VUW120

Rectangular smoke control damper for installation in a wall.

CE
1812

Rf-t

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V27-EN-B 02/2020

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Explanation of the abbreviations and pictograms

Wn = nominal width
Hn = nominal height
Sn = free air passage
E = integrity
I = thermal insulation
S = smoke leakage
60/120 = fire resistance time
Pa = pascal
o -> i = meets the criteria from the outside (o) to the inside (i)
i <-> o = fire side not important
AA = automatic activation
multi = multi compartment
ved = vertical duct
hod = horizontal duct
vew = vertical wall penetration
V = volt
W = watt
V AC = Volt alternating current
V DC = Volt direct current
E.TELE = power supply magnet
E.ALIM = power supply motor
Auto = automatic
Tele = remote controlled
Pnom = nominal capacity
Pmax = maximum capacity
DAS MOD = modular product
OP = option (delivered with the product)
KIT = kit (delivered separately for repair or upgrade)
PG = connection flange to the duct
GKB (type A) / GKF (type F): "GKB" stands for standard plasterboards (type A according to EN 520) while "GKF" plasterboards offer a higher fire resistance for a similar plate thickness (type F according to EN 520)
Cal-Sil = calcium silicate
ζ [-] = pressure loss coefficient
Q = air flow
ΔP = static pressure drop
v = air speed in the duct
Lwa = A-weighted sound power level
ME = motorised
H = habitat

	large dimensions		optimal free air passage and minimal pressure loss
-1500 Pa	superior air tightness (tested at 1500 Pa)		suitable for installation in rigid wall
	intermediate dimensions on request		

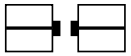
DECLARATION OF PERFORMANCE

CE_DoP_Rf-t_V27_EN ■ A-03/2019

1. Unique identification code of the product-type:	**VUW120**
2. Intended use/es:	Smoke control damper to be used in smoke control systems, in multi-compartment applications at fire temperatures, or in single-compartment applications.
3. Manufacturer:	Rf-Technologies NV, Lange Ambachtstraat 40, B-9860 Oosterzele
4. System/s of AVCP:	System 1
5. Harmonised standard / European Assessment Document; notified body / European Technical Assessment, Technical Assessment Body, notified body; certificate of constancy of performance:	EN 12101-8:2011, Efectis with identification number 1812; Efectis_1812_CPR_1596
6. Declared performance according to EN 12101-8:2011	(fire resistance according to EN 1366-10, classification according to EN 13501-4)

Essential characteristics					Performance
Range	Wall type	Wall	Sealing	Installation	Classification
300x300 mm ≤ VUW120 ≤ 1500x1000 mm	Rigid wall	Aerated concrete ≥ 100 mm	Mortar	1	EI 120 (v_{ew} i ↔ o) S 1500 AA multi C10000

1 Type of installation: built-in 0/180°



Nominal activation conditions/sensitivity:	Pass - automatic activation
Response delay (response time): closure time	Pass - automatic activation
Operational reliability: cycling	BLE - 10000 cycles (C10000) (no load)
Durability of response delay:	Pass
Durability of operational reliability:	Pass
High operational temperature (HOT 400/30):	NPD (no performance determined)

Harmonised standard EN 12101-8:2011

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:
Mathieu Steenland, Technical Manager

Oosterzele, 03/2019

Product presentation VUW120

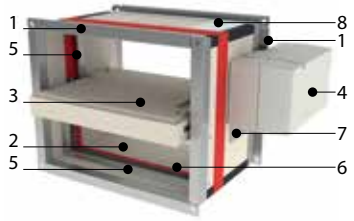
Product presentation VUW120

The rectangular VUW120 smoke control damper is suitable for installation in a wall and offers a fire-resistance up to 120 minutes. The damper is available in large dimensions and with an optional thermal housing for the operating mechanism.

Smoke control shutters and dampers are suitable for use in ventilating protected lobbies, venting to shafts either naturally or mechanically. They open to evacuate smoke in emergency situations whilst maintaining fire resistant integrity in standby position.

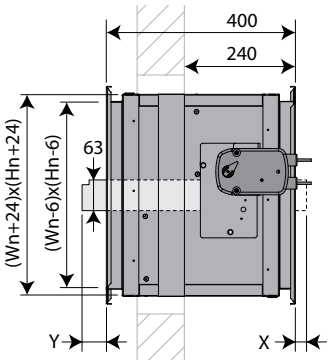
- ☑ superior air tightness (tested at 1500 Pa)
- ☑ optimal free air passage and minimal pressure loss
- ☑ large dimensions
- ■ tested according to EN 1366-10
- ■ compliant with EN 12101-8
- ■ suitable for installation in rigid wall
- ■ maintenance-free
- ■ for indoor use
- ■ intermediate dimensions on request
- ■ air tightness in accordance with EN 1751: class B (class C in option)

