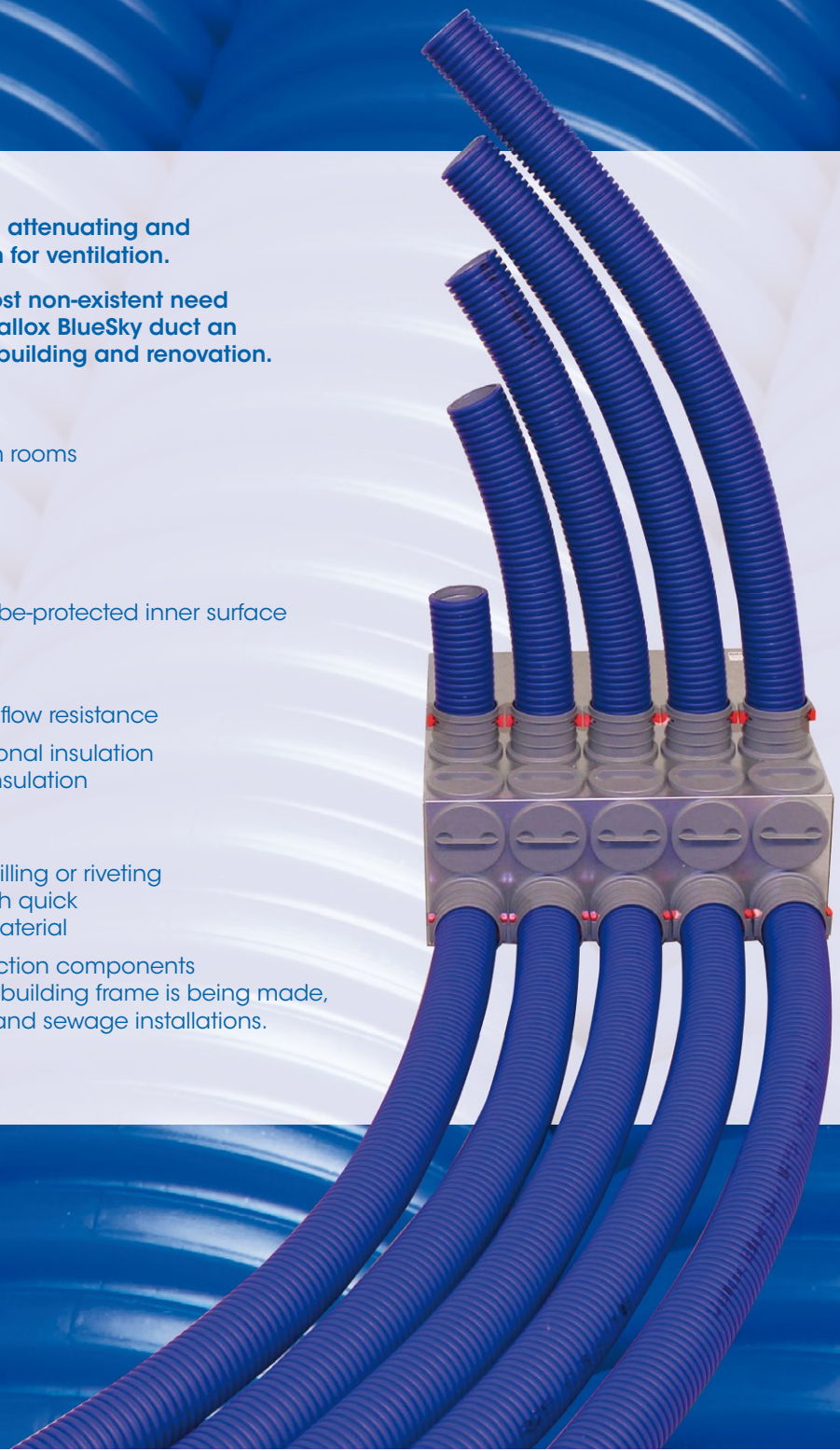
VALLOX

Vallox BlueSky

AIR DISTRIBUTION SYSTEM

Technical instructions

Planning and installation instructions



Vallox BlueSky is a flexible, sound attenuating and installation-friendly piping system for ventilation.

Speedy installation and the almost non-existent need for duct components make the Vallox BlueSky duct an affordable solution for both new building and renovation.

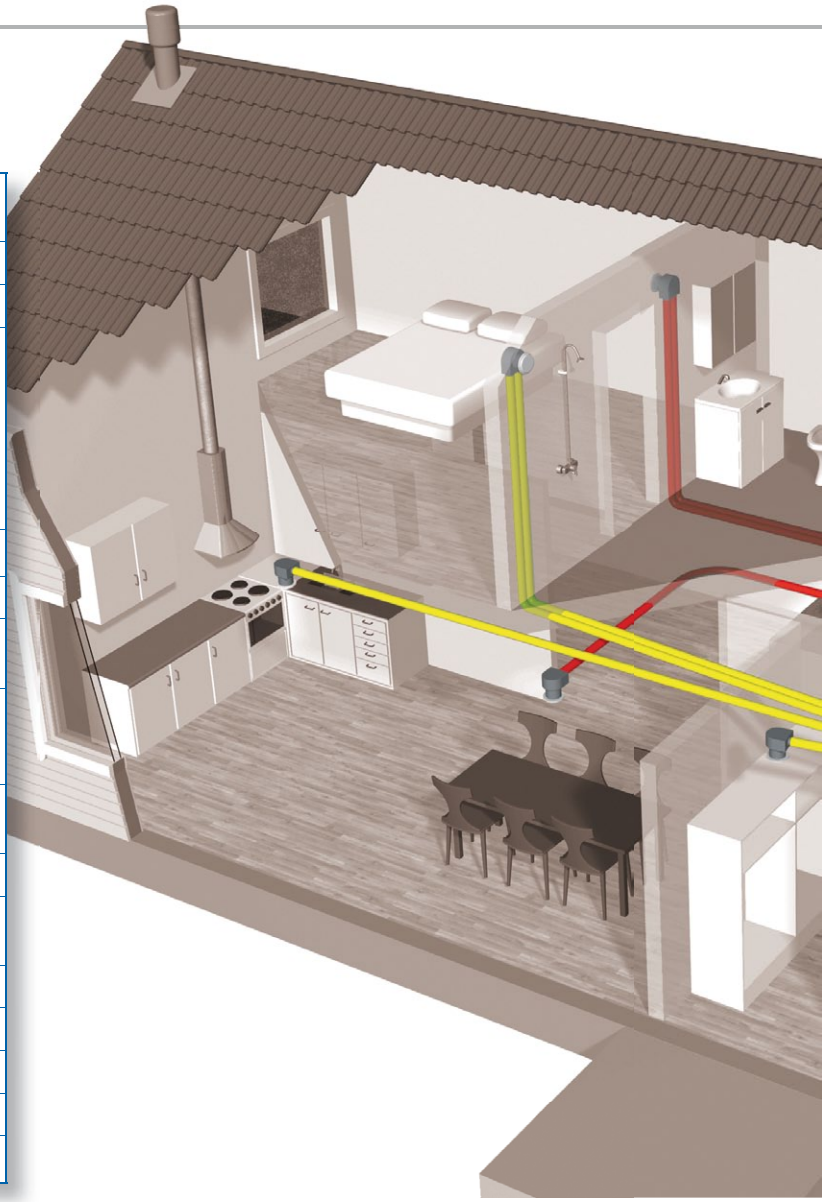
- Takes little space
  - outer diameter 75 mm
  - can be fully installed in warm rooms without large enclosures
- Hygienic
  - M1 classification
- Easy to clean
  - smooth, antistatic and microbe-protected inner surface
- Tight structure
- Small pressure loss
  - smooth inner surface – small flow resistance
- Does usually not require additional insulation when installed in blown wool insulation
- Quick to install
  - flexible duct
  - easy quick couplings – no drilling or riveting
  - duct may be lengthened with quick couplings – small waste of material
- Easy installation inside construction components already at the stage when the building frame is being made, in the same way as electricity and sewage installations.

