



Luftschleieranlagen



TTL Products

Air Curtain Systems



Selection of TTL Air curtains

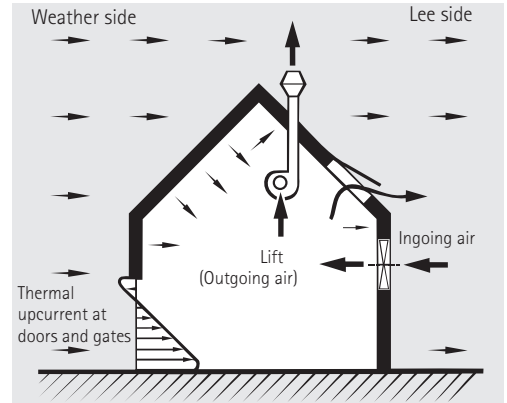
Design Principles

Ventilation and thermic impacts on door and gate areas

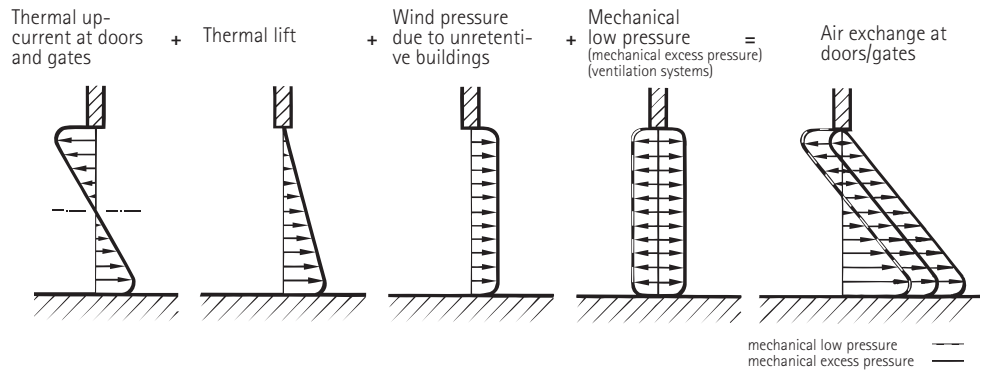
Thermal up-current at doors and gates (Pict.1 and 2)
 Due to the temperature difference between room temperature t_i and outside temperature t_a there are two air masses of different density ρ which make that the lighter warm room temperature in the upper door/gate area gets out and the cold outside air in the floor area gets in.

Thermal lift (Pict.1 and 2)
 There is a further air exchange at the door/gate opening caused by the thermal lift and the unretentiveness of the building (windows, doors, walls, roofs or mechanical outgoing air etc.).

Wind pressure due to unretentive buildings (Pict.1 and 2)
 Unretentive buildings (weather side/lee side) generate air flows affecting door/gate areas.



Picture 1: Air exchange in the building



Picture 2: Air exchange at doors/gates

Design details

Room surface

The bigger the volume of the room or building, the bigger the wind pressure weighing on the building. This wind pressure causes a low pressure being reduced above the door area which means that an exchange of air masses at different temperatures takes place - a situation which is not acceptable. (Picture 1 and 2)

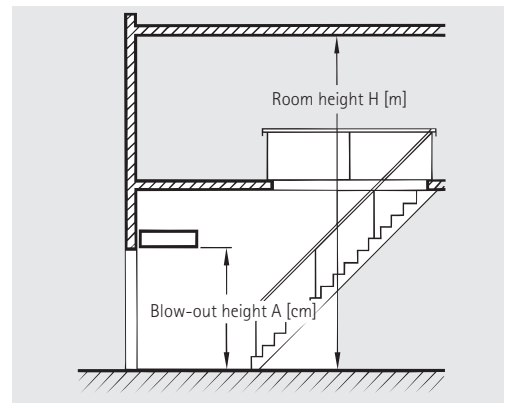
The bigger the room surface (room volume), the bigger the unretentiveness caused by doors, windows etc. The air exchange which takes place at the door is consequently intensified. Due to these facts and based on our practical experience it is important to consider the room size to be screened when selecting the appropriate air curtain.

Blow-out height

The blow-out height A is one of the most important criteria when selecting the type of air curtain. The lower the installation of the air curtain above the floor, the lower the air quantity required for achieving the desired screening effect. In this respect all technical and architectonic possibilities should be taken into account. Low air quantity means: low heating capacity, low sound level and low prime costs/operating costs.