1. connection flange PG30
2. casing made of refractory material
3. damper blade
4. operating mechanism in thermal housing (option)
5. sealing and blade bumper
6. intumescent strip
7. transmission
8. product identification



Range and dimensions VUW120

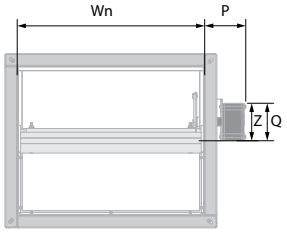
Wn/Hn per step of 50 mm
Exceeding blade: X = on the mechanism side, Y = on the wall side



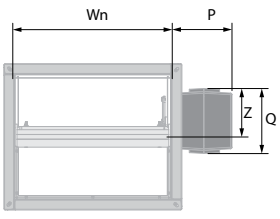
Hn [mm]	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
x	-	-	-	-	-	1	26	51	76	101	126	151	176	201	226
y	2	27	52	77	102	127	152	177	202	227	252	277	302	327	352

	≥	≤
(Wn x Hn) mm	300x300	1500x1000

VUW120+BLE



VUW120 + BLE + BOX



	BLE
P	112
Q	110
Z	98

	BLE
P	193
Q	205
Z	152

Evolution - kits

KITS BLE24	BLE 24V actuator for smoke control dampers
KITS BLE24-ST	BLE 24V actuator for smoke control dampers with plug (ST)
KITS BLE230	BLE 230V actuator for smoke control dampers

MECT	Testbox for mechanisms 24/48 V (magnet, motor, beginning and end of range switches)

Options - at the time of order

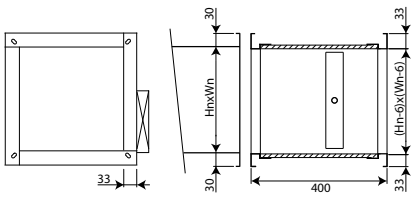
UL	Inspection shutter (set of 2)

EQ	Equipotential connection

EN1751_C	Air-tightness class C

BOX	The BOX is an optional thermal protection housing. It is specially designed to protect the motor against high temperatures.

Flange types - at the time of order



PG30	Connection to ducts with 30 mm flanges (either by sliding profile, or with bolts, or with clamps). Elliptical holes Ø 8,5 x 16 mm.

Storage and handling

Storage and handling

As this product is a safety element, it should be stored and handled with care.

Avoid:

- any kind of impact or damage
- contact with water
- deformation of the casing

It is recommended:

- to unload in a dry area
- not to flip or roll the product to move it
- not to use the damper as a scaffold, working table, etc.
- not to store smaller dampers inside larger ones

Installation

General points

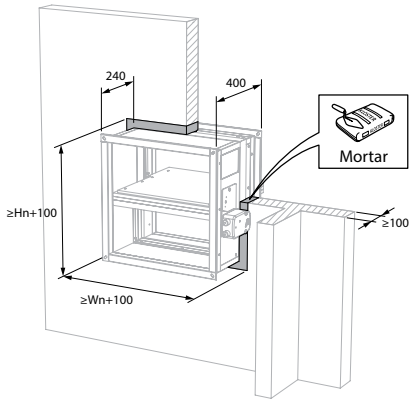
- The installation must comply with the installation manual and the classification report.
- The installation of the shaft must comply with the classification report delivered by the shaft manufacturer.
- Axis orientation: see the declaration of performance.
- Avoid the obstruction of adjoining shafts.
- Verify if the blade can move freely.
- Rf-t smoke dampers may be applied to ducts that have been tested according to EN 1366-8 and EN 1366-9 as appropriate, constructed from similar materials with a fire resistance, thickness and density equal or superior to these of the tested materials.
  - ⚠ Caution: when fitting, the product should be handled with care and remain protected from any sealing products.
  - ⚠ Caution: before putting the installation into operation, clean off all the dust and dirt.
  - ⚠ Caution: bear in mind the blade's clearance inside the smoke evacuation duct.

Installation in rigid wall

The product was tested and approved in:

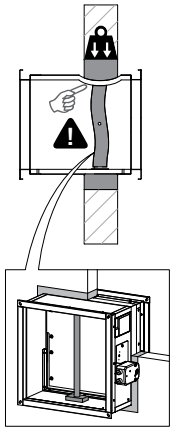
Range	Wall type		Sealing	Classification
300x300 mm ≤ VUW120 ≤ 1500x1000 mm	Rigid wall	Aerated concrete ≥ 100 mm	Mortar	EI 120 (v_ew i ↔ o) S 1500 AA multi C10000

1



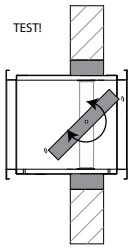
1. Make the necessary openings (Wn + 100 mm) x (Hn + 100 mm) in the wall.
Mount the damper in the opening.
Seal the rest of the opening with standard mortar.