Vallox BlueSky
- air distribution system

VALLOX

TECHNICAL DATA

Material		Odourless, antistatic, food-grade virgin HDPE
Transverse profile rigidity		SR24 > 31.5 kN/m^2
Smallest bending radius		Same as pipe diameter
Dimensions and recognisability		Outer Ø = 75 mm, inner Ø = 63 mm, s = 6 mm Double-casing structure. Outer surface blue, 8.5-mm groove interval. Smooth inner surface. Black VALLOX text on the outer surface at one-metre intervals.
Weight		0.35 kg/m
Coil length		50 m
Temperature range, installation and operation		–20 °C...+90 °C
Joints		Quick coupling and washer ring; air and water tightness according to the DIN EN 1610 standard
Cleanliness classification		Ventilation product cleanliness classification M1
Fire behaviour		Non-fire rated
Measurements	Emission measurement	VTT-S-00801-07
	Soilability	VTT-S-04858-07
	Cleanability	VTT-S-04858-07
	Installability	VTT-S-04858-07
	Fire test	VTT-S-03462-08
	Fire test	VTT-R-04517-10



Flexible and installation-friendly piping system for ventilation

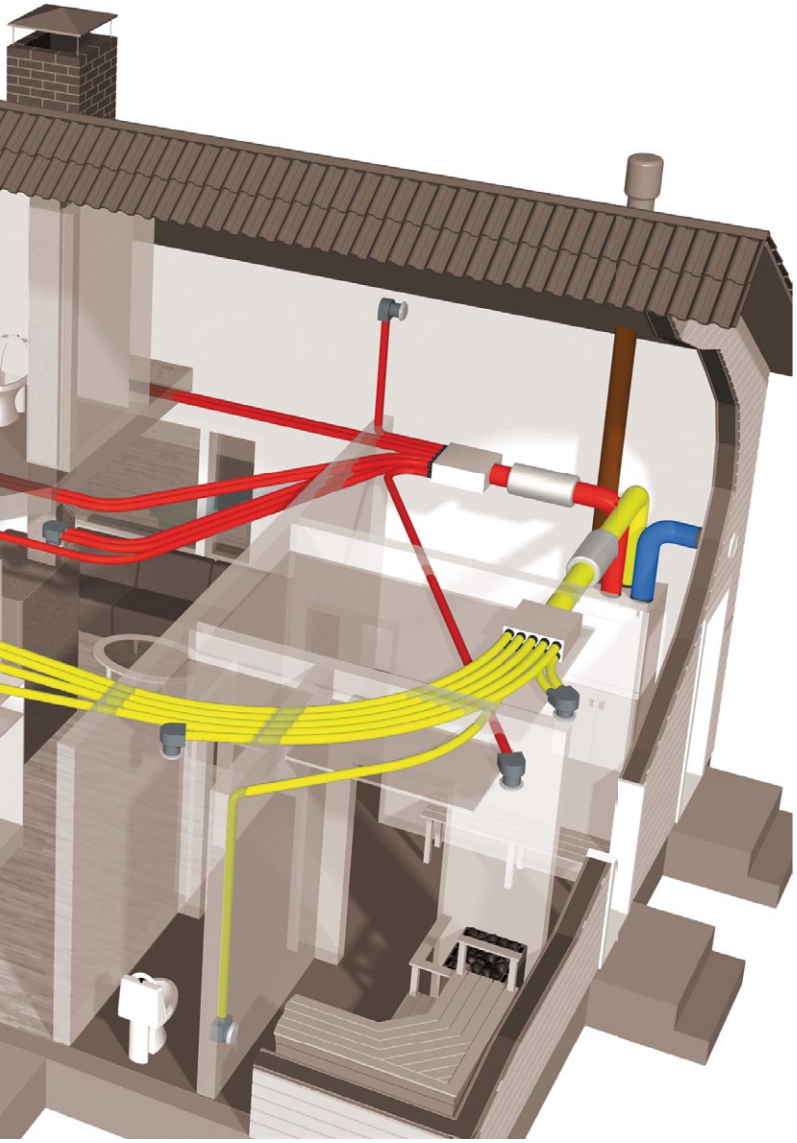
Vallox BlueSky is a flexible, sound attenuating and installation-friendly piping system for ventilation, made from odourless polyethylene.