Room height

The room height H and the room surface present together a parameter for the unretentiveness of rooms and, as a result, for the type of air curtain to be selected. This is also true of the thermal lift involved.



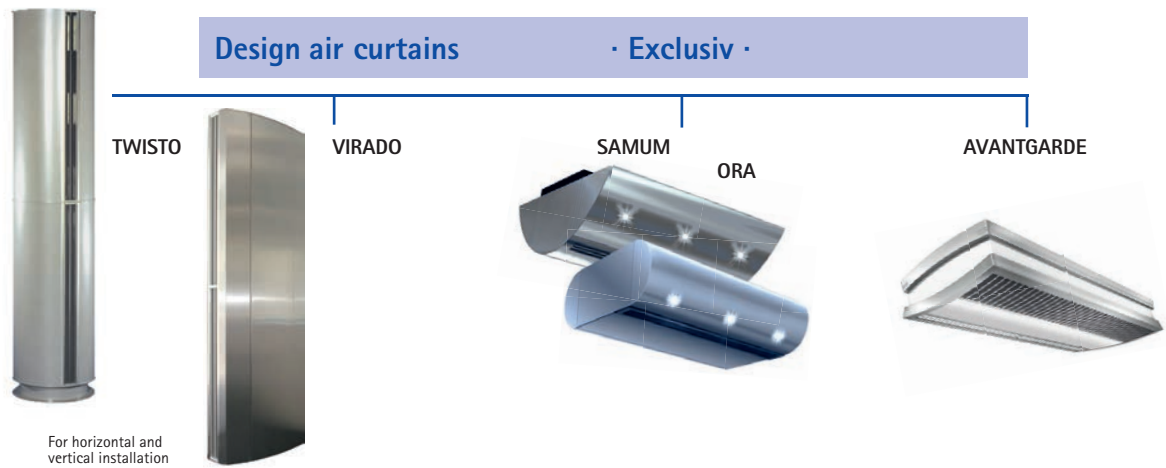
Picture 3: Blow-out height A; Room height H

Operating conditions

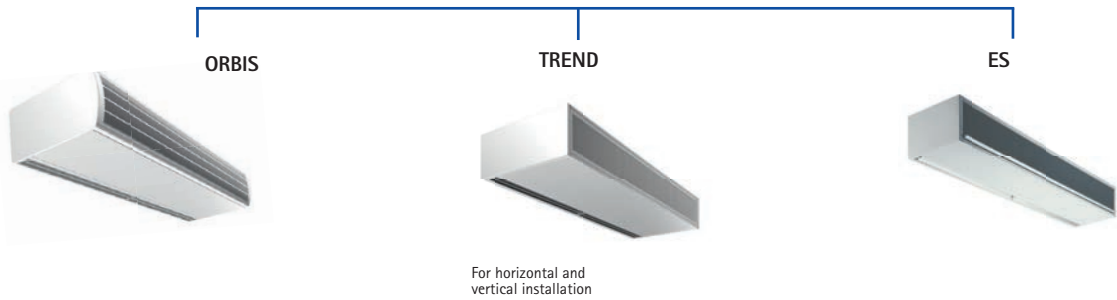
Air curtain systems are designed for the installation in dry rooms with normally utilized air. Ambient temperature min. 0 °C / max. 45 °C. Humidity max. 75 %.
 Special solutions on request.

TTL Products

Comfort area



Standard air curtains · Premium · and · Comfort ·



TTL Solutions – Air curtain systems for special application areas

The quiet ones - LOW NOISE

The effective ones - TWIN^{OR}

The cool ones - COLDLINE



Overview



Industry range

Industry air curtains

· Factory ·

DI

EUI

THI



TTL Greenline – System combinations with economic & ecologic effects

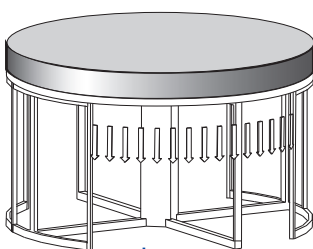
Greenline LWZ

Greenline KON

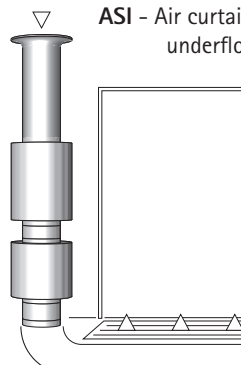
Combinations with
heat pumps or
VRV/VRF-systems



