Heat recovery unit KRB 1000—2000

General

KRB 1000—2000 are units designed for indoor installation to recover heat from the exhaust air.

- they are available in 5 different sizes, with a nominal flow range of 0.5—6.0 m^3/s
- they are provided with an outdoor air damper, rotary heat exchanger, heating coil, supply and exhaust air fan
- they have a heat insulated casing as standard
- they can be manufactured with standard certified housing, in fire class A-15 or A-30
- they can be provided with a mixing section for recirculated air operation
- they have fans with forward or backward curved blades
- they are connected to a standard duct with a PG connection
- they can be supplied for outdoor installation

Design

KRB 1000—2000 are constructed of a frame of extruded aluminium sections. Inspection doors and cover plates are manufactured from galvanised steel plate. The units are insulated on the inside as standard with 25 mm fire resistant mineral wool, but they can also be manufactured with standard certified housing in fire class A-15 or A-30.

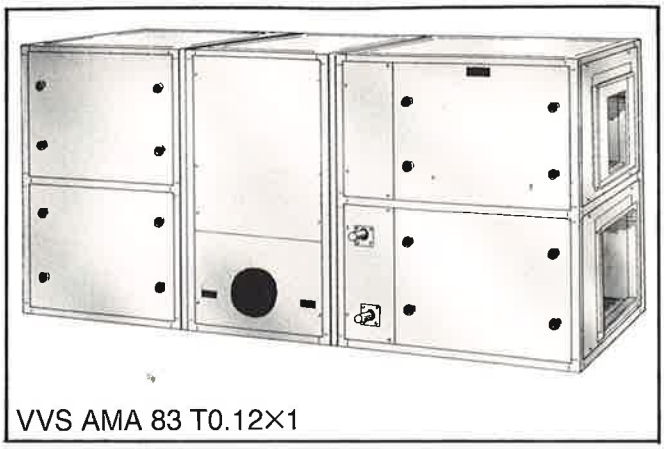
Supply and exhaust air is always separated by a partition of A-30 design.

The filters in class EU3 or EU5 are deep folded bags of the disposable type. U-tube pressure gauges are also supplied with the units.

Fans with both forward and backward curved blades may be selected. They are effectively insulated against vibration with fabric nets and vibration dampers, and size 1000—1750 fans are of the pull-out type.

All pulleys are fitted with clamping bushes.

KRB 1000, 1250, 1500, 1750 and 2000 are provided as standard with a heating coil consisting of copper pipes with aluminium fins, and water as the



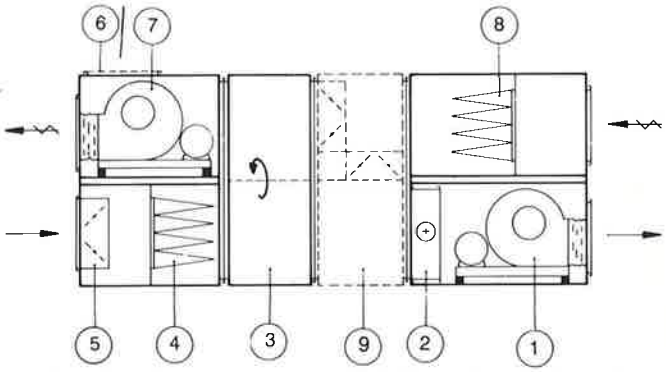
VVS AMA 83 T0.12×1

heating medium. An electrical coil in the low temperature design can be obtained after specifying the flow, power and pitch.

Max. electrical power: KRB 1000, 33.2 kW
KRB 1250, 46.1 kW
KRB 1500, 71.2 kW
KRB 1750, 92.9 kW
KRB 2000, 119 kW

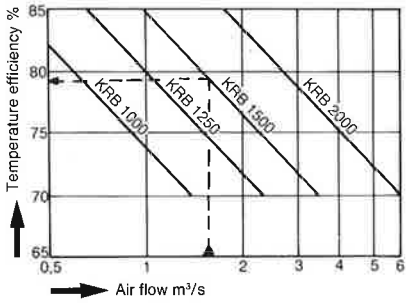
The heat exchanger is of our rotary RVA type. Mechanical speed control or operation at a constant speed may be selected.

The rotor may be removed from the fame.



1. Supply air fan
2. Heating coil
3. Heat exchanger
4. Outdoor air filter
5. Outdoor air damper
6. Alternative exhaust air fan connection
7. Exhaust air fan
8. Exhaust air filter
9. Mixing section, if provided

Survey, degree of recovery



Heat recovery unit KRB 1000—2000

INDUSTRI ventilation

Specification

HEAT RECOVERY UNIT KRB -a -b -c -d -e

Size -a
- 1000, 1250, 1500, 1750, 2000

Casing -b
- 00 = Standard
- 15 = A-15
- 30 = A-30

Rotor -c
- KN = Rotary const. oper., non-hygros.
- VN = Rotary speed control, non-hygroscopic
- KH = Rotary const. oper., hygroscopic
- VH = Rotary, speed control, hygroscopic

Fans -d
- F = forw. curved blades
- B = backw. curved blades

Inspection side* -e
- H = Höger
- V = Vänster

Supply air
- Motor see separate catalogue section for motors page 293
- Belt drive See page 299
- Filter EU3 KRBF-a-EU3
- Filter EU6 KRBF-a-EU6
- Water heating 1R KRBV-a-1-e
- Water heating 2R KRBV-a-2-e
- Water heating 3R KRBV-a-3-e
- Water heating 4R KRBV-a-4-e
- Electrical heating KRBE-a-kW-d-m³/s
  - Power stages in kW
  - min. air flow

Exhaust air
- Motor See separate catalogue section for motors, page 293
- Belt drive See page 299
- Filter EU3 KRBF-a-EU3
- Filter EU6 KRBF-a-EU6

* Inspection side viewed in the supply air flow direction

Accessories

Outdoor design KRBT-01-a-f
- 0 = without mixing section
- 1 = with mixing section