A Vallox BlueSky ventilation duct has a twofold non-sagging structure: corrugated external envelope and smooth, antistatic, odourless, tight and microbe-protected inner surface. Dirt does not stick to the smooth surface, which is easy to clean.

Supply and extract air are taken from the ventilation unit to the Vallox BlueSky air distribution boxes, from which supply and extract air are distributed to the valves through a flexible duct.The distribution boxes operate as silencers for both the fan sound and the sound travelling through the ventilation duct from one room to another. However, it is recommended to install a silencer between the ventilation unit and the air distribution box.

In the Vallox BlueSky air distribution system, one or two pipes are connected to each valve directly from the sound-insulated air distribution box. Because the air flow in a single duct is small, duct size is small and pressure loss and sound level remain low. A "star-shaped" system and the use of one or two ducts per valve as needed lead to a natural basic adjustment. It is extremely easy to measure and adjust air flows at the valves.

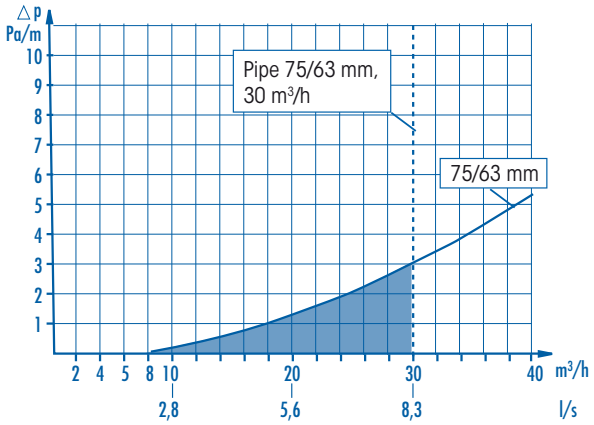
The Vallox BlueSky air distribution system can be easily installed inside partition walls, intermediate floors, suspended ceilings and boxes or concrete pouring. The quick-release fastening of all joints speeds up installation.



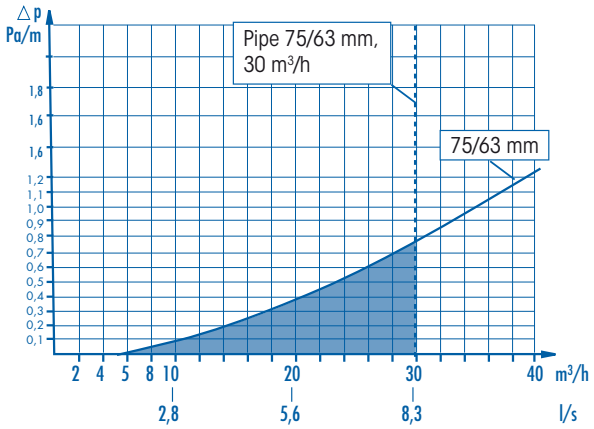
Pipe diameter:
Outer ø 75 mm, inner ø 63 mm, A = 0.0031 m²

Flow speed	Air volume		Flow resistance
m/s	m³/h	l/s	Pa/m
0.5	6.0	1.6	0.0
1.0	11.0	3.1	0.5
1.5	17.0	4.7	0.8
2.0	22.0	6.2	1.5
2.5	28.0	7.8	2.2
2.7	30.0	8.3	3.0
3.0	33.0	9.3	4.0
3.5	39.0	10.8	5.0
4.0	45.0	12.5	6.0

Pressure loss in Vallox BlueSky duct



Pressure loss in Vallox BlueSky 90° bend



Dimensioning of extract and supply air ducts

Recommendation:

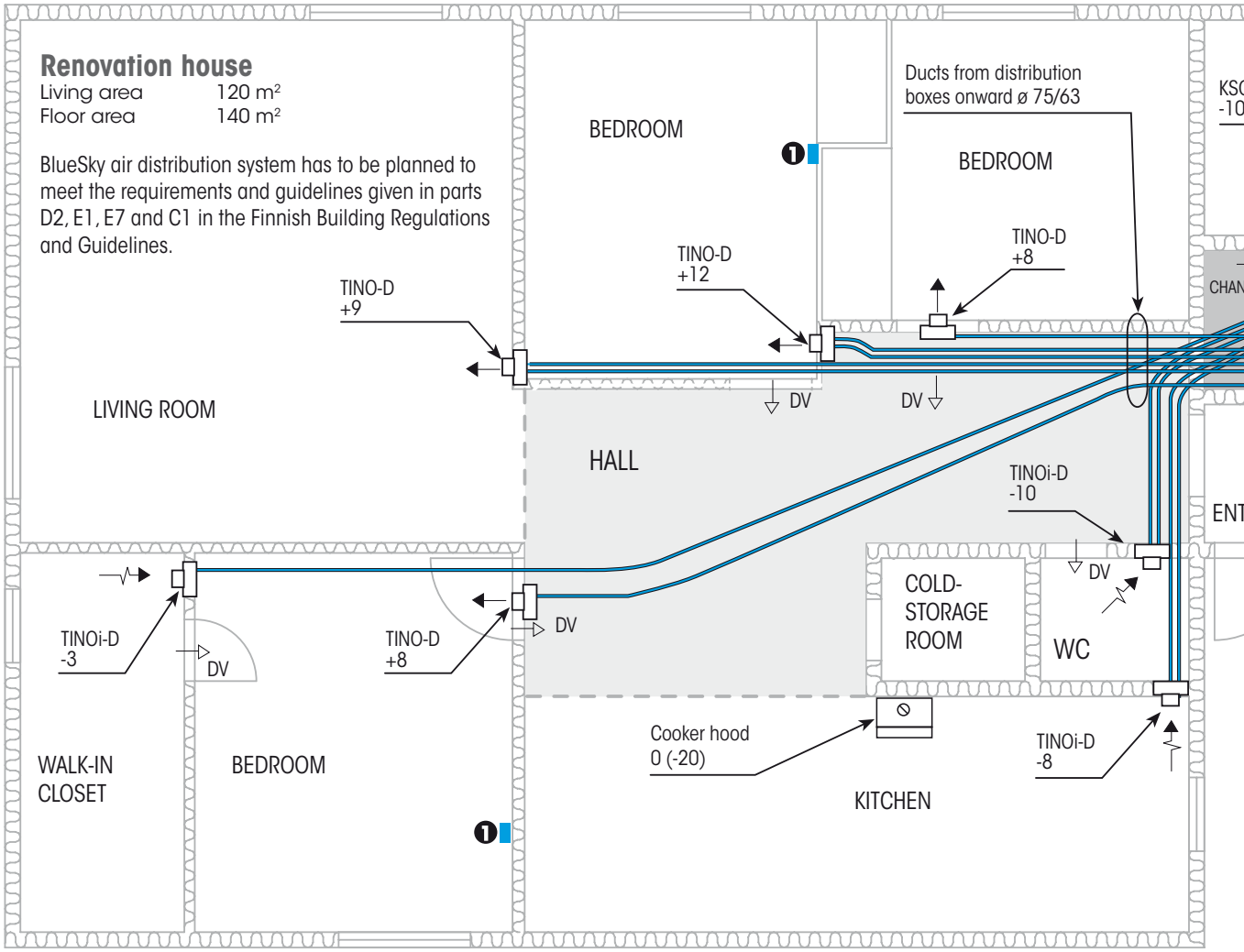
To ensure a noiseless ventilation system with a small pressure loss, a flow rate of no more than 3 m/s is recommended.