The special ones – ROVA – Air curtains for revolving doors



ASI – Air curtain systems for underfloor installation



Units for special applications and on customer requirements

On request



Evaluation / Design Criteria

Design fundamentals

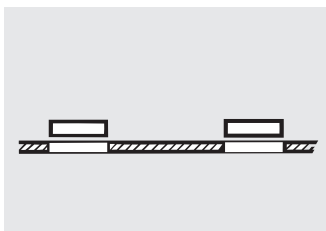
For selecting the appropriate capacity range, the following formula for the BRG design value (determination of the room size evaluation) may be used in combination with the selection diagram, based on the data evaluated in the questionnaire and the above fundamentals.

Design formula: $BRG = RF \times F1 \times F2 \times F3 \times F4 \times F5 \times F6$ [m²]

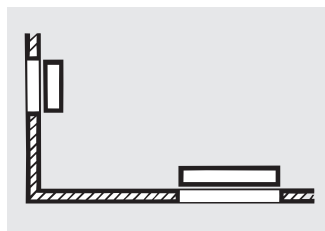
BRG = Room size evaluated
RF = Room area [m²]/story

Factor	Criteria	Value Factor F	
F1	Factor various doors/gates in the room (see picture 4-6)	no further door/gate open	1,00
		further door/gate in the same wall surface (picture 4)	1,00
		further door/gate in lateral wall surface (picture 5)	1,70
		further door/gate in opposite wall surface (picture 6)	2,50
F2	Factor location of door/gate in the building	wall center	1,00
		corner of building	1,30
F3	Factor location of door/gate in surrounding area	enclosed building / protected	0,90
		in squares / in corners / partially protected	1,00
		on hills / end of street / unprotected	1,30
F4	Factor sense of location door/gate (four points of compass)	North, North-East, East, South-East	1,00
		South (Southern Germany foehn) otherwise 1,0	1,10
		South-West, West, North-West	1,30
F5	Factor temperature Δt inside / outside	temperature difference Δt bis 20 K	0,87
		temperature difference Δt bis 25 K	0,90
		temperature difference Δt bis 30 K	1,00
F6	Factor door/gate width	up to 1,0 m	1,50
		up to 1,5 m	1,15
		up to 2,0 m	1,00
		up to 3,0 m	0,87
		up to 4,0 m	0,80
		over 4,0 m	0,75

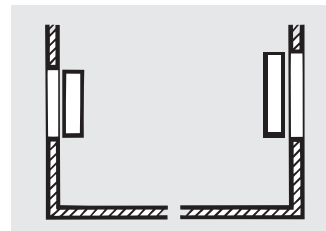
F1 Factor various doors/gates in the room



Picture 4



Picture 5



Picture 6

Example

Preselection on air curtain design:

Decision on type of installation:

Wanted: capacity range for following situation:

for example Type TREND, ORBIS or Design version ...

STE, AWE or TWIN^{OR}

door height 2,20 m, blow-out height (A) 2,30 m,
 total room height (H) 3,0 m, room area/story (RF) = 575 m²

F1 = 1,0 (another door in the same wall surface)

F2 = 1,0 (entrance in wall center)

F3 = 1,0 (partially protected)

F4 = 1,3 (four points of compass SW)

