

Window air curtain unit FSG

Window air curtain unit

Preliminary remarks

Window air curtain units are used to make up for transmission heat losses through window facades. For this purpose they are installed along the inner side of the facade. The air curtain generated by these units shields the windows from the rest of the space.

Window air curtain units make it possible to use a space up to a point close to the outer facade. They are most suitable for use at building facades with large windows.

Construction design

The main components of the window air curtain unit are the air discharge element **1** with slots **2**, the connection box **3** with connection spigot **4** and the upper cover profile **5**.

The slot width 's' is dependent upon the air volume flow rate to be discharged and the window height. The lengths 'A' and 'B' of the cover profile **5** depend on the application concerned. The unit is fitted with two fastening brackets **6**.

The diameter of the connection spigot is dependent upon the air volume flow rate and the acoustic requirements. Its standard nominal size ranges from DN 80 to DN 125. Depending on its nominal length the window air curtain unit can be fitted with one or two connection spigots.

The discharge element and the connection box are made of galvanized sheet metal. The cover profile is made of galvanized sheet metal with powder coating.

Table 1: Dimensions

Nominal length ¹⁾ L_N mm	Length L_K mm	Height in mm with:		Connection spigot DN mm	Weight W kg
		H_1 mm	H_2 mm		
1 000	945	260	160	1 x 80	5
1 200	1 215			1 x 100	6
1 400	1 350			2 x 100	7
1 600	1 620			2 x 125	8

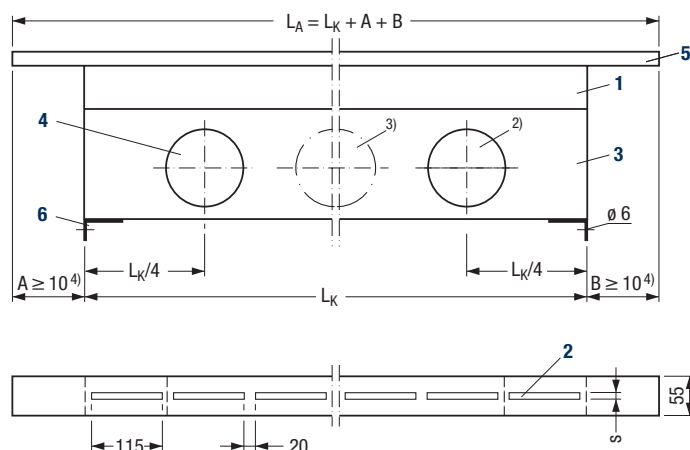


Fig. 1: Dimensions of window air curtain unit

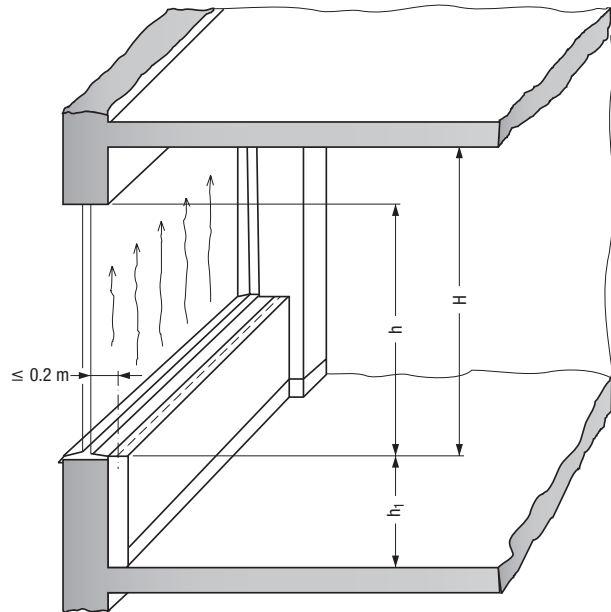
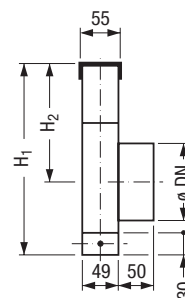