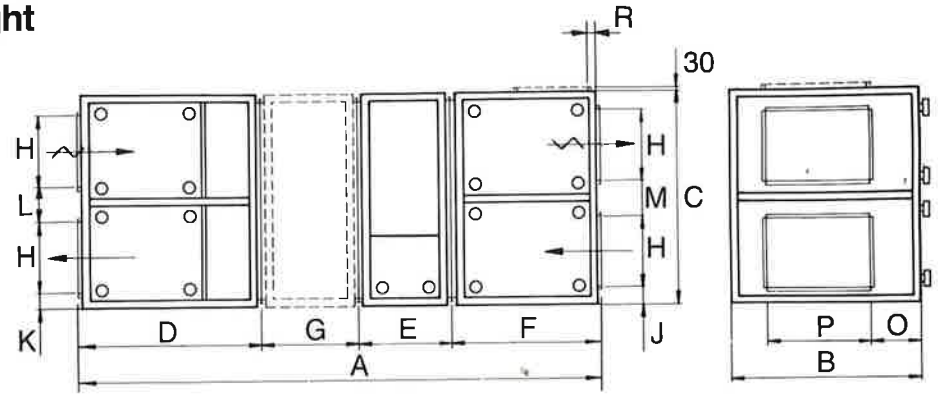
Mixing section	KRBT-10-a-b-e
Internal metal coating	KRBT-03-a
Sound attenuator	KRBT-04-a
Spacer section	KRBT-05-a
Exhaust air damper type 2	KRBT-06-a
Exhaust air damper type 3	KRBT-07-a
Outdoor air damper type 3	KRBT-08-a
Fan outlet, roof (exhaust air)	KRBT-09-a-b
Hinged inspection doors	KRBT-11-a
Guide vane damper. Applicable to sizes 1500,1750 and 2000	KRBT-12-a
Reinforced fan. Applicable to size 2000	KRBT-13

General accessories

Control and regulating equipment see page 102
Electrical connection to connection block or installed cubicle is available subject to separate specification

Technical data

Dimensions and weight

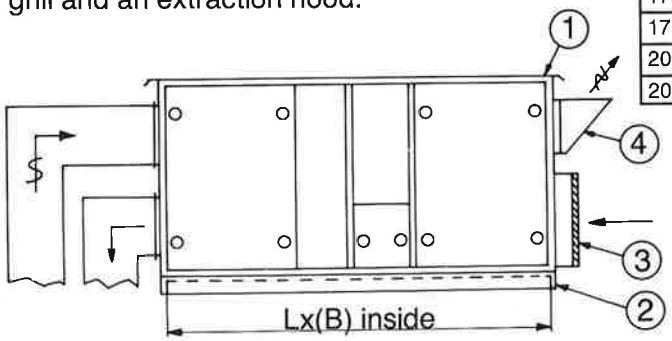


KRB																Weight**	Max. motor. Instal. size
De-sign	Size	A*	B	C	D	E	F	G	H	J	K	L	M	O	P	R	kg	
Stand	1000	2375	1025	1325	1075	450	850	545	400	140	85	300	195	280	600	100	400	112
	1250	2375	1325	1325	1075	450	850	545	400	140	85	300	195	280	600	100	500	112
	1500	2800	1575	1575	1275	450	1075	545	500	150	85	335	210	290	1000	100	700	132
	1750	3000	1750	1750	1275	450	1275	545	600	145	85	320	200	275	1200	100	900	132
	2000	3380	2105	2105	1465	450	1465	545	800	135	100	270	205	455	1200	100	1250	160
A-15 A-30	1000	2435	1060	1390	1105	450	880	545	400	170	110	310	185	305	600	135	600	112
	1250	2435	1360	1390	1105	450	880	545	400	150	110	335	210	305	600	135	740	112
	1500	2860	1610	1640	1305	450	1105	545	500	160	110	375	220	315	1000	135	1040	132
	1750	3060	1785	1815	1305	450	1305	545	600	180	110	330	190	275	1200	135	1350	132
	2000	3450	2140	2170	1500	450	1500	545	800	140	130	295	225	480	1200	130	1800	160

* Dimension, excluding mixing section (dimension G)
** Weight, excluding motors

Outdoor design KHBT-01

KRB 1000–2000 have partitions with 25 mm mineral wool insulation, giving a K value of approx. 0.9 W/m²°C. This is very often sufficient for them to be able to be installed outdoors, in which case the units need only be supplemented with a roof, bottom frame, outer wall grill and an extraction hood. See sketch below.



