
- Opening pressure adjusted by changing the position of counterweight(s)
- Minimum opening pressure between 30 Pa and 200 Pa depending on damper size
- Opening pressure can be adjusted up to 300 Pa. For higher opening pressure, contact Halton Marine
- Counterweights included
- Standard construction places weights on the right hand side, weights on the left hand side available as an option
- Final adjustment of counterweights carried out during commissioning onsite
- Maximum duct pressure for damper construction 5000 Pa and maximum air velocity 15 m/s. In case of high duct pressure, contact Halton Marine for finding the most suitable solution.
- Temperature operation range up to +100°C, optionally up to +180°C

GENERAL BRD DRAWINGS

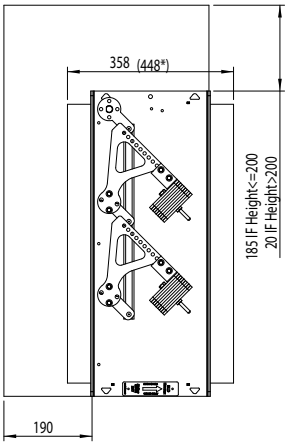


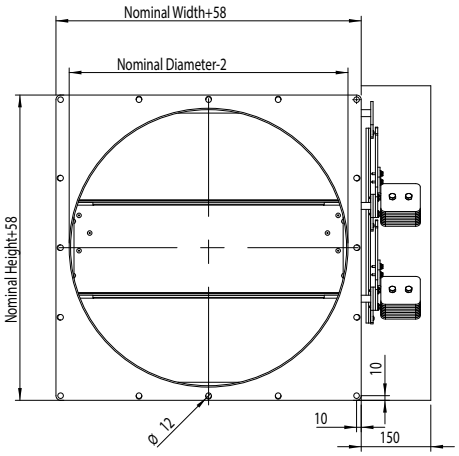


*THIS DIMENSION AS OPTION
WHEN ACTUATING MECHANISM
NEEDS TO BE INSIDE DAMPER DEPTH

OPERATION AREA

BRD DRAWING, CIRCULAR CONNECTIONS

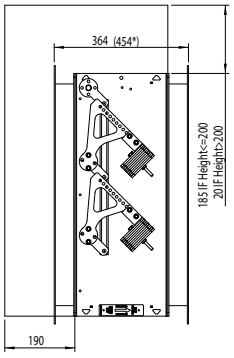


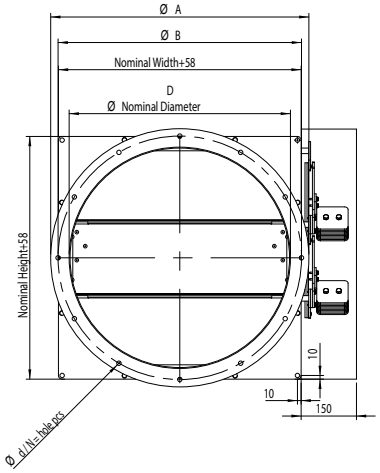


*THIS DIMENSION AS OPTION
WHEN ACTUATING MECHANISM
NEEDS TO BE INSIDE DAMPER DEPTH

OPERATION AREA

BRD, CIRCULAR, WITH CONNECTION FLANGES





*THIS DIMENSION AS OPTION
WHEN ACTUATING MECHANISM
NEEDS TO BE INSIDE DAMPER DEPTH

OPERATION AREA

D	B	A	d	N
200	225	300	8,5	4
250	280	350	12	4
315	355	415	12	8
400	450	500	12	8
500	560	600	12	12
630	690	730	12	12
800	860	900	12	16
1000	1070	1100	15	16
1250	1320	1350	15	20

BRD DIMENSIONS AND MATERIAL THICKNESS

BRD pressure relief dampers meet international standards for both rectangular (width B 150-1200 mm and height H 150-1400 mm, 1 mm division) and circular ducts (Ø100 - 1250 mm). Non-standard dimensions are available on request. Standard flange width 27 mm. Flanges and drilling also available according to ISO 15138 standards. Modular construction sizes up to 2400x2800 mm are available. Standard frame material thickness 3 mm. Blades are made of two sheets, each of being 0.8 mm thick (sandwich design).

BRD OPERATION PRINCIPLE

The pressure-relief damper will allow one-way pressure relief in the ductwork. This feature is based on imbalanced blades. When the pressure in the duct rises above a certain value the damper blades begin to open and allow pressure relief. As the pressure increases the blade angle opening increases. The size of the damper, without counterweights, determines the minimum pressure needed (see the table below). The opening force can be adjusted with weights. When the pressure in the ductwork drops below the minimum opening force required, the blades close and seal the duct.

BRD MINIMUM OPENING PRESSURE (WITHOUT COUNTERWEIGHTS)

OPENING DEFINED AS 5 DEGREES BLADE MOVEMENT.

H / HEIGHT	B / WIDTH (mm)																				
(mm)	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200
200	100	80	70	65	55	50	50	45	45	40	40	35	35	35	35	35	30	30	30	30	30
250	130	105	90	80	70	65	60	55	50	50	45	45	45	40	40	40	35	35	35	35	35
300	100	85	75	65	60	55	50	50	45	45	40	40	40	35	35	35	35	35	30	30	30
350	85	70	60	55	50	45	45	40	40	40	35	35	35	35	30	30	30	30	30	30	30
400	70	60	55	50	45	40	40	35	35	35	30	30	30	30	30	30	30	30	30	30	30
450	125	105	90	80	70	65	60	55	50	50	45	45	45	40	40	40	40	35	35	35	35
500	110	90	80	70	65	55	55	50	45	45	45	40	40	40	35	35	35	35	35	35	30
550	95	80	70	60	55	50	50	45	45	40	40	40	35	35	35	35	30	30	30	30	30
600	85	70	60	55	50	45	45	40	40	40	35	35	35	35	30	30	30	30	30	30	30
650	120	100	85	75	70	65	60	55	50	50	45	45	45	40	40	40	40	35	35	35	35
700	110	90	80	70	65	60	55	50	50	45	45	40	40	40	35	35	35	35	35	35	30
750	100	85	70	65	60	55	50	45	45	40	40	40	40	35	35	35	35	35	30	30	30
800	90	75	65	60	55	50	45	45	40	40	40	35	35	35	35	30	30	30	30	30	30
850	120	100	85	75	70	60	60	55	50	50	45	45	40	40	40	40	35	35	35	35	35
900	110	90	80	70	65	60	55	50	50	45	45	40	40	40	35	35	35	35	35	35	30
950	100	85	75	65	60	55	50	50	45	45	40	40	40	35	35	35	35	35	30	30	30
1000	95	80	70	60	55	50	50	45	45	40	40	35	35	35	35	35	30	30	30	30	30
1050	120	100	85	75	65	60	55	55	50	50	45	45	40	40	40	40	35	35	35	35	35
1100	110	90	80	70	65	60	55	50	50	45	45	40	40	40	35	35	35	35	35	35	30
1150	105	85	75	65	60	55	50	50	45	45	40	40	40	35	35	35	35	35	30	30	30
1200	100	80	70	65	55	55	50	45	45	40	40	40	35	35	35	35	35	30	30	30	30
1250	115	95	85	75	65	60	55	55	50	50	45	45	40	40	40	40	35	35	35	35	35
1300	110	90	80	70	65	60	55	50	50	45	45	40	40	40	40	35	35	35	35	35	30
1350	105	85	75	65	60	55	50	50	45	45	40	40	40	35	35	35	35	35	35	30	30
1400	100	85	70	65	60	55	50	45	45	40	40	40	35	35	35	35	35	30	30	30	30

WEIGHTS

STANDARD HALTON MARINE BRD DAMPERS (KG) including counter weights. Frame thickness 3mm.

H/HEIGHT	B / WIDTH (mm)													
(mm)	150	200	300	400	500	600	700	800	900	1000	1100	1200	D2 ØD	WEIGHT
150	8	9	11	13	15	16	18	20	22	24	25	27	mm	kg
200	10	12	12	14	16	19	20	22	24	26	28	29	100	12
300	12	13	15	18	20	21	24	26	29	31	34	35	160	12
400	14	15	18	20	23	25	28	30	33	36	37	40	200	15
500	17	17	21	24	27	29	32	35	37	40	43	45	250	17
600	19	20	24	26	29	32	36	39	42	45	47	51	315	21
700	21	23	26	30	33	37	40	43	47	50	53	57	400	26
800	22	24	27	33	36	40	43	47	51	54	58	62	500	36
900	26	28	32	36	39	44	48	52	56	60	63	67	630	45
1000	28	30	34	39	43	48	51	55	60	64	68	72	800	63
1100	31	33	38	42	47	51	56	60	65	70	72	78	1000	87
1200	33	35	40	45	50	54	59	64	69	74	78	84	1250	116
1300	36	38	44	48	53	58	64	69	74	79	83	89		
1400	38	40	46	51	56	62	67	73	78	83	88	94		

BDH BLAST PROTECTION DAMPER

For offshore, onshore and heavy industry ventilation systems

MATERIALS

PART	MATERIAL	FINISHING
Frame	Carbon steel	Painted or hot dip galvanized
Frame	Stainless steel EN 1.4404 (AISI316L)	-
Blades	Carbon steel	Hot dip galvanized
Blades	Stainless steel EN 1.4404 (AISI316L)	-
Setting, closing and locking mechanism	Stainless steel EN 1.4404 (AISI316L)	-
Maintenance-free bearings	Stainless steel EN 1.4404 (AISI316L)	-
Shafts	Stainless steel EN 1.4404 (AISI316L)	-
Debris catcher	Carbon steel	Hot dip galvanized
Debris catcher	Stainless steel EN 1.4404 (AISI316L)	-

APPLICATIONS

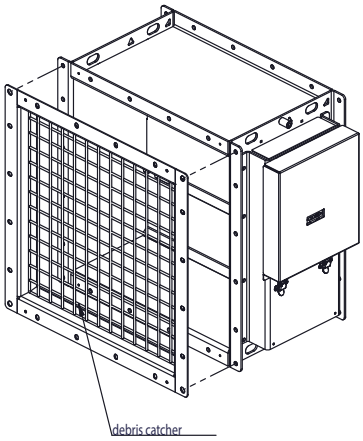
Halton BDH blast dampers protect against overpressure in offshore, onshore and heavy industry ventilation systems. The BDH can be installed in rectangular ducts or wall openings. When the blades are in the open position, the device does not cause significant pressure loss, noise or flow disturbance. The BDH has and adjustable arming mechanism to cope with different air velocity and closing pressure requirements. An open-closed indicator is visible on the outside of the damper.

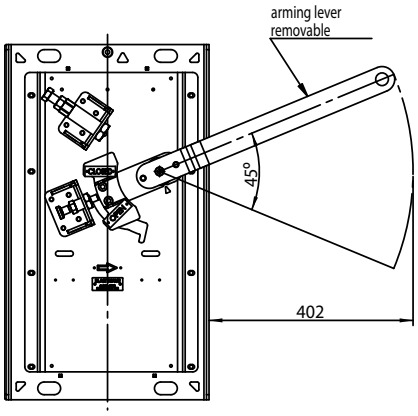
There is no external power source needed to operate damper. In case of a blast incident, the pressure wave closes the blades. There is a locking mechanism preventing the blades from opening during the negative phase. After a blast incident, the blades remain locked in the closed position, until the damper is set (armed) again.

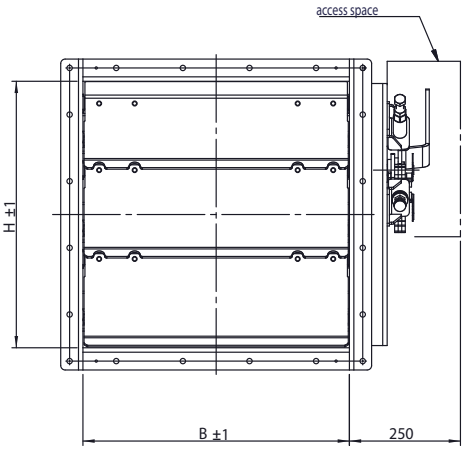
FEATURES

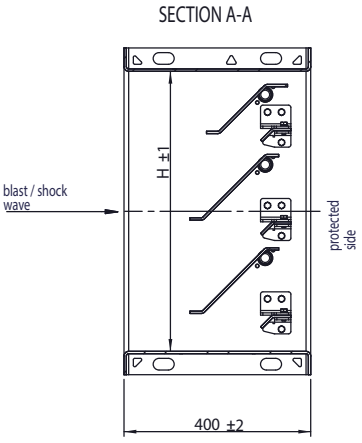
- Shock tube tested for detonation (shock) type pressure wave
- Shock tube tested for deflagration (blast) type pressure wave
- Shock tube testing in compliance with GSA TS01 and ASTM F 1642-04(2010).
- Debris (steel balls and wood plank missile) impact tested
- Debris impact testing in compliance with ASTM E 1886-13a and ASTM E 1996-14a
- Aerodynamic testing according to EN 1751
- Blade angle in the normal open position is 45 degrees
- ATEX certified
- Recommended maximum air velocity 10 m/s
- Maximum shock and blast wave pressure 1.0 bar
- Normal operation temperature for stainless steel damper is between -60 °C to +80 °C
- Normal operation temperature for carbon steel damper is between -20 °C to +80 °C

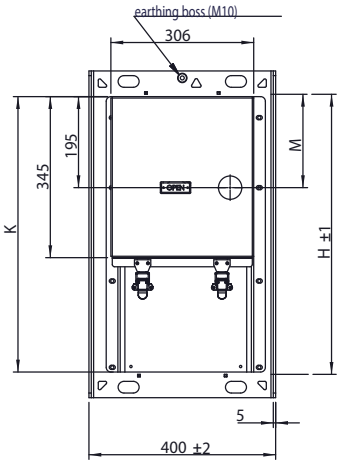
GENERAL BDH DRAWINGS

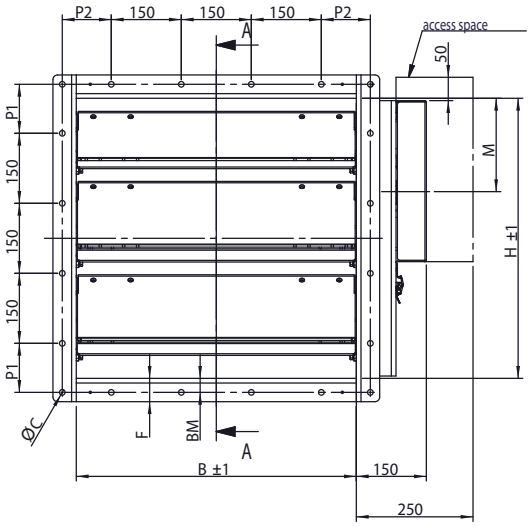












H	M	K
1200	200	1190
1150	200	1140
1100	200	1090
1050	200	1040
1000	200	990
950	200	940
900	200	890
850	200	840
800	200	790
750	200	740
700	200	690
650	200	640
600	200	590
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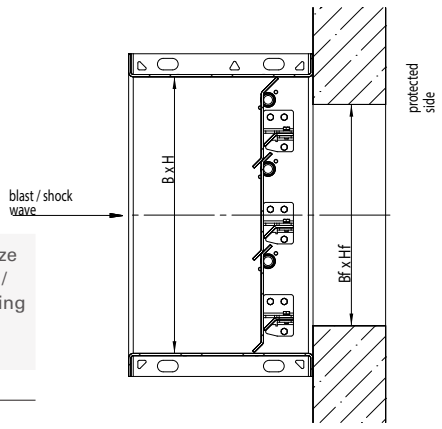
350	200	435
300	50	440
250	50	435
200	50	435



Damper size BxH	Opening size concrete wall (max) Bf x Hf	Opening size steel wall / duct / coaming (max) BxH
300x300	190x190	300x300
400x400	280x280	400x400
500x500	380x380	500x500
600x600	480x480	600x600
700x700	580x580	700x700
800x800	680x680	800x800
900x900	780x780	900x900
1000x1000	880x880	1000x1000
1100x1100	970x970	1100x1100
1200x1200	1070x1070	1200x1200

FLANGE DIMENSIONS ACCORDING TO ISO 15138

DIMENSIONS	ØC	F	P1	P2	BM
If longest side ≤ 350	10	40	75...150	75...150	20
If longest side 351...1000	12	50	75...150	75...150	30
If longest side ≥ 1001	14	80	75...150	75...150	40

BDH DIMENSIONS AND MATERIAL THICKNESS

BDH blast protection dampers are available for rectangular ducts and wall openings. Width B is 300-1200 mm, 25 mm division. Height H is 200-1200 mm, 50 mm division.
Larger damper available as a modular construction.
As a standard, flange width and bolt hole drilling is according to ISO 15138 standard.
Frame depth is 400 mm, frame thickness is 5 mm.
Blade thickness is 5 mm, blade shaft diameter is 25 mm.
Blades are bolted to shafts.
Damper has 1 – 6 blades. In multiblade damper (2 – 6 blades), blades are connected via linkage and operate in parallel. Linkage thickness is 8 mm.
Debris catcher is diameter 6 mm wire, open area between wires is 40 x 40 mm.

BDH INSTALLATION OPTIONS

Damper can be installed vertically outside of the building wall or between duct flanges. Also horizontal installation is possible on duct, floor or roof, but only on top-down blast direction.
Wall (or floor/roof) material can be concrete or steel.
In concrete wall, damper is installed using anchor bolts.
In steel wall, damper is installed using bolts or by welding.
Detailed information on installation available on BDH installation, operation and maintenance manual.

ACCESSORIES

Arming tool to open the damper, at least one tool per building.
Debris catcher to prevent large objects from entering to protected area.

WEIGHTS

STANDARD HALTON MARINE BDH DAMPERS (KG)

H/HEIGHT	B / WIDTH (mm)									
mm	300	400	500	600	700	800	900	1000	1100	1200
200	41	43	46	49	52	55	57	60	63	66
300	52	56	60	63	67	71	75	79	83	87
400	63	68	73	78	83	88	93	98	103	108
500	74	80	86	92	99	105	111	117	123	129
600	85	92	100	107	114	122	129	136	143	151
700	96	105	113	122	130	138	147	155	164	172
800	107	117	126	136	146	155	165	174	184	193
900	122	133	143	154	165	175	186	197	207	218
1000	133	145	157	168	180	192	204	216	227	239
1100	144	157	170	183	196	209	222	235	248	260
1200	155	169	183	197	211	226	240	254	268	282

PV-KK-SX BLAST VALVE

Self actuating blast protection for industrial and marine environment

SPECIFICATION

The PV-KK-SX blast valve block comprises three spring balanced closing elements moving in a slot and closing the air passage against the valve seats in response to both positive and negative (suction) phase of the blast. The valve blocks are mounted in stainless steel frames.

PV-KK-SX

All the components of the valve are made of stainless steel EN 1.4404 (AISI316L). The version is especially designed for offshore and other marine applications.

PRODUCT CODING

The material, size and form of the multi-column valves are indicated in the product code as follows.

- PV-KK-SX-number (column x rows) for acid-proof steel

where

number = total number of valve blocks
columns = number of valve block vertical columns
rows = number of valve block horizontal rows,

when blocks are in horizontal position as illustrated in picture.

APPLICATIONS

The blast valve PV-KK-SX is an application of the PV-KK blast valve for mounting on blast resistant wall surface. It is specifically designed for installation on steel walls. It can also be installed in existing buildings where casting of the valve frame in concrete is not possible. The valve is also applicable to industrial applications with risk of chemical and dust explosions.

The PV-KK-SX blast valve is available in various different sizes. Maximum height is 10 rows and width 9 columns. Contact Halton Marine for the availability of frames with custom dimensions.

The number of blocks in valve depends on the air flow requirement at desired pressure drop. When the valve dimensions do not match the opening to be covered, custom made adaptors are available.

DESIGN CRITERIA

The PV-KK-SX blast valve is designed for a blast load with 100 kPa (1.0 bar) reflected peak pressure. The valve is tested with pressure waves thus simulating hydrocarbon or dust cloud explosions.

TEST AND PERFORMANCE DATA

The valve is verified by tests to effectively attenuate slowly rising long duration (peak duration > 4s) pressure wave loads within the load range up to 100 kPa (1.0bar). The valve is designed to function within the operating temperature range of -45…+150°C.

TEST REPORTS

Test reports for PV-KK-SX by VTT Technical Research Centre of Finland are available upon request.

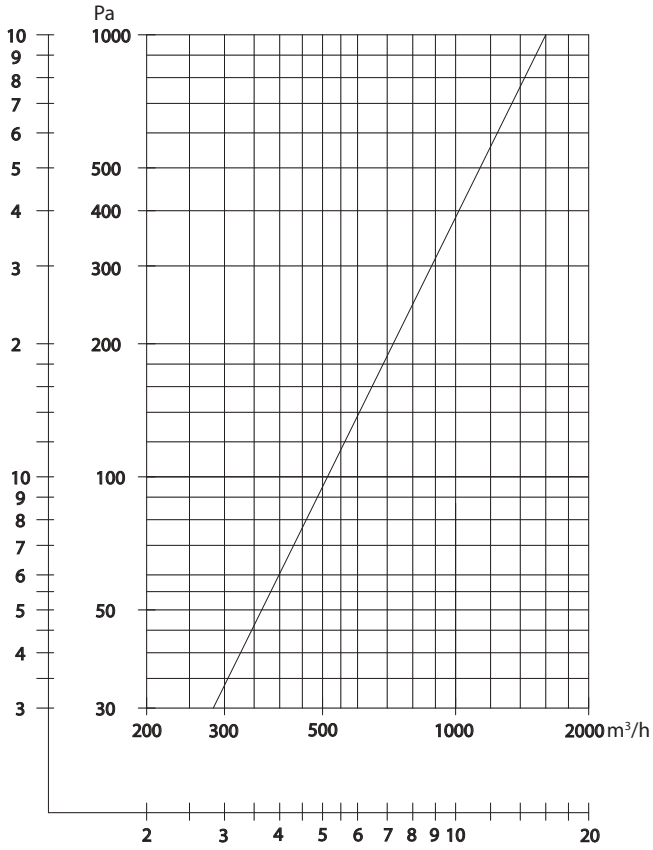
INSTALLATION ALTERNATIVES

The valve is designed to be installed onto the blast side of the blast resistant wall. The valve can be in upright or horizontal position or on ceiling/floor.

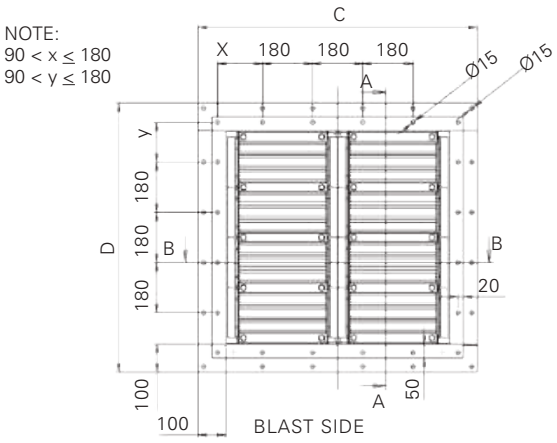
The valve is installed on a concrete wall by means of anchor bolts of type HILTI HSA M12 x 100. On a steel wall the valve can be installed by welding or bolting using M12 machine bolts.

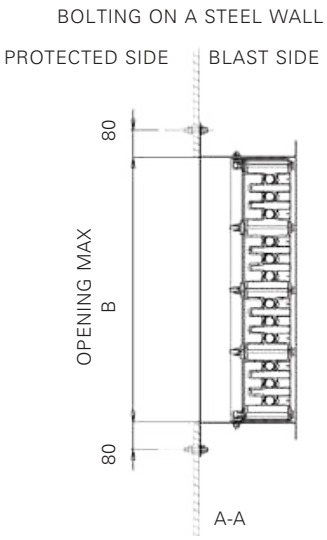
AIRFLOW CHARACTERISTICS

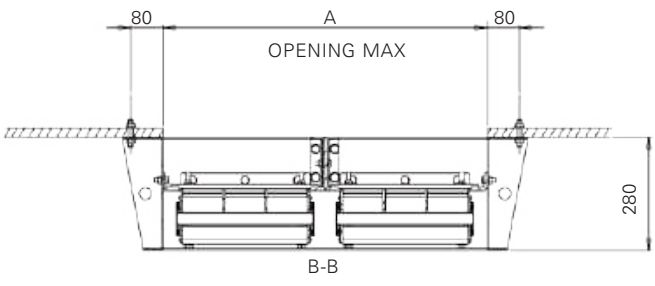
Air flow characteristics of one PV-KK-SX blast valve block are given in the above chart. The flow curve is measured at 20 °C corresponding to air density of 1.2 kg/m3. The required number of valve blocks in a specific application is determined by dividing the total air flow by the air flow capacity of one valve block at desired pressure drop.



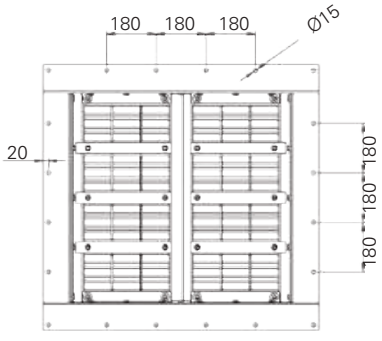
GENERAL PV-KK-SX DRAWINGS, MULTI-COLUMN







BOLTING ON A STEEL WALL



PROTECTED SIDE

CHARACTERISTICS AND DIMENSIONS OF PV-KK-SX SINGLE COLUMN VALVES

Valve type code	Concrete wall (mm)		Steel wall (mm)				Airflow at	Airflow at
	A_{max}	B_{max}	A_{max}	B_{max}	C (mm)	D (mm)	100 Pa (m^3/h)	200 Pa (m^3/h)
PV-KK-SX-1	325	145	406	225	605	425	500	700
PV-KK-SX-2	325	325	406	405	605	605	1000	1400
PV-KK-SX-3	325	505	406	585	605	785	1490	2100
PV-KK-SX-4	325	685	406	765	605	965	2000	2800
PV-KK-SX-5	325	865	406	945	605	1145	2500	3500
PV-KK-SX-6	325	1045	406	1125	605	1325	3000	4200
PV-KK-SX-7	325	1225	406	1305	605	1505	3500	4900
PV-KK-SX-8	325	1405	406	1485	605	1685	4000	5600
PV-KK-SX-9	325	1585	406	1665	605	1865	4460	6300
PV-KK-SX-10	325	1765	406	1845	605	2045	4950	7000

Key characteristics of the valves are given above relating to legends in drawings. Note that the size of opening to be covered depend on wall material due to the safety margin in bolting.

CHARACTERISTICS AND DIMENSIONS OF PV-KK-SX MULTICOLUMN VALVES

Valve type code	Concrete wall (mm)		Steel wall (mm)				Airflow at	Airflow at
	A_{max}	B_{max}	A_{max}	B_{max}	C (mm)	D (mm)	100 Pa (m^3/h)	200 Pa (m^3/h)
PV-KK-SX-4 (2x2)	722	325	802	405	1002	605	2000	2800
PV-KK-SX-6 (2x3)	722	505	802	585	1002	785	3000	4200
PV-KK-SX-8 (2x4)	722	685	802	765	1002	965	4000	5600
PV-KK-SX-16 (2x8)	722	1405	802	1485	1002	1685	8000	11200
PV-KK-SX-18 (2x9)	722	1585	802	1665	1002	1865	8900	12620
PV-KK-SX-12 (3x4)	1118	685	1198	765	1398	965	6000	8400
PV-KK-SX-15 (3x5)	1118	865	1198	945	1398	1145	7400	10500
PV-KK-SX-18 (3x6)	1118	1045	1198	1125	1398	1325	9000	12620
PV-KK-SX-21 (3x7)	1118	1225	1198	1305	1398	1505	10400	14700
PV-KK-SX-20 (4x5)	1514	865	1594	945	1794	1145	9900	14000
PV-KK-SX-24 (4x6)	1514	1045	1594	1125	1794	1325	11900	16800
PV-KK-SX-20 (5x4)	1910	685	1990	765	2190	965	9900	14000
PV-KK-SX-25 (5x5)	1910	865	1990	945	2190	1145	12400	17500
PV-KK-SX-35 (5x7)	1910	1225	1990	1305	2190	1505	17350	24550
PV-KK-SX-40 (5x8)	1910	1405	1990	1485	2190	1685	19800	28000
PV-KK-SX-24 (6x4)	2306	685	2386	765	2586	965	11900	16800
PV-KK-SX-30 (6x5)	2306	865	2386	945	2586	1145	14800	21050
PV-KK-SX-48 (6x8)	2306	1405	2386	1485	2586	1685	23800	33650
PV-KK-SX-54 (6x9)	2306	1585	2386	1665	2586	1865	26800	37900
PV-KK-SX-35 (7x5)	2702	865	2782	945	2982	1145	17350	24550
PV-KK-SX-70 (7x10)	2702	1765	2782	1845	2982	2045	34700	49100
PV-KK-SX-48 (8x6)	3098	1045	3178	1125	3378	1325	23800	33650
PV-KK-SX-80 (8x10)	3098	1765	3178	1845	3378	2045	39650	56100
PV-KK-SX-63 (9x7)	3494	1225	3574	1305	3774	1505	31200	44150
PV-KK-S-90 (9x10)	3494	1765	3574	1845	3774	2045	44500	63000

Key characteristics of the valves are given above relating to legends in drawings. Note that the size of opening to be covered depend on wall material due to the safety margin in bolting.

PV-KK-S BLAST VALVE

Self actuating blast protection for industrial and marine environment

SPECIFICATION

The PV-KK-S blast valve block comprises three spring balanced closing elements moving in a slot and closing the air passage against the valve seats in response to both positive and negative (suction) phase of the blast. The valve blocks are mounted in structural steel frames.

PV-KK-S

The valve is completely corrosion resistant. The valve closing elements are made of special non-corroding aluminum alloy, all springs are made of stainless steel EN 1.4571 (AISI316Ti), and frame made of structural steel are hot dip galvanized.

PRODUCT CODING

The material, size and form of the multi-column valves are indicated in the product code as follows.

- **PV-KK-S-number (columns x rows)** for hot dip galvanized steel

where

number = total number of valve blocks
columns = number of valve block vertical columns
rows = number of valve block horizontal rows,
when blocks are in horizontal position as illustrated in picture.

APPLICATIONS

The blast valve PV-KK-S is an application of the PV-KK blast valve for mounting on blast resistant wall surface. It is specifically designed for installation on steel walls.
It can also be installed in existing buildings where casting of the valve frame in concrete is not possible. The valve is also applicable to industrial applications with risk of chemical and dust explosions.
The PV-KK-S blast valve is available in various different sizes. Maximum height is 10 rows and width 9 columns. Contact Halton Marine for the availability of frames with custom dimensions.
The number of blocks in valve depends on the air flow requirement at desired pressure drop. When the valve dimensions do not match the opening to be covered, custom made adaptors are available.

DESIGN CRITERIA

The PV-KK-S blast valve is designed for a blast load with 100 kPa (1.0 bar) reflected peak pressure. The valve is tested with pressure waves thus simulating hydrocarbon or dust cloud explosions.

TEST AND PERFORMANCE DATA

The valve is verified by tests to effectively attenuate slowly rising long duration (peak duration > 4s) pressure wave loads within the load range up to 100 kPa (1.0bar). The valve is designed to function within the operating temperature range of -45…+150°C.

TEST REPORTS

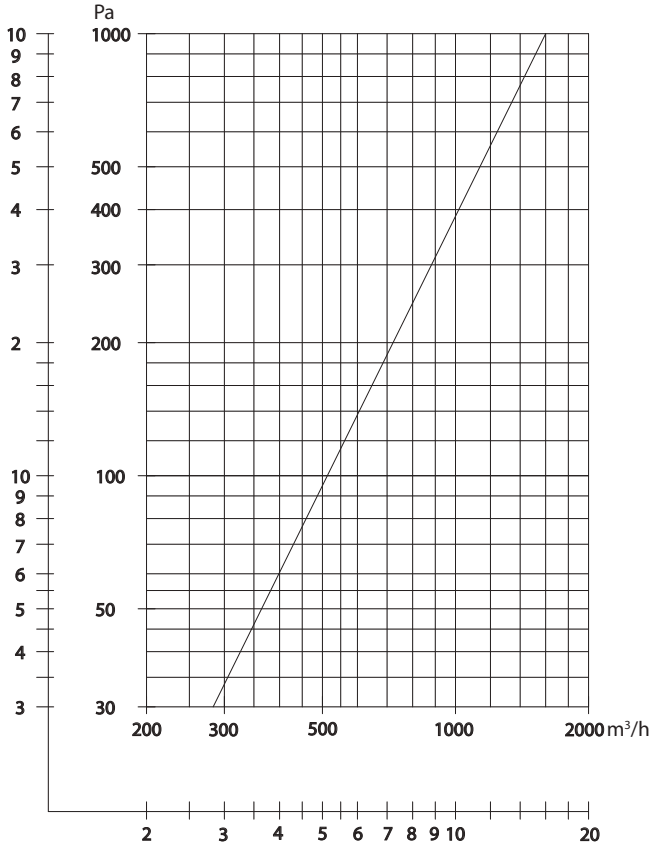
Test reports for PV-KK-S by VTT Technical Research Centre of Finland are available upon request.

INSTALLATION ALTERNATIVES

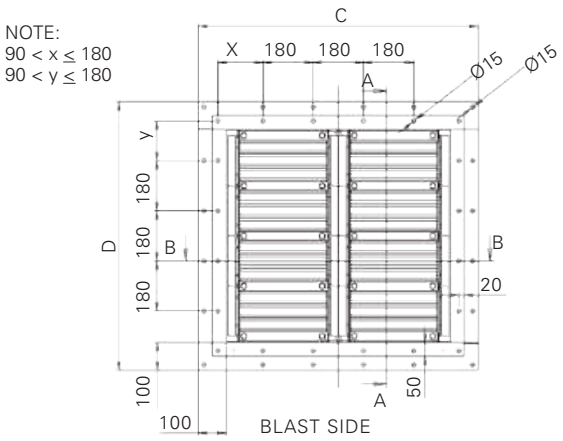
The valve is designed to be installed onto the blast side of the blast resistant wall. The valve can be in upright or horizontal position or on ceiling/floor.
The valve is installed on a concrete wall by means of anchor bolts of type HILTI HSA M12 x 100. On a steel wall the valve can be installed by welding or bolting using M12 machine bolts.

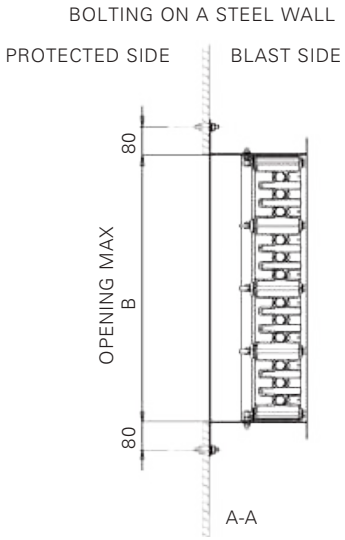
AIRFLOW CHARACTERISTICS

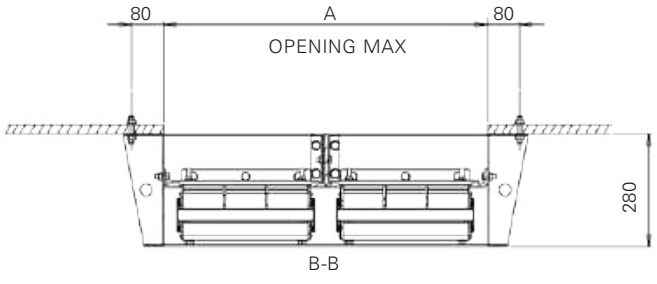
Air flow characteristics of one PV-KK-S blast valve block are given in the above chart. The flow curve is measured at 20 °C corresponding to air density of 1.2 kg/m3. The required number of valve blocks in a specific application is determined by dividing the total air flow by the air flow capacity of one valve block at desired pressure drop.



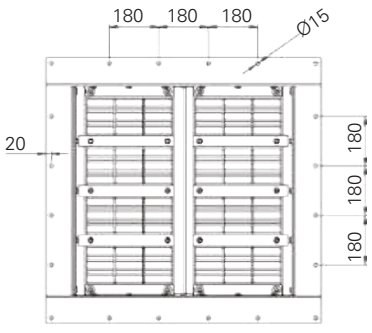
GENERAL PV-KK-S DRAWINGS, MULTI-COLUMN







BOLTING ON A STEEL WALL



PROTECTED SIDE

CHARACTERISTICS AND DIMENSIONS OF PV-KK-S SINGLE COLUMN VALVES

Valve type code	Concrete wall (mm)		Steel wall (mm)				Airflow at	Airflow at
	A_{max}	B_{max}	A_{max}	B_{max}	C (mm)	D (mm)	100 Pa (m^3/h)	200 Pa (m^3/h)
PV-KK-S-1	325	145	406	225	605	425	500	700
PV-KK-S-2	325	325	406	405	605	605	1000	1400
PV-KK-S-3	325	505	406	585	605	785	1490	2100
PV-KK-S-4	325	685	406	765	605	965	2000	2800
PV-KK-S-5	325	865	406	945	605	1145	2500	3500
PV-KK-S-6	325	1045	406	1125	605	1325	3000	4200
PV-KK-S-7	325	1225	406	1305	605	1505	3500	4900
PV-KK-S-8	325	1405	406	1485	605	1685	4000	5600
PV-KK-S-9	325	1585	406	1665	605	1865	4460	6300
PV-KK-S-10	325	1765	406	1845	605	2045	4950	7000

Key characteristics of the valves are given above relating to legends in drawings. Note that the size of opening to be covered depend on wall material due to the safety margin in bolting.

CHARACTERISTICS AND DIMENSIONS OF PV-KK-S MULTICOLUMN VALVES

Valve type code	Concrete wall (mm)		Steel wall (mm)				Airflow at	Airflow at
	A_{max}	B_{max}	A_{max}	B_{max}	C (mm)	D (mm)	100 Pa (m^3/h)	200 Pa (m^3/h)
PV-KK-S-4 (2x2)	722	325	802	405	1002	605	2000	2800
PV-KK-S-6 (2x3)	722	505	802	585	1002	785	3000	4200
PV-KK-S-8 (2x4)	722	685	802	765	1002	965	4000	5600
PV-KK-S-16 (2x8)	722	1405	802	1485	1002	1685	8000	11200
PV-KK-S-18 (2x9)	722	1585	802	1665	1002	1865	8900	12620
PV-KK-S-12 (3x4)	1118	685	1198	765	1398	965	6000	8400
PV-KK-S-15 (3x5)	1118	865	1198	945	1398	1145	7400	10500
PV-KK-S-18 (3x6)	1118	1045	1198	1125	1398	1325	9000	12620
PV-KK-S-21 (3x7)	1118	1225	1198	1305	1398	1505	10400	14700
PV-KK-S-20 (4x5)	1514	865	1594	945	1794	1145	9900	14000
PV-KK-S-24 (4x6)	1514	1045	1594	1125	1794	1325	11900	16800
PV-KK-S-20 (5x4)	1910	685	1990	765	2190	965	9900	14000
PV-KK-S-25 (5x5)	1910	865	1990	945	2190	1145	12400	17500
PV-KK-S-35 (5x7)	1910	1225	1990	1305	2190	1505	17350	24550
PV-KK-S-40 (5x8)	1910	1405	1990	1485	2190	1685	19800	28000
PV-KK-S-24 (6x24)	2306	685	2386	765	2586	965	11900	16800
PV-KK-S-30 (6x5)	2306	865	2386	945	2586	1145	14800	21050
PV-KK-S-48 (6x8)	2306	1405	2386	1485	2586	1685	23800	33650
PV-KK-S-54 (6x9)	2306	1585	2386	1665	2586	1865	26800	37900
PV-KK-S-35 (7x5)	2702	865	2782	945	2982	1145	17350	24550
PV-KK-S-70 (7x10)	2702	1765	2782	1845	2982	2045	34700	49100
PV-KK-S-48 (8x6)	3098	1045	3178	1125	3378	1325	23800	33650
PV-KK-S-80 (8x10)	3098	1765	3178	1845	3378	2045	39650	56100
PV-KK-S-63 (9x7)	3494	1225	3574	1305	3774	1505	31200	44150
PV-KK-S-90 (9x10)	3494	1765	3574	1845	3774	2045	44500	63000

Key characteristics of the valves are given above relating to legends in drawings. Note that the size of opening to be covered depend on wall material due to the safety margin in bolting.

KW3 GALLEY WATER WASH HOOD

With Capture Jet 3 technology

APPLICATIONS

Halton KW3 is a galley water wash hood for use in marine & offshore applications. The highly efficient KW3 hood uses Halton Capture Jet™ 3 technology, which allows the hood to operate with up to 45% lower exhaust airflow rates than traditional hoods. The KW3 galley hood automatically washes down the grease filters without the need for removal of the filters from the hood. The washing cycle, operated by a control cabinet CCW-M (see separate brochure), is fully automatic and programmable for use in different operating conditions. The washing process can be manually overridden, when required.

MATERIALS

PART	MATERIAL	NOTE
Front and side walls	Stainless steel EN 1.4301 (AISI304)*	Available as an option: EN 1.4404 (AISI316L)
Main body	Stainless steel EN 1.4301 (AISI304)*	Available as an option: EN 1.4404 (AISI316L)
Light fixture	Painted steel	-
Wash piping	Stainless steel, brass	-
Cables	Halogen free	-

* Thickness 1,25 mm

KW3 CONSTRUCTION

The KW3 hood comprises a Capture Jet™ air supply module, a light fixture, adjustment dampers, airflow measurement taps and KSA grease filters. All parts of the hood are manufactured from polished stainless steel EN 1.4301 (AISI304). The joints at the lower edges of the device are watertight. A drain pipe connection is fitted into the exhaust plenum in order to enable removal of the grease and dirt extracted by the KSA multi-cyclone filters and to drain the washing water. The Capture Jet supply plenum is thermally insulated through the use of mineral wool material to prevent condensation on the inner face above the cooking equipment.

KW3 PRODUCT OPTIONS

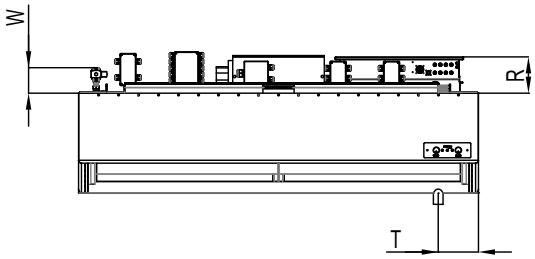
- Non-standard spigots: choice of size and position
- UV-light filtration - a combination of KSA filter, mesh filter and ultraviolet-light technology
- EN 1.4404 (AISI316L) construction
- Modulating fire damper manufactured of EN 1.4301 (AISI304) or EN 1.4404 (AISI316L) or shut-off damper in exhaust connection
- Wet chemical fire suppression system
- M.A.R.V.E.L. demand-based ventilation system

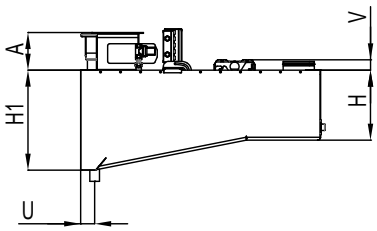
FEATURES

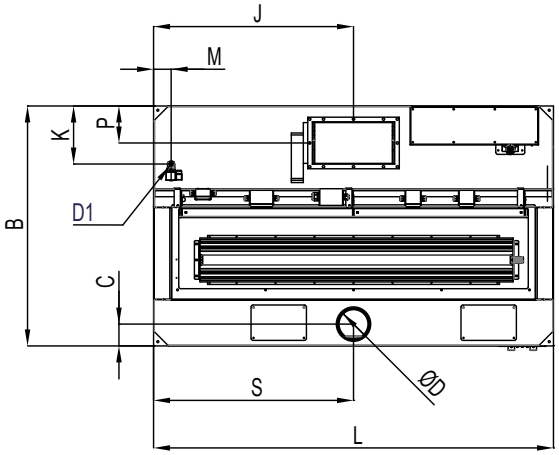
- Halton Capture Jet™ 3 technology, reducing the required exhaust airflow rate and improving the capture and containment efficiencies of the hood, while reducing energy use
- The design follows USPHS guidelines
- Automatic periodic cleaning of the exhaust plenum and KSA grease filters (and UV tubes when applicable)
- Minimal maintenance requirements, reducing the work load for personnel cleaning the filters and ductwork
- High level of hygiene facilitated
- Prevention of the build-up of grease deposits, which pose a serious fire hazard
- High-efficiency grease filtration using Halton KSA multi-cyclone filters
- Supplied as standard with lighting, balancing dampers for both capture and exhaust air and T.A.B.™ airflow measurement taps, which allow accurate and effective balancing of airflows, and efficient commissioning
- Stainless steel, welded construction
- UV-light filtration technology available as an option
- Modulating Halton fire damper or shut-off damper in exhaust connection (available as an option)

Halton

GENERAL KW3 DRAWINGS







KW3 DIMENSIONS (mm)			
A	195	L	1000-3000
B	1100-1900	M	87
C	110	P	185
D	100-200	S	1/2L
D1	3/4"	T	100-200
H	350	U	70
H1	500	R	185
J	1/2L	V	max 50
K	291	W	~130

Note: Maintenance / light fixture hatch is as big as the construction allows.
Note: Minimum length with UV-light technology is 1200 mm.

WEIGHTS

KW3 HOODS (KG)

B/L	1200	1600	2000	2500	3000
1100	107	130	156	182	211
1300	112	137	163	191	220
1500	118	144	171	199	230
1700	124	150	178	208	240
1900	130	158	189	218	250

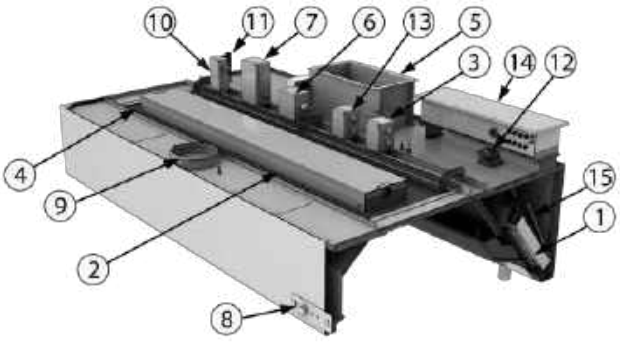
The above table represents an indication of different size of average KW3 hoods. Weight does not include fire damper.

KW3 HOODS WITH UV-LIGHT TECHNOLOGY (KG)

B/L	1200	1600	2000	2500	3000
1100	128	155	183	215	249
1300	133	162	191	223	258
1500	139	169	198	232	268
1700	145	175	206	240	278
1900	151	183	217	251	288

The above table represents an indication of different size of average KW3 hoods with UV technology. Weight does not include the fire damper.

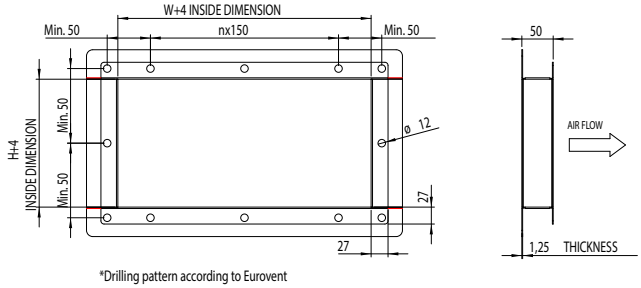
KW3 PARTS



PARTS: 1 KSA grease filters, 2 Lighting fixture, 3 Lighting fixture power supply junction box, 4 Maintenance hatch, 5 Exhaust air connection, fire damper or shut-off damper* (available as an option) and adjustment damper, 6 Fire damper junction box, 7 Actuator power and fuse info junction box, 8 Damper switch and indication (available as an option), 9 Capture air connection and adjustment damper, 10 Water wash piping connection R3/4" (G3/4" solenoid valve as an option), 11 Washing solenoid valve junction box, 12 UV system, available as an option, 13 UV power supply junction box, available as an option, 14 UV control junction box, available as an option (location may vary), 15 Mesh filter, available as an option.

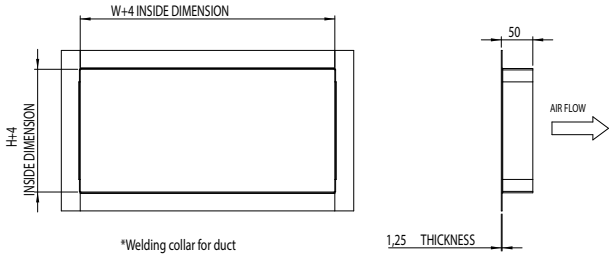
*If fire or shut-off damper is located at the duct, Halton suggests two default solutions for duct connection:
- Eurovent-collar with flange
- Welded L-collar

EUROVENT-COLLAR WITH FLANGE



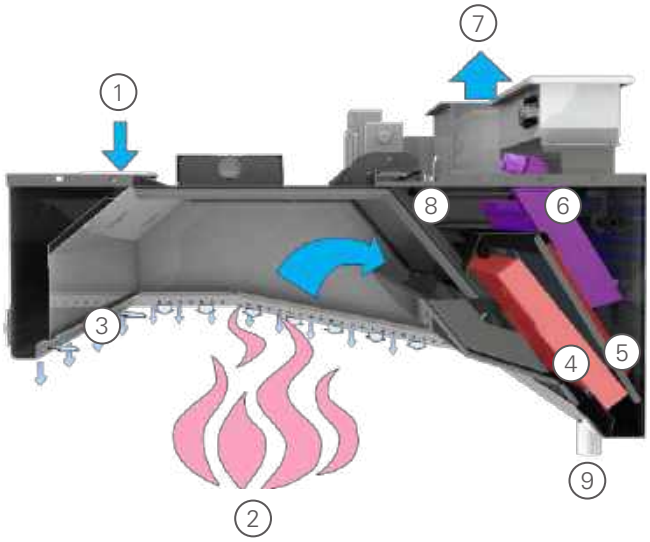
*Drilling pattern according to Eurovent

WELDED L-COLLAR



*Welding collar for duct

KW3 FUNCTION



1. Supply air enters the Capture Jet™ plenum.
2. Contaminated air and heat rises from the cooking appliances.
3. Contaminated air is directed into the hood from three different sides by Halton patented Capture Jet™ technology.
4. KSA multi-cyclone filters remove grease and contaminants from the air stream with the aid of centrifugal effect. According to independent laboratory tests KSA is the most efficient mechanical grease filter on the market.
5. Mesh filter balances the airflow inside exhaust plenum and apply more filtration to the air. Together with KSA filter this doubles filtration efficiency. Mesh filter is available as an option.
6. Based on Halton's patented highly efficiency Capture Jet™ solution and advanced mechanical KSA filter technology, UV-light technology with scheduled maintenance keeps the plenum and duct virtually grease-free and mitigates the cooking odor and emissions.
   The grease vapor and effluents that are not collected by high-efficiency filters pass over the lamps. This causes a chemical reaction that destroys the grease and converts it into carbon dioxide and water vapor. The chemical action carries over into the duct and helps keep the duct and exhaust fan clean.
   UV-filtration is available as an option.
7. Cleaned exhaust air contains small amounts of Ozone which further cleans the ducts downstream. All excess Ozone converts back into Oxygen.
8. At scheduled times the washing control cabinet stops the hood operation and begins a washing cycle. Hot water with mild detergent is pumped into the hood spray nozzles, washing the essential parts of the exhaust plenum including UV-lights and filters. Due to improved washing result, fire or shut-off damper of the hood has to be modulated to minimal airflow during washing cycle.
9. The waste from the washing cycle is drained from the hood via the drain connection.

SUGGESTED SPECIFICATIONS

The water wash galley hoods shall be constructed from stainless steel EN 1.4301 (AISI304). The galley hoods shall be supplied complete with outer casing / main body, capture jet plenum, airflow measurement taps, supply and exhaust air spigot connections with adjustment damper, maintenance hatch, light fixture, capture air jet, grease filters, drain connection, automatic washing system controlled by separate control cabinet with interfaces to ships safety systems. Classified fire damper in each exhaust connection. The manufacture of all galley hoods shall be controlled by ISO 3834-2:2005, ISO 9001, 14001 and OHSAS 18001 standards. The design of hoods shall follow USPHS guidelines.

CONSTRUCTION

All parts shall be constructed of stainless steel sheet EN 1.4301 (AISI304) (thickness 1.25 mm) with a polished finish. The inside corners of the hood are rounded for easy cleanability according to USPHS guidelines. The joints at the lower edges of the device are welded watertight. All visible screws are thumb screw type. The hood is equipped with a drain connection for removing the dirty water. There is a maintenance hatch in each hood for easy access above the hood.

WASHING MODULE

Grease filters shall have an automatic washing cycle utilising warm water and detergent via nozzles. The mixing of the detergent occurs within a separate control cabinet. The wastewater shall be removed from the hood by a direct drain connection. The casing of the control cabinet shall be constructed of stainless steel sheet EN 1.4301 (AISI304).

CAPTURE JET PLENUM

The Capture Jet™ plenum shall be insulated with sealed mineral wool. Plenum can be accessed through a maintenance hatch(es).

CAPTURE JET SYSTEM

The hood shall be designed with Capture Jet™ technology to reduce the exhaust airflow rate required and increase the capture and containment efficiencies of the hood, while reducing energy use.

AIRFLOW MEASUREMENT TAPS

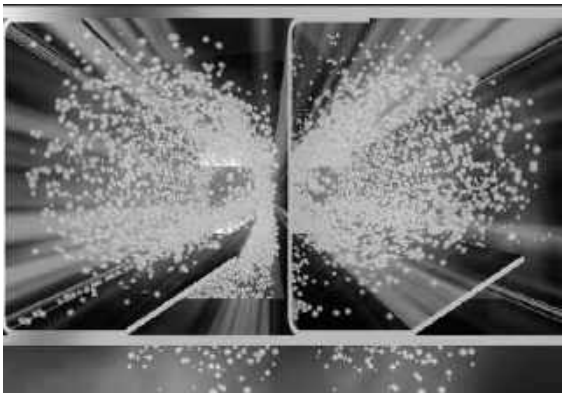
Measurement taps shall be located on top of the hood for capture air and exhaust air measurement.

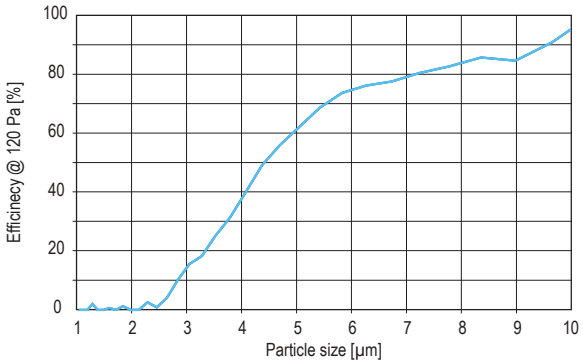
DEMAND BASED FILTRATION

Halton KSA filter

- Minimisation of grease deposits in the ducts
- Enhanced hygiene and safety

The KSA grease filters shall be constructed of stainless steel EN 1.4301 (AISI304). The grease filters shall be supplied in modular size of 500x330x50 mm and shall be removable via two folding handles. The grease filters shall have a honeycomb design in order to allow high grease filtration efficiency with the aid of centrifugal effect in filter honeycombs.





Mechanical filtration is recommended to be used in hoods with low utilization rate and cooking process producing mainly large grease particles (> 8 microns), e.g. food prepared with gas fryers, griddles and broilers (source ASHRAE).

UV-light filtration

Halton's UV-light technology is the most efficient solution for hoods with medium to high utilization rate and cooking processes producing all sizes of grease particles, e.g. food prepared with electric ranges, griddles and all type of broilers.
In the UV-light concept, most of the grease particles are first filtered with mechanical filtration (type KSA). The mesh filter behind the KSA spreads the airflow and the

remaining grease particles inside the hood chamber. This increases filtration efficiency up to 50% with grease particles sizes between 5-8 microns. Based on Halton's patented highly efficiency Capture Jet™ solution and advanced mechanical KSA filter technology, the UV-light technology with scheduled maintenance keeps the plenum and duct virtually grease-free and mitigates the cooking odor and emissions.
The grease vapor and effluents that are not collected by high-efficiency filters pass over the lamps. This causes a chemical reaction that destroys the grease and converts it into carbon dioxide and water vapor. The chemical action carries over into the duct and helps keep the duct and exhaust fan clean.

DUCT CONNECTIONS

The duct connections and adjustment dampers for supply and exhaust air shall be constructed from stainless steel. The dampers shall be adjustable.

LIGHT FIXTURES

Each hood shall be delivered with a fluorescent light fixtures or energy efficient LED light fixtures providing approx. an average illuminance of 500 lux at the work surfaces of the cooking appliances. The light fixtures shall be suitable for a single-phase 230-VAC power supply and shall be manufactured to be of protection class IP67. The ballast and capacitor shall be located within the light Frame. The core electric cables connecting the light fixture to the junction box shall be provided. The light fixture shall be installed on a hinged maintenance hatch, allowing access to the hood roof.

FLUORESCENT LIGHT FIXTURE SIZES

HOOD DIMENSION	LENGTH	WIDTH
L < 1400 mm, 2x24 W	720 mm	220 mm
L ≥ 1400 mm, < 2000 mm, 2x39 W	1020 mm	220 mm
L ≥ 2000 mm, 2x49 W	1620 mm	220 mm

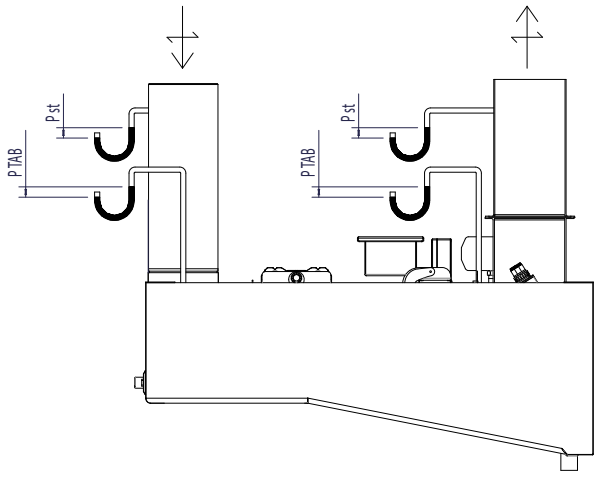
LED LIGHT FIXTURE SIZES

HOOD DIMENSION	LENGTH	WIDTH
L < 1400 mm, 1x28 W	720 mm	175 mm
L ≥ 1400 mm, < 2000 mm, 1x42 W	1020 mm	175 mm
L ≥ 2000 mm, 1x69 W	1620 mm	175 mm

MAINTENANCE HATCH

Each hood shall be provided with a maintenance hatch made of stainless steel EN 1.4301 (AISI304) with a shock-resistant plastic window. The heat tolerance of the window shall be up to +115 °C. The hatch shall be easily opened and closed.
The maintenance / light fixture hatch is as big as the construction allows.

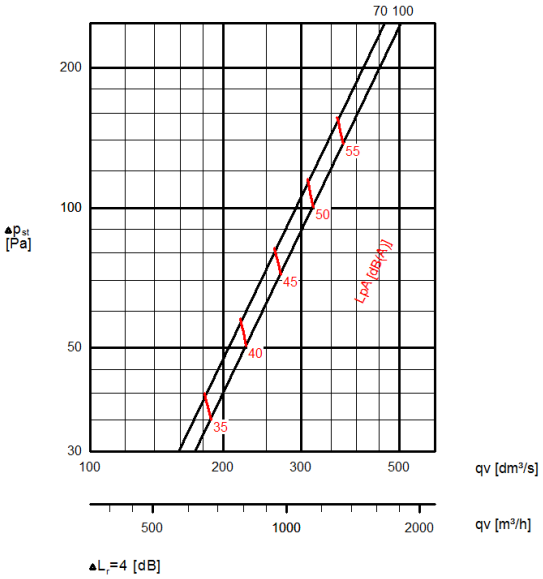
AIRFLOW MEASUREMENT



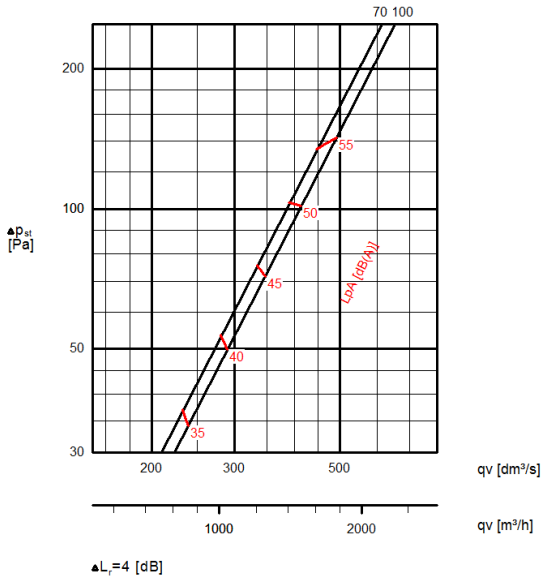
ΔP_{st} = Static pressure loss
ΔP_{TAB} = TAB pressure for airflow rate measurement
70, 100 = Damper opening in %

PRESSURE DROP AND SOUND DATA WITH RECOMMENDED EXHAUST CONNECTION SIZE

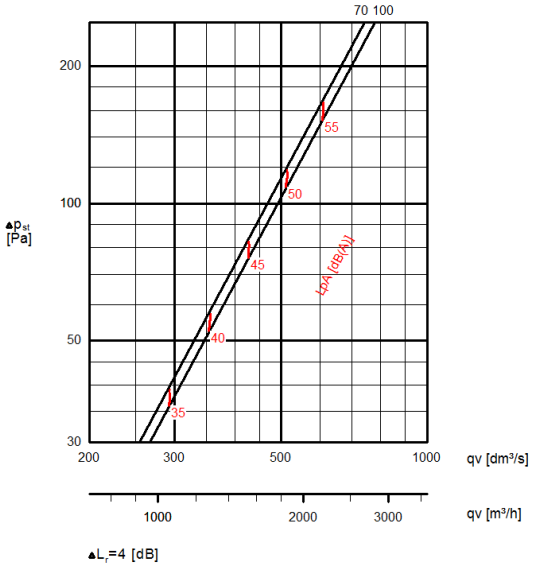
KW3, section 1000, static pressure loss and sound data



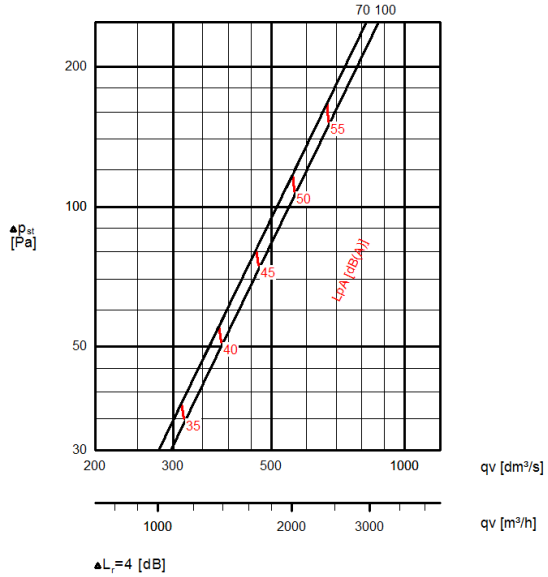
KW3, section 1500, static pressure loss and sound data



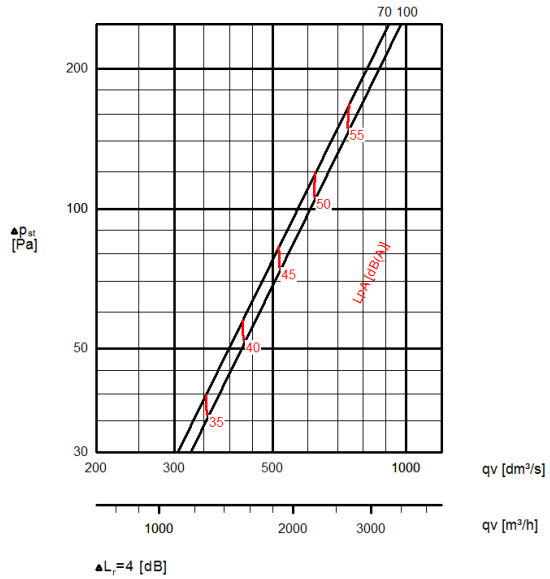
KW3, section 2000, static pressure loss and sound data



KW3, section 2500, static pressure loss and sound data

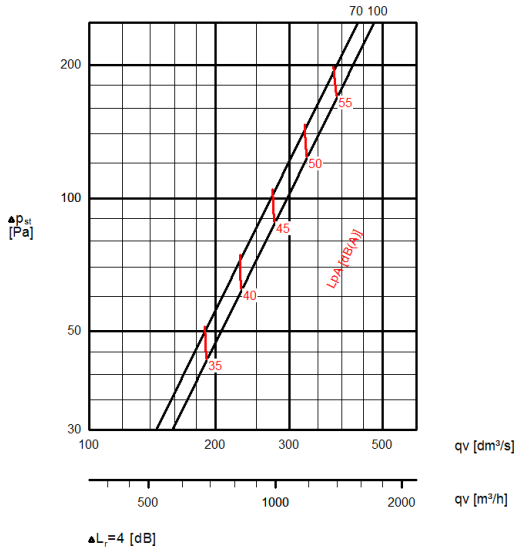


KW3, section 3000, static pressure loss and sound data

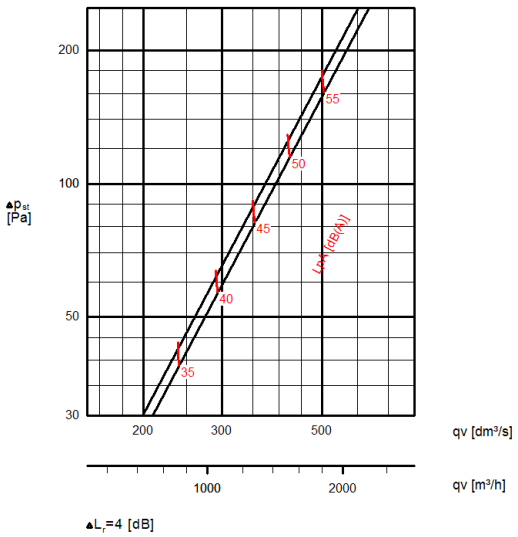


PRESSURE DROP AND SOUND DATA WITH RECOMMENDED EXHAUST CONNECTION SIZE

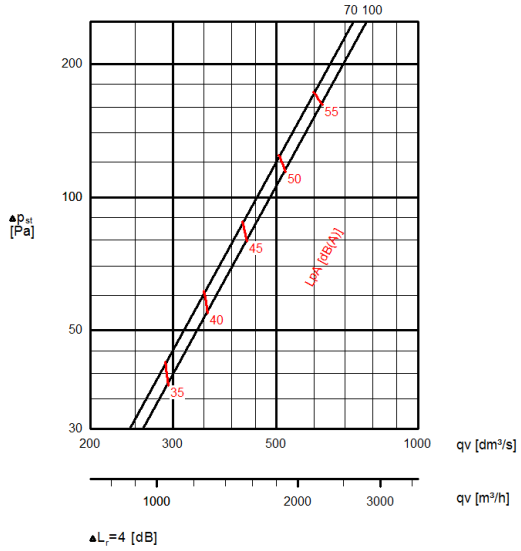
KW3 with UV-light technology, section 1000, static pressure loss and sound data



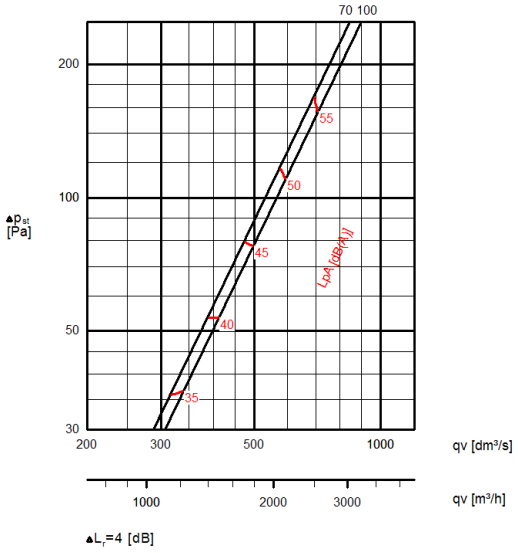
KW3 with UV-light technology, section 1500, static pressure loss and sound data



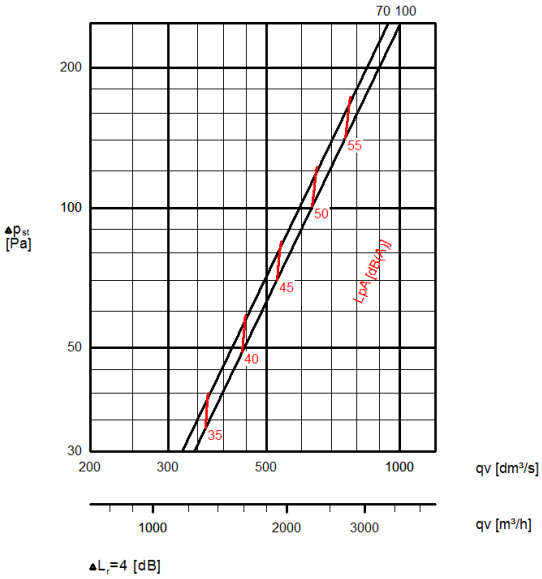
KW3 with UV-light technology, section 2000, static pressure loss and sound data



KW3 with UV-light technology, section 2500, static pressure loss and sound data



KW3 with UV-light technology, section 3000, static pressure loss and sound data



Δp_{st} = exhaust static pressure loss
70, 100 = damper opening in %
ΔL_r = room attenuation

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EXHAUST AIRFLOW RATE MEASUREMENT USING K FACTORS

KSA (NUMBER OF FILTERS)	KW3 HOOD k factor [m³/h]	KW3 HOOD k factor [l/s]	KW3 WITH UV k factor [m³/h]	KW3 WITH UV k factor [l/s]
1	105,7	29,4	88,1	24,5
2	133,2	37,0	121,3	33,7
3	170,3	47,3	158,4	44,0
4	211,3	58,7	197,5	54,9
5	232,9	64,7	229,3	63,7
6	262,4	72,9	261,7	72,7

With the T.A.B. pressure measurement, it is also possible to check the exhaust airflow with the following formula. Above values are with recommended exhaust connection size.

$q_{v,e} = k \times \sqrt{\Delta P_{TAB}\,[Pa]}$

$q_{v,e}$ = Airflow
k = K-factor
ΔP_{TAB} = Pressure difference

RECOMMENDED EXHAUST AIRFLOW FOR KW3

NUMBER OF KSA FILTERS	MINIMUM l/s	MAXIMUM l/s	MINIMUM m³/h	MAXIMUM m³/h
1	130	201	468	724
2	259	402	932	1447
3	389	602	1400	2167
4	518	803	1865	2891
5	648	1004	2333	3614
6	778	1205	2801	4338

Note: KSA filter size 500x330x50 mm

KW3 CAPTURE FOR ONE METER

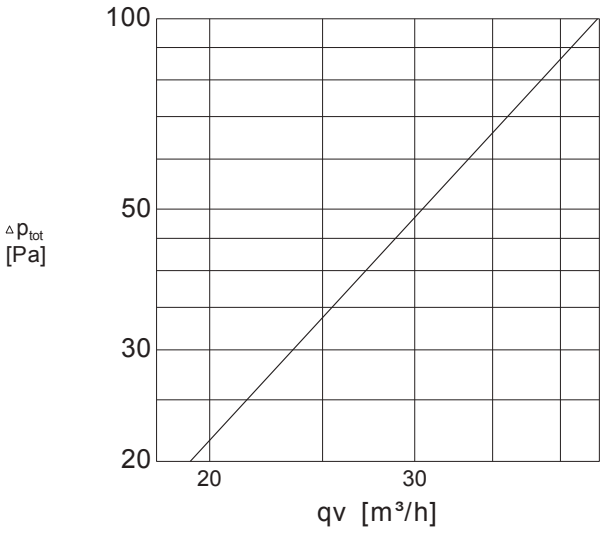
STATIC PRESSURE		TAB PRESSURE	
k factor [m³/h]	k factor [l/s]	k factor [m³/h]	k factor [l/s]
4,23	1,18	4,35	1,21

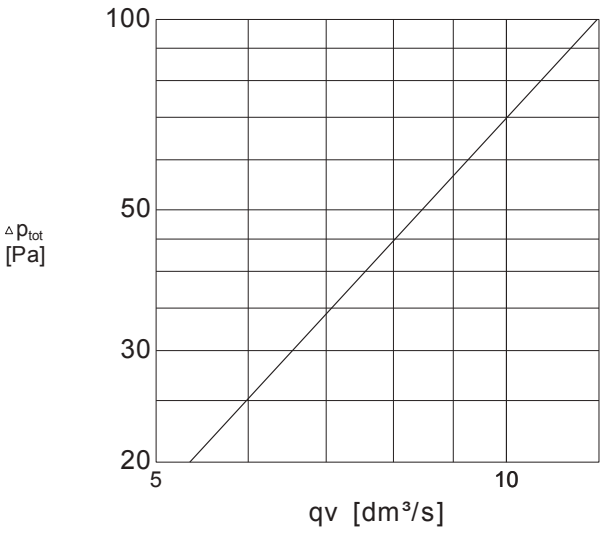
Recommended pressure for capture is 60Pa, corresponding approximately 34 m3/h (9,5l/s) for one meter of capture chamber.