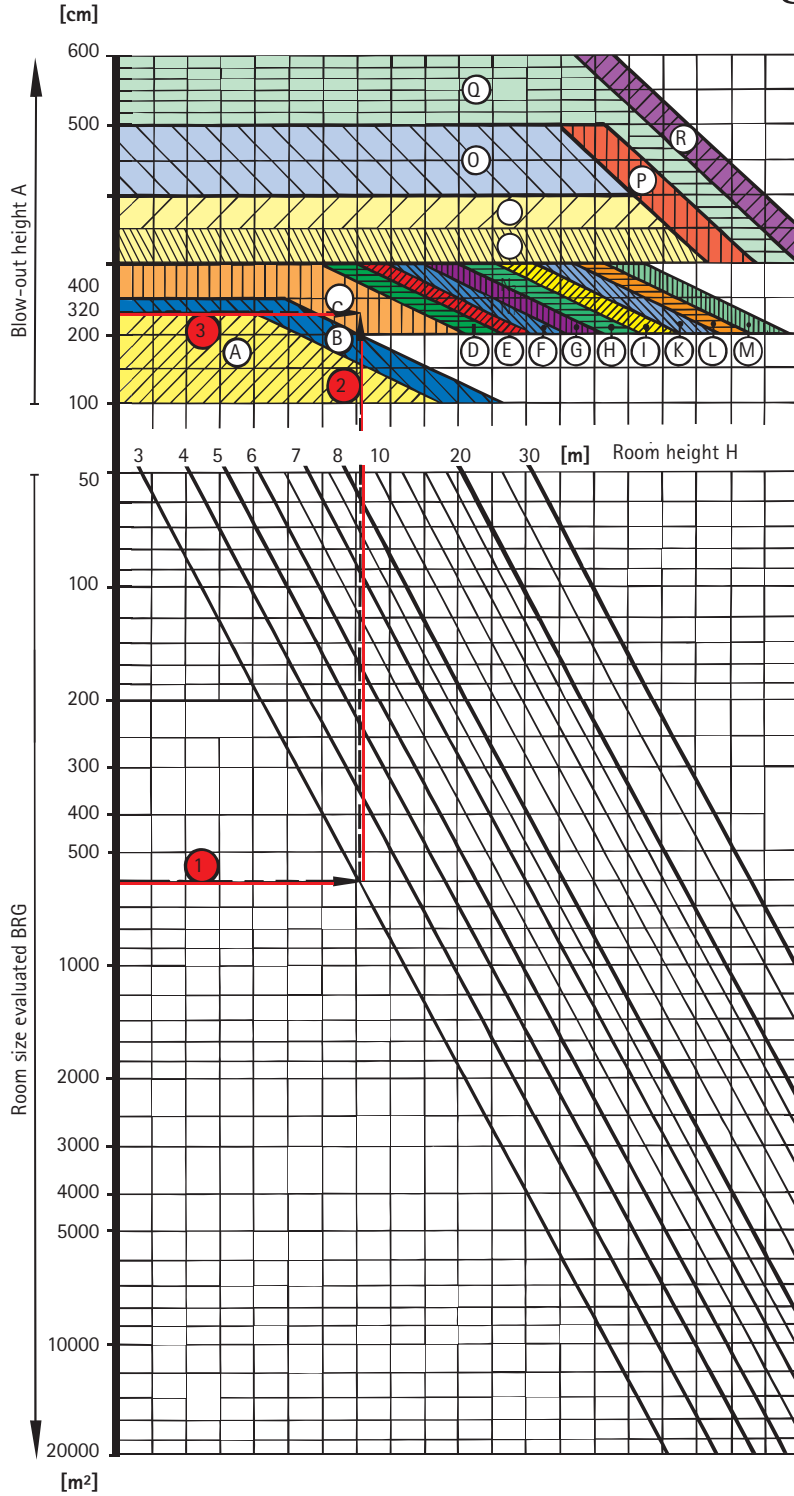
F5 = 1,0 (temperature difference 30 K, from -10°C to +20°C)

F6 = 0,8 (door width 4 m)

Solution: $BRG = 575 \times 1,0 \times 1,0 \times 1,0 \times 1,3 \times 1,0 \times 0,8 = 598$ [m²]

Insert this value in the selection diagram and select the type of unit accordingly. (see selection diagram at next page)

Selection Diagram / Example



Picture 7: Selection diagramm

Solution

An air curtain of capacity range C or higher is suitable. The respective technical data and descriptions are included in the corresponding catalogs, if necessary, correct your decision (type of installation / type of air curtain).

Repeat the above procedure, if required.

The selection diagram is valid in case of pressure compensation of the ventilation system and standard building retentiveness