- The recommended maximum air flow of one valve is 8.3 l/s with one Vallox BlueSky pipe and 16.7 l/s with two pipes.
- The biggest recommended length of one Vallox BlueSky pipe is 15 m when air flow is 8.3 l/s. Pressure loss is then 45 Pa.

VALVE OUTLETS

Depending on air flow, the use of one or two ducts leads to a natural basic adjustment and facilitates the final measurement of air flows.

PLANNING OF BlueSky VENTILATION SYSTEM



Pressure loss

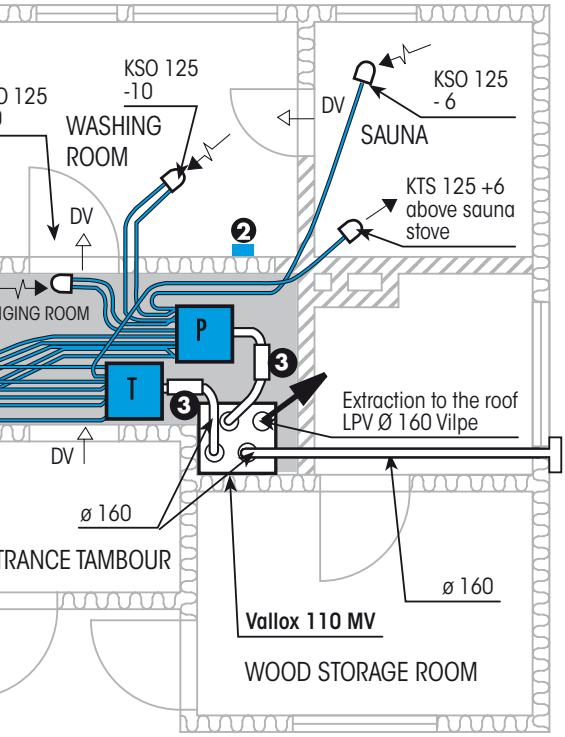
A carefully planned and implemented BlueSky air distribution system enables a small pressure loss in the ductwork. This ensures that the system is silent and the energy consumption of the fans remains low.

Example of pressure loss in extract air ductwork from washroom 10 l/s

Extract valve TINOi-D	10 Pa
BlueSky duct 2 m (1.5 Pa/m)	3 Pa
BlueSky distribution box 10	13 Pa
Extract and exhaust air duct 160 (4 m, 0.5 Pa)	2 Pa
Bend 160/90, 160/45 (4 pcs, 1.5 Pa/pc)	6 Pa
Roof penetration Vilpe 160	10 Pa
Total	44 Pa

Example of pressure loss in supply air ductwork to the farthest bedroom 8 l/s

External grille RIS-V 200 43 l/s	4 Pa
Outdoor and supply air duct 160 (5 m, 0.4 Pa/m)	2 Pa
Bend 160/90 (3 pcs, 1 Pa/pc)	3 Pa
Adapter 160/200	0.5 Pa
BlueSky distribution box 10	10 Pa
BlueSky duct 11 m (3 Pa/m)	33 Pa
Supply air valve TINO-D	10 Pa
Total	62.5 Pa



DV = Door vent:

Rooms to which 15...20 mm of air is brought

Rooms from which circa 10 mm of air is extracted

20 mm in the door between the door of the bathroom next to the sauna and the dwelling

Insulation

Supply and extract air ducts do not need insulation below the vapour barrier. Outdoor and exhaust air ducts are insulated below the vapour barrier with 19-mm cellular plastic and above the vapour barrier with 50-mm wool (no vapour-proof surface).

DIMENSIONING

Vallox 110 MV R

Supply air flow	43 l/s
Extract air flow (min 30% boosting)	47 l/s
Basic ventilation, speed of ventilation unit	3 á 47%
Total input power of fans	48 W
SFP of fans	1
Ventilation unit efficiency	85 %
Annual efficiency (Central Finland)	76 %
Amount of energy needed for ventilation without heat recovery	7,503 kWh/year
Energy saving through ventilation unit	5,704 kWh/year
Total energy consumption of ventilation	1,798 kWh/year

SUPPLIES

List of supplies	Unit	Amount
Vallox 110 MV R	pcs	1
Silencers	pcs	2
Carbon dioxide sensor	pcs	2
BlueSky duct 75 mm (50 m/roll)	roll	3
Extension connector	pcs	4
Washer ring (10 pcs/packet)	packet	4
Distribution box 160/10	pcs	2
Coupling unit for valve, side connection 125	pcs	4
Supply air valve TINO-D	pcs	4
Supply air valve KTS-125	pcs	1
Extract air valve TINOi-D	pcs	3
Extract air valve KSO-125	pcs	3
External grille RIS-V 200	pcs	1
Roof penetration Vilpe 160	pcs	1
Spiral-seam duct 160	m	12
Bend 160/90	pcs	5
Bend 160/45	pcs	2

Indicative calculation of supplies for BlueSky air distribution system

Duct volume

Duct volume as rolls according to the number of rooms. One additional roll for a two-storey house, and two additional rolls for a three-storey house.