2



2. Support the body and block the damper blade in its closed position to prevent deformation of the body during the drying process of the sealing.

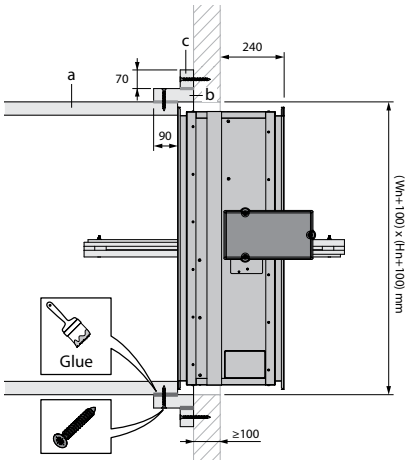
3



3. Check the movement of the damper blade.
Run a test on the mechanism of the damper.

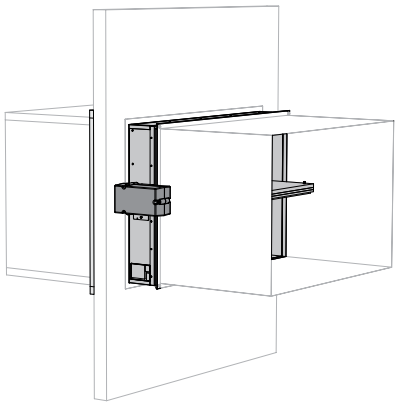
Installation in a multi / single compartment application

1



1. The multi compartment smoke extraction duct (a), made of refractory material of ≥ 50 mm thickness, is positioned against the flange of the damper. A frame (b), made of the same refractory material of ≥ 50 mm, connects the smoke extraction duct with the wall. This frame has an overlay on the duct of at least 90mm. The frame is connected to the duct using screws (ø5x90 mm) every 150 mm and corresponding duct glue.
An additional flange (c) of 70 mm height, made of the same refractory material of 50 mm or thicker, is screwed to the wall using screws suitable for that wall.
Material used:
Promatect L500 ≥ 50 mm
Duct glue: Promat K84
Screws: coarse thread ø5x90

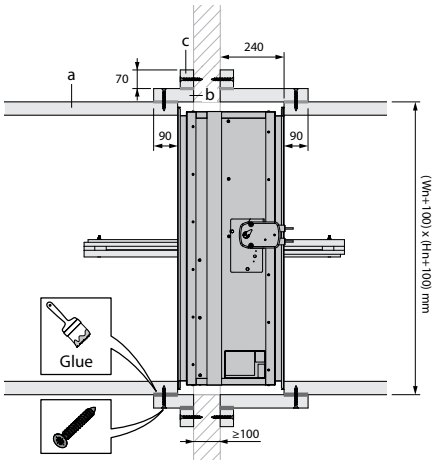
2



2. If required, connect single compartment smoke extraction ducts using the PG30 flange on the VUW120. The actuator could be protected by a thermal insulating box. This is not a requirement for the AA classification.

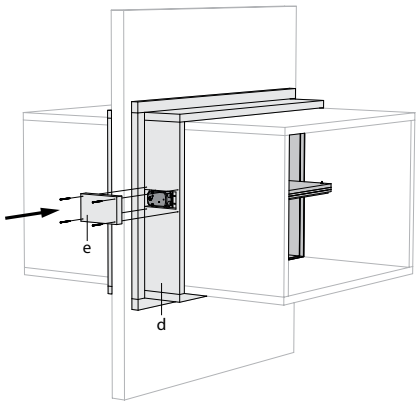
Installation with multi compartment application on both sides

1



1. The multi compartment smoke extraction ducts (a), made of refractory material of ≥ 50 mm thickness, is positioned on both sides of the damper. A frame (b), made of the same refractory material of ≥ 50 mm, connects the smoke extraction ducts to the wall. These frames have an overlay on the duct of at least 90mm. The frames are connected to the duct using screws (ø5x90 mm) every 150 mm and corresponding duct glue. Additional flanges (c) of 70mm height, made of the same refractory material of 50mm or thicker, are screwed to the wall using screws suitable for that wall.
Material used:
Promatect L500 ≥ 50 mm
Duct glue: Promat K84
Screws: coarse thread ø5x90

2



2. On the mechanism side, make an opening in frame (d) of 230 x 110 mm to access the actuator. Make a cover plate (e) of 280 x 210 mm made of the same refractory material of 50 mm or thicker. This will be used to cover the actuator, using 4 screws of ø5x90 mm. Caulk around the electrical cables with fire resistant sealant (such as BMS f.e.).