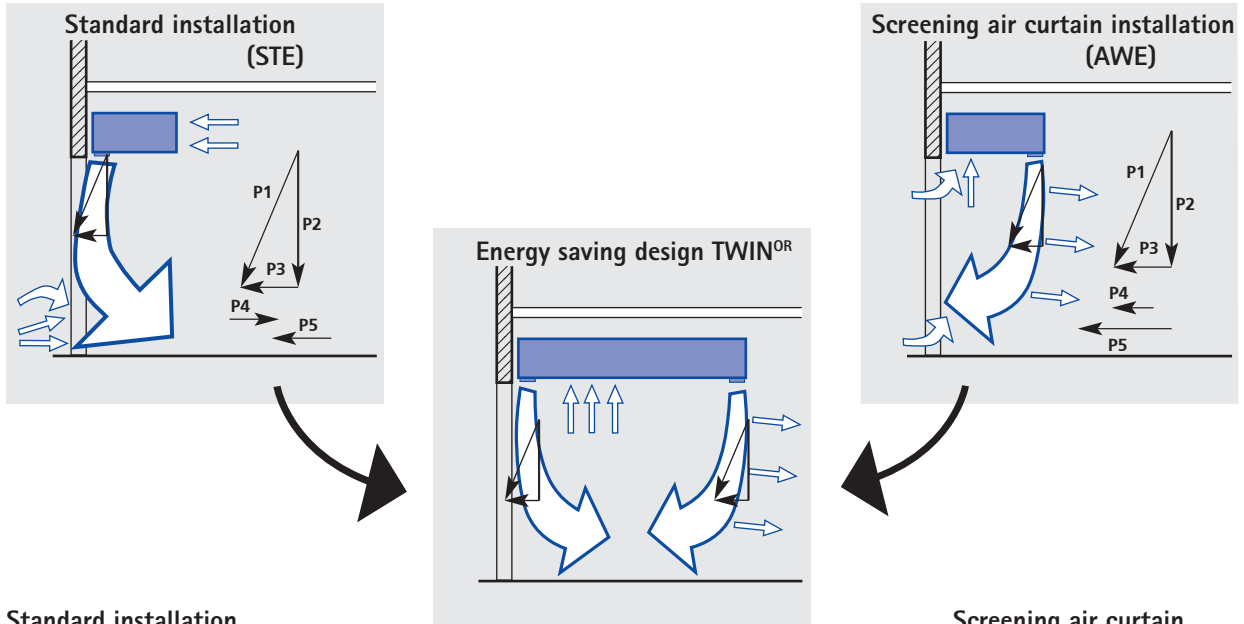
Capacity range	Air curtain series for installation version	
	STE	AWE
Comfort range		
A	ES .. -5	
B		ES .. -5
C	TWISTO ../VIRADO .. -5/-LNS TREND ../ORBIS .. -5/-LNS ORA ../SAMUM .. -5/-LNS AVANTGARDE .. -5/-LNS	
D	TWISTO ../VIRADO .. -8/-HE TREND ../ORBIS .. -8/-HE ORA .. -8/-HE AVANTGARDE .. -8/-HE TREND ../ORBIS .. -10 TREND ../ORBIS .. -LNX	TREND ../ORBIS .. -5/-LNS VIRADO .. -5/-LNS ORA ../SAMUM .. -5/-LNS AVANTGARDE .. -5/-LNS
E		TWIN ^{OR} .. -5 TREND ../ORBIS .. -8/-HE ORA ../VIRADO .. -8/-HE AVANTGARDE .. -8/-HE TREND ../ORBIS .. -10
F	TREND .. -15 ORBIS .. -15	TWIN ^{OR} .. -LNS TREND ../ORBIS .. -10/-LNX TREND ../ORBIS .. -HE ORA ../VIRADO .. -HE AVANTGARDE .. -HE
G		TWIN ^{OR} .. -HE
H	ZB .. -10	TREND ../ORBIS .. -15
I	Z .. -10	TWIN ^{OR} .. -15
K	ZB .. -15	-10
L	Z .. -15	-10
M		Z .. -15

Industry range			
N1	EUI ..	-2	EUI .. -1
	THI ..	-3	EUI .. -2
N2	THI ..	-4	
O	EUI ..	-3	
P	THI ..	-6	EUI .. -3
Q	DI ..	-10/-15	
	THI ..	-8	
R	THI ..	-8	DI .. -10/-15

Pict. 8: Capacity ranges and air curtain series

Types of air curtains and installation principles

By selecting the appropriate installation principle, the function of the air curtain and the operating data of the air curtain are crucially affected.



Standard installation (STE)

The room air is sucked in by the unit and blown to the outside above the door. The thus created air curtain rotates in the direction of the room. This creates a relatively large air circulation zone in the entrance area. In case of low pressure, unconditioned cold air may enter the floor area.

Preferably used:

In case of pressure compensation or excess pressure. For small and medium-sized buildings where no permanent working places are located near the door.

Energy saving design TWIN^{OR} with TWINtec[®] principle

TWIN^{OR} is the new and modern air curtain generation with maximum screening capacity and maximum energy saving and comfort at the same time.

