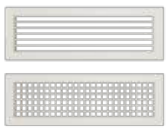
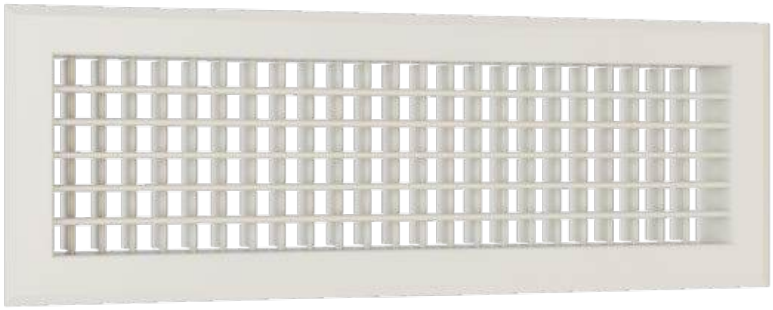


Ventilation grille

TR2

4 different blade arrangements

Ball impact protection grille



4 different fixing types

Ventilation grille, made of sheet steel, with individually adjustable blades

The high-quality ventilation grille blends perfectly into any room.

- Suitable for comfort and industrial areas for walls, sills, circular or rectangular air ducts
- Single piece available in the nominal sizes 225 × 75 to 2025 × 525 mm
- Adjustable blades for air direction control
- Easy volume flow rate balancing thanks to various attachments
- Simple mounting options for quick and easy installation
- Available in various RAL Classic or NCS colours as well as with a galvanised surface

Installation into circular ducts

Options

- Ball impact protection
- Filter element
- Attachment for flow channel
- Linear grille

General information

Application
- Ventilation grille type TR2 as air diffuser (supply and extract air) for comfort zones and industrial zones
- Directed supply air flow for mixed flow ventilation
- Blades are adjustable to meet different local requirements
- For constant and variable volume flows
- For supply air to room air temperature differences from –12 to +4 K
- For installation in walls, sills, circular or rectangular air ducts

Special characteristics
- Individually adjustable blades
- Countersunk hole, concealed screw fixing with or without installation subframe, unperforated front border without factory-fitted mounting option
- Filter element for extract grille optional

Nominal sizes
Width [mm]
225, 325, 425, 525, 625, 825, 1025, 1225, 1425, 1625, 1825, 2025

Height [mm]
75, 125, 225, 325, 425, 525

Grille for installation into circular ducts (R/RA versions)
Width [mm]
225, 325, 425, 525, 625, 825 1025, 1225

Height [mm]
75, 125, 225, 325

Variants
- Horizontal, vertical or vertical and horizontal blade arrangements
- Ball impact protection especially for installation in sports centres
- Linear grille consisting of end and centre sections that are assembled on site
- Grille for wall, sill and duct installation or for installation in circular air ducts
- Concealed screw fixing with and without installation subframe
- Countersunk hole in front border
- Non-perforated front border, without factory-fitted mounting option

Attachments
Volume flow rate balancing on site (only for standard sizes)
- AG: Damper element with opposed action blades
- AS: Hit and miss damper (parallel slide damper)
- SAS: Slanted hit and miss damper (only suitable for supply air)

Parts and characteristics
- Front border made of flanged profile
- Individually adjustable, horizontal and / or vertical blades
- Perimeter seal, factory-fitted
- Vertical centre mullion for nominal widths over 625 mm

Accessories
- Filter element for extract grille
- Installation subframe

Construction features
- Front frame profile 25 x 40 mm with bevelled edge to cover the installation opening
- Profiled blade, manually adjustable
- Fixed connection between attachment and ventilation grille via screw connection

Suitable air duct diameters
- Ø 125 - 2000 mm

Note: The possible air duct diameters are reduced depending on the grille height.

Material
- Front border made of galvanised steel
- Galvanised steel blades
- PES filter
- Foam seal
- Ball impact protection made of galvanised steel
- AS and SAS made of aluminium
- AG made of aluminium and galvanised steel

Surfaces
- Front border and blades without coating (galvanised steel)
- Front border and blades powder-coated in RAL 9010 pure white, GU50
- Front border and blades powder-coated according to RAL CLASSIC colour palette GU70
- Front border and blades powder-coated according to NCS

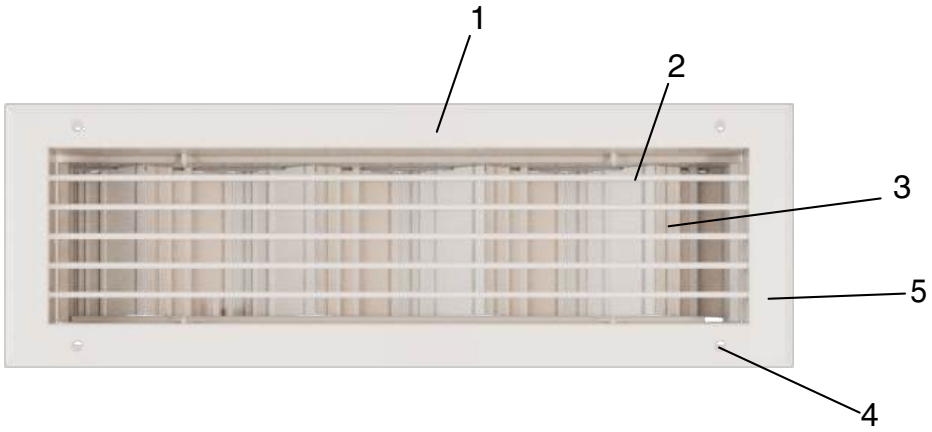
Maintenance
- Low maintenance as construction and materials are not subject to wear and tear
- Inspection and cleaning according to VDI 6022

Standards and guidelines
- Sound power level of the air-regenerated noise measured according to EN ISO 5135
- Filter class ISO Coarse 45% according to ISO (G3) 16890

Function

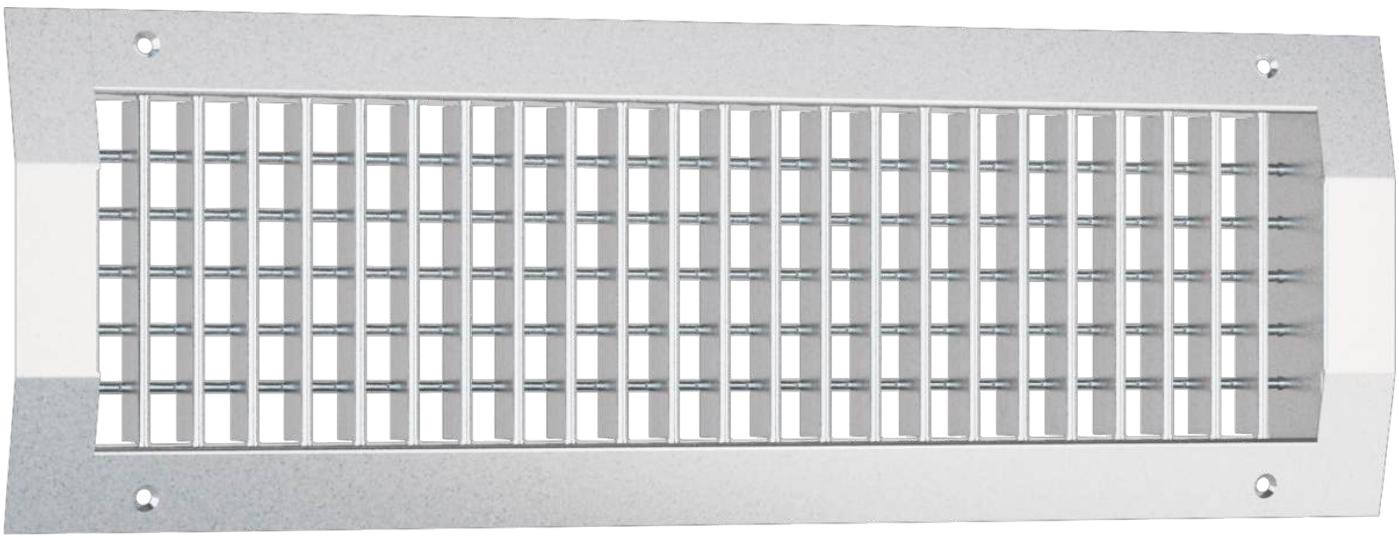
Ventilation grilles are air terminal devices for the supply air and extract air of ventilation and air conditioning systems. They direct the supply air into the room. Ventilation grilles with adjustable blades allow for adapting the discharge direction to the local conditions. The result is a mixed flow ventilation in comfort zones and industrial zones, with good overall room ventilation. Due to induction, the airflow velocity of the supply air flow decreases with increasing distance from the ventilation grille. The distance at which the airflow velocity reaches a certain defined value, e.g. 0.35 m/s, is called throw distance. The supply air flow from wall grilles that are arranged close the ceiling achieves a greater throw distance than a comparable free jet (without ceiling influence), due to the ceiling effect. Single grilles, groups of grilles and linear grilles all achieve different throw distances. In cooling mode, it is necessary to consider the jet deflection towards the occupied zone, which increases as the supply air to room air temperature difference increases and the discharge velocity decreases. In heating mode, the supply air jet is deflected towards the ceiling. This has no negative effect on the airflow velocity in the occupied zone, but it may affect the overall ventilation of the room.

