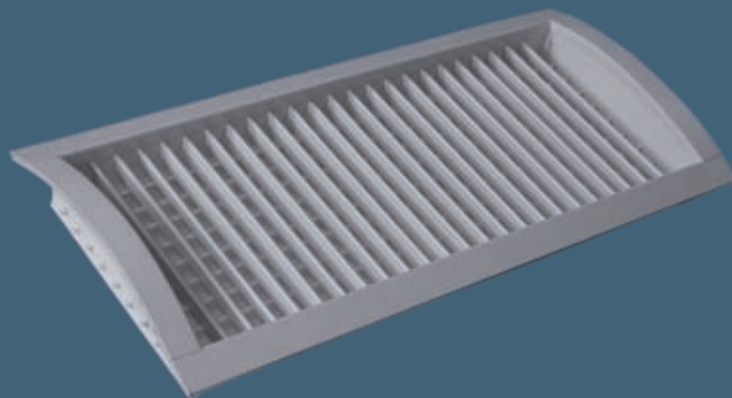


# MANDÍK®

## ADJUSTABLE VENT FOR ROUND DUCT

### VNKM



These technical specifications state a row of manufactured sizes and models of one-row and two-row adjustable vents for round duct with R1, R2, R3, R5 and R6 regulation (further only vents) VNKM. It is valid for manufacture, designing, ordering, delivery, assembly and operation.

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## II. GENERAL INFORMATION

### 1. Description

- 1.1.** The Adjustable vent is an end air-conditioning element for round ducts for air distribution in air-conditioned, ventilated or heated spaces.
- 1.2.** Adjustable vents made of galvanized steel sheet are supplied with screwed fastening.
- They consist of rectangular frame which holds either one row or two rows of rotating blades (one- or two-row vents).
- Front blades are vertical and rear blades are horizontal. The tightness of vents is ensured along the perimeter by means of sealing.
- 1.3.** Vents are designed for macroclimatic areas with mild climate according to EN 60 721-3-3 zm.A2.
- Temperature in the place of installation is permitted to range from - 20°C to + 70°C.
- Vents are suitable for systems without abrasive, chemical and adhesive particles.
- 1.4.** If is not noticed other way, all dimensions and weight are in millimeters and kilograms.

### 2. Design

- 2.1.** Vents are supplied, according to the number of rows of rotating blades, as one- or two-row vents.
- Vents can be equipped with R1 type regulation through counter-rotating blades, R2 type regulation through tilting arm of directing blades, R3 type regulation through fixed and adjustable regulation strip, parallel to vent frame, R5 type regulation through large format tilting blade and R6 type regulation through fixed and adjustable regulation strip, oblique to vent frame.
- Regulation R2 is intended for air inlet, regulations R1, R3, R5 and R6 are intended for air inlet and air outlet. Blades are pitched at 20 mm.
- 2.2.** Vents are installed in duct opening by using screws.

Fig. 1 One-row adjustable vent with regulation R1

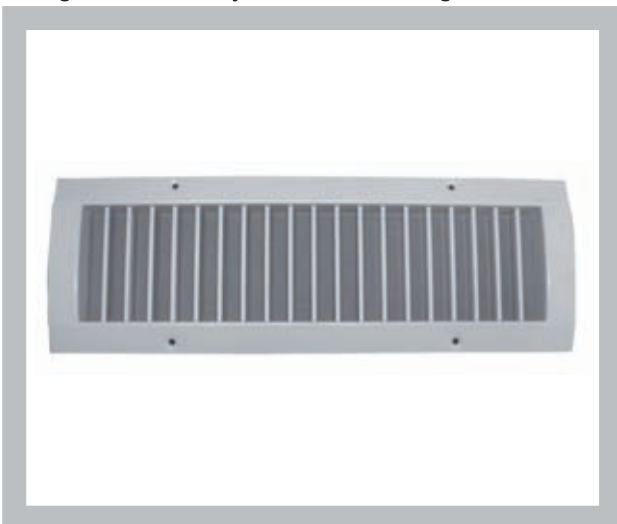
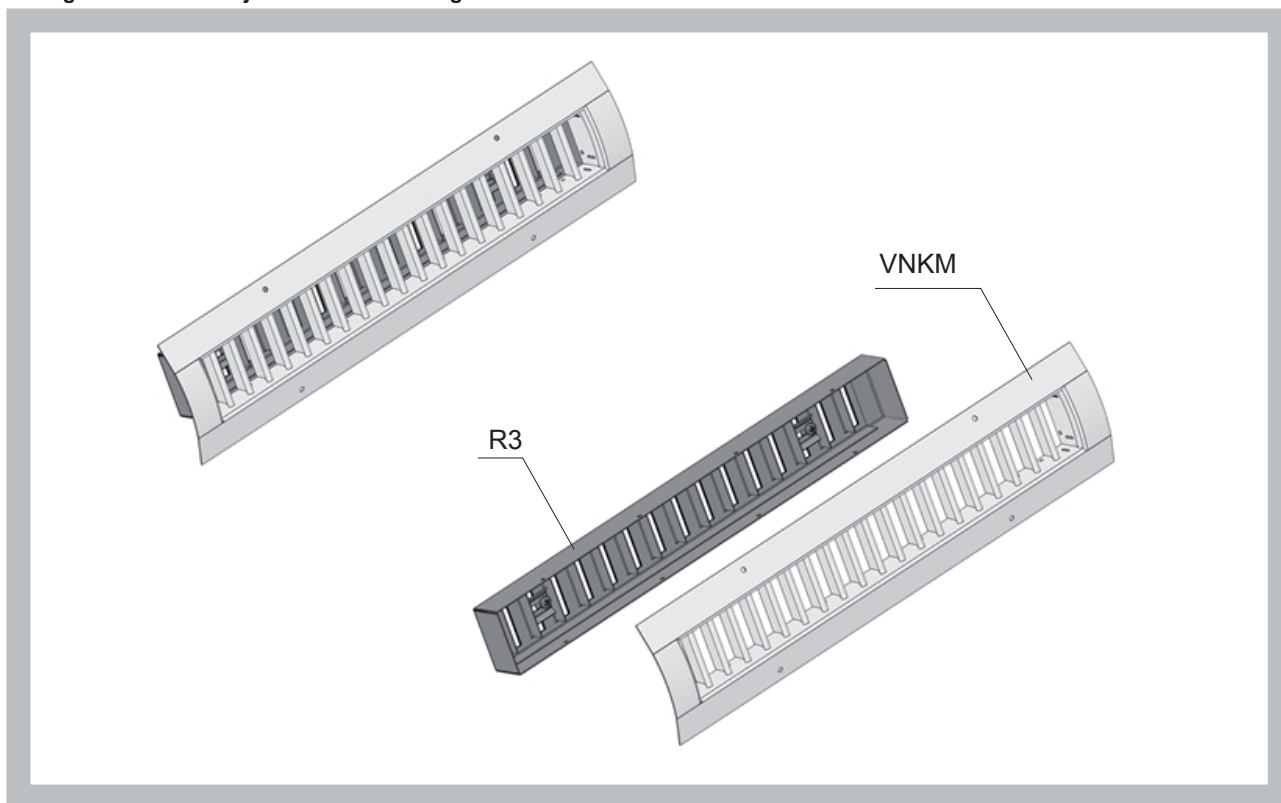