1. Roof
2. Bottom frame
3. Outer wall grill
4. Extraction hood

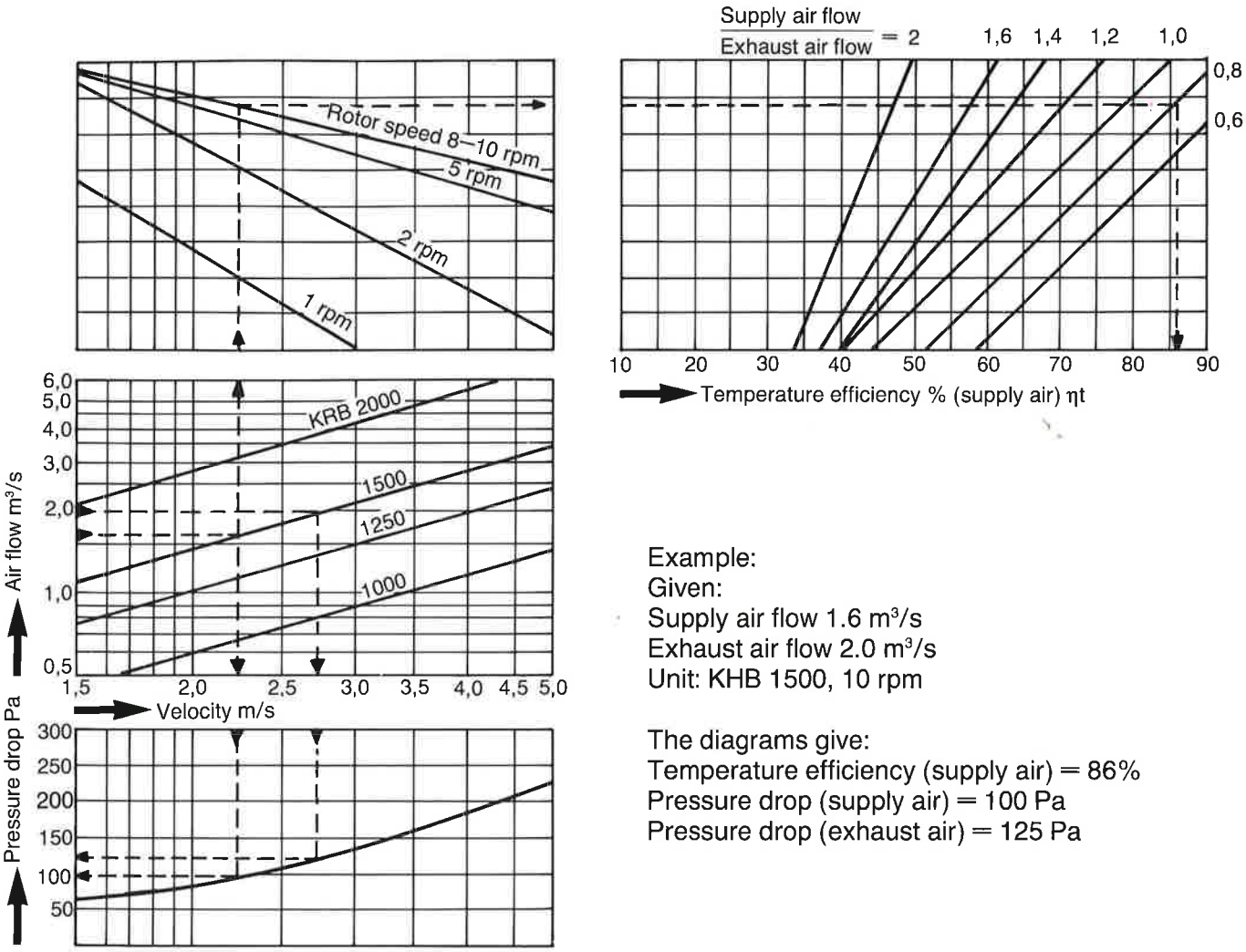
Bottom frame

Size	L	B
1000	2325	1025
1000 with mix. sect.	2875	1025
1250	2325	1325
1250 with mix. sect.	2875	1325
1500	2750	1575
1500 with mix. sect.	3300	1575
1750	2965	1750
1750 with mix. sect.	3515	1750
2000	3330	2100
2000 with mix. sect.	3880	2100

Heat recovery unit KRB 1000—2000

INDUSTRI ventilation

Technical Data



Example:
Given:
Supply air flow 1.6 m³/s
Exhaust air flow 2.0 m³/s
Unit: KHB 1500, 10 rpm

The diagrams give:
Temperature efficiency (supply air) = 86%
Pressure drop (supply air) = 100 Pa
Pressure drop (exhaust air) = 125 Pa

Motor data for heat exchanger

	KRB 1000—1250		KRB 1500—1750		KRB 2000	
	Power W	Current A* at 380V	Power W	Current A* at 380V	Power W	Current A* at 380 V
Constant speed approx. 10 rpm	120	0.35	180	0.56	250	0.75
Electronic control	The control centre is connected to single-phase 220V and is protected by a 6A slow-acting fuse					

* At 220V the current intensity is 1.73×Current A

Electronic control

The rotary heat recover unit can be provided with a driving device for constant operation or speed control. The speed control system consists of a drive motor and an electronic control centre with built-in functions for cleaning, rotation monitoring protection and alarm.

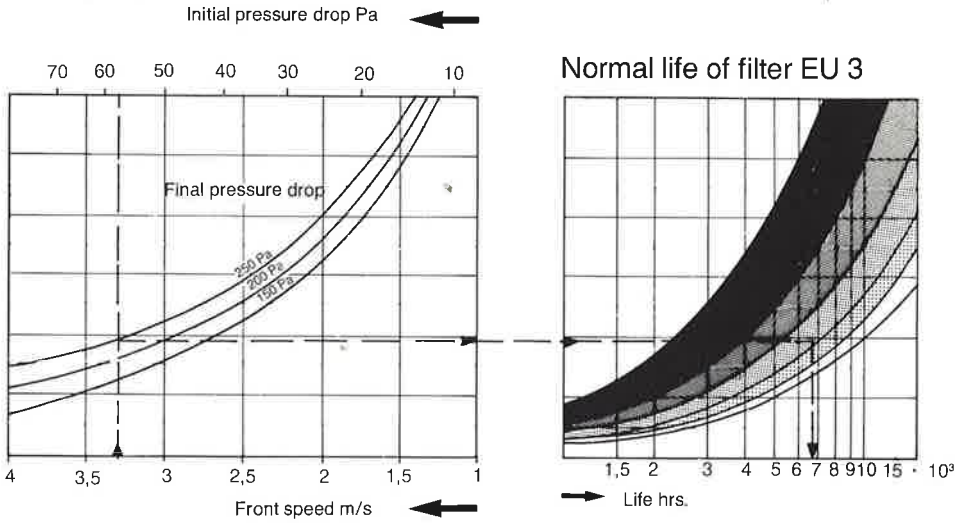
Detailed descriptions of the driving devices are given in the catalogue section for RVA heat recovery units on page 63.

Filter data

EU 3 (G80)

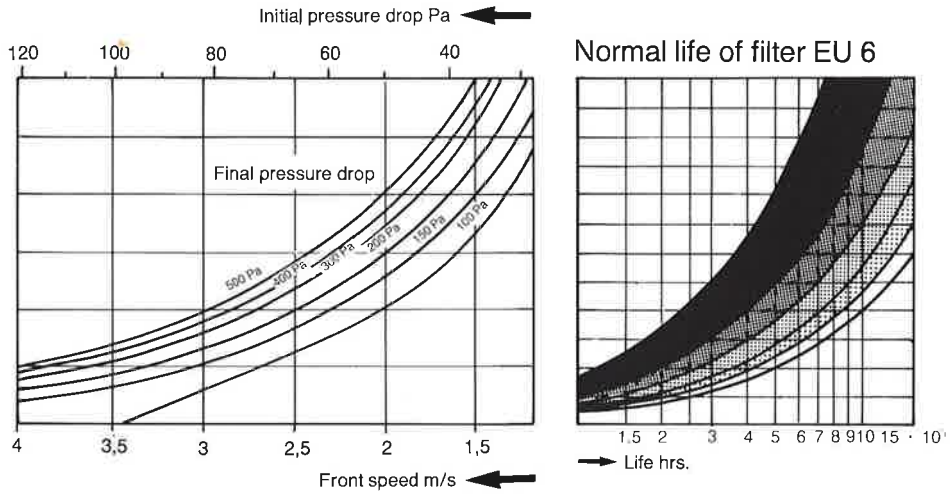
The filter is a non-cleaning bag filter manufactured from polyamid fibres.

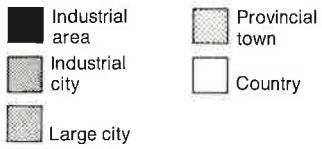
A large effective filter area and a high atmospheric dust retention capacity means that this filter can be used in many applications.



EU 6 (F65)

The filter is a bag filter manufactured from glass fibre material, which cannot be washed. The long life of the filter is due to the large filter area and high dust retention capacity.