Calculation for valve coupling units

Calculate the number of valves in the ventilation plan. If there is no plan, the number can be estimated: number of rooms x 1.2 (rounded up). A sauna has always, and a large living-room sometimes, two valves. This is taken into account in the factor of 1.2.

Every space with a ventilation valve, such as an entrance tambour where clothes are kept or a separate dining recess, is regarded as a room. An entrance hall is usually not taken into account.

Other ducts

Fresh air coming to the unit, exhaust air going from the unit and the duct coming from the unit to distribution boxes are always ducted with a hard duct. Silencers are located between the unit and distribution boxes. The extraction duct of a cooker hood or a fan must be a spiral-seam duct.

BlueSky supplies		Number of rooms:		
	HVAC code	10 or less	11–15	16–20
BlueSky duct 75 mm (50 m/roll)	8275000	2 rolls	3 rolls	4 rolls
Outer connector	8275001	4 pcs	6 pcs	8 pcs
Washer ring (10 pcs/packet)	8275002	4 pcs	6 pcs	8 pcs
air distribution box 6 outlets (connection 125 mm, H = 160)	8275018			
air distribution box 6 outlets (connection 125 mm, H = 200)	8275019			
air distribution box 10 outlets (connection 160 mm, H = 200)	8275020	2 pcs	2 pcs	
air distribution box 15 outlets (connection 200 mm, H = 300)	8275021			2 pcs
Coupling unit for valve, side connection 125	8275009	= valves	= valves	= valves
Coupling unit for valve, rear connection 125	8275008			
Tino-D supply air valve	8275015			
Tinoi-D extract air valve	8275016			

Vallox BlueSky
- air distribution system

Ducts and parts

Vallox BlueSky is a flexible, sound attenuating and installation-friendly piping system for ventilation, made from odourless polyethylene. A Vallox BlueSky ventilation duct has a twofold non-sagging structure: corrugated external envelope and smooth, antistatic, odourless, tight and microbe-protected inner surface.

Vallox BlueSky 75/63 PIPE

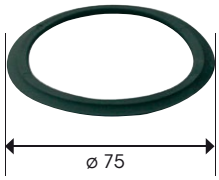
- *roll 50 running metres*
- *outer ø 75 mm*
- *inner ø 63 mm*

Flexible ventilation duct.

Product code	380750
HVAC code	8275000

WASHER RING FOR PIPE 75 mm

Dimensions



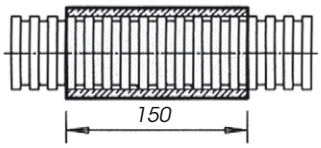
10 pcs/bag.

Product code	382750
HVAC code	8275002

OUTER CONNECTOR 75 mm

Dimensions

- *duct outer ø 75 mm*

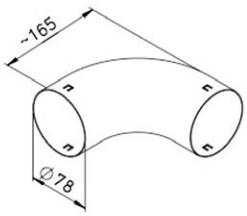


Outer connector for BlueSky duct.

Product code	381750
HVAC code	8275001

BEND 90° 75 mm

Dimensions

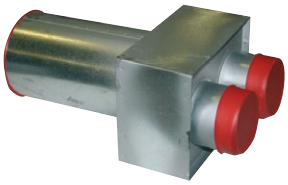


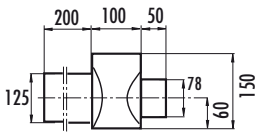
Galvanised steel sheet.
For narrow places where the bending radius of BlueSky pipe is not enough.

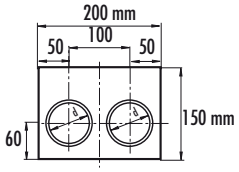
Product code	384759
HVAC code	8275006

CONNECTION PART FOR VALVE / BACK CONNECTION

Dimensions





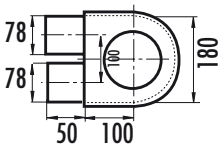


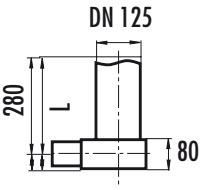
Duct size, ø125 mm.
Air volume 17 l/s 8 Pa.
Pipe outlets 2 x 75 mm.
Stop plug.

Product code	384751
HVAC code	8275008

CONNECTION PART FOR VALVE/SIDE CONNECTION

Dimensions





Duct size, ø125 mm.
Air volume 17 l/s 4/6 Pa.
Pipe outlets 2 x 75 mm.
Stop plug.

Product code	385750
HVAC code	8275009

Supply and extract air valves

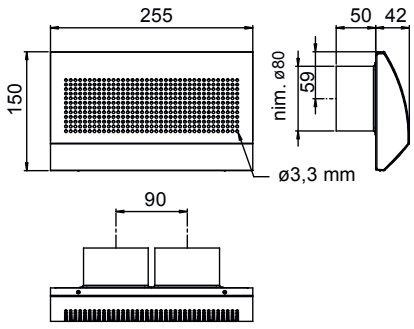
Tino-D supply air valves and Tinoi-D extract air valves can be directly connected to a Vallox BlueSky duct. Valve body has two outlet collars with an outer ø of 75mm. No valve coupling unit is needed.

Vallox BlueSky - air distribution system

SUPPLY AIR VALVE TINO-D

Dimensions

Adjustment values



TINO-D	k
$q_v = k \times \sqrt{\Delta p_m}$	12*37
A	4.5
Number of closed rows	
2	3.6
4	2.7
6	2.0
8	1.3
10	

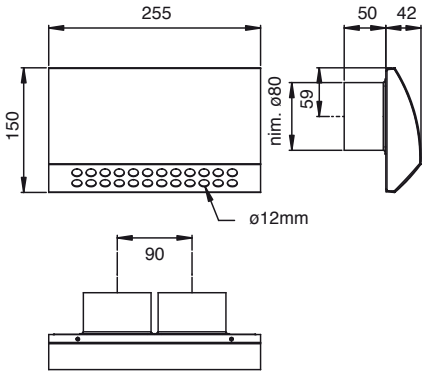
- *Supply air valve with two BlueSky duct joints*
- *Valve meets the choke requirement for fire valves (42 l/s/100 Pa)*