Fig. 2 Two-row adjustable vent with regulation R1



Fig. 3 One-row adjustable vent with regulation R3



**3. Dimensions, weights**

**3.1. Vents dimensions**

- W x H            nominal dimensions (dimensions of duct opening)
  - W<sub>1</sub> = W - 25    width of vent
  - H<sub>1</sub> = H - 25    high of vent
  - R                radius of vent rounding
  - Y<sub>1</sub>              depth of vent on the vent side
  - Y<sub>2</sub>              total depth of vent (without regulation)
- $$Y_2 = Y_1 + (R - 1/2 * \sqrt{4 * R^2 - H_1^2})$$

Tab. 3.1.1. Dimensions

Nominal dimensions W x H	Duct diameter D	Y <sub>1</sub>		Nominal dimensions W x H	Duct diameter D	Y <sub>1</sub>	
		Vent				Vent	
		One-row	Two-row			One-row	Two-row
225 x 75	150 - 400	30	50	225 x 85	150 - 400	30	50
325 x 75				325 x 85			
425 x 75				425 x 85			
525 x 75				525 x 85			
625 x 75				625 x 85			
725 x 75				725 x 85			
825 x 75				825 x 85			
1025 x 75				1025 x 85			
1225 x 75				1225 x 85			

Nominal dimensions W x H	Duct diameter D	Y <sub>1</sub>		Nominal dimensions W x H	Duct diameter D	Y <sub>1</sub>	
		Vent				Vent	
		One-row	Two-row			One-row	Two-row
225 x 125	300 - 900	30	50	225 x 325	630 - 2400	30	50
325 x 125							
425 x 125							
525 x 125							
625 x 125							
725 x 125							
825 x 125							
1025 x 125							
1225 x 125							
1225 x 325							
225 x 225	630 - 2400	30	50		630 - 2400	30	50
325 x 225							
425 x 225							
525 x 225							
625 x 225							
725 x 225							
825 x 225							
1025 x 225							
1225 x 225							

Row of duct (nominal diameter) - 150, 160, 180, 200, 224, 250, 300, 315, 355, 400, 450, 500, 560, 630, 710, 800, 900, 1000, 1120, 1250, 1400, 1500, 1600, 1800, 2400

Tab. 3.1.2. Rounding radius

Duct diameter	Nominal dimension - high H														
	75			85			125			225			325		
	R	Y <sub>2</sub> One-row	Y <sub>2</sub> Two-row	R	Y <sub>2</sub> One-row	Y <sub>2</sub> Two-row	R	Y <sub>2</sub> One-row	Y <sub>2</sub> Two-row	R	Y <sub>2</sub> One-row	Y <sub>2</sub> Two-row	R	Y <sub>2</sub> One-row	Y <sub>2</sub> Two-row
150	90	34	54	90	35	55									
160	90	34	54	90	35	55									
180	90	34	54	90	35	55									
200	110	33	53	110	34	54									
225	110	33	53	110	34	54									
250	160	32	52	160	33	53									
300	160	32	52	160	33	53	160	38	58						
315	225	31	51	225	32	52	160	38	58						
355	225	31	51	225	32	52	225	36	56						
400	225	31	51	225	32	52	225	36	56						
450							225	36	56						
500							225	36	56						
560							300	34	54						
630							300	34	54	300	47	67	300	70	90
710							300	34	54	400	43	63	355	63	83
800							400	33	53	400	43	63	400	59	79
900							400	33	53	400	43	63	500	53	73
1000										600	38	58	500	53	73
1120										600	38	58	600	49	69
1250										600	38	58	600	49	69
1400										800	36	56	800	44	64
1500										800	36	56	800	44	64
1600										800	36	56	800	44	64
1800										800	36	56	800	44	64
2400										1200	34	54	1200	39	59

Only vents with dimensions according Tab. 3.1.1. are supplied.  
Atypical design isn't produced.