$q_{v,e} = k \times l_{eff} \times \sqrt{\Delta P_m\,[Pa]}$

$q_{v,e}$ = Airflow
k = K-factor
l_{eff} = Lenght of effective capture
ΔP_m = Pressure difference

KW3 CAPTURE DIAGRAMS FOR ONE METER





KWT GALLEY WATER WASH HOOD

With supply air and Capture Jet technology

APPLICATIONS

Halton KWT is a galley water wash hood for use in marine & offshore applications. The highly efficient KWT hood uses Halton Capture Jet™ technology, which allows the hood to operate with up to 30% lower exhaust airflow rates than traditional hoods. The KWT galley hood automatically washes down the grease filters without the need for removal of the filters from the hood. The washing cycle, operated by a control cabinet CCW-M or WR (see separate brochure), is fully automatic and programmable for use in different operating conditions. The washing process can be manually overridden, when required.

MATERIALS

PART	MATERIAL	NOTE
Front and side walls	Stainless steel EN 1.4301 (AISI304)*	Available as an option: EN 1.4404 (AISI316L)
Main body	Stainless steel EN 1.4301 (AISI304)**	Available as an option: EN 1.4404 (AISI316L)
Light fixture	Painted steel	-
Wash piping	Stainless steel, brass	-
Cables	Halogen free	-

* Thickness 2,0 mm
** Thickness 1,25 mm

FEATURES

- The design follows USPHS guidelines
- Automatic periodic cleaning of the exhaust plenum and KSA grease filters (and UV tubes when applicable)
- Minimal maintenance requirements, reducing the work load for personnel cleaning the filters and ductwork
- High level of hygiene facilitated
- Prevention of the build-up of grease deposits, which pose a serious fire hazard
- Halton Capture Jet™ technology, reducing the required exhaust airflow rate and improving the capture and containment efficiencies of the hood, while reducing energy use
- Draught-free air supply directly to the work area from the low-velocity supply unit located on the front panel of the hood
- High-efficiency grease filtration using Halton KSA multi-cyclone filters
- Supplied as standard with lighting, balancing dampers for supply, capture and exhaust air and T.A.B.™ airflow measurement taps, which allow accurate and effective balancing of airflows, and efficient commissioning

KWT CONSTRUCTION

The KWT hood comprises a Capture Jet™ air supply module, a light fixture, adjustment dampers, airflow measurement taps and KSA grease filters. All parts of the hood are manufactured from polished stainless steel EN 1.4301 (AISI304). The joints at the lower edges of the device are watertight. A drain pipe connection is fitted into the exhaust plenum in order to enable removal of the grease and dirt extracted by the KSA multi-cyclone filters and to drain the washing water. The Capture Jet™ / supply plenum is thermally insulated through the use of mineral wool material to prevent condensation on the inner face above the cooking equipment.

KWT PRODUCT OPTIONS

- Non-standard spigots: choice of size and position
- UV-light filtration - a combination of KSA filter, mesh filter and ultraviolet-light technology
- Certified fire damper manufactured of EN 1.4301 (AISI304) or EN 1.4404 (AISI316L)
- Wet chemical fire suppression system
- M.A.R.V.E.L. demand-based ventilation system
- Possibility to have a separated make up air and capture air
- M.A.R.V.E.L. demand based ventilation system

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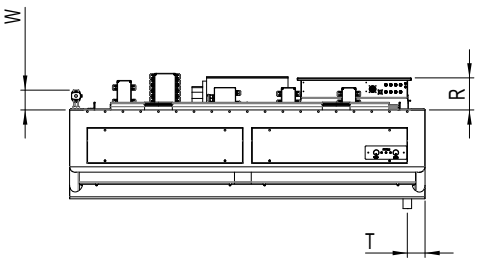
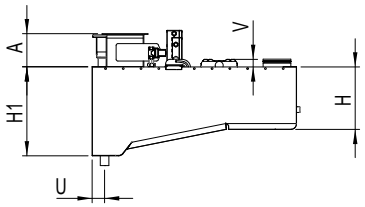
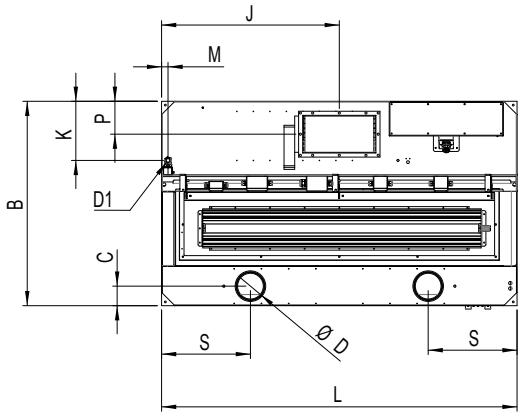
GENERAL KWT DRAWINGS







KWT DIMENSIONS (mm)			
A	195	L	1000-3000
B	1100-1900	M	37
C	110	P	185
D	100-200	S	1/2L
D1	3/4"	T	100-200
H	350	U	70
H1	500	R	185
J	1/2L	V	max 50
K	332	W	~130

Note: Maintenance / light fixture hatch is as big as the construction allows.
Note: Minimum length with UV-light technology is 1200 mm.

WEIGHTS

KWT HOODS (KG)

B/L	1200	1600	2000	2500	3000
1100	105	127	148	176	203
1300	110	133	155	184	212
1500	116	140	162	193	221
1700	122	146	169	201	230
1900	127	153	177	209	240

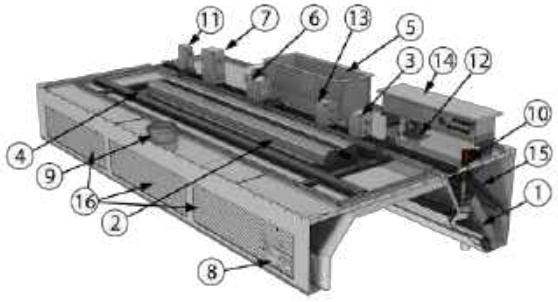
The above table represents an indication of different size of average KWT hoods. Weight does not include fire damper.

KWT HOODS WITH UV-LIGHT TECHNOLOGY (KG)

B/L	1200	1600	2000	2500	3000
1100	145	172	198	232	264
1300	151	179	205	240	274
1500	157	185	212	249	283
1700	162	192	220	257	292
1900	168	198	227	265	301

The above table represents an indication of different size of average KWT hoods with UV-light technology. Weight does not include the fire damper.

KWT PARTS

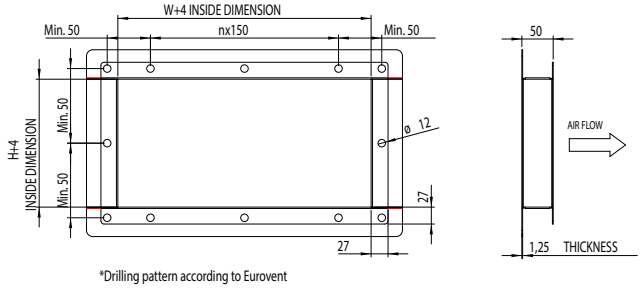


PARTS: 1 KSA grease filters, 2 Lighting fixture, 3 Lighting fixture power supply junction box, 4 Maintenance hatch, 5 Exhaust air connection, fire damper or shut-off damper* (available as an option) and adjustment damper, 6 Fire damper junction box, 7 Actuator power and fuse info junction box, 8 Damper switch and indication (available as an option), 9 Supply air connection and adjustment damper, 10 Water wash piping connection R3/4" (G3/4" solenoid valve as an option), 11 Washing solenoid valve junction box, 12 UV system, available as an option, 13 UV power supply junction box, available as an option, 14 UV control junction box, available as an option, 15 Mesh filter, available as an option, 16 Supply air panels

*If fire or shut-off damper is located at the duct, Halton suggests two default solutions for duct connection:

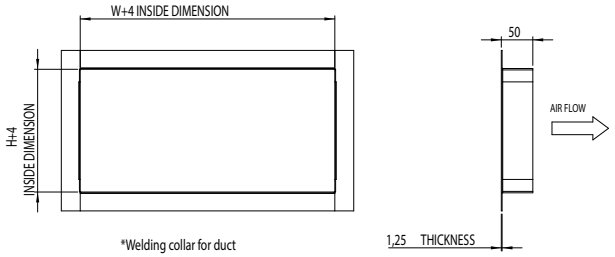
- Eurovent-collar with flange
- Welded L-collar

EUROVENT-COLLAR WITH FLANGE



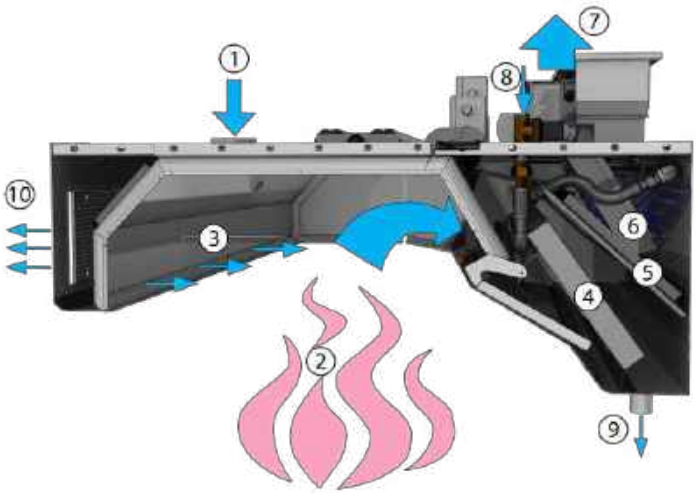
*Drilling pattern according to Eurovent

WELDED L-COLLAR



*Welding collar for duct

KWT FUNCTION



1. Supply air enters the Capture Jet plenum.
2. Contaminated air and heat rises from the cooking appliances.
3. Contaminated air is directed into the hood by Halton patented Capture Jet technology.
4. KSA multi-cyclone filters remove grease and contaminants from the air stream with the aid of centrifugal effect. According to independent laboratory tests KSA is the most efficient mechanical grease filter on the market.
5. Mesh filter balances the airflow inside exhaust plenum and apply more filtration to the air. Together with KSA filter this doubles filtration efficiency. Mesh filter is available as an option.
6. Based on Halton's patented highly efficiency Capture Jet™ solution and advanced mechanical KSA filter technology, the UV-light technology with scheduled maintenance keeps the plenum and duct virtually grease-free and mitigates the cooking odor and emissions.
   The grease vapor and effluents that are not collected by high-efficiency filters pass over the lamps. This causes a chemical reaction that destroys the grease and converts it into carbon dioxide and water vapor. The chemical action carries over into the duct and helps keep the duct and exhaust fan clean.UV-filtration is available as an option.
7. Cleaned exhaust air contains small amounts of Ozone which further cleans the ducts downstream. All excess Ozone converts back into Oxygen.
8. At scheduled times the washing control cabinet stops the hood operation and begins a washing cycle. Hot water with mild detergent is pumped into the hood spray nozzles, washing the essential parts of the exhaust plenum including UV-lights and filters.
9. The waste from the washing cycle is drained from the hood via the drain connection.
10. Supply air is distributed to the workspace at low velocity through the front panels

SUGGESTED SPECIFICATIONS

The water wash galley hoods shall be constructed from stainless steel EN 1.4301 (AISI304). The galley hoods shall be supplied complete with outer casing / main body, supply air plenum, supply air panels, pressure measurement taps, supply and exhaust air spigot connections with adjustment damper, maintenance hatch, light fixture, capture air jet, grease filters, drain connection, automatic washing system controlled by separate control cabinet with interfaces to ships safety systems. Classified fire damper in each exhaust connection. The manufacture of all galley hoods shall be controlled by ISO 3834-2:2005, ISO 9001, 14001 and OHSAS 18001 standards. The design of hoods shall follow USPHS guidelines.

CONSTRUCTION

All parts shall be constructed of stainless steel sheet EN 1.4301 (AISI304) (thickness 1.25-2.0 mm) with a polished finish. The inside corners of the hood are rounded for easy cleanability according to USPHS guidelines. The joints at the lower edges of the device are welded watertight. All visible screws are thumb screw type. The hood is equipped with a drain connection for removing the dirty water. There is a maintenance hatch in each hood for easy access above hood.

WASHING MODULE

Grease filters shall have an automatic washing cycle utilising warm water and detergent via nozzles. The mixing of the detergent occurs within a separate control cabinet. The wastewater shall be removed from the hood by a direct drain connection.The casing of the control cabinet shall be constructed of stainless steel sheet EN 1.4301 (AISI304).

SUPPLY AIR PLENUM

The supply air plenum shall be insulated with sealed mineral wool. Plenum can be accessed through a maintenance hatch(es). Part of the galley supply air will be distributed through the low velocity supply air panels located at the front of the hood. Rest of the supply air is used in Capture JetTM technology.

CAPTURE JET SYSTEM

The hood shall be designed with Capture JetTM technology to reduce the exhaust airflow rate required and increase the capture and containment efficiencies of the hood, while reducing energy use.

AIRFLOW MEASUREMENT TAPS

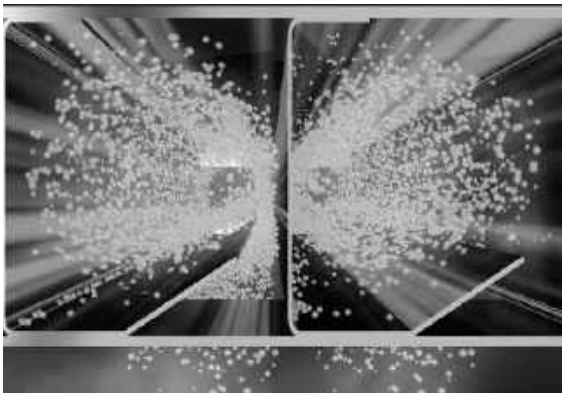
Measurement taps shall be located on top of the hood for supply, capture air and exhaust air measurement.

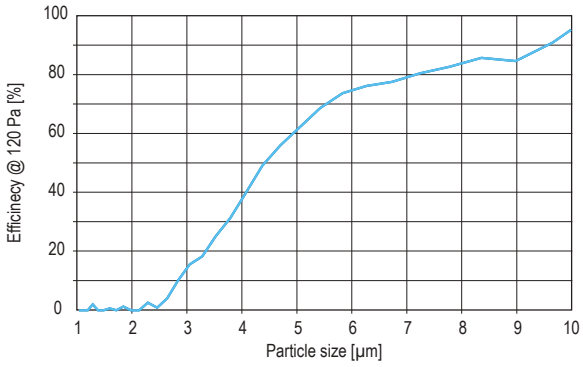
DEMAND BASED FILTRATION

Halton KSA filter

- Minimisation of grease deposits in the ducts
- Enhanced hygiene and safety

The KSA grease filters shall be constructed of stainless steel EN 1.4301 (AISI304). The grease filters shall be supplied in modular size of 500x330x50 mm and shall be removable via two folding handles. The grease filters shall have a honeycomb design in order to allow high grease filtration efficiency with the aid of centrifugal effect in filter honeycombs.





Mechanical filtration is recommended to be used in hoods with low utilization rate and cooking process producing mainly large grease particles (> 8 microns), e.g. food prepared with gas fryers, griddles and broilers (source ASHRAE).

UV-light filtration

Halton's UV-light technology is the most efficient solution for hoods with medium to high utilization rate and cooking processes producing all sizes of grease particles, e.g. food prepared with electric ranges, griddles and all type of broilers.

In the UV-light concept, most of the grease particles are first filtered with mechanical filtration (type KSA). The mesh filter behind the KSA spreads the airflow and the remaining grease particles inside the hood chamber. This

increases filtration efficiency up to 50% with grease particles sizes between 5-8 microns. Based on Halton's patented highly efficiency Capture JetTM solution and advanced mechanical KSA filter technology, the UV-light technology with scheduled maintenance keeps the plenum and duct virtually grease-free and mitigates the cooking odor and emissions.
The grease vapor and effluents that are not collected by high-efficiency filters pass over the lamps. This causes a chemical reaction that destroys the grease and converts it into carbon dioxide and water vapor. The chemical action carries over into the duct and helps keep the duct and exhaust fan clean.

DUCT CONNECTIONS

The duct connections and adjustment dampers for supply and exhaust air shall be constructed from stainless steel. The dampers shall be adjustable.

LIGHT FIXTURES

Each hood shall be delivered with a fluorescent light fixtures or LED light fixtures providing approx. an average illuminance of 500 lux at the work surfaces of the cooking appliances.
The light fixtures shall be suitable for a single-phase 230-VAC power supply and shall be manufactured to be of protection class IP67.
The ballast and capacitor shall be located within the light frame. The core electric cables connecting the light fixture to the junction box shall be provided.
The light fixture shall be installed on a hinged maintenance hatch, allowing access to the hood roof.

FLUORESCENT LIGHT FIXTURE SIZES

HOOD DIMENSION	LENGTH	WIDTH
L < 1250 mm, 2x24 W	720 mm	220 mm
L ≥ 1250 mm, < 2000 mm, 2x39 W	1020 mm	220 mm
L ≥ 2000 mm, 2x49 W	1620 mm	220 mm

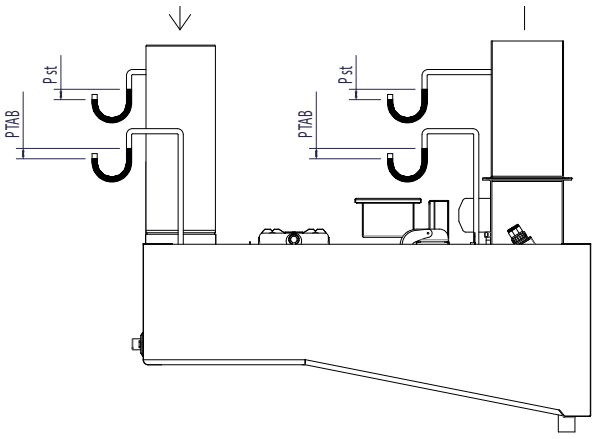
LED LIGHT FIXTURE SIZES

HOOD DIMENSION	LENGTH	WIDTH
L < 1250 mm, 1x28 W	720 mm	175 mm
L ≥ 1250 mm, < 2000 mm, 1x42 W	1020 mm	175 mm
L ≥ 2000 mm, 1x69 W	1620 mm	175 mm

MAINTENANCE HATCH

Each hood shall be provided with a maintenance hatch made of stainless steel EN 1.4301 (AISI304) with a shock-resistant plastic window. The heat tolerance of the window shall be up to +115 °C. The hatch shall be easily opened and closed.
The maintenance / light fixture hatch is as big as the construction allows.

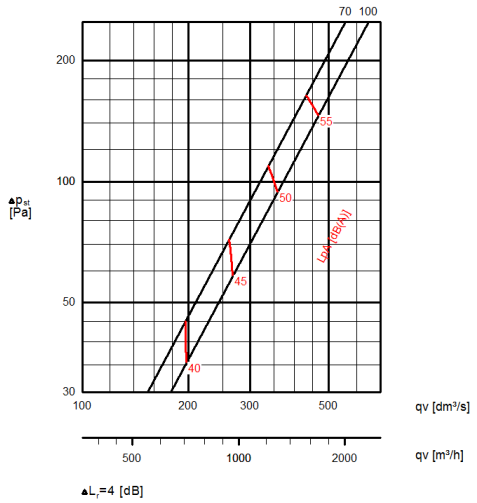
AIRFLOW MEASUREMENT



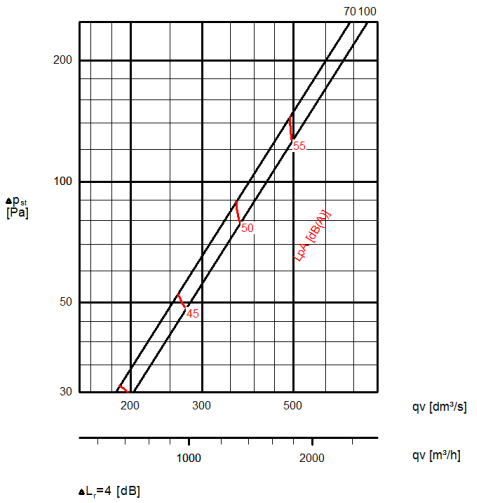
ΔP_{st} = Static pressure loss
ΔP_{TAB} = TAB pressure for airflow rate measurement
70, 100 = Damper opening in %

PRESSURE DROP AND SOUND DATA WITH RECOMMENDED EXHAUST CONNECTION SIZE

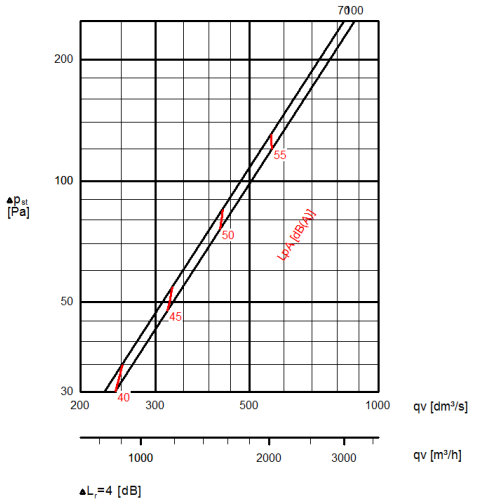
KWT, section 1000, static pressure loss and sound data



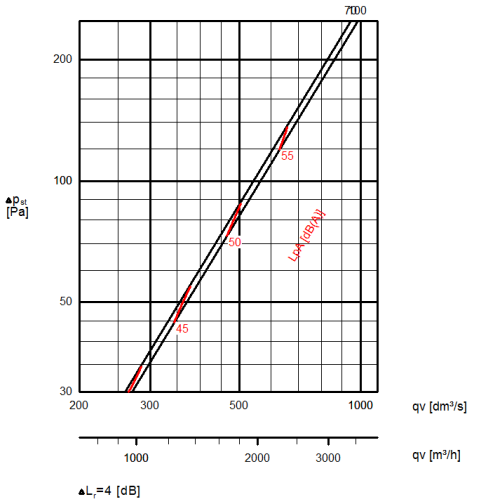
KWT, section 1500, static pressure loss and sound data



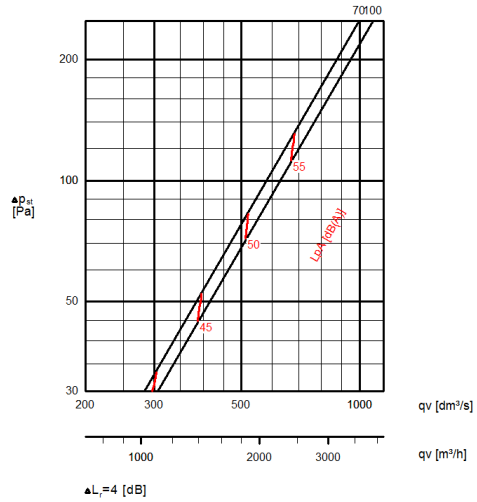
KWT, section 2000, static pressure loss and sound data



KWT, section 2500, static pressure loss and sound data

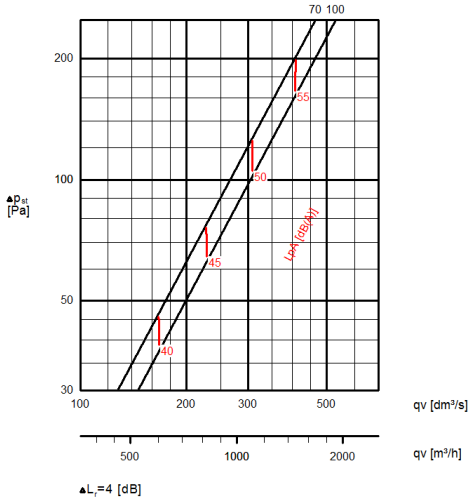


KWT, section 3000, static pressure loss and sound data

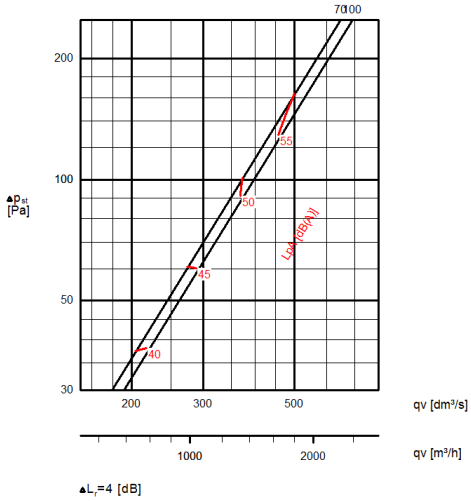


PRESSURE DROP AND SOUND DATA WITH RECOMMENDED EXHAUST CONNECTION SIZE

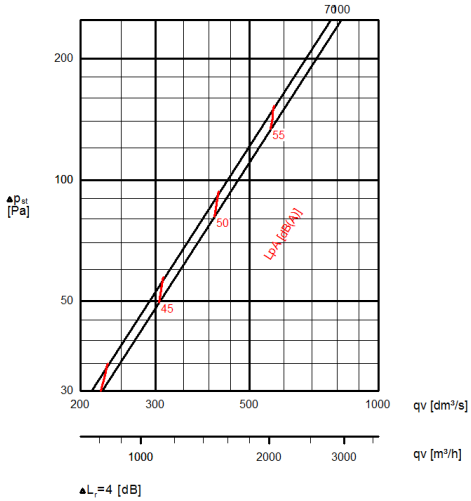
KWT with UV-light technology, section 1000, static pressure loss and sound data



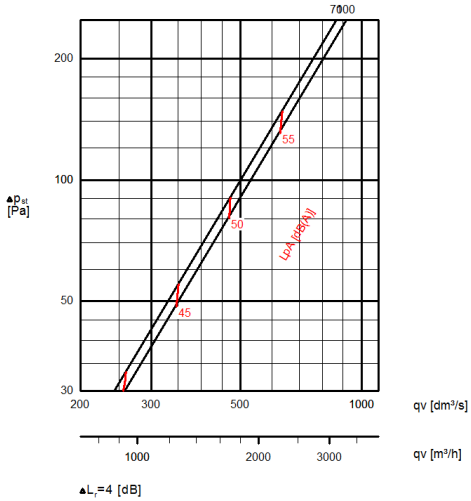
KWT with UV-light technology, section 1500, static pressure loss and sound data



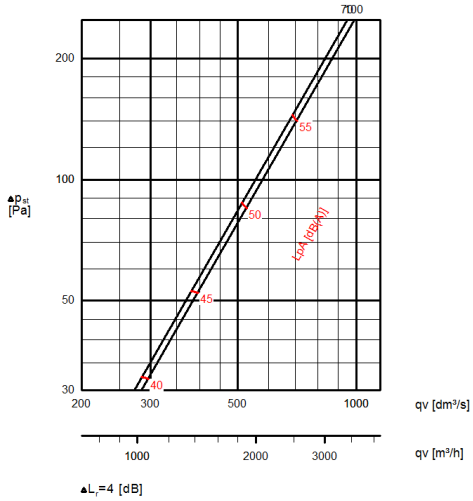
KWT with UV-light technology, section 2000, static pressure loss and sound data



KWT with UV-light technology, section 2500, static pressure loss and sound data



KWT with UV-light technology, section 3000, static pressure loss and sound data



Δp_{st} = exhaust static pressure loss
70, 100 = damper opening in %
ΔL_r = room attenuation

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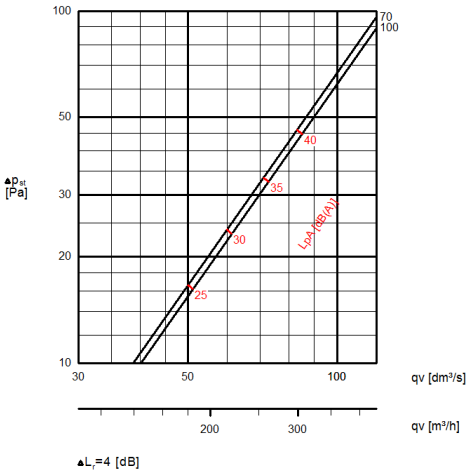
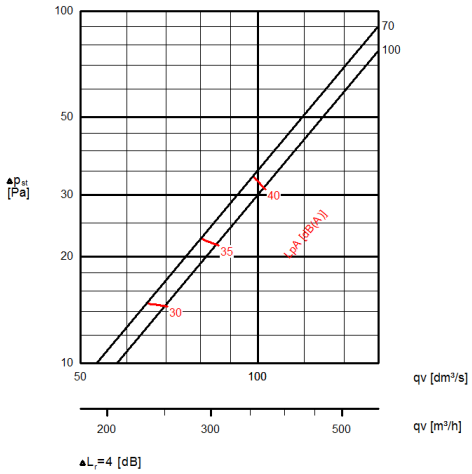
PRESSURE DROP AND SOUND DATA WITH RECOMMENDED SUPPLY CONNECTION SIZE

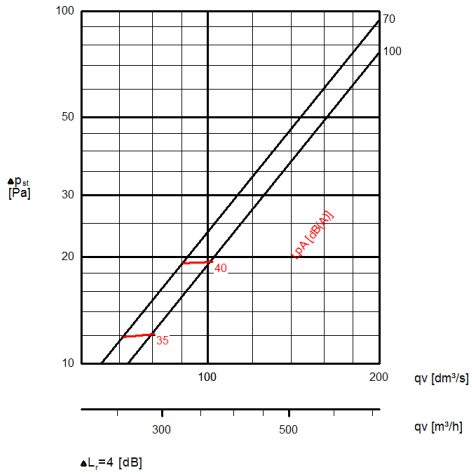
KWT, section 1000, static pressure loss and sound data



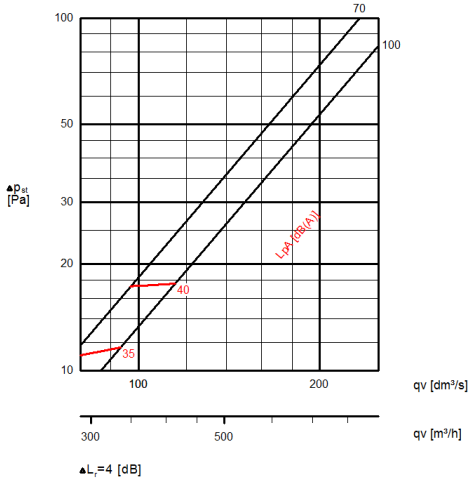
KWT, section 1500, static pressure loss and sound data



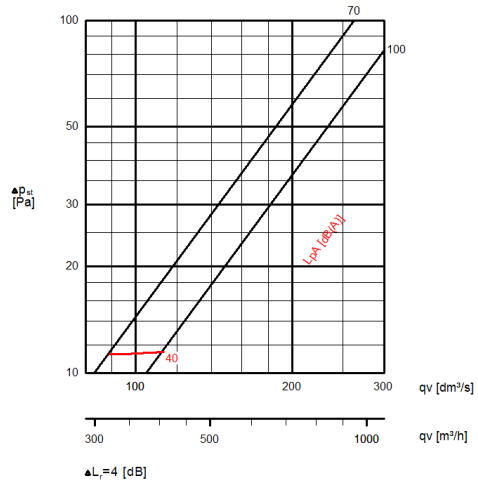
KWT, section 2000, static pressure loss and sound data



KWT, section 2500, static pressure loss and sound data



KWT, section 3000, static pressure loss and sound data



Δp_{st} = supply static pressure loss
70, 100 = damper opening in %
ΔL_r = room attenuation

EXHAUST AIRFLOW RATE MEASUREMENT USING K FACTORS

KSA (NUMBER OF FILTERS)	KWT HOOD k factor [m³/h]	KWT HOOD k factor [l/s]	KWT WITH UV k factor [m³/h]	KWT WITH UV k factor [l/s]
1	116,3	32,3	77,6	21,5
2	142,9	39,7	117,9	32,8
3	169,4	47,1	158,3	44,0
4	203,2	56,4	198,0	55,0
5	237,3	65,9	232,5	64,6
6	269,2	74,8	259,6	72,1

With the T.A.B. pressure measurement, it is also possible to check the exhaust airflow with the following formula. Above values are with recommended exhaust connection size.

$q_{v,e} = k \times \sqrt{\Delta P_{TAB}\,[Pa]}$

$q_{v,e}$ = Airflow
k = K-factor
ΔP_{TAB} = Pressure difference

RECOMMENDED EXHAUST AIRFLOW FOR KWT

NUMBER OF KSA FILTERS	MINIMUM l/s	MAXIMUM l/s	MINIMUM m³/h	MAXIMUM m³/h
1	130	201	468	724
2	259	402	932	1447
3	389	602	1400	2167
4	518	803	1865	2891
5	648	1004	2333	3614
6	778	1205	2801	4338

Note: KSA filter size 500x330x50 mm

KWH GALLEY WATER WASH HOOD

With Capture Jet technology

MATERIALS

PART	MATERIAL	NOTE
Front and side walls	Stainless steel EN 1.4301 (AISI304)*	Available as an option: EN 1.4404 (AISI316L)
Main body	Stainless steel EN 1.4301 (AISI304)**	Available as an option: EN 1.4404 (AISI316L)
Light fixture	Painted steel	-
Wash piping	Stainless steel, brass	-
Cables	Halogen free	-

* Thickness 2,0 mm
** Thickness 1,25 mm

KWH CONSTRUCTION

The KWH hood comprises a Capture Jet™ air supply module, a light fixture, adjustment dampers, airflow measurement taps and KSA grease filters. All parts of the hood are manufactured from polished stainless steel EN 1.4301 (AISI304). The joints at the lower edges of the device are watertight. A drain pipe connection is fitted into the exhaust plenum in order to enable removal of the grease and dirt extracted by the KSA multi-cyclone filters and to drain the washing water. The Capture Jet™ supply plenum is thermally insulated through the use of mineral wool material to prevent condensation on the inner face above the cooking equipment.

KWH PRODUCT OPTIONS

- Non-standard spigots: choice of size and position
- UV-light filtration - a combination of KSA filter, mesh filter and ultraviolet-light technology
- EN 1.4404 (AISI316L) construction
- Certified fire damper manufactured of EN 1.4301 (AISI304) or EN 1.4404 (AISI316L)
- Wet chemical fire suppression system
- M.A.R.V.E.L. demand-based ventilation system

APPLICATIONS

Halton KWH is a galley water wash hood for use in marine & offshore applications. The highly efficient KWH hood uses Halton Capture Jet™ technology, which allows the hood to operate with up to 30% lower exhaust airflow rates than traditional hoods. The KWH galley hood automatically washes down the grease filters without the need for removal of the filters from the hood. The washing cycle, operated by a control cabinet CCW-M or WR (see separate brochure), is fully automatic and programmable for use in different operating conditions. The washing process can be manually overridden, when required.

FEATURES

- The design follows USPHS guidelines
- Automatic periodic cleaning of the exhaust plenum and KSA grease filters (and UV tubes when applicable)
- Minimal maintenance requirements, reducing the work load for personnel cleaning the filters
- High level of hygiene facilitated
- Prevention of the build-up of grease deposits, which pose a serious fire hazard
- Halton Capture Jet™ technology, reducing the required exhaust airflow rate and improving the capture and containment efficiencies of the hood, while reducing energy use
- High-efficiency grease filtration using Halton KSA multi-cyclone filters
- Supplied as standard with lighting, balancing dampers for both capture and exhaust air and T.A.B.™ airflow measurement taps, which allow accurate and effective balancing of airflows, and efficient commissioning
- Stainless steel, welded construction

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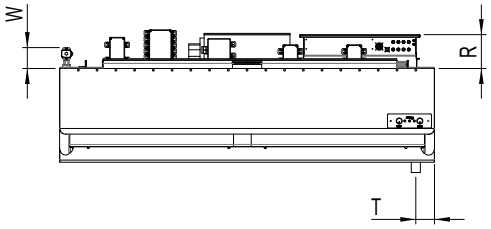
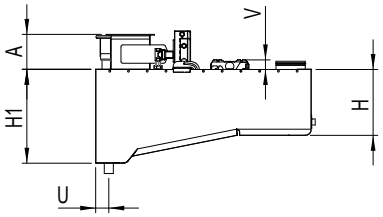
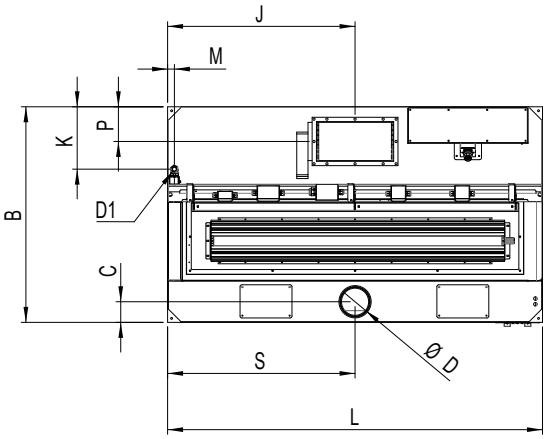
GENERAL KWH DRAWINGS







KWH DIMENSIONS (mm)			
A	195	L	1000-3000
B	1100-1900	M	37
C	110	P	185
D	100-200	S	1/2L
D1	3/4"	T	100-200
H	350	U	70
H1	500	R	185
J	1/2L	V	max 50
K	332	W	~130

Note: Maintenance / light fixture hatch is as big as the construction allows.
Note: Minimum length with UV-light technology is 1200 mm.

WEIGHTS

KWH HOODS (KG)

B/L	1200	1600	2000	2500	3000
1100	105	127	148	176	203
1300	110	133	155	184	212
1500	116	140	162	193	221
1700	122	146	169	201	230
1900	127	153	177	209	240

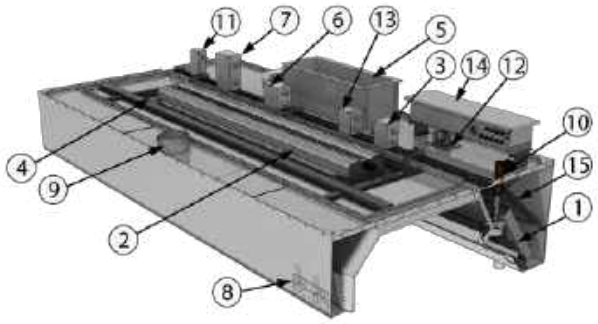
The above table represents an indication of different size of average KWH hoods. Weight does not include fire damper.

KWH HOODS WITH UV-LIGHT TECHNOLOGY (KG)

B/L	1200	1600	2000	2500	3000
1100	145	172	198	232	264
1300	151	179	205	240	274
1500	157	185	212	249	283
1700	162	192	220	257	292
1900	168	198	227	265	301

The above table represents an indication of different size of average KWH hoods with UV-light technology. Weight does not include the fire damper.

KWH PARTS

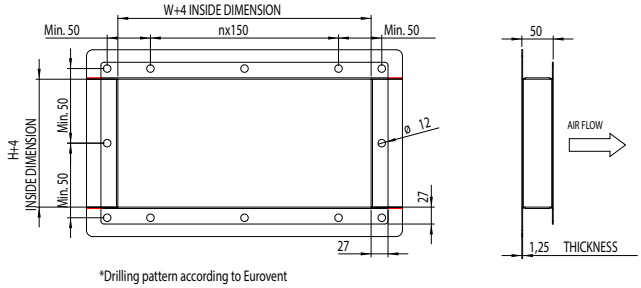


PARTS: 1 KSA grease filters, 2 Lighting fixture, 3 Lighting fixture power supply junction box, 4 Maintenance hatch, 5 Exhaust air connection, fire damper or shut-off damper* (available as an option) and adjustment damper, 6 Fire damper junction box, 7 Actuator power and fuse info junction box, 8 Damper switch and indication (available as an option), 9 Capture air connection and adjustment damper, 10 Water wash piping connection R3/4" (G3/4" solenoid valve as an option), 11 Washing solenoid valve junction box, 12 UV system, available as an option, 13 UV power supply junction box, available as an option, 14 UV control junction box, available as an option (location may vary), 15 Mesh filter, available as an option.

*If fire or shut-off damper is located at the duct, Halton suggests two default solutions for duct connection:

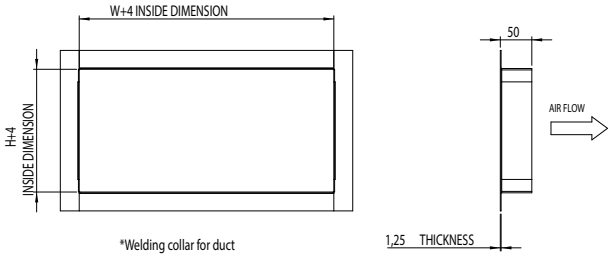
- Eurovent-collar with flange
- Welded L-collar

EUROVENT-COLLAR WITH FLANGE



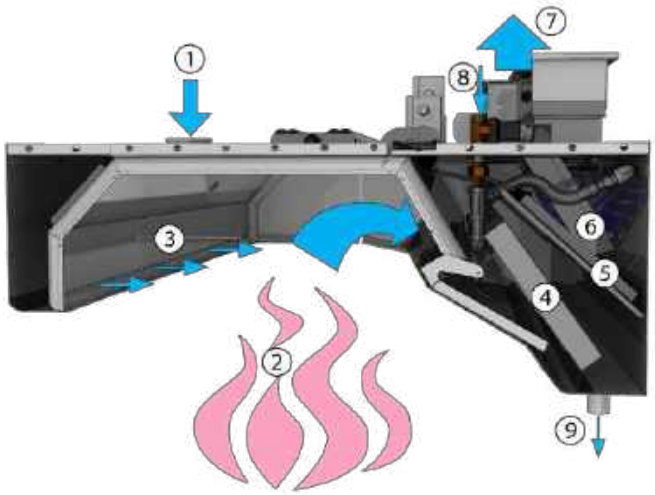
*Drilling pattern according to Eurovent

WELDED L-COLLAR



*Welding collar for duct

KWH FUNCTION



1. Capture air enters the Capture Jet™ plenum.
2. Contaminated air and heat rises from the cooking appliances.
3. Contaminated air is directed into the hood by Halton patented Capture Jet™ technology.
4. KSA multi-cyclone filters remove grease and contaminants from the air stream with the aid of centrifugal effect. According to independent laboratory tests KSA is the most efficient mechanical grease filter on the market.
5. Mesh filter balances the airflow inside exhaust plenum and apply more filtration to the air. Together with KSA filter this doubles filtration efficiency. Mesh filter is available as an option.
6. Based on Halton's patented highly efficiency Capture JetTM solution and advanced mechanical KSA filter technology, the UV-light technology with scheduled maintenance keeps the plenum and duct virtually grease-free and mitigates the cooking odor and emissions.
   The grease vapor and effluents that are not collected by high-efficiency filters pass over the lamps. This causes a chemical reaction that destroys the grease and converts it into carbon dioxide and water vapor. The chemical action carries over into the duct and helps keep the duct and exhaust fan clean.
   UV-filtration is available as an option.
7. Cleaned exhaust air contains small amounts of Ozone which further cleans the ducts downstream. All excess Ozone converts back into Oxygen.
8. At scheduled times the washing control cabinet stops the hood operation and begins a washing cycle. Hot water with mild detergent is pumped into the hood spray nozzles, washing the essential parts of the exhaust plenum including UV-lights and filters.
9. The waste from the washing cycle is drained from the hood via the drain connection.

SUGGESTED SPECIFICATIONS

The water wash galley hoods shall be constructed from stainless steel EN 1.4301 (AISI304). The galley hoods shall be supplied complete with outer casing / main body, capture jet plenum, airflow measurement taps, supply and exhaust air spigot connections with adjustment damper, maintenance hatch, light fixture, capture air jet, grease filters, drain connection, automatic washing system controlled by separate control cabinet with interfaces to ships safety systems. Classified fire damper in each exhaust connection. The manufacture of all galley hoods shall be controlled by ISO 3834-2:2005, ISO 9001, 14001 and OHSAS 18001 standards. The design of hoods shall follow USPHS guidelines.

CONSTRUCTION

All parts shall be constructed of stainless steel sheet EN 1.4301 (AISI304) (thickness 1.25-2.0 mm) with a polished finish. The inside corners of the hood are rounded for easy cleanability according to USPHS guidelines. The joints at the lower edges of the device are welded watertight. All visible screws are thumb screw type. The hood is equipped with a drain connection for removing the dirty water. There is a maintenance hatch in each hood for easy access above the hood.

WASHING MODULE

Grease filters shall have an automatic washing cycle utilising warm water and detergent via nozzles. The mixing of the detergent occurs within a separate control cabinet. The wastewater shall be removed from the hood by a direct drain connection. The casing of the control cabinet shall be constructed of stainless steel sheet EN 1.4301 (AISI304).

CAPTURE JET PLENUM

The Capture Jet™ plenum shall be insulated with sealed mineral wool. Plenum can be accessed through a maintenance hatch(es).

CAPTURE JET SYSTEM

The hood shall be designed with Capture Jet™ technology to reduce the exhaust airflow rate required and increase the capture and containment efficiencies of the hood, while reducing energy use.

AIRFLOW MEASUREMENT TAPS

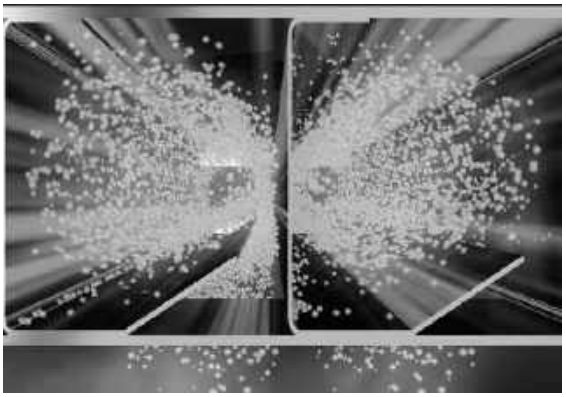
Measurement taps shall be located on top of the hood for capture air and exhaust air measurement.

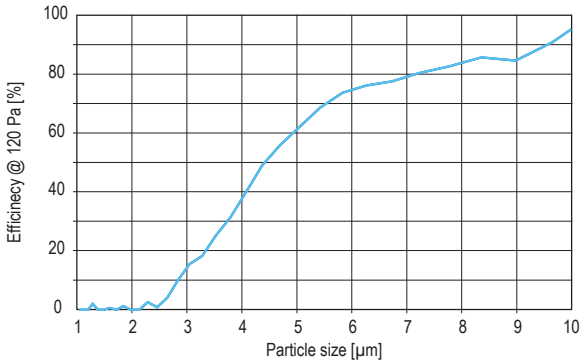
DEMAND BASED FILTRATION

Halton KSA filter

- Minimisation of grease deposits in the ducts
- Enhanced hygiene and safety

The KSA grease filters shall be constructed of stainless steel EN 1.4301 (AISI304). The grease filters shall be supplied in modular size of 500x330x50 mm and shall be removable via two folding handles. The grease filters shall have a honeycomb design in order to allow high grease filtration efficiency with the aid of centrifugal effect in filter honeycombs.





Mechanical filtration is recommended to be used in hoods with low utilization rate and cooking process producing mainly large grease particles (> 8 microns), e.g. food prepared with gas fryers, griddles and broilers (source ASHRAE).

UV-light filtration

Halton's UV-light technology is the most efficient solution for hoods with medium to high utilization rate and cooking processes producing all sizes of grease particles, e.g. food prepared with electric ranges, griddles and all type of broilers.

In the UV-light concept, most of the grease particles are first filtered with mechanical filtration (type KSA). The mesh filter behind the KSA spreads the airflow and the remaining grease particles inside the hood chamber. This

increases filtration efficiency up to 50% with grease particles sizes between 5-8 microns. Based on Halton's patented highly efficiency Capture Jet™ solution and advanced mechanical KSA filter technology, the UV-light technology with scheduled maintenance keeps the plenum and duct virtually grease-free and mitigates the cooking odor and emissions.
The grease vapor and effluents that are not collected by high-efficiency filters pass over the lamps. This causes a chemical reaction that destroys the grease and converts it into carbon dioxide and water vapor. The chemical action carries over into the duct and helps keep the duct and exhaust fan clean.

DUCT CONNECTIONS

The duct connections and adjustment dampers for supply and exhaust air shall be constructed from stainless steel. The dampers shall be adjustable.

LIGHT FIXTURES

Each hood shall be delivered with a fluorescent light fixtures or LED light fixtures providing approx. an average illuminance of 500 lux at the work surfaces of the cooking appliances.
The light fixtures shall be suitable for a single-phase 230-VAC power supply and shall be manufactured to be of protection class IP67.
The ballast and capacitor shall be located within the light frame. The core electric cables connecting the light fixture to the junction box shall be provided.
The light fixture shall be installed on a hinged maintenance hatch, allowing access to the hood roof.

FLUORESCENT LIGHT FIXTURE SIZES

HOOD DIMENSION	LENGTH	WIDTH
L < 1250 mm, 2x24 W	720 mm	220 mm
L ≥ 1250 mm, < 2000 mm, 2x39 W	1020 mm	220 mm
L ≥ 2000 mm, 2x49 W	1620 mm	220 mm

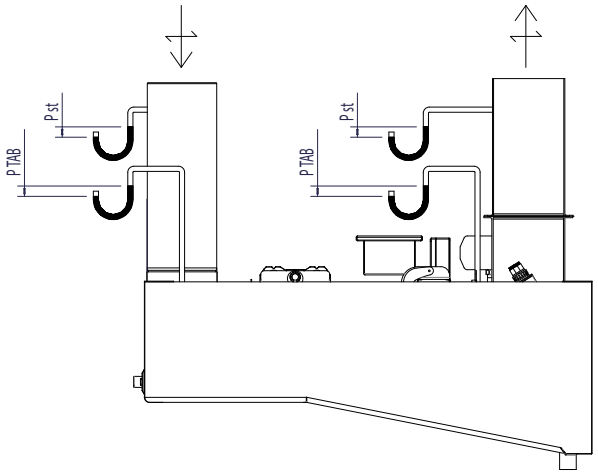
LED LIGHT FIXTURE SIZES

HOOD DIMENSION	LENGTH	WIDTH
L < 1250 mm, 1x28 W	720 mm	175 mm
L ≥ 1250 mm, < 2000 mm, 1x42 W	1020 mm	175 mm
L ≥ 2000 mm, 1x69 W	1620 mm	175 mm

MAINTENANCE HATCH

Each hood shall be provided with a maintenance hatch made of stainless steel EN 1.4301 (AISI304) with a shock-resistant plastic window. The heat tolerance of the window shall be up to +115 °C. The hatch shall be easily opened and closed.
The maintenance / light fixture hatch is as big as the construction allows.

AIRFLOW MEASUREMENT



ΔP_{st} = Static pressure loss
ΔP_{TAB} = TAB pressure for airflow rate measurement
70, 100 = Damper opening in %

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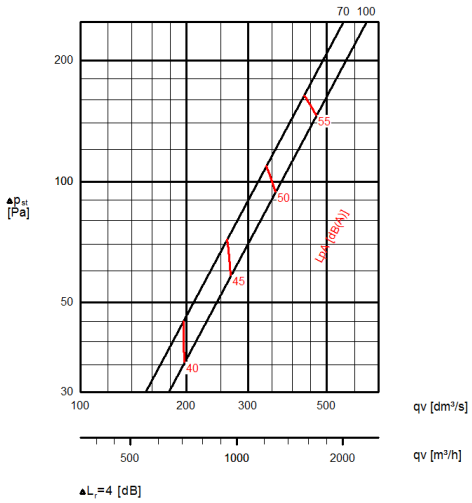
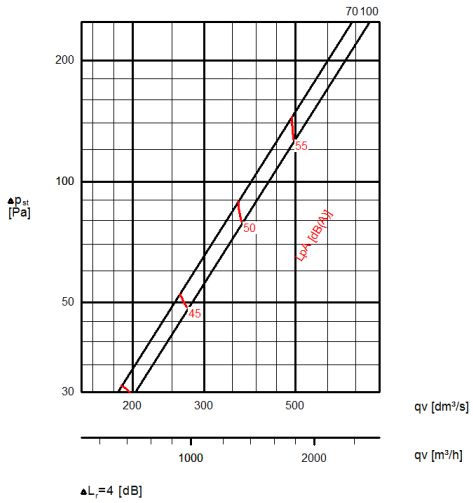
PRESSURE DROP AND SOUND DATA WITH RECOMMENDED EXHAUST CONNECTION SIZE

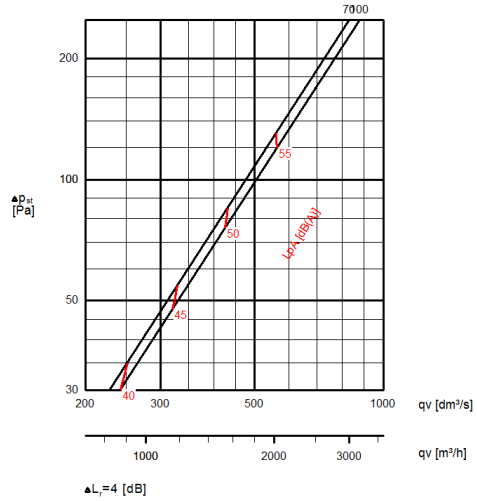
KWH, section 1000, static pressure loss and sound data



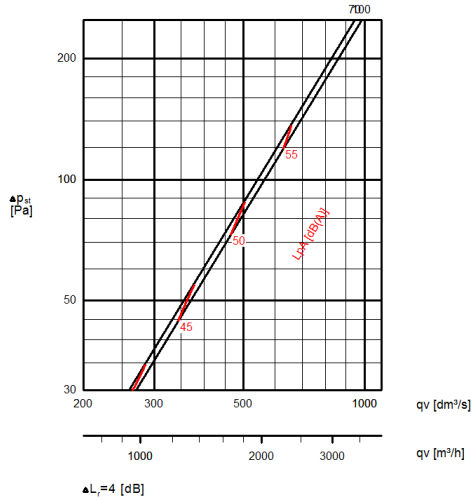
KWH, section 1500, static pressure loss and sound data



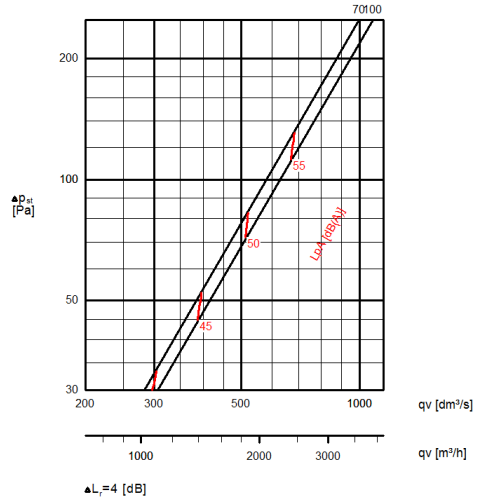
KWH, section 2000, static pressure loss and sound data



KWH, section 2500, static pressure loss and sound data

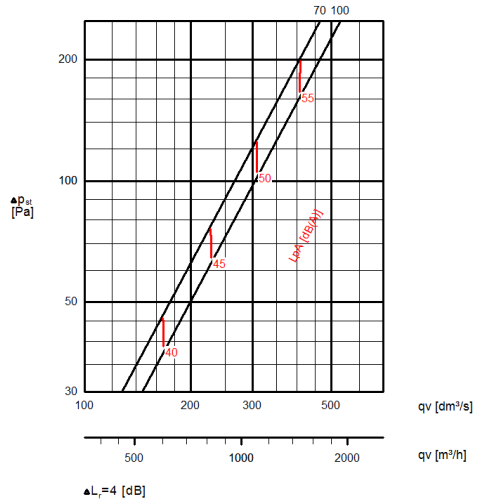


KWH, section 3000, static pressure loss and sound data

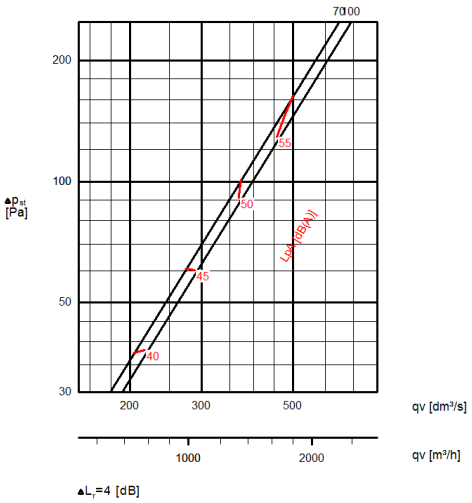


PRESSURE DROP AND SOUND DATA WITH RECOMMENDED EXHAUST CONNECTION SIZE

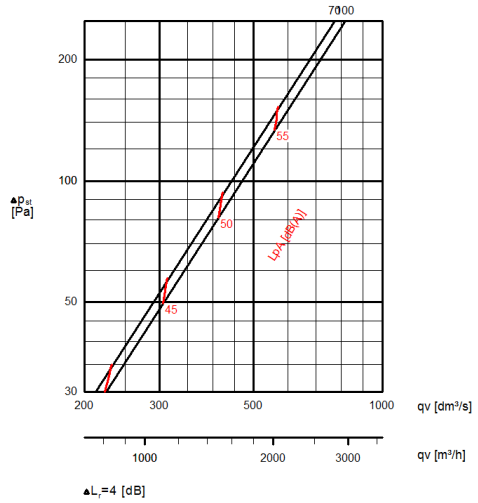
KWH with UV-light technology, section 1000, static pressure loss and sound data



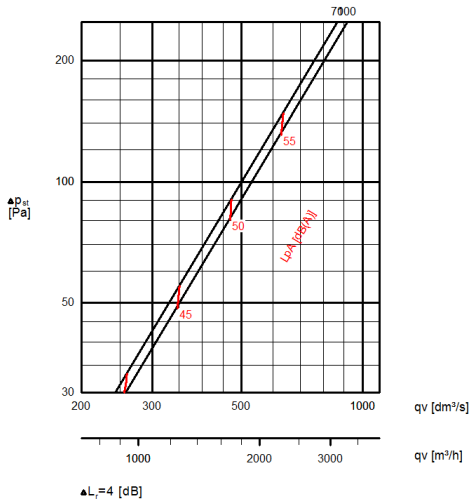
KWH with UV-light technology, section 1500, static pressure loss and sound data



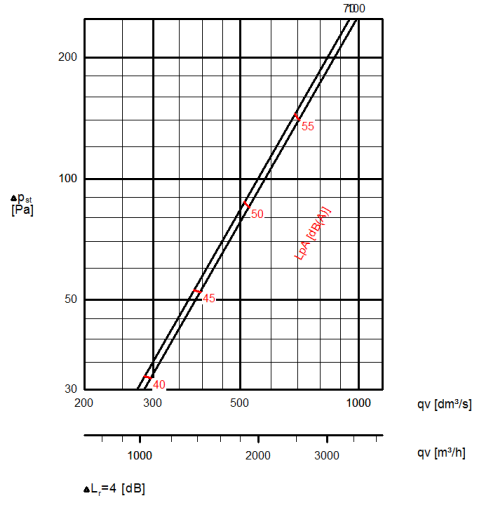
KWH with UV-light technology, section 2000, static pressure loss and sound data



KWH with UV-light technology, section 2500, static pressure loss and sound data



KWH with UV-light technology, section 3000, static pressure loss and sound data

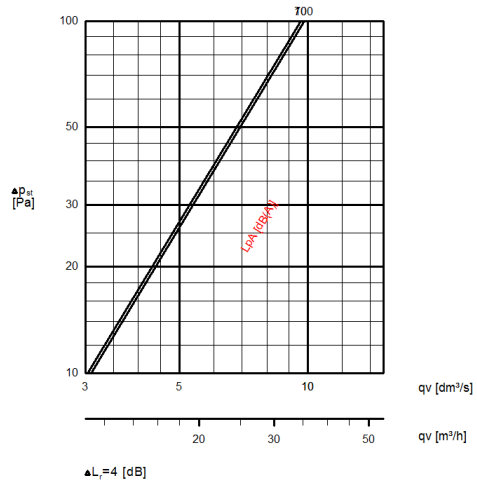


Δp_{st} = exhaust static pressure loss
70, 100 = damper opening in %
ΔL_r = room attenuation

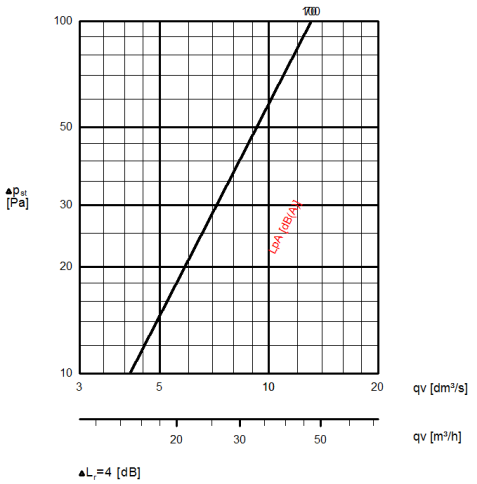
Halton

PRESSURE DROP AND SOUND DATA WITH RECOMMENDED CAPTURE CONNECTION SIZE

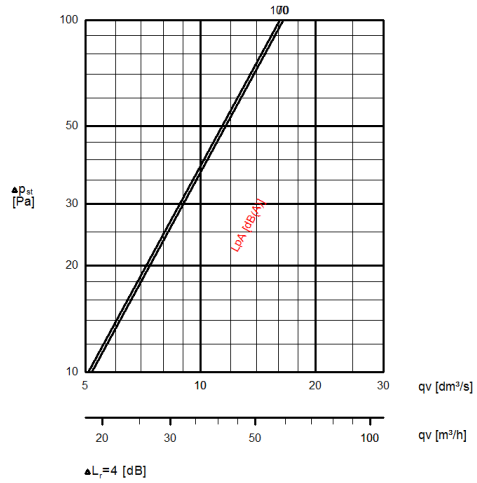
KWH, section 1000, static pressure loss and sound data



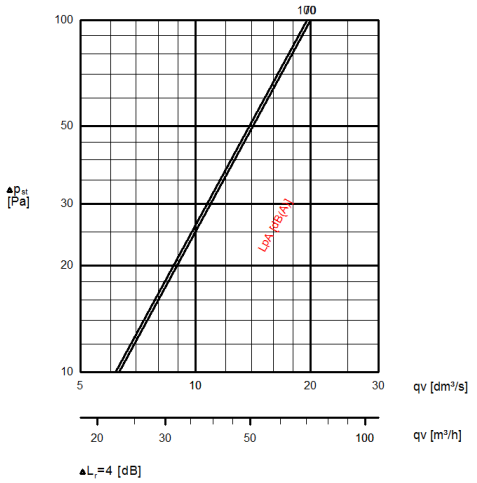
KWH, section 1500, static pressure loss and sound data



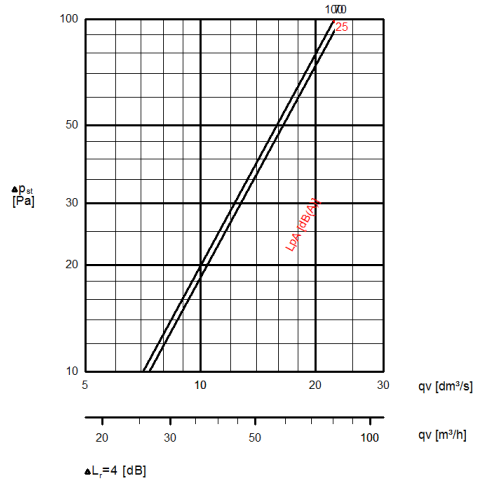
KWH, section 2000, static pressure loss and sound data



KWH, section 2500, static pressure loss and sound data



KWH, section 3000, static pressure loss and sound data



Δp_{st} = capture static pressure loss
70, 100 = damper opening in %
ΔL_r = room attenuation

EXHAUST AIRFLOW RATE MEASUREMENT USING K FACTORS

KSA (NUMBER OF FILTERS)	KWH HOOD k factor [m³/h]	KWH HOOD k factor [l/s]	KWH WITH UV k factor [m³/h]	KWH WITH UV k factor [l/s]
1	116,3	32,3	77,6	21,5
2	142,9	39,7	117,9	32,8
3	169,4	47,1	158,3	44,0
4	203,2	56,4	198,0	55,0
5	237,3	65,9	232,5	64,6
6	269,2	74,8	259,6	72,1

With the T.A.B. pressure measurement, it is also possible to check the exhaust airflow with the following formula. Above values are with recommended exhaust connection size.

$q_{v,e} = k \times \sqrt{\Delta P_{TAB}\,[Pa]}$

$q_{v,e}$ = Airflow

k = K-factor

ΔP_{TAB} = Pressure difference

RECOMMENDED EXHAUST AIRFLOW FOR KWH

NUMBER OF KSA FILTERS	MINIMUM l/s	MAXIMUM l/s	MINIMUM m³/h	MAXIMUM m³/h
1	130	201	468	724
2	259	402	932	1447
3	389	602	1400	2167
4	518	803	1865	2891
5	648	1004	2333	3614
6	778	1205	2801	4338

Note: KSA filter size 500x330x50 mm

WR CONTROL CABINET

For KWH and KWT galley hoods

APPLICATIONS

Halton WR water wash control cabinets are used to control the washing cycle of Halton galley hoods KWH and KWT. Water wash control cabinet automatically washes down the grease filters and UV-lamps (when equipped with UV-technology) without removal of the filters and UV-lamps of the hood. The washing cycle is fully automatic and programmable for use in different operation conditions. The washing process can be manually overridden, when required.

MATERIALS

PART	MATERIAL	NOTE
Main body	Stainless steel EN 1.4301 (AISI304)*	Available as an option: EN 1.4404 (AISI316L)
Connection pipes	Copper	-
Enclosures	Plastics	-
Booster pump	Painted steel	1-phase, 230 VAC
Soap pump	Plastics	1-phase, 230 VAC

* Thickness 1,25 mm

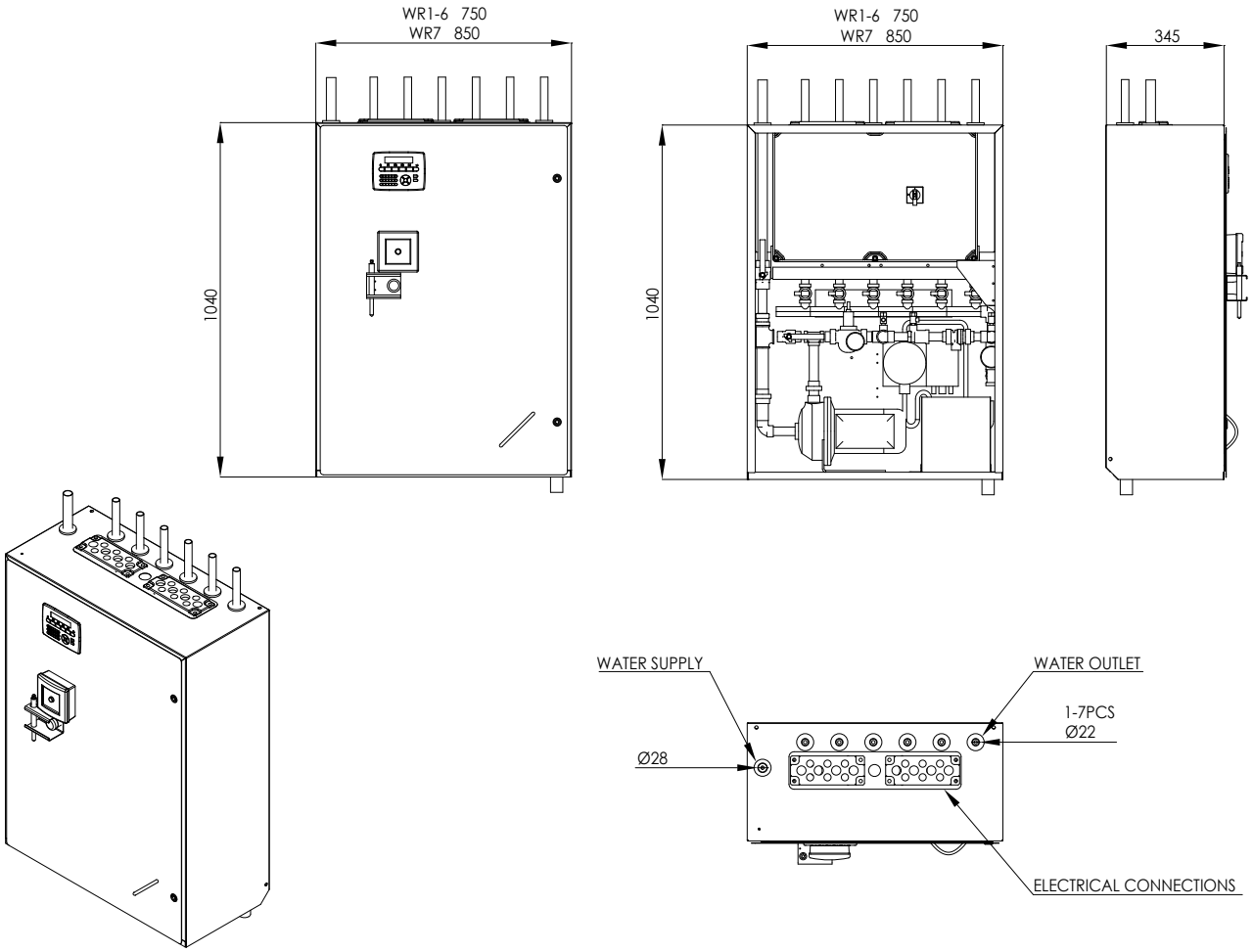
FEATURES

- Compact design
- Fully automatic control system
- All control devices locate on the cabinet door
- Designed for galley conditions
- Stainless steel EN
- Controls 1 - 7 hood groups
- Designed and manufactured according to USPHS guidelines

WR PRODUCT OPTIONS

- Stainless steel EN 1.4404 (AISI316L)
- Operating frequency of 50 Hz or 60 Hz
- UV-light technology control system
- Fan control switch (ON/OFF)

GENERAL WR DRAWINGS



WEIGHT

WR control cabinet weights 75...82 kg depending on the size.

CONSTRUCTION

The control cabinet comprises main body, washing pipes, enclosure, booster and detergent pumps. All parts of the main body are manufactured from polished stainless steel EN 1.4301 (AISI304). Control interface is located on the cabinet door.

