

Air diffusers and dampers

Product description

General

This section describes how Swegon reports specifications on its products.

A description of what is addressed under heading in the product presentation is given below.

Quick facts

Some of the product's most important characteristics are presented here in bulleted format. Used for initial identification of the product.

Example quick facts:

- Flexible distribution pattern, easily adjustable
- Cleanable, removable damper
- Simple commissioning, fixed measurement outlets
- Manages air flows substantially below room temperature
- Alternative duct connection rear/side

Quick selection

Provides a quick overview of the product's technical performance with respect to air flow and sound level. The table also indicates the total pressure at which the values apply.

Example:

EAGLE Ceiling size 250-600 with ALS 200-250

On the row corresponding to 250-600, we see that air flow 83 l/s results in sound level 25 dB(A). If we increase the flow to 114 l/s, we reach a sound level of 35 dB(A). Note that sound and flow apply at total pressure of 50 Pa.

AIR FLOW - SOUND LEVEL							
EAGLE Ceiling Size	ALS Size	25 dB(A)		30 dB(A)		35 dB(A)	
		l/s	m ³ /h	l/s	m ³ /h	l/s	m ³ /h
125-400	100-125	25	90	31	112	37	133
125-600	100-125	24	86	30	108	37	133
160-400	125-160	37	133	47	169	59	212
160-600	125-160	36	130	45	162	57	205
200-500	160-200	54	194	68	245	84	302
200-600	160-200	52	187	66	238	81	292
250-500	200-250	77	277	97	349	113	407
250-600	200-250	83	299	99	356	114	410
315-500	250-315	98	353	120	432	137	493
315-600	250-315	112	403	132	475	156	562
400-600	315-400	155	558	180	648	215	774

The data specified in the table is applicable to supply air and 50 Pa total pressure if an ALS commissioning box is used.

Technical description

All the information on the material and how the product shall be used and maintained is given under this heading.

Design

A description of the product's design and included parts is given here.

The casing of commissioning boxes has air tightness classes B or C.

The damper has pressure class A, max 1000 Pa over the damper leaf. The damper's housing is class C. Closed circular damper has class 4.

Closed rectangular damper has class 3.

Classification per standard EN 12237 and EN 12589.

Material and surface treatment

A description of what material the product is made from and its surface treatment is given here.

All air diffusers, with a few exceptions, are painted in our white standard colour with colour code NCS S 0500-N/RAL 9003. All painting is done by electrostatic powder coating, which is oven-cured. This provides good impact resistance and scratch resistance and a very high-surface finish.

Colours other than standard are available. Contact your nearest sales representative for more information.

All air diffuser products can manage an operating and ambient temperature of max. +80°C.

The table below per standard SS-EN ISO 12944-2.

Design	Corrosion class	Environmental corrosivity	Surface treatment	Environment example
Enamelled sheet steel	C1	Very low	Electrostatic powder coating	Indoors in heated premises, such as offices, schools, shops, hotels
Enamelled galvanised steel sheet	C2	Low	Electrostatic powder coating	Indoors in non-heated premises, such as athletics halls, warehouses
Galvanised sheet steel	C2	Low	Zinc 200 g/m ²	Indoors in non-heated premises, such as athletics halls, warehouses
Galvanised sheet steel	C3	Moderate	Zinc 275 g/m ²	Spaces with moderate humidity and a certain level of air contaminants, such as breweries, dairies, laundries
Aluminium	C3	Moderate	Naturally oxidised	Spaces with moderate humidity and a certain level of air contaminants, such as breweries, dairies, laundries
- Enamelled sheet steel - Enamelled galvanised steel sheet - Enamelled aluminium	C4	High	Primer + polyester powder on request	Spaces with high humidity and large amounts of air contaminants, such as swimming halls, chemical industry, fishing industry

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Accessories

Relevant accessories with description are under this heading.

Adaptation

If the product is available in an odd size, other material quality, design or similar, this is indicated here.

Project planning

Any project planning tips regarding special properties etc. are presented under this heading.

Installation

Here a description is given of how products shall be installed against building framing or connected to the duct system.

Commissioning

If the product features measurement and regulation functions, it is stated here how this is configured.

Maintenance

Description of how the diffuser should be cleaned and how accessibility from connected duct is possible.

Environment

Information on the product's components. Environmental product declaration.

Sizing

All information on performance and the conditions in which the sizing data are obtained is presented under this heading.

Sound data

The sound pressure level for the air diffuser products is specified in dB(A) and applies to rooms with 10 m² equivalent sound absorption area. Any deviations are presented in the each product sheet.

For duct products, that do not open into rooms, the sound power level is specified as $L_{w\text{tot}}$ dB alternatively as L_{wA} dB(A).