3.2. Adjustable vent for round duct

Fig. 4 One-row vent

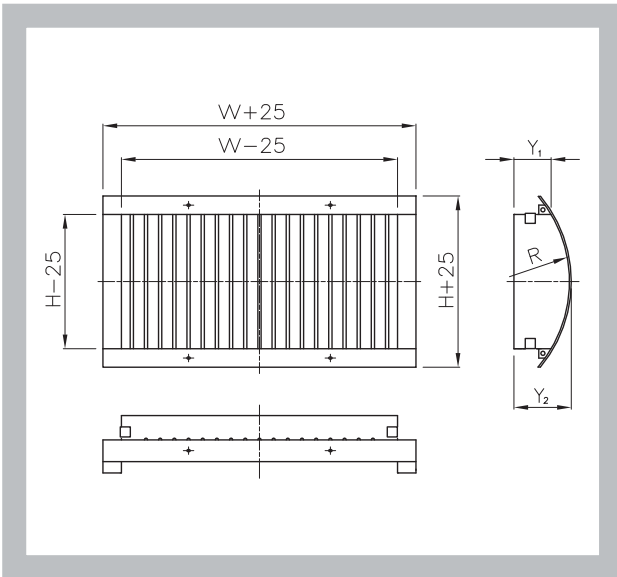


Fig. 5 One-row vent

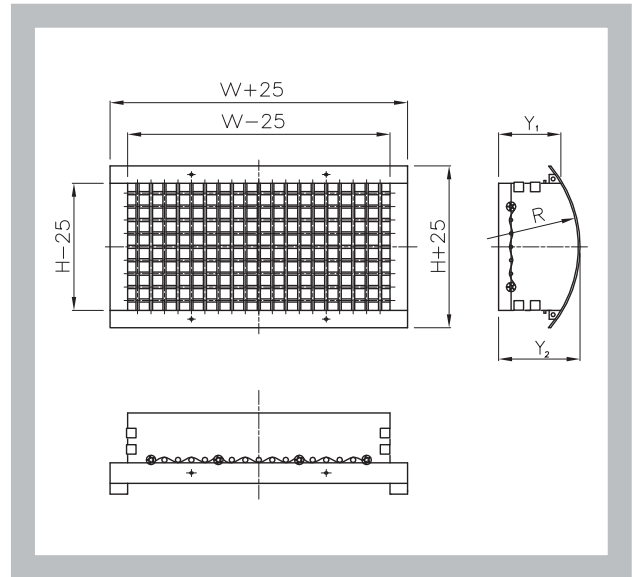
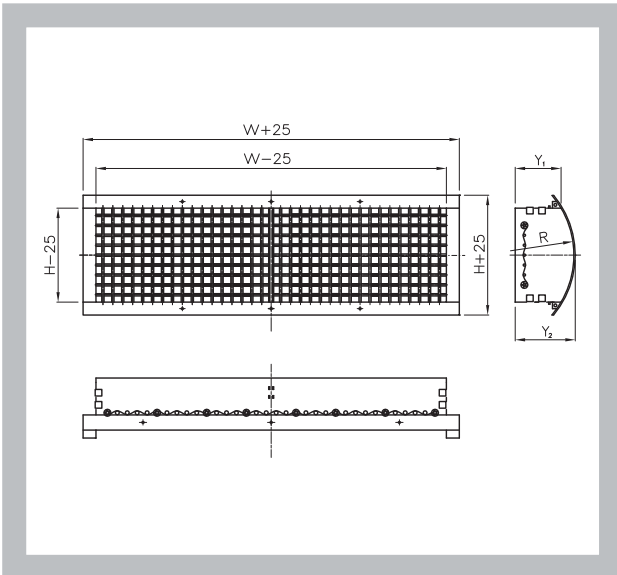


Fig. 6 Two-row vent ( $W \geq 750$  mm)