Fig. 2: Window air curtain unit in front of a window parapet; the unit may also be installed at floor level

Mode of operation

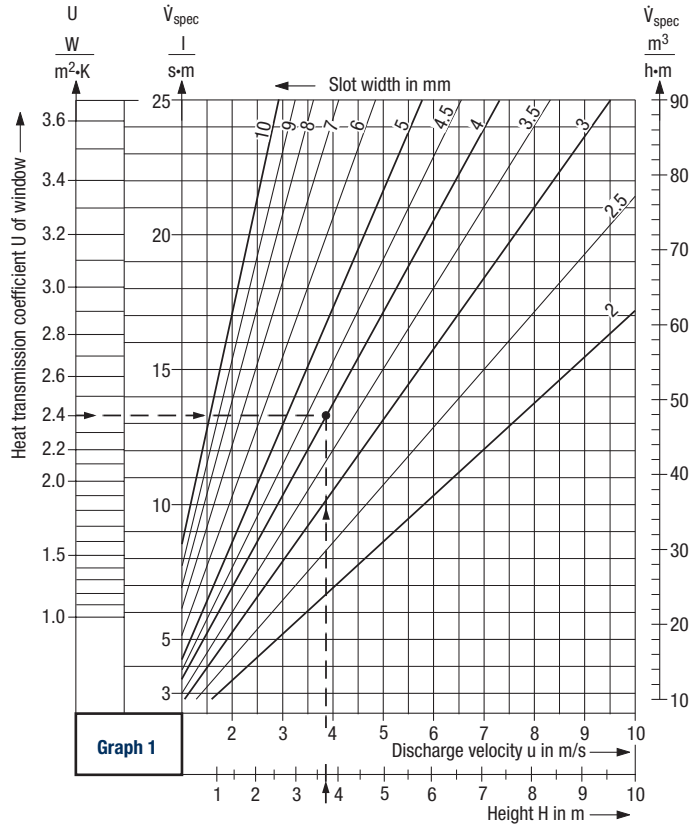
The air discharged forms an air curtain along the windows. The vertical air jets are stable and can reach up to 10 m length. In winter the window air curtain unit serves as a heating device, with the air curtain preventing the formation of cold air streams at the windows and resultant cold air zones at floor level. In summer the window air curtain unit covers part of the cooling load.



- 1** Air discharge element
- 2** Discharge slot
- 3** Connection box
- 4** Connection spigot
- 5** Cover profile
- 6** Fastening bracket (optional)

- 1) Other dimensions on request
- 2) On request spigot connection from below
- 3) For units with 1 spigot
- 4) Exact dimensions of 'A' and 'B' to be agreed upon