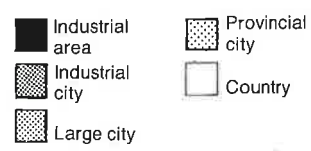
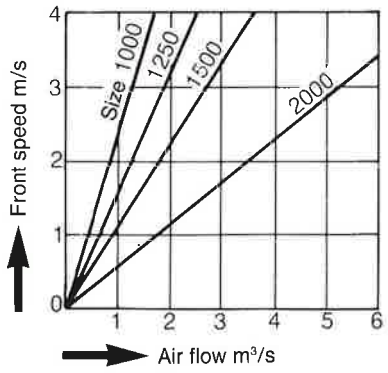


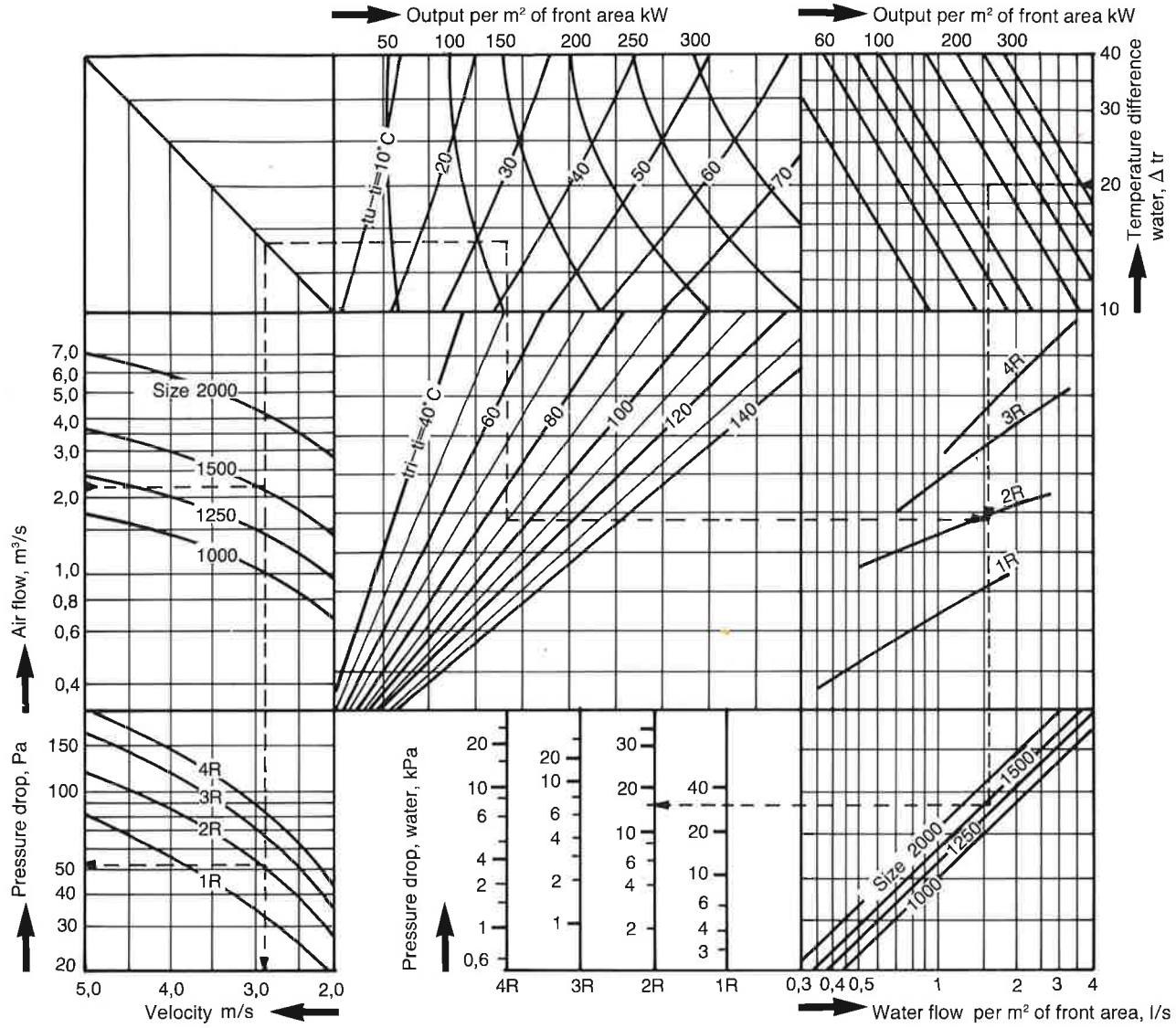
Diagram for calculating front speed over filter



Heat recovery unit KRB 1000—2000

INDUSTRI ventilation

Water heating



Front area A, m²	
Size	Area
1000	0.35
1250	0.5
1500	0.74
1750	1.02
2000	1.45

Example:

Given
Air flow = 2.2 m³/s
Entering air temp. ti = −10°C
Leaving air temp. tu = +25°C
Entering water temp. tri = 80°C
Leaving water temp. tru = 60°C
Size 1500 A = 0.74 m²

Solution

Enter the diagram at flow 2.2 m³/s.
Select size 1500.
Follow the dotted line.
The output, at tu—ti = 35°C, will be 130 kW per m² of front area.

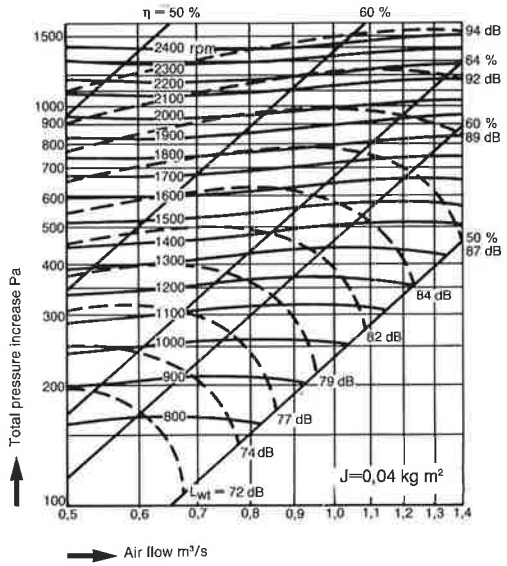
Go to the line of intersection tri—ti = 90°C, and proceed to the row determination diagram.
Use the water temperature difference Δ tr = 20°C and enter the row determination diagram at the power of 130 kW per m³.
Select the row, 2R which is closest above the point of intersection formed.