Schematic illustration of ventilation grille TR2-H-AG



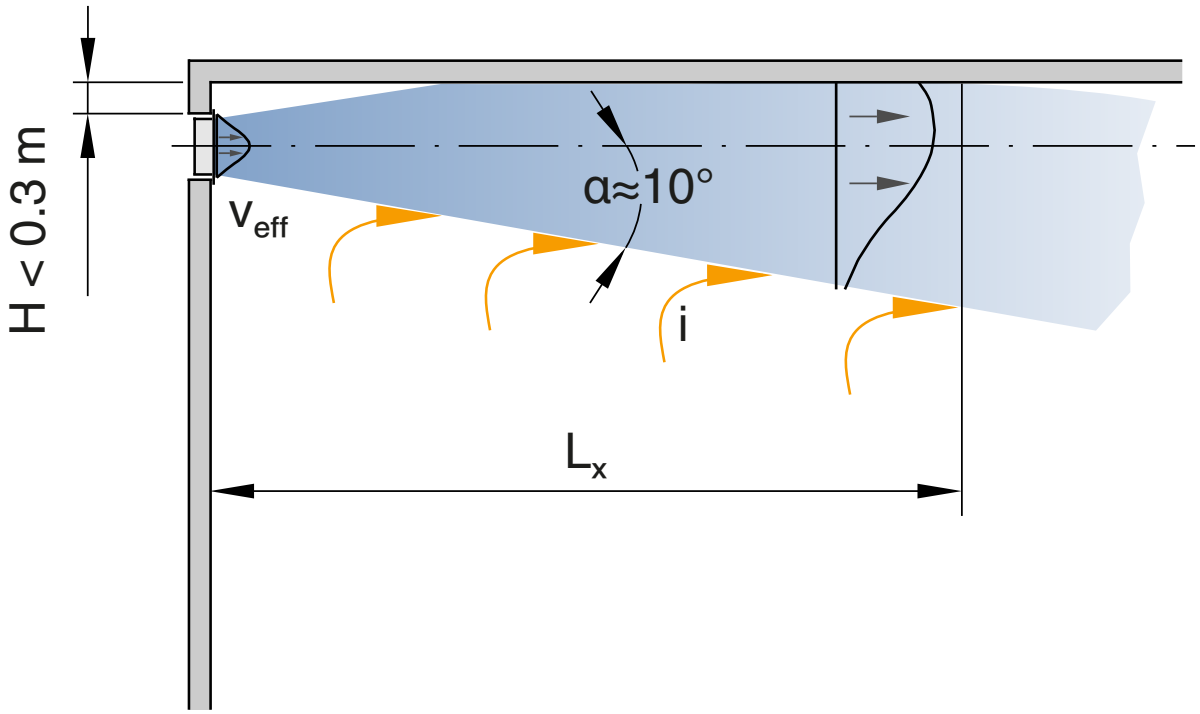
1 Front border
2 Blades horizontal
3 Attachment damper element, opposed action blades (galvanised frame, aluminium blades)
4 Countersunk hole
5 Surface powder-coated RAL 9010 (standard for wall, parapet and trunking installation)

Illustration of diffusion grilles for installation in circular ducts



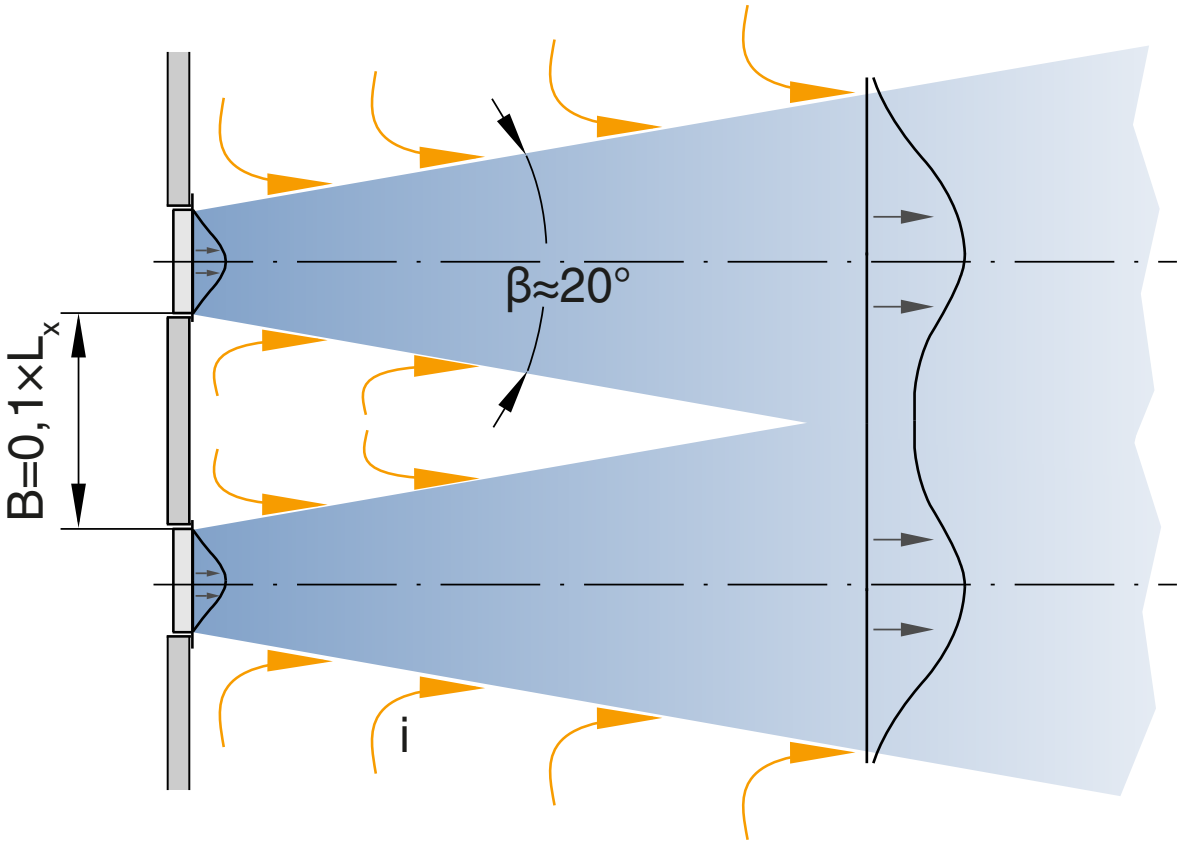
Galvanised steel (standard for ventilation grilles for installation into circular ducts)

Grille installation with ceiling effect (side view)

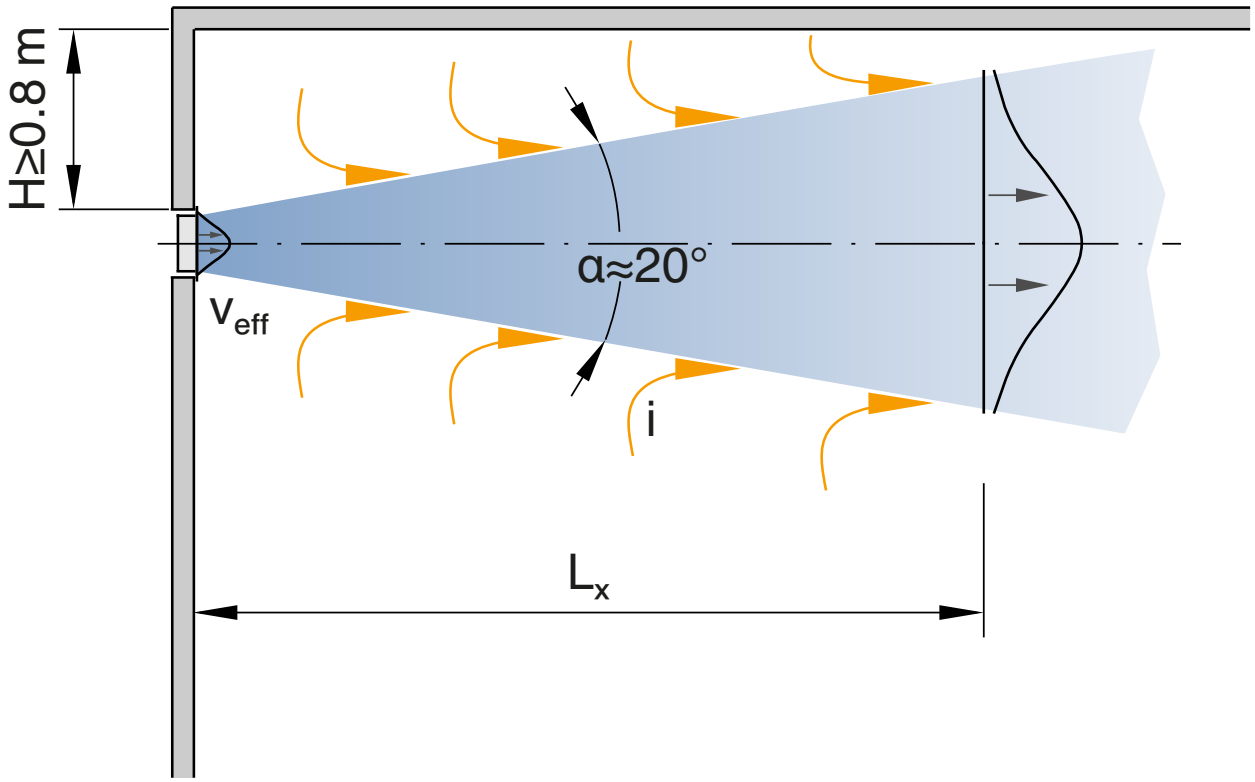


Due to the ceiling effect, the supply air flows into the room with a Coanda effect and achieves a greater throw distance (L_x).