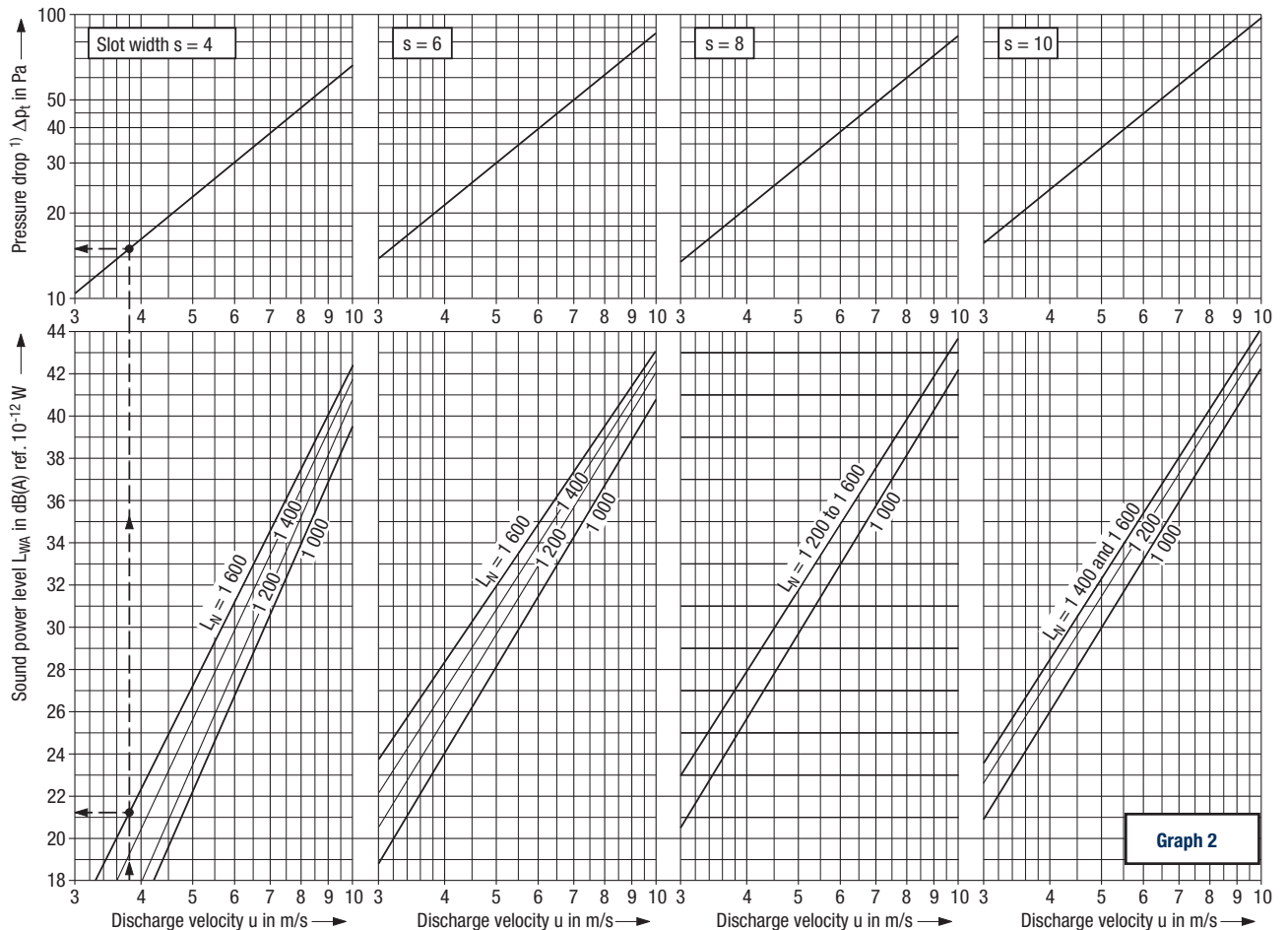
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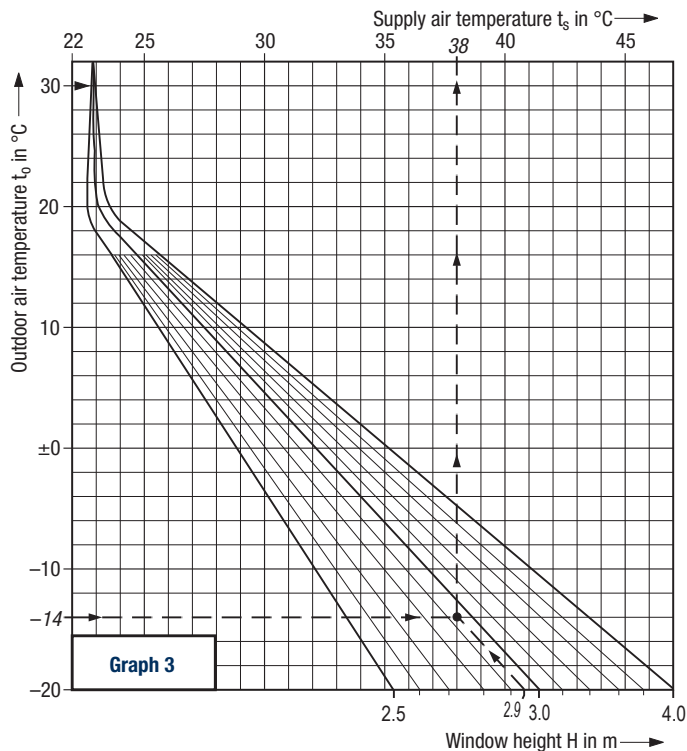
Layout example