3.3. Vents with regulations

Fig. 7 One-row vent with regulation R1

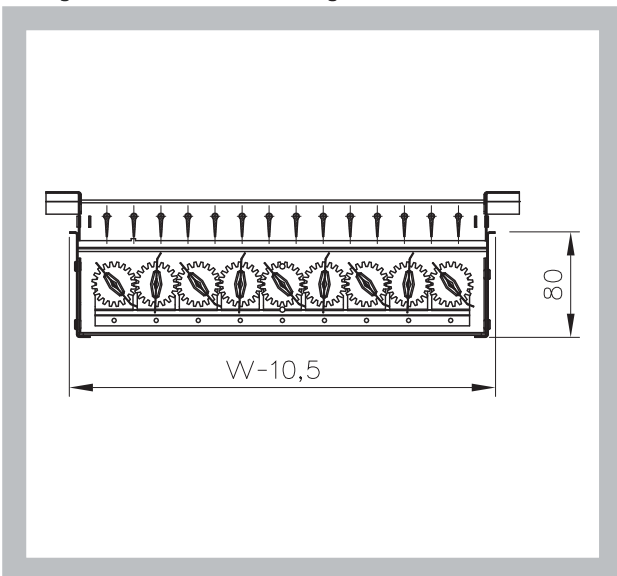


Fig. 8 Two-row vent with regulation R1

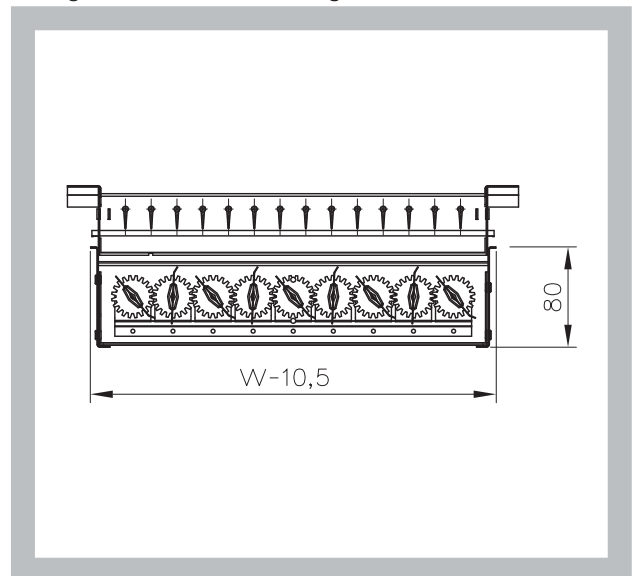


Fig. 9 One-row vent with regulation R2 (closed position)

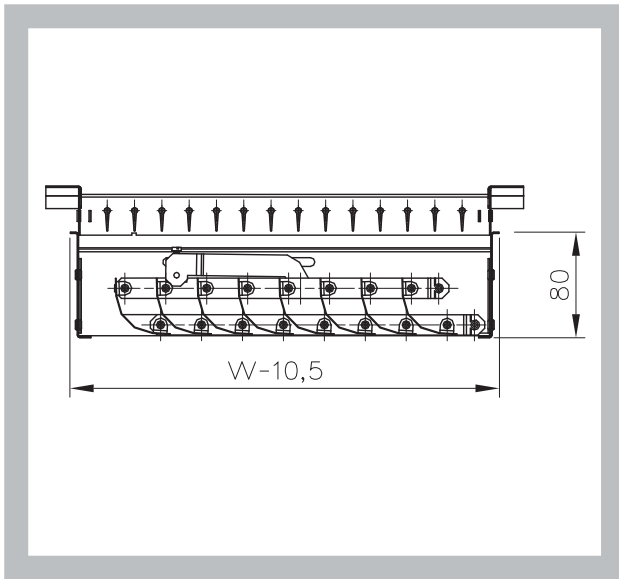


Fig. 10 One-row vent with regulation R2 (opened position)

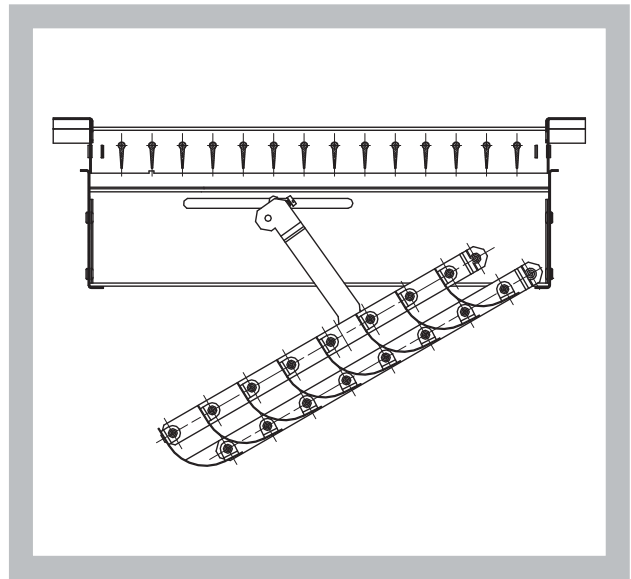


Fig. 11 Two-row vent with regulation R2 (closed position)

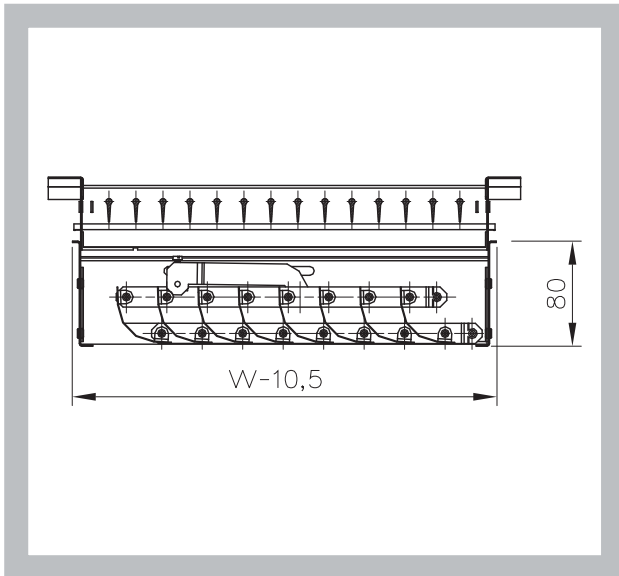


Fig. 12 Two-row vent with regulation R2 (opened position)