Grille installation with ceiling effect (top view)

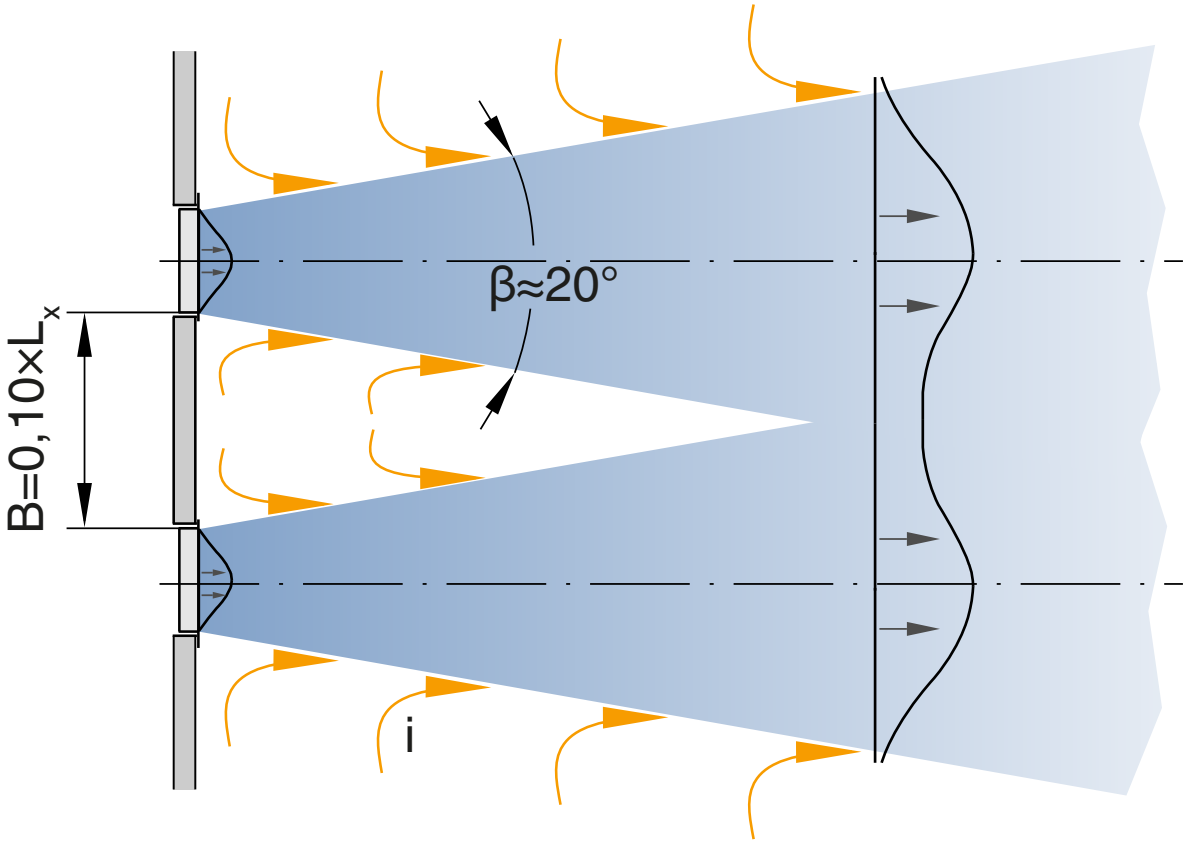


Grille installation without ceiling effect (side view)



At a distance of H ≥ 0.18 × L_x m between the upper edge of the grille and the lower edge of the ceiling, there is no ceiling effect. The throw distance is thus smaller due to the missing Coanda effect.

Grille installation without ceiling effect (top view)



Technical data

Nominal sizes	225 × 75 - 2025 × 525 mm
Minimum volume flow rate	11 – 1,111 l/s or 40 – 4,000 m³/h
Maximum volume flow rate, with LWA max. 40 dB(A) without attachments	53 - 3,056 l/s or 189 - 11,000 m³/h
Supply air temperature	-12 to +15 K

Volume flow rate indication for single grilles (undivided construction) for supply air.

The customised sizing of the ventilation and acoustic data for the different variants is possible with our free Easy Product Finder design programme.

Geometric free area (blade arrangement VH, HV) A_{geo} [m²]

H/B	225	325	425	525	625	825	1025	1225	1425	1625	1825	2025
75	0.008	0.012	0.015	0.019	0.023	0.031	0.039	0.046	0.054	0.062	0.069	0.077
125	0.015	0.023	0.031	0.039	0.046	0.062	0.077	0.092	0.108	0.123	0.139	0.154
225	0.031	0.046	0.062	0.077	0.092	0.123	0.154	0.185	0.216	0.246	0.277	0.308
325	–	0.069	0.092	0.115	0.139	0.185	0.231	0.277	0.323	0.37	0.416	0.462
425	–	–	–	–	–	0.246	0.308	0.37	0.431	0.493	0.554	0.616
525	–	–	–	–	–	–	0.385	0.462	0.539	0.616	0.693	0.77

Geometric free area (blade arrangement V) A_{geo} [m²]

H/B	225	325	425	525	625	825	1025	1225	1425	1625	1825	2025
75	0.008	0.012	0.016	0.02	0.024	0.032	0.04	0.048	0.056	0.063	0.071	0.079
125	0.016	0.024	0.032	0.04	0.048	0.063	0.079	0.095	0.111	0.127	0.143	0.159
225	0.032	0.048	0.063	0.079	0.095	0.127	0.159	0.19	0.222	0.254	0.285	0.317
325	–	0.071	0.095	0.119	0.143	0.19	0.238	0.285	0.333	0.381	0.428	0.476
425	–	–	–	–	–	0.254	0.317	0.381	0.444	0.508	0.571	0.634
525	–	–	–	–	–	–	0.397	0.476	0.555	0.634	0.714	0.793

Geometric free area (blade arrangement H) A_{geo} [m²]

H/B	225	325	425	525	625	825	1025	1225	1425	1625	1825	2025
75	0.008	0.012	0.016	0.021	0.025	0.033	0.041	0.049	0.057	0.066	0.074	0.082
125	0.016	0.025	0.033	0.041	0.049	0.066	0.082	0.098	0.115	0.131	0.148	0.164
225	0.033	0.049	0.066	0.082	0.098	0.131	0.164	0.197	0.23	0.262	0.295	0.328
325	–	0.074	0.098	0.123	0.148	0.197	0.246	0.295	0.344	0.394	0.443	0.492
425	–	–	–	–	–	0.262	0.328	0.394	0.459	0.525	0.59	0.656
525	–	–	–	–		–	0.41	0.492	0.574	0.656	0.738	0.82

Effective air inflow area supply air (blade arrangement VH, HV) A_{eff} [m²]

H/B	225	325	425	525	625	825	1025	1225	1425	1625	1825	2025
75	0.007	0.011	0.015	0.019	0.022	0.03	0.037	0.045	0.052	0.06	0.067	0.075
125	0.015	0.022	0.03	0.037	0.045	0.06	0.075	0.09	0.105	0.12	0.135	0.15
225	0.03	0.045	0.06	0.075	0.09	0.12	0.15	0.18	0.21	0.24	0.27	0.3
325	–	0.067	0.09	0.112	0.135	0.18	0.225	0.27	0.315	0.36	0.405	0.45
425	–	–	–	–	–	0.24	0.3	0.36	0.42	0.48	0.54	0.6
525	–	–	–	–	–	–	0.375	0.45	0.525	0.6	0.675	0.75

Effective air inflow area supply air (blade arrangement V) A_{eff} [m²]

H/B	225	325	425	525	625	825	1025	1225	1425	1625	1825	2025
75	0.008	0.012	0.015	0.019	0.023	0.031	0.039	0.046	0.054	0.062	0.07	0.077
125	0.015	0.023	0.031	0.039	0.046	0.062	0.077	0.093	0.108	0.124	0.139	0.154
225	0.031	0.046	0.062	0.077	0.093	0.124	0.154	0.185	0.216	0.247	0.278	0.309
325	–	0.07	0.093	0.116	0.139	0.185	0.232	0.278	0.324	0.371	0.417	0.463
425	–	–	–	–	–	0.247	0.309	0.371	0.433	0.494	0.556	0.618
525	–	–	–	–	–	–	0.386	0.463	0.541	0.618	0.695	0.772

Effective air inflow area supply air (blade arrangement H) A_{eff} [m²]