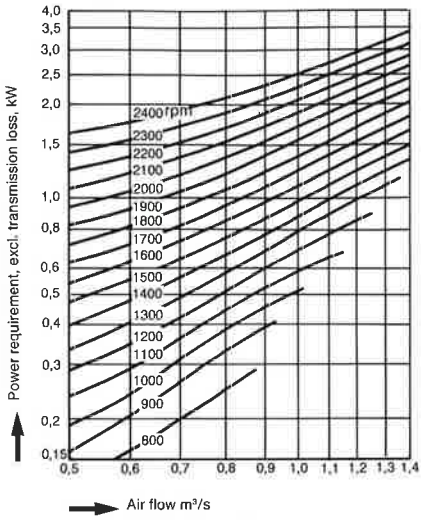
The following is therefore obtained from the diagram:

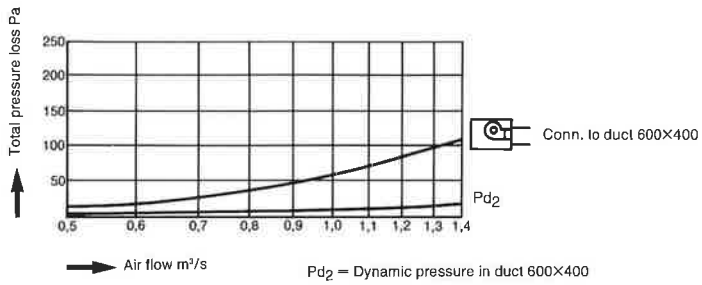
Air velocity	= 2.9 m/s
Pressure drop, air side	= 52 Pa
Output = A×output per m²	= 0.74×130 = 96 kW
Number of rows	= 2
Water flow =	
= A×water flow per m²	= 0.74×1.55 = 1.15 l/s
Pressure drop, water side	= 16 kPa

Capacity

Size 1000-F







Pd_2 = Dynamic pressure in duct 600×400

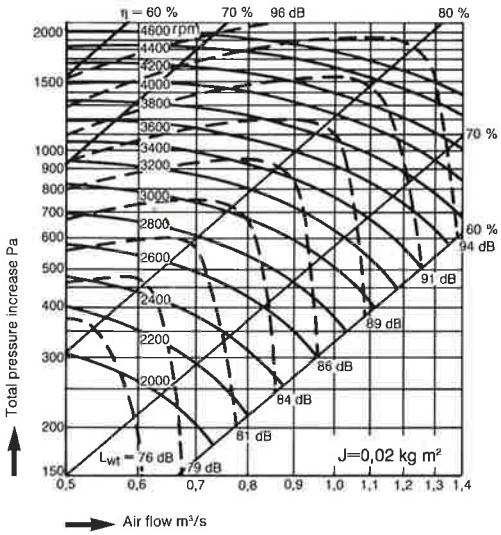
Sound data*

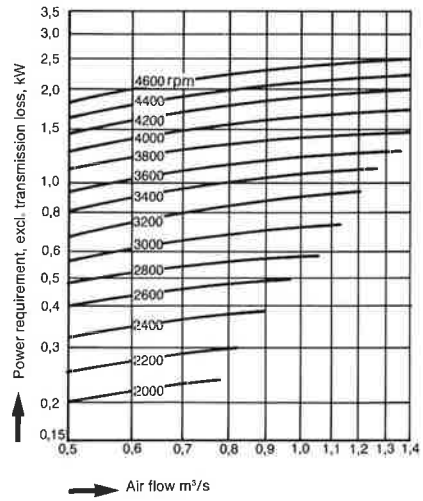
For dividing octave bands, add a correction K_{ok} to the value L_{wt} read off from the table

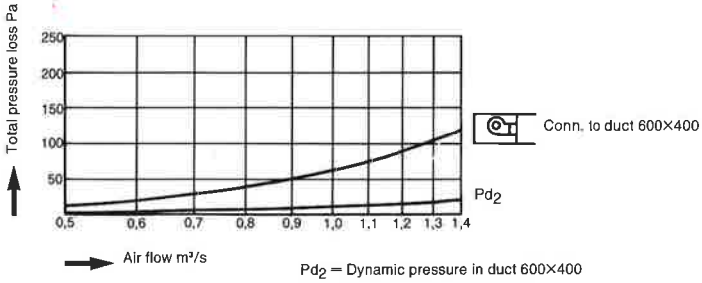
Middle frequency Hz	63	125	250	500	1000	2000	4000	8000
Correction K_{ok} duct	−6	−7	−10	−12	−13	−15	−19	−23
Correction K_{ok} fan compartm.	−19	−18	−21	−28	−33	−37	−44	−49

* According to DIN 45635

Size 1000-B







Pd_2 = Dynamic pressure in duct 600×400

Sound data*

For dividing octave bands, add a correction K_{ok} to the value L_{wt} read off from the table

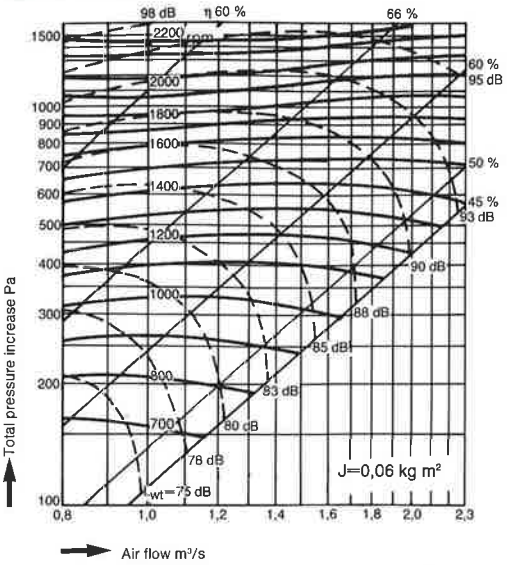
Middle frequency Hz	63	125	250	500	1000	2000	4000	8000
Correction K_{ok} duct	−4	−6	−7	−9	−11	−15	−19	−23
Correction K_{ok} fan compartm.	−20	−18	−20	−29	−33	−35	−43	−47