Product code	386760
HVAC code	8275015

EXTRACT AIR VALVE TINOi-D

Dimensions

Adjustment values



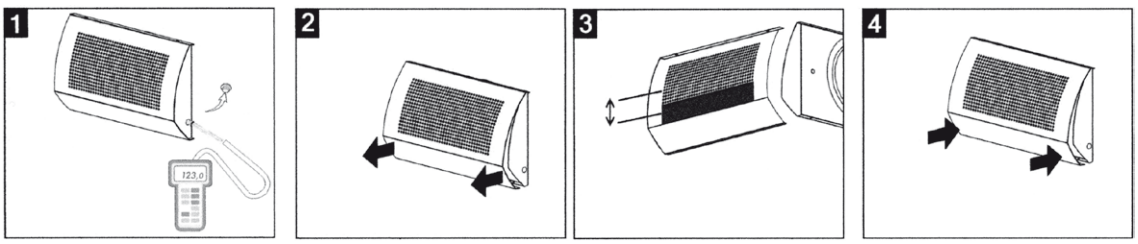
TINOi-D	k
$q_v = k \times \sqrt{\Delta p_m}$	12*2
A	2,4
Number of closed rows	
2	2,0
4	1,6
6	1,2
8	0,8
10	0,4

- *Extract air valve with two BlueSky duct joints*
- *Valve meets the choke requirement for fire valves (42 l/s/100 Pa)*

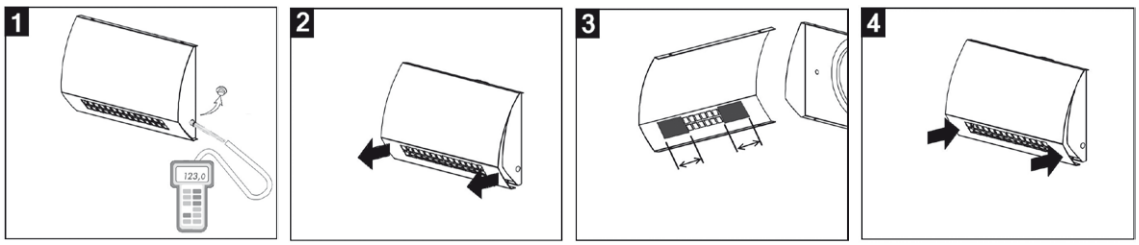
Product code	386770
HVAC code	8275016

ADJUSTMENT OF Tino VALVES

Tino-D supply air valve



Tinoi-D extract air valve



Vallox BlueSky
- air distribution system

Air distribution boxes

Vallox BlueSky air distribution boxes are made of galvanised steel sheet. They have an inspection door, and the structure is sound attenuating. The distribution boxes operate as silencers for both the fan sound and the sound travelling through the ventilation duct from one room to another.
In boxes with six duct outlets (H = 160) the BlueSky duct connections are situated at the end of the box. In boxes with six duct outlets (H = 200) and in boxes with ten and fifteen duct outlets some of the ducts start from the end and some on top of the box. A duct is locked into the outlet collar with two locks.

BlueSky AIR DISTRIBUTION BOX 6, H = 160/ H = 200 — Dimensions — Air volumes

H = 160

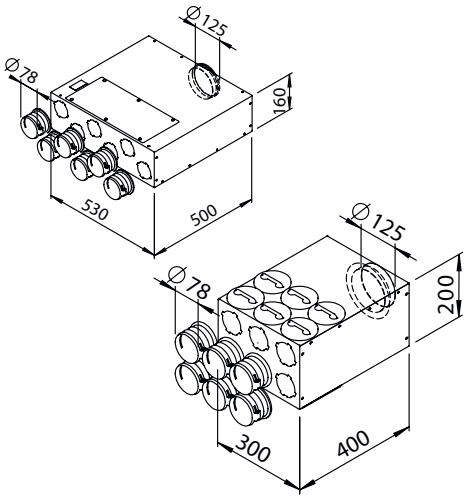
Product code 383277

HVAC code 8275018

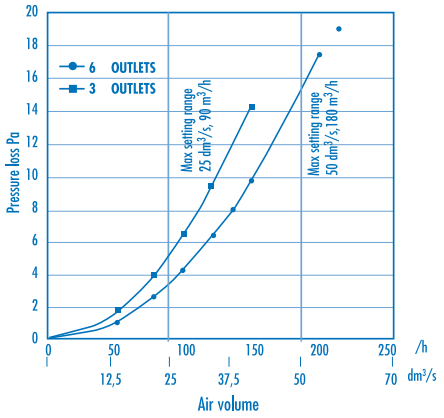
H = 200

Product code 383278

HVAC code 8275019



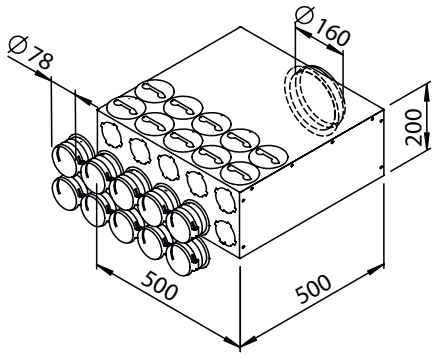
Connection 125 mm



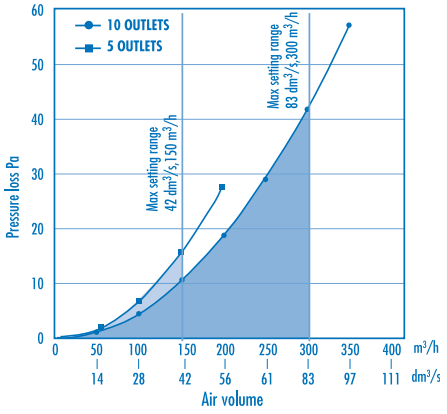
BlueSky AIR DISTRIBUTION BOX 10, H = 200 — Dimensions — Air volumes