H/B	225	325	425	525	625	825	1025	1225	1425	1625	1825	2025
75	0.008	0.012	0.016	0.02	0.024	0.032	0.04	0.048	0.056	0.064	0.072	0.08
125	0.016	0.024	0.032	0.04	0.048	0.064	0.08	0.096	0.112	0.128	0.144	0.16
225	0.032	0.048	0.064	0.08	0.096	0.128	0.16	0.192	0.224	0.256	0.288	0.319
325	–	0.072	0.096	0.12	0.144	0.192	0.24	0.288	0.335	0.383	0.431	0.479
425	–	–	–	–	–	0.256	0.319	0.383	0.447	0.511	0.575	0.639
525	–	–	–	–	–	–	0.399	0.479	0.559	0.639	0.719	0.799

Effective air inflow area return air (blade arrangement V) A_{eff} [m²]

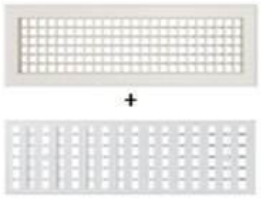
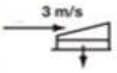
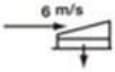
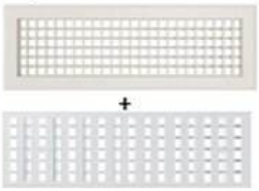
H/B	225	325	425	525	625	825	1025	1225	1425	1625	1825	2025
75	0.006	0.009	0.011	0.014	0.017	0.023	0.028	0.034	0.04	0.045	0.051	0.057
125	0.011	0.017	0.023	0.028	0.034	0.045	0.057	0.068	0.079	0.091	0.102	0.113
225	0.023	0.034	0.045	0.057	0.068	0.091	0.113	0.136	0.159	0.181	0.204	0.227
325	–	0.051	0.068	0.085	0.102	0.136	0.17	0.204	0.238	0.272	0.306	0.34
425	–	–	–	–	–	0.181	0.227	0.272	0.318	0.363	0.408	0.454
525	–	–	–	–	–	–	0.283	0.34	0.397	0.454	0.51	0.567

Effective air inflow area extract air (blade arrangement H) A_{eff} [m²]

H/B	225	325	425	525	625	825	1025	1225	1425	1625	1825	2025
75	0.006	0.009	0.012	0.015	0.018	0.023	0.029	0.035	0.041	0.047	0.053	0.059
125	0.012	0.018	0.023	0.029	0.035	0.047	0.059	0.07	0.082	0.094	0.106	0.117
225	0.023	0.035	0.047	0.059	0.07	0.094	0.117	0.141	0.164	0.188	0.211	0.235
325	–	0.053	0.07	0.088	0.106	0.141	0.176	0.211	0.246	0.281	0.317	0.352
425	–	–	–	–	–	0.188	0.235	0.281	0.328	0.375	0.422	0.469
525	–	–	–	–	–	–	0.293	0.352	0.41	0.469	0.528	0.586

Quick sizing

Quick sizing supply air

Zuluft	Veff[m/s]	2	2.5	3	3.5	4	4.5	5	
Gitter ohne Anbausatz 	Δps[Pa]	4	6	9	12	16	20	24	
	LWA0.08[dB(A)]	8	12	16	19	22	25	28	
Gitter mit schrägem Schlitzschieber SAS 	Δps[Pa]	20	26	32	39	47	56	65	
	LWA0.08[dB(A)]	37	40	44	47	49	52	55	
	Δps[Pa]	44	49	56	64	72	81	91	
	LWA0.08[dB(A)]	48	50	52	54	56	58	60	
Gitter mit parallelem Schlitzschieber AS 	Δps[Pa]	9	14	21	28	37	46	57	
	LWA0.08[dB(A)]	27	32	37	41	45	48	51	
Gitter mit Drosselklappe AG 	Δps[Pa]	5	5	8	11	14	18	22	
	LWA0.08[dB(A)]	12	18	22	26	30	33	35	
	Δps[Pa]	7	11	16	21	28	35	44	
	LWA0.08[dB(A)]	23	28	33	37	41	44	47	

Tolerances: Total level ± 2 dB, octave level ± 4 dB

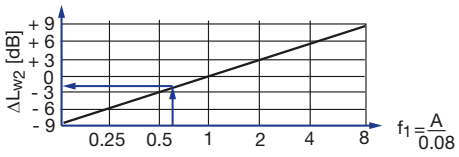
Stat. differential pressure and sound power level

With quick sizing, Δps and L_{WA} can be determined.
The discharge velocity v_{eff} results from the volume flow rate *V* in m³/h and the effective air inflow area A_{eff} in m².
A_{eff} results from the nominal size and can be read in the tables above.

Correction of the sound power level

The sound power level shown in the table refers to a grille area (nominal size) of 0.08m². For deviating grille sizes, $L_{WA0.08}$ needs to be corrected.
L_{WA} results from the sum $L_{WA0.08} + \Delta L_{W2}$.
In the following diagram, f1 is used to set the correction value ΔL_{W2}
A = B*H (nominal size)
L_{WA} [dB(A)] = $L_{WA0.08}$ + ΔL_{W2}

Sizing example supply air



Given data:
Volume flow rate (($\dot{V}$)) = 216 m³/h
Grille type = TR2-HV/425x125/AG
Damper blade position = 100%

Required:
1. Stat. pressure difference Δp_s
2. Sound power level L_{wA}

Procedure:
1. A_{eff} search from the grid size (425x125) --> 0.03 m²
2. V_{eff} Calculate: $V_{eff} = \dot{V}/(A_{eff}*3600)$ --> (216 m³/h)/(0.03*3600) = 2 m/s
3. In the quick sizing under AG, the damper blade position and the calculated V_{eff} read off the sound power level and the static pressure difference.

Consequently:
1. Stat. pressure difference Δp_s = 5 Pa
2. Sound power level $L_{wA0.08}$ = 12 dB(A)

Correction via the ratio of the area and the diagram.

f1=A/0.08 --> (0.425*0.125)/0.08 = 0.664

This results in a correction of -2 dB.

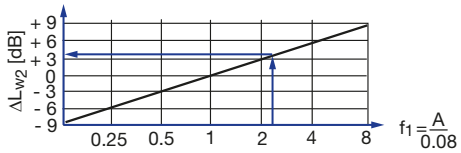
Sound power level L_{wA} = 12 – 2 = 10 dB(A)

Quick sizing extract air

Abluft	Veff[m/s]	2	2.5	3	3.5	4	4.5	5	
Gitter ohne Anbausatz	Δps[Pa]	-1	-2	-3	-4	-5	-6	-8	
	LWA0.08[dB(A)]	12	18	23	27	31	34	37	
Gitter mit Schlitzschieber AS +	Δps[Pa]	-3	-4	-6	-7	-10	-12	-15	100 %
	LWA0.08[dB(A)]	40	45	50	54	57	60	64	
Gitter mit Drosselklappe AG	Δps[Pa]	-2	-3	-4	-5	-7	-9	-11	100 %
	LWA0.08[dB(A)]	19	25	30	34	38	41	44	
+	Δps[Pa]	-10	-16	-23	-31	-41	-52	-64	50 %
	LWA0.08[dB(A)]	28	34	39	43	47	50	53	

Tolerances: Total level ± 2 dB, octave level ± 4 dB

Sizing example extract air



Given data:
Volume flow rate (*V*) = 1152 m³/h
Grille type = TR2-H/825x225/AG
Damper blade position = 100%

Required:
1. Stat. pressure difference Δp_s
2. Sound power level L_{wA}

Procedure:
1. A_{eff} search from the grid size (825x225) --> 0.128 m²
2. V_{eff} Calculate: $V_{eff}=V/(A_{eff}*3600)$ --> (1152 m³/h)/(0.128*3600) = 2.5 m/s
3. In the quick sizing under AG, the damper blade position and the calculated V_{eff} read off the sound power level and the static pressure difference.

Consequently:
1. Stat. pressure difference Δp_s = -3 Pa
2. Sound power level $L_{wA0.08}$ = 25 dB(A).

Correction via the ratio of the area and the diagram.

f1=A/0.08 -> (0.825*0.225)/0.08 = 2.32

This results in a correction of +3.5 dB.

Sound power level L_{wA} = 25 + 3.5 = 28.5 dB(A)

Specification text

This specification text describes the general properties of the product. Texts for variants can be generated with our Easy Product Finder design programme.

Specification text
Ventilation grille as supply air or extract air diffuser for the ventilation of rooms in ventilation and air conditioning systems. Consisting of a front border with bevelled edge. Installation preferably in circular or square air ducts, and for wall mounting. Ready-to-install component, consisting of a front border and individually adjustable, vertical and/or horizontal blades. Customised aerodynamic and acoustic design with web configurator.

