Air diffusers

Product description

General

This section explains how Swegon describes its products.

Below is a description of the information included in a product description.

Quick facts

The most important characteristics of the product are listed here. These are used for quick product identification.

Examples of quick facts:

- ▶ Flexible spread pattern, easily adjustable
- ▶ Cleanable, removable damper
- ▶ Simple commissioning, fixed measurement outlet
- ▶ Handles large under-temperatures
- ▶ Duct connection on rear or side

Quick guides

This section provides a quick overview of the technical performance of the product in terms of air flow and sound level. The table states for which total pressure the values are applicable:

Example:

HAWK Ceiling size 250-600 with ALSc 200-250

On the line in the table describing size 250-600, we see that an air flow of 85 l/s produces a sound level of 25 dB(A). If the flow is increased to 150 l/s a sound level of 35 dB(A) is obtained.

AIR FLOW–SOUND LEVEL				
HAWK Ceiling	ALS	l/s		
Size	Size	25 dB(A)	30 dB(A)	35 dB(A)
125-600	100-125	27	33	40
160-600	125-160	37	46	58
200-600	160-200	56	71	90
250-600	200-250	85	110	150
315-600	250-315	126	145	170
400-600	315-400	170	205	245

Data is valid for a total pressure of 50 Pa; diffuser combined with commissioning box ALS.

Technical description

All information on materials and how the product is used and maintained is presented in this section.

Design

This section describes how the model is manufactured and what materials it contains.

Materials and surface treatment

This section describes what materials the product is manufactured from and what surface treatment it is given.

All Swegon diffusers, with very few exceptions, are painted in our white standard paint with the colour code RAL 9010.

All painting is electrostatically applied powder coating which is then stove-hardened. This method gives good resistance to scratching and impact as well as a high quality surface finish.

Alternative colours are available. Please contact your nearest sales office for further details.

All air terminal device products can handle a surrounding temperature of +80 °C.

Accessories

Any accessories with their description are found here.

Customizing

Information about products in nonstandard sizes, different materials or designs.

Project planning

Planning tips regarding installation, commissioning or special characteristics.

Installation

Descriptions of how the products are mounted to the framework of the building and connected to the duct system are given in this section.

Commissioning

If the products are equipped with measurement and regulatory functions, this section describes the procedures required.

Maintenance.

A description of how the unit should be cleaned and if the connecting duct system is accessible.

Environment

Information about the components in the product is given in this section.

Swegon

Commissioning
If the products are equipped with measurement and regulatory functions, this section describes the procedures required.

Maintenance.
A description of how the unit should be cleaned and if the connecting duct system is accessible.

Environment
Information about the components in the product is given in this section.

Sizing
This section provides all information regarding the technical performance of the product and the condition under which the data was collected.

Sound data
The sound level is given in dB(A) for products which open into rooms and applies to rooms with 10 m² equivalent sound absorption area. Any exceptions are given in the product description.

For products which do not open into rooms (duct products), the sound power level, L_{wtot},is given in dB.

Measurement of terminals according to ISO 5135 and ISO 3471, which is intended for broad-band sound of a stable nature is performed according to the so-called "Comparison method", which means that the measured effective sound power level is compared with the sound pressure level for a calibrated sound source with a known sound power (method II and ASHRAE 36-72).

Measurement of sound attenuators is done according to EN-ISO 7235 without any air stream.

L_w	=	Sound power level in the octave band in dB over 1 pW. (10^{-12} W)
L_A	=	Sound level in dB(A) according to normalised frequency weighting A. All sound levels are related to an equivalent absorption area of 10 m².
ΔL	=	Sound attenuation in the octave band (dB)
K_{OK}	=	Correction for calculation of L_W value from the L_A or L_{Wtot} values

Sound level L_A dB(A) or L_{Wtot} dB can be divided into octave bands using the correction factor K_{OK}. This is given in table form for each product.

Formula: $L_W = L_A + K_{OK}$

$L_W = L_{Wtot} + K_{OK}$

The sound data divided into octave bands is also given in table form. For products with a sound level reported in dB(A) the opening attenuation is included in the sound attenuation data.

Airflow q
The airflow is given in l/s and m³/h, and is listed in the engineering diagram for each product.

Basic facts

Calculation of air velocity in jets
The following equations are used for approximate calculations of isothermal and free (undistorted) air stream velocity:

Supply air terminal device with asymmetrical jet:

$$\frac{V_X}{V_0} = K_1 \frac{\sqrt{A_{eff}}}{X}$$

X	=	Distance from the device, m
V_X	=	Highest velocity in the jet at a distance x from the device, m/s
V_0	=	Velocity at the opening of the device, m/s
K_1	=	Device coefficient (approx. 6-8)
A_{eff}	=	Effective outlet area of the device, m²
A_{eff}	=	q/V_0 where q = airflow through the device, m³/s

Supply air terminal device with flat jet (through long slots):

$$\frac{V_X}{V_0} = \sqrt{K_2 \frac{\cdot b}{X}}$$

Supply air terminal with an exial jet

K_2	=	Device coefficient (approx. 6-8)
b	=	Start thickness of the stream, m

Supply air terminal device with a radial jet (through a circular slot):

$$\frac{V_X}{V_0} = K_3 \frac{\sqrt{A_{eff}}}{X}$$

K_3	=	Device coefficient (approx. 1)

Throw $l_{0,2}$
Testing method according to EN 12238. The evaluation of the throw measurements is carried out according to the diagram below.