Standards:

- ISO 5135 and ISO 3741 describe the measurements that refer to broadband sound of stable character made as per the "Comparative method", which means that the effective sound pressure level measured is compared with the sound pressure level for a calibrated sound source with known sound output (method II and ASHRAE 36-72).
- EN-ISO 7235 Measurements of attenuation in air diffusers and attenuators are made without air flow.

Sound terms:

- L_w = Sound output level in octave band dB above 1 pW. (10-12 W)
- L_{wA} = Sound power level in dB(A) according to standard frequency weighting A and with room attenuation.
- $L_{p_{10A}}$ = Sound pressure level in dB(A) according to standard frequency weighting A.
All sound levels here refer to 10 m² equivalent sound absorption area.

- K_{OK} = Correction factor for calculation of the L_w values to octave bands.
- ΔL = Sound attenuation in octave band (dB)

Formulas

For air diffusers:

- Sound power level in octave bands: $L_w = L_{p_{10A}} + K_{OK}$

For duct products

- Sound power level in octave bands: $L_w = L_{w\text{tot}} + K_{OK}$
- Sound power level in octave bands: $L_{wA} = L_{w\text{tot}} + K_{OK}$

See also Swegon's calculation program on www.swegon.com

For products with reported sound level in dB(A), outlet attenuation is included in the reported sound attenuation data.

Air flow q

Air flow is indicated in l/s and m³/h. Description is given in the sizing diagram for each respective product.

Throw length $l_{0.2}$

Test method per EN 12238. Throw length measurements are evaluated per the diagram below.

Throw length ($l_{0.2}$) is reported as the greatest distance from the centre of a supply air diffuser to the isovel 0.2 m/s in isothermic air discharge. Throw length $l_{0.2}$ is described for all Swegon air diffusers.

The values indicated in the sizing diagrams apply for isothermic discharge. Check of the supply air diffuser's throw length is also done at the maximum temperature below room temperature permissible for the given diffuser type.

For air diffusers, the throw length applies for installation on ceilings. Certain supply air diffusers can be mounted in free blowing configuration, whereby throw length is reduced by approx. 20%. "Free" installation means that the air distributor's outlet opening is at least 400 mm from the ceiling.

Near zone

Test method per EN 12239. For low-velocity diffusers, the near zone is reported as the distance from wall to the isovel 0.20 m/s. The speed is measured at the distance from the floor at which the maximum value is obtained.

Sizing diagram

General

Unless otherwise stated for each respective product, the sizing diagram presents:

- Data under isothermic conditions
- Throw length with end velocity 0.2 m/s
- Sound level L_A dB(A) 10 m² equivalent sound absorption
- Total sound power level L_{Wtot} in dB
- Pressure drop p_t in Pa
- Air flow q in l/s and m³/h

Additional diagram types may be available for some products.

Pressure drop p

In the sizing diagram for the air diffuser, the pressure drop is indicated as total pressure (p_t). Certain diagrams also indicate static pressure drop (p_s). Note how accurately the pressure drop is indicated. Pressure drop (p_t) is defined as the sum of the static pressure drop (p_s) and the dynamic pressure (p_d) over an air diffuser.

$$\text{Supply air: } p_t = p_s + p_d$$

For a supply air diffuser, the total pressure drop is the sum of the two positive pressures and thereby has a numerical value greater than the static pressure drop. At the extract air diffuser, the static pressure drop is negative and the total pressure drop is thereby a lower numerical value than the static pressure drop.

$$\text{Exhaust air: } p_t = (-p_s) + p_d$$

Dynamic pressure is calculated as follows:

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

where v indicates intake velocity in m/s

ρ indicates air density kg/m³

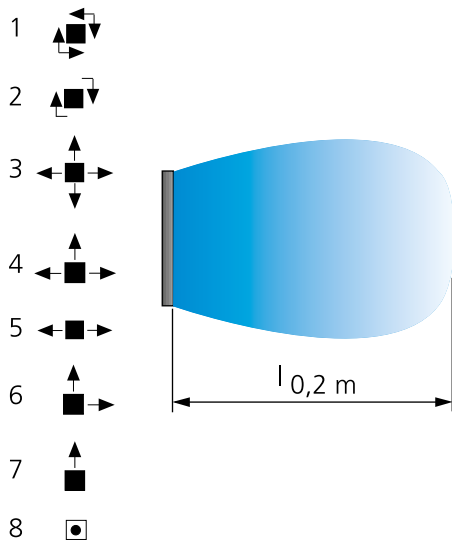
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Throw length and near zone

Throw length $l_{0,2}$

The following figures are used in the sizing diagrams for the majority of supply air diffusers to symbolise the various directions of diffusion.

The directions of distribution are clearly stated in other sizing diagrams.