Material
- Front border made of galvanised steel
- Galvanised steel blades
- PES filter
- Foam seal
- Ball impact protection made of galvanised steel
- AS and SAS made of aluminium
- AG made of aluminium and galvanised steel

Surfaces
- Front border and blades without coating (galvanised steel)
- Front border and blades powder-coated in RAL 9010 pure white, GU50
- Front border and blades powder-coated according to RAL CLASSIC colour palette GU70
- Front border and blades powder-coated according to NCS

Nominal sizes
Width [mm]
225, 325, 425, 525, 625, 825, 1025, 1225, 1425, 1625, 1825, 2025

Height [mm]
75, 125, 225, 325, 425, 525

Grille for installation into circular ducts (R/RA versions)
Width [mm]
225, 325, 425, 525, 625, 825 1025, 1225

Height [mm]
75, 125, 225, 325

Technical data
Design-specific

Standards and guidelines
- Sound power level of the air-regenerated noise measured according to EN ISO 5135
- Filter class ISO Coarse 45% according to ISO (G3) 16890

Variants
- Horizontal, vertical or vertical and horizontal blade arrangements
- Ball impact protection especially for installation in sports centres
- Linear grille consisting of end and centre sections that are assembled on site
- Grille for wall, sill and duct installation or for installation in circular air ducts
- Concealed screw fixing with and without installation subframe
- Countersunk hole in front border
- Non-perforated front border, without factory-fitted mounting option

Accessories
- Filter element for extract grille
- Installation subframe

Equivalence criteria
- Base material: galvanised sheet steel
- Adjustable air pattern
- Grille available in various colours
- Optional air direction control via factory-set blades
- Optional various attachments for restricting and balancing the grilles
- Various mounting options, customised for standard installation situations
- Ventilation data and acoustic data verified by laboratory measurements
- Dust and scratch protection thanks to individual packaging for up to 30 pieces

Manufacturer of the product
TROX GmbH

Type
TR2

Order code

TR2 – – R – – V – / 425 × 225 / AG / / SP – / 44 / P1 - RAL 9016
1 2 3 4 5 6 7 8 9 10 11 12 13

1 Type
TR2 Ventilation grille

2 Variant
No entry required: Single grille
E End section
M Middle section

3 Construction
No entry required: Installation into walls, sills or ducts
R Installation into circular ducts (large duct diameters)
RA Installation into circular ducts with small Ø and additional bend (small duct diameters)

4 Front border
No entry required: Profile 25 × 40 mm with bevelled edge

5 Blade arrangement
V Vertical front blade
H Horizontal front blade
VH Vertical front blade, horizontal air deflection
HV Horizontal front blade, vertical air direction control

6 Ball impact protection
No entry required: Without ball impact protection
BS With ball impact protection without fixing holes
BL With ball impact protection with fixing holes

7 Nominal size [mm]
Specify width × height

8 Attachment
Suitable for supply air and extract air
No entry required: Without attachment (front grille only)
AG Damper unit, opposed action blades
AS Hit and miss damper (parallel slide damper)
Only suitable for supply air
SAS Slanted hit and miss damper

9 Filter
Suitable for extract air
No entry required: Without filter element
EF With filter element (not with SAS attachment)

10 Fixing
No entry required: Countersunk holes in front border
SP Concealed screw fixing, for installation without installation subframe (not with filter EF)
VS Concealed screw fixing, for installation with subframe (not with filter EF)
NO No factory-fitted mounting option

11 Installation subframe
Only with VS fixing
No entry: Without installation subframe
ER With installation subframe

12 Air discharge
Only with V, VH blade arrangement
No entry required: Air direction control 0°
44 Air direction control 44°
84 Air direction control 84°
110 Air direction control 110°
140 Air direction control 140°
GEG Opposed

13 Surface
No entry required: Galvanised steel (standard for R/RA)
P0 Powder-coated, RAL 9010 (pure white), GE 50 (standard for wall, parapet and trunking installation)
P1 Powder-coated; specify RAL-CLASSIC colour, GU 70
PS Powder-coated; specify NCS colour and gloss level

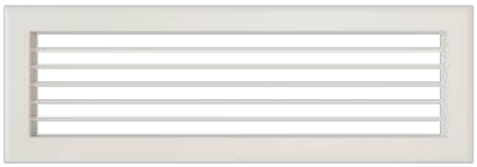
Order example: TR2-V/425×225/AS/VS-ER/P1-RAL9016

Type	TR2 – Ventilation grille
Variant	Single grille
Construction	Installation into walls, sills or ducts
Front border	Profile 25 × 40 mm with bevelled edge
Blade arrangement	Vertical front blade
Ball impact protection	Without ball impact protection
Nominal size [mm]	Width 425, height 225
Mounting kit	Hit and miss damper (parallel slide damper)
Filter	Without filter element
Fixing	Concealed screw fixing, for installation with subframe
Installation subframe	With installation subframe
Air discharge	Air direction control 0°
Surface	Powder-coated, RAL 9016 (traffic white), GU 70

Variants

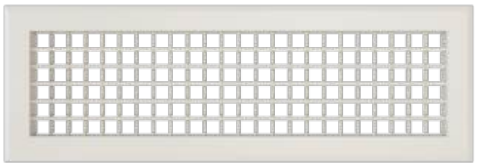
Blade arrangements

Horizontal blade arrangement (H)

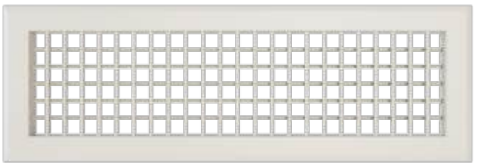


Vertical blade arrangement (V)

Horizontal, vertical blade arrangement (HV)

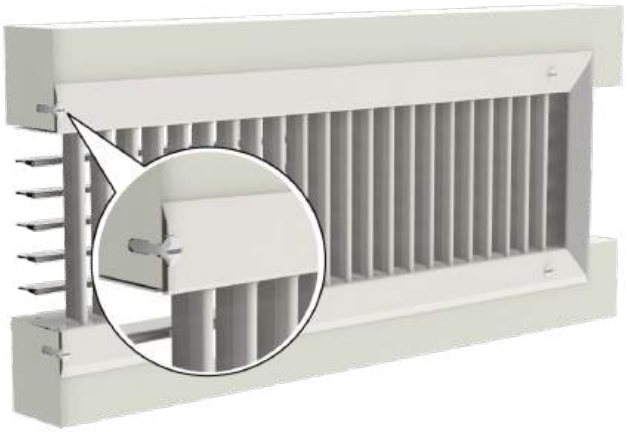


Vertical, horizontal blade arrangement (VH)

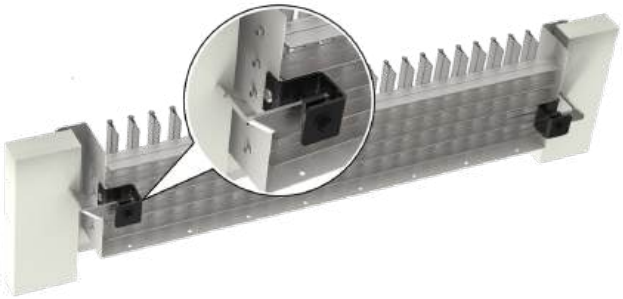


Fixings

TR2-VH with countersunk holes

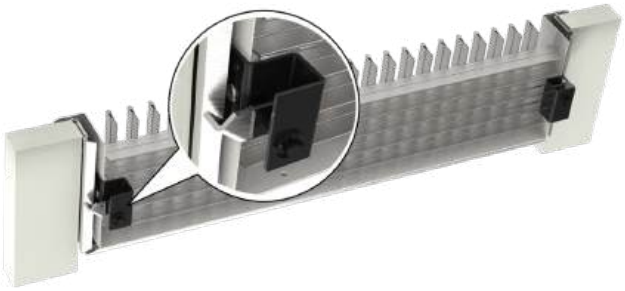


TR2-VH with concealed screw fixing (SP)



For installation without mounting frame

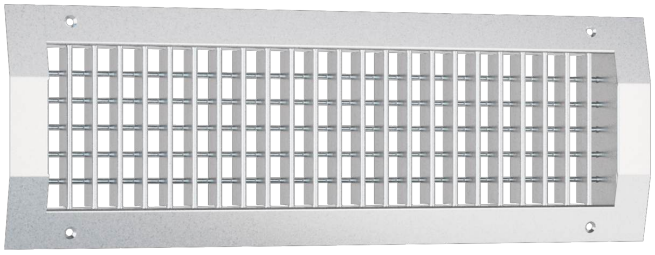
TR2-VH with concealed screw fixing (VS)



For installation with installation subframe

Variants

Ventilation grille (R) for installation in circular ducts



Ball impact protection grilles (BS) for installation in sports halls

Nominal sizes [mm]
Width (B): 325, 425, 525, 625, 825
Height (H): 125, 225

Without fixing holes

Ball impact protection (BL) for installation in circular ducts in sports halls

Nominal sizes [mm]
Width (B): 325, 425, 525, 625, 825
Height (H): 125, 225

With fixing holes

Ventilation grille with filter element (EF)

Nominal sizes [mm]
Width (B): 225, 325, 425, 525, 625, 825, 1025, 1225
Height (H): 125, 225, 325

Suitable for extract air

Attachments

Damper unit, opposed action blades (AG)

Application

- For volume flow rate balancing
- Mainly used in pressure ducts
- Damper units simplify the volume flow rate balancing required for commissioning, for supply air and extract air
- Ventilation grille need not be removed for adjustment
- Only available in standard sizes
- From widths (B) of 825, several mounting kits are installed, which are individually adjustable.

Parts and characteristics

- Opposed action blades made of aluminium
- Longitudinal and cross sections made of galvanised sheet steel

Standard sizes

Width (B): 225, 325, 425, 525, 625, 825, 1025, 1225, 1425, 1625, 1825, 2025
Height (H): 75, 125, 225, 325, 425, 525

Hit and miss damper (parallel slide damper) (AS)

Application

- For volume flow rate balancing
- Mainly used in pressure ducts
- Damper units simplify the volume flow rate balancing required for commissioning, preferably for extract air
- Ventilation grille need not be removed for adjustment
- Only available in standard sizes
- From widths (B) of 825, several mounting kits are installed, which are individually adjustable.