Maintenance

- No specific maintenance required.
- Schedule at least two running visual checks each year.
- Remove dust and all other particles before start-up.
- Follow the local maintenance regulations (i.e. BS9999 Annex V; NF S 61-933) and EN13306.

Operation and mechanisms

BLE Actuator for remote control of smoke control dampers

The actuator B(L)E is specially designed to remotely control smoke control dampers. The BLE model is intended for VU90-HOT dampers with small dimensions (W+H < 1800 mm) and for VU120 and VUW120 dampers.

1. access for manual resetting
2. plug (ST)

Unlocking

- **manual unlocking**: VUW120: turn the enclosed handle clockwise / VU120 - VU90-HOT: turn the enclosed handle anti-clockwise.
- **automatic unlocking**: n/a
- **remote unlocking**: power cables 1 and 2.

Caution:

⚠ Do not use a drill or screwing machine.

Resetting

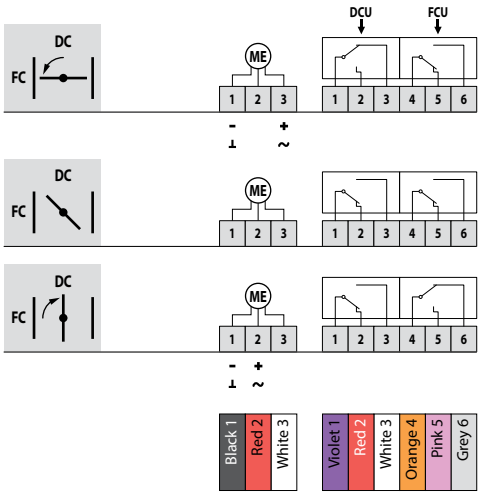
- **manual resetting**: VUW120: turn the enclosed handle anti-clockwise / VU120 - VU90-HOT: turn the enclosed handle clockwise.
- **motorised resetting**: power cables 1 and 3.

Caution:

⚠ Do not use a drill or screwing machine.

Electrical connection

BLE



DC : Switch closed position smoke evacuation shutter
FC : Switch open position smoke evacuation shutter

MEC	Nominal voltage motor	Nominal voltage magnet	Power consumption (stand-by)	Power consumption (operating)	Standard switches
BLE24	24 V AC/DC	N/A	0,5W	7,5W	1mA...3A, DC 5V...AC 250V
BLE24-ST	24 V AC/DC	N/A	0,5W	7,5W	1mA...3A, DC 5V...AC 250V
BLE230	230 V AC	N/A	1W	5W	1mA...3A, DC 5V...AC 250V

MEC	Resetting time motor	Running time spring	Noise level motor	Cable supply / control	Cable auxiliary switch	Protection class
BLE24	< 30 s (90°)	N/A	ca. 62 dB (A)	1 m, 3 x 0.75 mm^2 (halogen-free)	1 m, 6 x 0.75 mm^2 (halogen-free)	IP 54
BLE24-ST	< 30 s (90°)	N/A	ca. 62 dB (A)	1 m, 3 x 0.75 mm^2 (halogen-free), with plug connectors, suitable for IXI-R1, IXI-R2(-230), BKNE230-24	1 m, 6 x 0.75 mm^2 (halogen-free), with plug connectors, suitable for IXI-R1, IXI-R2(-230), BKNE230-24	IP 54
BLE230	< 30 s (90°)	N/A	ca. 62 dB (A)	1 m, 3 x 0.75 mm^2 (halogen-free)	1 m, 6 x 0.75 mm^2 (halogen-free)	IP 54