1 = Counter rotation

2 = Clockwise swirl

3 = 4-way

4 = 3-way

5 = 2-way centre

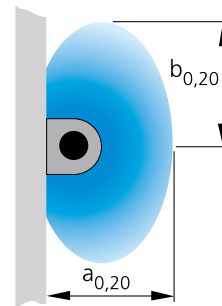
6 = 2-way corner

7 = 1-way

8 = Vertical

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

Reported in the low-velocity diffuser's sizing diagram to show the size of the near zone isovel.



Near zone isovel

Dimensions and weight

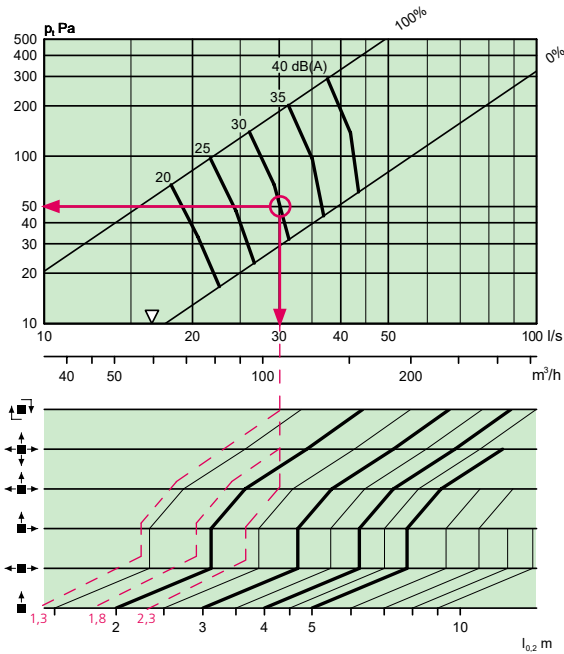
Provides detailed information on the product's key dimensions and weight.

Specification

Describes how the products shall be specified in orders or in program document.

Example of sizing diagram

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



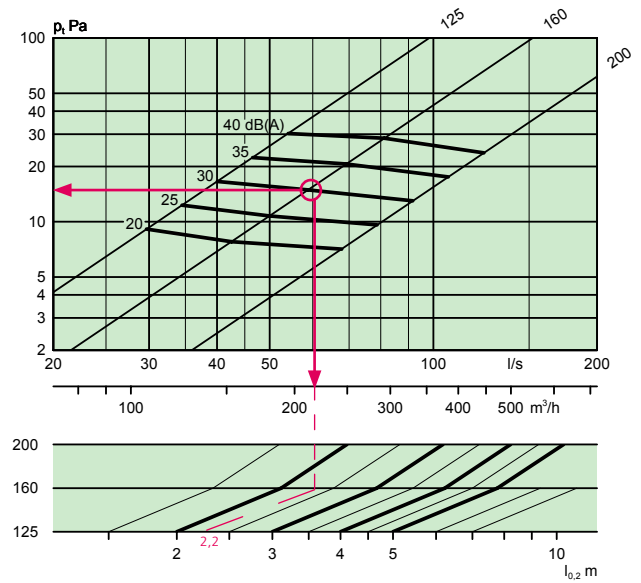
Sizing diagram COLIBRI CR + ALS, one step.

Example COLIBRI CR + ALS

30 l/s at 30 dB(A) results in 50 Pa and throw length 1.3 m $l_{0,2}$ in the clockwise swirl picture.

- 1.8 m at 4-way (see diagram)
- 2.3 m at 3-way (see diagram)
- 2.7 m at 2-way
- 4.1 m at 1-way

EAGLE Single, overview diagram

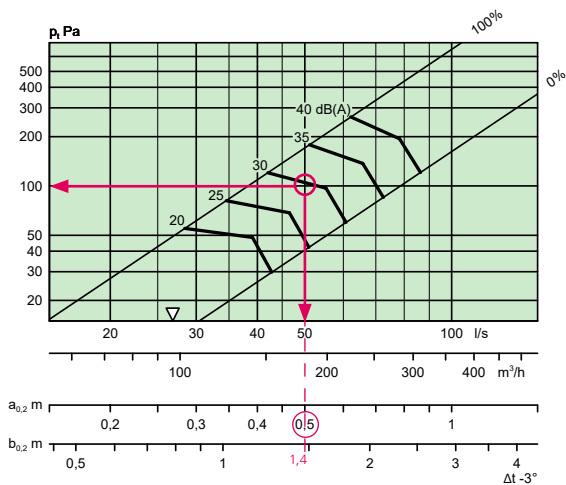


Sizing diagram EAGLE Single.

Example EAGLE Single. Size 160 and 60 l/s.

At 30 dB(A), results in 16 Pa and throw length 2.2 m $l_{0,2}$.

DHC 125 + REG



Sizing diagram DHC + REG

Example DHC + REG.

50 l/s at 30 dB(A) results in 100 Pa and near zone 0.5 m $a_{0,2}$ and 1.4 m $b_{0,2}$.