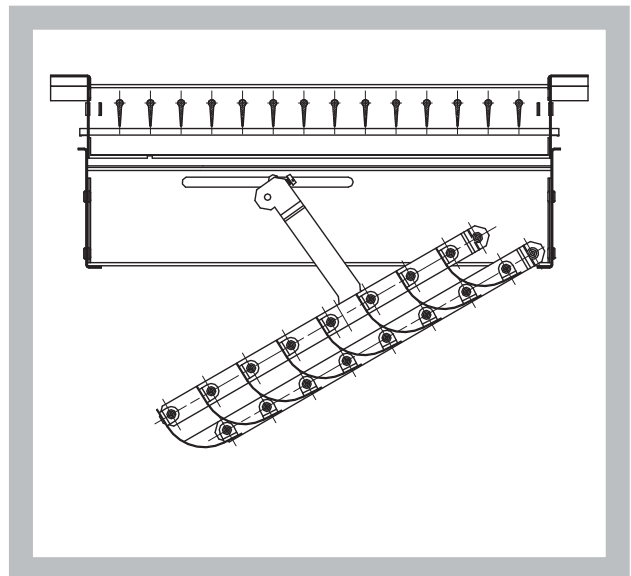


Fig. 13 One-row vent with regulation R3

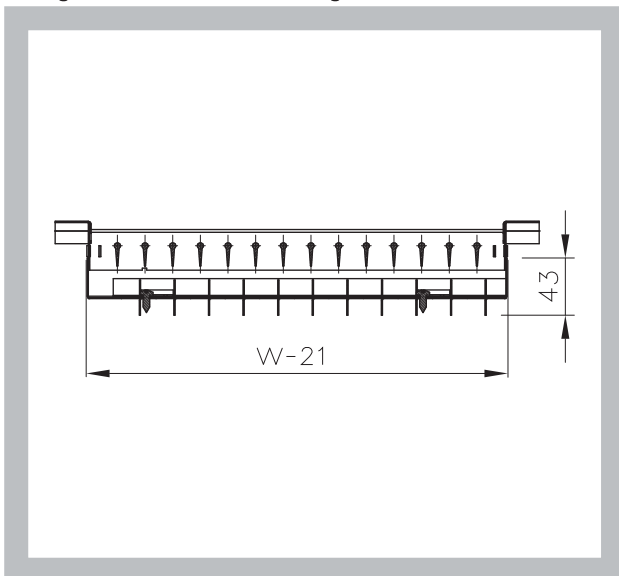


Fig. 14 Two-row vent with regulation R3

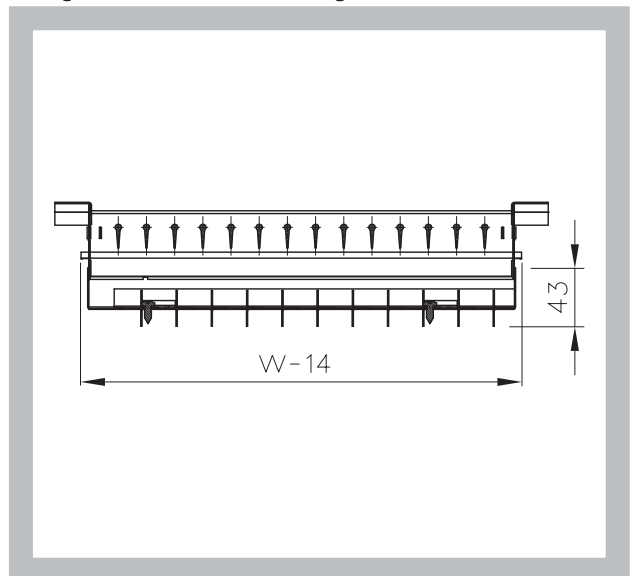


Fig. 15 One-row vent with regulation R5

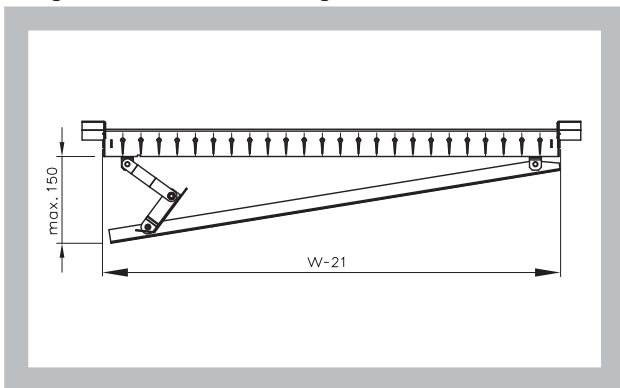


Fig. 16 Two-row vent with regulation R5

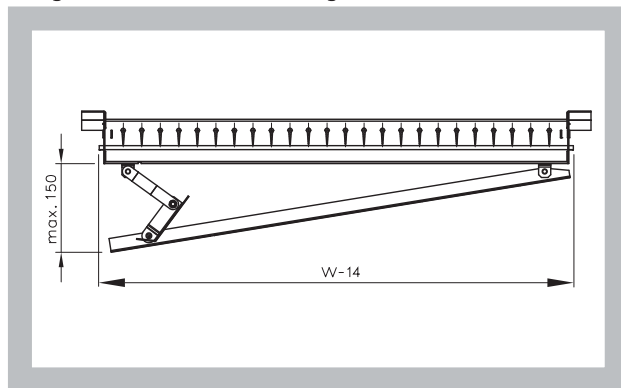


Fig. 17 One-row vent with regulation R6

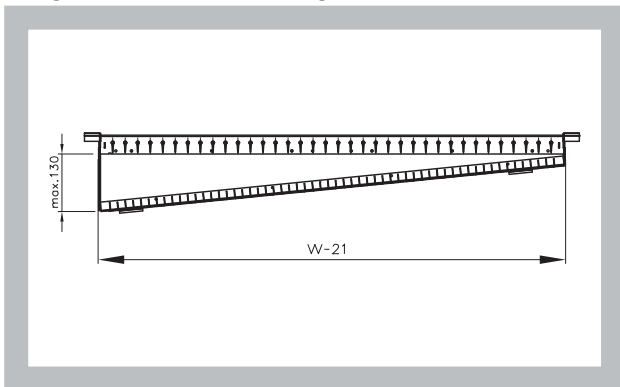
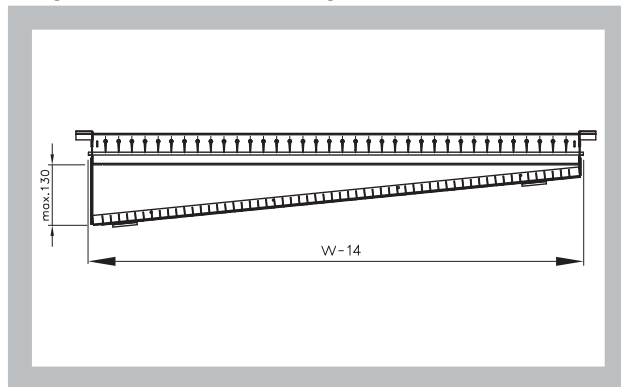


Fig. 18 Two-row vent with regulation R6



### 3.3. Weights

Tab. 3.3.1. Weights

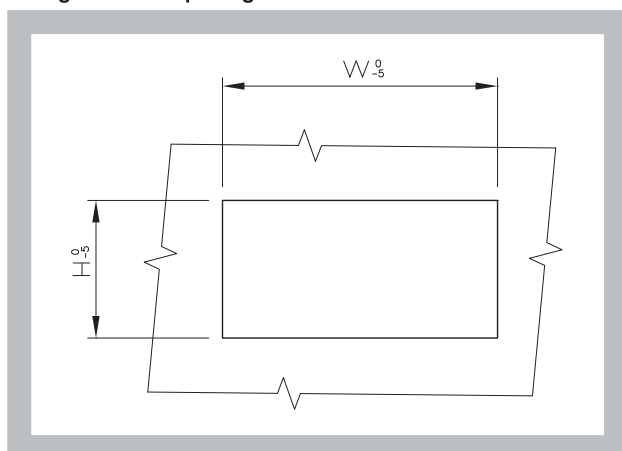
Nom. dim. W x H	Weight [Kg] vent				Nom. dim. W x H	Weight [Kg] vent			
	one-row	two-row	one-row with R1	two-row with R1		one-row	two-row	one-row with R1	two-row with R1
225 x 75	0,331	0,462	0,818	0,948	725 x 125	1,141	1,631	2,854	3,351
325 x 75	0,448	0,629	1,120	1,301	825 x 125	1,282	1,909	3,244	3,880
425 x 75	0,571	0,802	1,457	1,681	1025 x 125	1,573	2,338	3,965	4,732
525 x 75	0,687	0,967	1,757	2,033	1225 x 125	1,861	2,771	4,711	5,615
625 x 75	0,812	1,286	2,081	2,412	225 x 225	0,615	0,938	1,491	1,814