- | | | |
|---|-----------|--------------------------------|
| 1 Window height h | = | 2.9 m |
| 2 Height from discharge plane to ceiling H | = | 3.7 m |
| 3 Heat transmission coefficient of window U | = | 2.4 W/(m²·K) |
| 4 Outdoor temperature in winter $t_{o \min}$ | = | -14 °C |
| 5 Outdoor temperature in summer $t_{o \max}$ | = | +30 °C |
| 6 Requisite unit length L = 1.6 m | = | $L_N = 1\ 600$ mm |
| 7 Supply air volume flow rate \dot{V}_{spec} | = | 13.3 l/(s·m) [48 m³/(h·m)] |
| | | [from Graph 1] |
| 8 Discharge velocity u | = | 3.8 m/s [from Graph 1] |
| 9 Slot width s | = | 4 mm [from Graph 1] |
| 10 Spigot \varnothing / number | = | DN 100 / 1 piece [from Fig. 4] |
| 11 Sound power level L_{WA} | \approx | 22 dB(A) ref. 10^{-12} W |
| | | [from Graph 2] |
| 12 Total pressure drop Δp_t | = | 15 Pa [from Graph 2] |
| 13 Supply air volume flow rate per unit \approx | | 21 l/s [77 m³/h] |
| | | [from 6 · 7] |
| 14 Requisite supply air temperature in winter | = | 38 °C [from Graph 3] |
| 15 Requisite supply air temperature in summer | = | 23 °C [from Graph 3] |

¹⁾ Applies to all nominal lengths



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Key

- U = heat transmission coefficient of window
- H = height from discharge plane to ceiling
- h = window height
- h₁ = height from discharge slot to floor (h₁ ≥ 0)
- \dot{V}_{spec} = supply air volume flow rate
- s = width of discharge slot
- t_o = outdoor air temperature
- t_s = supply air temperature at discharge slot

The point of reference is always the heat transmission coefficient of the window to which corresponds a given specific supply air volume flow rate \dot{V}_{spec} . Graph 3 applies for 22 °C indoor air temperature in winter and for varying indoor air temperatures in summer according to the following equation:

$$t_i = 22 \text{ °C} + 0.4 (t_o - 22 \text{ °C})$$

Our layout program 'KOMPAUS' is available for layout cases that cannot be calculated with this graph (e.g. other specific supply air volume flow rates in relation to the 'U' value or other indoor air temperatures).