SUPPLY CONNECTION REQUIREMENTS

Water supply:

MIN TEMP. 50°C

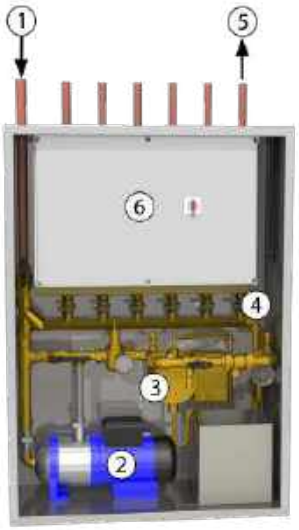
MAX TEMP. 60°C

Power supply:

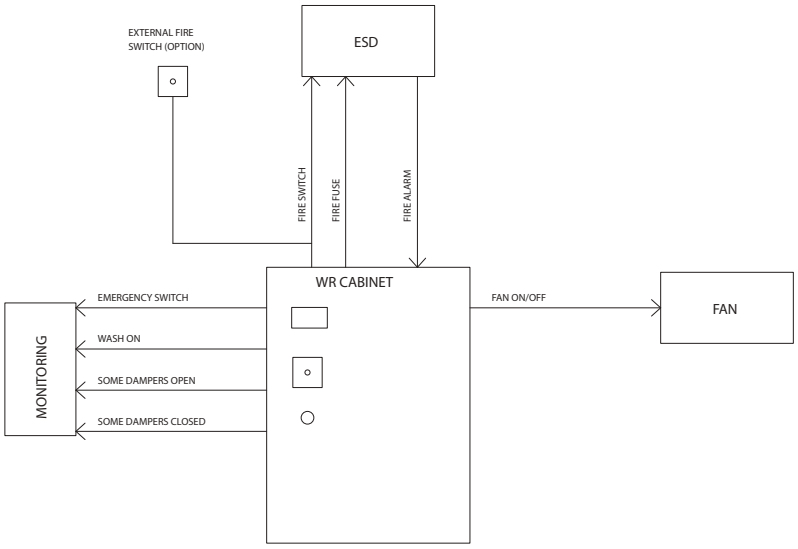
230VAC 50/60Hz 10A service

FUNCTION

1. Supply water enters the water wash cabinet
2. A booster pump is used if higher water pressure is needed
3. Detergent pump adds detergent to the water
4. Electromagnetic valves control the mixture of detergent and water to the hoods
5. Maximum of 7 water outlets are included in each cabinet, capable to wash up to 5 meters of filter length per outlet.
6. PLC based control system for controlling each function



CONNECTIONS TO SHIP SYSTEMS



Halton

CCW-M CONTROL CABINET

For KW3, KWH and KWT galley hoods

MATERIALS

PART	MATERIAL	FINISHING
Main body	Stainless steel EN 1.4301 (AISI304)*	Available as an option: EN 1.4404 (AISI316L)
Connection pipes	Stainless steel	
Booster pump	Painted steel	1-phase, 230 VAC
Soap pump	Plastics	1-phase, 230 VAC

* Thickness 1,5 mm

CCW-M PRODUCT OPTIONS

- Stainless steel EN 1.4404
- Electrical and water connections lefthand side

APPLICATIONS

The CCW-M control cabinet has been designed to manage the washing cycles of the hoods equipped with the water wash technology, whether they are combined or not with other technologies like UV-light system or M.A.R.V.E.L..

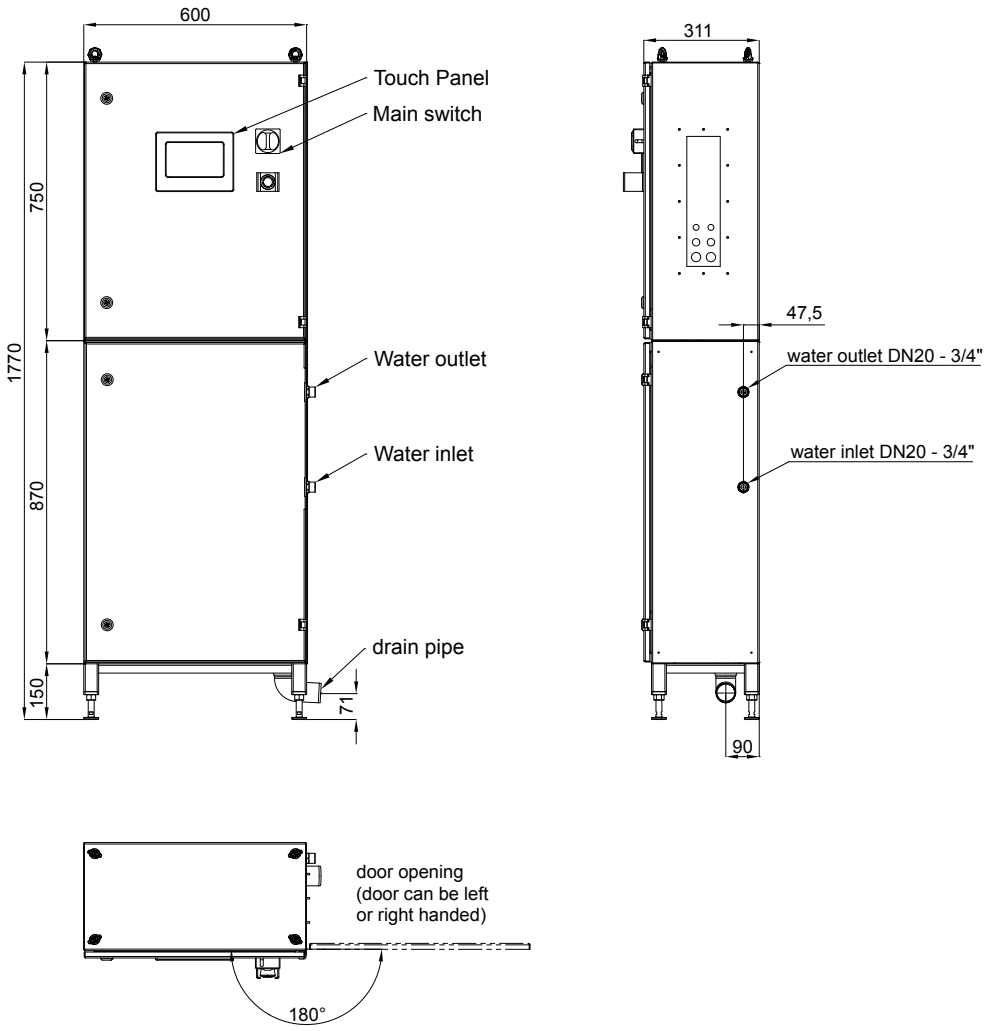
Each CCW-M control cabinet must be connected to a hot water supply. It is equipped with a detergent tank, connected to an automatic dosing system. The high dosing precision eliminates all risk of overdosing, thus contributing to a better environment. The control cabinet is equipped with a booster pump if the water pressure is not enough to ensure a good washing efficiency.

An LCD touch screen allows an intuitive and efficient interface between the control system and the users. The washing cycles (washing, soaking time and rinsing sequences) are fully automatic and programmable to suit different operating conditions. The washing process can be manually overridden when required. The control system is equipped with the possibility to interface with the Building Management System (BMS).

FEATURES

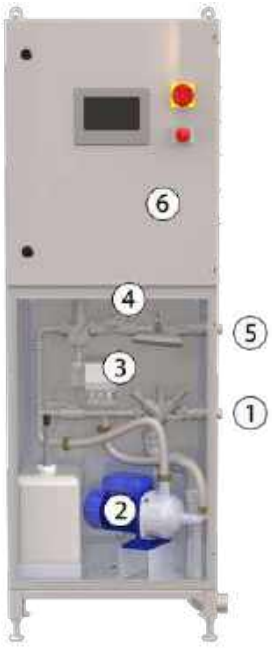
- One CCW-M control cabinet manage up to 16 hoods
- Designed and manufactured according to USPHS guidelines

GENERAL CCW-M DRAWINGS



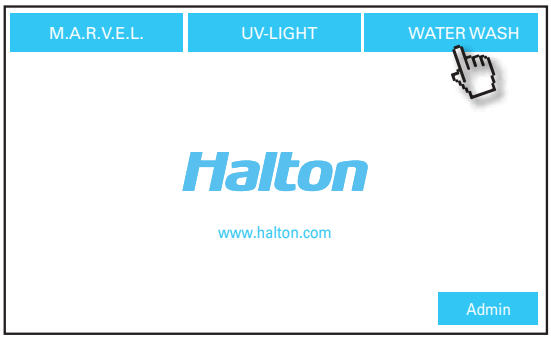
FUNCTION

1. Supply water enters the water wash cabinet.
2. A booster pump (optional) is used to increase water pressure.
3. Detergent pump adds detergent to the water.
4. Electromagnetic valves control the mixture of detergent and water to the hoods.
5. Water outlet to connect washing pipes to hoods.
6. PLC based control system for controlling each function.

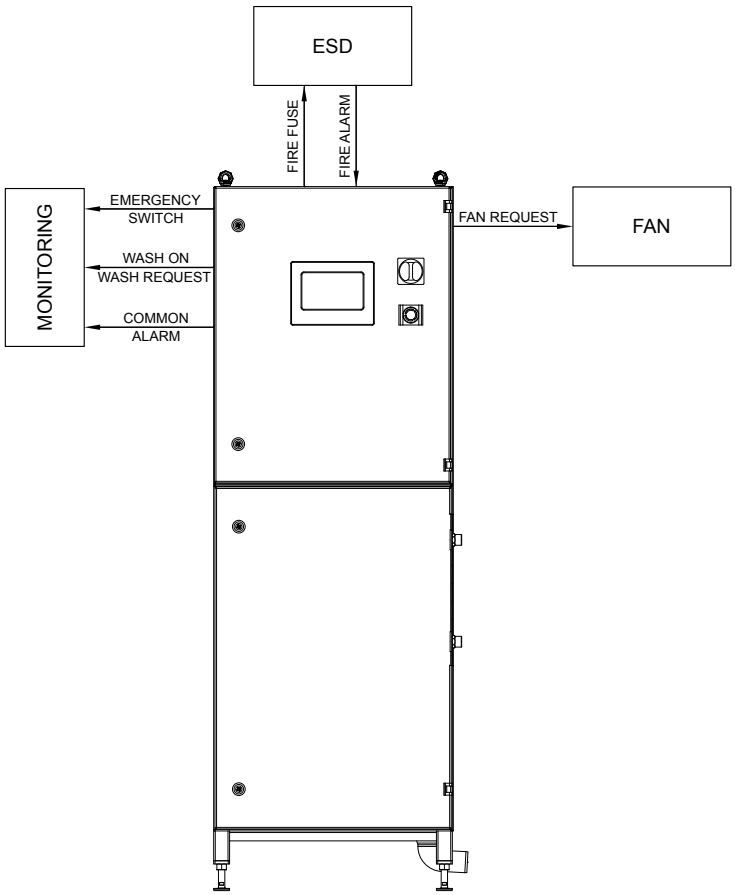


HALTON TOUCH PANEL

The touch panel provides an easy to use interface for operating the hood and selected technologies like UV-light technology, water wash system and demand controlled ventilation (M.A.R.V.E.L.). The touch panel displays individual hoods with clear images allowing the potential alarms or hood statuses to be displayed visually. The touch panel will be located on the door of the control cabinet or in a separate control box with available interface to the ships' automation system.



CONNECTIONS TO SHIP SYSTEMS



SUPPLY CONNECTION REQUIREMENTS

Water supply:

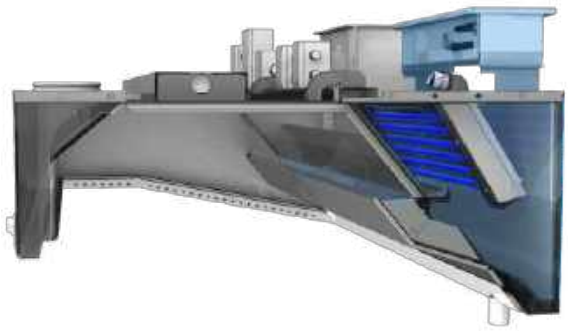
Temperature recommendation 45-55 °C
PRESSURE minimum 1 bar
HARDNESS < 8dH

Power supply:

1.5 kW @ 230V / 50 Hz / 60 Hz

UV-LIGHT TECHNOLOGY

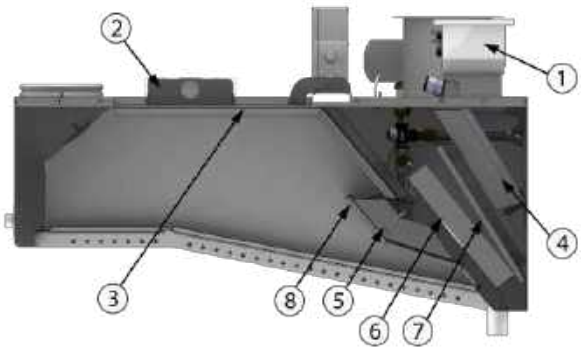
Superior grease filtration technology for Halton galley hoods



UV HOOD DESCRIPTION

1. UV control junction box, including ballast and control unit
2. Lighting fixture
3. Maintenance hatch
4. UV system, including rack and lamps
5. Magnetic proximity safety switches
6. KSA filters
7. Mesh filters
8. Deflector plates

Note: Automated washing system is not required, but it is recommended for use in hoods with UV-light technology.



APPLICATIONS

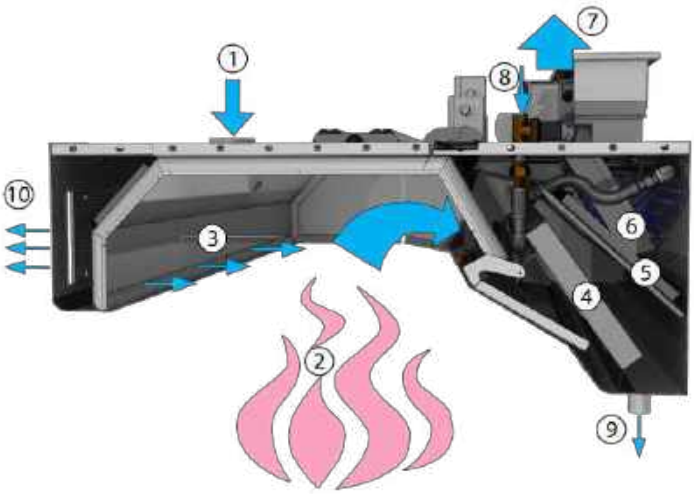
Halton's UV-light technology is the most efficient solution for hoods with medium to high utilization rate, and for cooking processes producing all sizes of grease particles. Based on Halton's patented highly efficiency Capture Jet™ solution and advanced mechanical KSA filter technology, the UV-light technology with scheduled maintenance keeps the plenum and duct virtually grease-free and mitigates the cooking odor and emissions.
The grease vapor and effluents that are not collected by high-efficiency filters pass over the lamps. This causes a chemical reaction that destroys the grease and converts it into carbon dioxide and water vapor. The chemical action carries over into the duct and helps keep the duct and exhaust fan clean.
This helps to reduce a serious fire risk and expensive cleaning of the ducts. UV-light technology is compatible with Halton KW3, KWT, KWH, KVF, KVI hoods.

FEATURES

- Cleaner exhaust ducts and hood interior for improved hygiene
- Reduced risk of fire
- Reduced duct cleaning costs
- Comfortable working conditions
- Scientifically proven results with world-wide references
- Easy maintenance through large service hatch that enables easy access e.g. to light fixture, hood control box, fire damper
- Easy access to UV-lamps. Lamps can be changed individually. Service life of UV-lamps appr. 13 000 hours.
- Prefabricated cables connected with fast connectors. Hood control box with fast connections.
- Several safety features. UV operation shuts-down automatically in case pressure is too low or the deflector plates are opened.
- Up to 16 hoods can be controlled with the new user friendly Touch Screen, or up to 12 hoods with the basic Control Panel.
- The UV-light technology is an excellent choice for hoods in new-builds but also for refurbishments as the equipment does not change hood's outer dimensions.

UV-HOOD OPERATION PRINCIPLE

1. Supply air enters the Capture Jet™ plenum.
2. Contaminated air and heat rises from the cooking appliances.
3. Contaminated air is directed into the hood by Halton patented Capture Jet technology.
4. KSA multi-cyclone filters remove grease and contaminants from the air stream with the aid of centrifugal effect. According to independent laboratory tests KSA is the most efficient mechanical grease filter on the market.
5. Mesh filter balances the airflow inside exhaust plenum and apply more filtration to the air. Together with KSA filter this doubles filtration efficiency.
6. Based on Halton's patented highly efficiency Capture JetTM solution and advanced mechanical KSA filter technology, the UV-light technology with scheduled maintenance keeps the plenum and duct virtually grease-free and mitigates the cooking odor and emissions.
   The grease vapor and effluents that are not collected by high-efficiency filters pass over the lamps. This causes a chemical reaction that destroys the grease and converts it into carbon dioxide and water vapor. The chemical action carries over into the duct and helps keep the duct and exhaust fan clean.



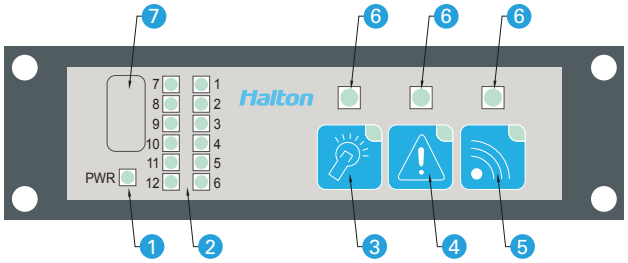
7. Cleaned exhaust air contains small amounts of Ozone which further cleans the ducts downstream. All excess Ozone converts back into Oxygen.
8. At scheduled times the washing control cabinet stops the hood operation and begins a washing cycle. Hot water with mild detergent is pumped into the hood spray nozzles, washing the essential parts of the exhaust plenum including UV-lights and filters.
9. The waste from the washing cycle is drained from the hood via the drain connection.
10. Supply air is distributed to the workspace at low velocity through the front panels (available on model KWT)

TOUCH SCREEN

The Halton Touch Screen is the central point of the hood system. It is used for displaying system status, alarms and other information and allows user to perform all necessary maintenance tasks. The touch screen is flush mounted on a control cabinet. If the hoods also have the Halton washing system, the touch screen can be mounted on the washing control cabinet. Each touch screen manages up to 16 hood sections. The graphical interface is intuitive and easy to learn. It is custom made for each system to ensure efficiency and to minimize learning time. The touch panel functionality can extend to manage hood washing and M.A.R.V.E.L functions. Administrative functions are password protected. When mounted on a control cabinet the touch screen is IP65.

CONTROL PANEL

The Halton UCS Control Panel can be used as an alternative for the Touch Screen as a control interface for the UV-light system. This compact panel can be integrated to a hood surface or control cabinet door. The simple user interface is easy to use. Each Control Panel can manage up to 12 UV hood sections. The full control of the hood settings and readings are available through a handheld device using Bluetooth connection.



1. Power indication light, 2. Maximum number of UV sections handled by the control panel, 3. UV lamps alarm and push button, 4. Maintenance alarm and push button, 5. Communication alarm and push button, 6. Default warning lights, 7. Bluetooth transmitter for PDA.

COMPONENTS

HOOD CONTROL BOX

The hood control box houses all the power connections, controller equipment and ballasts needed for the UV operation. Maintenance hatch provides easy access to the controller box and cables. Everything inside the control box is pre-wired and programmed ready. Customer only needs to connect supply power and pre-fabricated data cables between hood modules before UV commissioning.

HOOD CONTROLLER AND UV MODULES

The hood controller inside the hood controller box manages the entire UV system of a single hood section in which it is installed. It calculates the running hours of the lamps, the status of the system and any possible alarm or communication issues. There can be up to twenty four UV hoods connected to each other in one hood group, when using Touch Screen, or up to twelve UV hoods with Control Panel.

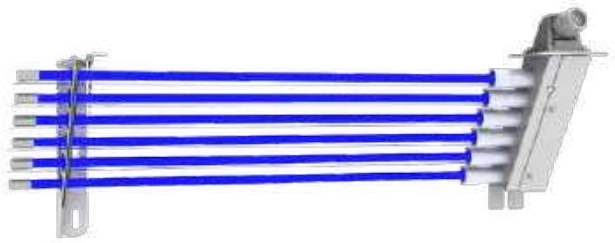
Each controller in a group of hoods is preprogrammed with the information it needs to operate and is given the appropriate numeric address [1 to 16] so it understands its location within the system regardless of the physical cabling arrangement. This essentially means that each hood is a slave that communicates on its own and the Touch Screen or the Control Panel is the master that manages all hoods in the system and acts as the user interface.

SAFETY MAGNETIC SWITCHES

Two magnetic limit switches are installed to detect the removal of the deflector plates. When the contact breaks, the UV system will automatically shut down.

THE UV-LIGHT RACK

The UV lamps are mounted into a UV-light rack that is integrated to the hood extract chamber. There are six UV lamps connected to the three UV light ballasts inside the control box. The UV lamps are specially manufactured for Halton.



The UV-light rack consists of six UV lamps that are connected to three UV-light ballasts

UV-LAMPS

The Halton UV lamps are germicidal short wavelength low-pressure mercury vapor lamps, which produce ultraviolet radiation at wavelengths lethal to micro-organisms. The connectors of the UV lamps are specially manufactured for Halton. The length of the hood determines if short or long lamps are used. Minimum length of UV hood is 1250 mm. Short lamps are for hoods 1250-2000 mm and long lamps for hoods with length above 2000 mm.

Short lamp

Lamp wattage: 41 W
Lamp current: 425 mA
Lamp voltage: 120 V
UV output at 253,7nm: 16 W / 150 µW/cm²
Rated life: 13,000 h

Long lamp

Lamp wattage: 75 W
Lamp current: 425 mA
Lamp voltage: 220 V
UV output at 253,7nm: 33 W / 240 µW/cm²
Rated life: 13,000 h

MAINTENANCE HATCH

The hinged maintenance hatch enables quick and easy access to the light fixture and UV-control box.

AUX MODULE

The auxiliary module is required for the external alarm signals. It conveys different UV alarms to the customer systems and also receives alarms or commands from the customer system. These alarms can be used to monitor and control the UV system remotely. The AUX module is located in the control cabinet.

CABLES

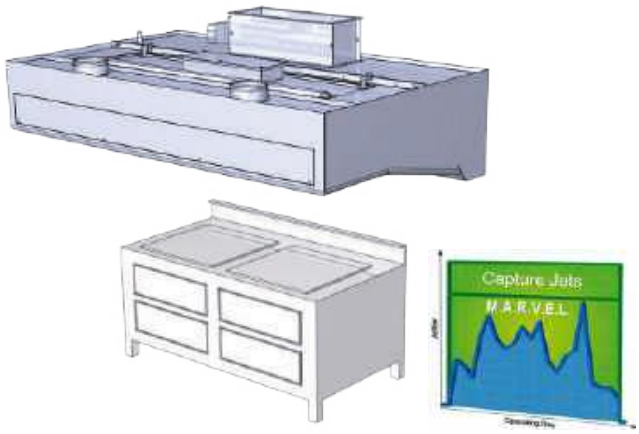
All internal and constant-length cables are prefabricated by Halton. Cables with varying length (between hood groups, user control panel & AUX module etc.) can be prefabricated to order if the length of each cable is known before delivery. Otherwise, Halton supplies only cable connectors.

CABLE CONNECTORS

Hood control box connectors available in plastic.

HALTON M.A.R.V.E.L.

Demand controlled ventilation system for Halton Marine galley hoods



APPLICATIONS

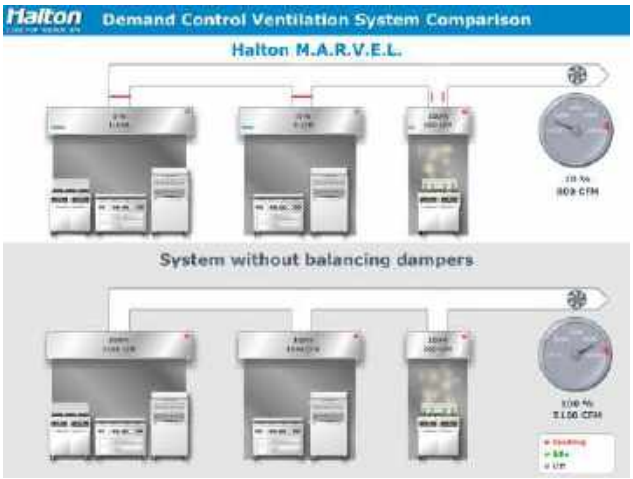
The Halton M.A.R.V.E.L.* is the first truly intelligent, responsive, and completely flexible demand controlled ventilation (DCV) system specifically designed for Halton hoods. In combination with Halton's Capture JetTM technology it offers the lowest levels of energy consumption currently possible and provides complete comfort for users.
The Halton M.A.R.V.E.L. that is packed full of technological innovations is compatible with Halton KW3, KWT, KWH, KVF, KVI, KFM, KVM hoods.

OPERATION PRINCIPLE

M.A.R.V.E.L. was designed to adapt in an automatic, permanent, and highly responsive manner without human intervention, and to suit all possible galley operation settings. The system continuously measures the actual status of each item of galley equipment:

- Switched off
- Heating up to cooking temperature
- Hot, cooking in progress.

On the basis of the status, and thanks to the modulating fire dampers integrated into the hood, M.A.R.V.E.L. adjusts the exhaust rates automatically, hood by hood or zone by zone. M.A.R.V.E.L. system will also take care of suitable supply air flow, by signalling the supply air fan and modulating required dampers.

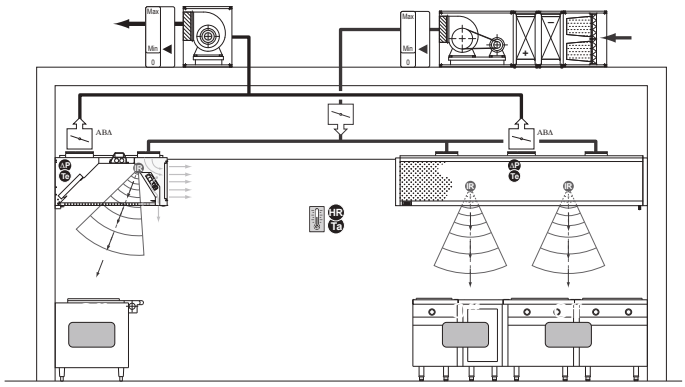


FEATURES

- M.A.R.V.E.L. is able to identify the current status of the cooking equipment (switched off, heating to cooking temperature, or cooking in progress).
- M.A.R.V.E.L. has the unique ability to adjust the exhaust flow rate to match these three statuses and, above all, hood by hood and in a totally independent manner. If only one of the cooking ranges in the galley is operating, the flow rate for that hood or zone concerned will be automatically adjusted to that required. The other hoods or zones will continue operation at a low flow rate.
- M.A.R.V.E.L. is capable of continuously regulating the flow rate achieved with the extraction fans but also, and most importantly, their pressure. By operating at a variable pressure and flow rate, this system enables you to fine tune the equipment to the exact area and overall requirements, with power consumption kept to the absolute minimum. The associated supply fans are also controlled so as to guarantee the air flow balance of the kitchen.
- M.A.R.V.E.L. is a totally flexible system. It can be reprogrammed at any time in response to changes in the galley layout.
- M.A.R.V.E.L. can be integrated, as a retrofit package, with previously delivered Halton hoods.

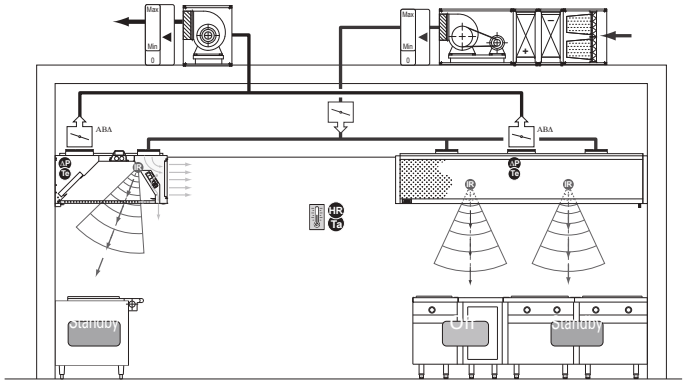
OPERATION PRINCIPLE

1 - PREPARATION OF THE GALLEY



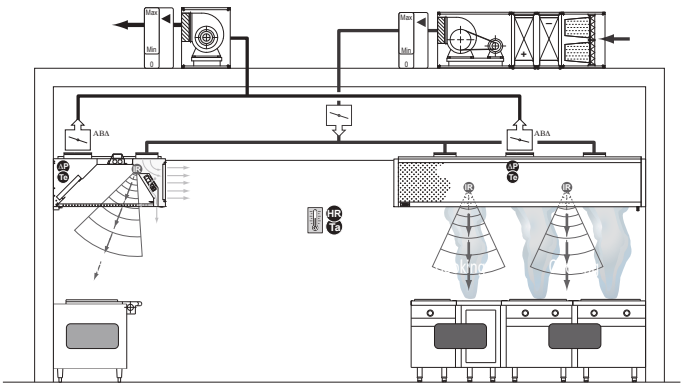
When the galley is not in operation, M.A.R.V.E.L. can be programmed to stop the ventilation or to continue it at a low flow rate that keeps proper hygiene maintained during the inactivity. In the latter case, the fans and dampers are automatically adjusted to the minimum programmed settings.

2 - HEATING OF THE EQUIPMENT

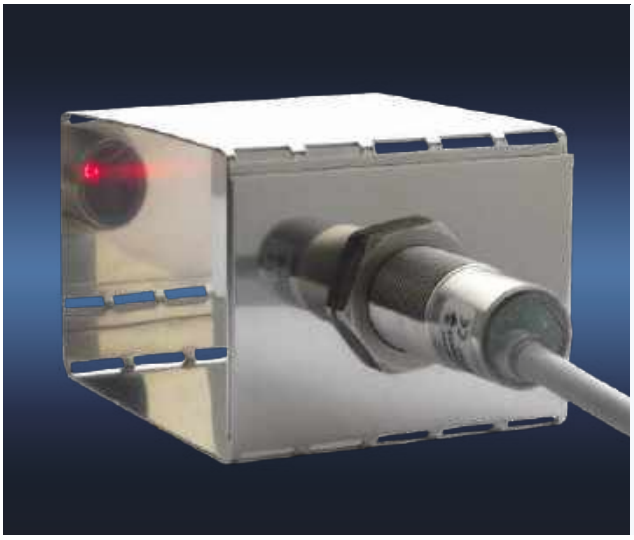


The cooking equipment is gradually heated according to the requirements of the menus to be prepared. The IRIS™ sensors associated with temperature sensors detect the state of the equipment concerned (hot and in hold). The system then automatically adjusts the position of each individual damper and the fan speed, in order to achieve the exact flow rate required for each hood in response to changing requirements.

3 - FULL-SCALE ACTIVITY OF THE GALLEY



When the galley is fully active, most of the equipment enters cooking mode while the other equipment generally remains on standby. The infrared sensors once again detect this change in activity, as it occurs. The exhaust (and fan) flow rate is then automatically adapted to the change in requirements, hood by hood in real time.



Monitoring system of duct networks (KGS)

SAFETY

Efficient and cost-effective prevention tool for hygiene and fire safety due to the assessment of grease build-up in the ductwork.

ECONOMIC ADVANTAGE

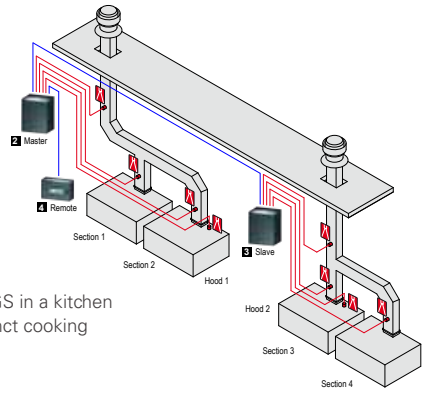
Allows for cleaning of ducts only when really necessary and not in a programmed and often unnecessary way. Maximum safety at minimum cost.

The Halton KGS duct safety system is a tool to assess the level of grease deposits in a kitchen's entire exhaust duct network. As soon as this level exceeds the threshold defined in standard NFPA-96 (or local equivalent), an alarm appears on the user interface and a signal can be sent to the Building Management System. The operator is then informed that it is necessary to clean the ductwork.

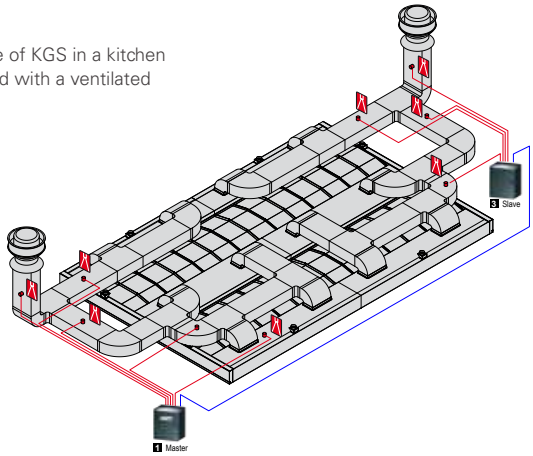
- Risks related to fire safety and food safety are thus reduced to the minimum.
- Cleaning operations are carried out at the right time, neither too infrequently or too frequently, and not according to a pre-defined schedule.
- The KGS system therefore combines lower ductwork cleaning costs with maximum fire and food safety.

The KGS system is based on the use of detection sensors, installed along the ductwork. It is also recommended to install one inside the exhaust plenums of the hood or parts of the ventilated ceiling that cover the heaviest cooking appliances. The innovative optical system fitted on the sensors assesses the level of grease deposits on the surface of the ducts.

The controllers of the KGS system are part of Halton's Foodservice Control Platform (FCP). The system can be managed either through the standard user interface or the Halton Touch Screen (see following details).



Example of KGS in a kitchen with two distinct cooking zones.



Example of KGS in a kitchen equipped with a ventilated ceiling.

Halton

Halton Culinary Light (HCL)

INDOOR ENVIRONMENT QUALITY (IEQ)

Close to sunlight render and increased lighting levels. Better working conditions.

SAFETY

Quality control i.e. cleanliness of the surfaces is facilitated by uniform lighting.

ECONOMIC ADVANTAGE

Drastic energy savings and lowest payback times.

The lighting in professional kitchens has been too often neglected and yet it is an aspect which is extremely important. We're not just talking about energy efficiency and working conditions but also about hygiene. Good quality lighting allows, for example, to more easily track dirt in a kitchen, which could otherwise be unnoticed.

Kitchens are characterised by the presence of many reflective surfaces, such as stainless steel. The lack of space can in addition complicate the lighting design that simply can't be left to chance.

Halton's LED based lighting system has been specifically and exclusively designed for professional kitchens, making it the first Culinary Light. It is based on the latest generation of powerful and energy efficient LEDs fitted in two types of spot: one with a broad beam (and 4,000°K temperature) and the other one with a focused beam (and 3,000°K temperature). The specific reflector used on the broad beam spots has been designed to avoid dazzling the kitchen staff.

Halton's Culinary Light combines the lowest return times on investment while providing the best visual comfort in professional kitchens.

Get your money back in record time

- Less energy: Up to 70% energy savings compared to traditional fluorescent tubes to get the same illumination level of 500 lx.
- Durable lighting level: Keeps the calculated lighting level after 50,000 working hours.
- Extended lifetime: During the same period, traditional fluorescent tubes have to be replaced 3 times.
- Lowest payback times: Specifically designed by Halton for Halton to get the best cost effectiveness.

Better visual comfort and safety

- More efficient: The average luminous efficiency is 40% higher compared to typical High Intensity Discharge (HID) tubes.
- More light: Provides a better illumination level with an average of 750 lx, increased to 1,000 lx on specific areas for better working conditions or quality control.
- Less dazzle: Excellent shielding that prevents the staff being dazzled.
- Close to sunlight render: Better colour rendering thanks to a more natural luminous spectrum. Better volumes rendering thanks to the combination of the two spot models with different opening angles.
- Easier to clean: Light modules are flush mounted thus reducing the number of joints making it easier to clean.

Flexibility

- A range of control possibilities for instance the adjustment of light intensity depending on the natural light (less light close to the windows, more on the rest of the kitchen) which saves even more energy.
- The focused spot beams can be mounted on a motor to adjust their position without having to access the light module (on request only).

KVF KITCHEN HOOD WITH FRONT SUPPLY

For closed, open or show kitchens

Capture Jet™ technology
Up to 40% reduction in airflow rates

Integrated supply air
Better smoke capture and comfort

Cyclonic filter (KSA)
95% efficient on 10 µm and above particles

T.A.B.™ technology
Quick airflow rates measurement

Recommended combinations

M.A.R.V.E.L. (MRV)
Extend airflow reduction to up to 64%

Capture Ray™ technology
Neutralises grease vapours and particles

Built-in Fire Suppression (FSS)
Engineered & pre-installed from factory

Duct safety monitoring (KGS)
Assesses grease deposits level

Two of these combinations in brief:

M.A.R.V.E.L. (MRV)
This technology has the unique ability to adjust the exhaust airflow hood by hood and in a fully independent way. Benefit from massive savings!

Capture Ray™ Technology
Establish your kitchen where you want and be safe thanks to the UV neutralisation of grease coming with a drastic reduction of odour emissions.

APPLICATIONS

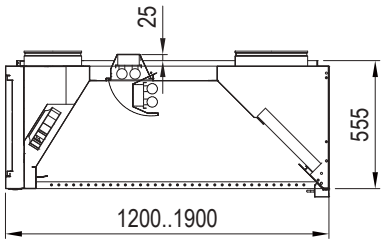
KVF hoods are particularly suitable for LEED(1) projects and can be used in all closed, open or show kitchens (hotels, hospitals, gastronomic restaurants, central kitchens, etc).

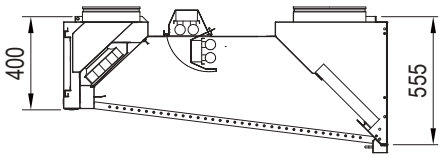
KVF hoods have the latest generation of patented Capture Jet™ technology. In addition, they are equipped with a low-velocity makeup air system built into the front face.

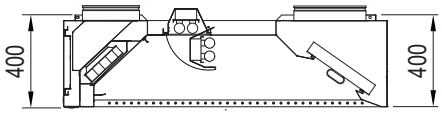
- HACCP(2) certified.
- Considerable energy savings: 30 to 40% less exhaust airflow rates due to Capture Jet™ technology.
- Savings on maintenance and enhanced safety: Highly-efficient KSA cyclonic filters (UL, NSF and LPS 1263 certified). Prevents build-up of grease deposits which constitute a serious hygiene and fire hazard. Lower ductwork cleaning costs.
- Better capture and comfort thanks to a low-velocity diffuser built into the front (make up air without draughts).
- Performance tested independently in accordance with the ASTM 1704 standard. Exhaust airflow rates calculated on the base of this performance and the calculation of cooking appliances' heat loads.
- Quick and easy commissioning. Hoods delivered "ready to install", with all accessories included, such as light fitting, T.A.B.™ taps and balancing dampers for quick balancing on-site.
- Sturdier and easier to clean: Less parts and less joints. Stainless steel construction.

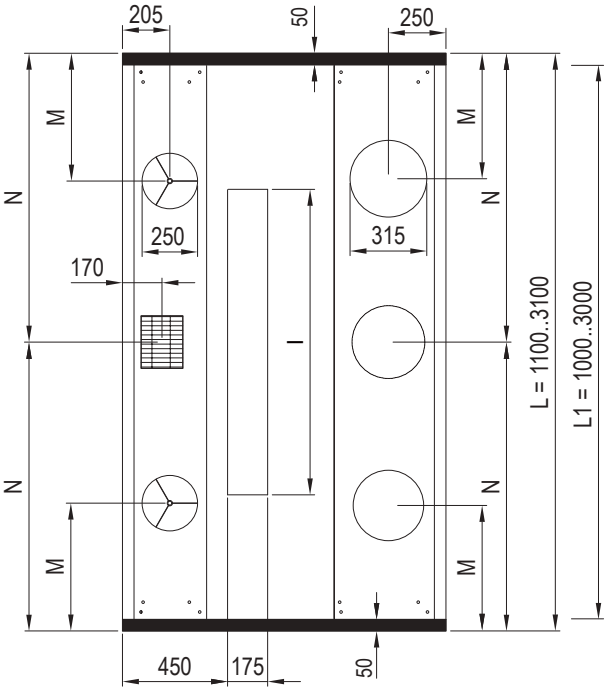
(1) Leadership in Energy and Environmental Design
(2) Hazard Analysis Critical Control Point

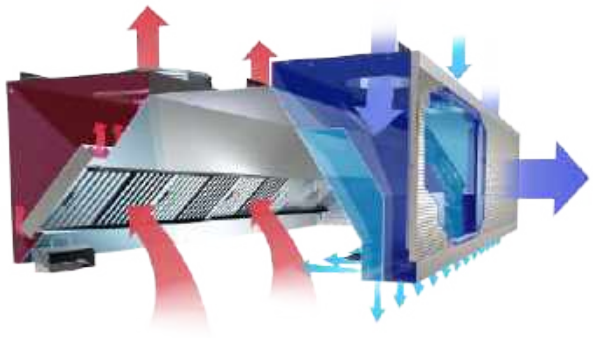
DESCRIPTION AND DIMENSIONS











Notes
The dimensions shown are for modular sections only. Longer hoods are assembled using a combination of separate modules to make delivery and on-site handling easier. Other Capture Jet™ air supply possibilities or connections are available on request.

LOCATION OF CONNECTIONS (mm)

Number of exhaust and supply connections to be assessed in relation to the length of the modules and the calculation of airflow rates depending on the configuration of the cooking appliances.

	Exhaust			Supply		Light
	1 Ø315	2 Ø315	3 Ø315	2Ø250	4 Ø250	
L	M	N	M, N	O	O, P	Q*
1600	L1/2	450	-	450	-	720
2100	L1/2	450	-	450	450, 500	1320
2600	-	450	L1/2, 450	450	450, 500	1320
3100	-	450	L1/2, 450	-	450, 500	1320

* 720 (L1<=1500, 2x18W), 1320 (L1>1500, 2x36W)

WEIGHT (h=555 mm, kg)

L/W	1100	1300	1500	1700	1900
1100	86	91	97	107	113
1600	114	119	125	136	141
2100	141	147	152	164	170
2600	169	174	180	193	199
3100	196	202	207	222	228

KVI KITCHEN HOOD

For closed, open or show kitchens

Capture Jet™ technology
Up to 40% reduction in airflow rates

Cyclonic filter (KSA)
95% efficient on 10 µm and above particles

T.A.B.™ technology
Quick airflow rates measurement

Recommended combinations

M.A.R.V.E.L. (MRV)
Extend airflow reduction to up to 64%

Capture Ray™ technology
Neutralises grease vapours and particles

Built-in Fire Suppression (FSS)
Engineered & pre-installed from factory

Duct safety monitoring (KGS)
Assesses grease deposits level

Two of these combinations in brief:

M.A.R.V.E.L. (MRV)
This technology has the unique ability to adjust the exhaust airflow hood by hood and in a fully independent way. Benefit from massive savings!

Capture Ray™ Technology
Establish your kitchen where you want and be safe thanks to the UV neutralisation of grease coming with a drastic reduction of odour emissions.

APPLICATIONS

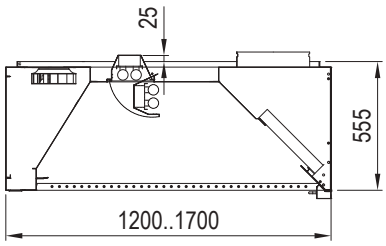
KVI hoods are particularly suitable for LEED(1) projects and can be used in all closed, open or show kitchens (hotels, hospitals, gastronomic restaurants, central kitchens, etc).

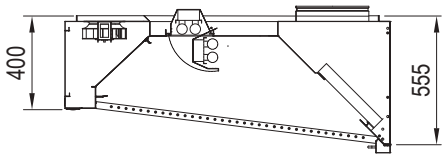
KVI hoods have the latest generation of patented Capture Jet™ technology. They are combined with Halton's draft free low velocity diffusers to keep the capture efficiency at its maximum level.

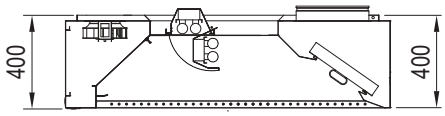
- HACCP(2) certified.
- Considerable energy savings: 30 to 40% less exhaust airflow rates thanks to Capture Jet™ technology.
- Savings on maintenance and enhanced safety: Highly-efficient KSA cyclonic filters (UL, NSF and LPS 1263 certified). Prevents build-up of grease deposits which constitute a serious hygiene and fire hazard. Lower ductwork cleaning costs.
- Performance tested independently in accordance with the ASTM 1704 standard. Exhaust airflow rates calculated on the basis of this performance and the calculation of cooking appliances' heat loads.
- Quick and easy commissioning. Hoods delivered "ready to install", with all accessories included, such as light fitting, T.A.B.™ taps and balancing dampers for quick balancing on-site.
- Sturdier and easier to clean: Less parts and less joints. Stainless steel construction.

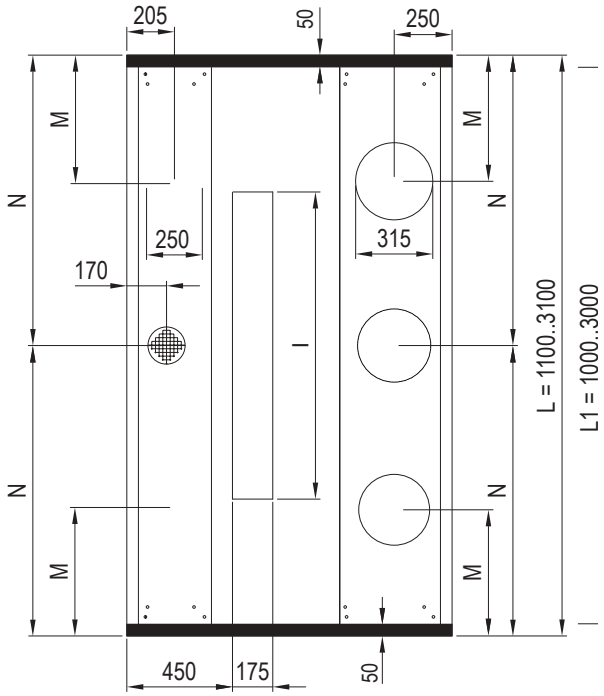
(1) Leadership in Energy and Environmental Design
(2) Hazard Analysis Critical Control Point

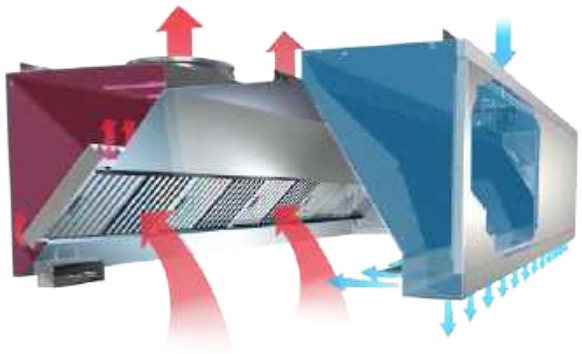
DESCRIPTION AND DIMENSIONS











Notes
The dimensions shown are for modular sections only. Longer hoods are assembled using a combination of separate modules to make delivery and on-site handling easier. Other Capture Jet™ air supply possibilities or connections are available on request.

LOCATION OF CONNECTIONS (mm)

Number of exhaust connections to be assessed in relation to the length of the modules and the calculation of airflow rates depending on the configuration of the cooking appliances.

	Exhaust			Light
	1 Ø315	2 Ø315	3 Ø315	
L	M	N	M, N	Q*
1600	L1/2	450	-	720
2100	L1/2	450	-	1320
2600	-	450	L1/2, 450	1320
3100	-	450	L1/2, 450	1320

* 720 (L1<=1500, 2x18W), 1320 (L1>1500, 2x36W)

WEIGHT (h=555 mm, kg)

L/W	1100	1300	1500	1700	1900
1100	78	83	88	93	98
1600	103	108	113	118	123
2100	128	133	138	143	148
2600	153	158	163	168	173
3100	178	183	188	193	198

KFM GALLEY GREASE HOOD

With Capture Jet technology

APPLICATIONS

Halton KFM is a galley grease hood for use in marine & offshore applications to remove contaminated air released by cooking equipment.
The KFM hood uses Halton Capture Jet™ technology, which allows the hood to operate with up to 30% lower exhaust airflow rates than traditional hoods.

MATERIALS

PART	MATERIAL	NOTE
Main body	Stainless steel EN 1.4301 (AISI304)*	Available as an option: EN 1.4404 (AISI316L)
Light fixture	Painted steel	-
Cables	Halogen free	-

* Thickness 1,25 mm

KFM CONSTRUCTION

The KFM hood comprises a Capture Jet™ air supply module, a light fixture, adjustment dampers, airflow measurement taps and KSA grease filters. All parts of the hood are manufactured from polished stainless steel EN 1.4301 (AISI304). The Capture Jet™ supply plenum is thermally insulated through the use of mineral wool material to prevent condensation on the inner face above the cooking equipment. The hood is equipped with removable grease cup for collection of the grease.

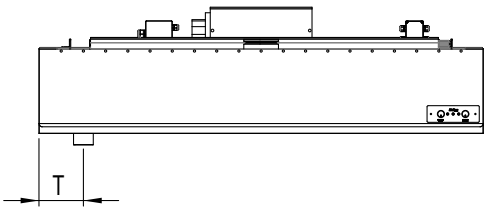
KFM PRODUCT OPTIONS

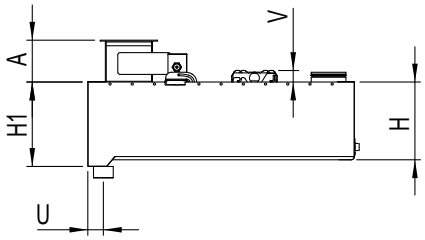
- Non-standard spigots: choice of size and position
- EN 1.4404 (AISI316L) construction
- Certified fire damper manufactured of EN 1.4301 (AISI304) or EN 1.4404 (AISI316L)
- Wet chemical fire suppression system
- M.A.R.V.E.L. demand-based ventilation system

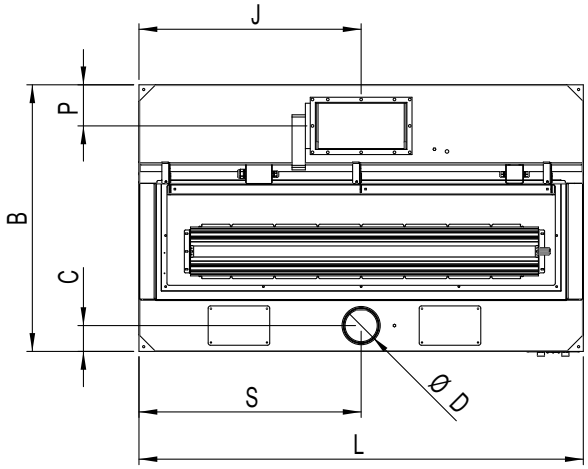
FEATURES

- The design follows USPHS guidelines
- Easily removable filters for cleaning
- High level of hygiene facilitated
- Prevention of the build-up of grease deposits, which pose a serious fire hazard
- With Halton Capture JetTM technology reducing the required exhaust airflow rate and improving the capture and containment efficiencies of the hood, while reducing energy use
- High-efficiency grease filtration using Halton KSA multi-cyclone filters
- Supplied as standard with lighting, balancing dampers for both capture and exhaust air and T.A.B.™ airflow measurement taps, which allow accurate and effective balancing of airflows, and efficient commissioning
- Stainless steel welded construction
- High-efficiency grease filtration using Halton KSA multi-cyclone filters

GENERAL KFM DRAWINGS







	KFM DIMENSIONS (mm)
A	195
B	1100-1900
C	115
D	100-200
H	350
H1	380
J	1/2L
L	1000-3000
P	185
S	1/2L
T	200
U	70
V	Max 50

Note: Maintenance / light fixture hatch is as big as the construction allows.

WEIGHTS

KFM HOODS (KG) WITH CAPTURE JET TECHNOLOGY

B/L	1000	1500	2000	2500	3000
1100	50	74	100	124	138
1300	56	80	105	129	146
1500	61	86	111	135	154
1700	67	92	117	141	162
1900	73	97	122	147	170

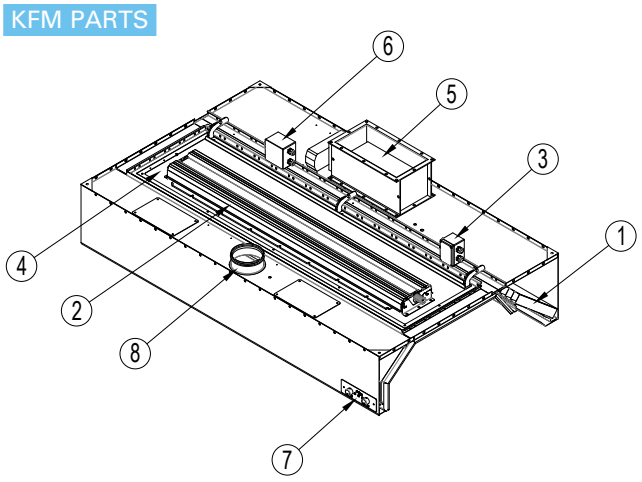
The above table represents an indication of different size of average KFM hoods with Capture Jet technology. Weight does not include fire damper.

KFM HOODS (KG)

B/L	1000	1500	2000	2500	3000
1100	40	60	80	100	110
1300	46	66	86	106	118
1500	51	71	92	111	126
1700	57	77	98	117	134
1900	63	83	103	123	142

The above table represents an indication of different size of average KFM hoods without Capture Jet technology. Weight does not include the fire damper.

KFM PARTS

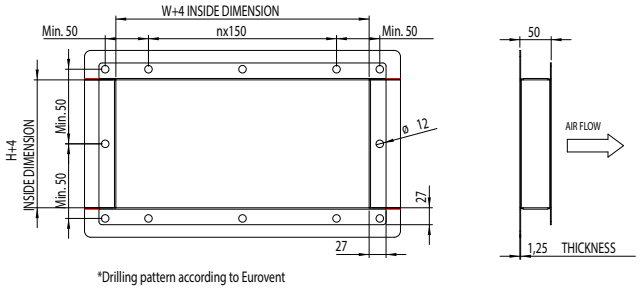


PARTS: 1 KSA grease filters, 2 Lighting fixture, 3 Lighting fixture power supply junction box, 4 Maintenance hatch, 5 Exhaust air connection, fire damper or shut-off damper* (available as an option) and adjustment damper, 6 Fire damper junction box (available as an option), 7 Damper switch and indication (available as an option), 8 Capture air connection and adjustment damper

*If fire or shut-off damper is located at the duct, Halton suggests two default solutions for duct connection:

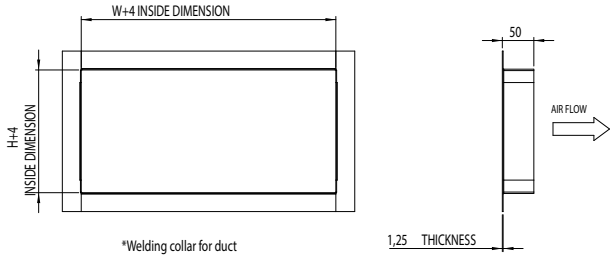
- Eurovent-collar with flange
- Welded L-collar

EUROVENT-COLLAR WITH FLANGE



*Drilling pattern according to Eurovent

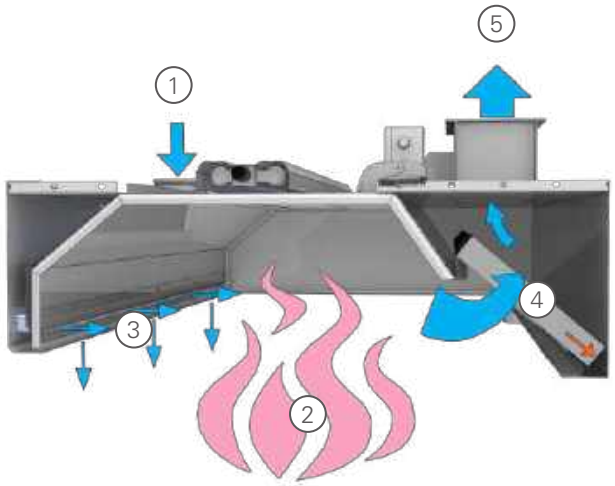
WELDED L-COLLAR



*Welding collar for duct

KFM FUNCTION

1. Supply air enters the Capture Jet™ plenum.
2. Contaminated air and heat rises from the cooking appliances.
3. Contaminated air is directed into the hood by Halton patented Capture Jet™ technology.
4. KSA multi-cyclone filters remove grease and contaminants from the air stream with the aid of centrifugal effect. According to independent laboratory tests KSA is the most efficient mechanical grease filter on the market.
5. Filtered exhaust air.



SUGGESTED SPECIFICATIONS

The galley hoods shall be constructed from stainless steel EN 1.4301 (AISI304). The galley hoods shall be supplied complete with outer casing / main body, airflow measurement taps, exhaust air spigot connection with adjustment damper, maintenance hatch, light fixture, grease filters, grease cup. Classified fire damper in each exhaust connection is available as an option. The manufacture of all galley hoods shall be controlled by ISO 3834-2:2005, ISO 9001, 14001 and OHSAS 18001 standards. The design of hoods shall follow USPHS guidelines.

CONSTRUCTION

All parts shall be constructed of stainless steel sheet (thickness 1.25 mm) with a polished finish. The inside corners of the hood are rounded for easy cleanability according to USPHS guidelines. The joints at the lower edges of the device are welded. All visible screws are thumb screw type. The hood is equipped with a grease cup for removing the grease. There is a maintenance hatch in each hood for easy access above the hood.

CAPTURE JET PLENUM

The Capture JetTM plenum shall be insulated with sealed mineral wool. Plenum can be accessed through a maintenance hatch(es).

CAPTURE JET PLENUM

The Capture JetTM plenum shall be insulated with sealed mineral wool. Plenum can be accessed through a maintenance hatch(es).

CAPTURE JET SYSTEM

The hood shall be designed with Capture JetTM technology to reduce the exhaust airflow rate required and increase the capture and containment efficiencies of the hood, while reducing energy use.

AIRFLOW MEASUREMENT TABS

Measurement taps shall be located on top of the hood for capture air and exhaust air measurement.

HALTON KSA FILTER

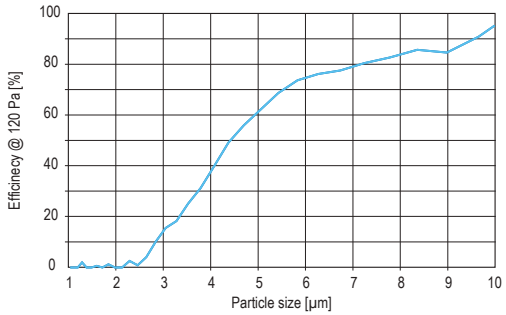
- Minimisation of grease deposits in the ducts
- Enhanced hygiene and safety

The KSA grease filters shall be constructed of stainless steel. The grease filters shall be supplied in modular size of 500x330x50 mm and shall be removable via two folding handles. The grease filters shall have a honeycomb design in order to allow high grease filtration efficiency with the aid of centrifugal effect in filter honeycombs.

HALTON KSA FILTER

- Minimisation of grease deposits in the ducts
- Enhanced hygiene and safety

The KSA grease filters shall be constructed of stainless steel. The grease filters shall be supplied in modular size of 500x330x50 mm and shall be removable via two folding handles. The grease filters shall have a honeycomb design in order to allow high grease filtration efficiency with the aid of centrifugal effect in filter honeycombs.



Mechanical filtration is recommended to be used in hoods with low utilization rate and cooking process producing mainly large grease particles (> 8 microns), e.g. food prepared with fryers, griddles and broilers (source ASHRAE).

DUCT CONNECTIONS

The duct connections and adjustment dampers for exhaust air shall be constructed from stainless steel. The dampers shall be adjustable.

LIGHT FIXTURES

Each hood shall be delivered with a fluorescent light fixtures or LED light fixtures providing an average illuminance of approximately 500 lux at the work surfaces of the cooking appliances. The light fixtures shall be suitable for a single-phase 230-VAC power supply and shall be manufactured to be of protection class IP67. The ballast and capacitor shall be located within the lighting fixture. The core electric cables connecting the light fixture to the junction box shall be provided. The light fixture shall be installed on a hinged maintenance hatch, allowing access to the hood roof.

FLUORESCENT LIGHT FIXTURE SIZES

HOOD DIMENSION	LENGTH	WIDTH
L < 1250 mm, 2x24 W	720 mm	220 mm
L ≥ 1250 mm, < 2000 mm, 2x39 W	1020 mm	220 mm
L ≥ 2000 mm, 2x49 W	1620 mm	220 mm

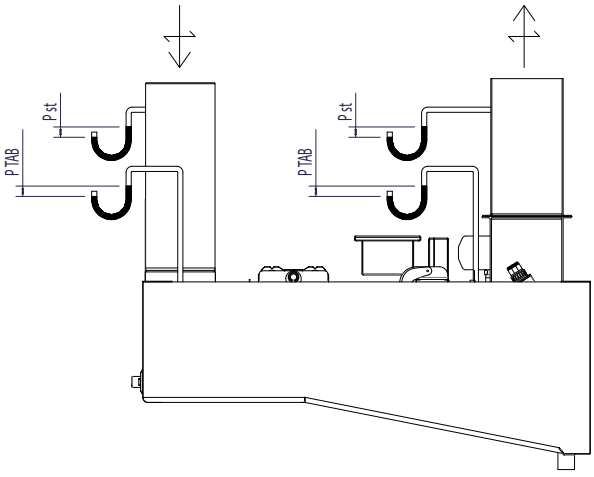
LED LIGHT FIXTURE SIZES

HOOD DIMENSION	LENGTH	WIDTH
L < 1250 mm, 1x28 W	720 mm	175 mm
L ≥ 1250 mm, < 2000 mm, 1x42 W	1020 mm	175 mm
L ≥ 2000 mm, 1x69 W	1620 mm	175 mm

MAINTENANCE HATCH

Each hood shall be provided with a maintenance hatch made of stainless steel with a shock- resistant plastic window. The heat tolerance of the window shall be up to +115 °C. The hatch shall be easily opened and closed. The maintenance / light fixture hatch is as big as the construction allows.

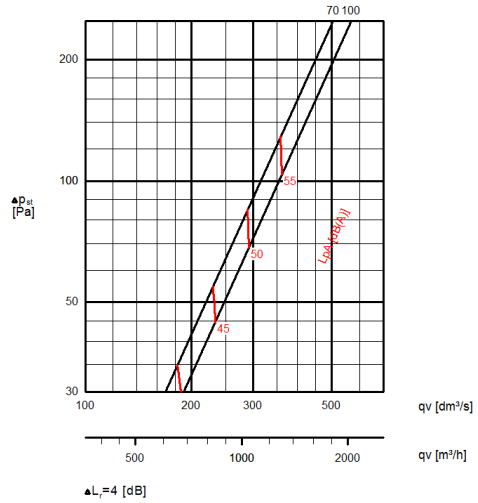
AIRFLOW MEASUREMENT



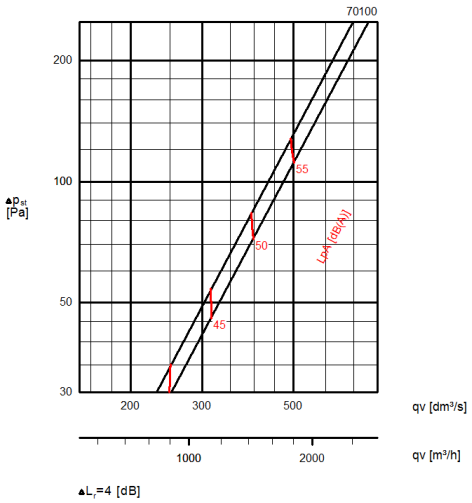
ΔP_{st} = Static pressure loss
ΔP_{TAB} = TAB pressure for airflow rate measurement
70, 100 = Damper opening in %

PRESSURE DROP AND SOUND DATA WITH RECOMMENDED EXHAUST CONNECTION SIZE

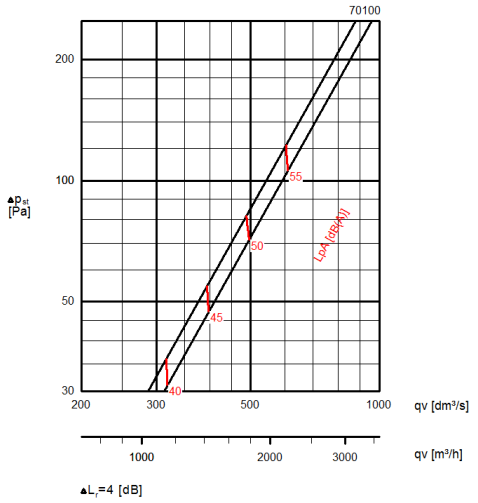
KFM, section 1000, static pressure loss and sound data



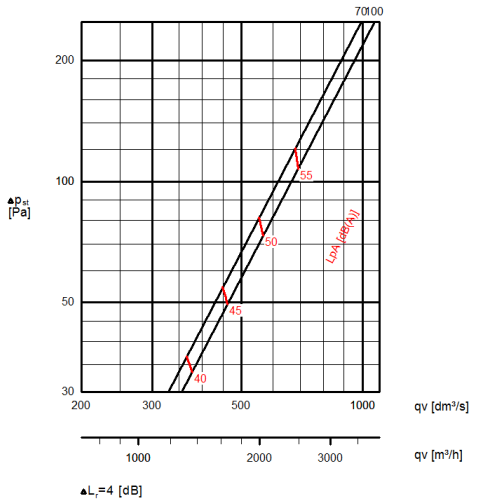
KFM, section 1500, static pressure loss and sound data



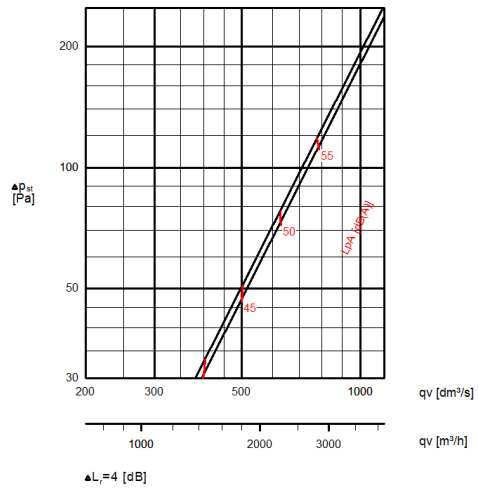
KFM, section 2000, static pressure loss and sound data



KFM, section 2500, static pressure loss and sound data



KFM, section 3000, static pressure loss and sound data

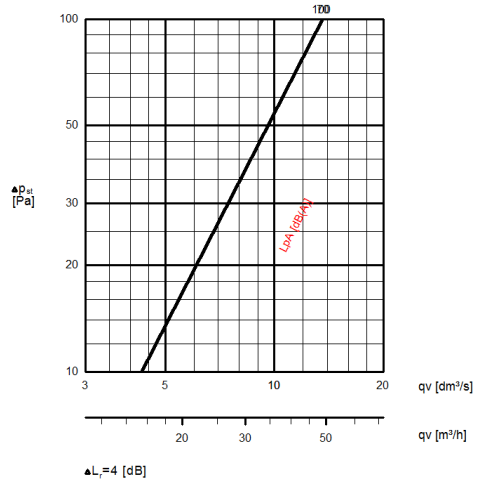


Δp_{st} = exhaust static pressure loss
70, 100 = damper opening in %
ΔL_r = room attenuation

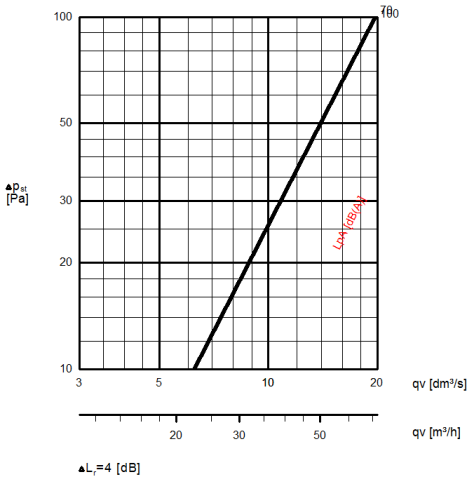
Halton

PRESSURE DROP AND SOUND DATA WITH RECOMMENDED CAPTURE CONNECTION SIZE

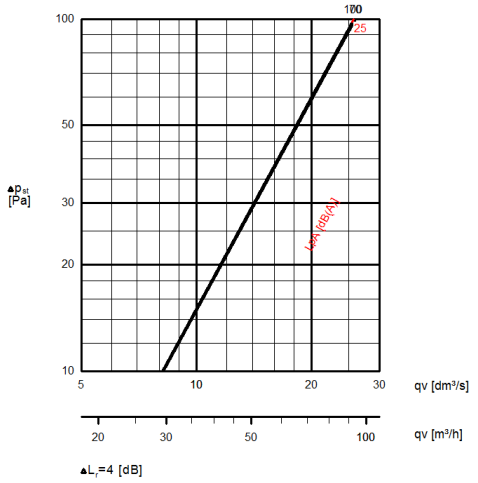
KFM, section 1000, static pressure loss and sound data



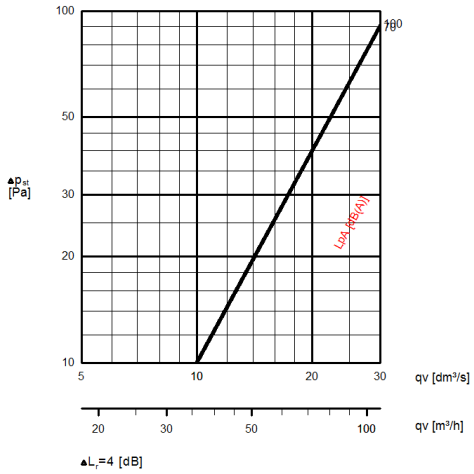
KFM, section 1500, static pressure loss and sound data



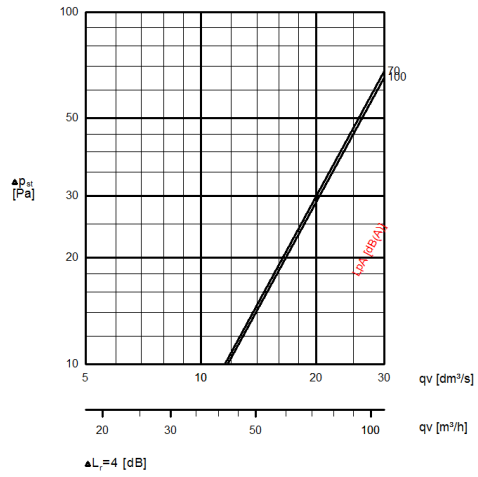
KFM, section 2000, static pressure loss and sound data



KFM, section 2500, static pressure loss and sound data



KFM, section 3000, static pressure loss and sound data



Δp_{st} = capture static pressure loss
70, 100 = damper opening in %
ΔL_r = room attenuation

EXHAUST AIRFLOW RATE MEASUREMENT USING K FACTORS

KSA (NUMBER OF FILTERS)	KFM HOOD k factor [m³/h]	KFM HOOD k factor [l/s]
1	87,0	24,2
2	139,6	38,8
3	192,3	53,4
4	287,8	80,0
5	333,4	92,6
6	394,9	109,7

With the T.A.B. pressure measurement, it is also possible to check the exhaust airflow with the following formula. Above values are with recommended exhaust connection size.

$q_{v,e} = k \times \sqrt{\Delta P_{TAB}\,[Pa]}$

$q_{v,e}$ = Airflow
k = K-factor
ΔP_{TAB} = Pressure difference

RECOMMENDED EXHAUST AIRFLOW FOR KFM

NUMBER OF KSA FILTERS	MINIMUM l/s	MAXIMUM l/s	MINIMUM m³/h	MAXIMUM m³/h
1	130	201	468	724
2	259	402	932	1447
3	389	602	1400	2167
4	518	803	1865	2891
5	648	1004	2333	3614
6	778	1205	2801	4338

Note: KSA filter size 500x330x50 mm

KVM EXTRACTION CANOPY

For non-grease applications

APPLICATIONS

The Halton Marine KVM canopies that are manufactured according to USPHS guidelines. The KVM extraction canopies are used to capture and remove steam and heat resulting e.g. of the industrial dishwashers and bain-maries. The KVM canopies are the choice when grease filtration is not required.

FEATURES

- High level of hygiene facilitated
- Supplied as standard with lighting
- Stainless steel, welded construction
- The design follows USPHS guidelines

MATERIALS

PART	MATERIAL	NOTE
Main body	Stainless steel EN 1.4301 (AISI304)*	Available as an option: EN 1.4404 (AISI316L)
Light fixture	Painted steel	-
Cables	Halogen free	-

* Thickness 1,25 mm

KVM CONSTRUCTION

The parts of the KVM canopy are manufactured from polished stainless steel EN 1.4301 (AISI304). The joints on the lower edge of the canopy are fully welded.