Parts and characteristics

- Hit and miss damper elements with airflow straighteners
- Can be adjusted and set with screws
- Made of aluminium

Standard sizes

Width (B): 225, 325, 425, 525, 625, 825, 1025, 1225, 1425, 1625, 1825, 2025
Height (H): 75, 125, 225, 325, 425, 525

Slanted hit and miss damper (SAS)

Application

- For volume flow rate balancing
- Slanting hit and miss damper that ensures a uniform airflow through the grille face
- Damper units simplify the volume flow rate balancing required for commissioning, only for supply air
- Ventilation grille need not be removed for adjustment
- Only available in standard sizes
- From widths (B) of 825, the angled hit-and-miss damper is combined with an AS hit-and-miss damper, both of which can be adjusted individually.

Parts and characteristics

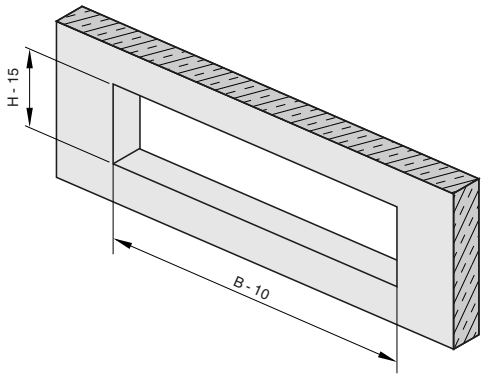
- Hit and miss damper elements with airflow straightener
- Can be adjusted and set with screws
- Made of aluminium

Standard sizes

Width (B): 225, 325, 425, 525, 625, 825, 1025, 1225
Height (H): 75, 125, 225, 325

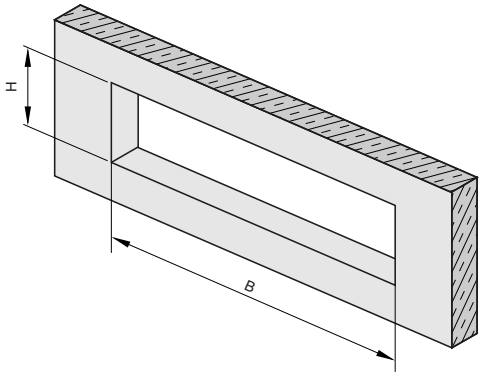
Dimensions

Installation opening countersunk hole



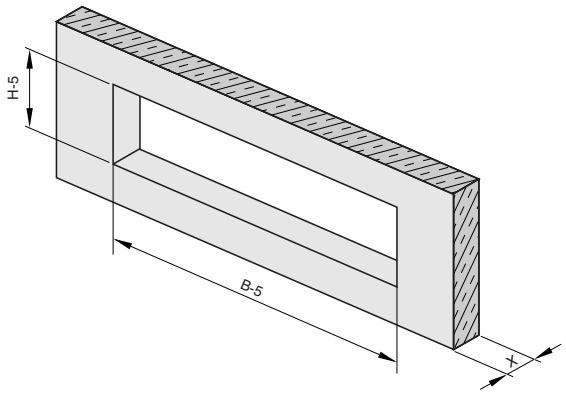
B = nominal width
H = nominal height

Installation opening for mounting with concealed screw fixing and installation subframe (VS)



B = nominal width
H = nominal height

Installation opening for mounting with concealed screw fixing, without installation subframe (SP)



B = nominal width
H = nominal height
X = clamping range

Installation opening TR2 for wall, sill and duct installation

Fixings	Installation opening [mm]	Min. clamping range [mm]	Max. clamping range [mm]
Countersunk hole	(B-10) × (H-15)	-	-
SP	(B-5) × (H-5)	4	32
VS	B x H	-	-
NO	(B-10) × (H-15)	-	-

Installation opening TR2-R/RA

Fixing	Installation opening [mm]	min. clamping range [mm]
Countersunk hole	(B-10) × (H-15)	-
NO	(B-10) × (H-15)	-

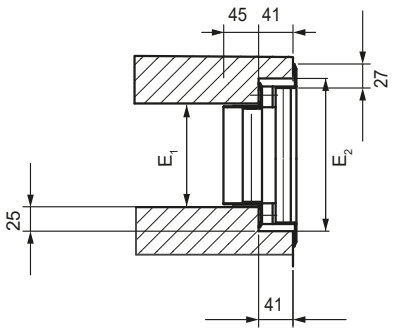
Quantity countersunk holes

H/B	225	325	425	525	625	825	1025	1225	1425	1625	1825	2025
75	4	4	4	4	6	6	6	6	8	8	8	10
125	4	4	4	4	6	6	6	6	8	8	8	10
225	4	4	4	4	6	6	6	6	8	8	8	10
325	–	4	4	4	6	6	6	6	8	8	8	10
425	–	–	–	–	–	6	6	6	8	8	8	10
525	–	–	–	–	–	–	6	6	8	8	8	10

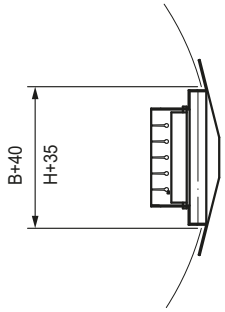
Number of fixings for SP and VS

H/B	225	325	425	525	625	825	1025	1225	1425	1625	1825	2025
75	2	2	2	2	2	2	2	2	4	4	4	4
125	2	2	2	2	2	2	2	2	4	4	4	4
225	2	2	2	2	2	2	2	2	4	4	4	4
325	–	2	2	2	2	2	2	2	4	4	4	4
425	–	–	–	–	–	4	4	4	6	6	6	6
525	–	–	–	–	–	–	4	4	6	6	6	6

Installation opening ball impact protection for wall, sill and duct installation



Installation opening ball impact protection for installation in circular ducts



E1 = Installation opening diffusion grille
E2 = Installation opening ball impact protection

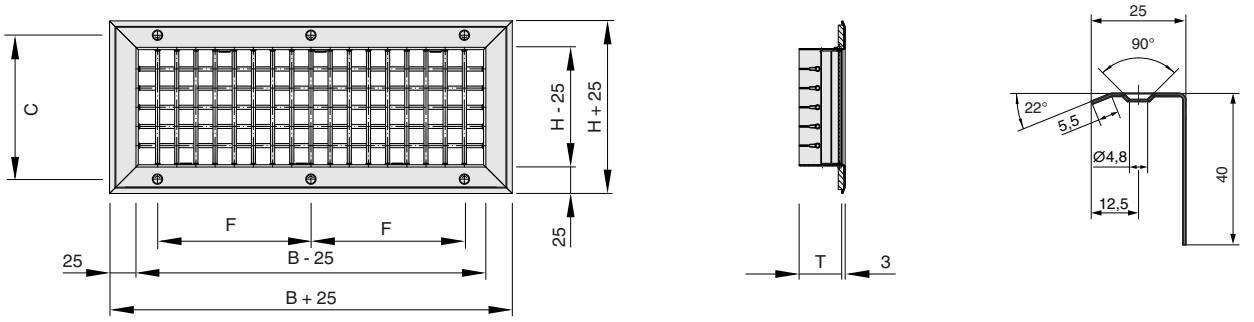
Installation opening TR2 for wall, sill and duct installation with ball impact protection

Ball impact protection grille	Installation opening E1 [mm]	Installation opening E2 [mm]
BL	(L-10) x (H-15)	(B+35) x (H+35)
BS	(L-10) x (H-15)	(B+35) x (H+35)

Installation opening TR2-R/RA with ball impact protection

Ball impact protection grille	Installation opening [mm]
BL	(B+40) x (H+35)

Dimensions TR2-VH



Screw hole pitch F (mm)

Width B [mm]	nxF
225	1x166.7
325	1x266.7
425	1x366.7
525	1x466.7
625	2x283.5
825	2x383.5
1025	2x483.5
1225	2x583.5
1425	3x455.7
1625	3x522.3
1825	3x588.9
2025	4x491.7

Screw hole pitch C (mm)

Height H [mm]	C
75	75
125	125
225	225
325	325
425	425
525	525

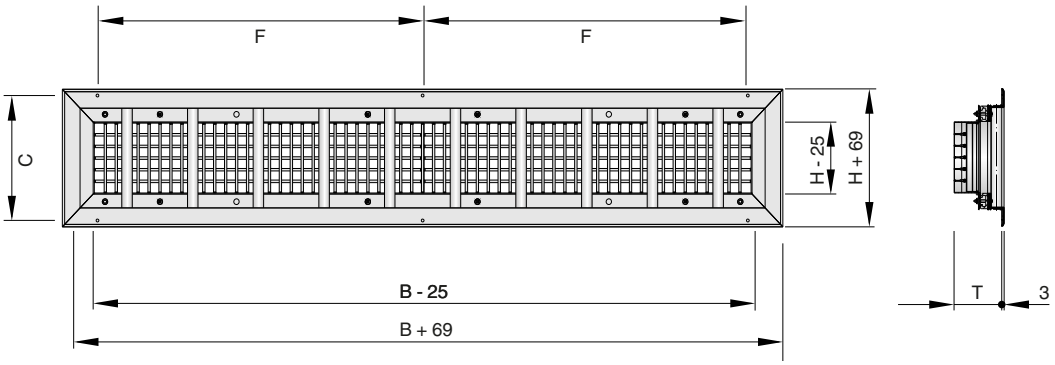
Installation depths T [mm]