Table 2: Sound power levels in relation to octave band centre frequencies

Nominal length ⇒		L _N = 1 000 mm							L _N = 1 400 mm							
Slot width s mm	Discharge velocity u m/s	Sound power level in dB ref. 10 ⁻¹² W														
		L _{WA} dB(A)	Octave band centre frequency in Hz							L _{WA} dB(A)	Octave band centre frequency in Hz					
			125	250	500	1 K	2 K	4 K		125	250	500	1 K	2 K	4 K	
4	4	17	25	16	15	—	—	—	21	29	19	20	15	—	—	
	6	27	27	28	27	20	18	—	30	31	32	29	23	20	—	
	8	34	30	30	31	32	18	—	36	33	33	33	34	21	—	
6	4	24	26	23	22	20	—	—	27	29	26	25	23	19	—	
	6	31	32	33	28	27	16	—	34	35	36	32	30	20	—	
	8	37	37	39	36	32	18	15	39	40	41	38	34	21	17	
8	4	26	28	26	25	20	15	—	28	29	28	26	23	20	17	
	6	33	33	35	31	29	18	—	35	35	37	33	30	21	18	
	8	38	39	38	37	34	23	16	40	40	42	37	36	24	20	
10	4	26	30	27	25	20	16	—	28	33	30	25	22	20	—	
	6	33	35	36	31	30	16	—	35	38	37	33	29	21	—	
	8	38	41	39	38	33	18	16	39	43	41	39	34	21	—	
Nominal length ⇒		L _N = 1 200 mm							L _N = 1 600 mm							
4	4	18	26	16	17	—	—	—	22	30	20	22	16	—	—	
	6	28	28	30	26	21	19	—	31	32	33	30	24	21	—	
	8	35	31	31	32	33	19	—	37	34	35	33	35	25	20	
6	4	26	28	25	24	22	18	—	28	30	28	27	24	18	—	
	6	33	34	35	30	29	18	—	35	36	37	33	31	20	15	
	8	38	39	41	38	32	20	15	40	42	41	39	35	22	19	
8	4	28	30	28	27	22	17	—	28	30	28	27	21	20	17	
	6	35	36	37	33	31	20	—	35	36	36	33	31	21	19	
	8	40	41	40	39	36	25	18	40	42	41	38	37	25	20	
10	4	27	32	29	24	21	17	—	28	34	31	25	22	20	17	
	6	35	37	37	33	30	17	—	35	39	37	33	30	21	19	
	8	39	42	40	39	34	20	19	40	44	41	40	34	22	21	

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Sound power level and pressure drop

The sound power level is rather low. It depends on the discharge velocity and the slot width. The number of connection spigots can be read off Table 1 for the different nominal lengths.

The same is true for the pressure drop.

Table 2 gives sound power levels in relation to octave band centre frequencies.

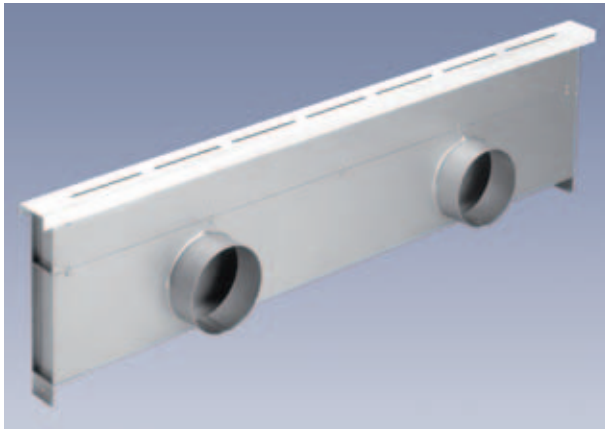
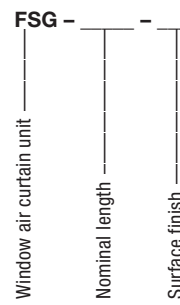


Fig. 3: Window air curtain unit

Type code



Nominal length ¹⁾

- 1000 = nominal length 1 000 mm
- 1200 = nominal length 1 200 mm
- 1400 = nominal length 1 400 mm
- 1600 = nominal length 1 600 mm

Surface finish

- 9010 = face painted to RAL 9010, semi-matt
- = face painted to RAL ...

Tender text

..... units

Window air curtain unit for installation along the inner side of a facade where it generates an air curtain,

consisting of:

- a linear discharge element with several slots in a line,
- a connection box with lateral connection spigot(s), fastening brackets under the connection box and upper cover profile.

Material

- Discharge element and connection box made of galvanized sheet metal
- Cover profile made of galvanized sheet metal powder coated to RAL

Make:

KRANTZ KOMPONENTEN

Type:

FSG - ____ - ____

¹⁾ For standard connection spigots see Table 1; other connection spigots on request

Subject to technical alterations.



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