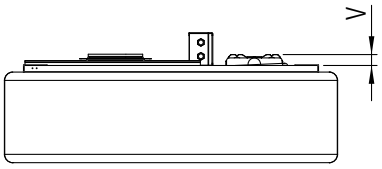
CONNECTIONS

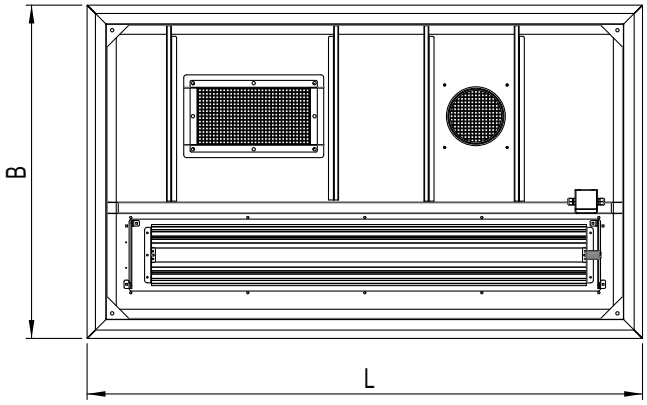
Amount, location and sizes of exhaust connections are defined by the customer. Both square and circular connections in various sizes can be done. Connection includes a net hatch.

KVM PRODUCT OPTIONS

- Material EN 1.4404 (AISI 316L)
- Special light fixtures according to customers needs
- DSH droplet separator in a ductwork
- Supply air plenum

GENERAL KVM DRAWINGS

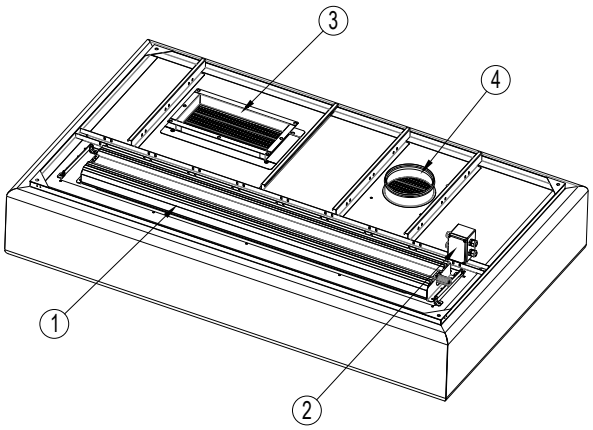




	KVM DIMENSIONS (mm)
L	600...3000
B	1100-1900
H	150...600
V	Max 50

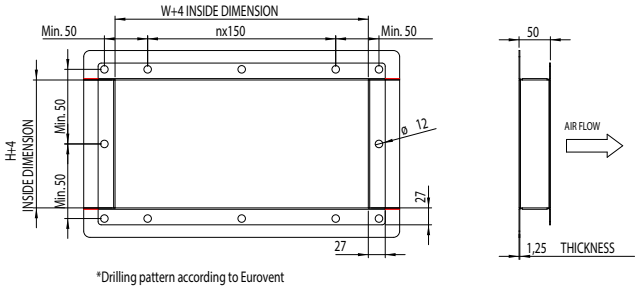
The dimensions presented above are for modular sections only. Larger canopies are assembled using a combination of separate module vane, which makes transportation and on-site handling easier.

KVM PARTS

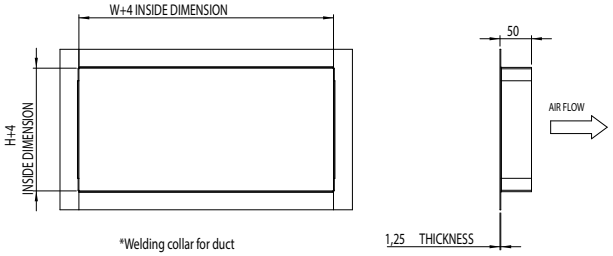


PARTS: 1 Lighting fixture, 2 Lighting fixture power supply junction box, 3 Eurovent-collar with flange, L-collar available as an option, 4 Round duct connection, available as an option

EUROVENT-COLLAR WITH FLANGE



WELDED L-COLLAR



WEIGHTS

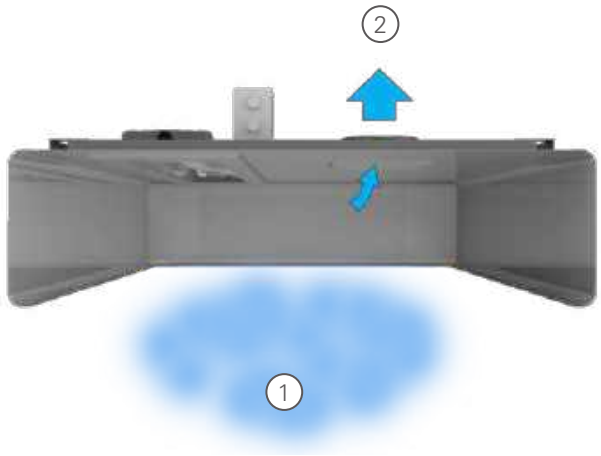
KVM CANOPIES (KG)

B/L	1000	1500	2000	2500	3000
1000	32	40	49	57	66
1500	40	51	62	73	84
2000	49	62	75	89	102

The above table represents an indication of different size of KVM canopies. Height of the canopy is 300 mm.

KVM FUNCTION

1. Contaminated air and heat rises from the cooking appliances.
2. Exhaust air.



SUGGESTED SPECIFICATIONS

The galley steam canopies shall be constructed from stainless steel EN 1.4301 (AISI304), material thickness 1,25 mm. The galley canopies shall be supplied complete with outer casing / main body, light fitting and exhaust collar with net hatch. The manufacture of canopies shall be controlled by ISO 3834-2:2005, ISO 9001, 14001 and OHSAS 18001 standards. The design of canopies shall follow USPHS guidelines.

OUTER CASING / MAIN BODY

Outer casing panels shall be constructed of stainless steel sheet EN 1.4301 (AISI304) with a polished finish. Each joint shall be welded. The joint of the edges shall be fully welded.

SPIGOT CONNECTIONS

The spigot connections for exhaust air shall be constructed from stainless steel EN 1.4301 (AISI304) and shall be supplied with a net hatch.

LIGHT FIXTURES

Each canopy shall be delivered with a fluorescent light fixtures or LED light fixtures providing approx. an average illuminance of 500 lux at the work surfaces of the cooking appliances.
The light fixtures shall be suitable for a single-phase 230-VAC power supply and shall be manufactured to be of protection class IP67.
The ballast and capacitor shall be located within the light frame. The core electric cables connecting the light fixture to the junction box shall be provided.
The light fixture shall be installed on a maintenance hatch, allowing access to the canopy roof.

FLUORESCENT LIGHT FIXTURE SIZES

HOOD DIMENSION	LENGTH	WIDTH
L < 1250 mm, 2x24 W	720 mm	220 mm
L ≥ 1250 mm, < 2000 mm, 2x39 W	1020 mm	220 mm
L ≥ 2000 mm, 2x49 W	1620 mm	220 mm

LED LIGHT FIXTURE SIZES

HOOD DIMENSION	LENGTH	WIDTH
L < 1250 mm, 1x28 W	720 mm	175 mm
L ≥ 1250 mm, < 2000 mm, 1x42 W	1020 mm	175 mm
L ≥ 2000 mm, 1x69 W	1620 mm	175 mm

MAINTENANCE HATCH

Each canopy shall be provided with a maintenance hatch made of stainless steel EN 1.4301 (AISI304) with a shock-resistant plastic window. The heat tolerance of the window shall be up to +115 °C. The hatch shall be easily opened and closed.

TCG LOW VELOCITY CEILING DIFFUSER

Stainless steel diffuser for galleys

APPLICATIONS

Halton TCG is a low velocity ceiling diffuser with rectangular connection of 302x152 mm as standard. The diffuser is manufactured of stainless steel.
The TCG diffuser is designed for galleys where good indoor climate conditions are required. Supply air velocity is designed to be very low to avoid draught in the near zone of the diffuser. This also supports the extraction efficiency of the hood. Where requirement of comfort are seen less important it is possible to use higher airflow rates that increase velocity close to the diffuser. In such cases diffuser should be installed further away from continuously occupied areas.

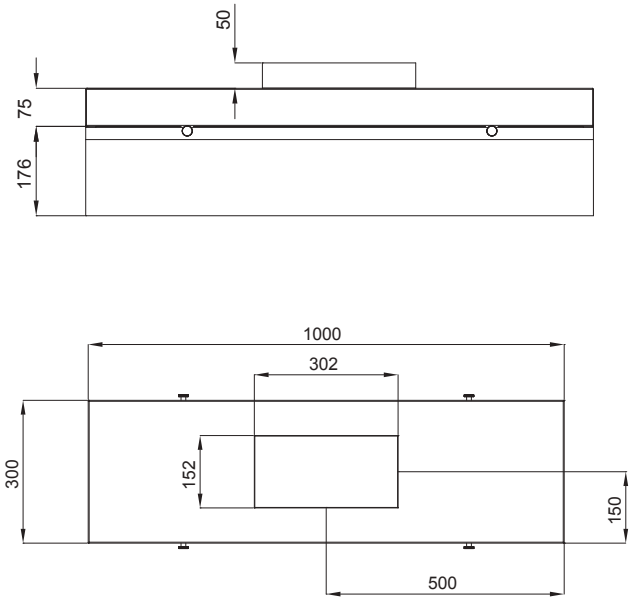
MATERIALS

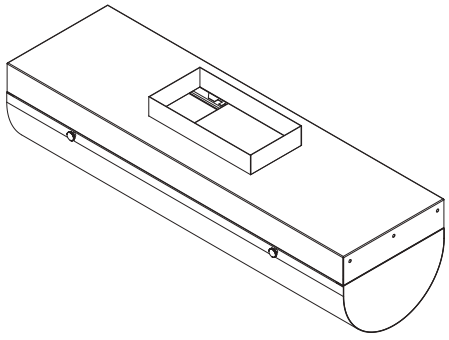
PART	MATERIAL
Casing	Stainless steel EN 1.4301 (AISI304)
Front plate	Stainless steel EN 1.4301 (AISI304)
Flow equalization element	Perforated stainless steel EN 1.4301 (AISI304
Adjustment plate	Stainless steel EN 1.4301 (AISI304)
Installation sleeve	Stainless steel EN 1.4301 (AISI304)

FEATURES

- Low velocity air supply
- Enables a potential saving on extract airflow quantity needed for a hood
- Supports comfortable thermal and good acoustic conditions
- Rectangular duct connection 302x152 mm as standard. Special circular connections available.
- Detachable front panel and perforated plate enable easy cleaning of the diffuser
- Manufactured according to USPHS requirements

DIMENSIONS AND WEIGHT TCG



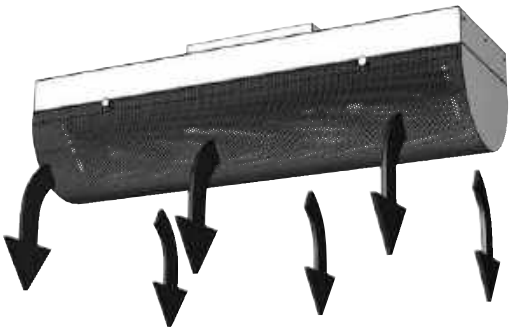


The standard TCG weights 11 kg

Halton

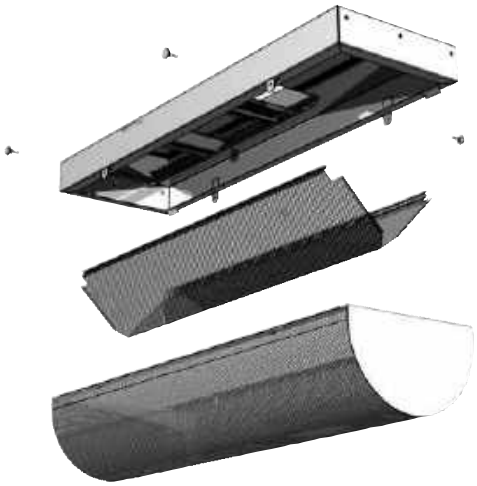
TCG FUNCTION

Supply air is supplied with low velocity from the galley ceiling. The air flows into the galley without causing a high velocity draught and turbulance that could effect on hood extraction efficiency.



TCG SERVICING

Open the front panel of the diffuser and clean the parts by wiping with a damp cloth. Push the front panel back into place so that the springs lock.



TCG INSTALLATION

Diffuser is suitable for connection to a supply ductwork with a rectangular connection of 302x152 mm as standard or with circular connections of D100, D160, D200 or D250 mm as a special product.

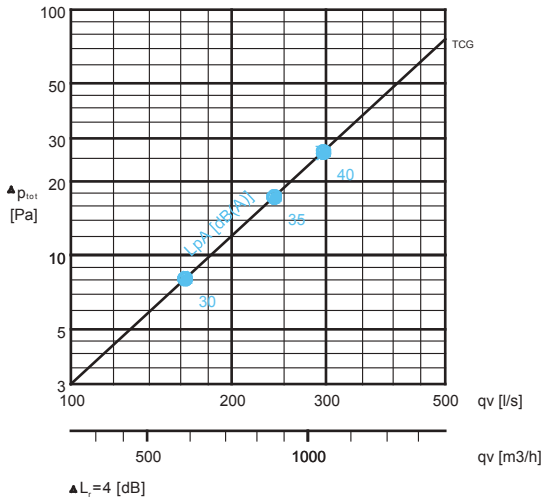
TCG diffuser causes sufficient pressure loss in order to provide self-balancing of the system and adjustment of airflow rates. The airflow rate of each diffuser is adjusted by setting the plenum chamber static pressure with adjustment plate.

TCG PEFORMANCE DATA

Pressure drop	
Airflow (m³/h)	P static (Pa)
500	4
800	10
900	12

Sound levels					
Airflow (m³/h)	Lw dB	Lw(A) dB(A)	Lp(A) dB(A)	NR dB(A)	NC dB(A)
500	38,9	32,5	28,5	27,1	23,5
800	42,3	37,5	33,5	29,3	27,8
900	44,1	39,9	35,9	32,1	30,6

Attenuation -4dB



MMC HALTON MARINE MOBICHEF

Autonomous mobile cooking station for electric appliances

APPLICATIONS

Halton MMC Marine MobiChef is a totally autonomous mobile cooking station for electric appliances. Unleashed from any ventilation ductwork, Halton MMC brings cooking closer to customers and where ever it is needed. The unit is highly efficient and includes a lot of Halton's experience and knowledge in the field of ventilation and emission control for professional kitchens.
Halton MMC Marine MobiChef is fast and easy to set up with plug and play function.

MATERIALS

PART	MATERIAL	NOTE
Main body	Stainless steel EN 1.4404 (AISI316L)	
Glass	Tempered and laminated	-
Light fixture	LED strip	-
Wheels	Caster wheel type, front wheels locable	-

MMC PRODUCT OPTIONS

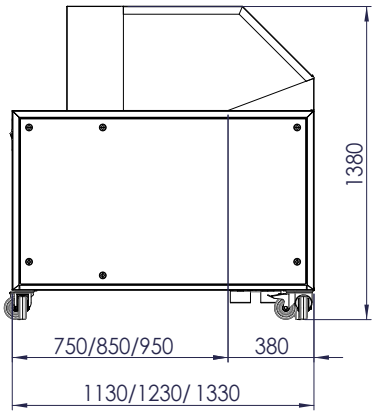
- Halton MMC is available in different sizes:
  - Small
  - Medium
  - Large
- Service table on lefthand side

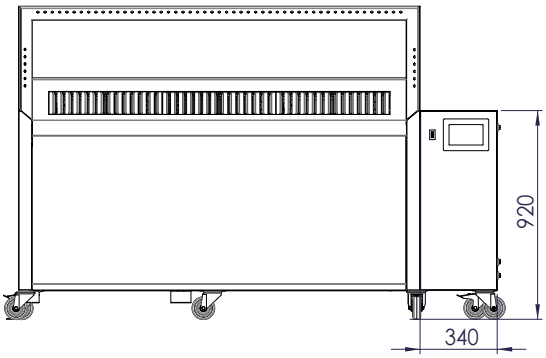
FEATURES

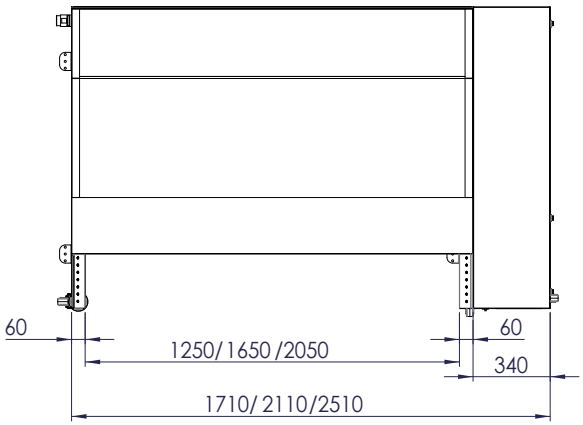
- Totally autonomous mobile cooking station
- With plug and play technology
- With Halton Capture Jet technology that creates an air curtain efficiently capturing the effluents and steering them forward to integrated air recycling unit
- Highly-efficient air recycling unit with a 6-step process
- Simple and easy-to-use touch screen
- Maximized glass surface for enhanced viewer experience of cooking
- Compatible with electric appliances from light-duty table top equipment to traditional 700 and 900 mm deep modular equipment (appliances are not included in Halton's scope)
- Construction follows USPHS guidelines

GENERAL MMC DRAWINGS

Halton MMC Marine MobiChef is available different sizes.







CAPTURE JET TECHNOLOGY ON MOBICHEF

Halton MMC Marine MobiChef is equipped with Capture Jet technology that "locks" the upper part and the side of the units by creating air curtain efficiently capturing smoke and odours released by the cooking process. The Capture Jets steer the smoke and odours to KSA multi-cyclone filters of the air recycling unit.

AIR RECYCLING UNIT

Halton MMC Marine MobiChef is integrated with a highly efficient air recycling unit based on 6-step process. It has been designed to remove all grease and smoke particles as well as cooking odours released by the cooking process. After processing the air, the highly-efficient air recycling unit enables discharge of air back into the space. The MMC does not require any connection to an exhaust ductwork.

1. Mechanical double stage pre-filtration comprising of Halton's KSA multi-cyclone filters (95% efficient on 10 µm particles and above) and mesh filters. The combination very efficiently removes medium sized particles. Both KSA and mesh filters are cleanable in dishwashing machine.
2. Disposable pre-filter (EU5, F5 class). The three pre-filtration steps enable the ESP (Electrostatic Precipitator) to work at maximum efficiency, i.e. on small particles.
3. ESP filter induces an electrostatic charge on the particles allowing them to collect on plates which generate a magnetic field. ESP filters are extremely efficient on fine particles including grease particles and vapour. ESP filter is cleanable.
4. Absolute filters (efficiency > 95% DOP on 0,3 µm particles). Absolute filters are used to remove ultra fine particles.
5. and 6. The remaining odours are removed by a combination of activated carbon and chemical pellets.

TOUCH PANEL

The user interface of Halton MMC Marine MobiChef has been designed to manage advanced technologies by use of clear visuals which allows easy control of main functions. The remaining life time of the filters are clearly displayed so that the maintenance operations can be easily planned.
Halton MMC Marine MobiChef controls ensure that you are always working at the correct airflow. The speed of the fan is adjusted automatically to compensate for filter pressure losses as they become dirty. The exhaust airflow is then kept constant, ensuring that the capture efficiency remains at its maximum level whatever the state of filters.

Halton

JES JET EXTRACTION SYSTEM

For show cooking areas

JES PRODUCT OPTIONS

- Rectangular model
- Round model
- Halton Skyline Culinary Lights
- Luminary ring
- Built in fire suppression system (only available for rectangular model)
- Duct safety monitoring system
- UV-light technology

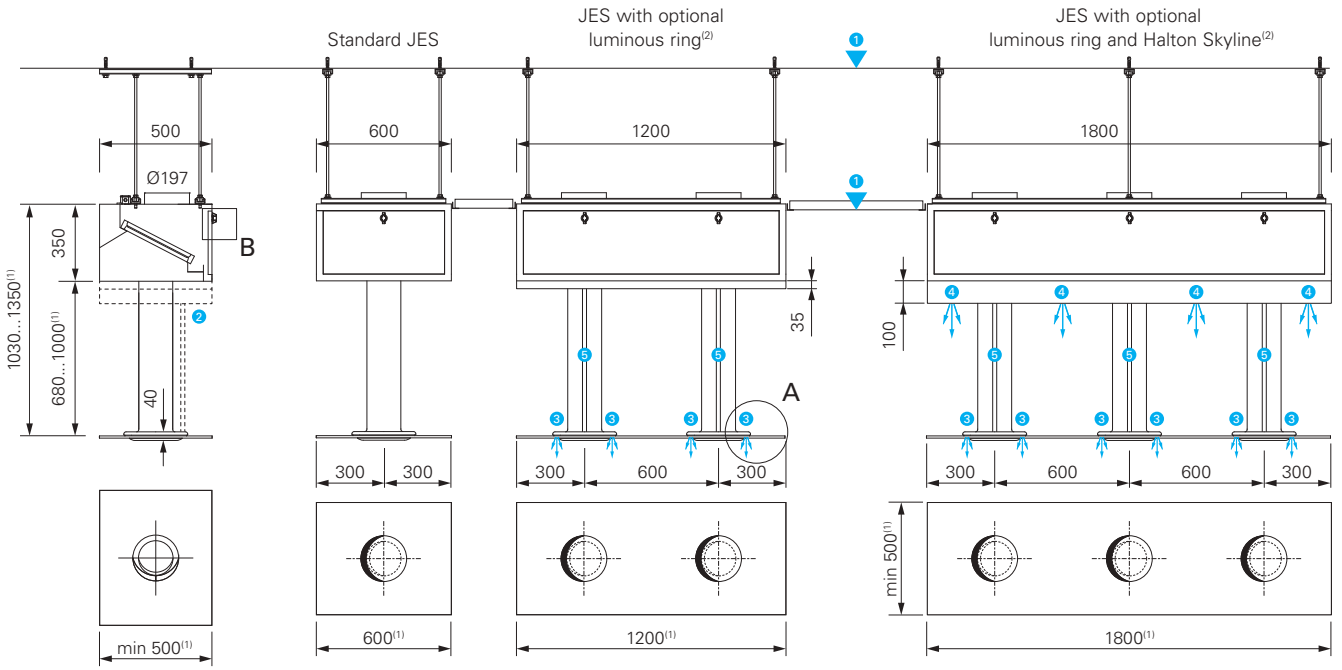
APPLICATIONS

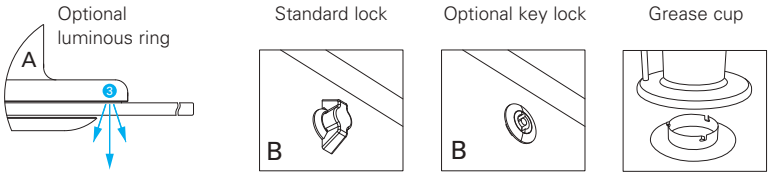
The JES jet extraction system is especially designed for show cooking areas or architectural cooking concepts with low-emission appliances such as grills, woks or hotplates with medium power.

FEATURES

- Designed to highlight the architectural aesthetics of distribution or show cooking areas.
- Energy savings due to an excellent exhaust/efficiency balance.
- 95% capture efficiency due to cyclonic extraction and to the proximity of the glass to the source (no dispersal of odours or smoke).
- Particularly suitable for cooking islands subject to horizontal sweeping phenomena (due to the possible presence of other extraction systems or hoods installed nearby).
- Optimal thermal and acoustic comfort in the work zone due to the low level of exhaust rates.
- The smooth surface and rounded edges minimise maintenance to simple and inexpensive cleaning operations.
- Lower ductwork maintenance costs thanks to highly efficient AS filters.
- The glass plate doubles as a sneeze-guard for guests and staff.
- Better use of natural lighting and the impression of space due to there being no hoods to obstruct the eye.
- Possibility to co-ordinate the colour to that of the decor.

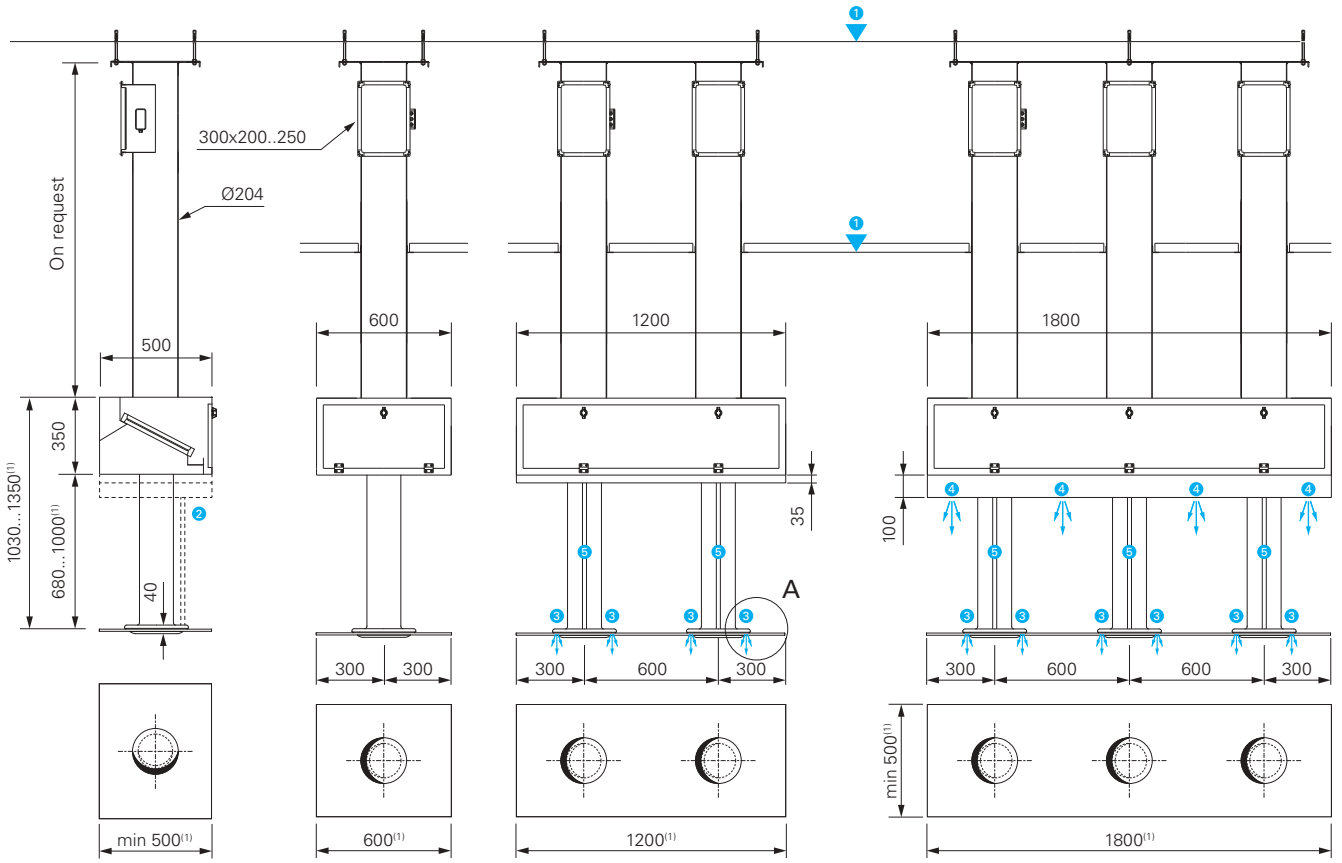
JES / DIMENSIONS



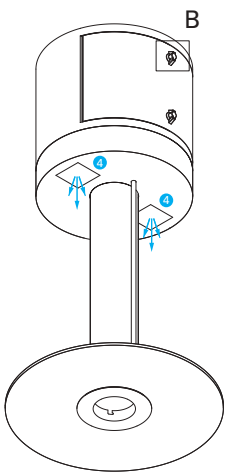


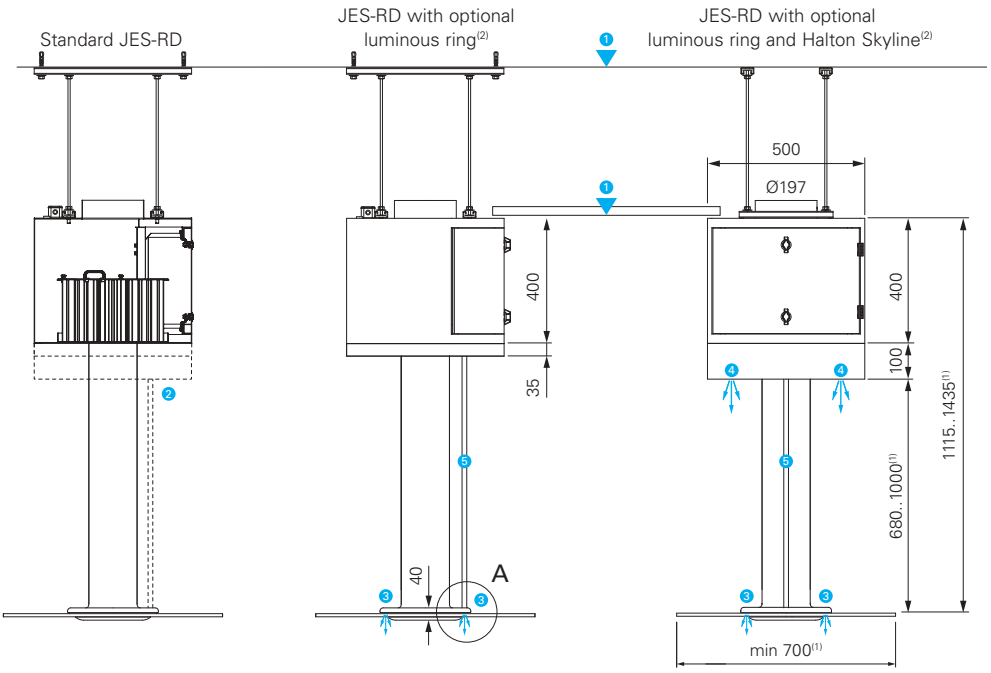
1 - Slab and false ceiling heigths (self supported)
2 - Plenum extension and cable duct for the optional luminous ring and/or Halton Skyline Culinary light
3 - Optional luminous ring
4 - Optional Halton Skyline Culinary Light
5 - Cable duct

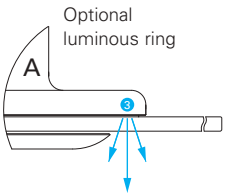
(1) Other dimensions on request
(2) Options available whatever the number of nozzles



JES-RD / DIMENSIONS



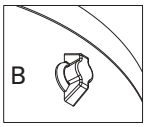




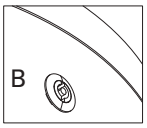
1 - Slab and false ceiling heigths (self supported)
2 - Plenum extension and cable duct for the optional luminous ring and/or Halton Skyline Culinary light
3 - Optional luminous ring
4 - Optional Halton Skyline Culinary Light
5 - Cable duct

(1) Other dimensions on request
(2) Options available whatever the number of nozzles

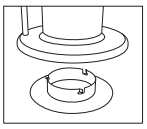
Standard lock

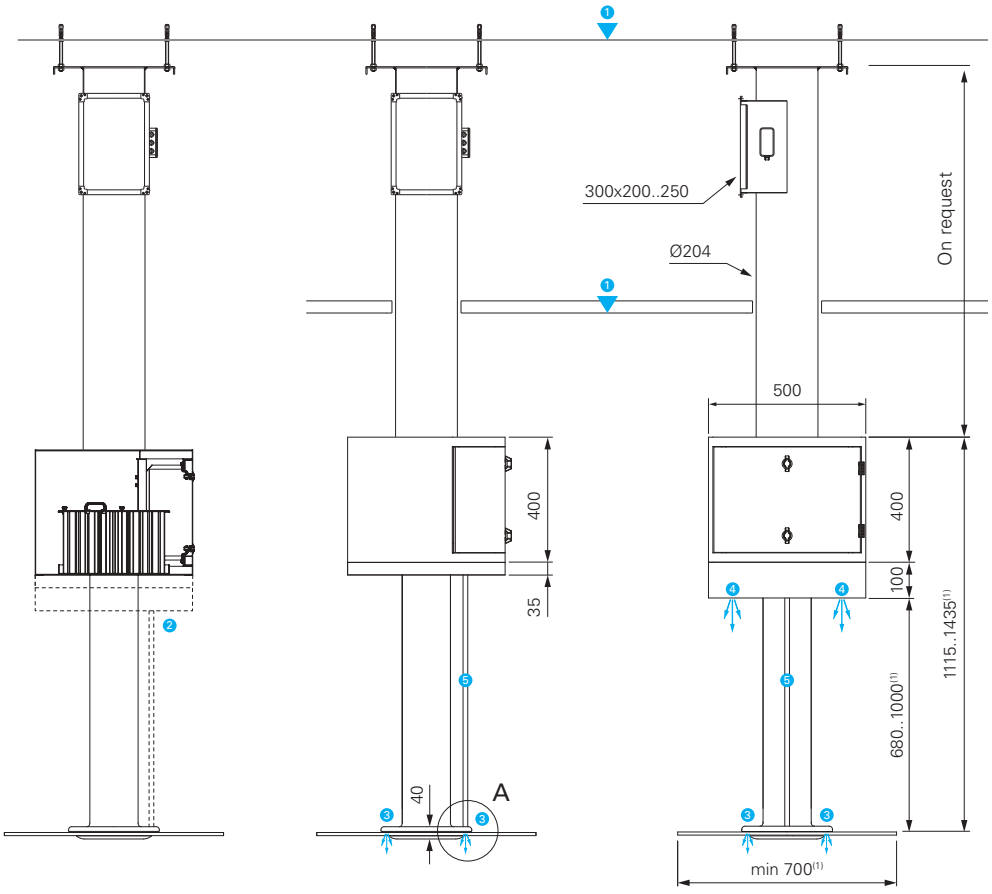


Optional key lock



Grease cup





Halton

HALTON CABEAM

Chilled beam for recessed installation

For outside cabins

MATERIALS

PART	MATERIAL	FINISHING
Front panel	Pre-painted galvanised steel	Polyester-painted White RAL 9003 20% gloss*
Side plates	Pre-painted galvanised steel	Polyester-painted White RAL 9003 20% gloss*
End plates	Pre-painted galvanised steel	Polyester-epoxy-painted White RAL 9003 20% gloss*
Supply air plenum	Galvanised steel	
Brackets	Galvanised steel	
Coil pipes	Copper	
Coil fins	Aluminium	Copper as an option

*) Special colours not available

TAILORING

The Halton CaBeam units can be tailored to customer demands according to the needed integration and requirements. Dimensions, capacities, and functionality details can be modified to project-specific. An advanced digital room temperature control completes the solution.

INSTALLATION

Easy installation can be ensured in a prefabricated cabin. The manufacturing method and innovative, compact design allow units to be modified for any situation.

APPLICATIONS

The Halton CaBeam is a cabin ventilation solution specifically designed for silent cabin comfort with sophisticated air treatment and control. The Halton CaBeam is available as an exposed, recessed or integrated installation.

The recessed CaBeam unit is an active chilled beam solution for demanding marine applications. The active chilled beam system employs fins to help heat and cool. The system is effective to the point where outdoor air can be mixed with the indoor air without any traditional air conditioning (such as heating, cooling, humidifying, or dehumidifying), allowing the building/ship to meet its "minimum outdoor air" air quality requirements.

The active chilled beam system requires much less energy to achieve the same heating and cooling effect as a traditional HVAC system.

The beam acts as a radiator chilled by recirculated water. The warm air rises and is cooled by the chilled beam; once it is cooled, the air falls back to the floor, where the cycle starts over. The ventilation air is delivered to the beam by a central air-handling system via ductwork.

SPECIFICATION

- The active chilled beam has an integral recirculation air path through the perforated front panel
- The front panel is openable from either side to allow general maintenance and cleaning
- The front panel is removable without any special tools
- The supply and return air grilles are openable and removable for maintenance
- The inlet duct connection is modifiable and can be located at the right, left, or middle of the supply-air plenum. When there is an integrated fan, there is no option for a connection in the middle
- The heat exchanger of the beam is oriented such that the water connections can be on either the right or left side of the beam
- All pipes are manufactured from copper, connection pipes with a wall thickness of 0.9–1.0 mm fulfilling the European Standard EN 1057:1996. The fins of the heat exchanger are manufactured from aluminium or copper as an option. The heat exchanger is factory pressure-tested. The maximum operating pressure of chilled/hot water pipework is 1.0 MPa
- The supply air ductwork connection is D125 mm

FEATURES

The cooling philosophy of the beam is based on dry cooling.
Controls and functionality are designed to eliminate the risk of condensation and to provide the highest energy-efficiency possible. Cabin door or openable window can be equipped with switches to indicate an open/close position and connected to the Halton CaBeam automation. The system can communicate with the operating crew for IEQ, as well as, energy-efficiency and is suitable for network communication (selected parameters).

DESIGN CRITERIA

- Room design temperature 22°C / 50% RH
- Fresh air rate 75 m^3/h
  Nozzle pressure 150-200 Pa
- Sensible cooling power 600-1500 W (depending on coil and water parameters)
- Heating power 500-1200 W
- Noise level 25-30 dB(A), boost <35 dB(A)
- Supply and exhaust to design values, 20 dm^3/s (75 m^3/h)
- Chilled water flow to 0,100 dm^3/s (360 dm^3/h)
- Chilled water inlet temperature 15°C
- Chilled water outlet temperature 17°C

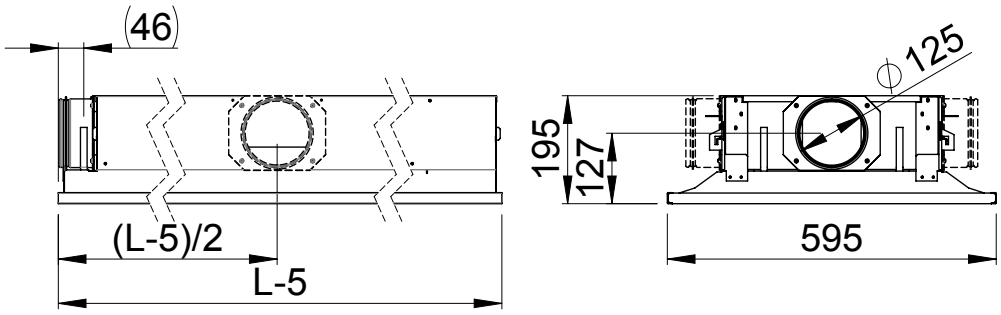
Note: Halton CaBeam systems are not exchangeable with FCU due to differences in the cooling circuit. Halton CaBeam systems take care of air distribution in the cabin as well.

FUNCTION

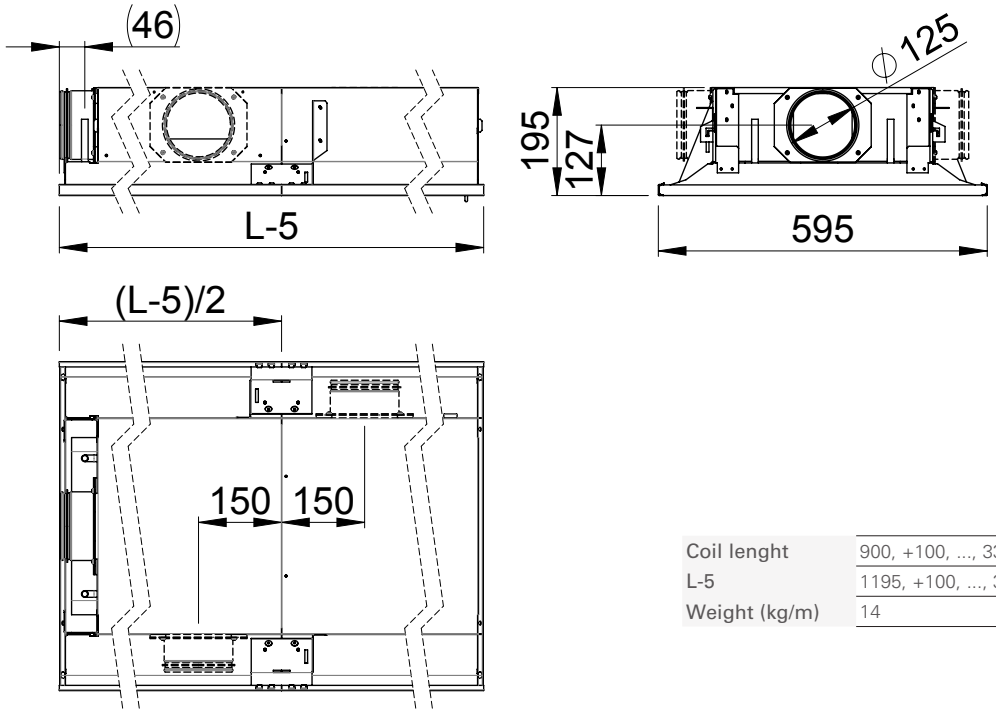
The supply air enters the plenum of the active chilled beam, from which it is diffused into the room through nozzles and the supply slot located on the top of the beam.
The supply air nozzle jets efficiently induce ambient room air, which is then directed horizontally along the ceiling surface. The secondary air is drawn through the perforation located at the bottom of the beam. The air is then cycled through the heat exchanger, where it is either cooled or heated before being diffused into the room.
The cooling capacities of the active chilled beam are controlled by regulating the water flow rate according to the control signal of the room temperature controller.
The Halton CaBeam is designed for exposed installation, recessed or integrated installation.

DIMENSIONS AND WEIGHT

TOTAL LENGHTS 1200 - 2400 MM

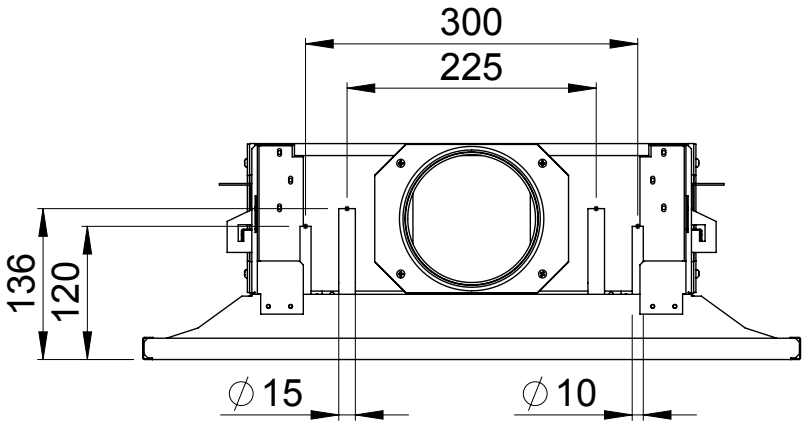


TOTAL LENGHT 2500 - 3600 MM

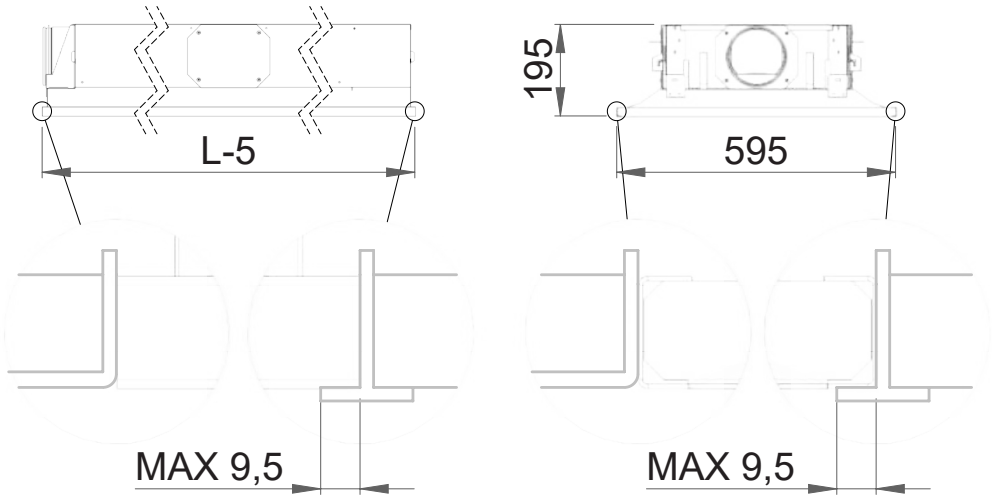


Coil lenght	900, +100, ..., 3300
L-5	1195, +100, ..., 3595 (+1715)
Weight (kg/m)	14

COIL PIPE DIMENSIONS



INTEGRATION WITH SUSPENDED CEILING



ADJUSTMENT

COOLING

The recommended cooling water mass flow rate is 0.02-0.10 kg/s, resulting in a temperature rise of 1-4°C in the heat exchanger. To avoid condensation, the recommended inlet water temperature of the heat exchanger is over 14°C.

HEATING

The heating of the cabin is done by an electric heater in the primary air duct. Heating power in the normal cabin is typically 1-1,2 kW and capillary thermostat with manual reset is in close proximity of heater. Control of heater must be verified because in some cases there has been "leak" in control triac.

HEATING WITH WATER (OPTION)

The recommended heating water mass flow rate is 0.01-0.04 kg/s, resulting in a temperature drop of 5-15°C in the heat exchanger. The maximum recommended temperature of the inlet water for the heat exchanger is 35°C.

BALANCING AND CONTROL OF WATER FLOW RATES

Balance the water flow rates of the chilled beam with adjustment valves installed on the outlet side of the cooling and heating water loops. The cooling capacity and heating capacity of the chilled beam are controlled by regulating the water mass flow rate. The water mass flow rate can be controlled by using an ON/OFF valve or a two- or three-way proportional valve. Valves are not included in the delivery of the beams.

ADJUSTMENT OF SUPPLY AIRFLOW RATE

Connect a manometer in the measurement tap and measure the static pressure in the chilled beam. The airflow rate is calculated according to the formula below.

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

l_{eff} = length of the coil (m)
Δp_m = measured static chamber pressure (Pa)

NOZZLE	k (l/s)	k (m³/h)
A	0,71	2,56
B	0,99	3,56
C	1,36	4,90
D	2,09	7,52
E	3,33	11,99

CONDENSATION PREVENTION

Air relative humidity and temperature will rise radically when the balcony door/window is opened. This could cause condensation on the surface of the beam coil. We are to prevent this undesired condensation by temperately heating the cooling water flow with 3,5 kW heater to raise beam coil surfaces above the dew point. This function is activated by the balcony door switch. Together with heating, the cooling valve is driven toward a closed position. Return water temperature is monitored by a sensor and when it reaches the desired level above the dew point the cooling valve is closed completely to prevent unnecessary heating of the cooling water circuit. When the balcony door remains open the cooling water circuit remains closed and coil surfaces remain above the dew point. The use of the condensation sensor and humidity sensor has been tested.
Relative humidity of air might also rise when the shower is on long periods and the toilet locker door is open.

SERVICING

CODE DESCRIPTION FOR RECESSED CABEAM

1. Front panel
2. Casing
3. Supply air connection
4. Heat exchanger
5. Halton Air Quality control (HAQ)

ACCESSORIES

COMMUNICATION ADAPTER

- Bluetooth communication to an external device
- For wireless connection to set cabin unit parameters and troubleshooting NETWORK ADAPTERS
- Network adapter (also available as Wi-Fi) expands a stand-alone unit to network compatible unit (LON or Ethernet networks)
- Enables supervision and advanced energy efficiency functions

CONTROL PANEL FEATURES

- Halton CaBeam systems are available with several different control panel combinations with push buttons, LED bar graphs and LCD-display with or without an integrated key card

COMMON FEATURES

- Balcony door and key card switch available as an option
- Cabin temperature measurement
- Connector for Bluetooth / communication adapter to set cabin parameters
- Software for parameter setting and troubleshooting
- Different colour options and custom labelling available as an option
- Delivered with IC-Cable (interconnection cable)
    - For control panel - control unit connection
    - Prefabricated with plugs on both ends
    - Cable plug on panel side is designed to be pulled through standard installation pipe
    - Halogen-free and flame-retardant
    - Standard length 7 meters

CONTROL PANEL WITH PUSH BUTTONS

- Temperature adjustment by buttons
- Self-diagnose function
- LCD intensity control and auto dimming
- Display for actual and setpoint temperatures available as an option
- Time display available as an option
- A customized background picture available as an option
- Several frame options available

LCD control panel

LCD control panel with push buttons

LCD control panel with push buttons

CONTROL PANEL WITH LCD DISPLAY

- Temperature adjustment by programmable buttons
- Self-diagnose function
- LCD intensity control and auto-dimming
- Display for actual and setpoint temperatures available as an option
- Time display available as an option
- A customized background picture available as an option
- Several frame options available

HALTON CABEAM

Chilled beam for exposed wall installation

For outside cabins

MATERIALS

PART	MATERIAL	FINISHING
Front panel	Pre-painted galvanised steel	Polyester-epoxy-painted White RAL 9003 20% gloss*
Supply air plenum	Galvanised steel	
Brackets	Galvanised steel	
Coil pipes	Copper	
Coil fins	Aluminium	Copper as an option

*) Special colours available

PLEASE NOTE IMPORTANT - TAILORING

The Halton CaBeam units can be tailored to customer demands according to the needed integration and requirements. Dimensions, capacities, and functionality details can be modified to project-specific. An advanced digital room temperature control completes the solution.

APPLICATIONS

The Halton CaBeam units have been specifically designed for silent cabin comfort with sophisticated air treatment and control. The Halton CaBeam is available as an exposed, recessed or integrated installation.
The exposed CaBeam unit is an active chilled beam solution for demanding marine applications. The active chilled beam system employs fins to help heat and cool. The system is effective to the point where outdoor air can be mixed with the indoor air without any traditional air conditioning (such as heating, cooling, humidifying, or dehumidifying), allowing the building/ship to meet its "minimum outdoor air" air quality requirements.
The active chilled beam system requires much less energy to achieve the same heating and cooling effect as a traditional HVAC system.
The beam acts as a radiator chilled by recirculated water. The warm air rises and is cooled by the chilled beam; once it is cooled, the air falls back to the floor, where the cycle starts over. The ventilation air is delivered to the beam by a central air-handling system via ductwork.

SPECIFICATION

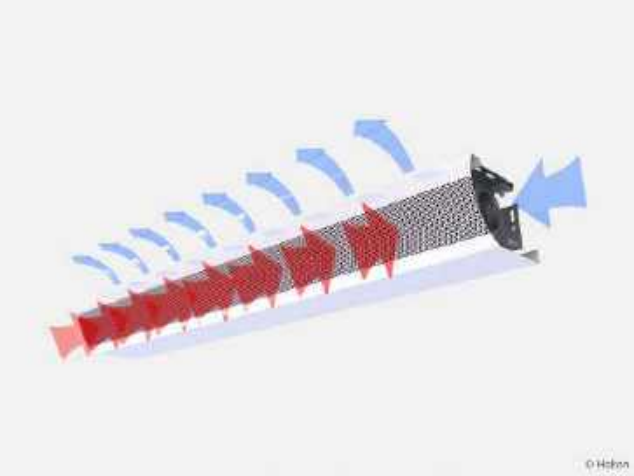
- The active chilled beam has an integral recirculation air path through the perforated front panel
- The front panel is openable from either side to allow general maintenance and cleaning
- The front panel is removable without any special tools
- The supply and return air grilles are openable and removable for maintenance
- The inlet duct connection is modifiable and can be located at the right, left, or middle of the supply-air plenum. When there is an integrated fan, there is no option for a connection in the middle
- The heat exchanger of the beam is oriented such that the water connections can be on either the right or left side of the beam
- All pipes are manufactured from copper, connection pipes with a wall thickness of 0.9–1.0 mm fulfilling the European Standard EN 1057:1996. The fins of the heat exchanger are manufactured from aluminium or copper as an option. The heat exchanger is factory pressure-tested. The maximum operating pressure of chilled/hot water pipework is 1.0 MPa
- The supply air ductwork connection is D125 mm

FEATURES

The cooling philosophy of the beam is based on dry cooling.
Controls and functionality are designed to eliminate the risk of condensation and to provide the highest energy-efficiency possible. Cabin door or openable window can be equipped with switches to indicate an open/close position and connected to the Halton CaBeam automation. The system can communicate with the operating crew for IEQ, as well as, energy-efficiency and is suitable for network communication (selected parameters).

FUNCTION

The supply air enters the plenum of the active chilled beam, from which it is diffused into the room through nozzles and the supply slot located on the top of the beam.
The supply air nozzle jets efficiently induce ambient room air, which is then directed horizontally along the ceiling surface. The secondary air is drawn through the perforation located at the bottom of the beam. The air is then cycled through the heat exchanger, where it is either cooled or heated before being diffused into the room.
The cooling capacities of the active chilled beam are controlled by regulating the water flow rate according to the control signal of the room temperature controller.



INSTALLATION

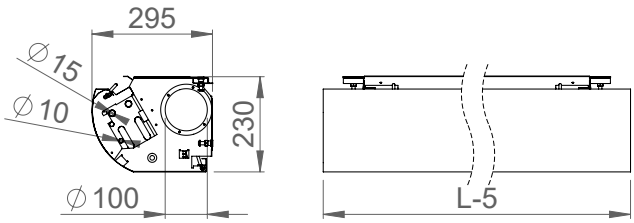
Easy installation can be ensured in a prefabricated cabin. The manufacturing method and innovative, compact design allow units to be modified for any situation.

DESIGN CRITERIA

- Room design temperature 22°C / 50% RH
- Fresh air rate 75 m³/h
  Nozzle pressure 150-200 Pa
- Sensible cooling power 600-1500 W (depending on coil and water parameters)
- Heating power 500-1200 W
- Noise level 25-30 dB(A), boost <35 dB(A)
- Supply and exhaust to design values, 20 dm³/s (75 m³/h)
- Chilled water flow to 0,100 dm³/s (360 dm³/h)
- Chilled water inlet temperature 15°C
- Chilled water outlet temperature 17°C

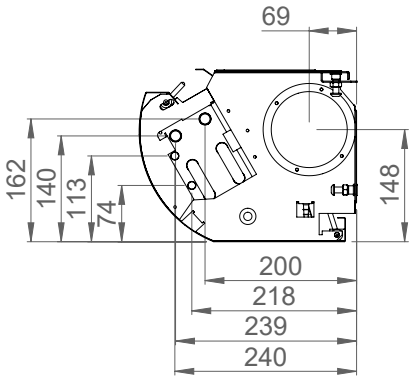
Note: Halton CaBeam systems are not exchangeable with FCU due to differences in the cooling circuit. Halton CaBeam systems take care of air distribution in the cabin as well.

DIMENSIONS AND WEIGHT



Coil length	1500, 1600...4700
L-5	1795, 1895...4995
kg/m	10

LOCATION OF THE PIPE CONNECTIONS



ADJUSTMENT

COOLING

The recommended cooling water mass flow rate is 0.03-0.10 kg/s, resulting in a temperature rise of 1-3°C in the heat exchanger. To avoid condensation, the recommended inlet water temperature of the heat exchanger is over 14°C.

HEATING

The heating of the cabin is done by an electric heater in the primary air duct. Heating power in the normal cabin is typically 1-1,2 kW and capillary thermostat with manual reset is in close proximity of heater. Control of heater must be verified because in some cases there has been "leak" in control triac.

HEATING WITH WATER (OPTION)

The recommended heating water mass flow rate is 0.01-0.04 kg/s, resulting in a temperature drop of 5-15°C in the heat exchanger. The maximum recommended temperature of the inlet water for the heat exchanger is 35°C...45°C.

BALANCING AND CONTROL OF WATER FLOW RATES

Balance the water flow rates of the chilled beam with adjustment valves installed on the outlet side of the cooling and heating water loops. The cooling capacity and heating capacity of the chilled beam are controlled by regulating the water mass flow rate. The water mass flow rate can be controlled by using an ON/OFF valve or a two- or three-way proportional valve. Valves are not included in the delivery of the beams.

ADJUSTMENT OF SUPPLY AIRFLOW RATE

Connect a manometer in the measurement tap and measure the static pressure in the chilled beam. The airflow rate is calculated according to the formula below.

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

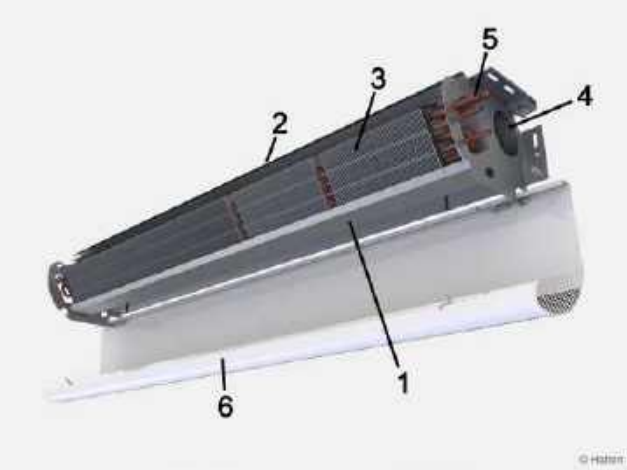
l_{eff} = length of the coil (m)
Δp_m = measured static chamber pressure (Pa)

NOZZLE	k (l/s)	k (m³/h)
A	0,71	2,56
B	0,99	3,56
C	1,36	4,90
D	2,09	7,52
E	3,33	11,99

CONDENSATION PREVENTION

Air relative humidity and temperature will rise radically when the balcony door/window is opened. This could cause condensation on the surface of the beam coil. We are to prevent this undesired condensation by temperately heating the cooling water flow with 3,5 kW heater to raise beam coil surfaces above the dew point. This function is activated by the balcony door switch. Together with heating, the cooling valve is driven toward a closed position. Return water temperature is monitored by a sensor and when it reaches the desired level above the dew point the cooling valve is closed completely to prevent unnecessary heating of the cooling water circuit. When the balcony door remains open the cooling water circuit remains closed and coil surfaces remain above the dew point. The use of the condensation sensor and humidity sensor has been tested.
Relative humidity of air might also rise when the shower is on long periods and the toilet locker door is open.

SERVICING



CODE DESCRIPTION FOR EXPOSED CABEAM

1. Front panel
2. Supply air connection
3. Heat exchanger
4. Female supply air connection
5. Pipe connections
6. Duct cover

ACCESSORIES

COMMUNICATION ADAPTER

- Bluetooth communication to an external device
- For wireless connection to set cabin unit parameters and troubleshooting NETWORK ADAPTERS
- Network adapter (also available as Wi-Fi) expands a stand-alone unit to network compatible unit (LON or Ethernet networks)
- Enables supervision and advanced energy efficiency functions

CONTROL PANEL FEATURES

- Halton CaBeam systems are available with several different control panel combinations with push buttons, LED bar graphs and LCD-display with or without an integrated key card

COMMON FEATURES

- Balcony door and key card switch available as an option
- Cabin temperature measurement
- Connector for Bluetooth / communication adapter to set cabin parameters
- Software for parameter setting and troubleshooting
- Different colour options and custom labelling available as an option
- Delivered with IC-Cable (interconnection cable)
    - For control panel - control unit connection
    - Prefabricated with plugs on both ends
    - Cable plug on panel side is designed to be pulled through standard installation pipe
    - Halogen-free and flame-retardant
    - Standard length 7 meters

CONTROL PANEL WITH PUSH BUTTONS

- Temperature adjustment by buttons
- Self-diagnose function
- LCD intensity control and auto dimming
- Display for actual and setpoint temperatures available as an option
- Time display available as an option
- A customized background picture available as an option
- Several frame options available

LCD control panel

LCD control panel with push buttons

LCD control panel with push buttons

CONTROL PANEL WITH LCD DISPLAY

- Temperature adjustment by programmable buttons
- Self-diagnose function
- LCD intensity control and auto-dimming
- Display for actual and setpoint temperatures available as an option
- Time display available as an option
- A customized background picture available as an option
- Several frame options available

HALTON CABEAM

Chilled beam for integrated installation

Integrated above a closet in crew cabins

MATERIALS

PART	MATERIAL	FINISHING
Return air grille	Pre-painted galvanised steel	Polyester-epoxy-painted White RAL 9003* 20% gloss
Supply air grille	Aluminium	Polyester-epoxy-painted White RAL 9003* 20% gloss
Casing	Galvanised steel	
Supply air plenum	Galvanised steel	
Brackets	Galvanised steel	
Coil pipes	Copper	
Coil fins	Aluminium	Copper as an option

*) Special colours available

PLEASE NOTE IMPORTANT - TAILORING

The Halton CaBeam units can be tailored to customer demands according to the needed integration and requirements. Dimensions, capacities, and functionality details can be modified to project-specific. An advanced digital room temperature control completes the solution.

APPLICATIONS

The Halton CaBeam is a cabin ventilation solution specifically designed for silent cabin comfort with sophisticated air treatment and control. The Halton CaBeam is available as an exposed, recessed or integrated installation.

The integrated CaBeam unit is an active chilled beam solution designed for bulkhead and enclosed installation with return and supply air grilles for demanding marine applications.

The active chilled beam system employs fins to help heat and cool. The system is effective to the point where outdoor air can be mixed with the indoor air without any traditional air conditioning (such as heating, cooling, humidifying, or dehumidifying), allowing the building/ship to meet its "minimum outdoor air" air quality requirements. The active chilled beam system requires much less energy to achieve the same heating and cooling effect as a traditional HVAC system.

The beam acts as a radiator chilled by recirculated water. The warm air rises and is cooled by the chilled beam; once it is cooled, the air falls back to the floor, where the cycle starts over. The ventilation air is delivered to the beam by a central air-handling system via ductwork.

SPECIFICATION

- The supply and return air grilles are openable and removable for maintenance
- The inlet duct connection is modifiable and can be located at the right, left, or middle of the supply-air plenum. When there is an integrated fan, there is no option for a connection in the middle
- The heat exchanger of the beam is oriented such that the water connections can be on either the right or left side of the beam
- All pipes are manufactured from copper, connection pipes with a wall thickness of 0.9–1.0 mm fulfilling the European Standard EN 1057:1996. The fins of the heat exchanger are manufactured from aluminium or copper as an option. The heat exchanger is factory pressure-tested. The maximum operating pressure of chilled/hot water pipework is 1.0 MPa
- The supply air ductwork connection is D125 mm

FEATURES

The cooling philosophy of the beam is based on dry cooling.
Operates as a non-condensing dry system with minimal use of mechanical parts: no mechanical filters, condensation tray, or drainage piping.
Controls and functionality are designed to eliminate the risk of condensation and to provide the highest energy-efficiency possible.
The system can communicate with the operating crew for IEQ, as well as, energy-efficiency and is suitable for network communication (selected parameters).

FUNCTION

The primary supply air enters the plenum of the active chilled beam, from where it is diffused into the room through nozzles and a supply grille on the front side of the beam. The supply air nozzle jets efficiently induce ambient room air through the lower return air grille and the heat exchanger, where it is either cooled or heated. The combined air jet is directed along the ceiling surface. Three different nozzle sizes are available to enable various supply airflow rates. The nozzle plates are inter-changeable to account for layout or room change.

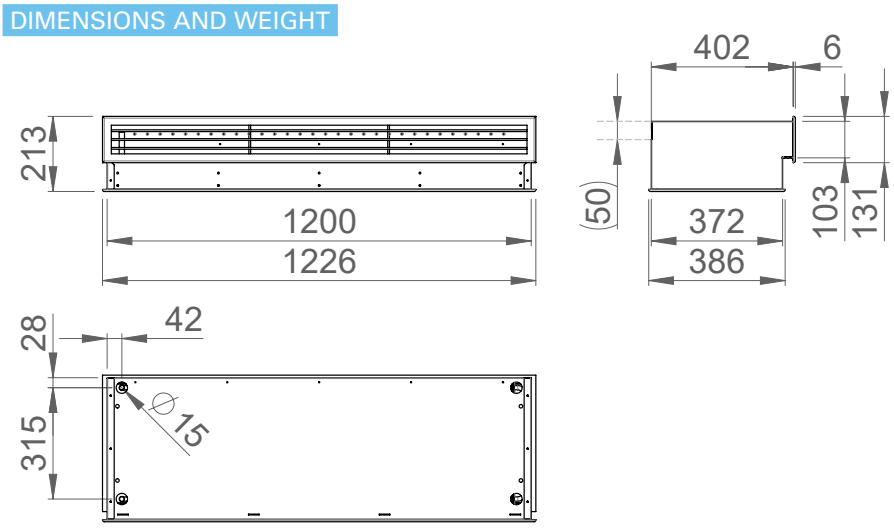
INSTALLATION

Easy installation can be ensured in a prefabricated cabin. The manufacturing method and innovative, compact design allow units to be modified for any situation.

DESIGN CRITERIA

- Room design temperature 24°C / 50% RH
- Fresh air rate 50-75 m^3/h
  Nozzle pressure 150-200 Pa
- Sensible cooling power 300-1500 W
- Heating power 500-1200 W
- Noise level 25-30 dB(A), boost <35 dB(A)
- Supply and exhaust to design values, 14 dm^3/s (50 m^3/h)
- Chilled water flow to 0,100 dm^3/s (360 dm^3/h)
- Chilled water inlet temperature 15°C
- Chilled water outlet temperature 17°C

DIMENSIONS AND WEIGHT



ADJUSTMENT

COOLING

The recommended cooling water mass flow rate is 0.02-0.10 kg/s, resulting in a temperature rise of 1-4°C in the heat exchanger. To avoid condensation, the recommended inlet water temperature of the heat exchanger is over 14-16°C.

HEATING

The heating of the cabin is done by an electric heater in the primary air duct. Heating power in the normal cabin is typically 1-1,2 kW and capillary thermostat with manual reset is in close proximity of heater. Control of heater must be verified because in some cases there has been "leak" in control triac.

HEATING WITH WATER (OPTION)

The recommended heating water mass flow rate is 0.01-0.04 kg/s, resulting in a temperature drop of 5-15°C in the heat exchanger. The recommended temperature of the inlet water for the heat exchanger is 35-40°C.

BALANCING AND CONTROL OF WATER FLOW RATES

Balance the water-flow rates of the chilled beam with the standard control valve by selecting the desired Kvs value in the valve body. When using an automatically balancing combination valve, set the desired water flow rate in the valve body, and verify the pressure difference (min. 16 kPa) across the valve. Regulating the water mass flow rate controls the cooling and heating capacity of the chilled beam.

ADJUSTMENT OF SUPPLY AIRFLOW RATE

Each chilled beam is equipped with a measurement tap for static pressure measurement, which enables fast and accurate measurement of the rate of supply-air flow through the beam. The airflow rate is calculated using the formula.

K value is determined according the table below:

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

K value is determined according the table below:

NOZZLE	WIDTH	k (l/s)	k (m³/h)
A	1000	2,14	7,71
A	1200	2,83	10,20
A	1400	3,59	12.91
B	1000	2,93	10,55
B	1200	3,90	14,06
B	1400	4,97	17,91
C	1000	4,00	14,40
C	1200	5,39	19,41
C	1400	6,94	24,99

SERVICING

CODE DESCRIPTION

1. Return air grille
2. Supply air grille
3. Supply air connection
4. Chilled water pope connections

Open the return air grille of the chilled beam. Clean the finned coils of the heat exchanger with a vacuum cleaner, taking care not to damage the finned coils. Clean the return and supply air grilles with a damp cloth. Check at regular intervals that the actuators and water-flow control valves are working.

ACCESSORIES

COMMUNICATION ADAPTER

- Bluetooth communication to an external device
- For wireless connection to set cabin unit parameters and troubleshooting NETWORK ADAPTERS
- Network adapter (also available as Wi-Fi) expands a stand-alone unit to network compatible unit (LON or Ethernet networks)
- Enables supervision and advanced energy efficiency functions

CONTROL PANEL FEATURES

- Halton CaBeam systems are available with several different control panel combinations with push buttons, LED bar graphs and LCD-display with or without an integrated key card

COMMON FEATURES

- Balcony door and key card switch available as an option
- Cabin temperature measurement
- Connector for Bluetooth / communication adapter to set cabin parameters
- Software for parameter setting and troubleshooting
- Different colour options and custom labelling available as an option
- Delivered with IC-Cable (interconnection cable)
    - For control panel - control unit connection
    - Prefabricated with plugs on both ends
    - Cable plug on panel side is designed to be pulled through standard installation pipe
    - Halogen-free and flame-retardant
    - Standard length 7 meters

CONTROL PANEL WITH PUSH BUTTONS

- Temperature adjustment by buttons
- Self-diagnose function
- LCD intensity control and auto dimming
- Display for actual and setpoint temperatures available as an option
- Time display available as an option
- A customized background picture available as an option
- Several frame options available

LCD control panel

LCD control panel with push buttons

LCD control panel with push buttons

CONTROL PANEL WITH LCD DISPLAY

- Temperature adjustment by programmable buttons
- Self-diagnose function
- LCD intensity control and auto-dimming
- Display for actual and setpoint temperatures available as an option
- Time display available as an option
- A customized background picture available as an option
- Several frame options available

HMF SINGLE DUCT CABIN UNIT

For passenger and crew cabins

MATERIALS

PART	MATERIAL	NOTE
Casing	Hot galvanized steel	Available as an option: stainless steel EN 1.4404 (AISI316L)
Casing thickness	0,5 mm	As an option: 0,75/1,0 mm
Spigots	Hot galvanized steel and EPDM rubber	Available as an option: stainless steel EN 1.4404 (AISI316L)
Insulation	Mineral wool, s=20 mm, MED approved	As an option: s=25 mm
I/O unit	Aluminium / plastic / electronics	-
Reheat coil	Stainless steel EN 1.4301 (AISI304)	-
Cables	Halogen free	
Airflow measurement probes and tubes	Aluminium / polyurethane	-

HMF PRODUCT OPTIONS

- Pressure independent model (VAV/CAV)
- Pressure dependent model (VAV)
- Inputs for external switches such as balcony door and key card switches available as an option
- Network compatible with adapter for advanced energy efficiency and supervision system available as an option
- Energy efficiency functions to reduce unnecessary cooling / heating costs available as an option

AVAILABLE REHEATERS

- Standard reheaters: 400W, 800W, 400+800W, 1200W, 1500W, 1800W
- Offshore reheaters: 400W, 800W, 1200W, 1600W (surface temperature below 90°C on operating airflow)

Practical power level may be software adjusted cabin by cabin. Cable and power supply design has to be done according to maximum available heating power.