Attachment	TR2
without attachment	37
AG	103
AS	67

Installation depths T [mm] with attachment SAS

Nominal width B [mm]	TR2
225	90
325	100
425	110
525	115
625	125
825	145
1025	170
1225	170

Dimensions TR2-VH-BL



Screw hole pitch F (mm)

Width B [mm]	nxF
325	1x266.7
425	1x366.7
525	1x466.7
625	2x283.5
825	2x383.5

Screw hole pitch C (mm)

Height H [mm]	C
125	167
225	267

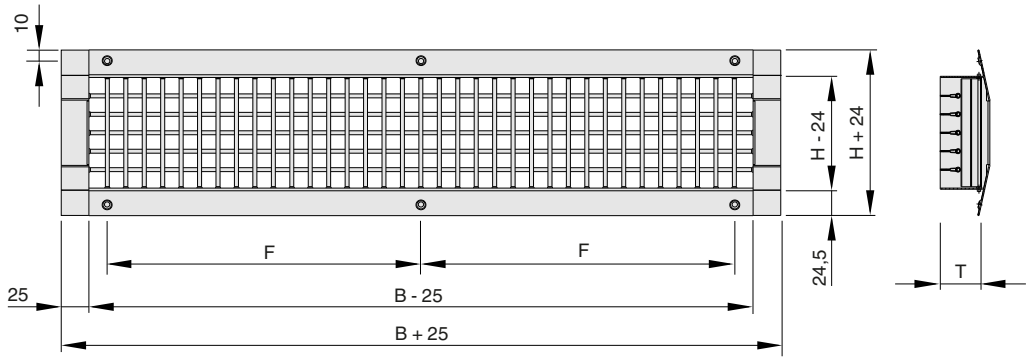
Installation depths T [mm]

Mounting kit	TR2-BL/BS
Without mounting kit	86
AG	152
AS	116

Installation depths T [mm] with attachment SAS

Nominal width B [mm]	TR2-BL/BS
625	170
825	190

Dimensions TR2-R-VH



Screw hole pitch F (mm)

Width B [mm]	nxF
225	1x166.7
325	1x266.7
425	1x366.7
525	1x466.7
625	2x283.5
825	2x383.5
1025	2x483.5
1225	2x583.5

Combinations of dimensions for installation in circular ducts

H	Air duct diameter [mm]																					
	100	125	140	160	180	200	224	250	280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250 <
75	–	RA	RA	RA	R	R	R	R	R	R	R	R	R	R	R	R	–	–	–	–	–	–
125	–	–	–	–	–	–	RA	RA	RA	RA	R	R	R	R	R	R	R	R	R	R	R	R
225	–	–	–	–	–	–	–	–	–	–	–	–	–	RA	RA	RA	R	R	R	R	R	R
325	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	RA	RA	R	R

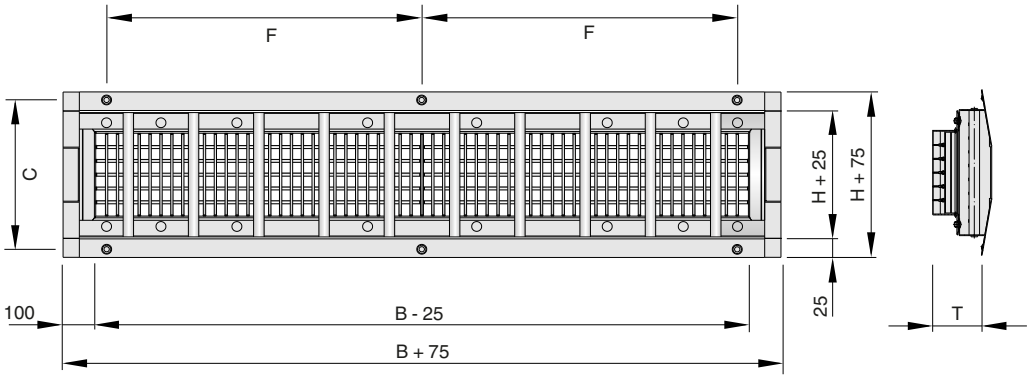
Installation depths T [mm]

Mounting kit	TR2-R/RA
Without mounting kit	40
AG	106
AS	70

Installation depths T [mm] with attachment SAS

Nominal width B [mm]	TR2-R/RA
225	90
325	100
425	110
525	115
625	125
825	145
1025	170
1225	170

Dimensions TR2-R-VH-BL



Screw hole pitch F [mm]

Width B [mm]	nxF
325	1x266.5
425	1x366.5
525	1x466.5
625	2x283.5
825	2x383.5

Screw hole pitch C [mm]

Height H [mm]	C
125	167
225	267

Combinations of dimensions for installation in circular ducts with ball impact protection

H	Air duct diameter [mm]													
	315	355	400	450	500	560	630	710	800	900	1000	1120	1250	1350
125	RA	RA	RA	R	R	R	R	R	R	R	R	–	–	–
225	–	–	–	–	RA	RA	RA	R	R	R	R	R	R	R

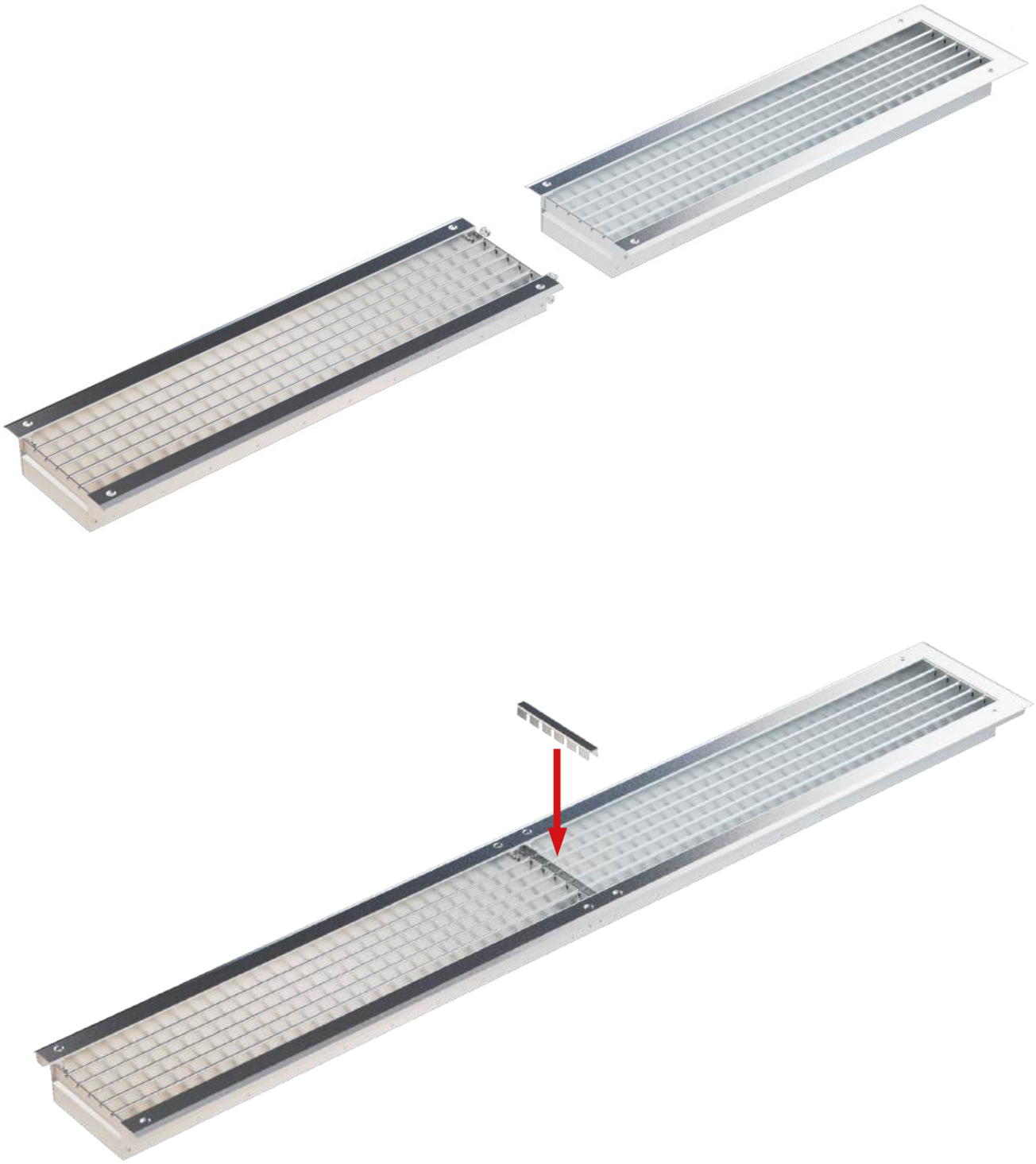
Installation depths T [mm]

Mounting kit	TR2-R/RA-BL
Without mounting kit	86
AG	152
AS	116

Installation depths T [mm] with attachment SAS

Nominal width B [mm]	TR2-R/RA-BL
625	Max. 170
825	Max. 190

TR2 linear grille end and centre section



The end and centre sections are assembled using a coupling plate. The seams are invisible after assembly.