725 x 75	0,934	1,309	2,362	2,743	325 x 225	0,801	1,240	1,952	2,390
825 x 75	1,051	1,500	2,699	3,148	425 x 225	0,992	1,546	2,428	2,983
1025 x 75	1,300	1,845	3,318	3,866	525 x 225	1,178	1,841	2,897	3,567
1225 x 75	1,540	2,186	3,952	4,600	625 x 225	1,372	2,155	3,425	4,232
225 x 85	0,353	0,516	0,869	1,002	725 x 225	1,561	2,457	3,863	4,763
325 x 85	0,476	0,699	1,184	1,368	825 x 225	1,750	2,822	4,358	5,433
425 x 85	0,605	0,838	1,517	1,749	1025 x 225	2,135	3,436	5,291	6,596
525 x 85	0,727	1,011	1,836	2,120	1225 x 225	2,513	4,044	6,268	7,804
625 x 85	0,858	1,189	2,185	2,519	225 x 325	0,848	1,302	1,989	2,443
725 x 85	0,986	1,364	2,479	2,863	325 x 325	1,082	1,698	2,336	3,552
825 x 85	1,109	1,561	2,829	3,282	425 x 325	1,321	2,099	2,879	3,915
1025 x 85	1,369	1,922	3,472	4,025	525 x 325	1,554	2,495	3,713	4,653
1225 x 85	1,620	2,273	4,125	4,786	625 x 325	1,796	2,898	4,373	5,475
225 x 125	0,406	0,610	1,039	1,226	725 x 325	2,034	3,293	4,916	6,177
325 x 125	0,563	0,819	1,268	1,657	825 x 325	2,269	3,782	5,518	7,031
425 x 125	0,709	1,033	1,765	2,089	1025 x 325	2,750	4,605	6,663	8,500
525 x 125	0,849	1,241	2,129	2,525	1225 x 325	3,223	5,385	7,919	10,083
625 x 125	0,996	1,456	2,522	2,984					