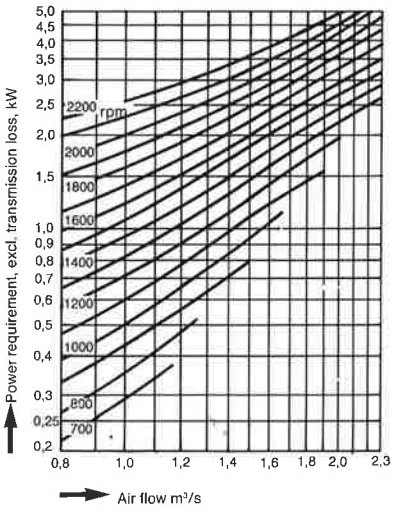
* According to DIN 45635

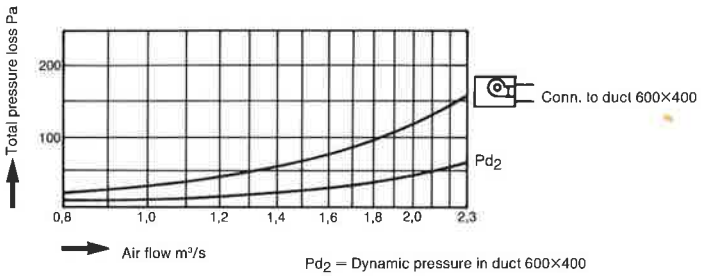
Heat recovery unit KRB 1000—2000

Capacity

Size 1250-F







Pd_2 = Dynamic pressure in duct 600×400

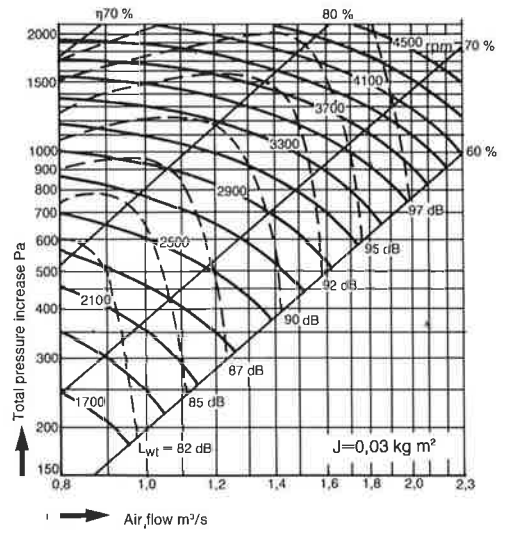
Sound data*

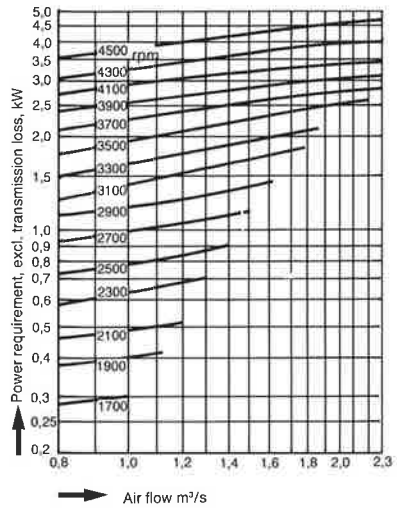
For dividing octave bands, add a correction K_{ok} to the value L_{wt} read off from the table

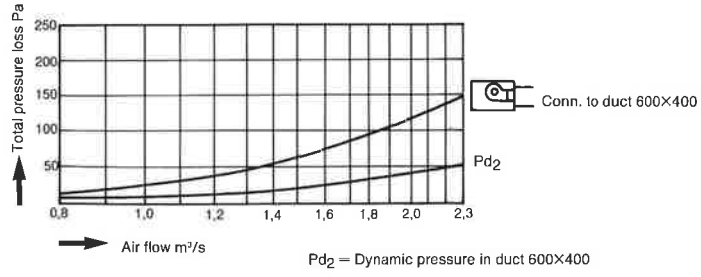
Middle frequency Hz	63	125	250	500	1000	2000	4000	8000
Correction K_{ok} duct	−6	−7	−10	−12	−13	−15	−19	−23
Correction K_{ok} fan compartm.	−19	−18	−21	−28	−33	−37	−44	−49

* According to DIN 45635

Size 1250-B







Pd_2 = Dynamic pressure in duct 600×400

Sound data*

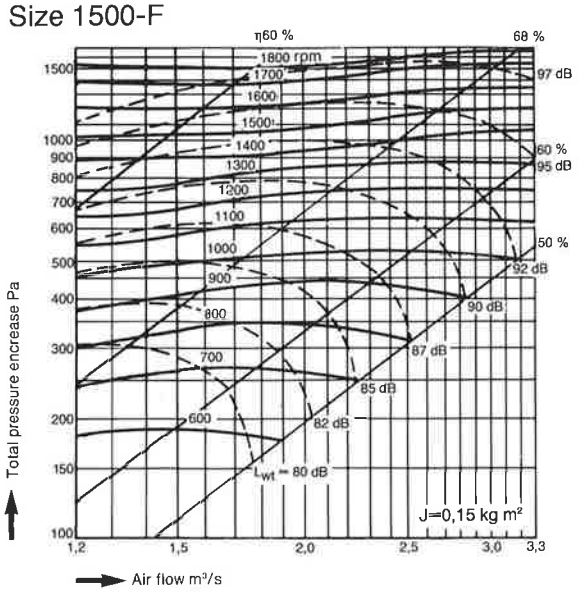
For dividing octave bands, add a correction K_{ok} to the value L_{wt} read off from the table

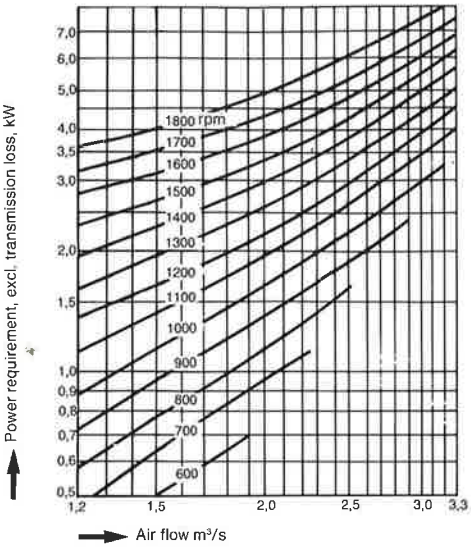
Middle frequency Hz	63	125	250	500	1000	2000	4000	8000
Correction K_{ok} duct	−4	−6	−7	−9	−11	−15	−19	−23
Correction K_{ok} fan compartm.	−19	−18	−21	−28	−33	−37	−44	−49

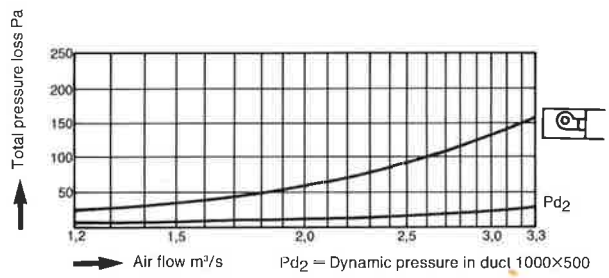
* According to DIN 45635

Capacity

Size 1500-F







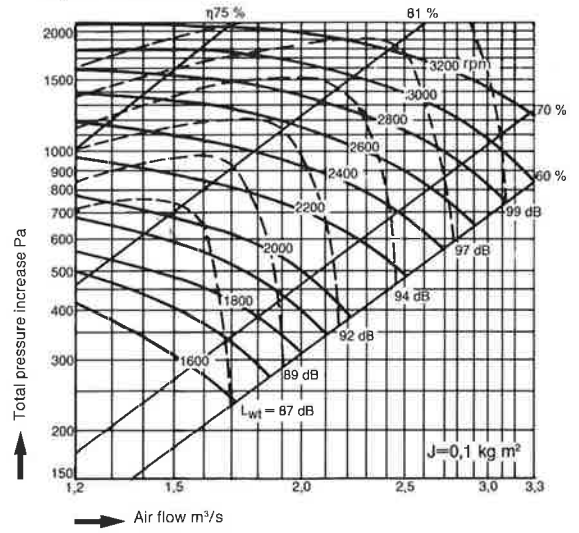
Sound data*

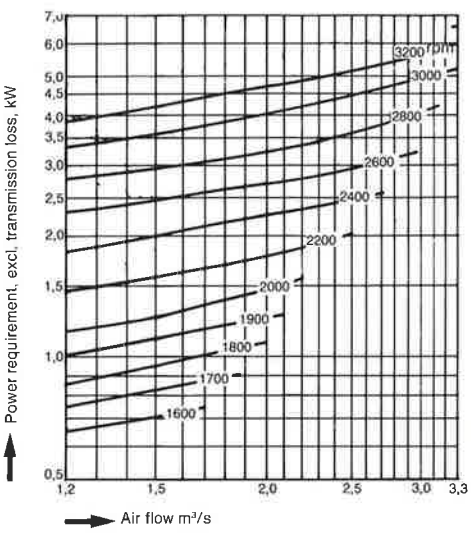
For dividing octave bands, add a correction K_{ok} to the value L_{wt} read off from the table