Weights ventilation grilles for wall, sill and duct installation (TR2) [kg]

H/B	225	325	425	525	625	825	1025	1225	1425	1625	1825	2025
75	0.6	0.7	0.9	1.2	1.3	1.8	2.2	2.6	2.9	3.3	4	4.4
125	0.9	1.1	1.2	1.7	1.9	2.5	3.2	3.8	4.2	4.8	5.7	6.3
225	1.2	1.5	1.8	2.4	2.7	3.7	4.6	5.5	6.1	6.9	8.2	9.1
325	–	1.9	2.2	3	3.3	4.3	5.6	6.7	7.4	8.4	10	11.1
425	–	–	–	–	–	4.9	6.6	7.9	8.7	9.9	11.9	13.1
525	–	–	–	–	–	–	8.1	9.6	10.7	12.1	14.5	16

Weights ventilation grilles for installation in circular ducts (TR2-R/RA) [kg]

H/B	225	325	425	525	625	825	1025	1225
75	0.6	0.7	0.9	1.2	1.3	1.8	2.2	2.6
125	0.9	1.1	1.2	1.7	1.9	2.5	3.2	3.8
225	1.2	1.5	1.8	2.4	2.7	3.7	4.6	5.5
325	-	1.9	2.3	3.1	3.5	4.9	6.0	7.2

Weight of ball impact protection grille without ventilation grille [kg]

H/B	325	425	525	625	825
125	0.6	0.6	0.9	1.1	1.2
225	1.2	1.2	1.8	2.2	2.4

Weights attachment AG [kg]

H/B	225	325	425	525	625	825	1025	1225	1425	1625	1825	2025
75	0.4	0.6	0.7	0.8	1	1.2	1.6	1.8	2.3	2.5	2.7	3.4
125	0.6	0.9	1	1.1	1.5	1.7	2.3	2.6	3.3	3.5	3.8	4.8
225	0.8	1.2	1.4	1.6	2.1	2.4	3.2	3.6	4.6	5	5.4	6.9
325	–	1.5	1.7	2	2.6	2.9	3.9	4.4	5.6	6.1	6.6	8.3
425	–	–	–	–	–	3.4	4.6	5.2	6.6	7.2	7.7	9.7
525	–	–	–	–	–	–	5.5	6.2	8.0	8.7	9.4	11.8

Weights attachment AS [kg]

H/B	225	325	425	525	625	825	1025	1225	1425	1625	1825	2025
75	0.10	0.15	0.20	0.25	0.30	0.35	0.45	0.5	0.6	0.7	0.75	0.85
125	0.15	0.20	0.25	0.35	0.40	0.55	0.65	0.80	0.90	1.05	1.15	1.30
225	0.25	0.35	0.45	0.55	0.65	0.90	1.10	1.30	1.55	1.75	2.00	2.20
325	–	0.55	0.60	0.75	0.90	1.20	1.50	1.80	2.10	2.40	2.65	2.95
425	–	–	–	–	–	1.50	1.90	2.30	2.65	3.00	3.40	3.80
525	–	–	–	–	–	–	2.30	2.80	3.25	3.70	4.20	4.65

Weights attachment SAS [kg]

H/B	225	325	425	525	625	825	1025	1225
75	0.10	0.20	0.25	0.30	0.35	0.50	0.55	0.65
125	0.15	0.25	0.30	0.40	0.50	0.65	0.80	0.95
225	0.25	0.40	0.50	0.65	0.75	1.05	1.25	1.50
325	–	0.50	0.70	0.85	1.00	1.40	1.65	2.00

Product details

Combinations TR2 single grille for wall, sill and duct installation

Blade arrangement	Attachment 1)	Filter 2)	Fixing	Installation subframe 3)	Air discharge 4)	Surface
V	-/ AG/ AS/ SAS	– / EF	–/ NO	– / ER	–/ 44 / 84 / 110 / 140 / GEG	- / P0 / P1 / PS
VH	-/ AG/ AS/ SAS	–	-/ VS / SP/ NO	– / ER	–/ 44 / 84 / 110 / 140 / GEG	- / P0 / P1 / PS
H	-/ AG/ AS/ SAS	– / EF	–/ NO	– / ER	–	- / P0 / P1 / PS
HV	-/ AG/ AS/ SAS	–	-/ VS / SP/ NO	– / ER	–	- / P0 / P1 / PS

1) SAS attachment: B max. 1225 mm and only in supply air
2) Filter: extract air only, B max: 1225 mm / H min: 125, max 325)
3) Installation frame: only possible with VS mounting, not with EF
4) Air discharge: supply air only, up to B: 1225 mm

Combinations TR2 end / centre piece for wall, sill and duct installation

Variant	Blade arrangement	Attachment	Fixing	Surface	
E	V	–/ AG/ AS	–/ NO	- / P0 / P1 / PS	
E	VH	–/ AG/ AS	–/ NO	- / P0 / P1 / PS	
M	V	–/ AG/ AS	–/ NO	- / P0 / P1 / PS	
M	VH	–/ AG/ AS	–/ NO	- / P0 / P1 / PS	- / P0 / P1 / PS

1) Installation subframe only possible with VS fixing

Combinations TR2 with ball impact protection grille for wall, sill and duct installation

Blade arrangement	Ball impact protection	Attachment 1)	Air discharge 2)	Surface
V	BS / BL	- / AG / AS / SAS	– / 44 / 84 / 110 / 140 / GEG	- / P0 / P1 / PS
VH	BS / BL	- / AG / AS / SAS	– / 44 / 84 / 110 / 140 / GEG	- / P0 / P1 / PS
H	BS / BL	- / AG / AS / SAS	–	- / P0 / P1 / PS
HV	BS / BL	- / AG / AS / SAS	–	- / P0 / P1 / PS

1) SAS attachment: B max. 1225 mm and only in supply air
2) Air discharge: supply air only, up to B: 1225 mm

Combinations TR2 in circular air ducts

Construction	Blade arrangement	Attachment 1)	Filter 2)	Air discharge 3)	Surface
R/ RA	V	- / AG / AS / SAS	– / EF	– / 44 / 84 / 110 / 140 / GEG	-/ P0/ P1/ PS
R/ RA	VH	- / AG / AS / SAS	–	– / 44 / 84 / 110 / 140 / GEG	-/ P0/ P1/ PS

1) SAS attachment: B max. 1225 mm and only in supply air
2) Filter: extract air only, B max: 1225 mm / H min: 125, max 325
3) Air discharge: supply air only, up to B: 1225 mm

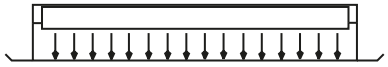
Combinations TR2 with ball impact protection grille in circular air ducts

Construction	Blade arrangement	Ball impact protection	Attachment 1)	Air discharge 2)	Surface
R/ RA	V	BL	-/ AG / AS / SAS	–/ 44 / 84 / 110 / 140 / GEG	- / P0 / P1 / PS

Construction	Blade arrangement	Ball impact protection	Attachment 1)	Air discharge 2)	Surface
R/ RA	VH	BL	-/ AG / AS / SAS	–/ 44 / 84 / 110 / 140 / GEG	- / P0 / P1 / PS

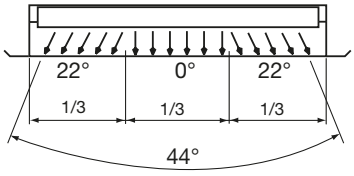
1) SAS attachment: B max. 1225 mm and only in supply air
2) Air discharge: supply air only, up to B: 1225 mm

Air direction control straight



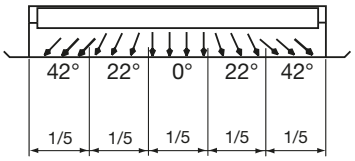
Air pattern β 20°
Throw distance L_x

Air direction control 44°



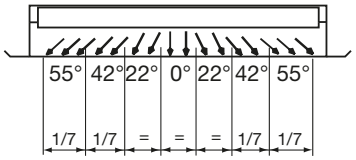
Air pattern β 60°
Throw distance L_x x 0.77

Air direction control 84°



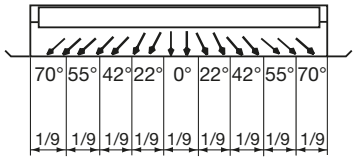
Air pattern β 80°
Throw distance L_x x 0.56

Air direction control 110°



Air pattern β 90°
Throw distance L_x x 0.42

Air direction control 140°



Air pattern β 180°
Throw distance L_x x 0.35

Air direction control opposed

Air pattern β 20°
Throw distance L_x x 1.3

Nomenclature

B [mm]
Nominal width

H [mm]
Nominal height

q_v [m³/h]
Air volume flow

Δp_t [Pa]
Total differential pressure

A_{eff} [m²]
Free area minus the components standing in the airflow

L_x [m]
Distance from ventilation grille / linear grille (throw distance)

i [ ]
Induction ratio

α [°]
Air pattern vertical

β [°]
Air pattern horizontal

L_{wA} [dB(A)]
A-weighted sound power level