Weights

VUW120 + BLE24 / BLE24-ST / BLE230

Hn\Wn [mm]		300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
300	kg	18,8	20,4	21,9	23,5	25,0	26,6	28,1	29,7	31,2	32,8	34,3	35,9	37,4	39,0	40,5
350	kg	20,4	22,1	23,7	25,4	27,0	28,7	30,4	32,0	33,7	35,4	37,0	38,7	40,4	42,0	43,7
400	kg	21,9	23,7	25,4	27,2	29,0	30,8	32,6	34,4	36,1	37,9	39,7	41,5	43,3	45,1	46,8
450	kg	23,4	25,3	27,2	29,1	31,0	32,9	34,8	36,7	38,6	40,5	42,4	44,3	46,2	48,1	50,0
500	kg	24,9	26,9	28,9	30,9	32,9	35,0	37,0	39,0	41,0	43,0	45,0	47,0	49,1	51,1	53,1
550	kg	26,4	28,5	30,6	32,8	34,9	37,0	39,2	41,3	43,4	45,6	47,7	49,8	52,0	54,1	56,2
600	kg	27,8	30,1	32,3	34,6	36,8	39,1	41,3	43,8	46,1	48,3	50,6	52,8	55,1	57,3	59,6
650	kg	29,3	31,7	34,1	36,4	38,8	41,2	43,8	46,1	48,5	50,9	53,2	55,6	58,0	60,3	62,7
700	kg	30,8	33,3	35,8	38,3	40,8	43,5	46,0	48,5	50,9	53,4	55,9	58,4	60,9	63,4	65,8
750	kg	32,3	34,9	37,5	40,1	43,0	45,6	48,2	50,8	53,4	56,0	58,6	61,2	63,8	66,4	69,0
800	kg	33,8	36,6	39,3	42,2	44,9	47,7	50,4	53,1	55,8	58,5	61,2	64,0	66,7	69,4	72,1
850	kg	35,3	38,2	41,2	44,1	46,9	49,7	52,6	55,4	58,2	61,1	63,9	66,7	69,6	72,4	75,2
900	kg	36,8	40,0	43,0	45,9	48,9	51,8	54,8	57,7	60,7	63,6	66,6	69,5	72,7	75,7	78,6
950	kg	38,6	41,6	44,7	47,8	50,8	53,9	57,0	60,0	63,1	66,2	69,2	72,5	75,6	78,7	81,7
1000	kg	40,1	43,3	46,4	49,6	52,8	56,0	59,2	62,3	65,5	68,7	72,1	75,3	78,5	81,7	84,9

Hn\Wn [mm]		1050	1100	1150	1200	1250	1300	1350	1400	1450	1500					
300	kg	42,1	43,6	45,2	46,7	48,3	49,8	51,4	52,9	54,5	56,0					
350	kg	45,4	47,0	48,7	50,4	52,0	53,7	55,4	57,0	58,7	60,4					
400	kg	48,6	50,4	52,2	54,0	55,7	57,5	59,3	61,1	62,9	64,7					
450	kg	51,9	53,8	55,7	57,6	59,5	61,3	63,3	65,2	67,0	68,9					
500	kg	55,1	57,1	59,1	61,2	63,2	65,2	67,2	69,2	71,2	73,2					
550	kg	58,4	60,5	62,6	64,8	66,9	69,0	71,2	73,3	75,4	77,5					
600	kg	61,8	64,1	66,3	68,6	70,8	73,1	75,3	77,6	79,8	82,1					
650	kg	65,1	67,4	69,8	72,2	74,5	76,9	79,3	81,6	84,0	86,4					
700	kg	68,3	70,8	73,3	75,8	78,2	80,7	83,2	85,7	88,2	90,7					
750	kg	71,6	74,2	76,8	79,4	82,0	84,6	87,2	89,8	92,4	95,0					
800	kg	74,8	77,5	80,3	83,0	85,7	88,4	91,1	93,8	96,5	99,3					
850	kg	78,1	80,9	83,7	86,6	89,4	92,2	95,1	97,9	100,7	103,6					
900	kg	81,6	84,5	87,5	90,4	93,3	96,3	99,3	102,2	105,1	108,1					
950	kg	84,8	87,9	90,9	94,0	97,1	100,1	103,2	106,3	109,3	112,4					
1000	kg	88,1	91,2	94,4	97,6	100,8	104,0	107,2	110,3	113,5	116,7					

Selection graphs

$$\Delta p = 0{,}6 \times v^2 \times \zeta$$

Hn\Wn [mm]		300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
300	ζ [-]	1,04	0,94	0,87	0,82	0,79	0,76	0,73	0,71	0,70	0,68	0,67	0,66	0,65	0,64	0,63
350	ζ [-]	0,92	0,83	0,77	0,73	0,69	0,67	0,64	0,63	0,61	0,60	0,59	0,58	0,57	0,57	0,56
400	ζ [-]	0,82	0,75	0,69	0,65	0,62	0,60	0,58	0,56	0,55	0,54	0,53	0,52	0,51	0,51	0,50
450	ζ [-]	0,75	0,68	0,63	0,59	0,57	0,55	0,53	0,51	0,50	0,49	0,48	0,48	0,47	0,46	0,46
500	ζ [-]	0,69	0,63	0,58	0,55	0,52	0,50	0,49	0,47	0,46	0,45	0,45	0,44	0,43	0,43	0,42
550	ζ [-]	0,65	0,58	0,54	0,51	0,49	0,47	0,45	0,44	0,43	0,42	0,41	0,41	0,40	0,40	0,39
600	ζ [-]	0,60	0,55	0,51	0,48	0,46	0,44	0,42	0,41	0,40	0,39	0,39	0,38	0,38	0,37	0,37
650	ζ [-]	0,57	0,51	0,48	0,45	0,43	0,41	0,40	0,39	0,38	0,37	0,37	0,36	0,35	0,35	0,35
700	ζ [-]	0,54	0,49	0,45	0,43	0,41	0,39	0,38	0,37	0,36	0,35	0,35	0,34	0,34	0,33	0,33
750	ζ [-]	0,51	0,46	0,43	0,40	0,39	0,37	0,36	0,35	0,34	0,33	0,33	0,32	0,32	0,31	0,31
800	ζ [-]	0,49	0,44	0,41	0,39	0,37	0,35	0,34	0,33	0,33	0,32	0,31	0,31	0,30	0,30	0,30
850	ζ [-]	0,47	0,42	0,39	0,37	0,35	0,34	0,33	0,32	0,31	0,30	0,30	0,29	0,29	0,29	0,28
900	ζ [-]	0,45	0,40	0,38	0,35	0,34	0,32	0,31	0,31	0,30	0,29	0,29	0,28	0,28	0,28	0,27
950	ζ [-]	0,43	0,39	0,36	0,34	0,32	0,31	0,30	0,29	0,29	0,28	0,28	0,27	0,27	0,26	0,26
1000	ζ [-]	0,42	0,38	0,35	0,33	0,31	0,30	0,29	0,28	0,28	0,27	0,27	0,26	0,26	0,25	0,25