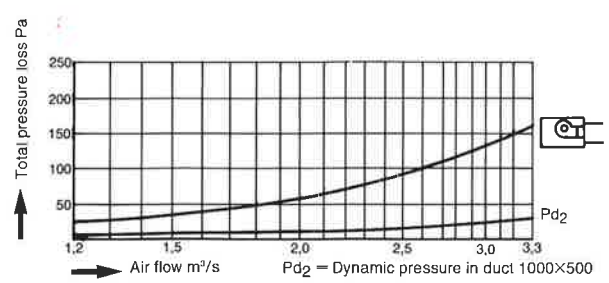
Middle frequency Hz	63	125	250	500	1000	2000	4000	8000
Correction K_{ok} duct	−6	−7	−10	−12	−13	−15	−19	−23
Correction K_{ok} fan comp.	−19	−18	−21	−28	−33	−37	−44	−49

* According to DIN 45635

Size 1500-B







Sound data*

For dividing octave bands, add a correction K_{ok} to the value L_{wt} read off from the table

Middle frequency Hz	63	125	250	500	1000	2000	4000	8000
Correction K_{ok} duct	−4	−6	−7	−9	−11	−15	−19	−23
Correction K_{ok} fan comp.	−20	−18	−20	−29	−33	−35	−43	−47

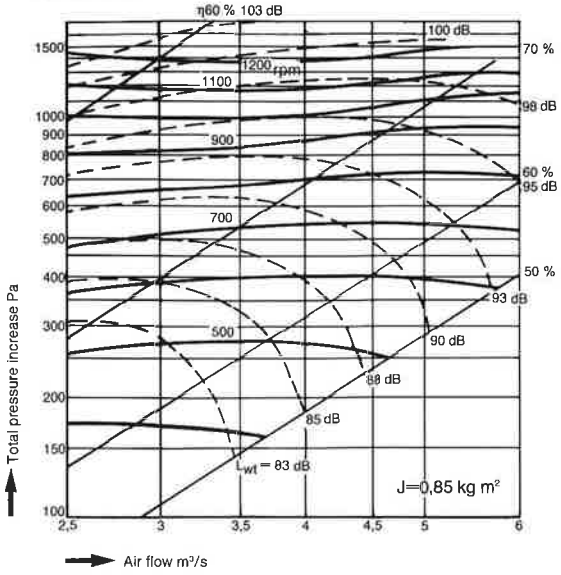
* According to DIN 45635

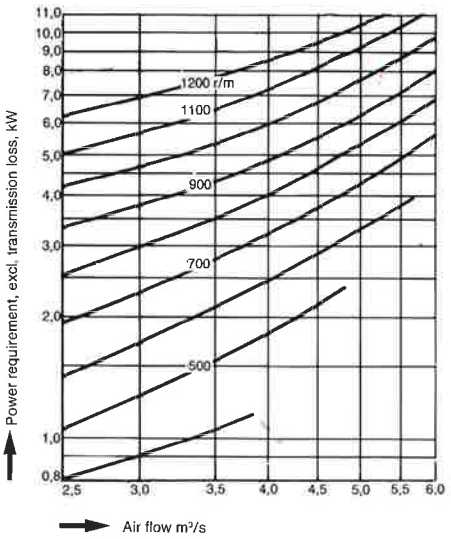
Heat recovery unit KRB 1000–2000

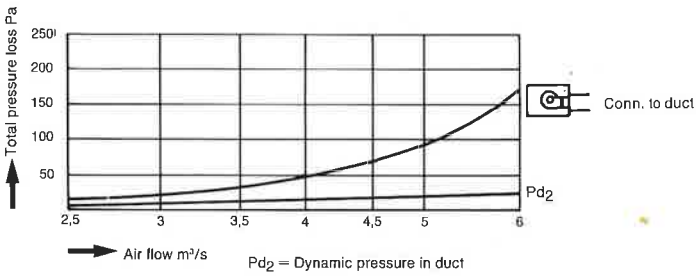
INDUSTRI ventilation

Capacity

Size 2000-F







Pd_2 = Dynamic pressure in duct

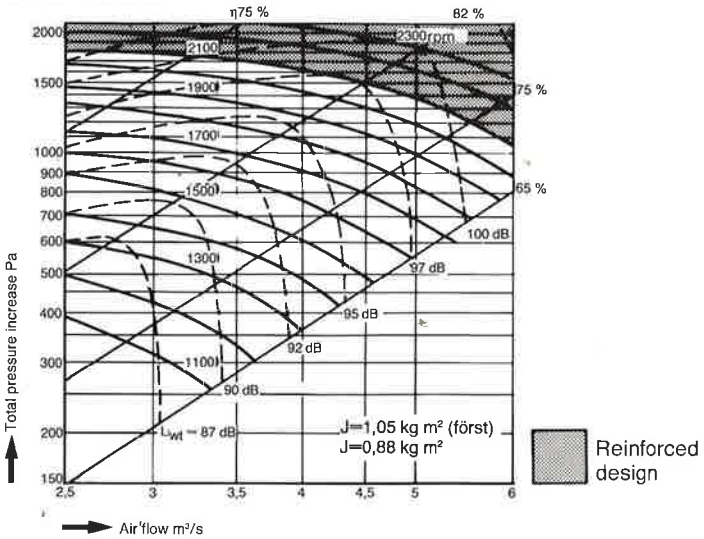
Sound data*

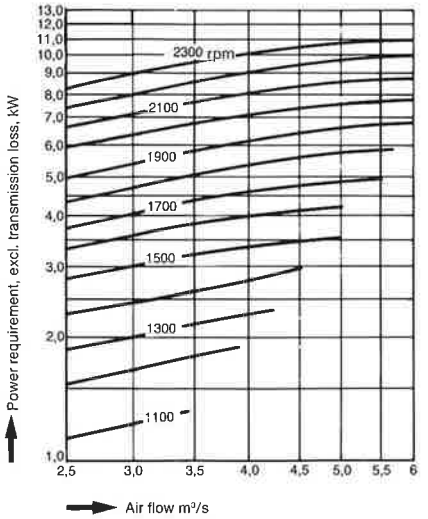
For dividing octave bands, add a correction K_{ok} to the value L_{wt} read off from the table