## 4. Installation and location

4.1. Vents are installed in duct opening by using screws.

Fig. 19 Duct opening for installation of vent



## III. TECHNICAL DATA

### 5. Calculation and determination values

5.1. Effective area

Tab. 5.1.1. Effective area

Nominal dimensions	Effective area $S_{ef}$ [m <sup>2</sup> ]		Nominal dimensions	Effective area $S_{ef}$ [m <sup>2</sup> ]	
	vent			vent	
W x H	one-row	two-row	W x H	one-row	two-row
225 x 75	0,0079	0,0061	725 x 125	0,0544	0,0415
325 x 75	0,0118	0,0090	825 x 125	0,0621	0,0473
425 x 75	0,0156	0,0119	1025 x 125	0,0775	0,0591
525 x 75	0,0195	0,0149	1225 x 125	0,0929	0,0708
625 x 75	0,0233	0,0178	225 x 225	0,0317	0,0234
725 x 75	0,0271	0,0207	325 x 225	0,0471	0,0347
825 x 75	0,0310	0,0237	425 x 225	0,0625	0,0460
1025 x 75	0,0387	0,0295	525 x 225	0,0779	0,0572
1225 x 75	0,0464	0,0354	625 x 225	0,0933	0,0685
225 x 85	0,0095	0,0077	725 x 225	0,1087	0,0798
325 x 85	0,0141	0,0114	825 x 225	0,1241	0,0910
425 x 85	0,0188	0,0151	1025 x 225	0,1549	0,1135
525 x 85	0,0234	0,0188	1225 x 225	0,1857	0,1360
625 x 85	0,0280	0,0225	225 x 325	0,0476	0,0347
725 x 85	0,0326	0,0262	325 x 325	0,0707	0,0514
825 x 85	0,0372	0,0299	425 x 325	0,0938	0,0680
1025 x 85	0,0465	0,0373	525 x 325	0,1169	0,0847
1225 x 85	0,0557	0,0447	625 x 325	0,1400	0,1013
225 x 125	0,0159	0,0122	725 x 325	0,1631	0,1180
325 x 125	0,0236	0,0180	825 x 325	0,1862	0,1347
425 x 125	0,0313	0,0239	1025 x 325	0,2324	0,1680
525 x 125	0,0390	0,0298	1225 x 325	0,2786	0,2013
625 x 125	0,0467	0,0356			

5.2. Basic parameters

$\dot{V}$	[m <sup>3</sup> /h]	volumetric air flow for one vent
$S_{ef}$	[m <sup>2</sup> ]	effective vent area
$\Delta p_c$	[Pa]	total pressure loss at $\rho = 1,2 \text{ kg.m}^{-3}$
$L_{WA}$	[dB(A)]	acoustic power level
$w_{ef}$	[M.s <sup>-1</sup> ]	effective air velocity in vent
$w$	[m.s <sup>-1</sup> ]	air velocity in duct

Effective velocity  $w_{ef}$

$$w_{ef} [\text{m.s}^{-1}] = (\dot{V} [\text{m}^3.\text{h}^{-1}] / (3600) / S_{ef} [\text{m}^2])$$

5.3. Acoustic powers and pressure losses

Diagram 5.3.1. Acoustic powers and pressure losses

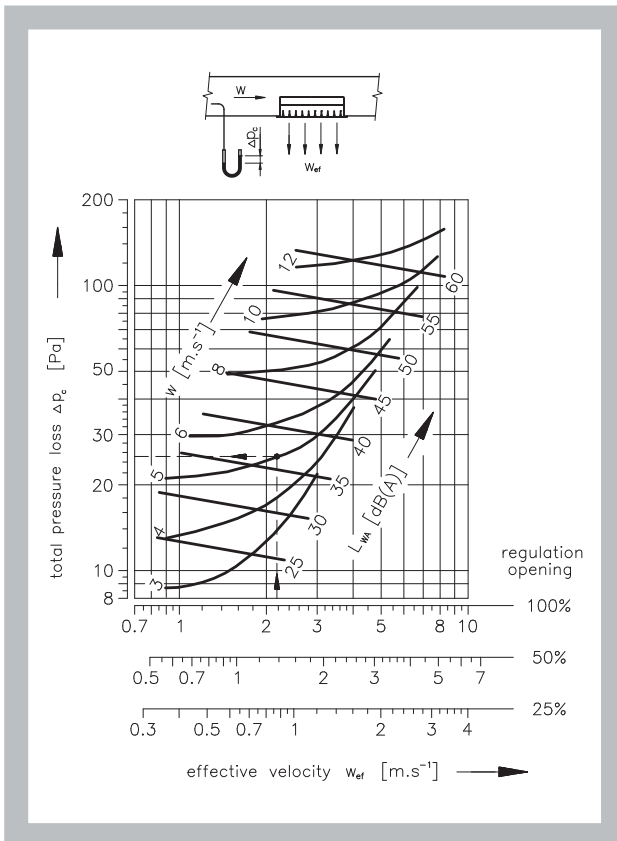


Fig. 18 Example

Given data:	Adjustable vent VNKM 2 - 625 x 125 with regulation R1 air inlet
	$\dot{V} = 280 \text{ m}^3.\text{h}^{-1}$
	$w = 5 \text{ m.s}^{-1}$
Tab. 5.2.1.	$S_{ef} = 0,0356 \text{ m}^2$
Calculation:	$w_{ef} = \dot{V} / (3600 * S_{ef}) = 2,18 \text{ m.s}^{-1}$
Diagram 5.3.1. :	$L_{WA} = 36 \text{ dB(A)}$
	$\Delta p_c = 25 \text{ Pa}$