Hn\Wn [mm]		1050	1100	1150	1200	1250	1300	1350	1400	1450	1500					
300	ζ [-]	0,63	0,62	0,62	0,61	0,61	0,60	0,60	0,60	0,59	0,59					
350	ζ [-]	0,55	0,55	0,54	0,54	0,53	0,53	0,53	0,53	0,52	0,52					
400	ζ [-]	0,50	0,49	0,49	0,48	0,48	0,47	0,47	0,47	0,47	0,47					
450	ζ [-]	0,45	0,45	0,45	0,44	0,43	0,43	0,43	0,43	0,43	0,43					
500	ζ [-]	0,42	0,41	0,41	0,41	0,40	0,40	0,40	0,40	0,39	0,39					
550	ζ [-]	0,39	0,38	0,38	0,38	0,37	0,37	0,37	0,37	0,37	0,37					
600	ζ [-]	0,36	0,36	0,36	0,35	0,35	0,35	0,34	0,34	0,34	0,34					
650	ζ [-]	0,34	0,34	0,34	0,33	0,33	0,33	0,33	0,33	0,32	0,32					
700	ζ [-]	0,32	0,32	0,32	0,32	0,31	0,31	0,31	0,31	0,30	0,30					
750	ζ [-]	0,31	0,30	0,30	0,30	0,30	0,29	0,29	0,29	0,29	0,29					
800	ζ [-]	0,29	0,29	0,29	0,29	0,28	0,28	0,28	0,28	0,28	0,28					
850	ζ [-]	0,28	0,28	0,28	0,28	0,27	0,27	0,27	0,27	0,27	0,26					
900	ζ [-]	0,27	0,27	0,27	0,27	0,26	0,26	0,26	0,25	0,25	0,25					
950	ζ [-]	0,26	0,26	0,26	0,26	0,25	0,25	0,25	0,25	0,24	0,24					
1000	ζ [-]	0,25	0,25	0,25	0,25	0,24	0,24	0,24	0,24	0,24	0,23					

Selection data

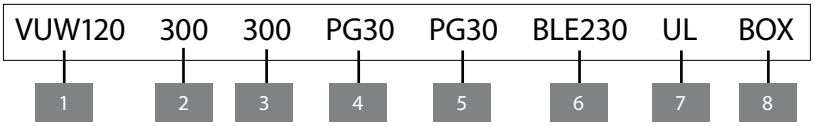
Free air passage (m^2)