The throw ($l_{0,2}$) is the longest distance from the centre of a supply air terminal to the isovel 0,2 m/s at isothermal air supply. A throw of $l_{0,2}$ is provided for all Swegon's air terminals.

The values given in the engineering graph apply to isothermal supply air control of the supply air terminal throw and is also done for the maximum under-temperature for each type of terminal.

For air terminals, the throw is given for mounting facing the ceiling. Some supply air terminals can be mounted free hanging or suspended from the ceiling, in which case the throw is reduced by approximately 20%. "Free-hanging" means that the diffuser outlet is at least 400 mm from the ceiling.

Graph: Principle for the evaluation of throw measurements.

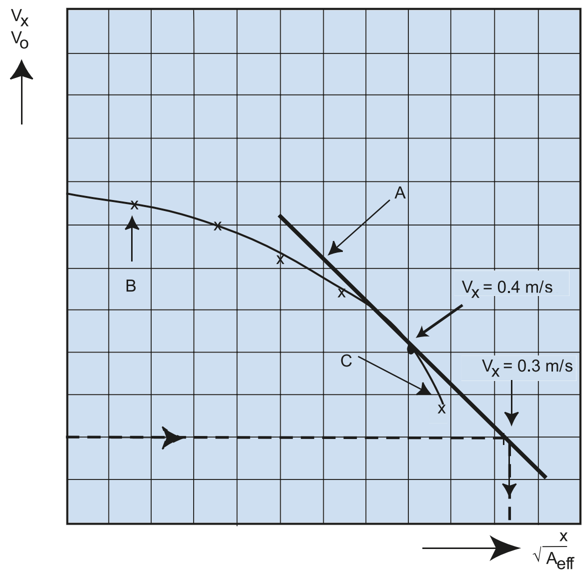


Figure 1. Evaluation of throw.

A = Extra polated curve with inclination -1
B = Measuring points
C = Curve drawn by measured values

Affected zone
Testing method according to EN 12239. For displacement air terminals the affected zone is given as a distance from the wall to the isovel of 0,20 m/s. The velocity is measured at the distance from the floor at which the maximum value is obtained.

Engineering graphs
General
Unless stated otherwise, the engineering graph for each product provides the following information:

- Data for isothermal conditions
- Throw with an end velocity of 0,2 m/s
- Sound level L_A dB(A) 10 m² equivalent sound absorption
- Total sound power level L_{Wtot}, dB
- Pressure drop p_t, Pa
- Air flow q l/s and m³/h

For some products other types of graphs can be given.

Pressure drop, p
In the engineering graph for air terminals the pressure drop is given as the total pressure drop (p_t). In certain graphs, however, the static pressure drop is given in (p_s). Please, note carefully how the pressure drop is given.

The total pressure drop (p_t) is the sum of the static pressure drop (p_s) and the dynamic pressure (p_d) over the air terminal.

Supply air: $p_t = p_s + p_d$

For a supply air terminal the total pressure drop is the sum of two positive pressures and therefore has a larger numerical value than the static pressure drop. For exhaust air terminals the static pressure drop is negative and the total pressure drop is therefore a numerically smaller value than the static pressure drop.

Exhaust air: $p_t = (-p_s) + p_d$

The dynamic pressure is calculated as follows:

$$P_d = \frac{v^2}{2} \rho \quad \text{Pa}$$

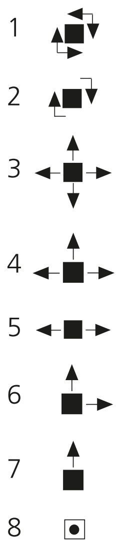
where v is the inlet velocity in m/s
ρ is the air density in kg/m³

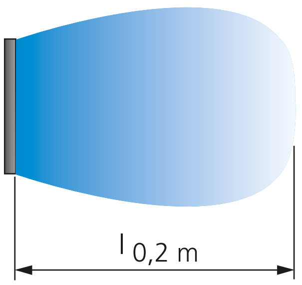
Throw and affected zone

Throw $l_{0,2}$

The following symbols are used in most of the engineering graphs for mixing supply air terminal devices to symbolise the various spread directions.

In other engineering graphs, the spread directions are stated in text form.

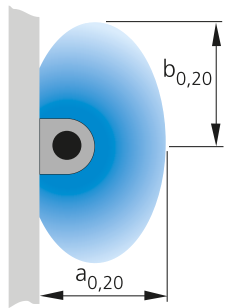




1 = Counter-rotation
2 = Rotation
3 = 4-way
4 = 3-way
5 = 2-way middle
6 = 2-way corner
7 = 1-way
8 = Vertical

Affected zone $a_{0,20}$ and $b_{0,20}$

These are stated on the dimensioning graphs for dipslacement diffusers to show the size of the affected zone.