Product code 383676

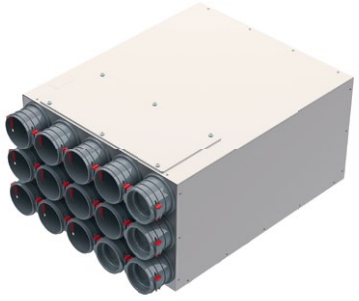
HVAC code 8275020



Connection 160 mm

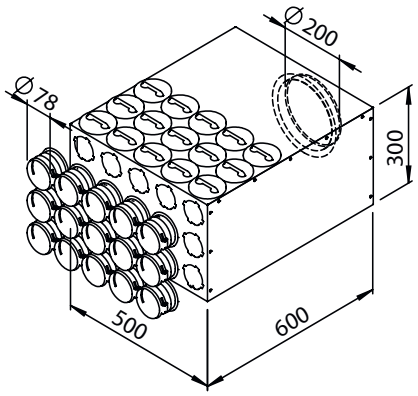


BlueSky AIR DISTRIBUTION BOX 15, H = 300 — Dimensions — Air volumes

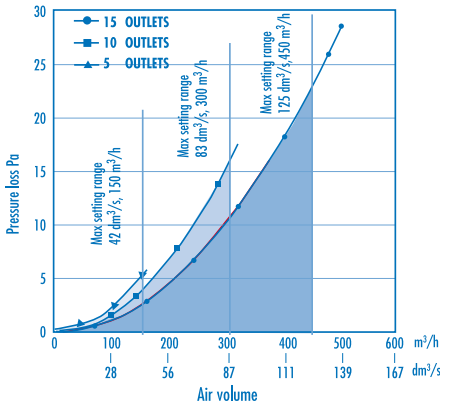


Product code 383876

HVAC code 8275021



Connection 200 mm



Silencing, BlueSky air distribution box

Medium frequency of octave band/Sound attenuation dB								
Hz	63	125	250	500	1000	2000	4000	8000
6 outlets, dB	13	17	17	23	25	20	25	31
10 outlets, dB	12	19	20	24	15	29	25	36
15 outlets, dB	17	23	17	26	19	28	34	37

Accessories for air distribution boxes

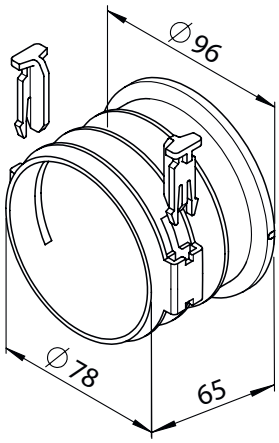
Distribution Boxes delivery includes nominal amount of the collars, plugs and covers.

Outlet collars with bayonet locking and other accessories for BlueSky 75 mm are also available separately as accessories.

Vallox BlueSky - air distribution system

OUTLET COLLAR 75 mm + 2 locking devices

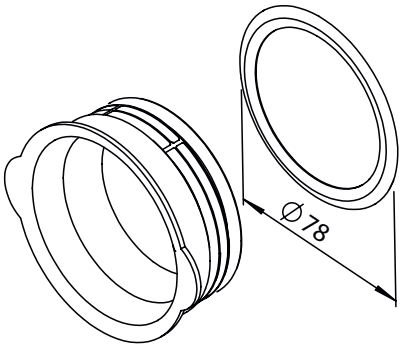
Dimensions



Product code	985023
HVAC code	8275022

PLUG AND SEAL FOR 75 mm OUTLET COLLAR

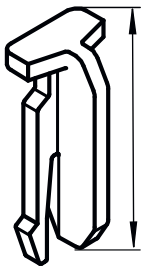
Dimensions



Product code	386751
HVAC code	8275023

LOCKING DEVICE

Dimensions

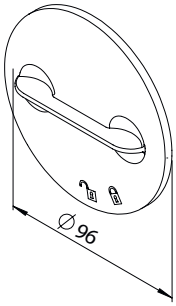


10 pcs/bag

Product code	386752
HVAC code	8275024

COVER FOR DISTRIBUTION BOX 75 mm

Dimensions



Product code	985024
HVAC code	8275025

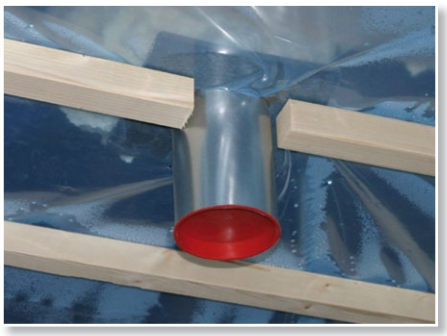
INSTALLATION OF BlueSky AIR DISTRIBUTION SYSTEM

Installation in suspended enclosures or casings

When the ducts are in a warm room, no heat insulation is needed. If cooled air is transported in the ducts, insulation against condensation in the duct is necessary.

Attic floor installation

When a pipe is installed in attic floor insulation, it is recommended to do the installation right on top of the vapour barrier. When this is the case, the pipes do not need any additional insulation for the attic floor insulation is enough for insulating the duct as well. The penetrations of the vapour barrier are insulated.



Installation tips

- Vallox BlueSky is a flexible duct system, and it is practical to design and install it in a "star shape". This way the ductwork becomes symmetrical and short.
- Before installation, the Vallox BlueSky duct has to be inspected for any damage and impurities caused during transportation.
- To speed up work, the dimensioning of the ductwork can be carried out first on the floor. After that, the pipes and the distribution boxes can be lifted up and fixed to the ceiling.
- The distribution boxes, valve connection parts and TINO-D valves are equipped with outlet collars that are suitable as such for BlueSky ducts.
- To make the coupling tight, put a washer ring at the end of the duct, in the first groove between the ridges. We recommend moistening the washer ring before installation!
- After installation and before taking the pipes into use protect the pipe ends against dust and other dirt with the supplied shield caps.
- It is worthwhile installing the whole BlueSky ductwork either outside or inside the vapour barrier in order to make the vapour barrier as tight as possible.

Installation regulations

- During the installation of the BlueSky air distribution system, the requirements of parts D2, E1, E7 and C1 in the Finnish Building Regulations and Guidelines have to be met.
- The fire safety of the Vallox BlueSky ventilation duct has been proven in the research report VTT-S-04517-10 of VTT.