Hn\Wn [mm]		300	350	400	450	500	550	600	650	700	750	800	850	900
300	Sn [m^2]	0,0531	0,0631	0,0732	0,0832	0,0933	0,1033	0,1134	0,1234	0,1335	0,1435	0,1536	0,1636	0,1737
	Sn [%]	61,39	62,41	63,16	63,75	64,22	64,60	64,91	65,18	65,41	65,61	65,78	65,94	66,07
350	Sn [m^2]	0,0663	0,0788	0,0914	0,1039	0,1165	0,1290	0,1416	0,1541	0,1667	0,1792	0,1918	0,2043	0,2169
	Sn [%]	65,52	66,60	67,41	68,04	68,53	68,94	69,28	69,57	69,81	70,02	70,21	70,37	70,52
400	Sn [m^2]	0,0795	0,0945	0,1096	0,1246	0,1397	0,1547	0,1698	0,1848	0,1999	0,2149	0,2300	0,2450	0,2601
	Sn [%]	68,60	69,73	70,58	71,23	71,76	72,18	72,54	72,84	73,09	73,32	73,51	73,68	73,83
450	Sn [m^2]	0,0927	0,1102	0,1278	0,1453	0,1629	0,1804	0,1980	0,2155	0,2331	0,2506	0,2682	0,2857	0,3033
	Sn [%]	70,99	72,16	73,03	73,71	74,25	74,69	75,06	75,37	75,64	75,87	76,07	76,24	76,40
500	Sn [m^2]	0,1059	0,1259	0,1460	0,1660	0,1861	0,2061	0,2262	0,2462	0,2663	0,2863	0,3064	0,3264	0,3465
	Sn [%]	72,89	74,09	74,99	75,69	76,24	76,70	77,07	77,39	77,67	77,90	78,11	78,29	78,45
550	Sn [m^2]	0,1191	0,1416	0,1642	0,1867	0,2093	0,2318	0,2544	0,2769	0,2995	0,3220	0,3446	0,3671	0,3897
	Sn [%]	74,44	75,67	76,59	77,30	77,87	78,33	78,72	79,04	79,32	79,56	79,77	79,96	80,12
600	Sn [m^2]	0,1323	0,1573	0,1824	0,2074	0,2325	0,2575	0,2826	0,3076	0,3327	0,3577	0,3828	0,4078	0,4329
	Sn [%]	75,74	76,99	77,92	78,64	79,22	79,69	80,08	80,41	80,70	80,94	81,16	81,35	81,51
650	Sn [m^2]	0,1455	0,1730	0,2006	0,2281	0,2557	0,2832	0,3108	0,3383	0,3659	0,3934	0,4210	0,4485	0,4761
	Sn [%]	76,83	78,10	79,04	79,78	80,36	80,84	81,24	81,57	81,86	82,11	82,33	82,52	82,69
700	Sn [m^2]	0,1587	0,1887	0,2188	0,2488	0,2789	0,3089	0,3390	0,3690	0,3991	0,4291	0,4592	0,4892	0,5193
	Sn [%]	77,76	79,05	80,01	80,75	81,34	81,82	82,23	82,57	82,86	83,11	83,33	83,52	83,69
750	Sn [m^2]	0,1719	0,2044	0,2370	0,2695	0,3021	0,3346	0,3672	0,3997	0,4323	0,4648	0,4974	0,5299	0,5625
	Sn [%]	78,57	79,87	80,84	81,59	82,19	82,67	83,08	83,42	83,72	83,97	84,19	84,39	84,56
800	Sn [m^2]	0,1851	0,2201	0,2552	0,2902	0,3253	0,3603	0,3954	0,4304	0,4655	0,5005	0,5356	0,5706	0,6057
	Sn [%]	79,28	80,59	81,56	82,32	82,93	83,42	83,83	84,17	84,47	84,73	84,95	85,15	85,32
850	Sn [m^2]	0,1983	0,2358	0,2734	0,3109	0,3485	0,3860	0,4236	0,4611	0,4987	0,5362	0,5738	0,6113	0,6489
	Sn [%]	79,90	81,22	82,21	82,97	83,58	84,07	84,49	84,84	85,13	85,39	85,62	85,82	86,00
900	Sn [m^2]	0,2115	0,2515	0,2916	0,3316	0,3717	0,4117	0,4518	0,4918	0,5319	0,5719	0,6120	0,6520	0,6921
	Sn [%]	80,45	81,78	82,78	83,54	84,16	84,66	85,07	85,42	85,72	85,98	86,21	86,41	86,59
950	Sn [m^2]	0,2247	0,2672	0,3098	0,3523	0,3949	0,4374	0,4800	0,5225	0,5651	0,6076	0,6502	0,6927	0,7353
	Sn [%]	80,95	82,29	83,28	84,06	84,67	85,18	85,60	85,95	86,25	86,51	86,74	86,94	87,12
1000	Sn [m^2]	0,2379	0,2829	0,3280	0,3730	0,4181	0,4631	0,5082	0,5532	0,5983	0,6433	0,6884	0,7334	0,7785
	Sn [%]	81,39	82,74	83,74	84,52	85,14	85,65	86,07	86,42	86,73	86,99	87,22	87,42	87,60