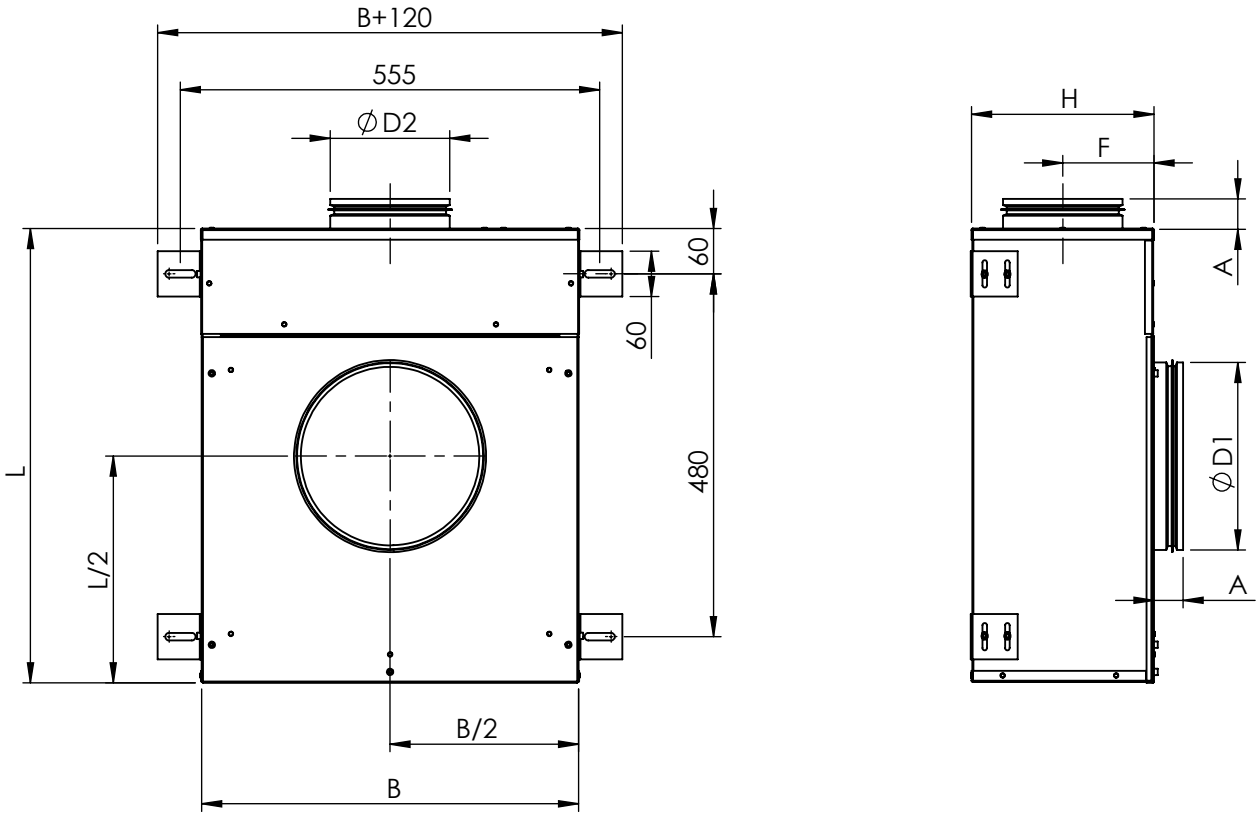
APPLICATIONS

Halton HMF is pressure independent (VAV/CAV) or pressure dependent (VAV) single duct cabin unit with intergrated reheater. Pressure independent VAV or CAV operation is facilitated by continuous airflow measurement and damper regulation by intelligent controller. Pressure independent HMF adapts to variations in supply ductwork pressure levels and maintains individual fresh supply airflow rate to each cabin. Pressure dependent VAV operation is facilitated only by damper regulation by intelligent controller. Pressure dependent HMF adapts to room temperature changes by regulating airflow between pre-set minimum and maximum damper positions.

FEATURES

- Pressure range from 200 Pa up to 1000 Pa
- Airflow range 120 m3/h...500 m3/h
- 230 VAC ±10%, 50/60 Hz
- Inbuilt airflow measurement (pressure independent models)
- Damper min. / max. position settings (pressure dependent models)
- Triac controlled reheating coil(s), adjustable heating power (PWM) 0...100%
- Master/slave functionality: several cabin units can be controlled by one control panel
- Internal fuses included
- All parameters can be set onsite during commissioning by external device or preset at the factory
- All cable connections with fast connectors
- Easily tailored for different types of installations
- 90 °C safety switch with state detection and manual reset
- Minimum flow alarm (pressure independent model) and inbox temperature measurement with overheat limit to cut-off reheater power
- HMF cabin unit is supplied with control panel and interconnection cable
- MED approved for B-0/B-15 installations

GENERAL HMF DRAWINGS



HMF DIMENSIONS, unit material thickness 0.5 mm

	L	B	H	F	A	ØD1 male/female	ØD2 male
HMF-100	590	490	190	83	45	199/201	99
HMF-125	590	490	230	115	45	249/251	124
HMF-160	590	490	230	115	45	249/251	159

Note: male connection: outer dimension, female connection: inner dimensions. Note: Standard dimensions, modifications possible

HMF DIMENSIONS, unit material thickness 0.75/1.0 mm

	L	B	H	F	A	ØD1 male/female	ØD2 male
HMF-100	600	500	200	88	40	199/201	99
HMF-125	600	500	240	120	40	249/251	124
HMF-160	600	500	240	120	40	249/251	159

Note: male connection: outer dimension, female connection: inner dimensions. Note: Standard dimensions, modifications possible

HMF WEIGHTS, KG

Casing thickness	HMF-100	HMF-125
0,5 mm	11	11,5
0,75/1,0 mm	17	18

FUNCTION

Control panel includes also a number of special features such as diagnostics function, room brightness measurement and re-programmability. The power supply and data transfer between cabin unit and control panel is carried out via interconnection cable.Temperature range is software adjustable between 10 and 30°C.

FUNCTION OF VAV UNIT

When passenger demands lower temperature by using control panel unit, the damper opens in order to increase the flow of cold air towards the maximum value. When the required temperature in the cabin is achieved, the damper reference is held until the temperature demand changes. In heating mode, the damper restricts the airflow towards its minimum rate, and if the required temperature in the cabin is not thus achieved, the controller activates the electric reheater inside the unit in a stepless manner.

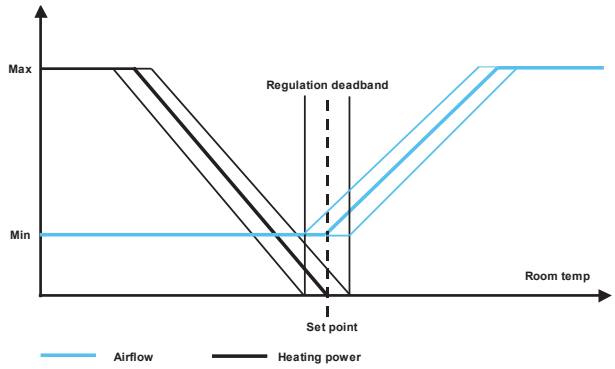
FUNCTION OF CAV UNIT

Airflow is kept in pre-set level in any condition. When passenger demands for a higher temperature by using control panel, the electric reheater inside the cabin unit will be activated in a stepless manner towards to maximum heating capacity or until desired temperature is achieved. When passenger demands for a lower temperature by using control panel, the electric reheater inside the unit will be deactivated in a stepless manner towards to zero heating capacity or until desired temperature is achieved.

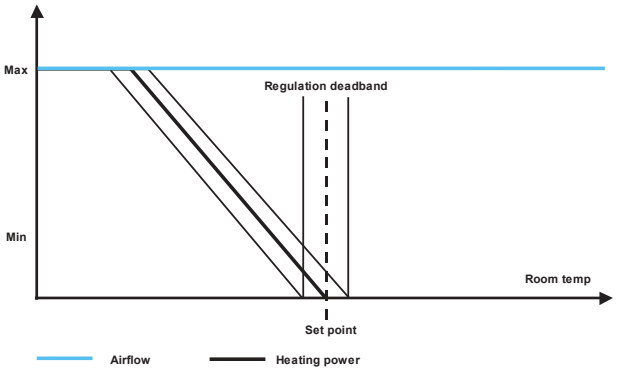
OPERATING RANGE FOR HMF

HMF-100	HMF-125
120 m³/h - 350 m³/h	150 m³/h - 500 m³/h

REGULATION DIAGRAM, VAV



REGULATION DIAGRAM, CAV



CABIN UNIT'S AIRFLOW MEASUREMENT ACCURACY

	AIRFLOW (m³/h)				
	120-150	151-200	201-300	301-400	401-500
Accuracy*	±20%	±15%	±10%	±8%	±6%

* ductwork pressure 200-1000 Pa (optimal)

Note: When comparing airflow measurements between cabin unit and other device, cabin unit's airflow regulation dead-band has to be taken into account (± 10 m³/h).

CONTROL PANEL FEATURES

Halton Marine HMF cabin units are available with three different control panel models; with rotating knob, push buttons with LED bar graph (available as option: IP54) and push buttons with LCD-display (available as option: IP54).

COMMON FEATURES

- Cabin temperature measurement
- Connector for bluetooth / communication adapter to set cabin parameters
- Software for parameter setting and trouble shooting
- Different colour options and custom labeling available as an option
- Delivered with IC-Cable (interconnection cable)
  - For control panel - cabin unit connection
  - Prefabricated with plugs on both ends
  - Cable plug on panel side is designed to be pulled through standard installation pipe
  - Halogen free and flame-retardant
  - Standard length 7 meters. Other lengths available.

CONTROL PANEL WITH ROTATING KNOB

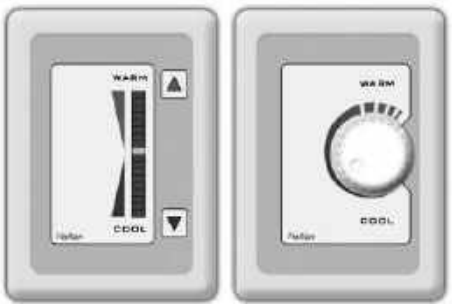
- Temperature adjustment by rotating knob

CONTROL PANEL WITH PUSH BUTTONS AND LED BAR GRAPH

- Temperature adjustment by push buttons
- Self diagnose function
- LED intensity control and auto dimming

CONTROL PANEL WITH PUSH BUTTONS AND LCD-DISPLAY

- Temperature adjustment by buttons
- Self diagnose function
- LCD intensity control and auto dimming
- Display for actual and set point temperatures available as an option
- Time display available as an option
- A customized background picture available as an option
- Several frame options available



Control panel models; push button and rotating knob

LCD control panel

CABIN VENTILATION CONFIGURATION TABLE

	UNIT	HMM	HMM	HME	HME	HMF	HMF	HMF	HFR/M	HFR/M	HFR/M	HMR	HMR	HML
TERMINAL UNIT WITH JUNCTION BOX	CONTROL PACKAGE	K01	D03	K01	D03	M00	M01	M02	M00	M01	M02	D21	H21	B00
	Damper	manual	manual	manual	manual	electric	electric	electric	electric	electric	electric	electric	electric	electric
	Airflow measurement and control (VAV, CAV)	no	no	no	no	yes	no	yes	yes	no	yes	yes	yes	yes
	In-box temperature measurement	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	yes
	Reheater safety switch, manual reset	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	yes
	Safety switch state detection	no	yes	no	yes	yes	yes	yes	yes	yes	yes	no	no	yes
	Spare inputs (balcony door etc.)	no	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Parameter setting by service tool	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
CONTROL PANEL	Cabin temperature measurement	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Controller with push buttons, 18 led bar	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
	Controller with knob	yes	no	yes	no	no	yes	yes	no	yes	yes	no	yes	no
	LCD room thermostat	no	optional	no	optional	optional	no	no	optional	no	no	optional	no	optional
	LED intensity control and auto dimming	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
	Self diagnose functionality	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
	Network compatible with adapter	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	no	yes
	CO2 sensor available as an option	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
CABLES	Interconnection cable	IC4-X	IC6-X	IC4-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X
	Master-Slave cable	MS4-X	MS2-X	MS4-X	MS2-X	MS2-X (MS5-X)	MS3-X	MS3-X	MS2-X (MS5-X)	MS3-X	MS3-X	MS2-X	MS3-X	MS2-X

Please note: HMM and HME units are also available without a control package.

MANUALLY CONTROLLED AIRLOWS

Single duct units; HMM, HME

PRESSURE DEPENDENT UNITS

Single duct units; HMF, HFR/M

PRESSURE INDEPENDENT UNITS

Single duct units; HMF, HFR/M, HML
Dual duct units; HMR

ACCESSORIES FOR HMF CABIN UNITS

MS-CABLE (MASTER-SLAVE CABLE)

- For master cabin unit - slave cabin unit/units connection
- Prefabricated with plugs on both ends
- Halogen free and flame-retardant
- Standard length is 7 meters. Other lengths available as an option.

COMMUNICATION ADAPTER

- Bluetooth communication to external device
- For wireless connection to set cabin unit parameters and trouble shooting

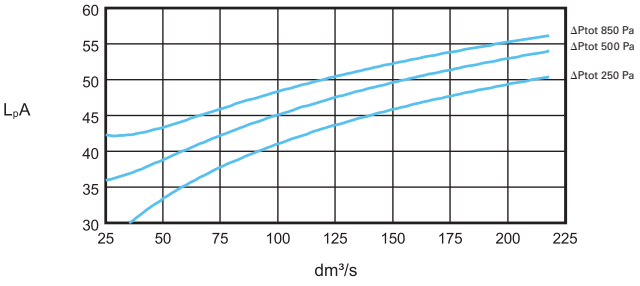
NETWORK ADAPTERS

- Network adapter (also available as WiFi) expands a stand-alone unit to network compatible unit (LON or Ethernet network)
- Enables supervision and advanced energy efficiency functions
- For more information, see Halton Networks for cabin ventilation -brochure or contact Halton Marine Sales office.

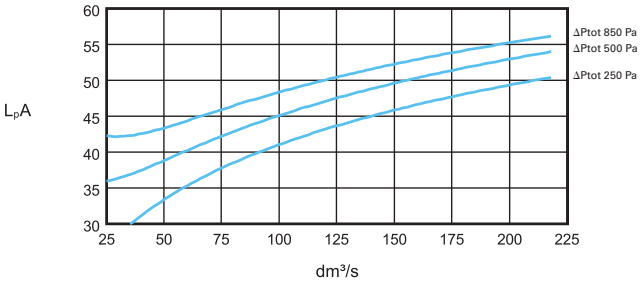
PERFORMANCE DATA

SOUND LEVELS, CABIN SOUND ABSORPTION 4 dB(A)

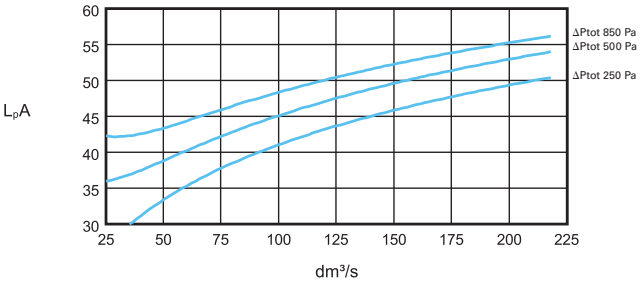
HMF-100-160



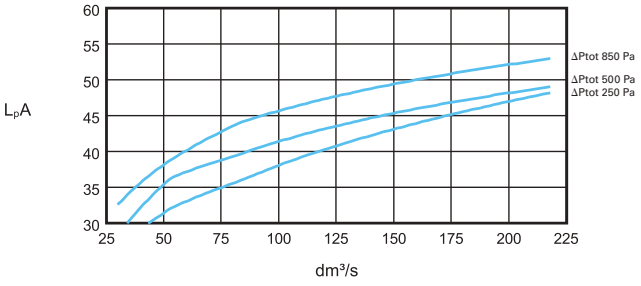
HMF-100-200



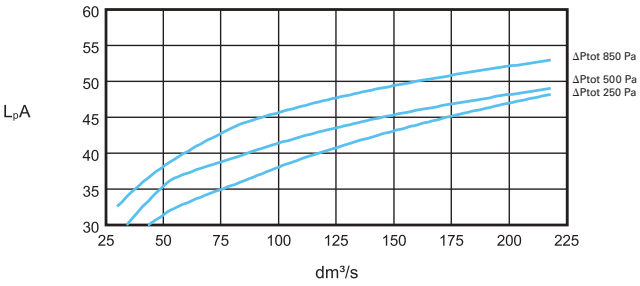
HMF-100-250



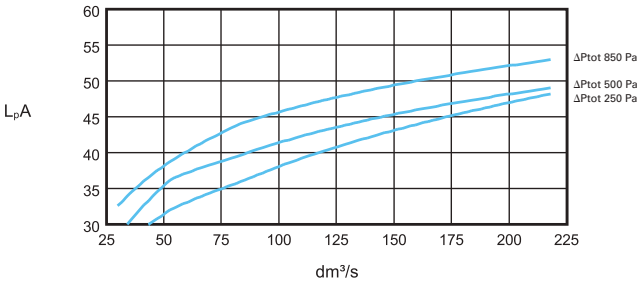
HMF-125-160



HMF-125-200



HMF-125-250



SOUND ATTENUATION (dB)

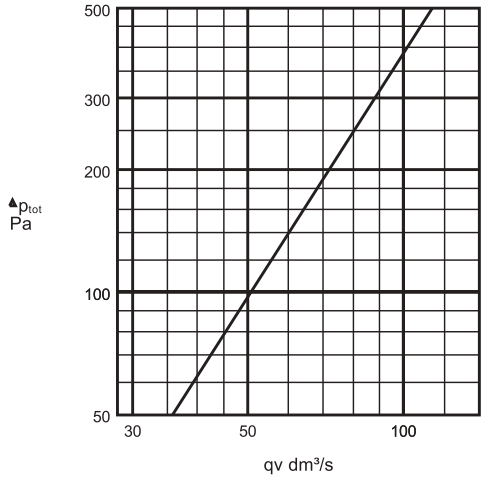
	f(Hz)	63	125	250	500	1000	2000	4000	8000
HMF-100	ΔL(dB)	6,4	11,3	15,9	25,8	34,8	37,9	35,3	34,7
HMF-125	ΔL(dB)	4,9	9,6	16,2	24,9	33,4	36,8	35,4	35,6

ΔL: Sound attenuation not including end reflection

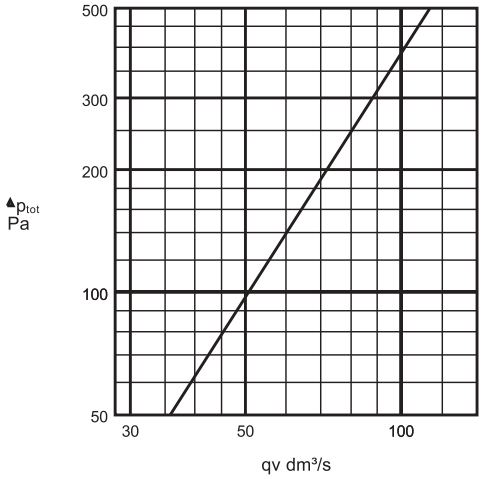
Halton

PRESSURE DROP

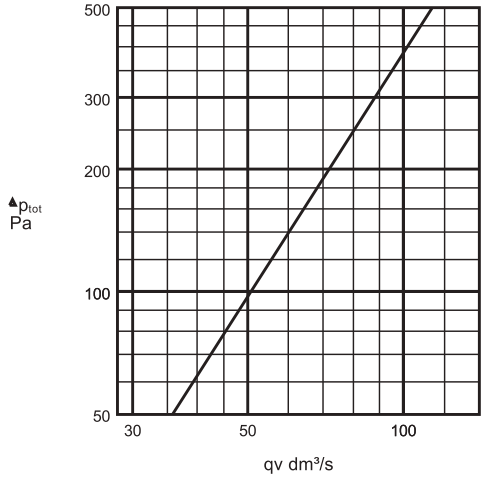
HMF-100-160



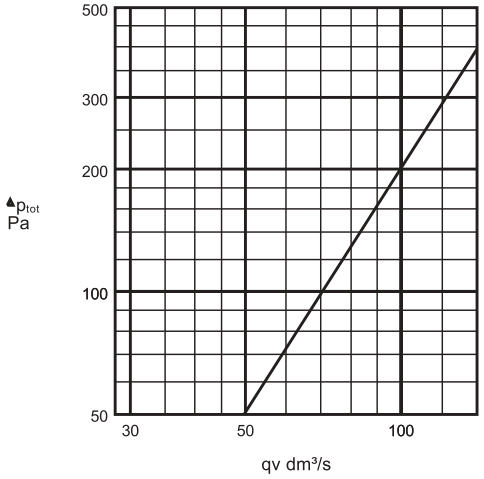
HMF-100-200



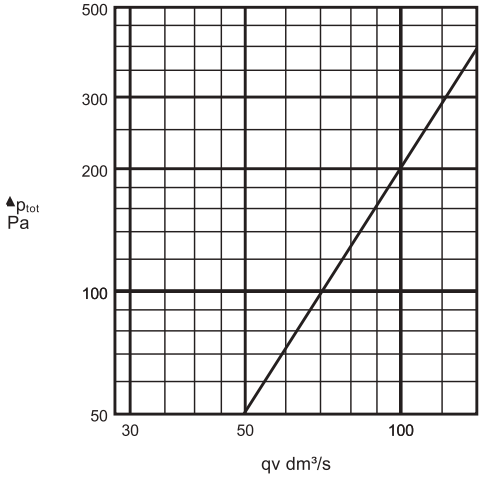
HMF-100-250



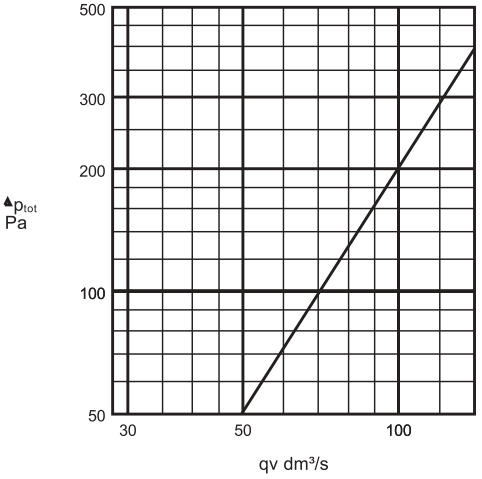
HMF-125-160



HMF-125-200



HMF-125-250



HMR DUAL DUCT CABIN UNIT

For passenger and crew cabins

APPLICATIONS

Halton HMR is pressure independent dual duct cabin unit. The airflow is continuously measured from the warm air spigot, as well as for total air volume. Pressure independent HMR adapts to variations in ductwork pressure and maintains individual conditions in each cabin.

MATERIALS

PART	MATERIAL	NOTE
Casing	Hot galvanized steel	Available as an option: stainless steel EN 1.4404 (AISI316L)
Spigots	Hot galvanized steel and EPDM rubber	Available as an option: stainless steel EN 1.4404 (AISI316L)
Insulation	Mineral wool, s=25 mm, MED approved	-
I/O unit	Aluminium / plastic / electronics	-
Cables	Halogen free	
Airflow measurement probes and tubes	Aluminium / polyurethane	-

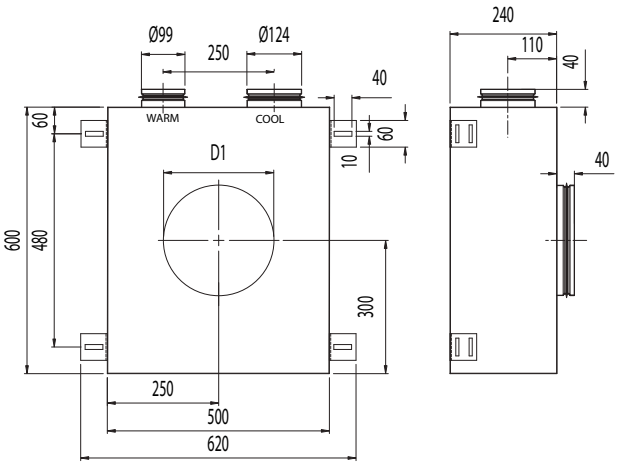
HMR PRODUCT OPTIONS

- Pressure independent model (VAV/CAV)
- Inputs for external switches such as balcony door and key card switches available as an option
- Network compatible with adapter for advanced energy efficiency and supervision system available as an option
- Energy efficiency functions to reduce unnecessary cooling / heating costs available as an option

FEATURES

- Pressure range from 200 Pa up to 1000 Pa
- Airflow range 120 m3/h...400 m3/h
- 230 VAC ±10%%, 50/60 Hz
- Inbuilt airflow measurements
- Master/slave functionality: several cabin units can be controlled by one control panel
- Internal fuse included
- All parameters can be set onsite during commissioning by external device or preset at the factory
- Different regulation principles available according to supply air temperatures (see regulation diagrams)
- HMR cabin unit is supplied with control panel and interconnection cable
- MED approved for B-0/B-15 installations

GENERAL HMR DRAWINGS



HMR DIMENSIONS

	H	ØD1 male/ female	Ø warm duct/ Ø cool duct
HMR-240	240	249/251	99/124

Note: male connection: outer dimension, female connection: inner dimensions

FUNCTION

Control panel includes also a number of special features such as diagnostics function, room brightness measurement and re-programmability. The power supply and data transfer between cabin unit and control panel is carried out via interconnection cable.Temperature range is software adjustable between 10 and 30°C degrees.

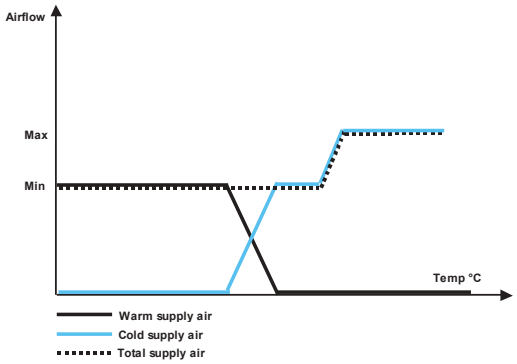
FUNCTION OF VAV UNIT

When passenger demands for a lower temperature, the damper opens the cold air duct in order to increase of flow of cool air towards to maximum setpoint. Simultaneously the damper closes the warm air duct. When the required temperature in the cabin is achieved, the damper references are held until the temperature demand changes. In a heating mode, the operation is reserved.

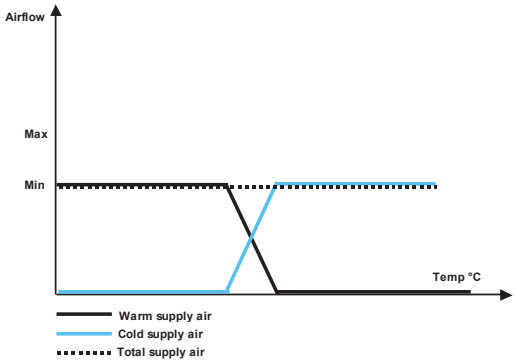
FUNCTION OF CAV UNIT

Airflow is kept in pre-set level in any condition. When passenger demands for a lower temperature by using control panel, the damper opens the cold air duct in order to increase of flow of cool air. Simultaneously the damper closes the warm air duct. When the required temperature in the cabin is achieved, the damper references are held until the temperature demand changes. In a heating mode, the operation is reserved.

REGULATION DIAGRAM, VAV



REGULATION DIAGRAM, CAV



OPERATING RANGE FOR HMR

HMR-240
120 m³/h - 400 m³/h

CABIN UNIT'S AIRFLOW MEASUREMENT ACCURACY

	AIRFLOW (m³/h)			
	120-150	151-200	201-300	301-400
Accuracy*	±20%	±15%	±10%	±8%

* ductwork pressure 200-1000 Pa (optimal)

Note: When comparing airflow measurements between cabin unit and other device, cabin unit's airflow regulation dead-band has to be taken into account (± 10 m³/h).

CONTROL PANEL FEATURES

Halton Marine HMF cabin units are available with three different control panel models; with rotating knob, push buttons with LED bar graph (available as option: IP54) and push buttons with LCD-display (available as option: IP54).

COMMON FEATURES

- Cabin temperature measurement
- Connector for bluetooth / communication adapter to set cabin parameters
- Software for parameter setting and trouble shooting
- Different colour options and custom labeling available as an option
- Delivered with IC-Cable (interconnection cable)
  - For control panel - cabin unit connection
  - Prefabricated with plugs on both ends
  - Cable plug on panel side is designed to be pulled through standard installation pipe
  - Halogen free and flame-retardant
  - Standard length 7 meters. Other lengths available.

CONTROL PANEL WITH ROTATING KNOB

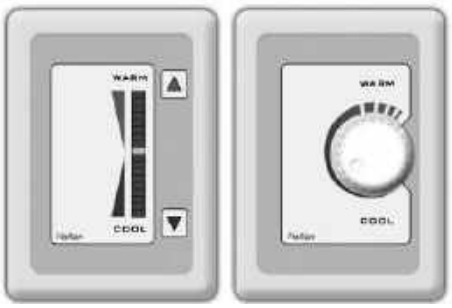
- Temperature adjustment by rotating knob

CONTROL PANEL WITH PUSH BUTTONS AND LED BAR GRAPH

- Temperature adjustment by push buttons
- Self diagnose function
- LED intensity control and auto dimming

CONTROL PANEL WITH PUSH BUTTONS AND LCD-DISPLAY

- Temperature adjustment by buttons
- Self diagnose function
- LCD intensity control and auto dimming
- Display for actual and set point temperatures available as an option
- Time display available as an option
- A customized background picture available as an option
- Several frame options available



Control panel models; push button and rotating knob

LCD control panel

CABIN VENTILATION CONFIGURATION TABLE

	UNIT	HMM	HMM	HME	HME	HMF	HMF	HMF	HFR/M	HFR/M	HFR/M	HMR	HMR	HML
TERMINAL UNIT WITH JUNCTION BOX	CONTROL PACKAGE	K01	D03	K01	D03	M00	M01	M02	M00	M01	M02	D21	H21	B00
	Damper	manual	manual	manual	manual	electric	electric	electric	electric	electric	electric	electric	electric	electric
	Airflow measurement and control (VAV, CAV)	no	no	no	no	yes	no	yes	yes	no	yes	yes	yes	yes
	In-box temperature measurement	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	yes
	Reheater safety switch, manual reset	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	yes
	Safety switch state detection	no	yes	no	yes	yes	yes	yes	yes	yes	yes	no	no	yes
	Spare inputs (balcony door etc.)	no	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Parameter setting by service tool	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
CONTROL PANEL	Cabin temperature measurement	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Controller with push buttons, 18 led bar	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
	Controller with knob	yes	no	yes	no	no	yes	yes	no	yes	yes	no	yes	no
	LCD room thermostat	no	optional	no	optional	optional	no	no	optional	no	no	optional	no	optional
	LED intensity control and auto dimming	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
	Self diagnose functionality	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
	Network compatible with adapter	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	no	yes
	CO2 sensor available as an option	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
CABLES	Interconnection cable	IC4-X	IC6-X	IC4-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X
	Master-Slave cable	MS4-X	MS2-X	MS4-X	MS2-X	MS2-X (MS5-X)	MS3-X	MS3-X	MS2-X (MS5-X)	MS3-X	MS3-X	MS2-X	MS3-X	MS2-X

Please note: HMM and HME units are also available without a control package.

MANUALLY CONTROLLED AIRLOWS

Single duct units; HMM, HME

PRESSURE DEPENDENT UNITS

Single duct units; HMF, HFR/M

PRESSURE INDEPENDENT UNITS

Single duct units; HMF, HFR/M, HML
Dual duct units; HMR

ACCESSORIES FOR HMR CABIN UNITS

MS-CABLE (MASTER-SLAVE CABLE)

- For master cabin unit - slave cabin unit/units connection
- Prefabricated with plugs on both ends
- Halogen free and flame-retardant
- Standard length is 7 meters. Other lengths available as an option.

COMMUNICATION ADAPTER

- Bluetooth communication to external device
- For wireless connection to set cabin unit parameters and trouble shooting

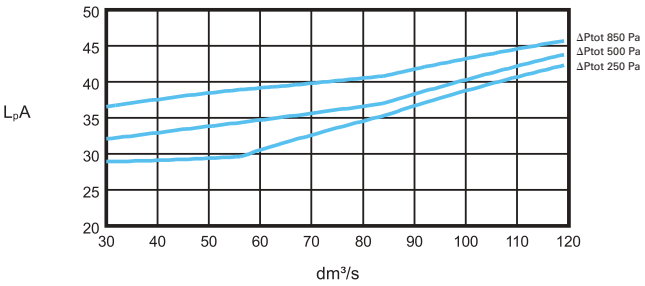
NETWORK ADAPTERS

- Network adapter (also available as WiFi) expands a stand-alone unit to network compatible unit (LON or Ethernet network)
- Enables supervision and advanced energy efficiency functions
- For more information, see Halton Networks for cabin ventilation -brochure or contact Halton Marine Sales office.

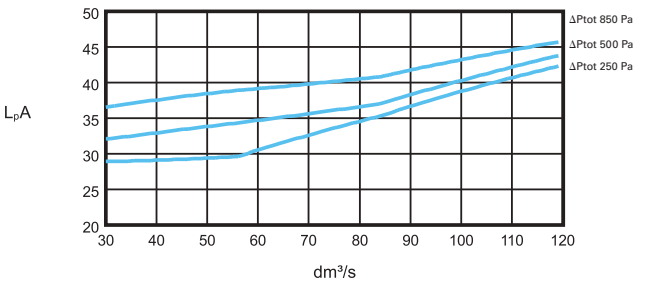
PERFORMANCE DATA

SOUND LEVELS, CABIN SOUND ABSORPTION 4 dB(A)

HMR-100/125-200

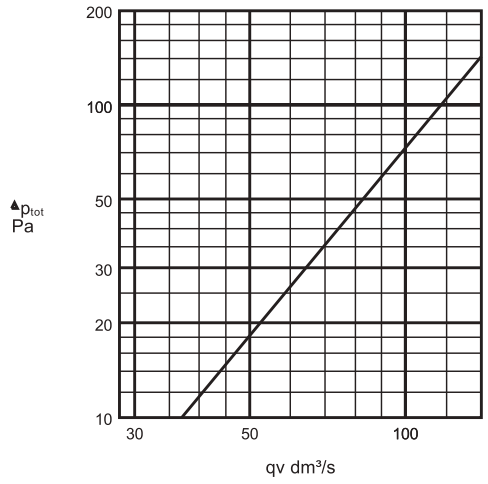


HMR-100/125-250

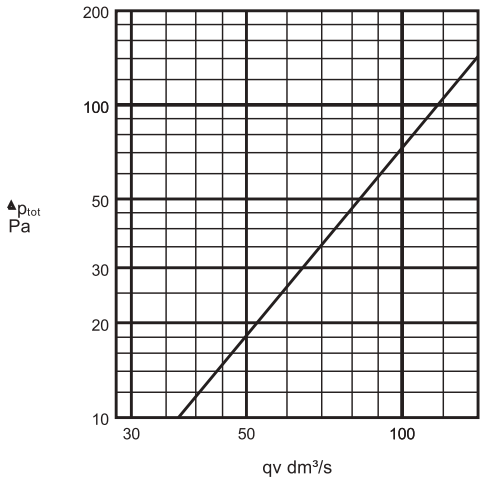


PRESSURE DROP

HMR-100/125-200



HMR-100/125-250



SOUND ATTENUATION (dB)

	f(Hz)	63	125	250	500	1000	2000	4000	8000
HMF-100/125	ΔL(dB)	3,9	8,3	16,9	25,6	35,3	38,6	38,4	37,4

ΔL: Sound attenuation not including end reflection

HFR/M MULTI-CONNECTION CABIN UNIT

For suites and other larger spaces

MATERIALS

PART	MATERIAL	NOTE
Casing	Hot galvanized steel	Available as an option: stainless steel EN 1.4404 (AISI316L)
Spigots	Hot galvanized steel and EPDM rubber	Available as an option: stainless steel EN 1.4404 (AISI316L)
Insulation	Mineral wool, s=25 mm, MED approved	-
I/O unit	Aluminium / plastic / electronics	-
Reheat coil	Stainless steel EN 1.4301 (AISI304)	-
Cables	Halogen-free	
Airflow measurement probes and tubes	Aluminium / polyurethane	-

HFR/M PRODUCT OPTIONS

- Pressure independent model (VAV/CAV)
- Pressure dependent model (VAV)
- Inputs for external switches such as balcony door and key card switches available as an option
- Network compatible with adapter for advanced energy efficiency and supervision system available as an option
- Energy efficiency functions to reduce unnecessary cooling / heating costs available as an option

AVAILABLE REHEATERS

- Standard reheaters: 400W, 800W, 400W+800W, 1200W, 1500W, 1800W
- Offshore reheaters: 400W, 800W, 1200W, 1600W (surface temperature below 90 °C on operating airflow)

Practical power level may be software adjusted cabin by cabin. Cable and power supply design has to be done according to maximum available heating power.

APPLICATIONS

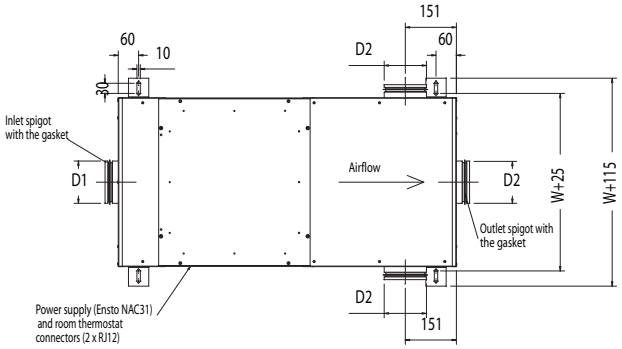
Halton HFR/M is pressure independent or pressure dependent single duct cabin unit with 1-3 outlet connections for terminal units. Pressure independent VAV or CAV operation is facilitated by continuous airflow measurement and damper regulation by intelligent controller. Pressure independent HMF adapts to variations in supply ductwork pressure levels and maintains individual fresh supply airflow rate to each cabin. Pressure dependent VAV operation is facilitated only by damper regulation by intelligent controller. Pressure dependent HMF adapts to room temperature changes by regulating airflow between pre-set minimum and maximum damper positions. Halton HFR/M is an excellent choice for suites, deluxe cabins and office areas where the total airflow needs to be distributed to several points, but controlled centrally with one control panel.

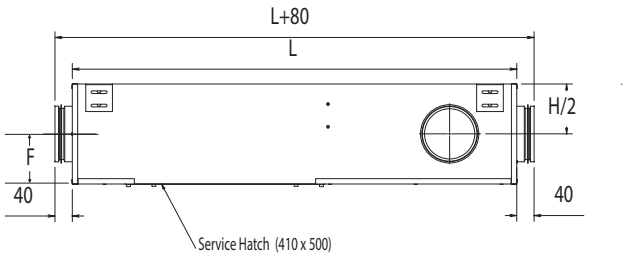
FEATURES

- Pressure range from 200 Pa up to 1000 Pa
- Airflow range 175 m3/h...1000 m3/h
- 230 VAC ±10%, 50/60 Hz
- Inbuilt airflow measurement (pressure independent models)
- Damper min. / max. position settings (pressure dependent models)
- Triac controlled reheating coil(s), adjustable heating power (PWM) 0...100%
- Master/slave functionality: several cabin units can be controlled by one control panel
- Internal fuses included
- All parameters can be set onsite during commissioning by external device or preset at the factory
- All cable connections with fast connectors
- Easily tailored for different types of installations
- 90 °C safety switch with state detection and manual reset
- Minimum flow alarm (pressure independent model) and inbox temperature measurement with overheat limit to cut-off reheater power
- HFR/M cabin unit is supplied with control panel and interconnection cable

Halton

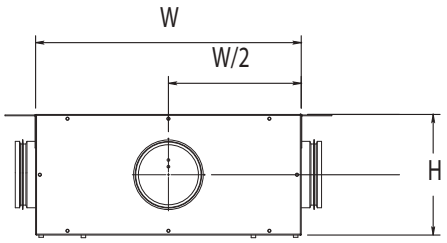
GENERAL HFR/M DRAWINGS





HFR/M DIMENSIONS

	D1/D2 (DN)	L	W	H	F
HFR/M-125	125	1000	500	225	99
HFR/M-160	160	1000	500	250	121
HFR/M-200	200	1000	500	300	136



FUNCTION

Control panel includes also a number of special features such as diagnostics function, room brightness measurement and re-programmability. The power supply and data transfer between cabin unit and control panel is carried out via interconnection cable.Temperature range is software adjustable between 10 and 30°C.

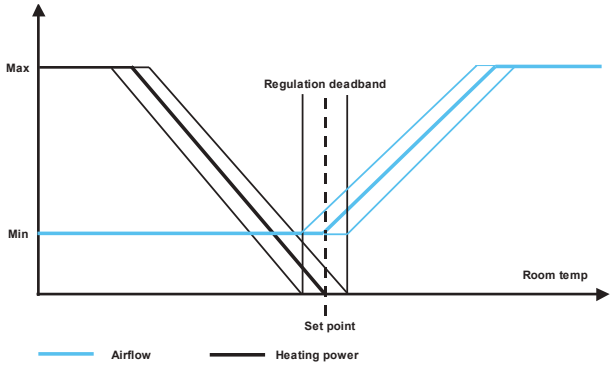
FUNCTION OF VAV UNIT

When passenger demands lower temperature by using control panel unit, the damper opens in order to increase the flow of cold air towards the maximum value. When the required temperature in the cabin is achieved, the damper reference is held until the temperature demand changes. In heating mode, the damper restricts the airflow towards its minimum rate, and if the required temperature in the cabin is not thus achieved, the controller activates the electric reheater inside the unit in a stepless manner.

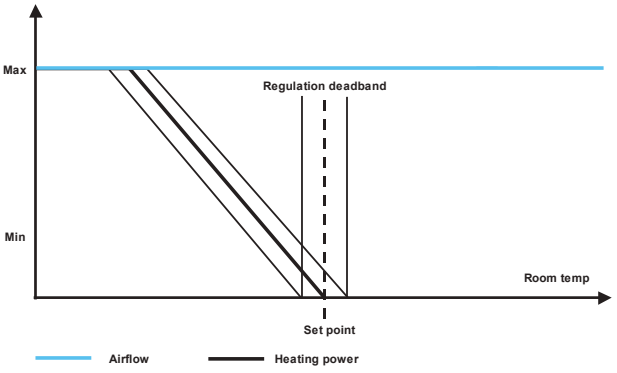
FUNCTION OF CAV UNIT

Airflow is kept in pre-set level in any condition. When passenger demands for a higher temperature by using control panel, the electric reheater inside the cabin unit will be activated in a stepless manner towards to maximum heating capacity or until desired temperature is achieved. When passenger demands for a lower temperature by using control panel, the electric reheater inside the unit will be deactivated in a stepless manner towards to zero heating capacity or until desired temperature is achieved.

REGULATION DIAGRAM, VAV



REGULATION DIAGRAM, CAV



OPERATING RANGE FOR HFR/M

HFR/M-125	HFR/M-160	HFR/M-200
175 m^3/h - 500 m^3/h	250 m^3/h - 800 m^3/h	350 m^3/h - 1000 m^3/h

CABIN UNIT'S AIRFLOW MEASUREMENT ACCURACY

	AIRFLOW (m^3/h)		
	175-300	300-600	600-1000
Accuracy*	±15%	±10%	±8%

* ductwork pressure 200-1000 Pa (optimal)

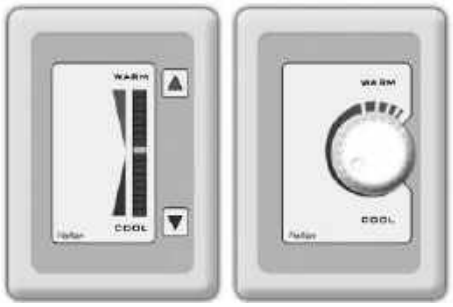
Note: When comparing airflow measurements between cabin unit and other device, cabin unit's airflow regulation dead-band has to be taken into account (± 10 m^3/h).

CONTROL PANEL FEATURES

Halton Marine HFR/M cabin units are available with three different control panel models; with rotating knob, push buttons with LED bar graph (available as option: IP54) and push buttons with LCD-display (available as option: IP54).

COMMON FEATURES

- Cabin temperature measurement
- Connector for bluetooth / communication adapter to set cabin parameters
- Software for parameter setting and trouble shooting
- Different colour options and custom labeling available as an option
- Delivered with IC-Cable (interconnection cable)
  - For control panel - cabin unit connection
  - Prefabricated with plugs on both ends
  - Cable plug on panel side is designed to be pulled through standard installation pipe
  - Halogen free and flame-retardant
  - Standard length 7 meters. Other lengths available.



Control panel models; push button and rotating knob

LCD control panel

CONTROL PANEL WITH ROTATING KNOB

- Temperature adjustment by rotating knob

CONTROL PANEL WITH PUSH BUTTONS AND LED BAR GRAPH

- Temperature adjustment by push buttons
- Self diagnose function
- LED intensity control and auto dimming

CONTROL PANEL WITH PUSH BUTTONS AND LCD-DISPLAY

- Temperature adjustment by buttons
- Self diagnose function
- LCD intensity control and auto dimming
- Display for actual and set point temperatures available as an option
- Time display available as an option
- A customized background picture available as an option
- Several frame options available

CABIN VENTILATION CONFIGURATION TABLE

	UNIT	HMM	HMM	HME	HME	HMF	HMF	HMF	HFR/M	HFR/M	HFR/M	HMR	HMR	HML
TERMINAL UNIT WITH JUNCTION BOX	CONTROL PACKAGE	K01	D03	K01	D03	M00	M01	M02	M00	M01	M02	D21	H21	B00
	Damper	manual	manual	manual	manual	electric	electric	electric	electric	electric	electric	electric	electric	electric
	Airflow measurement and control (VAV, CAV)	no	no	no	no	yes	no	yes	yes	no	yes	yes	yes	yes
	In-box temperature measurement	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	yes
	Reheater safety switch, manual reset	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	yes
	Safety switch state detection	no	yes	no	yes	yes	yes	yes	yes	yes	yes	no	no	yes
	Spare inputs (balcony door etc.)	no	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Parameter setting by service tool	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
CONTROL PANEL	Cabin temperature measurement	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Controller with push buttons, 18 led bar	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
	Controller with knob	yes	no	yes	no	no	yes	yes	no	yes	yes	no	yes	no
	LCD room thermostat	no	optional	no	optional	optional	no	no	optional	no	no	optional	no	optional
	LED intensity control and auto dimming	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
	Self diagnose functionality	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
	Network compatible with adapter	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	no	yes
	CO2 sensor available as an option	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
CABLES	Interconnection cable	IC4-X	IC6-X	IC4-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X
	Master-Slave cable	MS4-X	MS2-X	MS4-X	MS2-X	MS2-X (MS5-X)	MS3-X	MS3-X	MS2-X (MS5-X)	MS3-X	MS3-X	MS2-X	MS3-X	MS2-X

Please note: HMM and HME units are also available without a control package.

MANUALLY CONTROLLED AIRLOWS

Single duct units; HMM, HME

PRESSURE DEPENDENT UNITS

Single duct units; HMF, HFR/M

PRESSURE INDEPENDENT UNITS

Single duct units; HMF, HFR/M, HML
Dual duct units; HMR

ACCESSORIES FOR HFR/M CABIN UNITS

MS-CABLE (MASTER-SLAVE CABLE)

- For master cabin unit - slave cabin unit/units connection
- Prefabricated with plugs on both ends
- Halogen free and flame-retardant
- Standard length is 7 meters. Other lengths available as an option.

COMMUNICATION ADAPTER

- Bluetooth communication to external device
- For wireless connection to set cabin unit parameters and trouble shooting

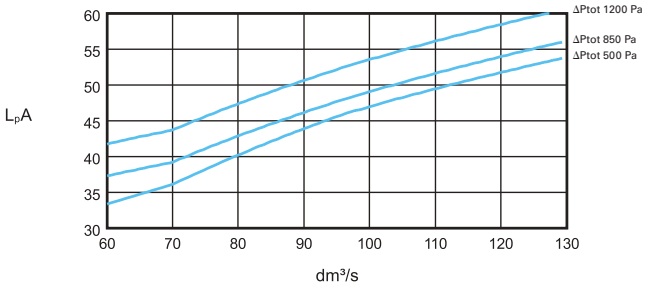
NETWORK ADAPTERS

- Network adapter (also available as WiFi) expands a stand-alone unit to network compatible unit (LON or Ethernet network)
- Enables supervision and advanced energy efficiency functions
- For more information, see Halton Networks for cabin ventilation -brochure or contact Halton Marine Sales office.

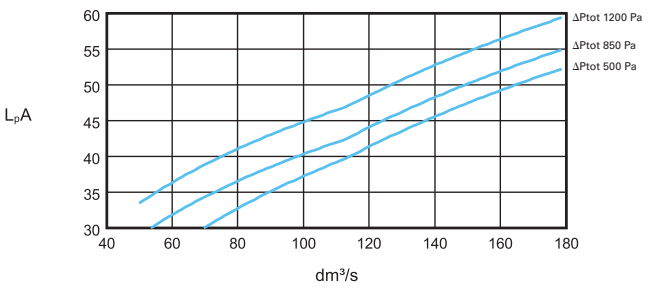
PERFORMANCE DATA

SOUND LEVELS, CABIN SOUND ABSORPTION 4 dB(A)

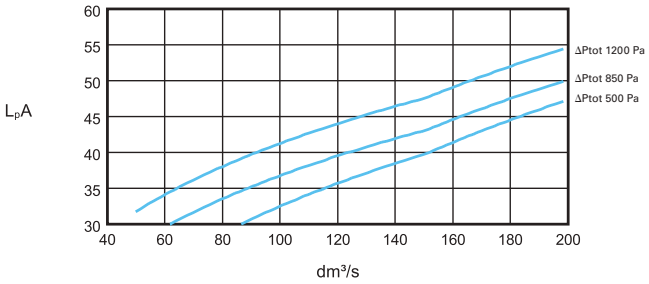
HFR/M-125



HFR/M-160

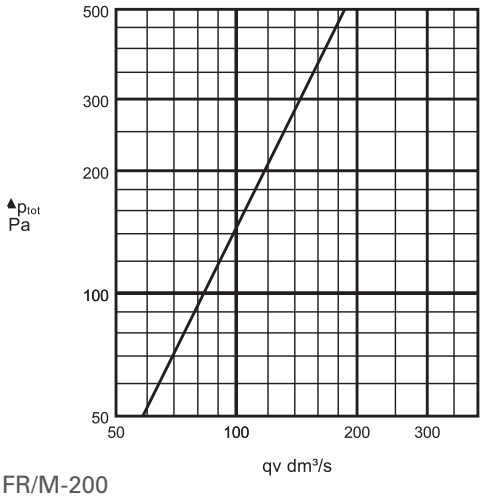


HFR/M-200

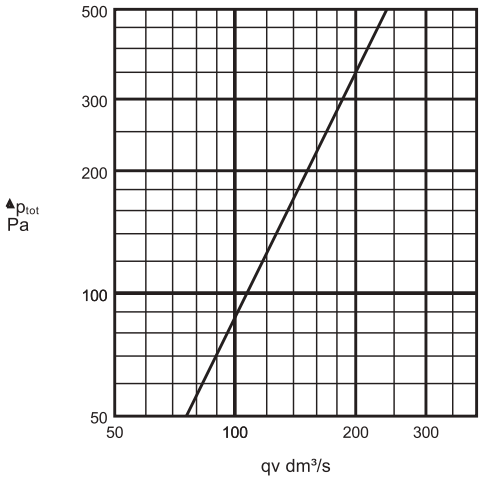


PRESSURE DROP

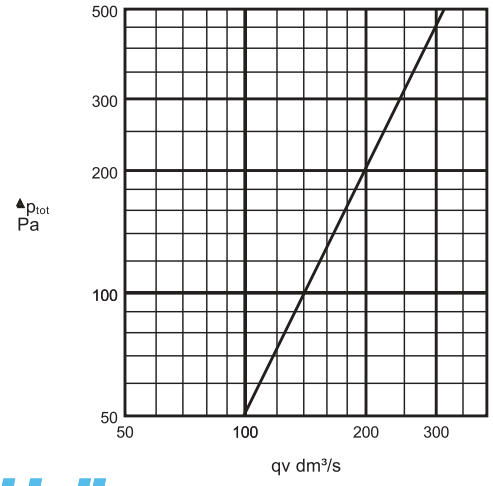
HFR/M-125



HFR/M-160



HFR/M-200



HME SINGLE DUCT CABIN UNIT

Sound attenuator and balancing box

MATERIALS

PART	MATERIAL	NOTE
Casing	Hot galvanized steel	Available as an option: stainless steel EN 1.4404 (AISI316L)
Casing thickness	0,5 mm	As an option: 0,75/1,0 mm
Spigots	Hot galvanized steel and EPDM rubber	Available as an option: stainless steel EN 1.4404 (AISI316L)
Insulation	Mineral wool, s=20 mm, MED approved	As an option s=25 mm
I/O unit	Aluminium / plastic / electronics	-
Reheat coil	Stainless steel EN 1.4301 (AISI304)	-
Cables	Halogen-free	
Measurement and adjustment module (MSM) (supply units)	Body; aluminium, plate; hot galvanized, spindle; stainless steel, tubes; polypropylene	-
Adjustment module (MEM) (exhaust units)	Spindle; stainless steel	-

HME PRODUCT OPTIONS

- For supply (with MSM module)
- For supply with reheater and MSM module
- For exhaust (with MEM module)

AVAILABLE REHEATERS

- Standard reheaters: 400W, 800W, 1200 W, 1500W with K01 control package
- Standard reheaters: 400W, 800W, 1200W, 1500W, 1800W with D03 control package

Practical power level may be software adjusted cabin by cabin. Cable and power supply design has to be done according to maximum available heating power.

APPLICATIONS

Halton HME can be used for air distribution and sound attenuation in various applications such as suites and pantries. The unit operates as a plenum box with a balancing and measurement module inside but also fulfils fire safety requirements as standard cabin unit. The supply volume flow rate is determined during commissioning by using the measurement and adjustment device. The airflow measurement tubes and control spindle can be accessed through the unit's outlet. Using the pressure difference readings between the measurement taps and the k coefficient, the corresponding volume flow rate can be calculated. Rotating the control spindle adjusts the volume flow rate until the desired setting is achieved.

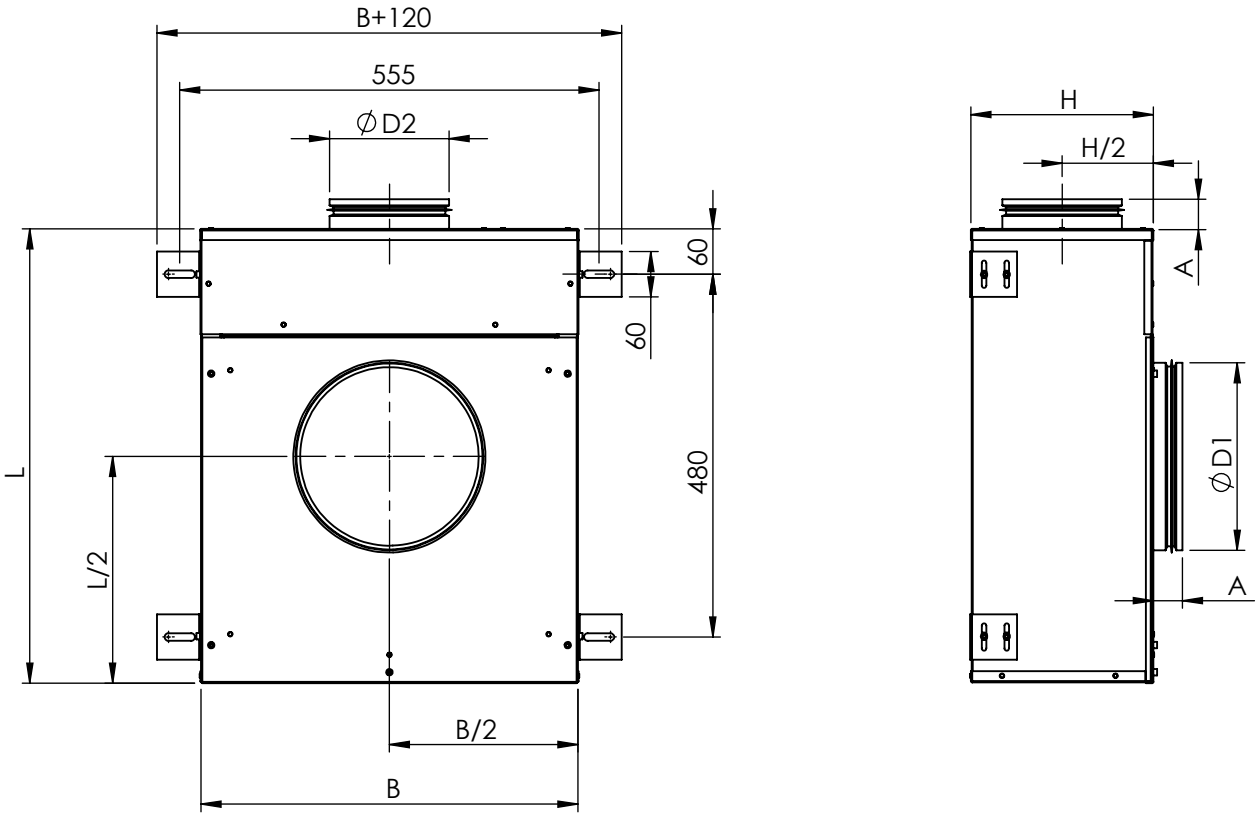
FEATURES

- Recommended pressure range from 0 Pa to 200 Pa
- Airflow range 0 m3/h...500 m3/h
- Excellent choice to be used together with HFR/M
- Airflow adjustment with control spindle (MSM module)
- Airflow measurement tubes
- Can be used also as exhaust plenum with MEM airflow adjustment device
- MED approved for B-0/B-15 installations

FEATURES WITH REHEAT MODELS

- 230 VAC ±10%, 50/60 Hz
- Triac controlled reheating coil(s), adjustable heating power (PWM) 0...100%
- Master/slave functionality: several cabin units can be controlled by one control panel
- Internal fuses included
- All parameters can be set onsite during commissioning by external device or preset at the factory
- All cable connections with fast connectors
- Easily tailored for different types of installations
- 90°C safety switch with state detection and manual reset
- HME cabin unit is supplied with control panel and interconnection cable

GENERAL HME DRAWINGS



HME DIMENSIONS, unit material thickness 0.5 mm

	L	B	H	A	ØD1 male/female	ØD2 male
HME-100	590	490	190	45	159/161	99
HME-125	590	490	190	45	199/201	124
HME-160	590	490	210	45	249/251	159

Note: male connection: outer dimension, female connection: inner dimensions. Note: Standard dimensions, modifications possible

HME DIMENSIONS, unit material thickness 0.75/1.0 mm

	L	B	H	A	ØD1 male/female	ØD2 male
HME-100	600	500	200	40	159/161	99
HME-125	600	500	200	40	199/201	124
HME-160	600	500	220	40	249/251	159

Note: male connection: outer dimension, female connection: inner dimensions. Note: Standard dimensions, modifications possible

HME WEIGHTS, KG

Casing thickness	HME-100	HME-125	HME-160
0,5 mm	9,5	10	10,5
0,75/1,0 mm	13,5	14	14,5

Reheater + I/O unit +1Kg

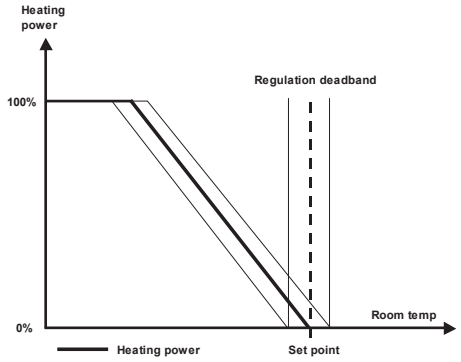
FUNCTION

Correct airflow for HME unit is set during commissioning by adjusting MSM/MEM device in inlet spigot. MSM/MEM is operated by flexible spindle which is easy to access from outlet.

MODELS WITH REHEATER

When passenger demands for warmer temperature by using contol panel, the controller activates the electric reheater inside the cabin unit. When the required temperature in the cabin is achieved, the reference is held until the temperature demand changes.

REGULATION DIAGRAM WITH REHEATER



OPERATING RANGE FOR HME WITHOUT REHEATER

HME-100	HME-125	HME-160
50 m^3/h - 200 m^3/h	50 m^3/h - 350 m^3/h	50 m^3/h - 500 m^3/h

OPERATING RANGE FOR HME WITH REHEATER

HME-100	HME-125	HME-160
100 m^3/h - 200 m^3/h	100 m^3/h - 350 m^3/h	100 m^3/h - 500 m^3/h

CONTROL PANEL FEATURES

Halton Marine HME cabin units are available with three different control panel models; with rotating knob, push buttons with LED bar graph (available as option: IP54) and push buttons with LCD-display (available as option: IP54).

COMMON FEATURES

- Cabin temperature measurement
- Connector for bluetooth / communication adapter to set cabin parameters
- Software for parameter setting and trouble shooting
- Different colour options and custom labeling available as an option
- Delivered with IC-Cable (interconnection cable)
  - For control panel - cabin unit connection
  - Prefabricated with plugs on both ends
  - Cable plug on panel side is designed to be pulled through standard installation pipe
  - Halogen free and flame-retardant
  - Standard length 7 meters. Other lengths available.

CONTROL PANEL WITH ROTATING KNOB

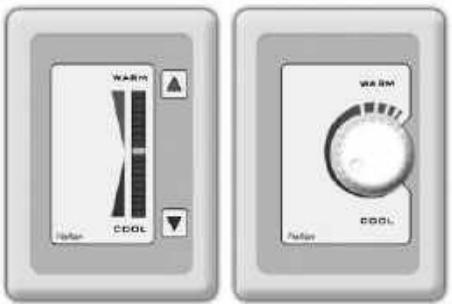
- Temperature adjustment by rotating knob

CONTROL PANEL WITH PUSH BUTTONS AND LED BAR GRAPH

- Temperature adjustment by push buttons
- Self diagnose function
- LED intensity control and auto dimming

CONTROL PANEL WITH PUSH BUTTONS AND LCD-DISPLAY

- Temperature adjustment by buttons
- Self diagnose function
- LCD intensity control and auto dimming
- Display for actual and set point temperatures available as an option
- Time display available as an option
- A customized background picture available as an option
- Several frame options available



Control panel models; push button and rotating knob

LCD control panel

CABIN VENTILATION CONFIGURATION TABLE

	UNIT	HMM	HMM	HME	HME	HMF	HMF	HMF	HFR/M	HFR/M	HFR/M	HMR	HMR	HML
TERMINAL UNIT WITH JUNCTION BOX	CONTROL PACKAGE	K01	D03	K01	D03	M00	M01	M02	M00	M01	M02	D21	H21	B00
	Damper	manual	manual	manual	manual	electric	electric	electric	electric	electric	electric	electric	electric	electric
	Airflow measurement and control (VAV, CAV)	no	no	no	no	yes	no	yes	yes	no	yes	yes	yes	yes
	In-box temperature measurement	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	yes
	Reheater safety switch, manual reset	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	yes
	Safety switch state detection	no	yes	no	yes	yes	yes	yes	yes	yes	yes	no	no	yes
	Spare inputs (balcony door etc.)	no	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Parameter setting by service tool	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
CONTROL PANEL	Cabin temperature measurement	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Controller with push buttons, 18 led bar	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
	Controller with knob	yes	no	yes	no	no	yes	yes	no	yes	yes	no	yes	no
	LCD room thermostat	no	optional	no	optional	optional	no	no	optional	no	no	optional	no	optional
	LED intensity control and auto dimming	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
	Self diagnose functionality	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
	Network compatible with adapter	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	no	yes
	CO2 sensor available as an option	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
CABLES	Interconnection cable	IC4-X	IC6-X	IC4-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X
	Master-Slave cable	MS4-X	MS2-X	MS4-X	MS2-X	MS2-X (MS5-X)	MS3-X	MS3-X	MS2-X (MS5-X)	MS3-X	MS3-X	MS2-X	MS3-X	MS2-X

Please note: HMM and HME units are also available without a control package.

MANUALLY CONTROLLED AIRLOWS

Single duct units; HMM, HME

PRESSURE DEPENDENT UNITS

Single duct units; HMF, HFR/M

PRESSURE INDEPENDENT UNITS

Single duct units; HMF, HFR/M, HML
Dual duct units; HMR

ACCESSORIES FOR HME CABIN UNITS

MS-CABLE (MASTER-SLAVE CABLE)

- For master cabin unit - slave cabin unit/units connection
- Prefabricated with plugs on both ends
- Halogen free and flame-retardant
- Standard length is 7 meters. Other lengths available as an option.

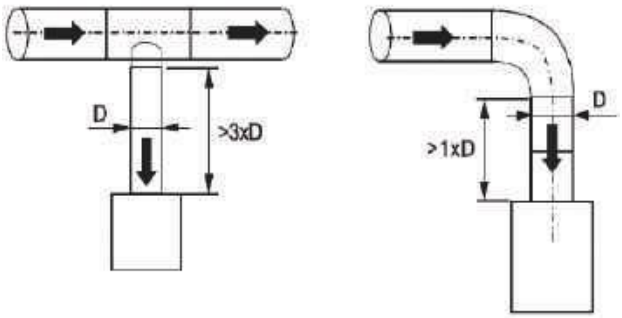
COMMUNICATION ADAPTER

- Bluetooth communication to external device (only with D03 control package)
- For wireless connection to set cabin unit parameters and trouble shooting (only with D03 control package)

NETWORK ADAPTERS (available with D03 control package)

- Network adapter (also available as WiFi) expands a stand-alone unit to network compatible unit (LON or Ethernet network)
- Enables supervision and advanced energy efficiency functions
- For more information, see Halton Networks for cabin ventilation -brochure or contact Halton Marine Sales office.

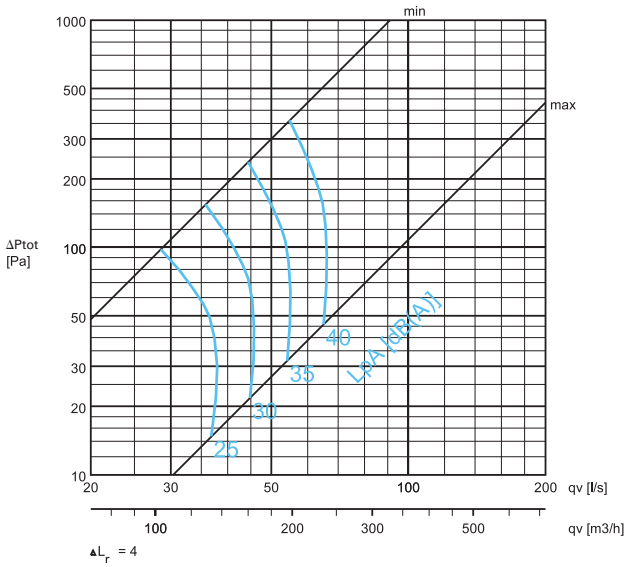
MINIMUM SAFETY DISTANCES BEFORE AIRFLOW MEASUREMENT



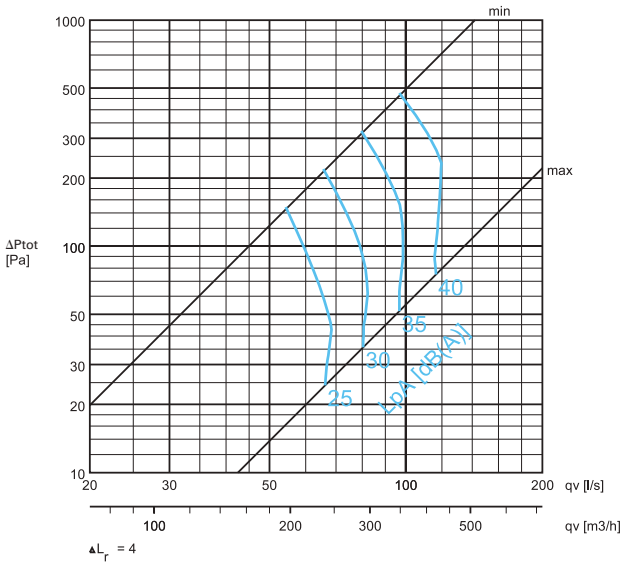
PERFORMANCE DATA

SOUND LEVELS, CABIN SOUND ABSORPTION 4 dB(A)

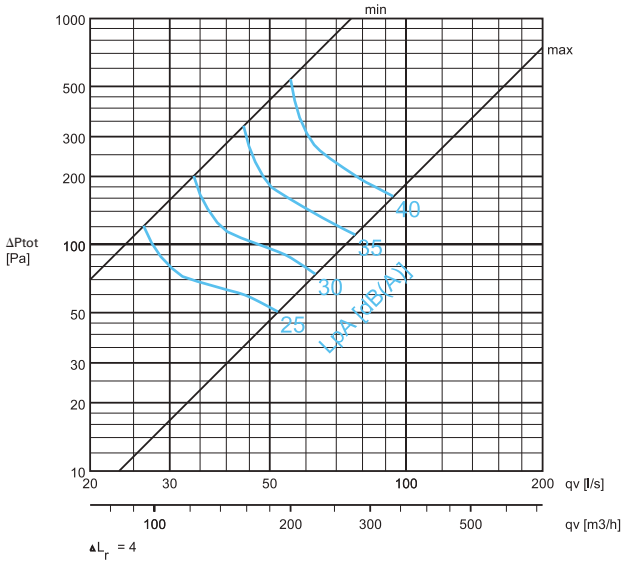
HME/A-125-200



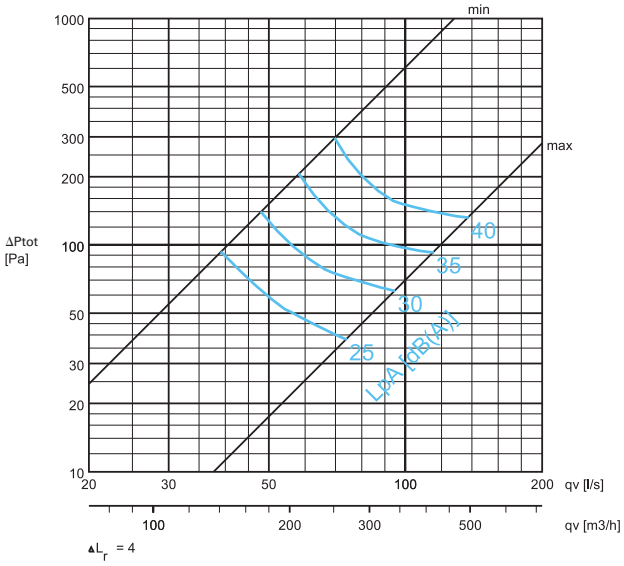
HME/A-160-250



HME/D-125-200



HME/D-160-250



SOUND ATTENUATION (dB)

	f(Hz)	63	125	250	500	1000	2000	4000	8000
HME-125	ΔL(dB)	6,4	11,3	15,9	25,8	34,8	37,9	35,3	34,7
HME-160	ΔL(dB)	7,2	7,2	17,2	26,7	36,4	40,7	38,5	34,3

ΔL: Sound attenuation not including end reflection

HMM SINGLE DUCT CABIN UNIT

For crew cabins, manual model

APPLICATIONS

Halton HMM is a manually operated cabin unit for single duct applications. Airflow is controlled via an adjusting knob installed on the diffuser. The control mechanism has mechanical limits for minimum and maximum airflows. These limits can be easily set during commissioning. HMM is recommended to be used in conjunction with Halton's diffusers, as the mechanism has to be fixed to the diffuser's structure. The airflow is adjusted with diffuser knob. The HMM cabin unit can be supplied with reheater - controlled by a control panel.

MATERIALS

PART	MATERIAL	NOTE
Casing	Hot galvanized steel	Available as an option: stainless steel EN 1.4404 (AISI316L)
Casing thickness	0.5 mm	As an option: 0.75/1.0 mm
Spigots	Hot galvanized steel and EPDM rubber	Available as an option: stainless steel EN 1.4404 (AISI316L)
Insulation	Mineral wool, s=20 mm, MED approved	As an option s=25 mm,
I/O unit	Aluminium / plastic / electronics	-
Reheat coil	Stainless steel EN 1.4301 (AISI304)	-
Cables	Halogen free	
Airflow measurement probes and tubes	Aluminium / polyurethane	-

HMM PRODUCT OPTIONS

- Manual cabin unit without reheater
- Manual cabin unit with reheater
- Network compatible with adapter. Available as an option with D03 control package

AVAILABLE REHEATERS

- Standard reheaters: 400W, 800W, 1200 W, 1500W with K01 control package
- Standard reheaters: 400W, 800W, 1200W, 1500W, 1800W with D03 control package

Practical power level may be software adjusted cabin by cabin. Cable and power supply design has to be done according to maximum available heating power.