The energy saving design TWIN^{OR} with the innovative TWINtec[®] principle perfectly combines the advantages of the STE and AWE versions. Two blower units produce two screening air curtains - at different temperatures rotating against each other. The exterior unheated air curtain assures an optimum screening effect in the door area. Energy losses are reduced.

Preferably used:

Optimum screening capacities for all pressure conditions.

The interior heated screening air curtain conditions additionally the air which makes that the outside temperature in the entrance area is not felt as draft.

The combination of ducted air curtain/screening air curtain is an important factor for energy saving and comfort in the entrance area.

Note:

For the TWIN^{OR} version an antifreezing thermostat has to be provided (factory-fitted).

Screening air curtain installation (AWE)

The air above the door is sucked in by the unit and blown into the room. The thus created air curtain rotates against the inflowing cold air. This brings about a considerably higher screening capacity, a reduction of the screening air volume required and of the sound level and a considerable reduction of the air circulation in the entrance area. Due to the lower temperatures of the air sucked in, the heating capacity is higher than for the STE version.

Note:

For the AWE version an antifreezing thermostat has to be provided (factory-fitted).

Preferably used:

In case of low pressure in the building.

Key: Forces

P1 = Forces developed in order to get to the floor with the heated air jet
P3 = Forces of the air curtain outwards
P5 = Screening force

P2 = Residual forces of the air curtain for screening
P4 = Forces of the air curtain

Questionnaire air curtains

Fill in and return by fax - we will work out an offer according to your specifications.

(Possible installation drawings and proposals are shown in the catalog - Chapter 1 "Insights". Selection diagram for preselecting in detail the type of air curtain see page 5 and 6 in the catalog).

Building project:

Company / Phone / Fax / Person in charge

- | | | | |
|---|-----------------------------------|--|-------------------------------|
| 1. Range of use | Comfort <input type="checkbox"/> | 12. Room temperature | °C |
| | Industry <input type="checkbox"/> | 13. Minimum outside temperature | °C |
| 2. Door/gate height | cm | with open door/gate | |
| 3. Blow-out height (A) | cm | 14. Pressure conditions | |
| 4. Door/gate width | cm | in door/gate center | |
| 5. Max. air curtain installation width | cm | considering | |
| 6. Floor area / story | m ² | ingoing air quantity with filter covered with dust | |
| 7. Total height (H) | m | outgoing air quantity of all facilities | |
| of the openly | | (ventilation / suction / exhaust air etc.) | |
| connected stories | | • pressure compensation | <input type="checkbox"/> |
| 8. Various doors / gates which are open at | | • low pressure | <input type="checkbox"/> |
| the same time | | • excess pressure | <input type="checkbox"/> |
| • in one wall surface | yes <input type="checkbox"/> | differential air quantity approx. | m ³ /h |
| • in one wall surface | <input type="checkbox"/> | 15. Heating medium (e.g. PWW-80/60°) | °C |
| • in opposite wall surface | <input type="checkbox"/> | (Electric heating) | <input type="checkbox"/> |
| 9. Door/gate located in the building | | 16. Depending on outside temperature | <input type="checkbox"/> |
| • wall center | <input type="checkbox"/> | (sliding movement) flow | |
| • corner of building | <input type="checkbox"/> | from: at: °C | |
| 10. Door/gate located in surrounding area | | to: at: °C | |
| • enclosed building (protected) | <input type="checkbox"/> | 17. Windscreen available | Ja <input type="checkbox"/> |
| • in squares/in corners (partially protected) | <input type="checkbox"/> | (always one door closed) | Nein <input type="checkbox"/> |
| • on hills/end of street (unprotected) | <input type="checkbox"/> | 18. Type of installation of air curtain | |
| 11. Direction of location of door/gate | | • visible installation | <input type="checkbox"/> |
| North | <input type="checkbox"/> | • flush mounted with mounting frame | <input type="checkbox"/> |
| East | <input type="checkbox"/> | • intermediate ceiling mounting with | <input type="checkbox"/> |
| South | <input type="checkbox"/> | sliding type fittings | |
| West | <input type="checkbox"/> | 19. Paint of air curtain / grating | |
| | | carcase / intake grate | |
| | | standard RAL 9016 / RAL 9006 | <input type="checkbox"/> |
| | | special paint RAL / | <input type="checkbox"/> |
| | | (extra price) | |