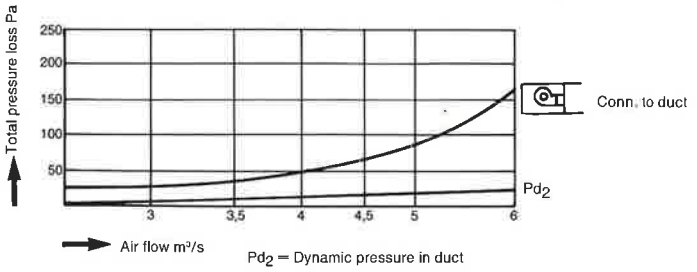
Middle frequency Hz	63	125	250	500	1000	2000	4000	8000
Correction K_{ok} duct	−6	−7	−10	−12	−13	−15	−19	−23
Correction K_{ok} fan compartm.	−19	−18	−21	−28	−33	−37	−44	−49

* According to DIN 45635

Size 2000-B







Pd_2 = Dynamic pressure in duct

Sound data*

For dividing octave bands, add a correction K_{ok} to the value L_{wt} read off from the table

Middle frequency Hz	63	125	250	500	1000	2000	4000	8000
Correction K_{ok} duct	−4	−6	−7	−9	−11	−15	−19	−23
Correction K_{ok} fan compartm.	−20	−18	−20	−24	−33	−35	−43	−47

* According to DIN 45635

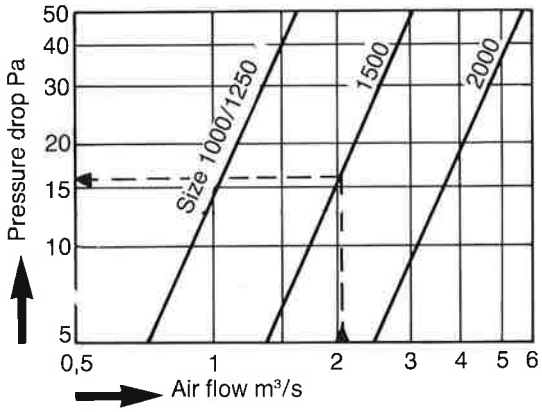
We reserve the right to make changes without prior notice

Sound attenuators KRBT-04

Construction

The sound attenuators are constructed from a casing in hot dip galvanised steel plate, with 200 mm thick baffle elements manufactured from mineral wool, with a coat of glass fibre fabric on the air side. The distance between the baffles is 100 mm. To reduce the pressure drop, the baffles are "pointed" at the inlet and outlet. The sound attenuators can be connected directly to the inlet of the unit, but if mounted on the fan outlet, a spacer section must be placed between the unit and the sound attenuator.

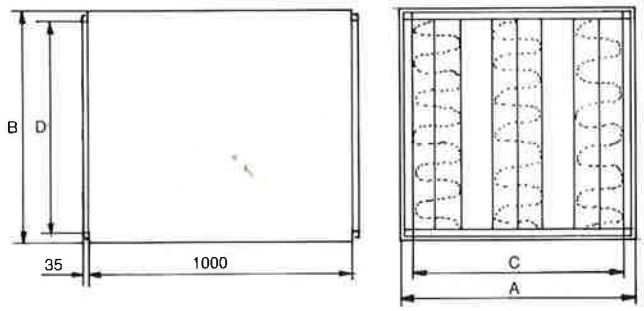
Pressure drop



Sound attenuation

Octave band	1	2	3	4	5	6	7	8
Middle frequency Hz	63	125	250	500	1000	2000	4000	8000
Attenuation dB	8	11	19	29	40	35	27	19

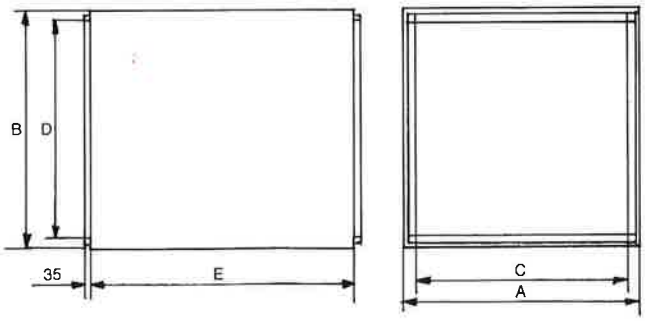
Dimensions and weight



DIMENSION TABLE					
	A	B	C	D	Weight
Size					kg
1000/1250	900	500	600	400	57
1500	1200	700	1000	500	95
1750	1500	800	1200	600	130
2000	1500	1000	1200	800	143

Spacer section KRBT-05

Dimensions and weight



DIMENSION TABLE						
	A	B	C	D	E	Weight
Size						kg
1000/1250	650	450	600	400	330	8
1500	1050	550	1000	500	430	14
1750	1250	650	1200	600	530	19
2000	1250	850	1200	800	530	22

Control and regulating equipment

The units are supplied with complete control and regulating equipment.
A detailed description of the equipment is given in Section 10 of the catalogue.
BIV (Billman) and SIV (Staefa) are identical operationally, apart from the make of the components installed. Supplied in 4 basic versions, there is a variety of additional equipment to ensure that the normal control cases can be conformed to.

The electrical equipment is dimensioned for fan motors with a rated current of 12 A max.
The unit can be supplied complete with control and regulating equipment installed or connected to connection boxes with a separate electrical cubicle.

Description	BIV (Billman) Catalogue page 9.1.1	SIV (Staefa) Catalogue page 9.2.1
Basic equipment		
Constant supply air temp., water heating	BIVT	SIVT
Constant room temp., water heating	BIVR	SIVR
Constant supply air temp., electrical heating 15 kW	BIET	SIET
Constant room temp., electrical heating 15 kW	BIER	SIER
Additional equipment		
Fan monitors	T1	T1
Filter monitor	T2	T2
Rotation monitor	T3	T3
Flue gas damper TF	T4	T4
Flue gas damper	T5	T5
Fire damper FF	T6	T6
Exhaust air damper	T7	T7
Recirculated air damper	T8	T8
Intermittent night-time operation	T9	T9
Max. power stage (electrical heating)	T10	T10
Fire monitor	T11	T11
Sequence control	T12	T12
Cleaning	T16	T16
Rotation monitor with efficiency meter	T17	—
Summer/Winter compensation		T18
Shunt group	Control shunt or Vari-shunt	Shunto-pac