FEATURES

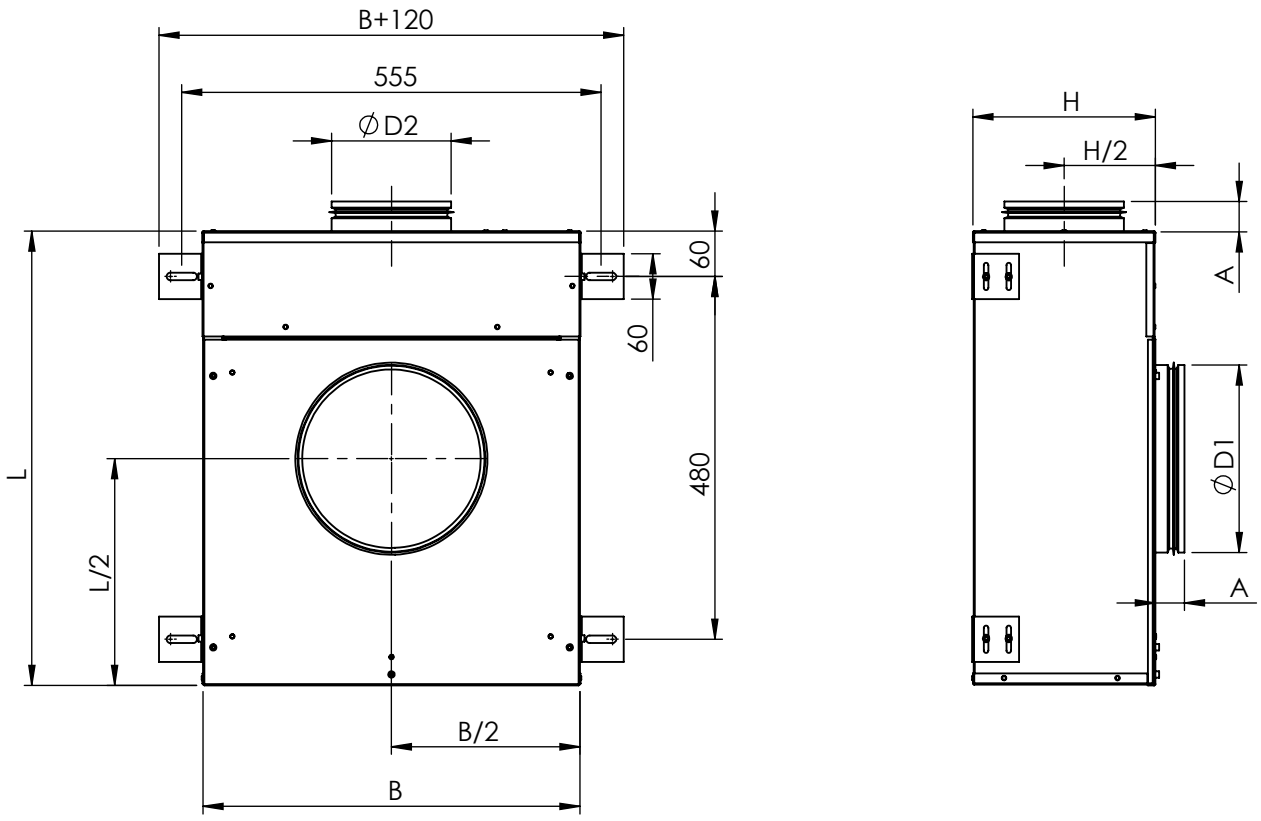
- Pressure range from 50 Pa up to 1000 Pa
- Airflow range 0 m3/h...500 m3/h
- Airflow adjustment with diffuser knob
- Mechanical max./min. airflow limits for easy commissioning
- Airflow measurement probes
- MED approved for B-0 and B-15 installations

FEATURES WITH REHEAT MODELS

- 230 VAC ±10%, 50/60 Hz
- Triac controlled reheating coil(s), adjustable heating power (PWM) 0...100%
- Master/slave functionality: several cabin units can be controlled by one control panel
- Internal fuses included
- All parameters can be set onsite during commissioning by external device or preset at the factory
- All cable connections with fast connectors
- Easily tailored for different types of installations
- 90°C safety switch with state detection and manual reset
- HMM cabin unit is supplied with control panel and interconnection cable

Halton

GENERAL HMM DRAWINGS



HMM DIMENSIONS, unit material thickness 0.5 mm

	L	B	H	A	ØD1 male/female	ØD2 male
HMM-100	590	490	190	45	199/201	99
HMM-125	590	490	230	45	249/251	124
HMM-160	590	490	230	45	249/251	159

Note: male connection: outer dimension, female connection: inner dimensions. Special dimensions available for inlet 80 or 160 and outlet 160, 200 or 250. Sound and pressure drop data is limited for special dimensions.

HMM DIMENSIONS, unit material thickness 0.75/1.0 mm

	L	B	H	A	ØD1 male/female	ØD2 male
HMM-100	600	500	200	40	199/201	99
HMM-125	600	500	240	40	249/251	124
HMM-160	600	500	240	40	249/251	159

Note: male connection: outer dimension, female connection: inner dimensions. Special dimensions available for inlet 80 or 160 and outlet 160, 200 or 250. Sound and pressure drop data is limited for special dimensions.

HMM WEIGHTS, KG

Casing thickness	HMM-100	HMM-125	HMM-160
0.5 mm	10.5	11.5	12
0.75/1.0 mm	15	16	16.5

Reheater + I/O unit +1kg

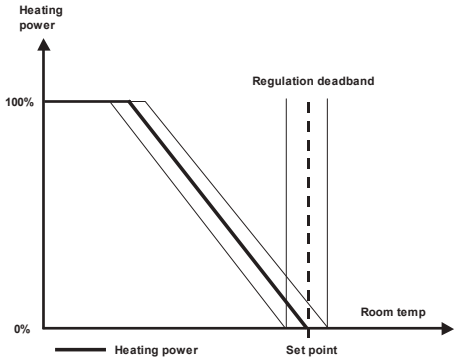
FUNCTION

Airflow is controlled via an adjustment knob between the preset limits.

MODELS WITH REHEATER

When passenger demands for warmer temperature by using control panel, the controller activates the electric reheater inside the cabin unit. When the required temperature in the cabin is achieved, the reference is held until the temperature demand changes.
Mechanical maximum and minimum limits are set during commissioning.

REGULATION DIAGRAM WITH REHEATER



OPERATING RANGE FOR HMM WITHOUT REHEATER

HMM-100	HMM-125	HMM-160
0 m³/h - 350 m³/h	0 m³/h - 500 m³/h	0 m³/h - 500 m³/h

OPERATING RANGE FOR HMM WITH REHEATER

HMM-100	HMM-125	HMM-160
100 m³/h - 350 m³/h	100 m³/h - 500 m³/h	100 m³/h - 500 m³/h

ADJUSTMENT

The supply flow rate is determined by using the measurement probes and manometer.
The diffuser front plate are removed and tubes are passed through the diffuser. Measure the differential pressure with a manometer. The flow rate is calculated using the shown formula. Adjust the minimum airflow rate by rotating the D-shape bar until the desired setting is achieved. Move the minimum airflow mechanical limiter against the stand and tighten socket cap screw. Adjust the maximum airflow rate by rotating the D-shape bar until desired setting is achieved. Move the maximum airflow mechanical limiter against the stand and tighten socket cap screw.

K-FACTORS TABLE

HMM	k
HMM-100	48.2
HMM-125	74.2

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

q_v = airflow (m³/h)
k = k factor
Δp_M = measured pressure (Pa)

CONTROL PANEL FEATURES

Halton Marine HMM cabin units are available with three different control panel models; with rotating knob, push buttons with LED bar graph (available as option: IP54) and push buttons with LCD-display (available as option: IP54).

COMMON FEATURES

- Cabin temperature measurement
- Connector for bluetooth / communication adapter to set cabin parameters
- Software for parameter setting and trouble shooting
- Different colour options and custom labeling available as an option
- Delivered with IC-Cable (interconnection cable)
  - For control panel - cabin unit connection
  - Prefabricated with plugs on both ends
  - Cable plug on panel side is designed to be pulled through standard installation pipe
  - Halogen free and flame-retardant
  - Standard length 7 meters. Other lengths available.

CONTROL PANEL WITH ROTATING KNOB

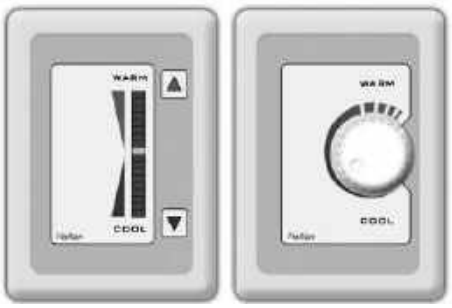
- Temperature adjustment by rotating knob

CONTROL PANEL WITH PUSH BUTTONS AND LED BAR GRAPH

- Temperature adjustment by push buttons
- Self diagnose function
- LED intensity control and auto dimming

CONTROL PANEL WITH PUSH BUTTONS AND LCD-DISPLAY

- Temperature adjustment by buttons
- Self diagnose function
- LCD intensity control and auto dimming
- Display for actual and set point temperatures available as an option
- Time display available as an option
- A customized background picture available as an option
- Several frame options available



Control panel models; push button and rotating knob

LCD control panel

CABIN VENTILATION CONFIGURATION TABLE

	UNIT	HMM	HMM	HME	HME	HMF	HMF	HMF	HFR/M	HFR/M	HFR/M	HMR	HMR	HML
TERMINAL UNIT WITH JUNCTION BOX	CONTROL PACKAGE	K01	D03	K01	D03	M00	M01	M02	M00	M01	M02	D21	H21	B00
	Damper	manual	manual	manual	manual	electric	electric	electric	electric	electric	electric	electric	electric	electric
	Airflow measurement and control (VAV, CAV)	no	no	no	no	yes	no	yes	yes	no	yes	yes	yes	yes
	In-box temperature measurement	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	yes
	Reheater safety switch, manual reset	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	yes
	Safety switch state detection	no	yes	no	yes	yes	yes	yes	yes	yes	yes	no	no	yes
	Spare inputs (balcony door etc.)	no	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Parameter setting by service tool	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
CONTROL PANEL	Cabin temperature measurement	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Controller with push buttons, 18 led bar	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
	Controller with knob	yes	no	yes	no	no	yes	yes	no	yes	yes	no	yes	no
	LCD room thermostat	no	optional	no	optional	optional	no	no	optional	no	no	optional	no	optional
	LED intensity control and auto dimming	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
	Self diagnose functionality	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
	Network compatible with adapter	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	no	yes
	CO2 sensor available as an option	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
CABLES	Interconnection cable	IC4-X	IC6-X	IC4-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X
	Master-Slave cable	MS4-X	MS2-X	MS4-X	MS2-X	MS2-X (MS5-X)	MS3-X	MS3-X	MS2-X (MS5-X)	MS3-X	MS3-X	MS2-X	MS3-X	MS2-X

Please note: HMM and HME units are also available without a control package.

MANUALLY CONTROLLED AIRLOWS

Single duct units; HMM, HME

PRESSURE DEPENDENT UNITS

Single duct units; HMF, HFR/M

PRESSURE INDEPENDENT UNITS

Single duct units; HMF, HFR/M, HML
Dual duct units; HMR

ACCESSORIES FOR HMM CABIN UNITS

MS-CABLE (MASTER-SLAVE CABLE)

- For master cabin unit - slave cabin unit/units connection
- Prefabricated with plugs on both ends
- Halogen free and flame-retardant
- Standard length is 7 meters. Other lengths available as an option.

COMMUNICATION ADAPTER

- Bluetooth communication to external device (only with D03 control package)
- For wireless connection to set cabin unit parameters and trouble shooting (only with D03 control package)

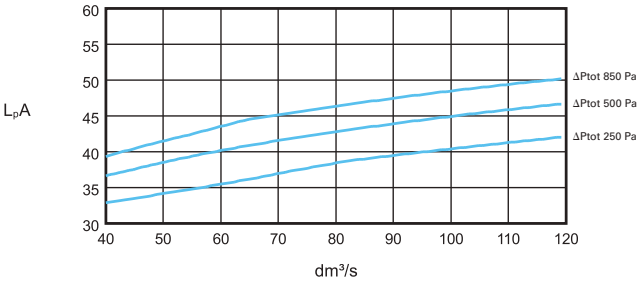
NETWORK ADAPTERS (available with D03 control package)

- Network adapter (also available as WiFi) expands a stand-alone unit to network compatible unit (LON or Ethernet network)
- Enables supervision and advanced energy efficiency functions
- For more information, see Halton Networks for cabin ventilation -brochure or contact Halton Marine Sales office.

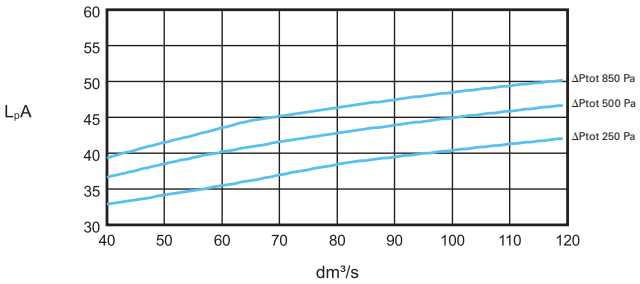
PERFORMANCE DATA

SOUND LEVELS, CABIN SOUND ABSORPTION 4 dB(A)

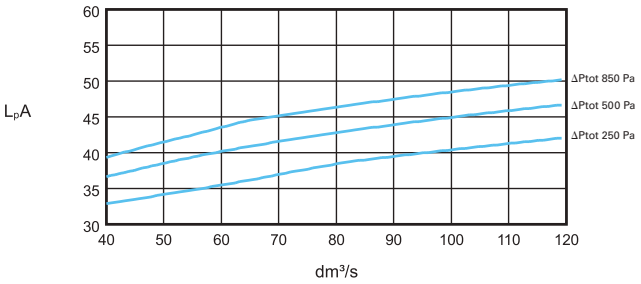
HMM-100-160



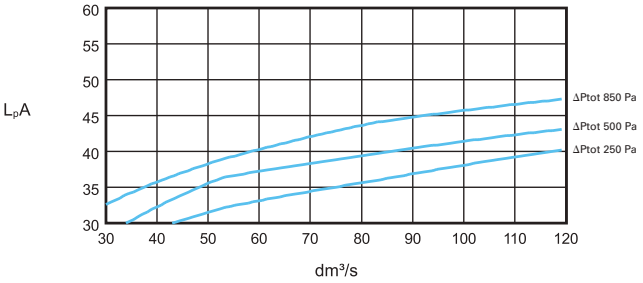
HMM-100-200



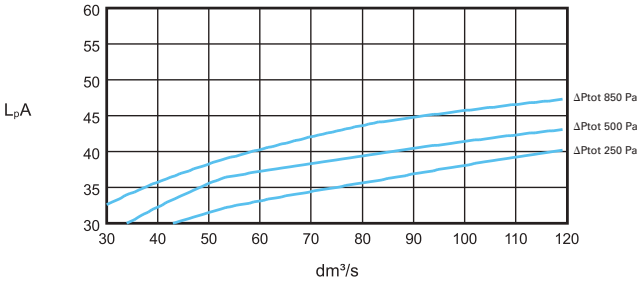
HMM-100-250



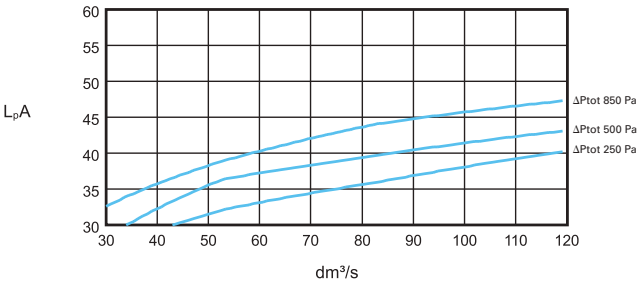
HMM-125-160



HMM-125-200

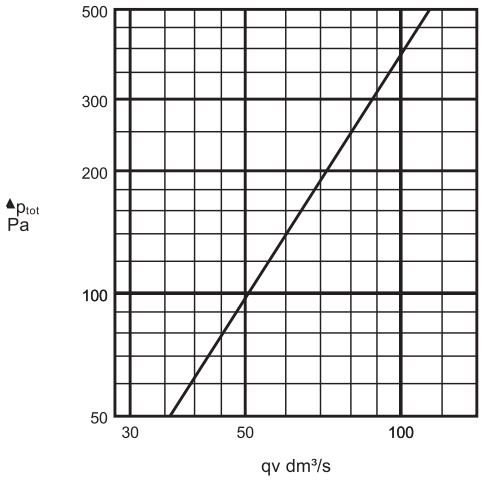


HMM-125-250

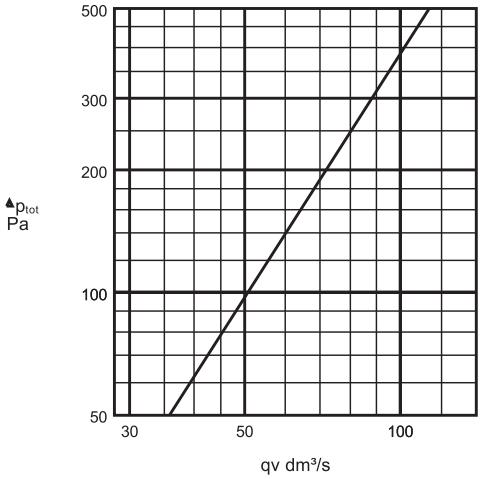


PRESSURE DROP

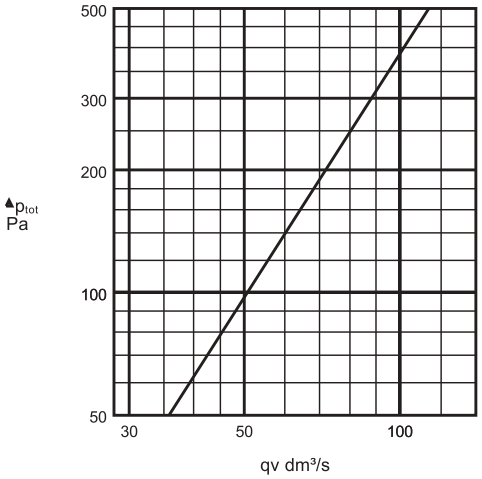
HMM-100-160



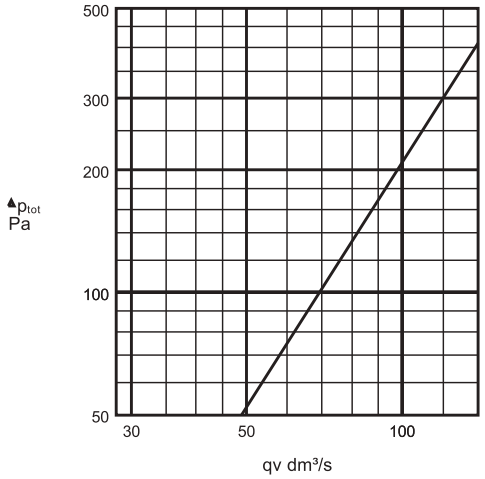
HMM-100-200



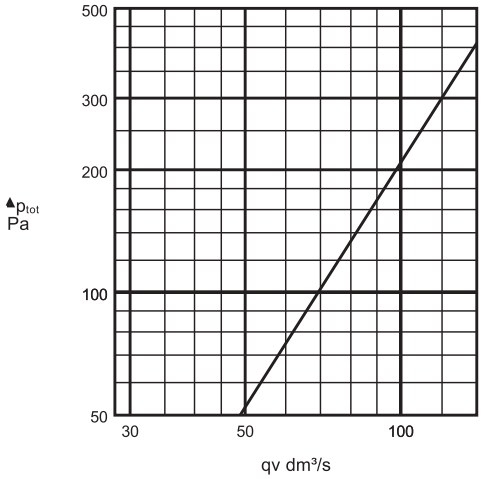
HMM-100-250



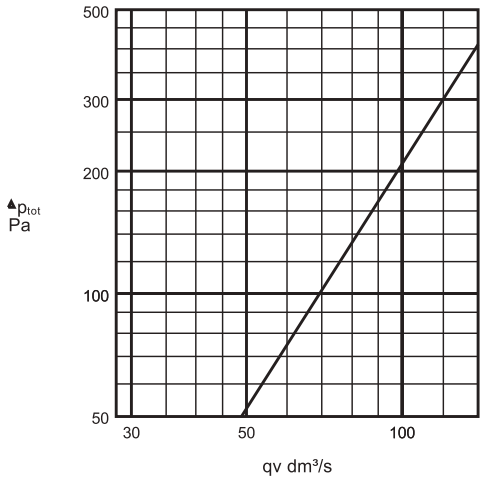
HMM-125-160



HMM-125-200



HMM-125-250



SOUND ATTENUATION (dB)

	f(Hz)	63	125	250	500	1000	2000	4000	8000
HMF-100	ΔL(dB)	6.4	11.3	15.9	25.8	34.8	37.9	35.3	34.7
HMM-125	ΔL(dB)	4.9	9.6	16.2	24.9	33.4	36.8	35.4	35.6

ΔL: Sound attenuation not including end reflection

HMC SINGLE DUCT CABIN UNIT

For crew cabins, manual model

APPLICATIONS

Halton HMC is a manually operated cabin unit for single duct applications. The unit can be installed directly through one ceiling blade (300 mm). Airflow is controlled via an adjusting knob installed through the diffuser. The control mechanism has mechanical limits for minimum and maximum airflows. Airflow limits can be easily set during commissioning. HMC is recommended to be used in conjunction with Halton's TCL diffuser that is specifically designed for HMC cabin unit.

MATERIALS

PART	MATERIAL	NOTE
Casing	Hot galvanized steel	Available as an option: stainless steel EN 1.4404 (AISI316L)
Spigots	Hot galvanized steel and EPDM rubber	Available as an option: stainless steel EN 1.4404 (AISI316L)
Insulation	Mineral wool, s=25 mm, MED approved	-

FEATURES

- Pressure range from 0 Pa...200 Pa
- Airflow range 0 m3/h...180 m3/h
- Airflow adjustment with diffuser knob, painted with the diffuser color
- Mechanical max/min airflow limits for easy commissioning
- Easily tailored for different types of installations
- MED approved for B-0/B-15 installations

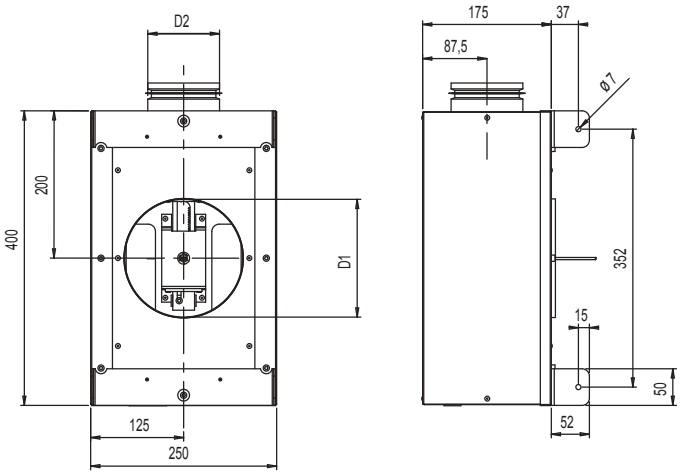
HMC DIMENSIONS AND WEIGHT

	B	L	H	ØD1 male/ female	ØD2 male
HMC	250	400	175	159/161	98

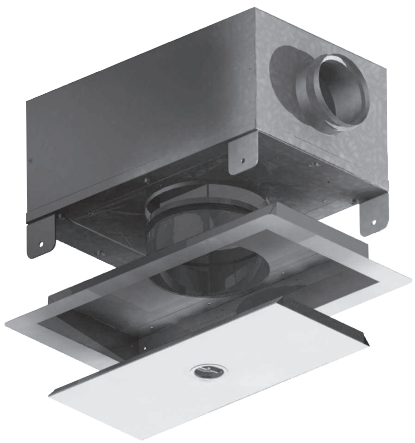
Note: male connection: outer dimension, female connection: inner dimensions

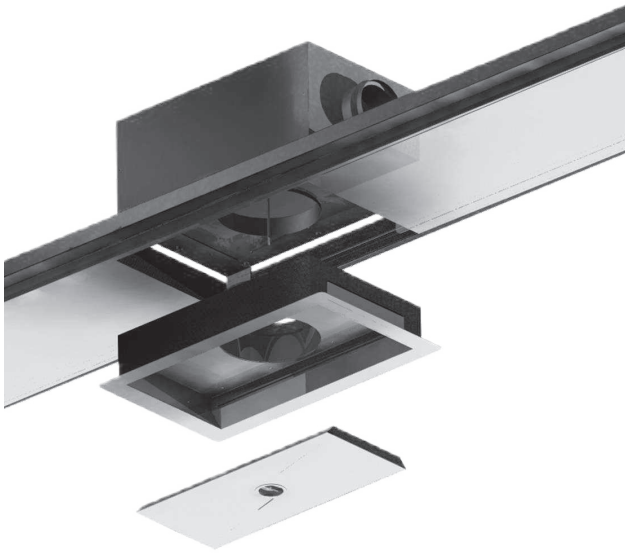
HMC cabin unit without a diffuser weights 6,2 kg.

HMC GENERAL DRAWINGS



MAIN PARTS





FUNCTION

Airflow is controlled via an adjusting knob installed through the diffuser. The control mechanism has mechanical limits for minimum and maximum airflows.

INSTALLATION

HMC can be installed directly through one ceiling blade.

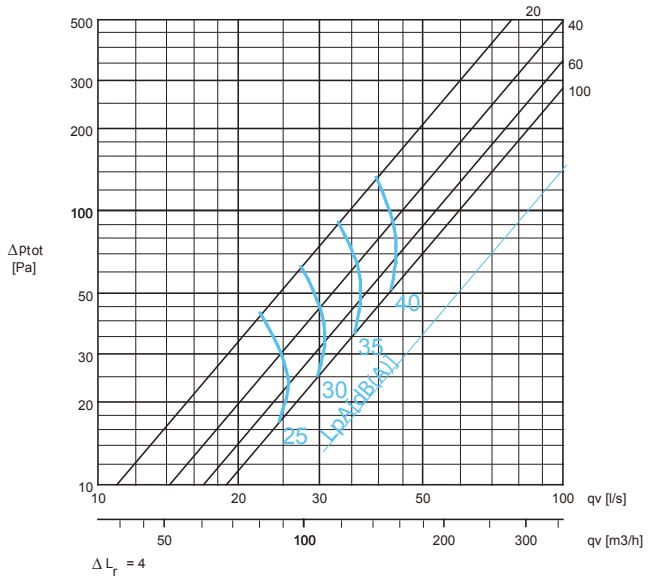
ADJUSTMENT

The supply flow rate is determined by using a hand-held measurement device.
Adjust the minimum airflow rate by rotating the D-shape bar until the desired setting is achieved. Move the minimum airflow mechanical limiter against the stand and tighten socket cap screw. Adjust the maximum airflow rate by rotating the D-shape bar until desired setting is achieved. Move the maximum airflow mechanical limiter against the stand and tighten socket cap screw.

PERFORMANCE DATA

PRESSURE DROP AND SOUND LEVELS (CABIN SOUND ABSORPTION 4 dB(A)

HMC



SOUND ATTENUATION (dB)

	f(Hz)	63	125	250	500	1000	2000	4000	8000
HMC	ΔL(dB)	3,7	4,1	12,4	21,5	23,8	33,4	34,9	35,2

ΔL: Sound attenuation not including end reflection

SOUND ATTENUATION (dB) WITH TCL-160 DIFFUSER

	f(Hz)	63	125	250	500	1000	2000	4000	8000
HMC+TCL	ΔL(dB)	3,7	6,4	16,9	21,7	31,0	41,2	35,7	36,8

ΔL: Sound attenuation not including end reflection

HML AIRFLOW UNIT FOR LARGE VOLUMES

With centralized airflow heating

MATERIALS

PART	MATERIAL	NOTE
Casing	Hot galvanized steel	Available as an option: stainless steel EN 1.4404 (AISI316L)
Insulation	Mineral wool, s=50 mm, MED approved	-
I/O unit	Aluminium / plastic / electronics	-
Reheat coil	Incoloy 800	-
Cables	Halogen-free	
Measurement probes and tubes	Aluminium / polyurethane	-

HML PRODUCT OPTIONS

- VAV or CAV
- Inputs for external switches such as balcony door and key card switches available as an option
- Network compatible with adapter for advanced energy efficiency and supervision system available as an option
- Energy efficiency functions to reduce unnecessary cooling / heating costs available as an option

REHEATER PACKAGE ENCLOSURE

- IP44
- Painted carbon steel

APPLICATIONS

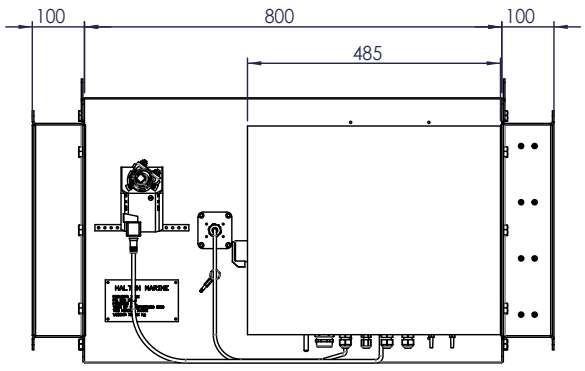
Halton HML is an airlow unit for large air volumes with centralized airflow heating. The unit can be controlled with one control panel. HML VAV/CAV unit offers several regulation options from independent operation system to network applications. This pressure independent product can be equipped with reheater(s) from 900 W up to 30 KW.

FEATURES

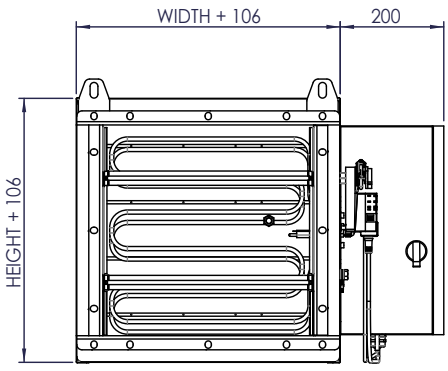
- Pressure range from 100 Pa...1000 Pa
- Air velocity: min. 2.1 m/s, max. 12 m/s
- 230 VAC, 1Ph or 400 VAC, 3 Ph, 50/60 Hz
- Inbuilt airflow measurement
- Triac controlled reheating coil(s), adjustable heating power (PWM) 0...100%
- Master/slave functionality: several cabin units can be controlled by one control panel
- Internal fuses included
- All parameters can be set onsite during commissioning by external device or preset at the factory
- All cable connections with cable glands
- Easily tailored for different types of installations
- 90 °C manual reset safety switch with state detection indication to control panel
- Minimum flow alarm and inbox temperature measurement with overheat limit to cut-off reheater power
- HML airflow unit is supplied with control panel and interconnection cable

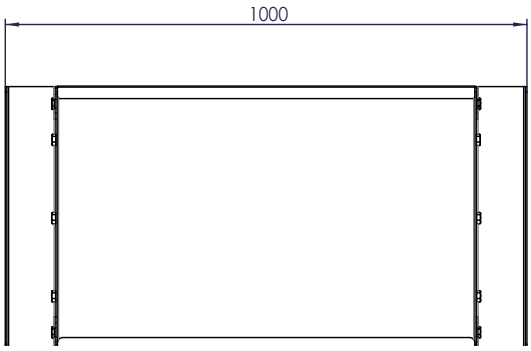
Halton

GENERAL HML DRAWINGS



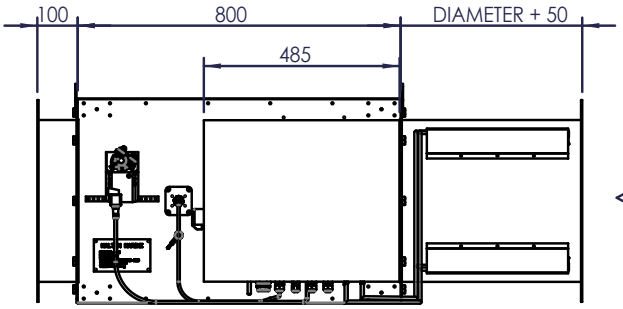
AIR FLOW



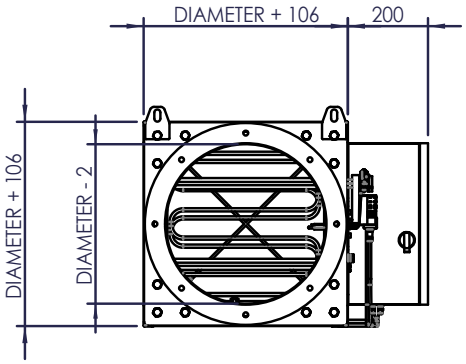


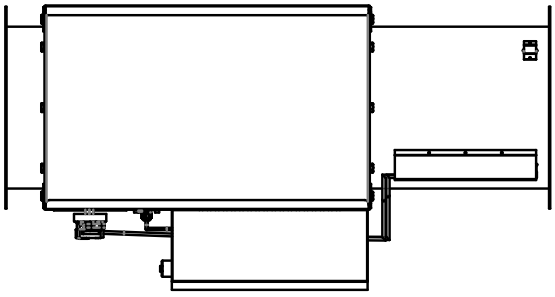
HML units are manufactured for rectangular ducts (width B 200-1000 mm and height H 200 x 1000 mm). Circular connection pieces are available. Non-standard dimensions and flange drilling available on request.

HML WITH CIRCULAR CONNECTION PIECES



AIR FLOW





FUNCTION

Control panel includes also a number of special features such as diagnostics function, room brightness measurement and re-programmability. The power supply and data transfer between cabin unit and control panel is carried out via interconnection cable.Temperature range is software adjustable between 10 and 30°C.

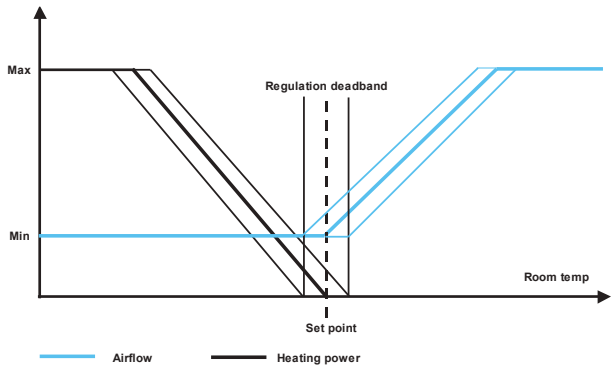
FUNCTION OF VAV UNIT

When passenger demands lower temperature by using control panel unit, the damper opens in order to increase the flow of cold air towards the maximum value. When the required temperature in the cabin is achieved, the damper reference is held until the temperature demand changes. In heating mode, the damper restricts the airflow towards its minimum rate, and if the required temperature in the cabin is not thus achieved, the controller activates the electric reheater inside the unit in a stepless manner.

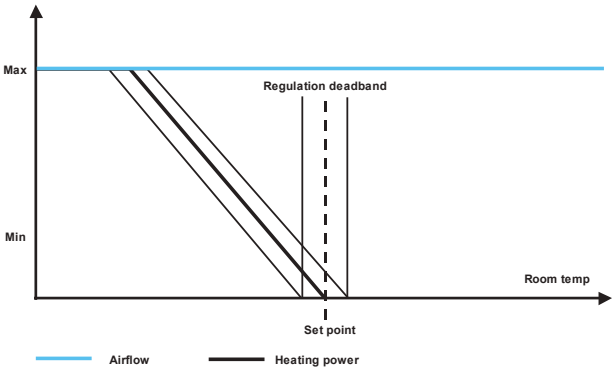
FUNCTION OF CAV UNIT

Airflow is kept in pre-set level in any condition. When passenger demands for a higher temperature by using control panel, the electric reheater inside the cabin unit will be activated in a stepless manner towards to maximum heating capacity or until desired temperature is achieved. When passenger demands for a lower temperature by using control panel, the electric reheater inside the unit will be deactivated in a stepless manner towards to zero heating capacity or until desired temperature is achieved.

REGULATION DIAGRAM, VAV



REGULATION DIAGRAM, CAV



HML UNIT'S AIRFLOW MEASUREMENT ACCURACY

Accuracy*	±15%

* ductwork pressure 100-1000 Pa (optimal)

Note: When comparing airflow measurements between cabin unit and other device, cabin unit's airflow regulation dead-band has to be taken into account (± 10 m^3/h).

CONTROL PANEL FEATURES

Halton Marine HMF cabin units are available with three different control panel models; with rotating knob, push buttons with LED bar graph (available as option: IP54) and push buttons with LCD-display (available as option: IP54).

COMMON FEATURES

- Cabin temperature measurement
- Connector for bluetooth / communication adapter to set cabin parameters
- Software for parameter setting and trouble shooting
- Different colour options and custom labeling available as an option
- Delivered with IC-Cable (interconnection cable)
  - For control panel - cabin unit connection
  - Prefabricated with plugs on both ends
  - Cable plug on panel side is designed to be pulled through standard installation pipe
  - Halogen free and flame-retardant
  - Standard length 7 meters. Other lengths available.

CONTROL PANEL WITH ROTATING KNOB

- Temperature adjustment by rotating knob

CONTROL PANEL WITH PUSH BUTTONS AND LED BAR GRAPH

- Temperature adjustment by push buttons
- Self diagnose function
- LED intensity control and auto dimming

CONTROL PANEL WITH PUSH BUTTONS AND LCD-DISPLAY

- Temperature adjustment by buttons
- Self diagnose function
- LCD intensity control and auto dimming
- Display for actual and set point temperatures available as an option
- Time display available as an option
- A customized background picture available as an option
- Several frame options available

Control panel models; push button and rotating knob

LCD control panel

CABIN VENTILATION CONFIGURATION TABLE

	UNIT	HMM	HMM	HME	HME	HMF	HMF	HMF	HFR/M	HFR/M	HFR/M	HMR	HMR	HML
TERMINAL UNIT WITH JUNCTION BOX	CONTROL PACKAGE	K01	D03	K01	D03	M00	M01	M02	M00	M01	M02	D21	H21	B00
	Damper	manual	manual	manual	manual	electric	electric	electric	electric	electric	electric	electric	electric	electric
	Airflow measurement and control (VAV, CAV)	no	no	no	no	yes	no	yes	yes	no	yes	yes	yes	yes
	In-box temperature measurement	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	yes
	Reheater safety switch, manual reset	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	yes
	Safety switch state detection	no	yes	no	yes	yes	yes	yes	yes	yes	yes	no	no	yes
	Spare inputs (balcony door etc.)	no	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Parameter setting by service tool	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
CONTROL PANEL	Cabin temperature measurement	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Controller with push buttons, 18 led bar	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
	Controller with knob	yes	no	yes	no	no	yes	yes	no	yes	yes	no	yes	no
	LCD room thermostat	no	optional	no	optional	optional	no	no	optional	no	no	optional	no	optional
	LED intensity control and auto dimming	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
	Self diagnose functionality	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
	Network compatible with adapter	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	no	yes
	CO2 sensor available as an option	no	yes	no	yes	yes	no	no	yes	no	no	yes	no	yes
CABLES	Interconnection cable	IC4-X	IC6-X	IC4-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X	IC6-X
	Master-Slave cable	MS4-X	MS2-X	MS4-X	MS2-X	MS2-X (MS5-X)	MS3-X	MS3-X	MS2-X (MS5-X)	MS3-X	MS3-X	MS2-X	MS3-X	MS2-X

Please note: HMM and HME units are also available without a control package.

MANUALLY CONTROLLED AIRLOWS

Single duct units; HMM, HME

PRESSURE DEPENDENT UNITS

Single duct units; HMF, HFR/M

PRESSURE INDEPENDENT UNITS

Single duct units; HMF, HFR/M, HML
Dual duct units; HMR

ACCESSORIES FOR HMR CABIN UNITS

MS-CABLE (MASTER-SLAVE CABLE)

- For master cabin unit - slave cabin unit/units connection
- Prefabricated with plugs on both ends
- Halogen free and flame-retardant
- Standard length is 7 meters. Other lengths available as an option.

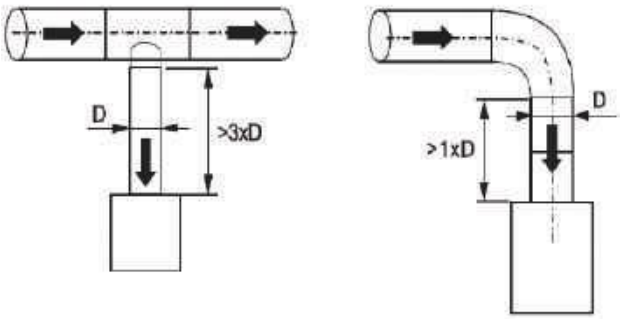
COMMUNICATION ADAPTER

- Bluetooth communication to external device
- For wireless connection to set cabin unit parameters and trouble shooting

NETWORK ADAPTERS

- Network adapter (also available as WiFi) expands a stand-alone unit to network compatible unit (LON or Ethernet network)
- Enables supervision and advanced energy efficiency functions
- For more information, see Halton Networks for cabin ventilation -brochure or contact Halton Marine Sales office.

MINIMUM SAFETY DISTANCES BEFORE AIRFLOW MEASUREMENT



FCU VERTICAL FANCOIL UNIT

For all types of cabins

MATERIALS

PART	MATERIAL
Structure	Galvanized steel. Inner surface insulated with marine mineral wool
	Stainless steel drip tray EN 1.4404 (AISI316L) or antibacterial plastic with rounded corners for easy cleaning, insulated to prevent condensation
	Maintenance hatch enable access to filter, cooling coil, fan and electrical reheaters
Components	A return air filter according to requested class
	Tubes and finning of cooling coil made of copper. Casing of the cooling coil copper or stainless steel EN 1.4404 (AISI316L)
	An electric reheater with safety switch (manual reset)
Water set	A 2-way PICV or 3-way control valve
	Quick water connections or customer specific water connections
	Flow control valve

FCU - COMPACT DESIGN

Halton FCU is a compact fancoil unit to be installed in a vertical position. All cooling, media and electrical connections are made with quick couplings. The air filter, fan, coil and electrical parts are easy to acces via maintenance hatch.

APPLICATIONS

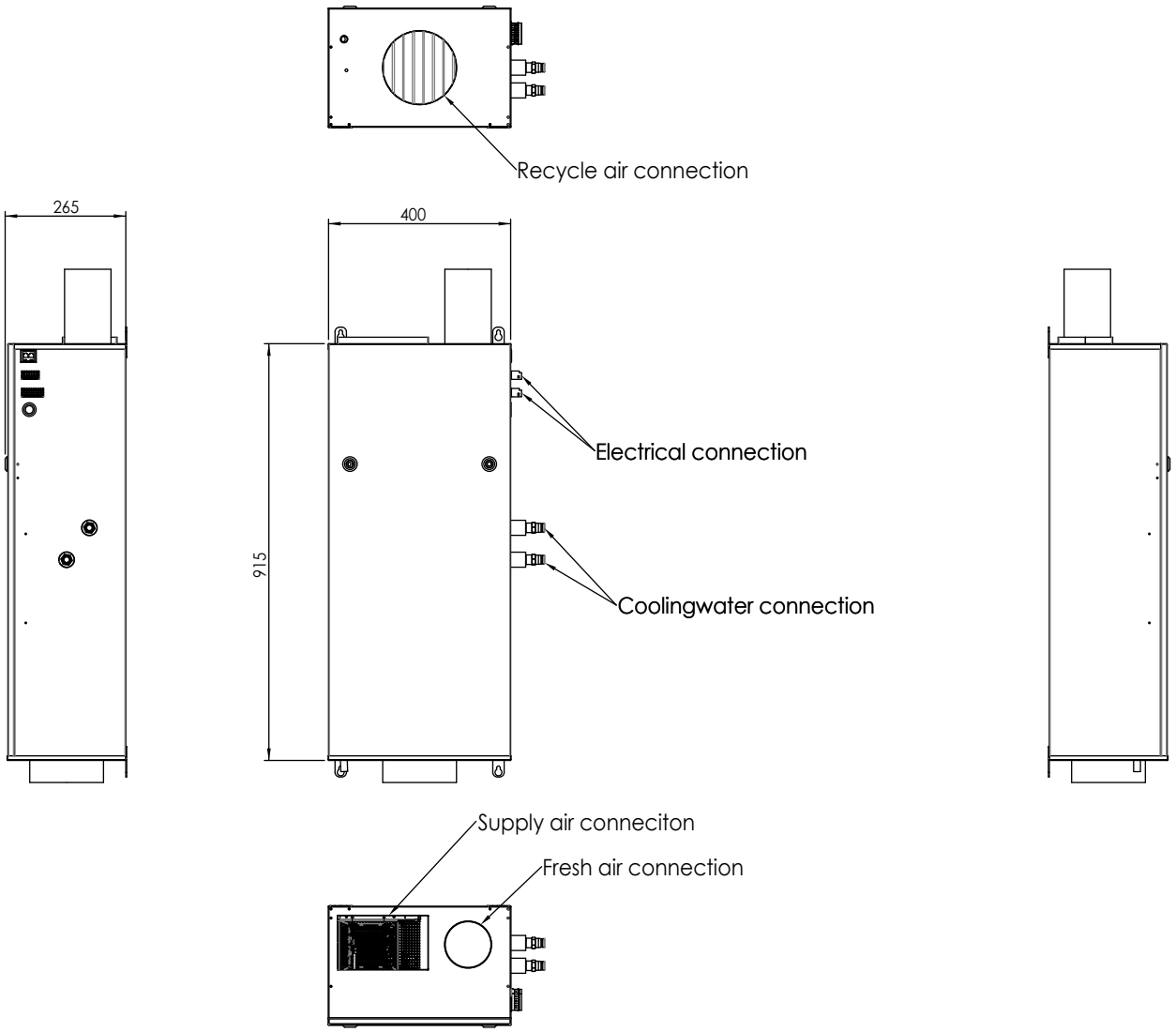
Halton FCU fancoil is a cabin ventilation solution for demanding marine applications. The FCU units can be tailored to customer demands according to the needed integration and requirements. Dimensions, capacities and functionality details can be modified to project specific.
The FCU vertical fancoil together with Halton return and supply grilles have been specifically designed for silent cabin comfort with sophisticated air treatment and control. An advanced digital room temperature control system with stepless fan speed control and heating/ cooling power regulation completes the solution.
To ensure easy installation in prefabricated cabins, FCU can be installed e.g. in the toilet block in the vertical position. In addition to better sound attenuation, this offers easy access to the unit without disturbing passengers.
The manufacturing method and innovative, compact design allow fancoil units to be modified for any situation. FCU is capable of distributing airflows up to 360 m3/h. The unit's operating voltage is 230 VAC ±10%, 50/60 Hz.

FEATURES

- Electric reheaters up to 1200W
- Silent and stepless fan operation
- Integrated electrical connectors
- Total cooling capacity up to 1250W
- Recycled air range up to 235 m^3/h
- Air connections and fan type can be tailored according to customer's specifications

Halton

GENERAL FCU DRAWINGS



Please note:
Sizes and positions of air and water connections can be tailored according to customers' needs.

OPERATING RANGE FOR FCU

150 m³/h - 360 m³/h

FAN

- Protection class IP 44
- Galvanized steel impeller
- Galvanized steel housing
- Stepless fan speed control

Other fan types available as an option

ACCESSORIES FOR FCU FANCOILS

COMMUNICATION ADAPTER

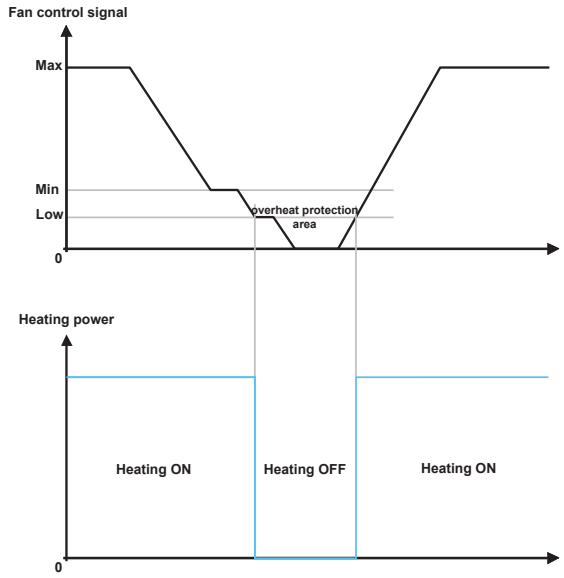
- Bluetooth communication to external device
- For wireless connection to set cabin unit parameters and trouble shooting

NETWORK ADAPTERS

- Network adapter (also available as WiFi) expands a stand-alone unit to network compatible unit (LON or Ethernet network)
- Enables supervision and advanced energy efficiency functions
- For more information, see Halton Networks for cabin ventilation -brochure or contact Halton Marine Sales office

OVERHEAT PROTECTION

If minimum airflow alarm is active (e.g. low fan speed), reheaters will not heat (see diagram).



CONTROL PANEL FEATURES

Halton Marine FCU cabin units are available with three different control panel models; with rotating knob, push buttons with LED bar graph (available as option: IP56) and push buttons with LCD-display.

COMMON FEATURES

- Balcony door and keycard switch available as an option
- Cabin temperature measurement
- Connector for Bluetooth / communication adapter to set cabin parameters
- Software for parameter setting and trouble shooting
- Different colour options and custom labeling available as an option
- Delivered with IC-Cable (interconnection cable)
  - For control panel - cabin unit connection
  - Prefabricated with plugs on both ends
  - Cable plug on panel side is designed to be pulled through standard installation pipe
  - Halogen free and flame-retardant
  - Standard length 7 meters

CONTROL PANEL WITH ROTATING KNOB

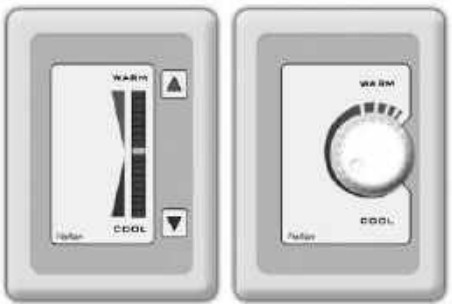
- Temperature adjustment by rotating knob

CONTROL PANEL WITH PUSH BUTTONS AND LED BAR GRAPH

- Temperature adjustment by push buttons
- Self diagnose function
- LED intensity control and auto dimming

CONTROL PANEL WITH PUSH BUTTONS AND LCD-DISPLAY

- Temperature adjustment by buttons
- Self-diagnose function
- LCD intensity control and auto dimming
- Display for actual and set point temperatures available as an option
- Time display available as an option
- A customized background picture available as an option
- Several frame options available

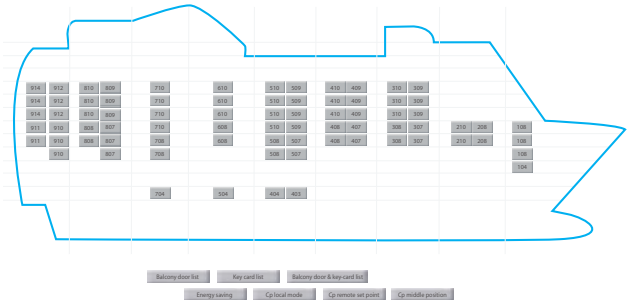


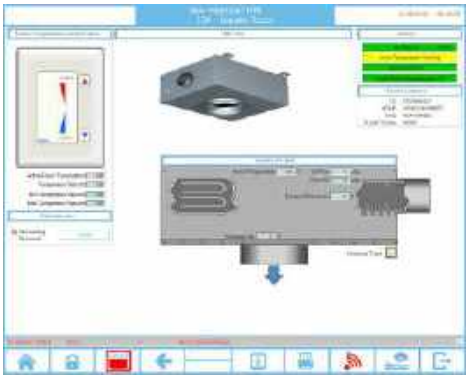
Control panel models; push button and rotating knob

LCD control panel

HALTON NETWORKS

For cabin ventilation





NETWORK BENEFITS

Connecting a Halton cabin ventilation system to a network offers many advantages

- Improved energy efficiency
- A possibility to control, monitor and adjust cabin indoor climate centralized via network
- Improved passenger comfort
- Savings in troubleshooting time
- Savings in commissioning time

In a network, selected cabin ventilation parameters can be managed remotely with supervision system or locally. The network also enables optimization of the cabin ventilation system. Connecting a Halton cabin ventilation system to a network enables substantial savings in energy consumption. One of the best benefits is the active operation between AHU (Air Handling Unit) and terminal units. Necessary data from terminal units is collected and calculated to adjust the AHU operation.
When the terminal units are not connected in a network, they operate as stand-alone units.

APPLICATIONS

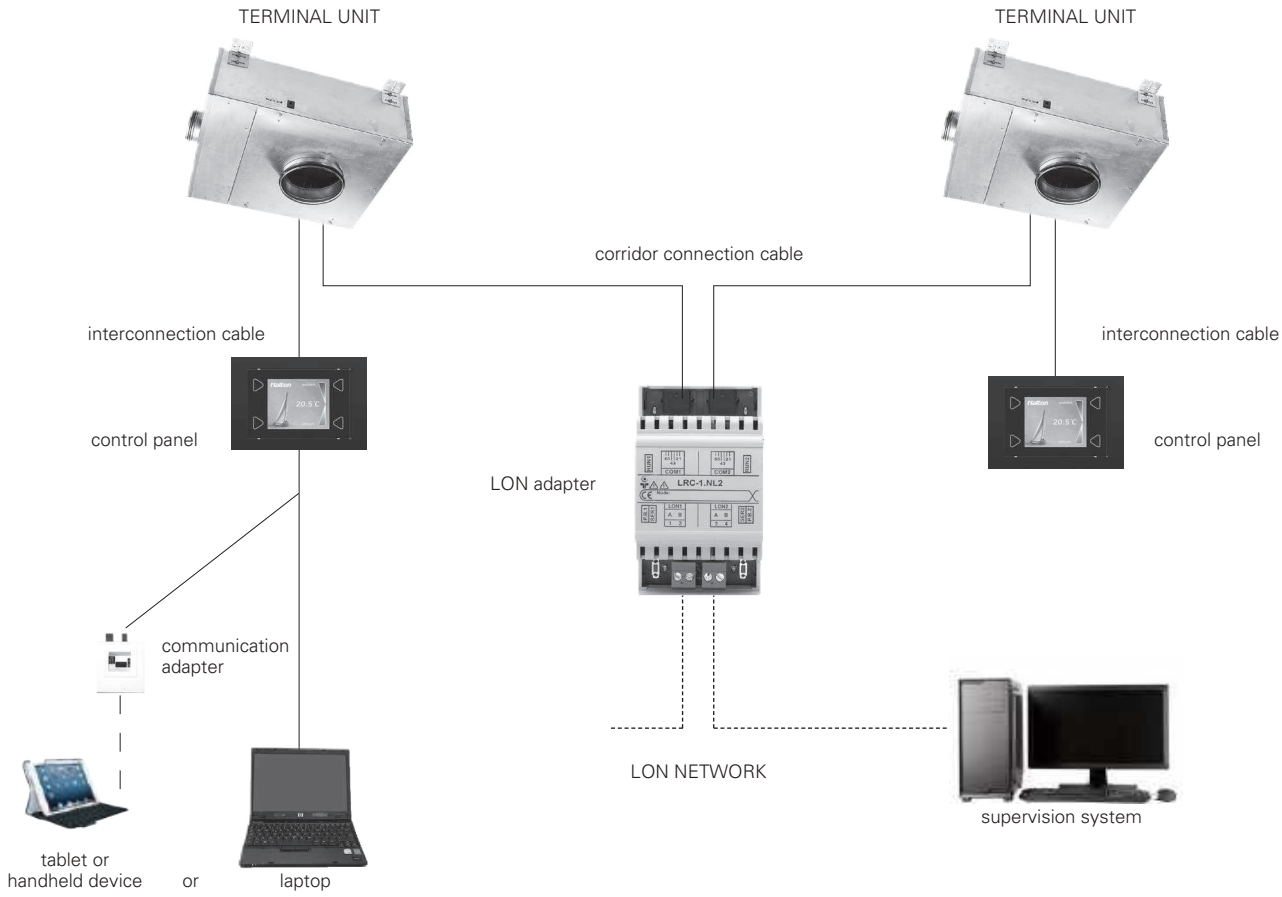
Halton Marine cabin units can be connected to a LON, Ethernet or WiFi network in order to improve energy efficiency and implement supervision of a total cabin HVAC system. The network adapters that enable network communications are available for new-buildings as well as for refurbishments.

FEATURES

- Halton Marine terminal unit
- Design of the network and network functions
- Design of the network architecture and component implementation plan
- LON, Ethernet or WiFi adapters
- All needed network components, such as routers, switches and repeaters are available from Halton Marine
- Data calculator for AHU (Air Handling Unit) optimization
- Tailored project based software (HMI)
- The network commissioning and start-up services

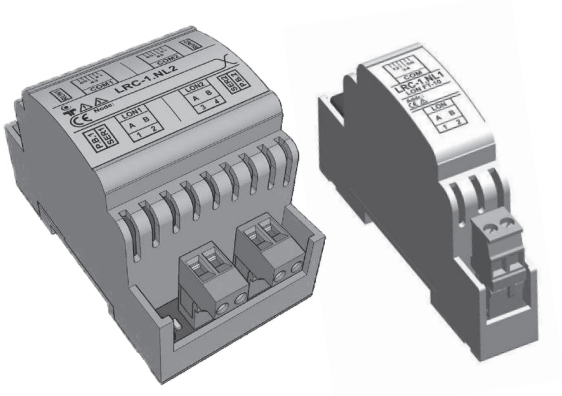
LON NETWORK

LON network is one choice to build Halton Marine centralized cabin ventilation system. Network is normally built by connecting terminal units of each ventilation system together. Data from terminal units is gathered in centralized supervision system operating in a PC software. Each terminal unit is identified with its individual node address. This enables a two-way-communication and identification from each node to the supervision software. An automatic Halton Marine LON node replacer software, running on supervision PC, enables easy maintenance of the LON network components.



HALTON LON ADAPTER

LON adapter expands a stand-alone terminal unit to a LON network compatible unit. LRC-1.NL adapter is available as two different versions; NL1 for single terminal unit communication or NL2 for double terminal unit communication. LRC-1.NL adapters use FT-10 free topology and has for troubleshooting inbuilt 4 diagnostics LEDs.



Halton LON adapters LRC-1.NL2 and LRC-1.NL1

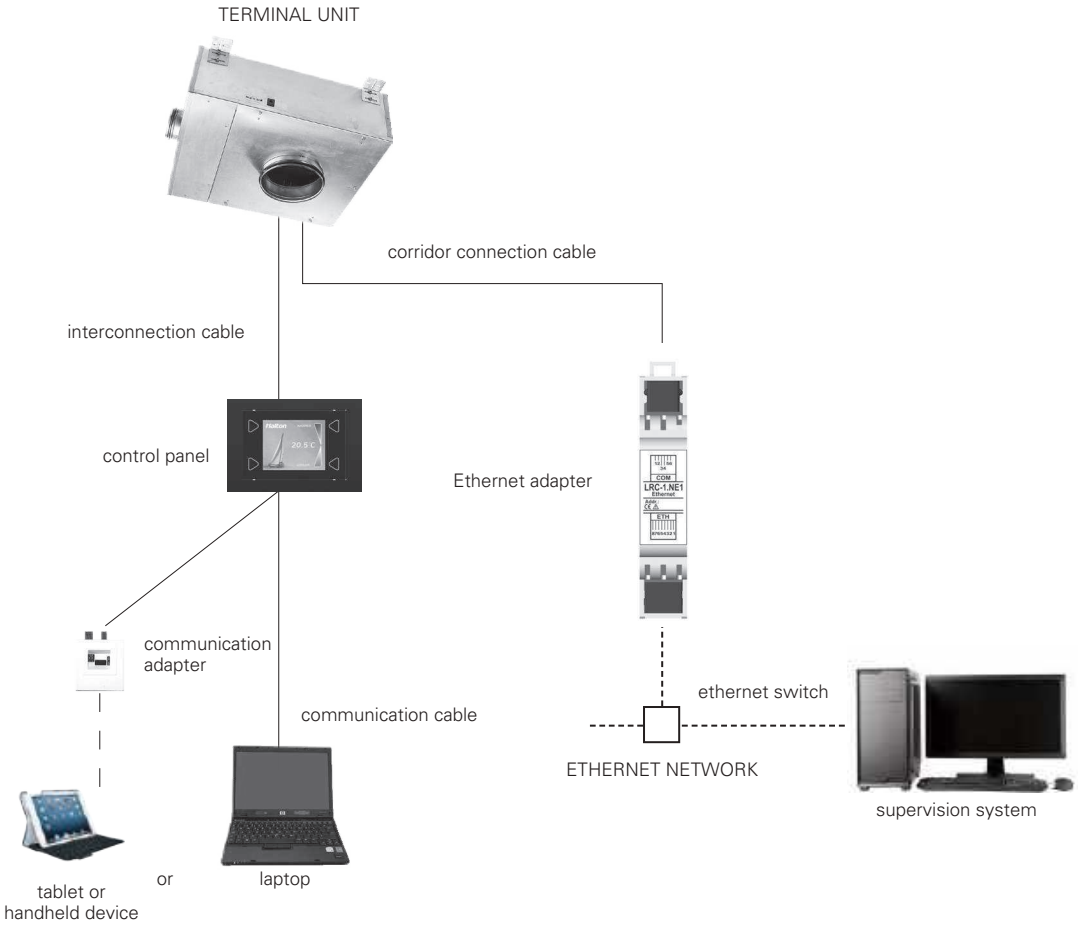
NODE REPLACER

Node replacer is a software application that automatically detects LON node failure, informs the user to change a new component, provides a new address for the node, and updates all network variables and settings. Node replacer software enables the component replacement without a network specialist.

ETHERNET NETWORK

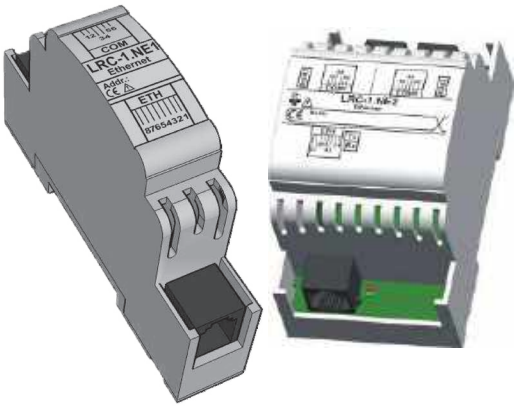
Ethernet network is another choice to build Halton Marine centralized cabin ventilation system. In principle the operations are the same in the both networks. In Ethernet network IP-addresses are used for identification of different terminal units. Nodes and IP-addresses can contain multiple exchangeable / readable parameters for setting and monitoring cabin climate conditions.

Halton Ethernet solution can be also embedded to an existing Ethernet network built on board, which is perhaps used for other services such as IP-telephone, Internet, multimedia, IP-television etc.



HALTON ETHERNET ADAPTER

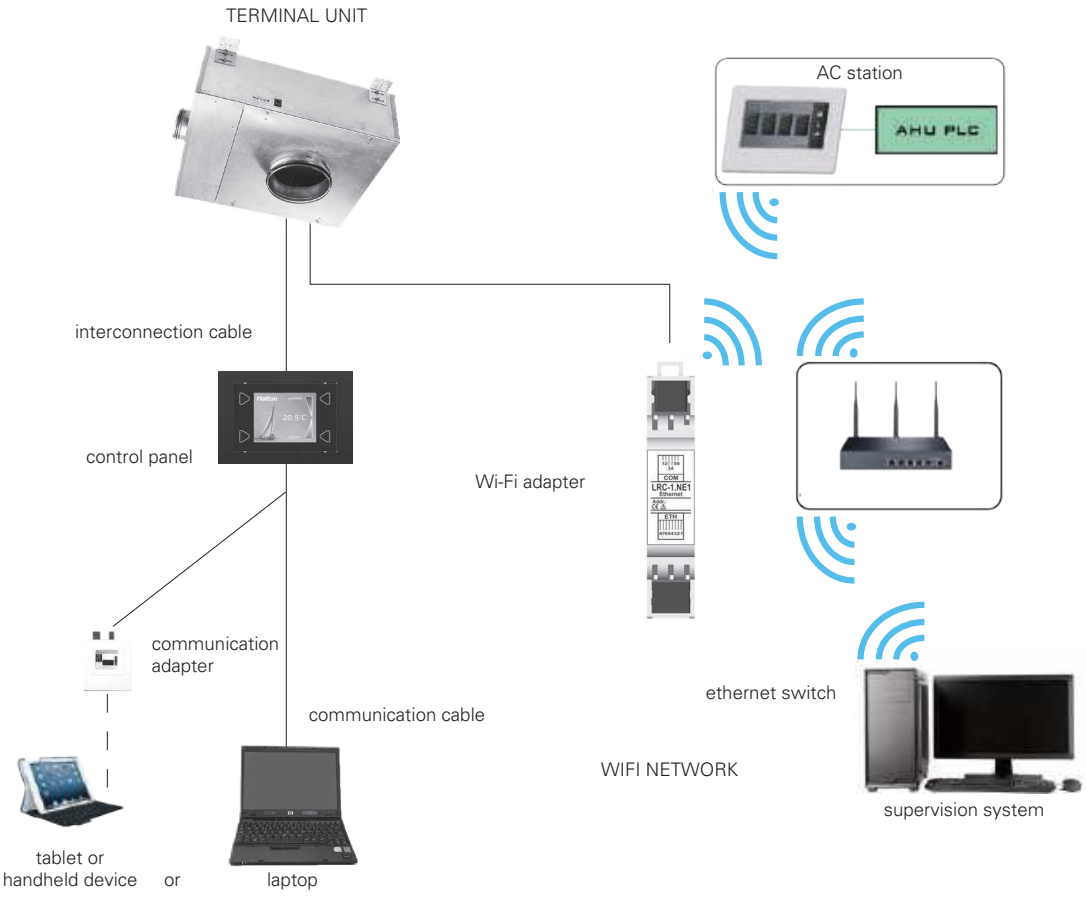
Ethernet adapter expands a stand-alone terminal unit to a Ethernet network compatible unit LRC-1.NE1.
The LRC-1.NE2 is used to connect 2 terminal units to one adapter module.
LRC-1.NE adapter acts like a Modbus slave device using TCP/IP protocol and has 3 diagnostic LEDs inbuilt for troubleshooting.



Halton Ethernet adapters LRC-1.NE1 and LRC-1.NE2

WIFI NETWORK

WiFi network is another choice to build Halton Marine centralized cabin ventilation system. In principle the operations are the same in the both networks. In WiFi network IP-addresses are used for identification of different terminal units. Nodes and IP-addresses can contain multiple exchangeable /readable parameters for setting and monitoring cabin climate conditions.
Halton WiFi solution can be also embedded to an existing WiFi network built on board, which is perhaps used for other services such as IP-telephone, Internet, multimedia, IP-television etc.



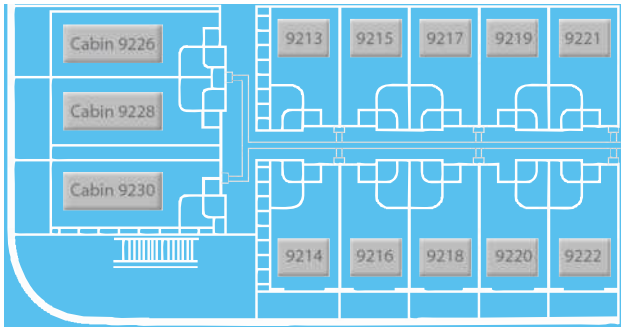
HALTON WIFI ADAPTER

WiFi adapter expands a stand-alone terminal unit to a WiFi network compatible unit LRC-1.NW1. LRC-1.NW1 adapter uses Modbus protocol and has for troubleshooting inbuilt 3 diagnostics LEDs.

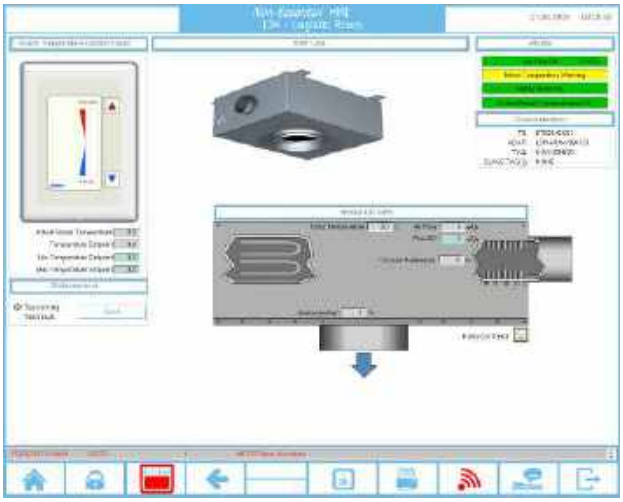
Halton WiFi adapter LRC-1.NW1

THE NETWORK ARCHITECTURE AND SUPERVISION SYSTEM - ACCORDING TO CUSTOMERS' NEEDS

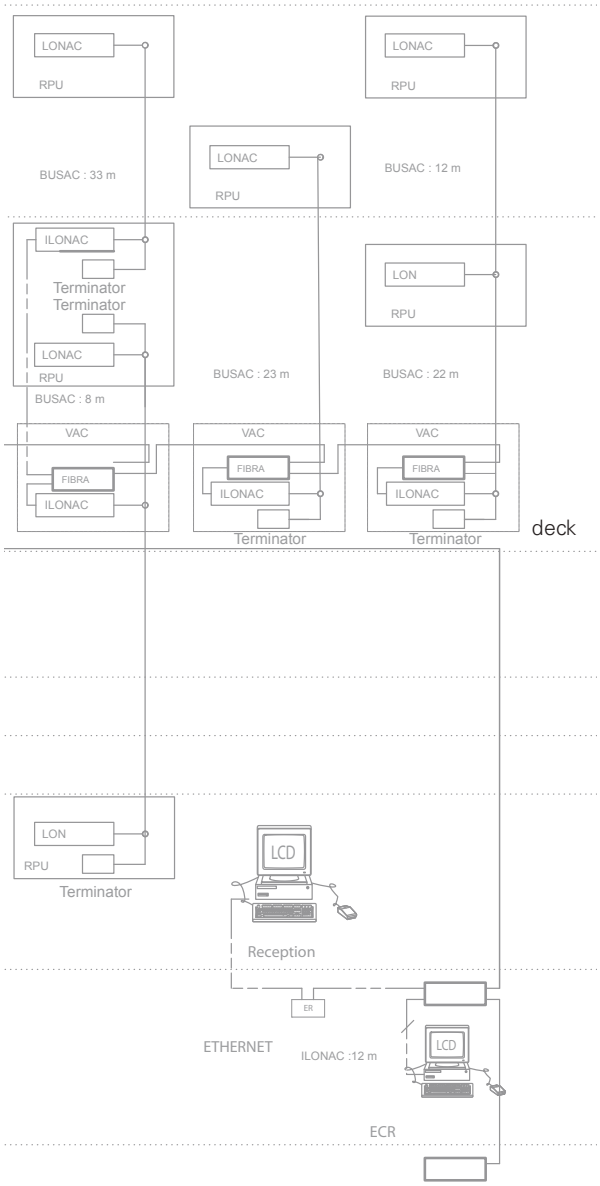
The Halton Marine supervision software runs on a standard computer and offers an excellent tool for HVAC Engineering and Hotel Management. The software offers an overview from a cabin ventilation system, to each cabin that can be individually adjusted, controlled and monitored via the network.The software enables the changing of parameters and set-points, for individual cabins or for cabin groups, as well as printed listings of different items that have a direct impact on indoor climate conditions, safety and energy-efficiency, such as key-card positions, open balcony doors etc. The supervision system can also displays the historical data and trends. Symbolic representation of the process and clear displays make it easy and convenient to use the software. Halton Marine supervision interface is always built according to customers' needs.



Halton supervision software includes touch screen display



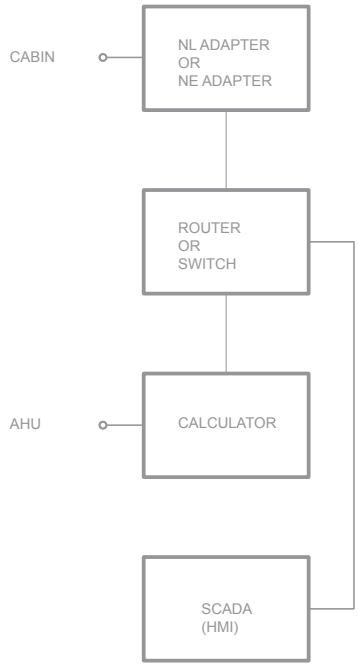
A display including an overview of a single cabin



An example of a basic network architecture

Halton Marine offers its services for designing the network architecture.

THE BASIC NETWORK CONSTRUCTION



Principle drawing of the main components of LON or Ethernet network

THE BASIC NETWORK COMPONENTS

Adapters

Network adapters are used to connect Halton terminal units to a standard LON or Ethernet network.

Routers / switches

Routers (LON) / switches (Ethernet) are used to connect different parts of the network together.

Data calculator

Calculator is a solution for optimizing operation of AHU. Calculator collects information (e.g. damper position and reheater power) from cabins through a network. This data can be used e.g. to optimize AHU supply air, temperature and pressure.