Hn\Wn [mm]		950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	
300	Sn [m^2]	0,1837	0,1938	0,2038	0,2139	0,2239	0,2340	0,2440	0,2541	0,2641	0,2742	0,2842	0,2943	
	Sn [%]	66,19	66,30	66,40	66,49	66,57	66,65	66,72	66,78	66,84	66,90	66,95	66,99	
350	Sn [m^2]	0,2294	0,2420	0,2545	0,2671	0,2796	0,2922	0,3047	0,3173	0,3298	0,3424	0,3549	0,3675	
	Sn [%]	70,65	70,76	70,87	70,96	71,05	71,13	71,21	71,27	71,34	71,39	71,45	71,50	
400	Sn [m^2]	0,2751	0,2902	0,3052	0,3203	0,3353	0,3504	0,3654	0,3805	0,3955	0,4106	0,4256	0,4407	
	Sn [%]	73,97	74,09	74,20	74,30	74,39	74,48	74,55	74,62	74,69	74,75	74,81	74,86	
450	Sn [m^2]	0,3208	0,3384	0,3559	0,3735	0,3910	0,4086	0,4261	0,4437	0,4612	0,4788	0,4963	0,5139	
	Sn [%]	76,54	76,67	76,78	76,89	76,98	77,07	77,15	77,22	77,29	77,35	77,41	77,47	
500	Sn [m^2]	0,3665	0,3866	0,4066	0,4267	0,4467	0,4668	0,4868	0,5069	0,5269	0,5470	0,5670	0,5871	
	Sn [%]	78,59	78,72	78,84	78,95	79,05	79,13	79,22	79,29	79,36	79,43	79,49	79,54	
550	Sn [m^2]	0,4122	0,4348	0,4573	0,4799	0,5024	0,5250	0,5475	0,5701	0,5926	0,6152	0,6377	0,6603	
	Sn [%]	80,27	80,40	80,52	80,63	80,73	80,82	80,91	80,98	81,05	81,12	81,18	81,24	

Hn\Wn [mm]		950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	
600	Sn [m²]	0,4579	0,4830	0,5080	0,5331	0,5581	0,5832	0,6082	0,6333	0,6583	0,6834	0,7084	0,7335	
	Sn [%]	81,66	81,80	81,92	82,03	82,13	82,22	82,31	82,39	82,46	82,53	82,59	82,65	
650	Sn [m²]	0,5036	0,5312	0,5587	0,5863	0,6138	0,6414	0,6689	0,6965	0,7240	0,7516	0,7791	0,8067	
	Sn [%]	82,84	82,98	83,10	83,21	83,32	83,41	83,50	83,58	83,65	83,72	83,78	83,84	
700	Sn [m²]	0,5493	0,5794	0,6094	0,6395	0,6695	0,6996	0,7296	0,7597	0,7897	0,8198	0,8498	0,8799	
	Sn [%]	83,85	83,99	84,11	84,22	84,33	84,42	84,51	84,59	84,67	84,74	84,80	84,86	
750	Sn [m²]	0,5950	0,6276	0,6601	0,6927	0,7252	0,7578	0,7903	0,8229	0,8554	0,8880	0,9205	0,9531	
	Sn [%]	84,72	84,86	84,99	85,10	85,21	85,30	85,39	85,47	85,55	85,62	85,68	85,74	
800	Sn [m²]	0,6407	0,6758	0,7108	0,7459	0,7809	0,8160	0,8510	0,8861	0,9211	0,9562	0,9912	1,0263	
	Sn [%]	85,48	85,62	85,75	85,87	85,97	86,07	86,16	86,24	86,32	86,39	86,45	86,51	
850	Sn [m²]	0,6864	0,7240	0,7615	0,7991	0,8366	0,8742	0,9117	0,9493	0,9868	1,0244	1,0619	1,0995	
	Sn [%]	86,15	86,30	86,42	86,54	86,65	86,75	86,84	86,92	86,99	87,07	87,13	87,19	
900	Sn [m²]	0,7321	0,7722	0,8122	0,8523	0,8923	0,9324	0,9724	1,0125	1,0525	1,0926	1,1326	1,1727	
	Sn [%]	86,75	86,89	87,02	87,14	87,25	87,35	87,44	87,52	87,60	87,67	87,74	87,80	
950	Sn [m²]	0,7778	0,8204	0,8629	0,9055	0,9480	0,9906	1,0331	1,0757	1,1182	1,1608	1,2033	1,2459	
	Sn [%]	87,28	87,43	87,56	87,68	87,78	87,88	87,97	88,06	88,14	88,21	88,28	88,34	
1000	Sn [m²]	0,8235	0,8686	0,9136	0,9587	1,0037	1,0488	1,0938	1,1389	1,1839	1,2290	1,2740	1,3191	
	Sn [%]	87,76	87,91	88,04	88,16	88,27	88,37	88,46	88,54	88,62	88,69	88,76	88,82	

Sample order



1. product
2. width
3. height
4. frame on the side of the mechanism
5. frame on the side of the wall
6. mechanism type
7. option: inspection shutter
8. option: thermal protection housing

Approvals and certificates

All our products are submitted to a number of tests by official test institutes. Reports of these tests form the basis for the approvals of the products.

CE
1812

Efectis_1812_CPR_1596

If the product is manipulated in any other way than described in this manual, Rf-Technologies will decline any responsibility and the guarantee will expire!