Affected zone isovel.

Dimensions and weight

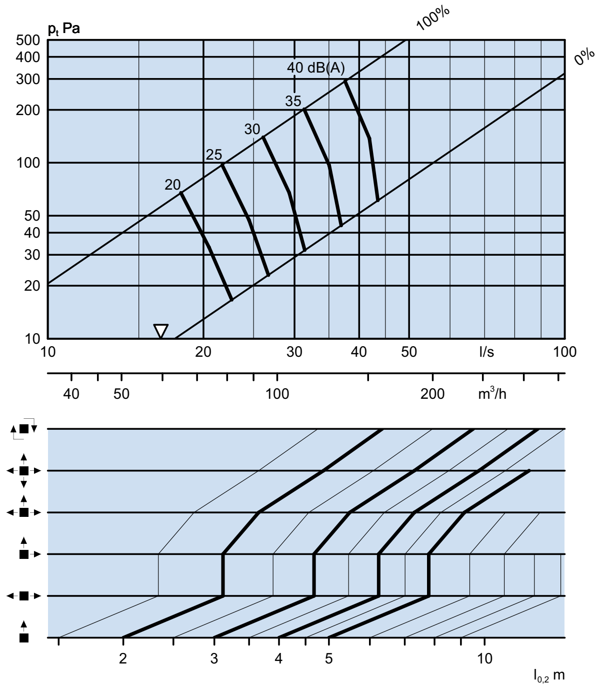
Gives information about the product's most important measurement and weights.

Ordering key

Describes how the product is to be specified in program documentation or when ordering.

Engineering graphs examples

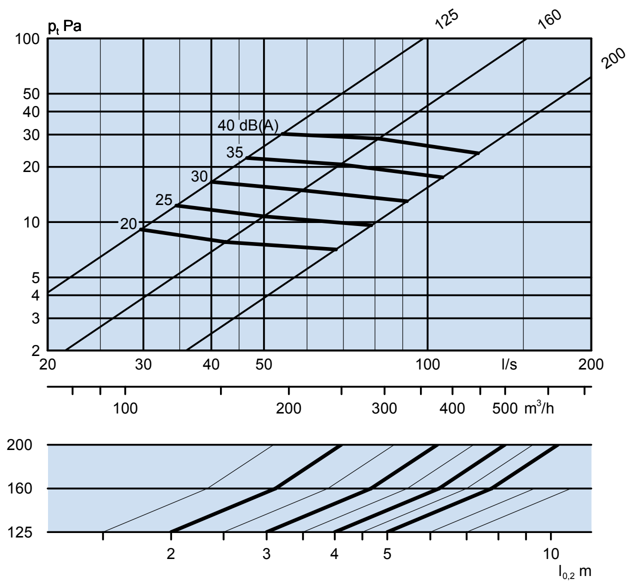
COLIBRI CR 125-400 + ALS 100-125, 1-step



Engineering graph COLIBRI CR + ALS, 1-step

Example COLIBRI CR + ALS
30 l/S at 30 dB(A) gives 50 Pa and a throw of 1.3 m $l_{0,2}$ with spread pattern rotation.
1,8 m with 4-way
2,3 m with 3-way
2,7 m with 2-way
4,1 m with 1-way

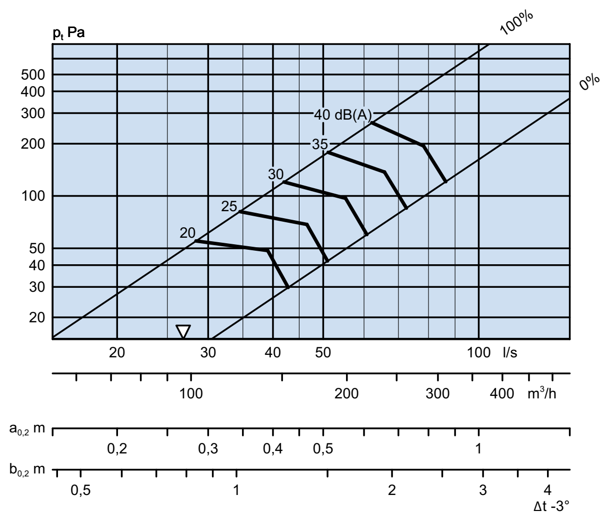
EAGLE Single, general graph



Engineering graph for EAGLE Single.

Example EAGLE Single. Size 160 and 60 l/s, at 30 dB(A) gives 16 Pa and a throw of 2.2 m $l_{0,2}$.

DHC 125 + REG



Engineering graph DHC + REG

Example DHC + REG.
50 l/s at 30 dB(A) gives 100 Pa and a throw 0.5 m $a_{0,2}$ and 1.4 m $b_{0,2}$.