SCADA

SCADA (Supervision Control And Data Acquisition) is an industrial control system that is used for monitoring and controlling a process.

ENERGY EFFICIENCY

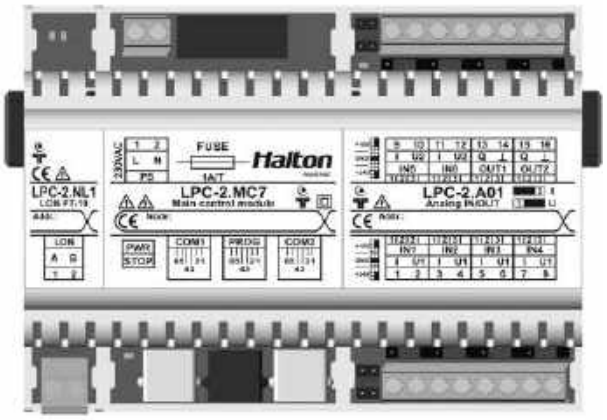
1. Adjusting the fan operation to optimal level

Based on the collected data from terminal units calculator determines the pressure in front of each unit. Pressure data is used to optimize the fan operation, which cuts down the unnessary energy consumption. All this is done without loosing any comfort in the cabins.

2. Minimizing the unnecessary electrical re-heating

Based on the re-heater's utilization rates, AHU's cooling/ heating valves can be controlled to prevent unnecessary electrical heating inside the terminal unit. The supply air is kept actively on optimum temperature level.

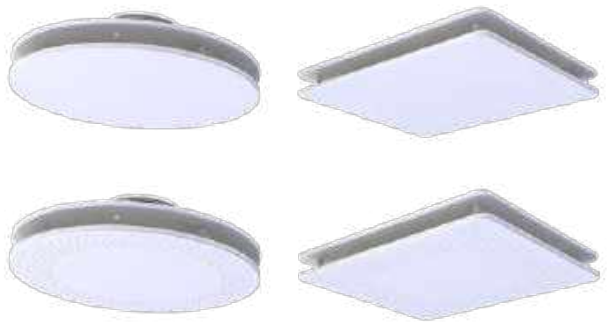
Based on calculations it is possible to save up to 35% in cabin HVAC energy consumption with Halton Marine advanced energy efficiency technology.



Halton data calculator

JCC HALTON JAZ CLOUD CEILING DIFFUSER

Especially designed for low spaces



APPLICATIONS

Halton Jaz Cloud Ceiling is a circular or square ceiling diffuser for circular duct connections D 100...250 mm. The diffuser has a solid or perforated front plate. The detachable front plate is fixed to the upper plate with springs; cleaning of the diffuser and cabin unit can be carried out through the diffuser. Halton Jaz Cloud Ceiling is especially designed for low spaces and is therefore an excellent choice for marine, navy and offshore applications. The Halton Jaz Cloud Ceiling is fully compatible with Halton cabin units. A manual cabin unit control knob is available as an option.

MATERIALS

PART	MATERIAL	NOTE
Upper plate	Steel	Available in stainless steel (EN1.4404/AISI 316L)
Front plate	Steel	Available in stainless steel (EN1.4404/AISI 316L)
Deflection panels	Foamed plastic	
Coupling sleeve with gasket	Galvanized steel	Gasket rubber compound
Installation panel	Steel	Available in stainless steel (AISI 316L)
Finishing	Painted, white RAL 9003 30 % gloss	Special colours available on request

FEATURES

- Ceiling diffuser with side slot in square and circular shape
- Low construction height minimizes the installation space
- Diffuser is available for air supply and exhaust
- Installation either directly to ductwork or to balancing plenum
- Detachable front panel enables the cleaning of the diffuser and ductwork
- Deflector panels available for selection of flow pattern in 1-4 directions

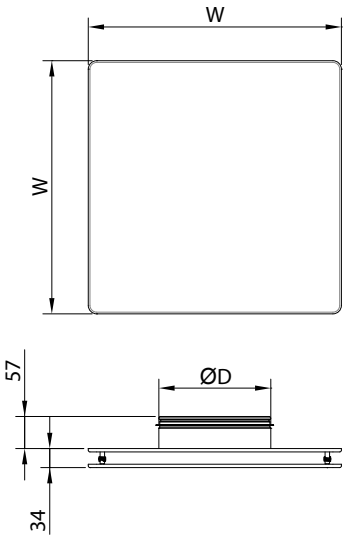
PRODUCT MODELS

- Square, with solid or perforated front panel
- Circular, with solid or perforated front panel
- Direct installation to the standard T-bar ceiling opening
- Material alternative in stainless steel (EN1.4404/ AISI316L)

ACCESSORIES

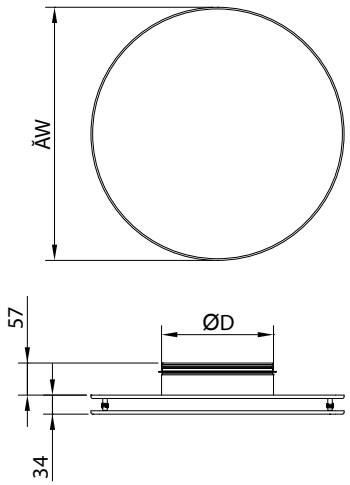
- Deflector panel to provide control for flow pattern direction
- Balancing plenum with measurement and adjustment functions
- Installation panel for modular ceiling

DIMENSIONS JCC SQUARE



NS	W	ØD
100	300	99
125	300	124
160	300	159
200	450	199
250	450	249

DIMENSIONS JCC CIRCULAR



NS	W	ØD
100	300	99
125	300	124
160	300	159
200	450	199
250	450	249

JCC PRODUCT MODELS

JCC, square with solid front panel

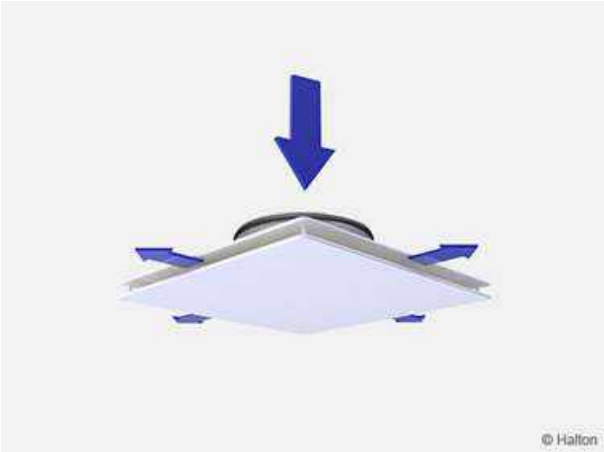
JCC, circular with solid front panel

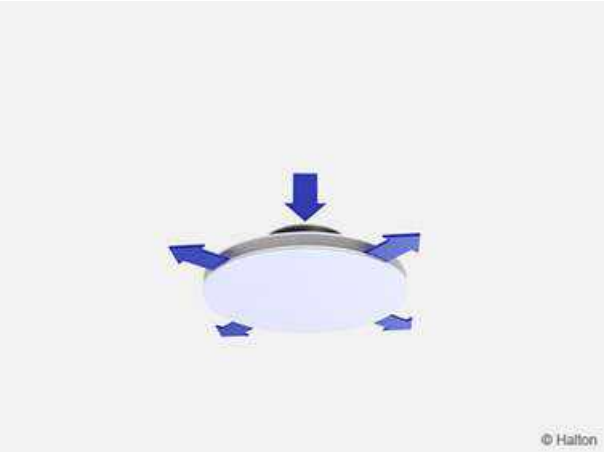
JCC, square with perforated front panel

JCC, circular with perforated front panel

JCC FUNCTION

Air is supplied into the space through the side slots and mixed with the room air outside the diffuser.
Recommended maximum air temperature difference between supply and room air is 10 °C.
The throw pattern can be deflected in different (1, 2 and 3) directions with the deflection panels (included in delivery).





JCC INSTALLATION

The diffuser can be connected to the Halton cabin unit by using duct between cabin unit outlet and diffuser in order to reach the false ceiling level. Diffuser can be also connected directly in cabin unit outlet. In this case cabin unit outlet must be female connection.
Diffuser can as well be connected directly to the duct or plenum box.

JCC SERVICING

Open the front panel of the diffuser and clean the parts by wiping them with a damp cloth.
Push the front panel back into place so that the springs lock.

TCL RECTANGULAR CEILING DIFFUSER

For Halton HMC cabin unit

APPLICATIONS

Halton TCL is a rectangular ceiling diffuser for circular duct connection D160 mm. The diffuser is manufactured from steel and finished with epoxy paint in white RAL 9003 as a standard colour. Other colours are available on request. The galvanized steel coupling sleeve is equipped with a rubber gasket compound. The diffuser has a solid front plate. The detachable front plate is fixed to the upper plate with screws; cleaning of the diffuser and cabin unit can be carried out through the diffuser. Halton TCL is especially designed for low smaller spaces and is therefore an excellent choice for crew cabins.

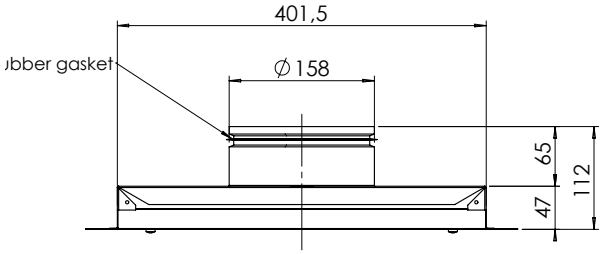
MATERIALS

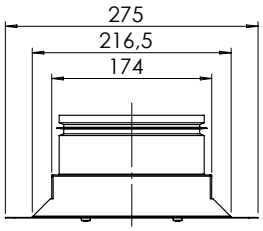
PART	MATERIAL	NOTE
Upper plate	Steel	-
Front plate	Steel	-
Front plate fixing screws	Galvanized steel, NOT PAINTED	ISO 7380-1 M5x10
Coupling sleeve	Galvanized steel	Gasket
Duct gasket	Rubber compound	-
Finishing	Epoxy-painted / White RAL 9003	Special colours available on request

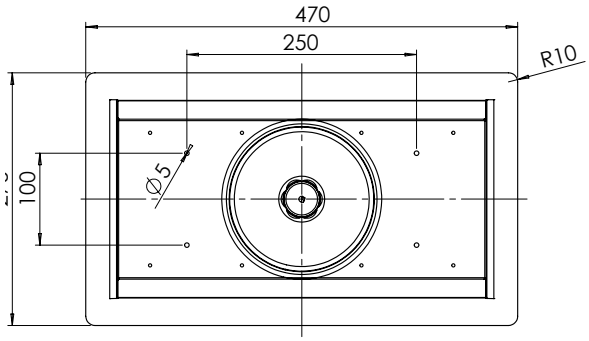
FEATURES

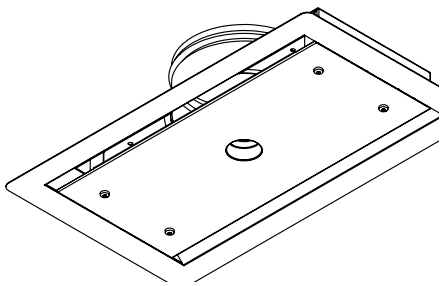
- Horizontal radial air supply, suitable also for exhaust
- Specifically designed to be used in conjunction with HMC cabin unit (applicable for B-0 and B-15 installations)
- Forms an integral impression with a ceiling
- Available for installation directly through one ceiling blade
- Compact and light construction
- Detachable front plate enables cleaning of the diffuser
- Airflow is controlled via an adjusting knob installed through the diffuser
- Circular duct connection with gasket

DIMENSIONS AND WEIGHT TCL









The standard weight of the TCL diffuser is 2,3 kg.

Halton

TCL FUNCTION

Air is supplied horizontally into the space through the side slots of the diffuser and induces the room air outside the diffuser. The recommended maximum air temperature difference between supply and room air is 10 °C degrees.

TCL SERVICING

Open the screws of the front panel and clean the parts by wiping with a damp cloth. Put the front panel back into the place and lock the screws.

TCL INSTALLATION

The TCL diffuser can be connected directly to a Halton HMC cabin unit.

DLQ ARCHITECTURAL CEILING DIFFUSER

Especially designed for low spaces

APPLICATIONS

Halton DLQ is a rectangular architectural diffuser for circular duct connections D250 mm. The diffuser is manufactured of steel and finished with epoxy paint in RAL/NCS colour. The DLQ diffuser is specially designed to meet the highest criteria of good indoor climate in cruise ship applications. The short-throw levels guarantee low air residual velocities in cabins, which also reduces draft. DLQ diffuser is to be installed in a false ceiling (B-0, B-15), and with it form an integral impression. The low noise level of less than 40 dB(A) is achieved through the operating level of the diffuser which is between 250 - 300 m3/h. Air is supplied into space through the diffuser slots on the front plate. The detachable front plate is fixed to the sleeve with clips. The DLQ diffuser is fully compatible with Halton cabin units.

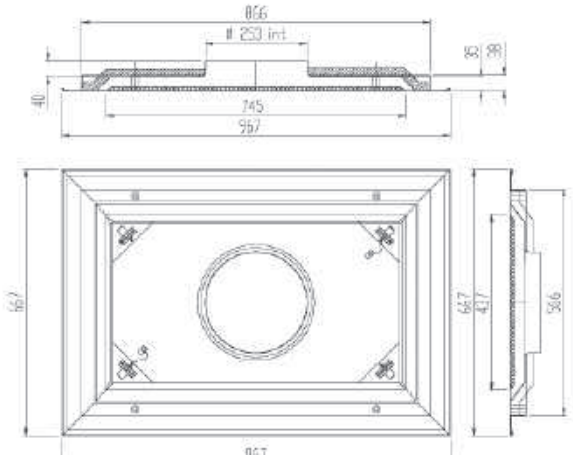
MATERIALS

PART	MATERIAL	NOTE
Upper plate	Steel	-
Front plate	Steel	-
Front plate insulation	Mineral wool	-
Coupling sleeve	Steel	
Finishing	Epoxy-painted	RAL/NCS colours available

FEATURES

- Horizontal radial air supply
- Installation either to balancing plenum or cabin unit
- Detachable front plate enables cleaning of the diffuser
- Circular duct connection
- Compatible with Halton cabin units

DIMENSIONS AND WEIGHT DLQ

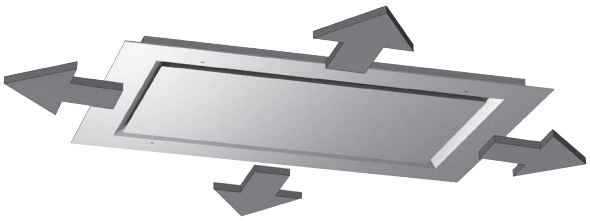


The standard weight of the DLQ diffuser is 10,8 kg.

Halton

DLQ FUNCTION

Air is supplied horizontally into the space through the side slots of the diffuser and induces the room air outside the diffuser.



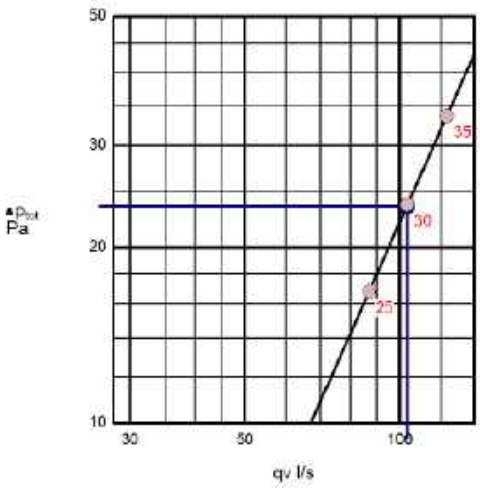
DLQ SERVICING

Open the front panel of the diffuser and clean the parts by wiping with a damp cloth. After servicing, fasten the safety wires back into the front panel. Place the front panel back into place and lock the latches.

Supply					**DLQ-250**							2020.03
qv l/s	Δp_{st} Pa	Δp_{tot} Pa	L_pA dB(A)	NR/ NC	L_W dB fHz							
					63	125	250	500	1000	2000	4000	8000
87	15	17	25	21/19	33	32	30	29	23	9	3	9
104	21	24	30	26/24	37	36	35	34	28	16	6	10
123	30	24	35	31/30	42	41	40	39	33	23	14	11
146	42	47	40	36/35	46	45	45	44	39	30	21	12

Supply / Attenuation				**DLQ-250**			2020.03
ΔL dB							
f Hz							
63	125	250	500	1000	2000	4000	8000
15	10	7	4	7	16	21	22

Supply				**DLQ-250**			2020.03
qv = 103 l/s				Δp_{tot} = 24 Pa			
L_pA re 10m²sab = 30 dB(A)				L_W = 34 dB(A)		NR/NC = 26/24	
L_W dB							
63	125	250	500	1000	2000	4000	8000
15	10	7	4	7	16	21	22



DLQ INSTALLATION

The DLQ diffuser can be connected to a balancing plenum or cabin unit.

URH EXHAUST VALVE

For ceiling installation

APPLICATIONS

Halton URH valve throttles the exhaust airflow and attenuates the duct noise. The pressure drop is dependant on the position of the central cone. The desired exhaust airflow rate is adjusted during the balancing of the airflows in a ductwork system. After the adjustment the valve is locked at the required adjustment position.

FEATURES

- Exhaust valve with adjustable pressure loss
- Ceiling or wall installation with a separate installation frame
- Several frame options
- Attenuates duct noise
- Airflow rate adjustment and measurement facility

MATERIALS

PART	MATERIAL	NOTE
Collar	Steel	-
Central cone	Steel	-
Gasket	Polyurethane	-
Installation frame	Galvanized steel	Gasket of rubber compound
Protection ring	Steel	-
Finishing	Polyester-epoxy-painted white RAL 9003	Special colours available

URH PRODUCT OPTIONS

- Alternative installation with fixed springs
- Alternative installation frame options

QUICK SELECTION

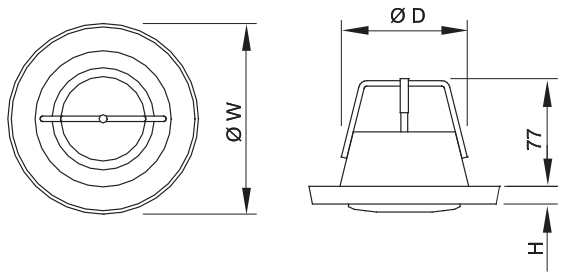
qv	l/s	15	20	25	30	40	50	60	70	80	90	100
	m³/h	54	72	90	108	144	180	216	252	288	324	360
URH/A-100	LpA	13	20	26	30	37						
	ΔPtot	26	46	72	104	184						
	dP_t	157	152	161	148	-						
URH/A-125	LpA			14	19	27	33	38				
	ΔPtot			31	44	79	123	177				
	dP_t			207	188	165	145	-				
URH/A-160	LpA					15	21	27	32	36		
	ΔPtot					38	59	85	116	152		
	dP_t					176	160	155	147	-		
URH/A-200	LpA						17	21	26	29	33	35
	ΔPtot						39	57	77	102	129	159
	dP_t						147	154	150	154	155	-

LpA values presented with room attenuation 4 dB (red 10m² - sab). When using room attenuation 8 dB (red 10m² - sab): LpA - 4dB.

LpA	A-weighted sound pressure level, reduced by total equivalent absorption surface of 10m², dB(A) red 10m² - sab
ΔPtot	Total pressure drop, Pa
dP_t	Maximum ΔPtot (Pa), when a-weighted sound pressure level (Lp) is 35 dB(A)

Halton

GENERAL URH DRAWINGS



NS	ØW	H	ØD
100	140	13	96
125	165	13	122
160	200	13	158
200	251	13	198

ACCESSORIES

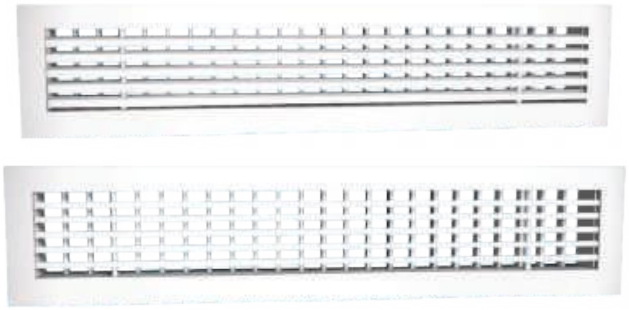
ACCESSORY	CODE	DESCRIPTION
Protection ring	CS	For protection of the surfaces from smudging and for directing the air jet in a grid-structured ceiling
Extension part	EP	Extension part for detaching the valve from the surface/ standard height 50 mm
Installation frame	LF	Installation frame without gasket/height 50 mm
Installation frame	GF	Installation frame with gasket/height 50 mm
Installation frame	DF	Installation frame with duct dimensions can be installed directly to duct parts such as bending or T-branch etc

MORE INFORMATION

For more detailed information visit: https://www.halton.com/en_GB/halton/products/-/product/URH or download Halton HIT Design tool at: https://www.halton.com/en_GB/halton/products/halton-hit-design-tool

AWE, AWU UNIVERSAL GRILLES

For wall installation with aesthetic design



APPLICATIONS

Supply air is supplied with vertical 15° angle or no deflection and with horizontal deflection (rear vanes) through the vanes into the space, mixing with room air in front of the
grille. The flow pattern is adjusted by changing the angle of the adjustable rear vanes.
Wall installation for horizontal supply or ceiling installation for vertical supply.
In wall installations, the recommended distance from the ceiling is 200 mm, when the supply air is directed to the ceiling. (AWE)
The grille can also be used as an exhaust unit. (AWU)

MATERIALS

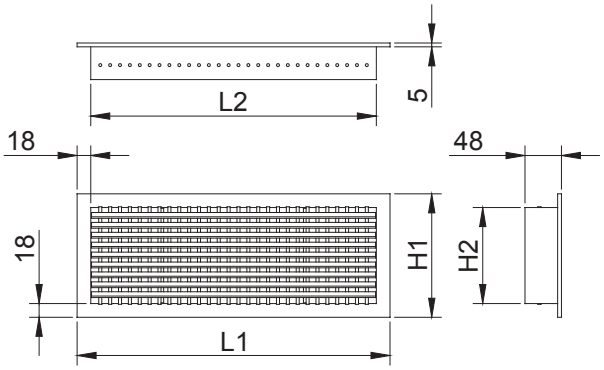
PART	MATERIAL	FINISHING
Frame	Aluminium	Anodized, epoxy/polyester painted, white RAL 9003 30% gloss *
Vanes	Aluminium	Anodized, epoxy/polyester painted, white RAL 9003 30% gloss *
Installation frame	Galvanized steel	-
Plenum box / spigot	Galvanized steel	-

*) Note: Special colours available. Epoxy-painting (100%) available

FEATURES

- Horizontal air supply, suitable also for exhaust
- Fixed front vanes, stable throw pattern with vertical 15° deflection: AWE, no deflection: AWU
- Adjustable rear vanes for horizontal deflection of the air jet
- Aluminium construction with elegant outlook
- Detachable grille enables cleaning of the grille and ductwork
- Continuous grilles available with modular construction

GENERAL AWE, AWU DRAWINGS



DIMENSIONS

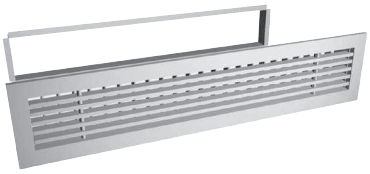
NS	L1	L2	H1	H2
200x50	212	176	62	26
200x100	212	176	112	76
300x100	312	276	112	76
400x100	412	376	112	76
500x100	512	476	112	76
600x100	612	576	112	76
800x100	812	776	112	76
1000x100	1012	976	112	76
600x150	612	576	162	126
800x150	812	776	162	126
1000x150	1012	976	162	126
1200x150	1212	1176	162	126
1500x150	1512	1476	162	126
600x200	612	576	212	176
800x200	812	776	212	176
1000x200	1012	976	212	176
1200x200	1212	1176	212	176
1500x200	1512	1476	212	176

In addition to standard sizes, other sizes can be specially ordered. The maximum size is 1500x500 mm (LxH). It is possible to have a continuous grille of modular design when the installation length is greater than 1500 mm. The maximum total length is 20 m.

Halton

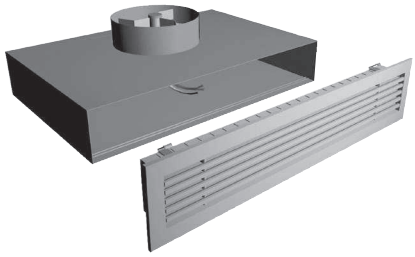
ACCESSORIES

ACCESSORY	CODE	DESCRIPTION
Balancing plenum	PRL	For balancing & equalising the airflow and attenuating the duct noise
Plenum	BDR	Plenum for duct connection (with or without attenuation material)
Airflow measurement and adjustment unit	MSM	For supply installation
Sound attenuation	IN	Mineral wool for the BDR plenum box. Polyester fiber or mineral wool for the PRL plenum box
Flow adjustment damper	OD	Aluminium opposite blade damper~for airflow adjustment
Installation frame	IF	For installation without plenum
Concealed screw fastening	CC	For installation with BDR plenum or IF frame



Installation frame (IF)

PRL plenum box



BDR plenum box

MORE INFORMATION

For more detailed information visit:
https://www.halton.com/en_GB/halton/products/-/product/AWE
https://www.halton.com/en_GB/halton/products/-/product/AWU
or download Halton HIT Design tool at: https://www.halton.com/en_GB/halton/products/halton-hit-design-tool

WDD UNIVERSAL GRILLES

For wall installation with aesthetic design

APPLICATIONS

Supply air is supplied with horizontal and vertical deflection through the vanes into the space. The supply air mixes with the room air in front of the grille. The supply air is directed with the horizontal adjustable vanes. Moving the vertical vanes can change the length and form of the flow pattern. In wall installations, the recommended distance from the ceiling is 200 mm, when the supply air is directed to the ceiling. The rear vane angle can also be controlled by optional wax-bulb actuator. The grille can also be used as an exhaust unit.

FEATURES

- Horizontal air supply, suitable also for exhaust
- Adjustable vertical front vanes, adjustable horizontal rear vanes
- Aluminium construction with elegant outlook
- Detachable grille enables cleaning of the grille and ductwork

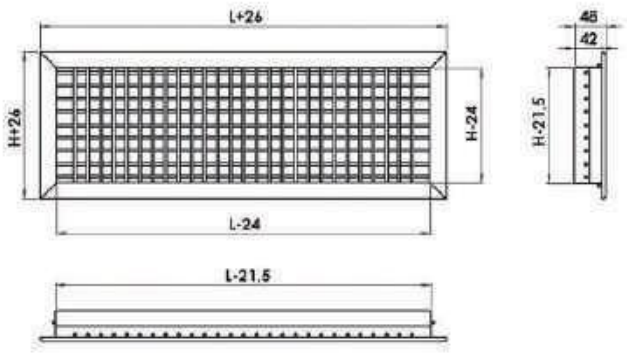
MATERIALS

PART	MATERIAL	FINISHING
Frame	Aluminium	Epoxy/polyester painted, white RAL 9010 30% gloss *
Vanes	Aluminium	Epoxy/polyester painted, white RAL 9010 30% gloss *
Installation frame	Galvanized steel	-
Plenum box / spigot	Galvanized steel	-

*) Note: Special colours available

GENERAL WDD DRAWINGS

WDD



DIMENSIONS

LxH	L1	L2	H1	H2
200x100	226	176	126	76
250x100	276	226	126	76
300x100	326	276	126	76
300x150	326	276	176	126
400x150	426	376	176	126
400x200	426	376	226	176
500x200	526	476	226	176
600x200	626	576	226	176
800x200	826	776	226	176
1000x200	1026	976	226	176
600x300	626	576	326	276
800x300	826	776	326	276
1000x300	1026	976	326	276
1000x400	1026	976	426	376
1200x400	1226	1176	426	376

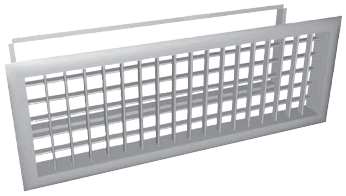
WDD: With OD (airflow adjustment damper) total depth = 48 mm + 45 mm.

In addition to these standard sizes, other dimensions are available by special order. The maximum size is 1500mm x 600mm.

Halton

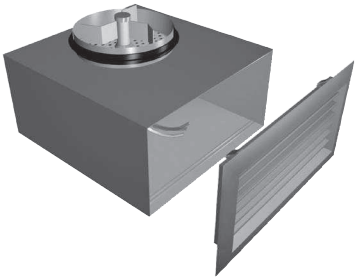
ACCESSORIES

ACCESSORY	CODE	DESCRIPTION
Balancing plenum	PRL	For balancing & equalising the airflow and attenuating the duct noise
Plenum	BDR	Plenum for duct connection (with or without attenuation material)
Airflow measurement and adjustment unit	MSM	For supply installation
Airflow measurement and adjustment unit	MEM	For exhaust installation
Sound attenuation	IN	Mineral wool for the BDR plenum box. Mineral wool ja polyester fibre for PRL plenum box.
Flow adjustment damper	OD	Aluminium opposite blade damper for airflow adjustment
Installation frame	IF	For installation without plenum
Visible screw fastening	SF	Screw fastening
Concealed screw fastening	CC	For installation with BDR plenum or IF frame
Wax-bulb actuator (WDD)	MT	The actuator controls the vane angle depending on the supply air temperature



Installation frame (IF)

PRL balancing plenum



BDR plenum box

WAX-BULB ACTUATOR (WDD)

In applications, where both heating and cooling are provided, the air pattern can be changed automatically via the wax-bulb actuator.
The wax-bulb actuator alters the angles of the horizontal rear vane depending on the supply air temperature. Neither auxiliary energy nor dedicated control system are needed.
When cold air is supplied at a temperature up to 18°C the supply jet is horizontal. The vane angle is 0°. As the supply air temperature rises, the actuator piston progressively changes the angle of the rear vanes to direct the supply air jet downwards. Vane angle reaches 45° in 10 to 20 minutes.
No maintenance is required for the wax-bulb actuator.

MORE INFORMATION

For more detailed information visit:
https://www.halton.com/en_GB/halton/products/-/product/WDD
or download Halton HIT Design tool at: https://www.halton.com/en_GB/halton/products/halton-hit-design-tool

DSH HIGH-EFFICIENCY DROPLET SEPARATOR

For demanding applications

MATERIALS

PART	MATERIAL	FINISHING
Droplet separator	Aluminium EN AW 6060	Painted RAL9010, C3 acc. standard* ISO 12944-2 as standard
Droplet separator	Stainless steel EN 1.4404 (AISI316L)	Painted as an option
Mask louvre	Aluminium EN AW 5754 / AW 6060	Painted RAL9010, C3 acc. standard* ISO 12944-2 as standard
Mask louvre	Stainless steel EN 1.4404 (AISI316L)	Painted as an option
Frame	Aluminium EN AW 5754	Painted RAL9010, C3 acc. standard* ISO 12944-2 as standard
Frame	Stainless steel EN 1.4404 (AISI316L)	Painted as an option
Net	Stainless steel EN 1.4404 (AISI316L)	-
Filter	ISO Coarse 70% panel filter or ePM2,5 65% bag filter, other types available on request	-

*) C3 durability of 7-15 years. C5-M with the durability of 15-25 years durability, available as an option.

DSH PRODUCT OPTIONS

Halton DSH is commonly delivered as a single-stage, two-stage or three-stage model:

- The single-stage unit comprises DSH vane section only, vane pitch can be 28mm, 23mm or 18mm
- The two-stage units comprise DSH+panel filter or DSH+bag filter
- The three-stage units comprise DSH+panel filter+DSH or DSH+bag filter+DSH

Special configurations are available

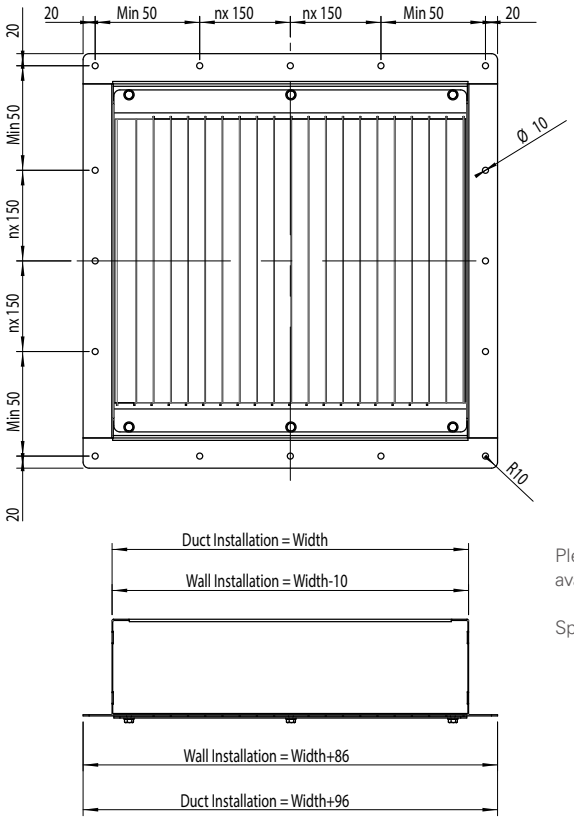
APPLICATIONS

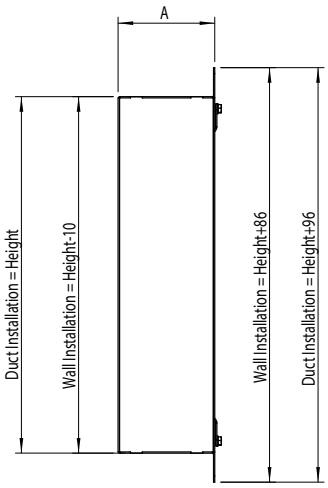
Halton's DSH high-efficiency droplet separators are designed for demanding applications such as marine, oil & gas, chemical, energy industries, where reliability, easy installation and special design play an important role.
Droplet separators operate on the principle of inertial vane separation and are designed to restrict the penetration of moisture, salt spray, rainwater and airborne aerosol particles into HVAC systems, engine room intakes, machinery spaces, and diesel and gas turbine engine air intakes.
Three configurations are commonly used according to the level of droplet removal efficiency required, single-stage, two-stage, and three-stage, but special configurations are also available. Two and three-stage units will include a coalescing and particulate filter. Halton can assist in the design and selection of the droplet separator according to the application with special consideration to the pressure drop, velocity, wind speed and direction, turbulence, and drainage.

FEATURES

- High droplet and moisture separation efficiency
  - Class A results (EN 13030:2001)
  - Minimum pressure drop
- Performance tested according to EN 13030:2001 test for louvres subjected to simulated rain, at the independent laboratory
- Independent droplet removal efficiency testing carried out for single-stage, two-stage and three-stage configurations
- Tailored sizes and designs according to customer's needs. Unlimited sizes with modular construction.
- For wall and duct installations
- Two and three-stage units will include a coalescing and particulate filter. Normally these are an ISO Coarse 70% panel filter or ePM2,5 65% bag filter.
- The option of a mask louvre (ML) is available to architecturally disguise the vertical vane sections
- A possibility to connect with Halton Marine fire or shut-off dampers resulting in saving of the space
- Easy installation and commissioning. No special maintenance required.

GENERAL DSH DRAWINGS





Please note that flanges in accordance with Norsok / ISO15138 are available as an option.

Special flange configurations available on request.

DSH DIMENSIONS

TYPE	A	
	Wall installation	Duct installation
DSH	160	170
DSH+ML	210	-
DSH+panel filter	225	235
DSH+panel filter+ML	275	-
DSH+bag filter	595	605
DSH+ML+bag filter	645	-

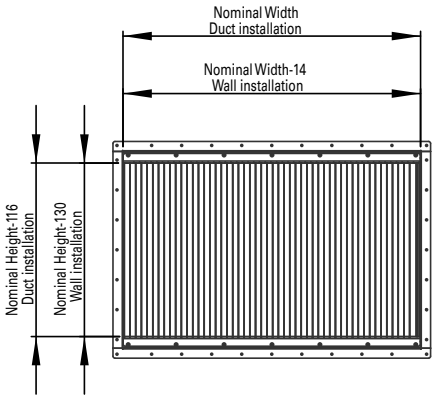
DSH = droplet separator
DSH+ML = droplet separator + mask louvre
DSH+panel filter = droplet separator + ISO Coarse 70% panel filter
DSH+panel filter+ML = droplet separator + ISO Coarse 70% panel filter with depth 360mm + mask louvre
DSH+bag filter = droplet separator + ePM2,5 65% bag filter with depth of 300 mm
DSH+ML+bag filter = droplet separator + mask louvre + ePM2,5 65% bag filter with depth of 360 mm
Net available as an option.

MATERIAL THICKNESS

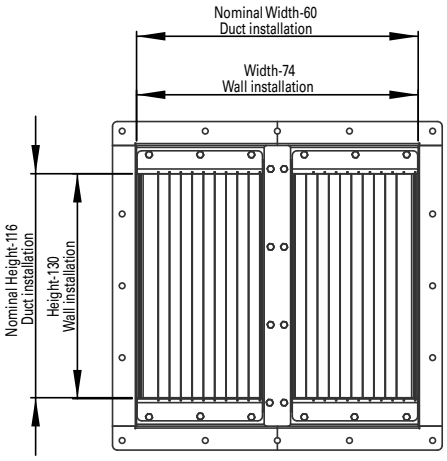
Standard frame thickness of 2 mm. 3 mm or more available as an option.

DSH FACE AREA DIMENSIONS

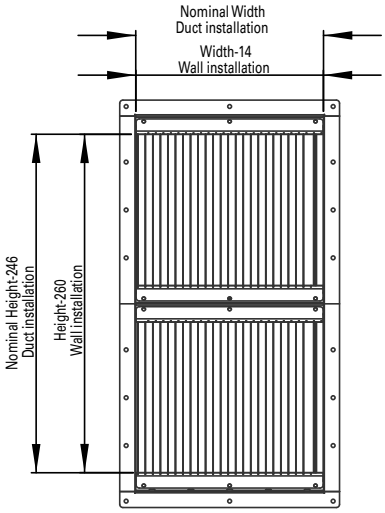
DSH single unit



DSH module unit (width)

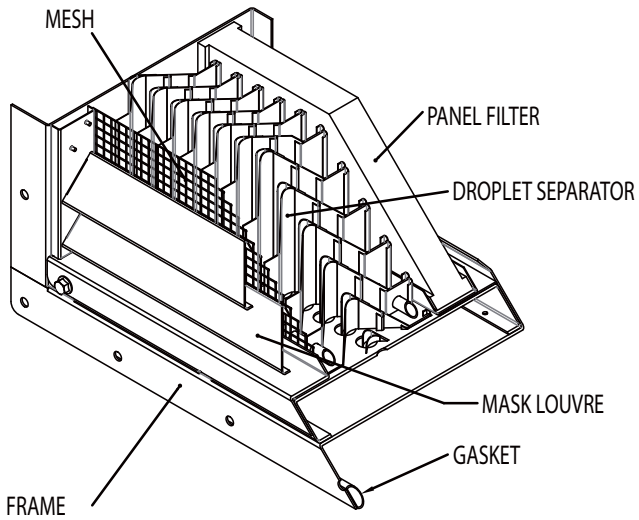


DSH module unit (height)



For example wall installation DSH
Size: width 600 mm, height 600 mm
= face area: width 586 mm, height 470 mm

GENERAL CONSTRUCTION

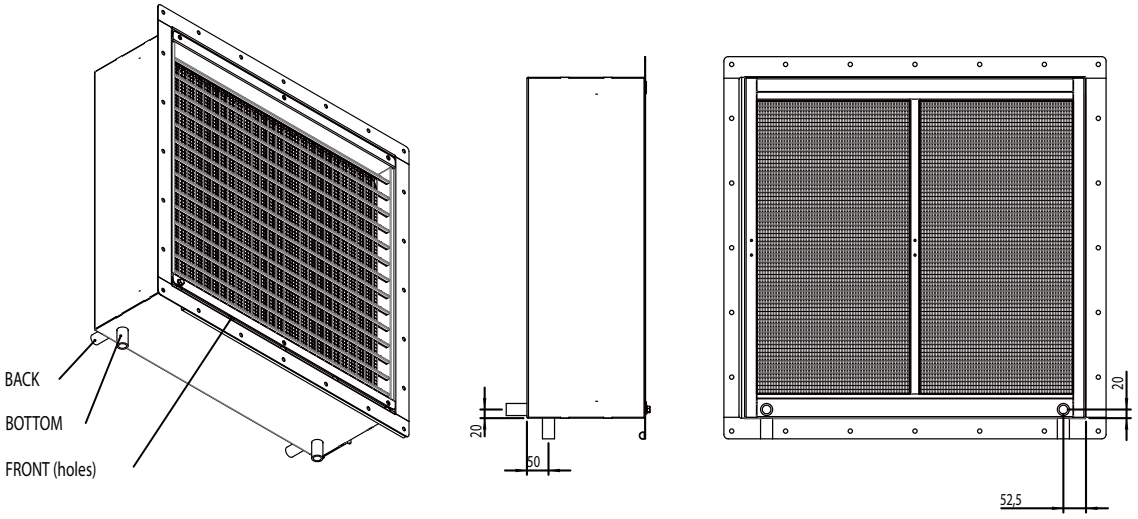


- The single-stage unit comprises DSH vane section only, vane pitch can be 28mm, 23mm or 18mm
- Two-stage units comprise DSH+panel filter or DSH+bag filter
- Three-stage units comprise DSH+panel filter+DSH or DSH+bag filter+DSH
- Special configurations are available
- Mask Louvre (ML) and mesh (ME) are available as an option
- The mesh (ME) prevents objects from entering the air intake system
- The mask louvre (ML) is available to architecturally disguise the vertical vane sections
- Access to filter for removal and maintenance is LH (left hand) or RH (right hand) as standard

DRAINAGE

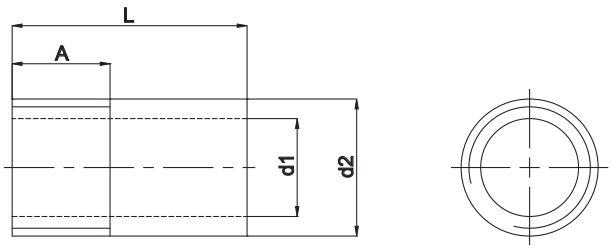
Single-stage units are supplied with front drain holes or with drainage pipes. Two and three-stage units are normally supplied with a manometric drain trap to prevent unfiltered air by-passing the droplet separator.

DRAIN LOCATIONS



DRAIN PIPE SIZES

Weld-on nipple	Size	L mm	A mm	d1 mm	d2 mm
Aluminium	1/2	50	20	15	22
	3/4	50	20	20	28
	1	60	25	25	35
Stainless steel AISI 316	1/2	35	15	16	21
	3/4	40	15	22	27
	1	60	25	25	34

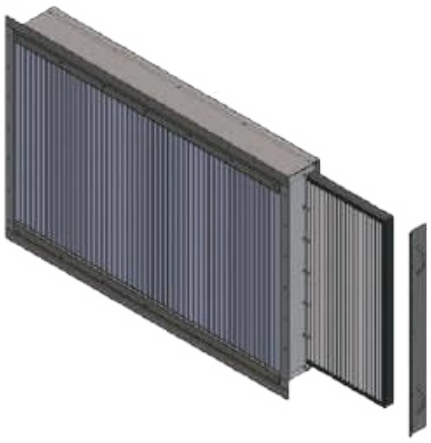


Standard size is 3/4". 1/2" and 1" are available as an option. Thread type BSPT (male).

OPTIONAL FEATURES

SERVICE HATCH (SH)

Enables easy access to the filter from the side of the unit. Hatch can be placed to the left side (HL) or the right side (HR) of the DSH. (ISO Coarse 70% panel filter in the picture).



ISO COARSE 70% PANEL FILTER

Panel filters are manufactured of progressive thermally smoothened synthetic polyester having high dust holding capacity and constancy for humidity. The filters are used in the general ventilation system for air purification.

ePM10 70%, ePM2,5 65% AND ePM1 50% BAG FILTERS

The materials of the synthetic fine filters are high-quality and durable, progressive mounted synthetic fibres. The filters can be used in example for air purification of the intake air.

ATEX APPROVED FILTERS

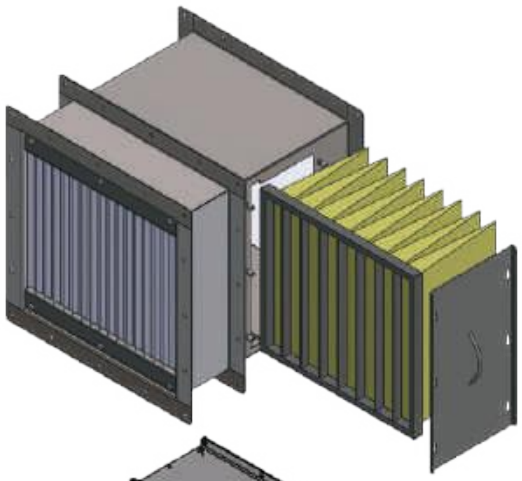
Halton Marine also offers ATEX approved filters for droplet separators.

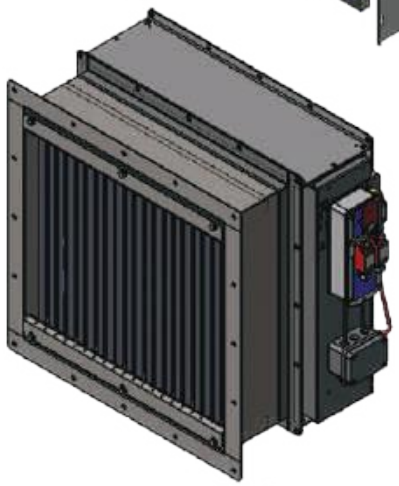
INSTALLATION IN CONJUNCTION WITH A DAMPER

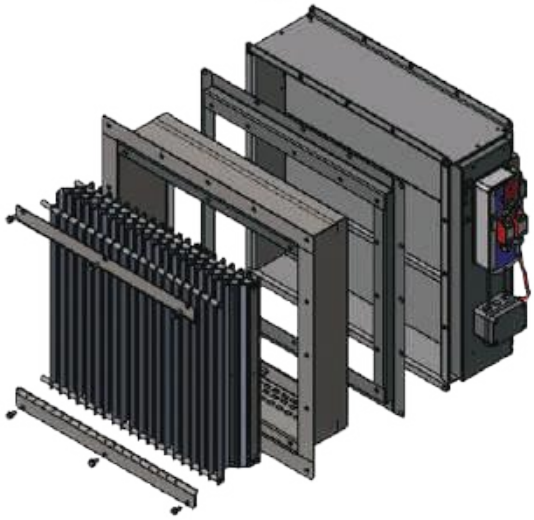
Halton droplet separator can be connected to a Halton Marine damper with or without a connection piece. In both cases, the construction is modified to fit the damper. Connecting DSH with a fire damper must be mentioned when ordering products. Special flanges and drilling patterns are available for all models on request. The structural flexibility of dampers and high-quality combined with a wide range of accessories (ex-actuators) and special steels, enable Halton Marine to offer tailored solutions for its customers.
Combining Halton Marine droplet separator to damper offers customers a compact solution for air intake that also saves space. The products are recommended to be connected at Halton Marine factory.

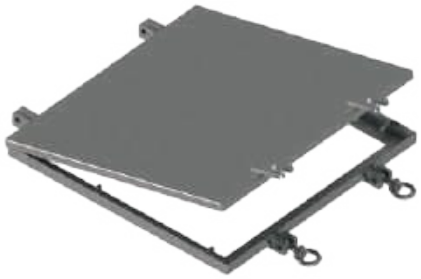
WEATHERTIGHT HATCH

Weathertight hatch is used e.g. to shut down the intake close to the waterline in the event of rough seas.
See a separate brochure on weathertight hatch called Halton WTH.



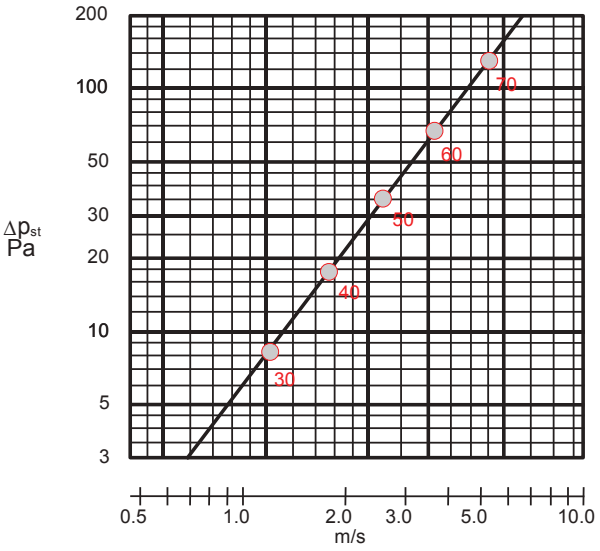




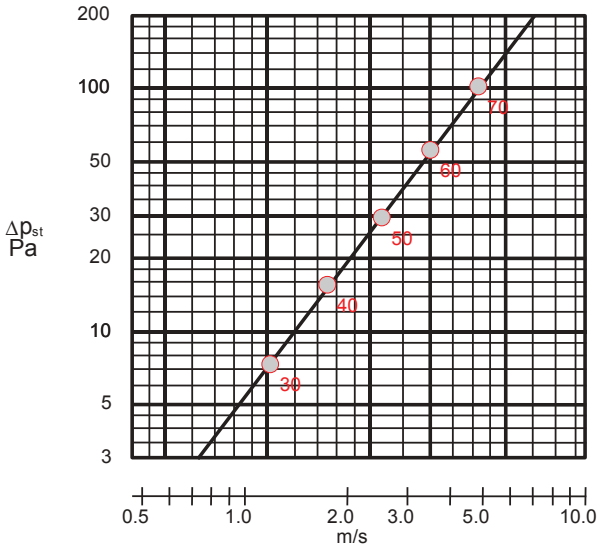


PRESSURE DROP AND SOUND DATA LWA[DB(A)], PITCH SPACING 28. VELOCITY IS BASED ON FACE AREA.

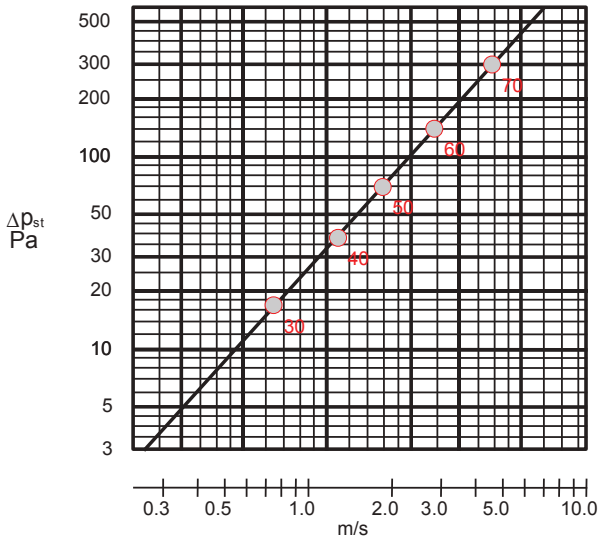
DSH aluminium



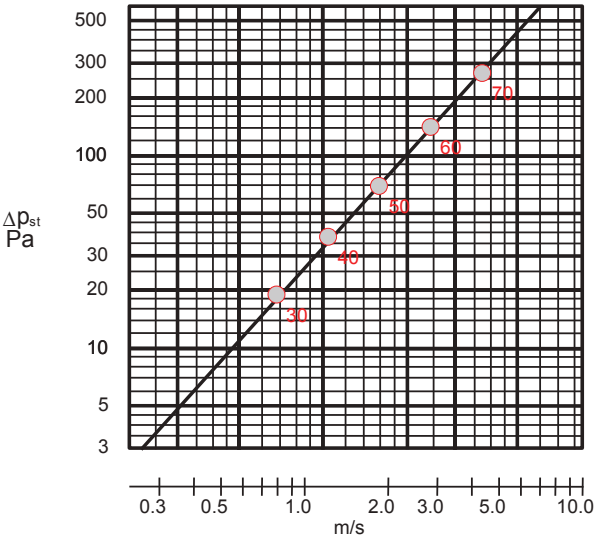
DSH stainless steel



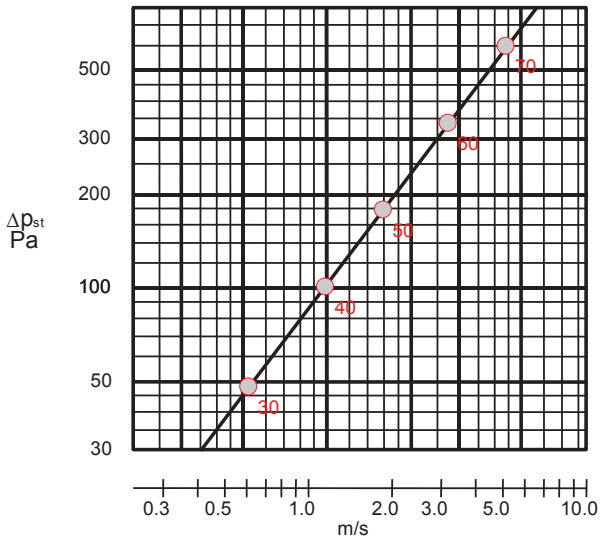
DSH aluminium with ISO Coarse 70% panel filter



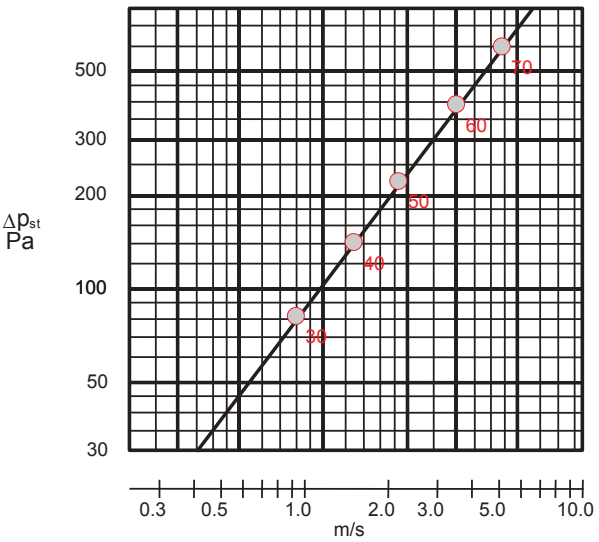
DSH stainless steel with ISO Coarse 70% panel filter



DSH aluminium with ePM2,5 65% bag filter

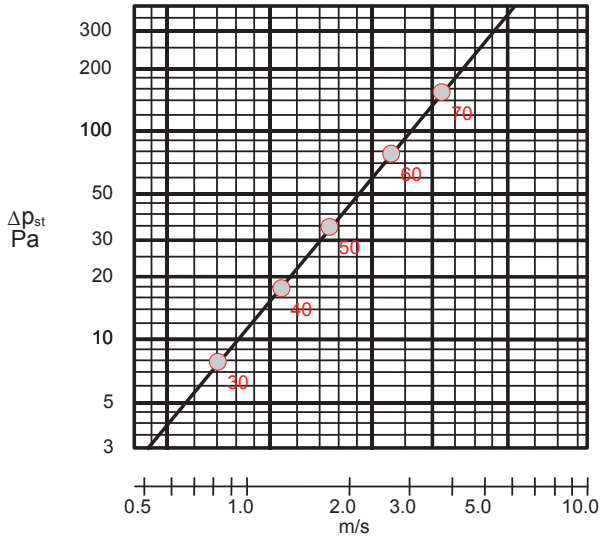


DSH stainless steel with ePM2,5 65% bag filter

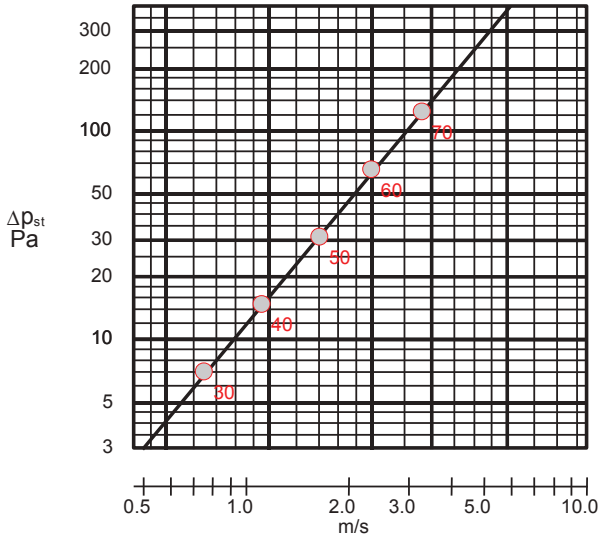


PRESSURE DROP AND SOUND DATA LWA[DB(A)], PITCH SPACING 28. VELOCITY IS BASED ON FACE AREA.

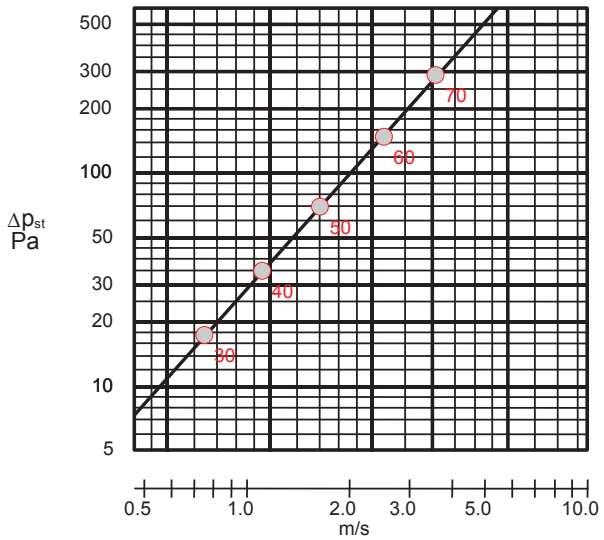
DSH aluminium with mask louvre



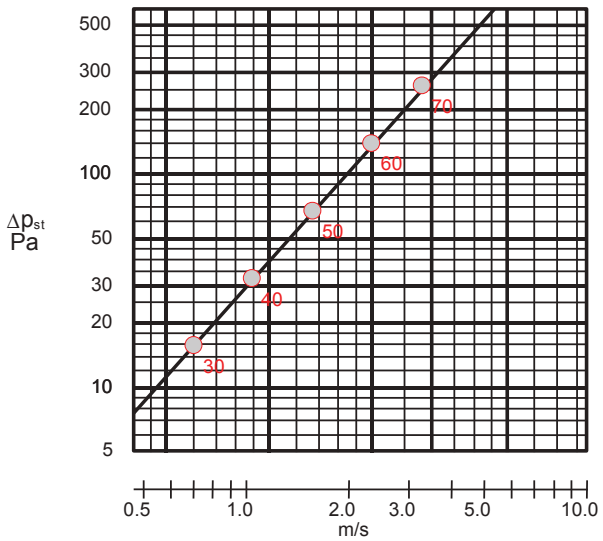
DSH stainless steel with mask louvre



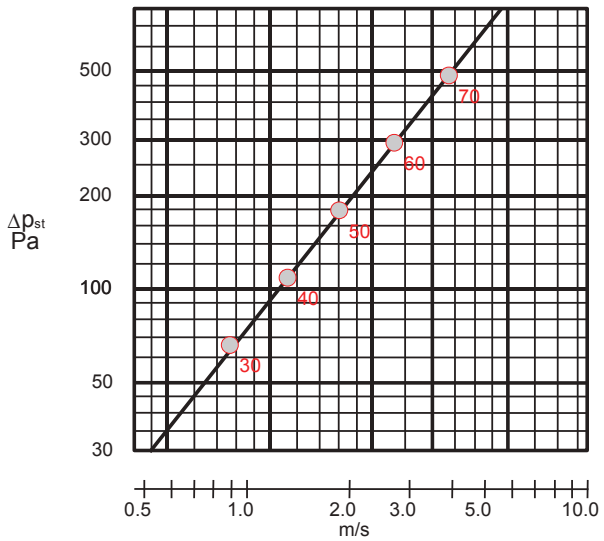
DSH aluminium with mask louvre
and ISO Coarse 70% panel filter



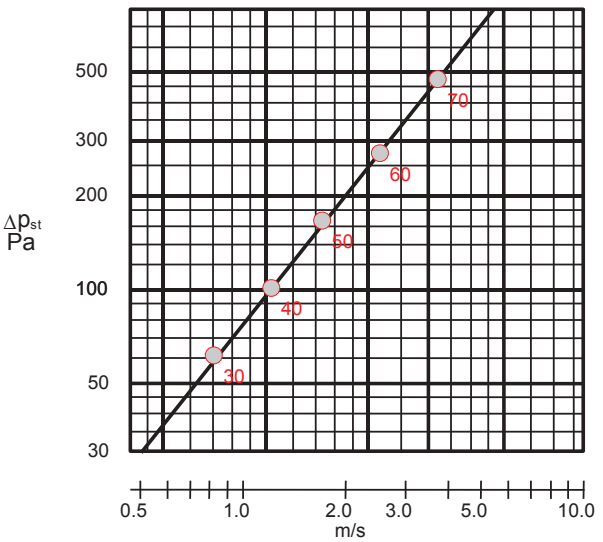
DSH stainless steel with mask louvre
and ISO Coarse 70% panel filter



DSH aluminium with mask louvre
and ePM2,5 65% bag filter



DSH stainless steel with mask louvre
and ePM2,5 65% bag filter



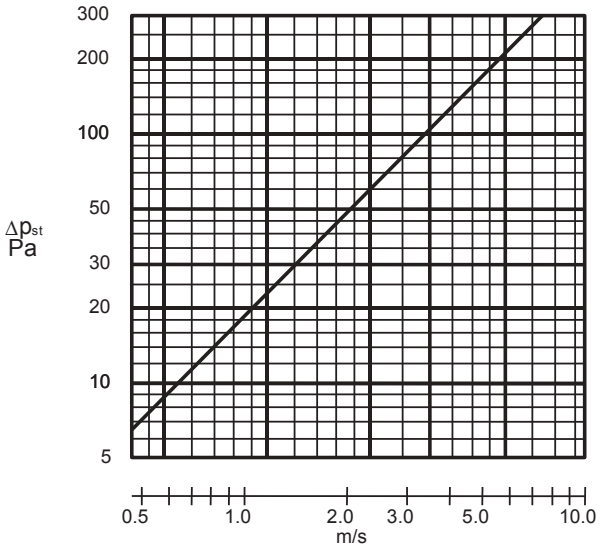
Measured size 1000 x 1000 mm.

Halton

PRESSURE DROP, PITCH SPACING 18 MM.

VELOCITY IS BASED ON FACE AREA.

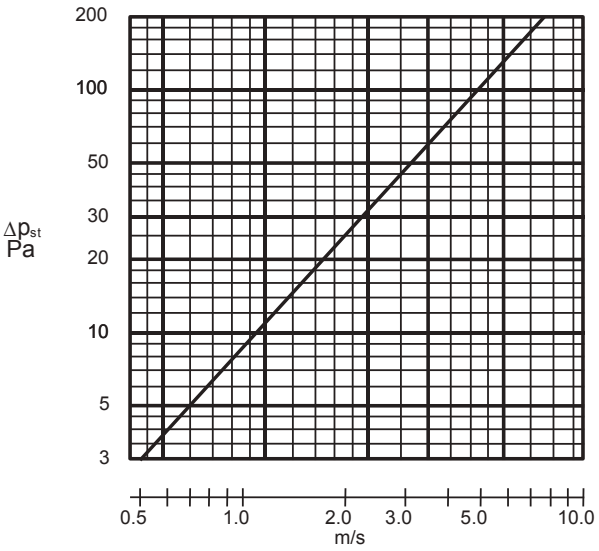
DSH stainless steel



PRESSURE DROP, PITCH SPACING 23 MM.

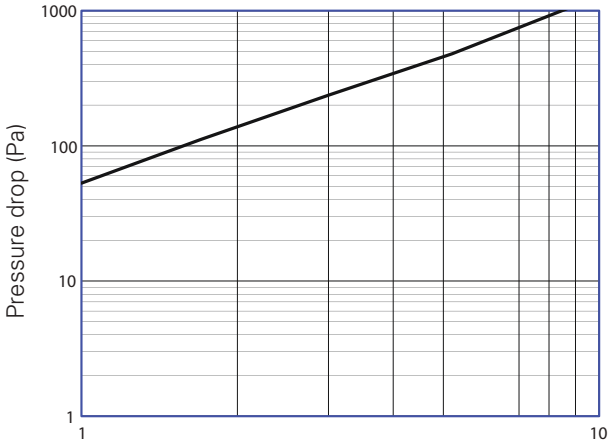
VELOCITY IS BASED ON FACE AREA.

DSH stainless steel



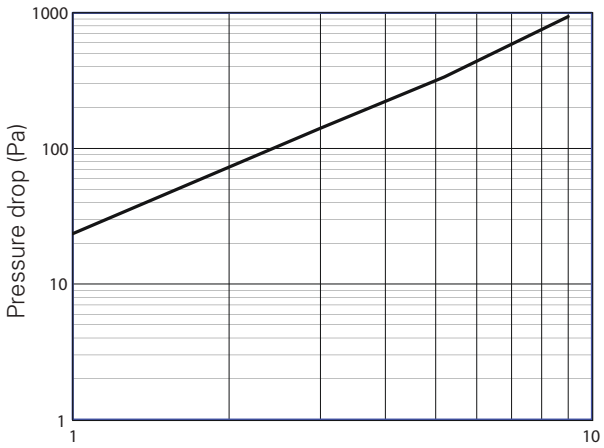
DSH PRESSURE DROP, PITCH SPACING 18 MM, THREE STAGE DROPLET SEPARATOR.

DSH stainless steel with ePM2,5 65% bag filter and DSH stainless steel



Air velocity at the face area of the droplet separator (m/s).

DSH stainless steel with ISO Coarse 70% panel filter and DSH stainless steel

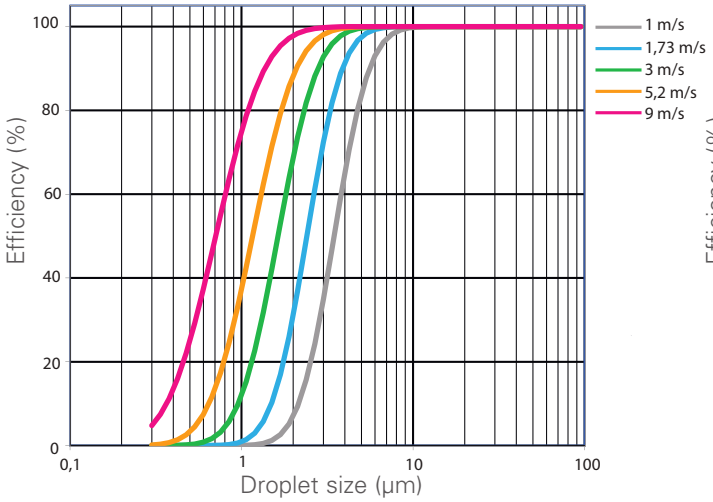


Air velocity at the face area of the droplet separator (m/s).

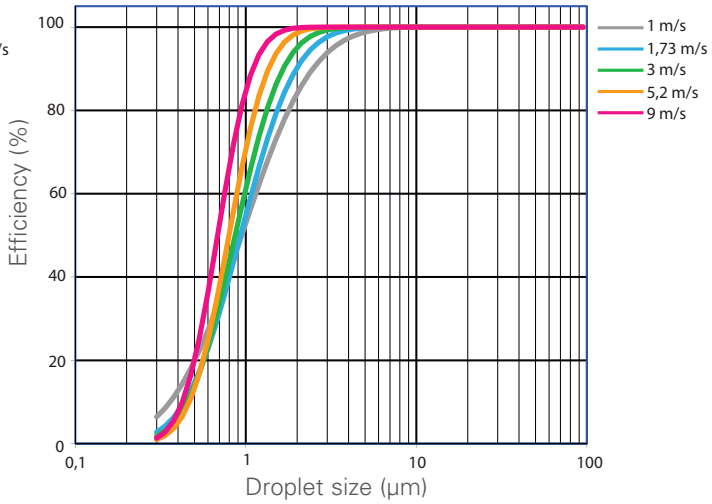
Please note: Pressure drop is dependent on total configuration. Please contact Halton Marine for further information.