**IV. MATERIAL, FINISHING**

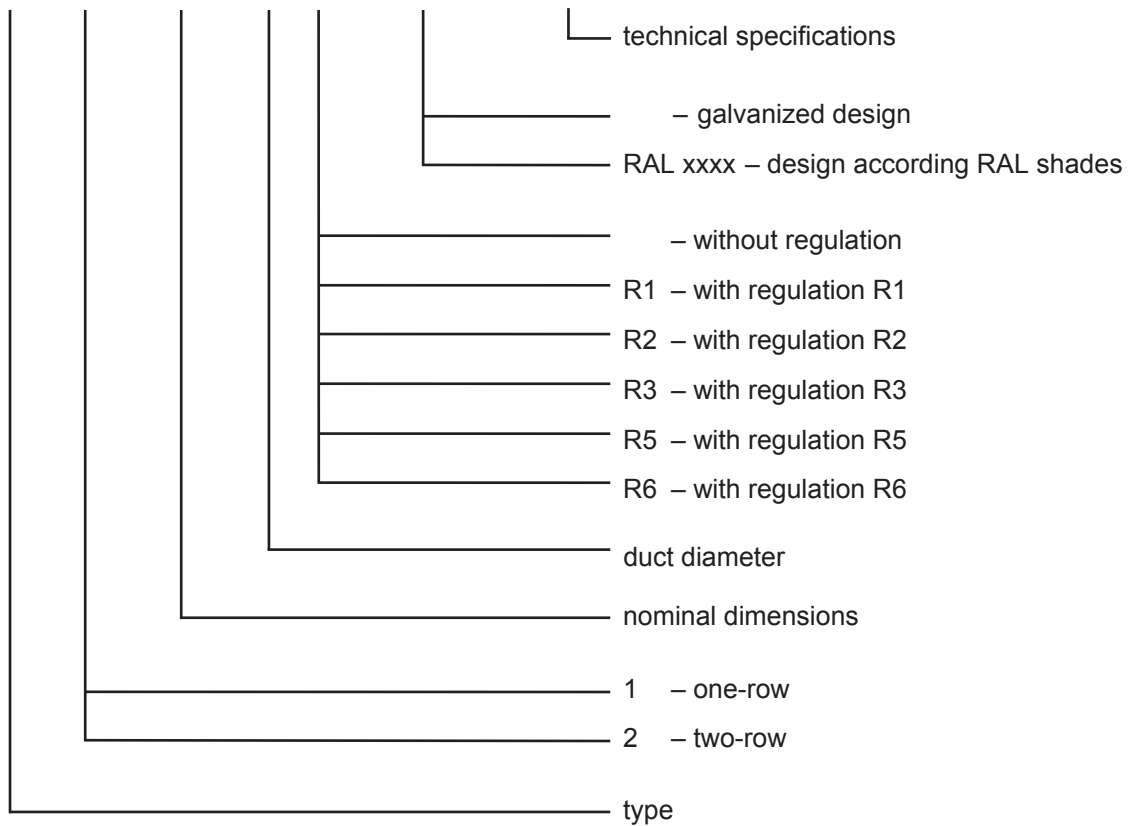
**6. Material**

- 6.1. Vent frames and regulations are made of galvanized steel sheet. Blades are made of drawn aluminium sections. Section surfaces are eloxal coated. If it's requested is possible to coat vent frames according RAL shades. Wheels and cogs of regulation R1 are made of plastic. The sealing along the vent perimeter is made of plastic foam self-adhesive tape.

**V. ORDERING INFORMATION**

**7. Ordering key**

**VNKM 2 625 x 125/400/R1 RAL 9006 TPM 034/04**



**VI. PACKING, TRANSPORTATION, TAKE-OVER, STORAGE AND GUARANTEE**

**8. Logistic terms**

- 8.1. Vents are supplied packed in shrinking foil. While transported and stored they must be protected against mechanical damage and weather conditions.
- 8.2. If no method of take-over is mentioned in the order, handing the goods over to the carrier will be considered as a take-over.
- 8.3. Vents have to be stored in closed premises, in the environment without aggressive steams, gases and dusts. Temperature range have to be from -5 to +40°C and relative humidity max. 80%.

## **9. Guarantee**

- 9.1.** The manufacturer provides a guarantee to the adjustable vents for the period of 24 months from the date of shipment.

## **VII. INSTALATION**

### **10. Assembly and disassembly**

#### **10.1.** Vents - assembly

Delivery components of the vents are screws, covers and seal.

- 1) Place the vent into the duct opening and secure the screws
- 2) If a regulation is installed, adjust the flow of air through the vent
- 3) Set the position of the front row of the vent's blades

#### **10.2.** Vents - disassembly

- 1) Unscrew the screws
- 2) Take out the vent

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