Fire protection and enclosure

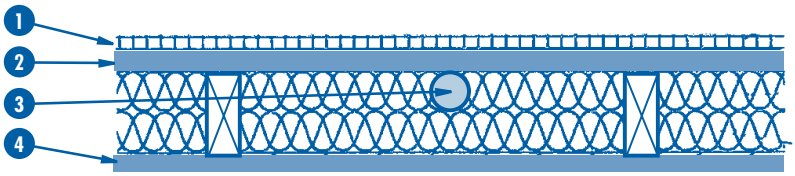
- When the Vallox BlueSky system is installed inside buildings belonging to fire class P3 (detached houses, terraced houses and semi-detached houses), the ducts are enclosed with material of at least class D-s2,d2 or coated with mineral wool.
- Valves to be used are ones that choke air flow and meet the requirements given in part E7 6.1. in the Finnish Building Regulations and Guidelines.
- When the Vallox BlueSky system is installed in a dwelling in a block of flats, the finished duct installations must be coated e.g. with a 2 x 15 mm fire-resistant plasterboard and tested fire damping valves are used as valves.

Supporting

To prevent the coming loose of the duct joints, the Vallox BlueSky ducts are supported in the immediate vicinity of all joints and on both sides of the connector outlet. There is no need to support the duct in any other place unless the method of installation so requires.

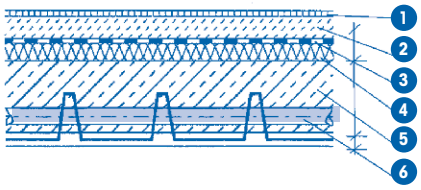
Intermediate floor installation

1. *Floor coating*
2. *Timber panel or plasterboard*
3. *Vallox BlueSky pipe in insulation*
4. *Ceiling below*



Installation in concrete pouring

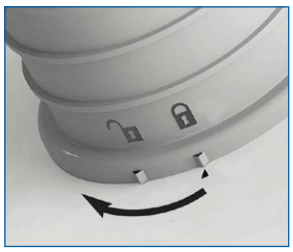
The Vallox BlueSky ductwork is installed among concrete reinforcement or thin-shell slab and fixed to the concrete reinforcement with cable ties. After the duct and other HVAC installations have been done, other necessary skin reinforcement is applied before concrete pouring.



1. *Floor coating*
2. *Cement mortar*
3. *Building foil*
4. *Soundproofing as required*
5. *Concrete slab according to strength calculations, inside which the Vallox BlueSky pipes have been cast.*
6. *Vallox BlueSky ventilation ductwork*

Installation of air distribution boxes and valve connection parts

- Sealing is installed in every joint of the Vallox BlueSky ventilation duct in the last pipe groove.
- Vallox BlueSky distribution boxes have sound attenuation and a service door.
- However, it is recommended to install a silencer between the ventilation unit and the air distribution box in order to silence the sound of the fan.
- A Vallox BlueSky air distribution box is delivered with the installation corners and their screws.
- The Vallox BlueSky duct and the washer ring are pushed into the outlet collar of the air distribution box and locked with two locking devices. For the duct coming from the ventilation unit there is an outlet collar with a rubber ring.
- The valve connection outlet is first attached to the structures, after which one or more ducts can be connected to it.
- The Vallox BlueSky duct and the washer ring are pushed into the valve connection part. The duct is locked into the locking tongues.
- A 125-mm valve is installed in the valve connection part either with a spring attachment or with a 125-mm clamping frame.
- Tino-D and Tinoi-D valves have two outlets for the BlueSky duct. The Vallox BlueSky duct and the washer ring are pushed into the duct outlet. The duct locks into the locking tongues of the duct outlet.
- If only one of the duct outlets of the valve or connection part is taken into use, the other outlet is closed with the shield plug supplied with the outlet. The shield plug is installed inside the duct outlet.



Vallox BlueSky
- air distribution system

VALLOX

Insulation of BlueSky ducts on floors and in cold rooms

When BlueSky ducts are installed below the vapour barrier, the plastic vapour barrier stays undamaged. In winter the heat losses of the ductwork are minimised, and the cooling power of the ventilation unit is not wasted in the hot attic in summer.

In attic installation, the thin BlueSky duct does not need other insulation than blown wool when the duct is installed close to the vapour barrier. A sufficient isolation thickness above the duct must be ensured if the duct is installed apart from the vapour barrier.

The valve connection parts are fixed to the ceiling structures and the 125-mm pipe coming through the vapour barrier is sealed to the vapour barrier.

Any deviating special requirements imposed by the local building authorities have to be met.

Ducts in warm rooms – interior

Temperature of air running in the duct more than + 10° C
- Extract air duct
- Supply air duct

No insulation

Temperature of air running in the duct less than + 10° C
- Outdoor air duct to the unit
- Exhaust air duct from the unit
- Supply air duct

Closed cell insulation 2 cm

Ducts in cold and warm rooms

Cooling with ventilation unit

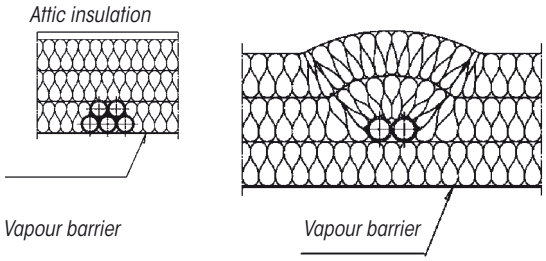
Temperature of air running in the duct less than + 17° C

- Supply air duct

Closed cell insulation 2 cm

Ducts in cold rooms – in the attic, attic insulation and above

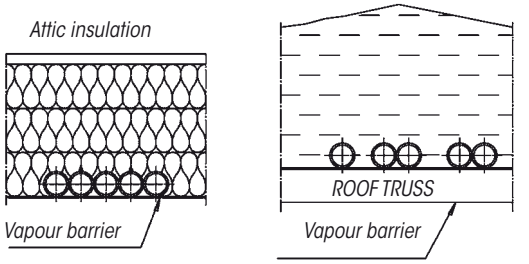
- Supply air duct
- Extract air duct



DUCTS IN BLOWN WOOL

Note!

The outdoor and exhaust air duct must not be installed inside attic insulation



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Myllykyläntie 9-11
FIN 32200 LOIMAA
FINLAND