DSH EFFICIENCY RESULTS

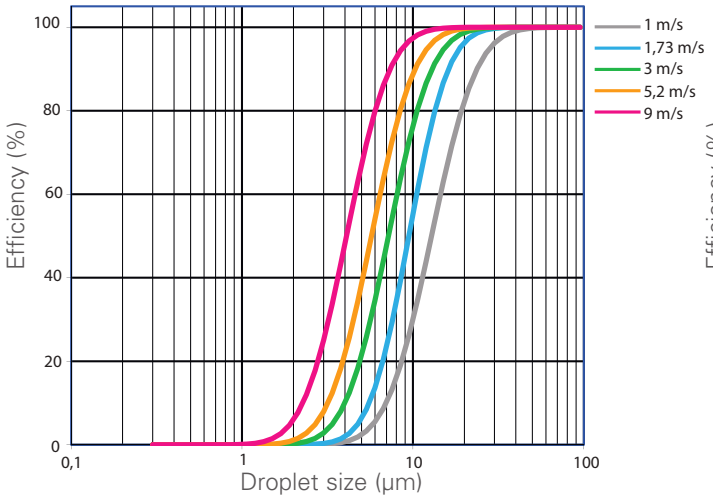
Three-stage droplet separator with ISO Coarse 70% panel filter



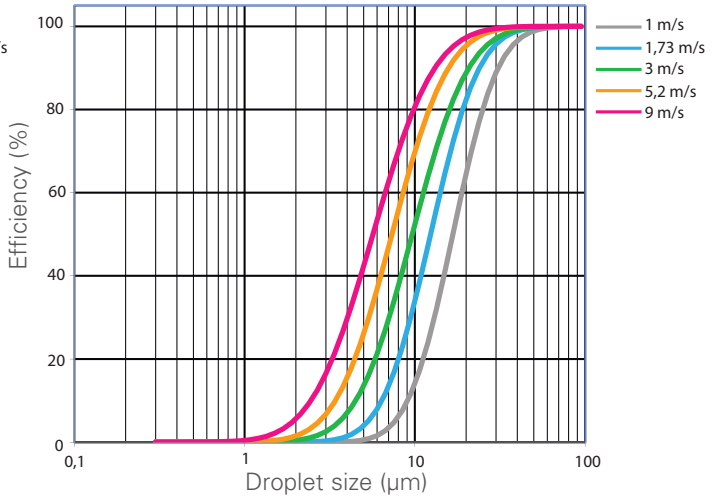
Three-stage droplet separator with ePM2,5 65% bag filter



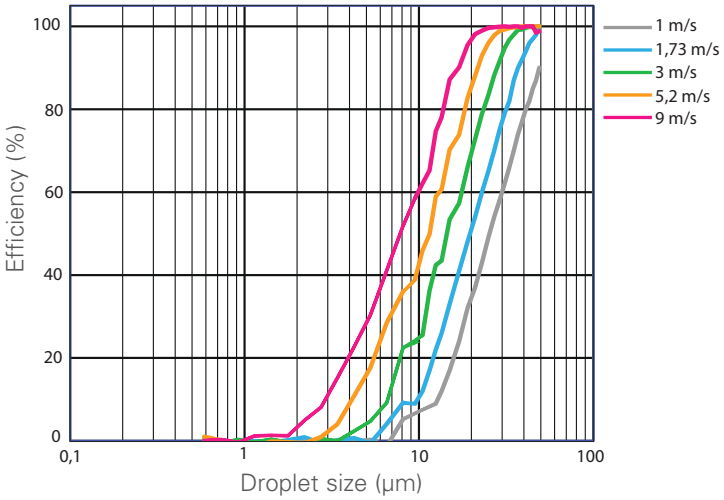
Single-stage DSH, pitch spacing 18 mm



Single-stage DSH, pitch spacing 23 mm



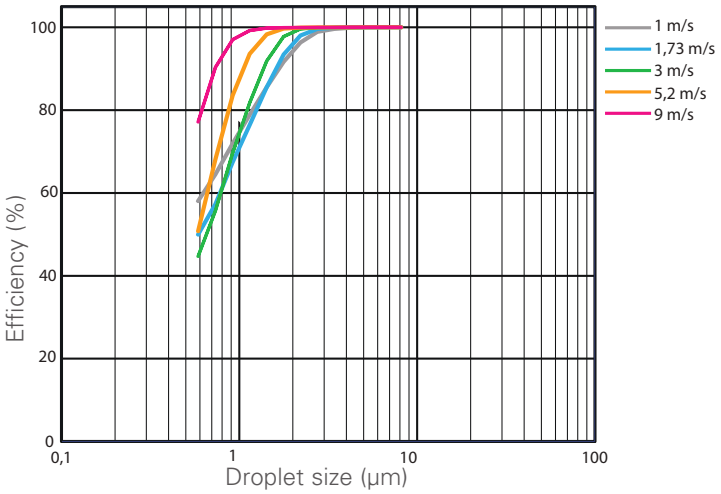
Single-stage DSH, pitch spacing 28 mm



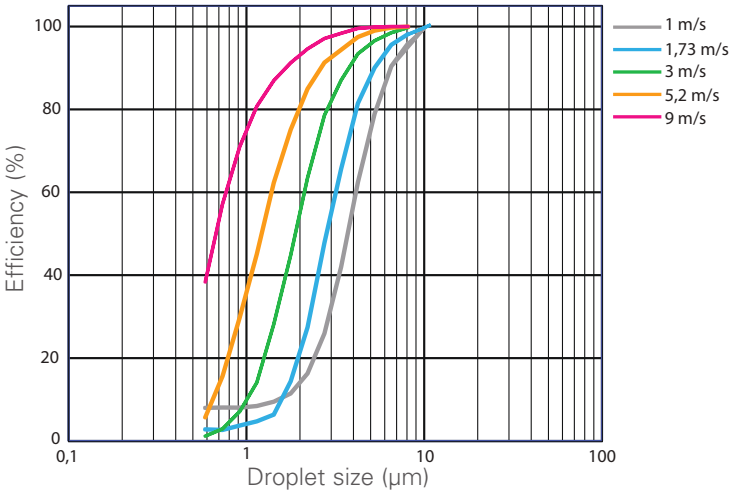
Halton

DSH EFFICIENCY RESULTS

Two-stage DSH with ePM2,5 65% bag filter



Two-stage DSH with ISO Coarse 70% panel filter (filter depth 48 mm)



PERFORMANCE DATA

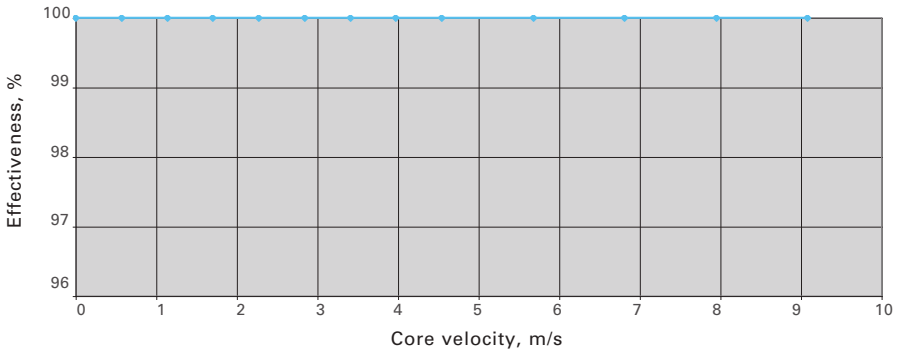
Effectiveness for removal of simulated rain

EN 13030:2001

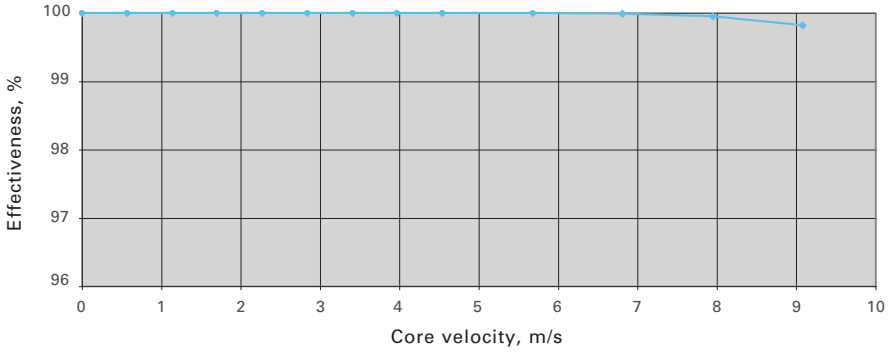
Rainfall rate: 75 (l/h)/m², (75 mm/h)

Vertical installation

Rainwater effectiveness, material aluminium



Rainwater effectiveness, material stainless steel



WEIGHTS

WEIGHTS OF DSH INCLUDING FRAME, ALUMINIUM (KG), pitch spacing 28 mm

H/HEIGHT	B / WIDTH (mm)													
mm	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
200	1,7	2,1	3,1	3,9	4,8	5,8	6,7	7,6	8,6	9,4	10,3	11,3	12,2	13,0
300	2,4	2,9	4,4	5,6	6,8	8,3	9,5	10,8	12,2	13,5	14,7	16,2	17,4	18,6
400	3,1	3,7	5,7	7,3	8,9	10,8	12,4	14,0	15,9	17,5	19,1	21,0	22,6	24,2
500	3,9	4,6	7,0	8,9	10,9	13,3	15,2	17,2	19,6	21,5	23,5	25,9	27,8	29,8
600	4,6	5,4	8,3	10,6	12,9	15,8	18,1	20,4	23,3	25,6	27,9	30,8	33,0	35,3
700	5,3	6,3	9,6	12,3	14,9	18,3	20,9	23,6	27,0	29,6	32,2	35,6	38,3	40,9
800	6,0	7,1	10,9	13,9	16,9	20,8	23,8	26,8	30,6	33,6	36,6	40,5	43,5	46,5
900	6,7	7,9	12,3	15,6	19,0	23,3	26,6	30,0	34,3	37,7	41,0	45,4	48,7	52,1
1000	7,5	8,8	13,6	17,3	21,0	25,8	29,5	33,2	38,0	41,7	45,4	50,2	53,9	57,6
1100	8,2	9,6	14,9	19,0	23,0	28,3	32,4	36,4	41,7	45,7	49,8	55,1	59,1	63,2
1200	8,9	10,5	16,2	20,6	25,0	30,8	35,2	39,6	45,4	49,8	54,2	59,9	64,4	68,8

The weights on the table are indicative and do not include the filter.

WEIGHTS OF DSH INCLUDING FRAME, ALUMINIUM (KG), pitch spacing 23 mm

H/HEIGHT	B / WIDTH (mm)													
mm	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
200	2,3	3,3	4,5	5,5	6,5	7,5	8,6	9,6	10,6	11,6	12,8	13,8	14,8	15,8
300	3,4	4,9	6,6	8,1	9,6	11,1	12,8	14,3	15,7	17,2	18,9	20,4	21,9	23,4
400	4,5	6,4	8,8	10,7	12,7	14,6	16,9	18,9	20,8	22,8	25,1	27,1	29,0	31,0
500	5,6	8,0	10,9	13,3	15,8	18,2	21,1	23,5	25,9	28,4	31,3	33,7	36,1	38,6
600	6,6	9,5	13,0	15,9	18,8	21,7	25,2	28,1	31,0	33,9	37,5	40,3	43,2	46,1
700	7,7	11,1	15,2	18,6	21,9	25,3	29,4	32,8	36,1	39,5	43,6	47,0	50,4	53,7
800	8,8	12,6	17,3	21,2	25,0	28,9	33,6	37,4	41,2	45,1	49,8	53,6	57,5	61,3
900	9,9	14,2	19,5	23,8	28,1	32,4	37,7	42,0	46,4	50,7	56,0	60,3	64,6	68,9
1000	10,9	15,7	21,6	26,4	31,2	36,0	41,9	46,7	51,5	56,2	62,1	66,9	71,7	76,5
1100	12,0	17,3	23,8	29,0	34,3	39,6	46,0	51,3	56,6	61,8	68,3	73,6	78,8	84,1
1200	13,1	18,8	25,9	31,6	37,4	43,1	50,2	55,9	61,7	67,4	74,5	80,2	85,9	91,7

The weights on the table are indicative and do not include the filter.

WEIGHTS OF DSH INCLUDING FRAME, ALUMINIUM (KG), pitch spacing 18 mm

H/HEIGHT	B / WIDTH (mm)													
mm	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
200	2,6	3,7	4,9	6,0	7,2	8,3	9,4	10,6	11,7	12,9	14,0	15,1	16,3	17,4
300	3,9	5,7	7,4	9,1	10,8	12,6	14,3	16,0	17,8	19,5	21,2	23,0	24,7	26,4
400	5,2	7,6	9,9	12,2	14,5	16,8	19,2	21,5	23,8	26,1	28,5	30,8	33,1	35,4
500	6,5	9,5	12,4	15,3	18,2	21,1	24,0	27,0	29,9	32,8	35,7	38,6	41,5	44,4
600	7,9	11,4	14,9	18,4	21,9	25,4	28,9	32,4	35,9	39,4	42,9	46,4	49,9	53,4
700	9,2	13,3	17,4	21,5	25,6	29,7	33,8	37,9	42,0	46,1	50,2	54,3	58,4	62,5
800	10,5	15,2	19,9	24,6	29,2	33,9	38,6	43,3	48,0	52,7	57,4	62,1	66,8	71,5
900	11,8	17,1	22,4	27,6	32,9	38,2	43,5	48,8	54,1	59,3	64,6	69,9	75,2	80,5
1000	13,1	19,0	24,9	30,7	36,6	42,5	48,4	54,2	60,1	66,0	71,9	77,7	83,6	89,5
1100	14,4	20,9	27,4	33,8	40,3	46,8	53,2	59,7	66,2	72,6	79,1	85,6	92,0	98,5
1200	15,7	22,8	29,9	36,9	44,0	51,0	58,1	65,1	72,2	79,3	86,3	93,4	100,4	107,5

The weights on the table are indicative and do not include the filter.

WEIGHTS OF DSH+ML INCLUDING FRAME, ALUMINIUM (KG), pitch spacing 28 mm

H/HEIGHT	B / WIDTH (mm)													
mm	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
200	2,8	4,1	5,2	6,3	7,6	8,7	9,9	11,1	12,2	13,4	14,6	15,8	16,9	18,2
300	3,8	5,6	7,2	8,8	10,6	12,1	13,7	15,5	17,1	18,6	20,4	22,0	23,6	25,4
400	4,8	7,2	9,2	11,2	13,5	15,5	17,5	19,9	21,9	23,9	26,2	28,2	30,2	32,6
500	5,9	8,8	11,2	13,6	16,5	19,0	21,4	24,3	26,7	29,1	32,1	34,5	36,9	39,8
600	6,9	10,3	13,2	16,0	19,5	22,4	25,2	28,7	31,5	34,4	37,9	40,7	43,6	47,0
700	7,9	11,9	15,2	18,5	22,5	25,8	29,1	33,1	36,4	39,6	43,7	46,9	50,2	54,2
800	8,9	13,5	17,2	20,9	25,5	29,2	32,9	37,5	41,2	44,9	49,5	53,2	56,9	61,5
900	9,9	15,0	19,2	23,3	28,4	32,6	36,7	41,9	46,0	50,2	55,3	59,4	63,6	68,7
1000	10,9	16,6	21,2	25,8	31,4	36,0	40,6	46,2	50,8	55,4	61,1	65,6	70,2	75,9
1100	12,0	18,2	23,2	28,2	34,4	39,4	44,4	50,6	55,6	60,7	66,9	71,9	76,9	83,1
1200	13,0	19,7	25,2	30,6	37,4	42,8	48,3	55,0	60,5	65,9	72,7	78,1	83,6	90,3

The weights on the table are indicative and do not include the filter.

Halton

WEIGHTS OF DSH+ML INCLUDING FRAME, ALUMINIUM (KG), pitch spacing 23 mm

H/HEIGHT	B / WIDTH (mm)													
mm	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
200	3,1	4,3	5,7	7,0	8,3	9,5	10,9	12,2	13,5	14,7	16,1	17,4	18,7	19,9
300	4,3	6,1	8,2	10,0	11,8	13,7	15,7	17,5	19,4	21,2	23,2	25,0	26,9	28,7
400	5,6	7,9	10,7	13,0	15,4	17,8	20,5	22,9	25,2	27,6	30,3	32,7	35,1	37,4
500	6,8	9,7	13,2	16,1	19,0	21,9	25,3	28,2	31,1	34,0	37,4	40,4	43,3	46,2
600	8,1	11,6	15,6	19,1	22,6	26,0	30,1	33,6	37,0	40,5	44,5	48,0	51,5	54,9
700	9,3	13,4	18,1	22,1	26,1	30,1	34,9	38,9	42,9	46,9	51,7	55,7	59,7	63,7
800	10,6	15,2	20,6	25,1	29,7	34,3	39,7	44,2	48,8	53,4	58,8	63,3	67,9	72,4
900	11,9	17,0	23,0	28,2	33,3	38,4	44,5	49,6	54,7	59,8	65,9	71,0	76,1	81,2
1000	13,1	18,8	25,5	31,2	36,8	42,5	49,2	54,9	60,6	66,2	73,0	78,6	84,3	90,0
1100	14,4	20,6	28,0	34,2	40,4	46,6	54,0	60,2	66,5	72,7	80,1	86,3	92,5	98,7
1200	15,6	22,4	30,5	37,2	44,0	50,7	58,8	65,6	72,3	79,1	87,2	93,9	100,7	107,5

The weights on the table are indicative and do not include the filter.

WEIGHTS OF DSH+ML INCLUDING FRAME, ALUMINIUM (KG), pitch spacing 18 mm

H/HEIGHT	B / WIDTH (mm)													
mm	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
200	3,3	4,7	6,1	7,5	8,9	10,3	11,7	13,1	14,5	15,9	17,3	18,7	20,1	21,5
300	4,8	6,9	9,0	11,0	13,1	15,2	17,2	19,3	21,4	23,4	25,5	27,6	29,7	31,7
400	6,3	9,1	11,8	14,5	17,3	20,0	22,7	25,5	28,2	30,9	33,7	36,4	39,2	41,9
500	7,8	11,2	14,6	18,0	21,4	24,8	28,2	31,6	35,0	38,5	41,9	45,3	48,7	52,1
600	9,3	13,4	17,5	21,5	25,6	29,7	33,7	37,8	41,9	46,0	50,0	54,1	58,2	62,2
700	10,8	15,5	20,3	25,0	29,8	34,5	39,2	44,0	48,7	53,5	58,2	62,9	67,7	72,4
800	12,3	17,7	23,1	28,5	33,9	39,3	44,7	50,1	55,6	61,0	66,4	71,8	77,2	82,6
900	13,8	19,9	25,9	32,0	38,1	44,2	50,2	56,3	62,4	68,5	74,5	80,6	86,7	92,8
1000	15,3	22,0	28,8	35,5	42,3	49,0	55,7	62,5	69,2	76,0	82,7	89,5	96,2	102,9
1100	16,8	24,2	31,6	39,0	46,4	53,8	61,2	68,6	76,1	83,5	90,9	98,3	105,7	113,1
1200	18,3	26,3	34,4	42,5	50,6	58,7	66,7	74,8	82,9	91,0	99,1	107,1	115,2	123,3

The weights on the table are indicative and do not include the filter.

WEIGHTS OF DSH INCLUDING FRAME, STAINLESS STEEL AISI316 (KG), pitch spacing 28 mm

H/HEIGHT	B / WIDTH (mm)													
mm	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
200	4,9	6,7	8,6	10,4	12,3	14,1	16,0	17,8	19,7	21,5	23,4	25,2	27,1	28,9
300	6,4	8,5	10,9	13,1	15,5	17,7	20,1	22,2	24,6	26,8	29,2	31,3	33,8	35,9
400	7,9	10,4	13,3	15,8	18,7	21,2	24,1	26,7	29,6	32,1	35,0	37,5	40,4	43,0
500	9,3	12,2	15,6	18,5	21,9	24,8	28,2	31,1	34,5	37,4	40,8	43,7	47,1	50,0
600	10,8	14,1	18,0	21,2	25,1	28,4	32,3	35,6	39,5	42,7	46,6	49,9	53,8	57,1
700	12,3	15,9	20,3	23,9	28,3	32,0	36,4	40,0	44,4	48,1	52,5	56,1	60,5	64,1
800	13,7	17,7	22,6	26,6	31,5	35,6	40,5	44,5	49,4	53,4	58,3	62,3	67,2	71,2
900	15,2	19,6	25,0	29,4	34,8	39,1	44,5	48,9	54,3	58,7	64,1	68,5	73,9	78,3
1000	16,7	21,4	27,3	32,1	38,0	42,7	48,6	53,4	59,3	64,0	69,9	74,7	80,6	85,3
1100	18,1	23,3	29,7	34,8	41,2	46,3	52,7	57,8	64,2	69,3	75,7	80,9	87,2	92,4
1200	19,6	25,1	32,0	37,5	44,4	49,9	56,8	62,3	69,2	74,7	81,5	87,0	93,9	99,4

The weights on the table are indicative and do not include the filter.

WEIGHTS OF DSH INCLUDING FRAME, STAINLESS STEEL AISI316 (KG), pitch spacing 23 mm

H/HEIGHT	B / WIDTH (mm)													
mm	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
200	5,1	7,0	9,0	10,9	12,9	14,8	16,8	18,8	20,7	22,6	24,7	26,6	28,5	30,4
300	6,6	9,1	11,7	14,2	16,6	19,0	21,7	24,1	26,5	28,9	31,6	34,0	36,4	38,8
400	8,2	11,2	14,5	17,4	20,3	23,2	26,5	29,4	32,3	35,2	38,5	41,4	44,3	47,3
500	9,8	13,2	17,2	20,6	24,0	27,4	31,3	34,7	38,1	41,5	45,5	48,9	52,3	55,7
600	11,4	15,3	19,9	23,8	27,7	31,6	36,1	40,0	43,9	47,8	52,4	56,3	60,2	64,1
700	13,0	17,4	22,6	27,0	31,4	35,8	41,0	45,4	49,8	54,2	59,3	63,7	68,1	72,5
800	14,6	19,5	25,3	30,2	35,1	40,0	45,8	50,7	55,6	60,5	66,3	71,2	76,1	81,0
900	16,2	21,6	28,0	33,4	38,8	44,2	50,6	56,0	61,4	66,8	73,2	78,6	84,0	89,4
1000	17,8	23,7	30,7	36,6	42,5	48,4	55,4	61,3	67,2	73,1	80,1	86,0	91,9	97,8
1100	19,4	25,8	33,4	39,8	46,2	52,6	60,2	66,6	73,0	79,4	87,1	93,4	99,8	106,2
1200	21,0	27,9	36,1	43,0	49,9	56,8	65,1	72,0	78,8	85,7	94,0	100,9	107,8	114,6

The weights on the table are indicative and do not include the filter.

WEIGHTS OF DSH INCLUDING FRAME, STAINLESS STEEL AISI316 (KG), pitch spacing 18 mm

H/HEIGHT	B / WIDTH (mm)													
mm	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
200	5,3	7,5	9,6	11,8	13,9	15,9	18,1	20,2	22,4	24,4	26,5	28,7	30,8	33,0
300	7,2	10,1	12,8	15,8	18,4	21,1	24,1	26,7	29,7	32,4	35,0	38,0	40,7	43,6
400	9,0	12,7	16,0	19,7	23,0	26,3	30,0	33,3	37,0	40,3	43,6	47,3	50,6	54,3
500	10,9	15,3	19,2	23,7	27,6	31,5	35,9	39,9	44,3	48,2	52,1	56,6	60,5	64,9
600	12,7	17,9	22,4	27,6	32,2	36,7	41,9	46,4	51,6	56,1	60,7	65,9	70,4	75,6
700	14,5	20,5	25,6	31,6	36,7	41,9	47,8	53,0	58,9	64,1	69,2	75,2	80,3	86,3
800	16,4	23,1	28,8	35,5	41,3	47,1	53,8	59,5	66,2	72,0	77,8	84,5	90,2	96,9
900	18,2	25,6	32,1	39,5	45,9	52,3	59,7	66,1	73,5	79,9	86,3	93,8	100,2	107,6
1000	20,1	28,2	35,3	43,4	50,4	57,5	65,6	72,7	80,8	87,9	94,9	103,0	110,1	118,2
1100	21,9	30,8	38,5	47,4	55,0	62,7	71,6	79,2	88,1	95,8	103,4	112,3	120,0	128,9
1200	23,8	33,4	41,7	51,3	59,6	67,9	77,5	85,8	95,4	103,7	112,0	121,6	129,9	139,6

The weights on the table are indicative and do not include the filter.

WEIGHTS OF DSH+ML INCLUDING FRAME, STAINLESS STEEL (KG), pitch spacing 28 mm

H/HEIGHT	B / WIDTH (mm)													
mm	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
200	7,2	9,8	12,5	15,0	17,7	20,2	22,9	25,5	28,2	30,7	33,4	36,0	38,6	41,2
300	9,1	12,1	15,4	18,4	21,7	24,7	28,0	31,0	34,3	37,3	40,6	43,6	46,9	49,9
400	11,0	14,5	18,4	21,9	25,7	29,2	33,1	36,6	40,5	43,9	47,8	51,3	55,2	58,7
500	12,9	16,9	21,3	25,3	29,8	33,7	38,2	42,1	46,6	50,6	55,0	59,0	63,4	67,4
600	14,8	19,2	24,3	28,7	33,8	38,2	43,3	47,7	52,7	57,2	62,2	66,7	71,7	76,1
700	16,7	21,6	27,3	32,1	37,8	42,7	48,3	53,2	58,9	63,8	69,4	74,3	80,0	84,9
800	18,6	24,0	30,2	35,6	41,8	47,2	53,4	58,8	65,0	70,4	76,6	82,0	88,3	93,6
900	20,5	26,3	33,2	39,0	45,8	51,7	58,5	64,3	71,2	77,0	83,9	89,7	96,5	102,3
1000	22,4	28,7	36,1	42,4	49,9	56,2	63,6	69,9	77,3	83,6	91,1	97,4	104,8	111,1
1100	24,3	31,1	39,1	45,9	53,9	60,7	68,7	75,4	83,5	90,2	98,3	105,0	113,1	119,8
1200	26,2	33,4	42,1	49,3	57,9	65,1	73,8	81,0	89,6	96,9	105,5	112,7	121,3	128,6

The weights on the table are indicative and do not include the filter.

WEIGHTS OF DSH+ML INCLUDING FRAME, STAINLESS STEEL (KG), pitch spacing 23 mm

H/HEIGHT	B / WIDTH (mm)													
mm	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
200	7,4	10,0	12,9	15,6	18,3	20,9	23,8	26,5	29,2	31,8	34,7	37,4	40,1	42,7
300	9,4	12,7	16,2	19,5	22,8	26,1	29,6	32,9	36,2	39,5	43,0	46,3	49,6	52,9
400	11,4	15,3	19,5	23,4	27,3	31,2	35,4	39,3	43,2	47,1	51,3	55,2	59,1	63,0
500	13,4	17,9	22,9	27,3	31,8	36,3	41,3	45,7	50,2	54,7	59,7	64,1	68,6	73,1
600	15,4	20,5	26,2	31,3	36,3	41,4	47,1	52,2	57,2	62,3	68,0	73,0	78,1	83,2
700	17,5	23,1	29,5	35,2	40,9	46,5	52,9	58,6	64,2	69,9	76,3	82,0	87,6	93,3
800	19,5	25,7	32,9	39,1	45,4	51,6	58,8	65,0	71,2	77,5	84,6	90,9	97,1	103,4
900	21,5	28,4	36,2	43,0	49,9	56,7	64,6	71,4	78,3	85,1	92,9	99,8	106,6	113,5
1000	23,5	31,0	39,5	47,0	54,4	61,8	70,4	77,8	85,3	92,7	101,3	108,7	116,1	123,6
1100	25,6	33,6	42,9	50,9	58,9	67,0	76,2	84,3	92,3	100,3	109,6	117,6	125,6	133,7
1200	27,6	36,2	46,2	54,8	63,4	72,1	82,1	90,7	99,3	107,9	117,9	126,5	135,2	143,8

The weights on the table are indicative and do not include the filter.

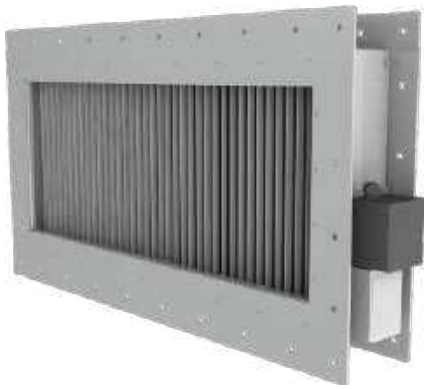
WEIGHTS OF DSH+ML INCLUDING FRAME, STAINLESS STEEL (KG), pitch spacing 18 mm

H/HEIGHT	B / WIDTH (mm)													
mm	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
200	7,6	10,6	13,4	16,4	19,2	22,1	25,1	27,9	30,9	33,7	36,5	39,5	42,3	45,3
300	9,9	13,7	17,3	21,1	24,6	28,2	32,0	35,5	39,4	42,9	46,5	50,3	53,8	57,6
400	12,2	16,8	21,1	25,8	30,0	34,3	38,9	43,2	47,9	52,1	56,4	61,1	65,3	70,0
500	14,5	20,0	24,9	30,4	35,4	40,4	45,9	50,9	56,4	61,4	66,3	71,8	76,8	82,3
600	16,7	23,1	28,8	35,1	40,8	46,5	52,8	58,5	64,9	70,6	76,3	82,6	88,3	94,7
700	19,0	26,2	32,6	39,8	46,2	52,6	59,8	66,2	73,4	79,8	86,2	93,4	99,8	107,0
800	21,3	29,3	36,4	44,4	51,6	58,7	66,7	73,9	81,9	89,0	96,2	104,2	111,3	119,3
900	23,5	32,4	40,3	49,1	57,0	64,8	73,7	81,5	90,4	98,2	106,1	115,0	122,8	131,7
1000	25,8	35,5	44,1	53,8	62,4	70,9	80,6	89,2	98,9	107,5	116,0	125,7	134,3	144,0
1100	28,1	38,6	47,9	58,5	67,7	77,0	87,6	96,9	107,4	116,7	126,0	136,5	145,8	156,3
1200	30,4	41,7	51,7	63,1	73,1	83,1	94,5	104,5	115,9	125,9	135,9	147,3	157,3	168,7

The weights on the table are indicative and do not include the filter.

DSA HIGH-EFFICIENCY DROPLET SEPARATOR

With heated vanes

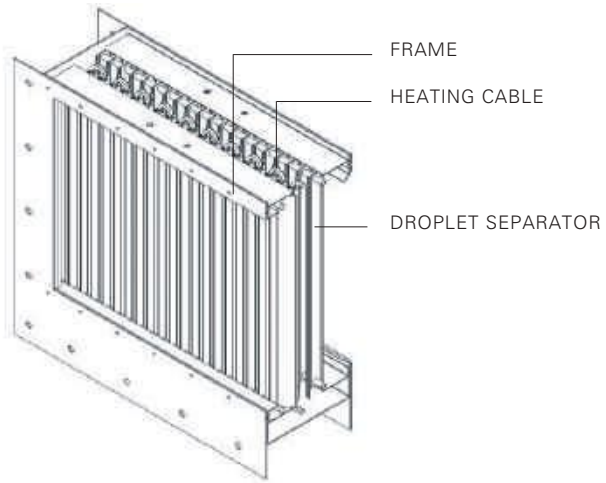


MATERIALS

PART	MATERIAL	FINISHING
Droplet separator	Aluminium EN AW 6060	-
Frame	Aluminium EN AW 5754	Painted RAL9010, C3 acc. standard* ISO 12944-2 as standard
Frame	Stainless steel EN 1.4404 (AISI316L)	Painted as an option
Heating cable	Nickel-plated copper wire, silicone rubber outer jacket (ATEX certified)	-
Junction box	GRP, Eex e II T6 IP66	-

*) C3 durability of 7-15 years. Please note about painting procedures; NORSOK C5-M and Norsok M501 available on request.
Please note: Stainless steel junction box available as an option.

GENERAL CONSTRUCTION



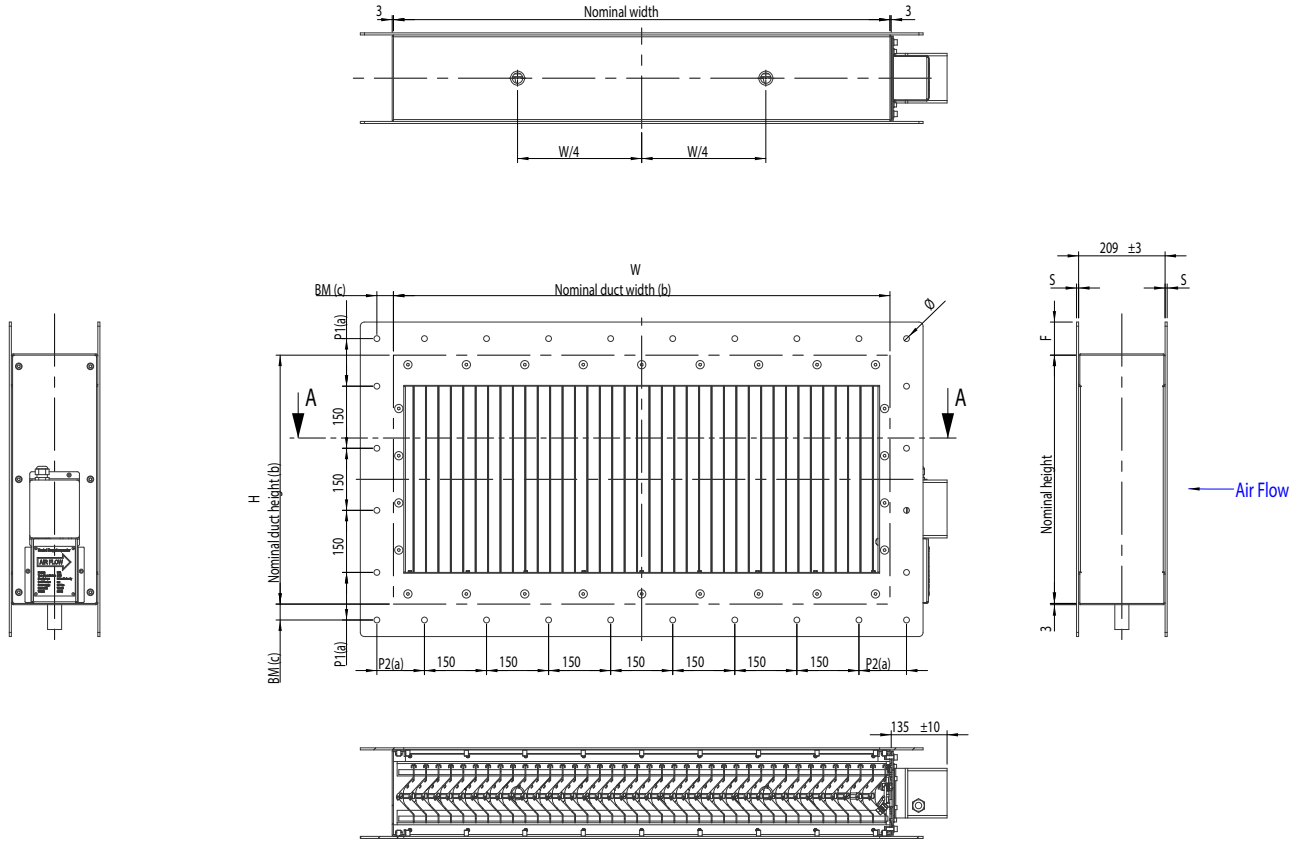
APPLICATIONS

Halton's DSA high-efficiency droplet separators are designed for demanding applications such as oil & gas, chemical, energy and marine industries, where reliability, easy installation and special design play an important role. Droplet separators are designed to restrict the passage of moisture, salt spray, rainwater and airborne aerosol particles e.g. into HVAC systems, engine room intakes, machinery spaces, and diesel and gas turbine air intakes. DSA droplet separators are fitted with heating elements. The regulated temperature is subject to the surrounding conditions. The actual surface temperature of the heated DSA depends on many variables such as the size of the separator, wind circumstances, face velocity, air temperature and relative humidity. Electrical heating capacities vary between 2,5 kW/m2 - 3,7 kW/m2, depending on these conditions. The cable heating does not prevent icing in the most severe conditions but it will help defrost the ice when the icing conditions have passed.
When intake air is crucial during extreme icing conditions the Halton ECS (Extreme Conditions Solution) keeps the air intake open. The ECS is available as an option.

FEATURES

- High droplet and moisture separation efficiency
  - Class A results (EN 13030:2001)
  - Minimum pressure drop
- Performance tested according to EN 13030:2001 test for louvres subjected to simulated rain, at the independent laboratory
- Tailored sizes and designs according to customer's needs. Modular construction is available.
- For wall and duct installations
- No special maintenance required
- ATEX certified components II 2 G/D EEx e II T3/T2
- Heating capacity 2,5 kW/m2 - 3,7kW/m2
- Operating temperature for DSA -50 °C – +40 °C
- An Extreme Conditions Solution available
- Stainless steel junction box available as an option

GENERAL DSA DRAWINGS



SECTION A-A

PLEASE NOTE

a) 75 mm <P1 & P2 ≤150 mm
b) Width x Height = nominal duct size (internal)
c) Back mark BM is the distance from the inside duct to centerline hole

FRAME OPTIONS

- Flange only in front
- Flange only in back
- Flange in front and back
- Without a flange

Flange drilling ISO15138 as standard.

Nominal duct Longest side (mm)	Back mark BM (mm)	Flange F (mm)	Bolt hole size Ø (mm)	Aluminium Flange thickness S (mm)	Stainless steel Flange thickness S (mm)
≤ 350	20	40	10	5	3
> 350 to ≤ 1000	30	50	12	5	3
> 1000	40	80	14	5	5

DSA MINIMUM AND MAXIMUM DIMENSIONS

Minimum size for Halton DSA droplet separator is 300x300 mm (WxH). Maximum size for a single separator is 1500x1200 mm (WxH). Sizes with 50 mm divisions. Modular construction is available up to 3000x2400 mm (WxH).

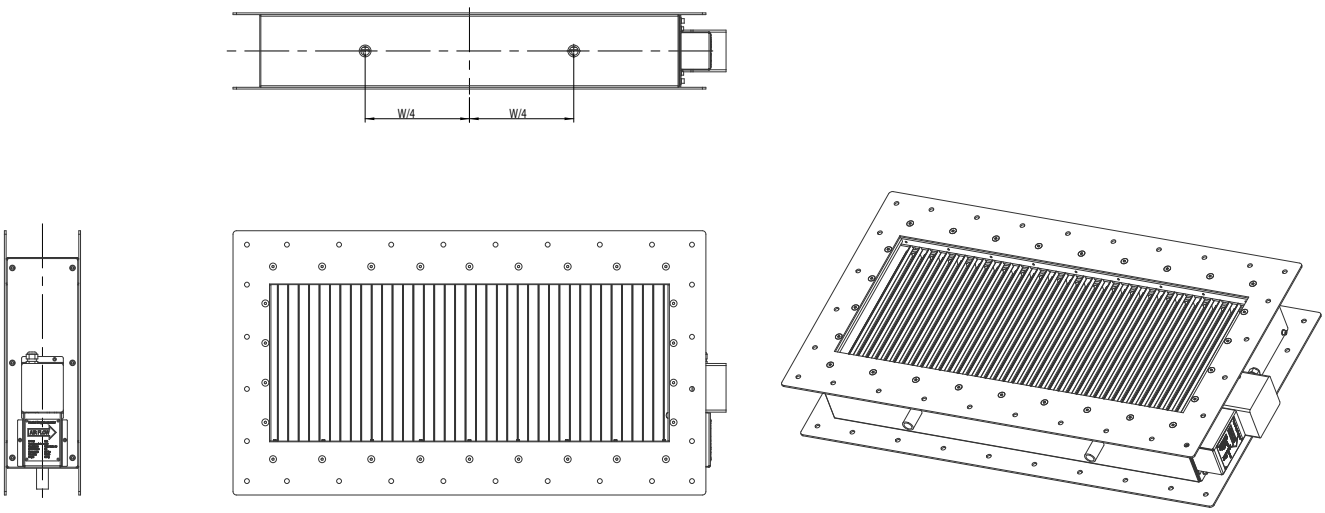
MATERIAL THICKNESS

Standard frame thickness of 3 mm. Larger thicknesses are available as an option.

DSA DRAIN PIPE

Threaded drain pipes are welded to the bottom of the droplet separator. The thread type is 1" BSPT (male).

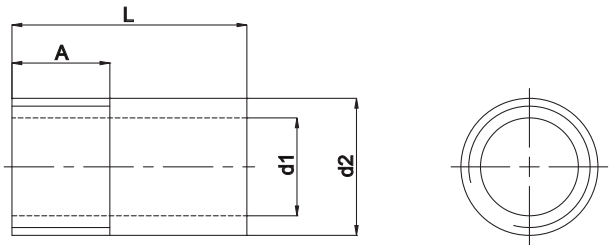
DRAIN LOCATIONS



DRAIN PIPE SIZES

WELD-ON PIPE	Ø Inch	L mm	A mm	d1 mm	d2 mm
Aluminium EN AW 6060	1	50	25	25	35
Stainless steel EN 1.4404 (AISI316L)	1	40	20	27	34

Other drain types available on request.



ELECTRICAL DATA AND CONTROL

Power supply 230V, 1 Phase AC.

Electrical heating capacities vary between 2,5 kW/m^2 - 3,7 kW/m^2, depending on the ambient temperature. For optimal performance and control, contact Halton Marine.

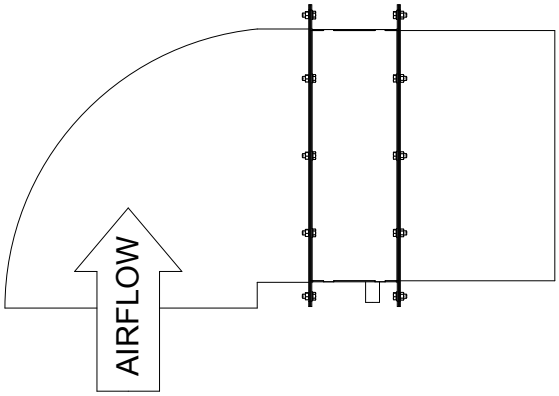
OPTIONAL FEATURES

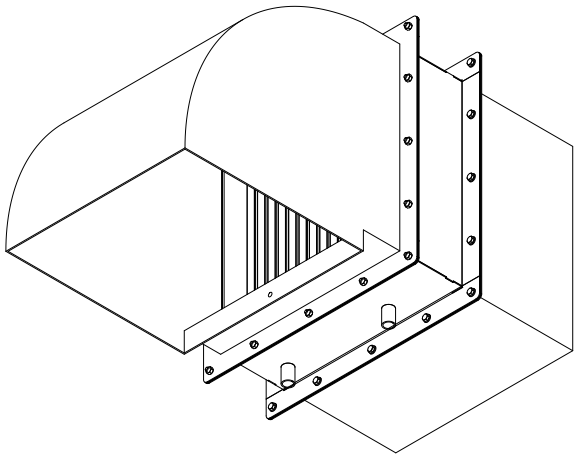
THE EXTREME CONDITIONS SOLUTION (ECS)

When intake air is crucial during extreme icing conditions, the Halton Extreme Condition Solution (ECS) keeps the air intake open. The Halton ECS combines the DSA heated droplet separators with either shut-off or fire dampers with an additional option for filter units. The solution can allow one or more separators to remain open and ice-free while the other separator is in defrost mode during critical atmospheric conditions. This is achieved by shutting-off a section of the DSA to allow the ice build-up to melt. There are a few control methods available to alternate the opening/closing sequence of the ECS to ensure a free flow of unrestricted air.

"GOOSENECK" - REDUCING THE WIND EFFECT

Strong wind can adversely affect the performance of the droplet separator. In environments where stormy weather is regular Halton recommends using a “gooseneck” air intake with droplet separators. A gooseneck can be installed directly to a duct installation type of droplet separator.





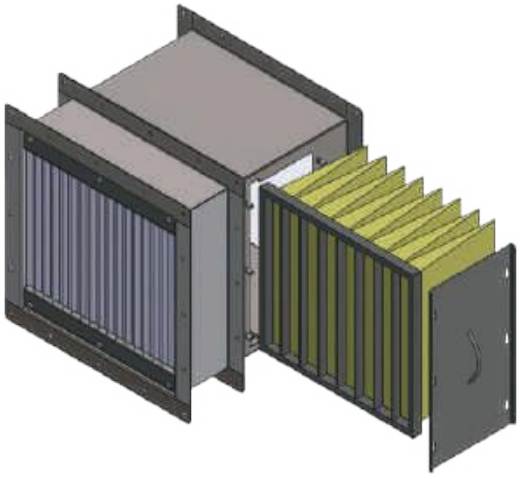
FILTERS

ISO Coarse 70% filter

Panel filters are manufactured of progressive thermally smoothened synthetic polyester having high dust holding capacity and constancy for humidity. The filters are used in the general ventilation system for air purification.

ePM10 70%, ePM2,5 65%, ePM1 50% Bag filters

The materials of the synthetic fine filters are high-quality and durable, progressive mounted synthetic fibres. The filters can be used in example for air purification of the intake air.



ATEX approved filters

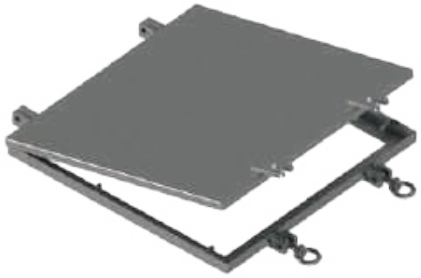
Halton Marine also offers ATEX approved filters for droplet separators.

INSTALLATION IN CONJUNCTION WITH A DAMPER

Halton droplet separator can be connected to a Halton Marine damper with or without a connection piece. In both cases, the construction is modified to fit the damper. Connecting DSH with a fire damper must be mentioned when ordering products. Special flanges and drilling patterns are available for all models on request. The structural flexibility of dampers and high-quality combined with a wide range of accessories (ex-actuators) and special steels, enable Halton Marine to offer tailored solutions for its customers.
Combining Halton Marine droplet separator to damper offers customers a compact solution for air intake that also saves space. The products are recommended to be connected at Halton Marine factory.

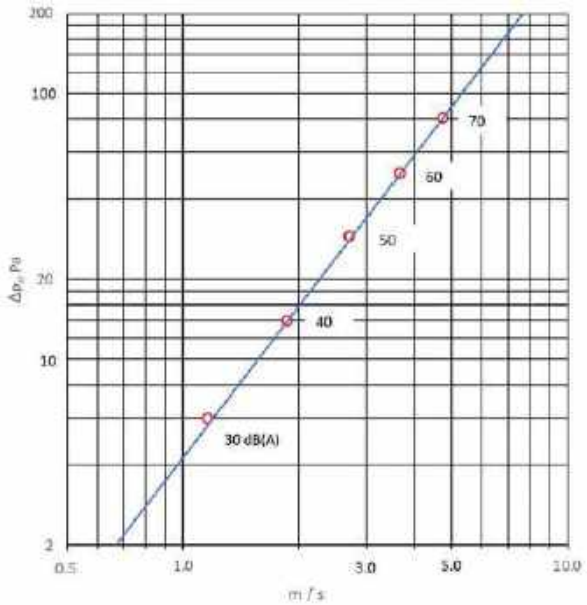
WEATHERTIGHT HATCH

Weathertight hatch is used e.g. to shut down the intake close to the waterline in the event of rough seas.
See a separate brochure on weathertight hatch called Halton WTH.



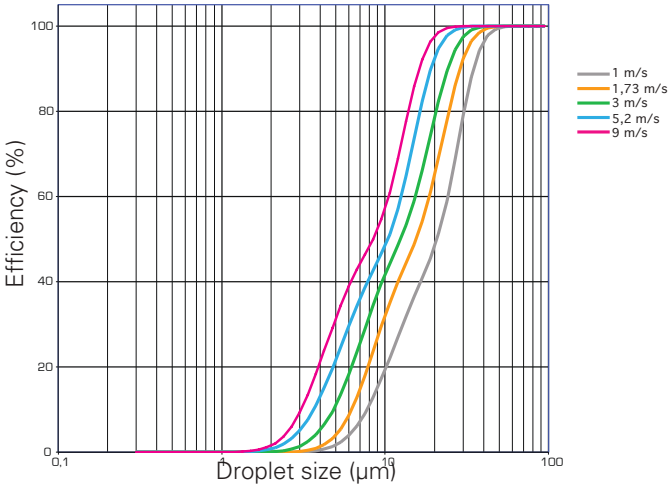
PRESSURE DROP AND SOUND DATA LPA[DB(A)]

DSA aluminium, pitch spacing 28 mm. Velocity based on the face area



DSA EFFICIENCY RESULTS

Single-stage DSA, pitch spacing 28 mm



Halton

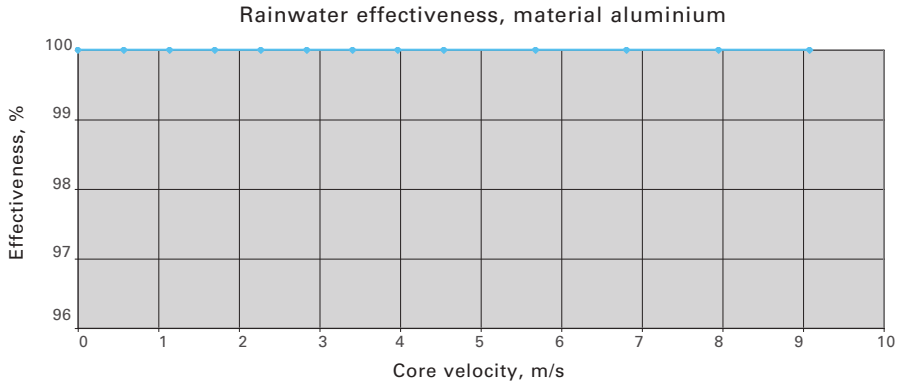
PERFORMANCE DATA

Effectiveness for removal of simulated rain

EN 13030:2001

Rainfall rate: 75 (l/h)/m², (75 mm/h)

Vertical installation



WEIGHTS

WEIGHTS OF DSA INCLUDING FRAME, 1 FLANGE, ALUMINIUM (KG), pitch spacing 28 mm

H/HEIGHT mm	B / WIDTH (mm)																								
	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500
300	10	12	13	14	16	17	18	20	21	22	23	24	26	27	28	31	33	34	35	37	38	39	41	42	43
350	12	13	14	16	17	19	20	22	23	24	26	27	29	30	31	35	36	37	39	41	42	44	45	46	48
400	13	14	16	17	19	20	22	24	25	27	28	30	31	33	34	38	40	41	43	45	46	48	49	51	52
450	14	16	17	19	21	22	24	26	27	29	31	32	34	36	37	41	43	45	46	48	50	52	54	55	57
500	15	17	18	20	23	24	26	28	29	32	34	35	37	39	40	44	47	48	50	52	54	56	58	59	62
550	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	48	50	52	54	56	58	60	62	64	66
600	17	20	21	24	26	27	30	32	34	36	39	40	43	45	47	51	53	55	58	60	62	64	67	68	71
650	18	21	22	25	28	29	32	34	36	39	41	43	45	48	50	54	57	59	61	64	66	68	71	73	75
700	19	22	24	27	29	31	34	37	38	41	44	45	48	51	53	58	60	62	65	68	70	72	75	77	80
750	21	23	25	28	31	33	36	39	40	43	46	48	51	54	56	61	64	66	69	72	73	76	79	81	84
800	22	25	27	30	33	35	38	41	43	46	49	51	54	57	59	64	67	69	72	75	77	81	84	86	89
850	23	26	28	31	34	36	40	43	45	48	51	53	57	60	62	67	71	73	76	79	81	85	88	90	93
900	24	27	29	33	36	38	42	45	47	51	54	56	59	63	65	71	74	76	80	83	85	89	92	94	98
950	25	29	31	34	38	40	44	47	49	53	56	59	62	66	68	74	78	80	83	87	89	93	96	99	102
1000	26	30	32	36	40	42	46	49	52	55	59	61	65	69	71	77	81	83	87	91	93	97	101	103	107
1050	29	33	35	39	43	46	50	54	56	60	64	66	70	74	76	80	84	87	91	95	97	101	105	107	111
1100	30	34	37	41	45	47	52	56	58	62	66	69	73	77	80	84	88	90	94	99	101	105	109	112	116
1150	31	36	38	42	47	49	54	58	60	65	69	72	76	80	83	87	91	94	98	102	105	109	114	116	120
1200	32	37	40	44	48	51	56	60	63	67	72	74	79	83	86	90	95	97	102	106	109	113	118	121	125

The weights on the table are indicative and do not include a filter and damper.

Consult Halton Marine for weights for different types of configurations and weights for modular constructions. Minimum size for Halton DSA droplet separator is 300x300 mm (WxH). Maximum size for a single separator is 1500x1200 mm (WxH). Sizes with 50 mm divisions. Modular construction is available up to 3000x2400 mm (WxH).

USM MARINE EXTERNAL LOUVRE

For air intake and exhaust

APPLICATIONS

For use as a primary air intake device or can be used as an exhaust air diverter.
These are commonly used in Engine/Machine rooms and HVAC equipment rooms for air management.

MATERIALS

PART	MATERIAL	FINISHING	NOTE
Fixed blades	Steel	Painted* or galvanized	Blade material thickness 1.0 mm
Fixed blades	Stainless steel EN 1.4404 (AISI316L)	-	-
Fixed blades	Stainless steel EN 1.4432 (AISI316L)	-	-
Fixed blades	Aluminium ENAW 5754 / EN 6060	Painted*	-
Frame	Steel	Painted* or galvanized	Frame material thickness 3.0 mm as standard
Frame	Stainless steel EN 1.4404 (AISI316L)	-	-
Frame	Stainless steel EN 1.4432 (AISI316L)	-	-
Frame	Aluminium ENAW 5754	Painted*	-
Mesh	Galvanized steel	-	Mesh opening 10 mm
Mesh	Stainless steel EN 1.4404 (AISI316L)	-	Mesh opening 12.7 mm

* Painted RAL9010, C2 as standard. C2 average service life 5 years. C5-M with average service life of 10 years available as an option.

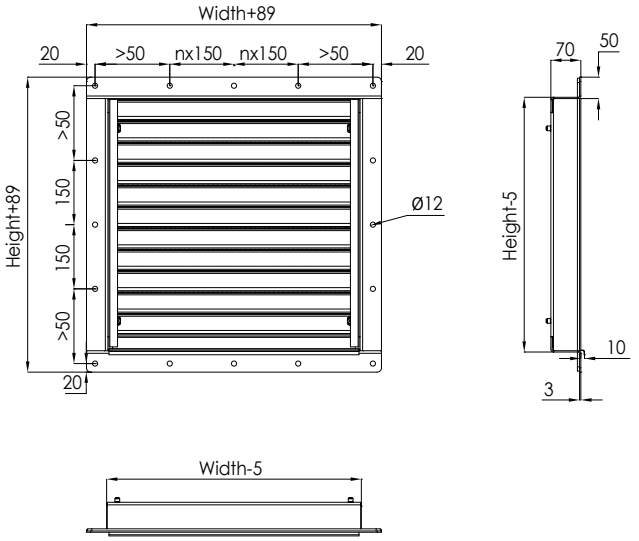
FEATURES

- External louvre for air intake and exhaust
- The louvre shall be effective in preventing rainwater, snow, leaves, animals and other objects entering the ductwork
- Operation based on special front edge blade profile and side grooves
- Suitable for medium and high airflow rates
- Depth of the blades 70 mm, distance 50 mm and free opening 50%

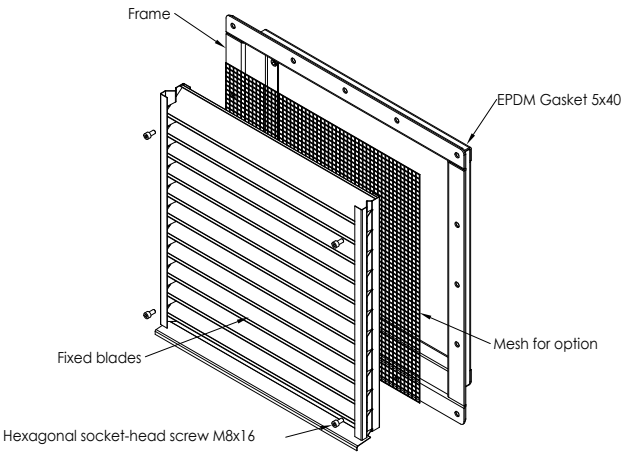
USM PRODUCT OPTIONS

- Modular construction available for large sizes
- Mesh fitted behind the louvre available as an option
- Non-standard dimensions and flange drilling available as an option
- Can be fitted with Halton Marine damper

GENERAL USM DRAWINGS



USM CONSTRUCTION



USM DIMENSIONS

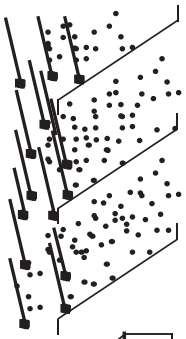
USM louvres are manufactured for rectangular openings (width B150-1500 mm and height H150-2400 mm, with 1 mm division). Modular contruction for larger sizes is available.
Special flange configurations are available on request.

USM FUNCTION

Air is supplied or extracted through the horizontal blades. The design of the grille prevents rainwater from reaching the ductwork. The slot between the frame and the top blade is sealed, thus preventing rainwater from entering the ductwork from above. Drops of water are collected in the grooves at the front edge of the blades. Water flows to the side grooves, where it drops down.

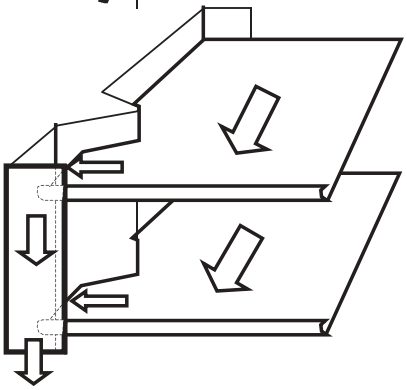
TRADITIONAL OUTDOOR LOUVRE

Rain falling on the vane flows downwards to the front edge of the vane. Drops formed at the edge fall down on the vane below, and upon contact with the vane surface break into small droplets and spray which are easily moved by the air flow through the louvre.
Water flowing along the wall onto the louvre penetrates the slot between the frame and the top vane unless the slot has been closed.



USM BLADE CONSTRUCTION

The vanes of the USM louvre are designed to collect the droplets in grooves at the front edge of the vanes. Once the slot between the frame and the top vane has been securely closed, water flowing down the wall will not enter the louvre. The top vane directs the water to the side grooves, along which the which the water flows down past the air flow.



WTH WEATHER TIGHT HATCH

A cover for droplet separators and louvres

APPLICATIONS

Halton's WTH effectively prevents rainwater, snow, leaves, animals and other objects from entering into ductwork. Halton's Weather Tight Hatch can be used as a cover for droplet separators and outdoor louvers. WTH is designed for demanding applications such as marine, oil & gas, chemical and energy industries where reliability and ease of installation play an important role. The hatch is used to shut down the ventilation openings in applications close to the waterline and even on rough seas.

MATERIALS

PART	MATERIAL	FINISHING
Hatch cover	Steel	Painted or galvanized
Hatch cover	Stainless steel EN 1.4404 (AISI316L)	-
Hatch frame	Steel	Painted or galvanized
Hatch frame	Stainless steel EN 1.4404 (AISI316L)	-

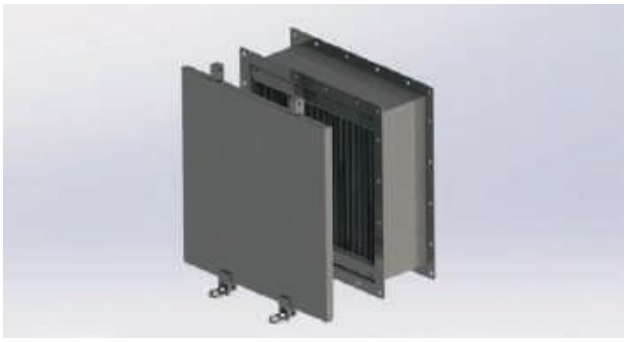
FEATURES

- Weather tight cover to use with Halton Marine droplet separators, louvres and dampers
- Easy to open and close
- Easy to install
- No special maintenance required
- Variable open position
- Lockable
- Customized size and module design available
- Stainless steel as a standard, painted steel as an option

WTH PRODUCT OPTIONS

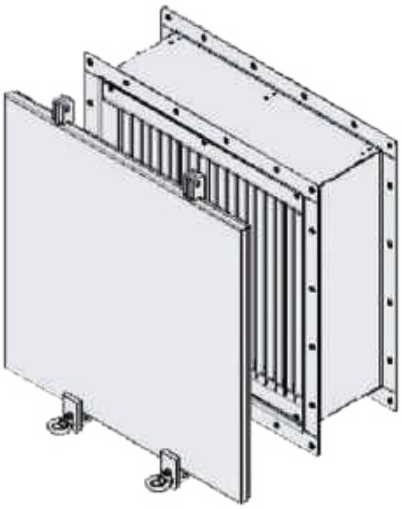
Halton WTH can be fitted with:

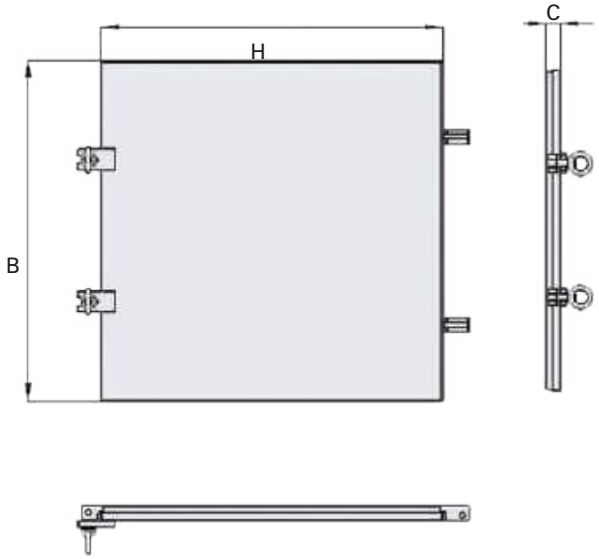
- Halton droplet separator
- Halton external louvre
- Halton droplet separator and dampers



Halton

GENERAL WTH DRAWINGS





WTH hatches are manufactured for rectangular openings (width B 100-1200 mm and height H 100-1200 mm, with 1 mm division).
Modular contruction for larger sizes is available.
Cover thickness (C) is minimum 34 mm, but is variable by material thickness.

HATCH OPENING

Option 1. Hatch opening in different angle based on customer requirements.

Option 2. Hatch opening 180 degrees with mounting brackets.

PCL CENTRAL VACUUM CLEANER

For professional cleaning in marine & offshore

MATERIALS

PART	MATERIAL	FINISHING
Frame	Carbon steel	Powder coating
Pipeline options	Stainless steel EN 1.4301 (AISI304), EN 1.4404 (AISI316L), PVC-U	-
Flushing valve	Steel	Galvanized
Inlet valve	Stainless steel EN 1.4301 (AISI304),	-

PROCLEAN PRODUCT OPTIONS

Halton ProClean central units are available with following options:

- Supply power: 3AC 380…480 V / 690 V
- Supply frequency: 50 Hz / 60 Hz
- 3,0 – 29,0 kW motor power per unit
- Fieldbus connection
- System start from inlet valve, start timer or from external signal
- Tailored logic program
- Tailored additional features

A wide range of accessories available.

APPLICATIONS

Every Halton ProClean vacuum unit serves multiple simultaneous users. The module design minimizes investment and maintenance. A single fire zone can be operated even with only one central vacuum cleaning unit. A module contains a central unit (complete unit with two stage filtration: cyclone and a fine filter, dust container, control cabinet, automatic filter cleaning), piping, inlet valves, pipe cleaning valves and vacuum cleaning equipment.
Sensors optimize vacuum power and minimizes power consumption continuously. The Halton central vacuum cleaning requires minimum maintenance which results in less maintenance costs.
Central unit, inlet valves and cleaning valves are all made of robust materials. Pipelines are designed to withstand vibrations, heavy use and high suction pressure.

FEATURES

- 1 to 12 users per vacuum system. Normally 1-2 vacuum system per fire zone.
- Piping size is from Ø50 mm up to Ø160 mm
- Vacuum pressure up to -300 mbar
- Robust, industrial quality materials & components
- Demand based, energy efficient power control with frequency controller and pressure transmitter
- Minimal maintenance need, even on continuous operation
- No pipe blockages, thanks to automated pipe flushing function
- Potential free status information available to vessel automation system
- Restraint of use, system can only be started and operated by vessel/platform personnel
- Long lifetime, lasts for vessel's lifetime

OPERATION PRINCIPLE

Halton ProClean central vacuum cleaning system is user friendly as it is automated to control vacuum level, filter and pipeline cleaning. System starts by plugging in the vacuuming hose or from start timer. Power level is adjusted to maintain constant suction pressure, regardless of number of connected users.

Maintenance need is minimal, thanks to automated functions and robust components. 80-liter dust container has a plastic bag to be replaced around once per month. Fine filter cartridge is very long lasting thanks to cyclone pre-separation and automatic filter cleaning. Side channel turbine and other components are of industrial quality and require no annual maintenance.

System can be monitored by and controlled from vessel's central automation system. Bulkhead and other piping penetrations are done same as for drainage piping.

LABORATORY VENTILATION

Total solutions for demanding laboratory spaces

INSTALLATION, COMMISSIONING AND MAINTENANCE

- Damper with control box and prewired sensors simplify installation and minimize disturbance on site
- Commissioning on site is made easy through pre-loaded parameters and validation from the Halton Touch Panel on site
- The solution is tested and validated upon delivery
- Service and maintenance is quick and easy with the Halton Touch Panel

FAST RESPONSE TIME

- The fast and accurate ventilation control of the Halton Vita Lab solutions is built around Halton's high-quality dampers, controllers and sensors.
- The dampers are available in several sizes and material options include PVC/PPS,stainless steel and galvanised steel. Explosion-proof damper models are also available (HFI/EX)
- The Halton Vita Lab controller is the communication hub for the system ensuring seamless interaction between components. The controller is pre-wired and mounted on the damper, which substantially simplifies installation on site.
- Various sensors are used to enhance the accuracy and speed of the measurements.

HALTON HTP TOUCH PANEL FOR LABORATORY SOLUTIONS

The Halton HTP touch panel for laboratory solutions is a user-friendly control panel that is the core of all user functions for different user profiles.

APPLICATIONS

Halton's Vita solutions offer intelligent and efficient management of laboratory pressure conditions and thermal comfort. The Halton Vita Lab solutions are adaptable, tested and validated. Pre-commissioning and maintenance services for the whole lifecycle of the solution are available.
Halton Vita Lab solution family includes the following solutions:

- is a fast and accurate airflow management system for all types of fume cupboards
- is an intelligent and efficient management system for laboratory pressure and thermal comfort
- provides enhanced system stability with integrated zonal pressure management for a space or a group of spaces

FEATURES

- Fast and accurate system measurement mechanisms prevent harmful substances from entering the working space
- Seamless interaction between system components guarantees a stable environment at all times
- An easy-to-use touch panel user interface minimises the risk of human errors
- A reliable audio-visual alarm system secures a safe laboratory environment
- Savings during the whole lifecycle of the laboratory
- Demand-based operations with variable airflow control
- Manual ECO-mode enables the user to adjust the ventilation
- An occupancy sensor reacts to presence in the space and adjusts the airflow
- Energy efficiency can be further enhanced with zonal airflow management

VLS HALTON VITA LAB SOLO

The fastest and most accurate airflow management system for all types of fume cupboards

APPLICATIONS

Halton Vita Lab Solo is a fast and accurate airflow management solution for all types of fume cupboards and exhausts in laboratories where safety needs to be ensured in all conditions.

- Suitable for all fume cupboards and laboratory exhausts
- An exceptionally fast response time and constantly stable operations guarantee the safety of laboratory professionals
- Energy efficiency is enhanced by an occupancy sensor and automatic sash closing without compromising safety
- Complies with the European fume cupboard standard EN 14175-6

Halton Vita Lab Solo is available in different configurations for various application needs.

ADVANCED SOLUTIONS

meet the requirements for the most demanding laboratory spaces:

- Double Sensor Control, a state-of-the-art solution combining speed, safety and adaptation
- Sash Movement Control provides enhanced speed and stability, optimised for traditional control

BASIC APPLICATIONS

for normal laboratory conditions:

- Face velocity control - maintains a constant face velocity regardless of the sash position
- Dual position airflow control - maintains a minimum face velocity by detecting if the sash is open or closed
- Sash position control - maintains a constant face velocity depending on the sash position

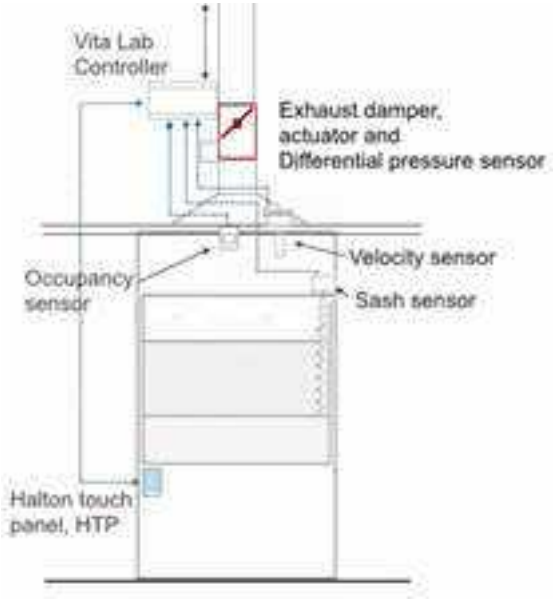
Features for Halton Vita Lab Solo applications	Face Velocity Control	Dual Position Control	Sash Position Control	Sash Movement Control	Double Sensor Control
For fume cupboards with					
Vertically sliding sash	●	●	●	●	●
Horizontally sliding sash	●				
Vertical & horizontal sash	●				●
High heat load inside		●	●	●	
Explosion risk (requires HFI/EX)		●			
High risk of exposure				●	●
Features					
Face velocity measurement	●				●
Constant face velocity	●		●	●	●
Variable airflow control	●		●	●	●
Automatic ECO mode with occupancy sensor	○		○	○	○
Exceptionally fast response time				●	●
Low installation cost	●	●			
Halton Touch Panel	●		●	●	●

● = standard
○ = optional

THE HALTON VITA LAB SOLO DOUBLE SENSOR CONTROL

configuration is the most advanced solution, offering the fastest response time and a high system stability for the most demanding laboratory environments. The solution uses two sensor controls to provide the optimum solution:

- Control of the sash movement in order to provide a quick increase of the exhaust airflow
- Control the face velocity in order to maintain the face velocity at its setpoint
- Application areas: for non ex zone with high risk of exposure to harmful substances

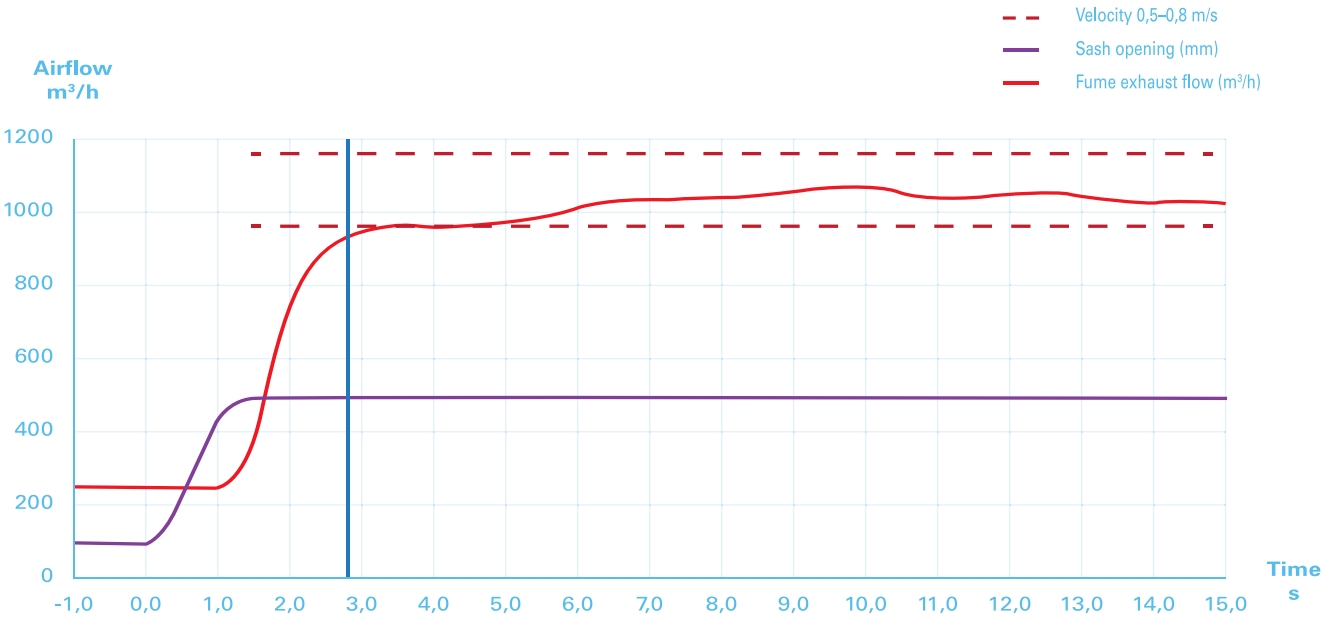


RESPONSE TIME AND SYSTEM STABILITY

The time in which stable control velocity is reached after the fume cupboard opening has a significant effect on the exposure; once the response time exceeds 3 seconds, the exposure risk increases significantly. After 5 seconds from the sash movement, the maximum concentrations at the fume cupboard opening may reach the exhaust concentration.

The Halton Vita Lab Solo Double sensor control application has been tested by Halton according to EN 14175-6 with the following results:

- Fast stabilization - even after maximum change, less than 3 seconds from min to max position
- Immediate reaction to change was less than 1 second
- Fast and steady response to sash movement for both from minimum to maximum and maximum to minimum



A sash sensor with a very quick reaction time ensures that the airflow is adjusted in less than one second (< 1 s) and the system is stabilised in less than three seconds (< 3 s). When the sash sensor has reached the desired level, the face velocity sensor takes over the control in order to maintain the velocity, taking also into account any blockage caused by people or equipment by the sash opening.

VLR HALTON VITA LAB ROOM

Intelligent and efficient management of laboratory pressure and thermal comfort

Designed for the pressure and airflow control of laboratories where safety, air quality and comfort need to be maintained at the required level

- Controlled over- and underpressure conditions ensure the safety of the laboratory environment by preventing the dispersal of contaminants
- Continuous control of the room conditions and seamless interaction between the system components provide stable room airflow conditions
- Consistently optimal indoor air quality, air diffusion and thermal comfort

Based on continuous measurements from the Halton Vita Lab damper, the system controls the room pressure by adjusting and maintaining the airflow difference between the supply and exhaust, simultaneously keeping the energy consumption to a minimum.
The Halton Touch Panel is equipped with a temperature sensor and a user key for adjusting the temperature for maximum comfort. Additional heating and cooling elements can be integrated for advanced temperature control.

Halton Vita Lab Room is available in a range of configurations for different applications.

VLZ HALTON VITA LAB ZONE

Enhanced system stability with integrated zonal pressure management

The Halton Vita Lab Zone solution ensures constant conditions for the Halton Vita Lab Solo and Halton Vita Lab Room solutions and makes the adaption of the laboratory space easy.

- • Constant duct pressure controls supply airflow, enhancing energy efficiency
- Zonal management prevents zone-to-zone fluctuation, giving a steady airflow
- Installation is simple with no internal wiring to fume cupboards
- Flexible and easy layout modifications considerably reduce refurbishment costs
- Halton Vita Lab Zone simplifies system design