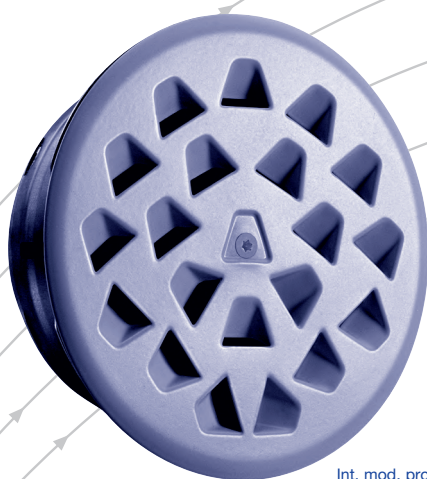


# Step diffuser WAVESTEP

Type WST



Int. mod. prot. reg.

## TROX<sup>®</sup> TECHNIK

The art of handling air



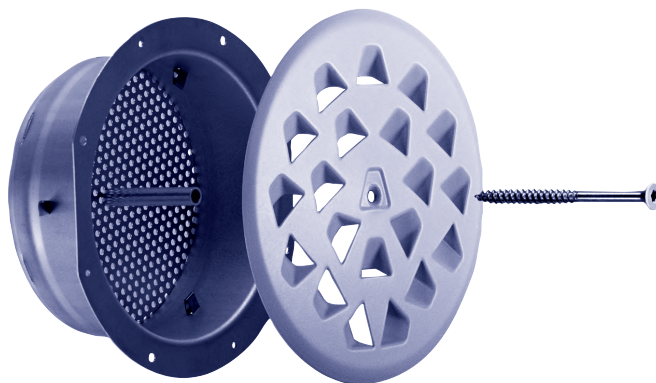
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# Contents · Application · Execution · Safety instructions

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## Application

The circular step diffuser type WAVESTEP, supplied together with a spigot, is used primarily in theatres, cinemas or auditoriums.

The circular and compact inductive diffuser is fitted directly to the step risers. Because of its asymmetric wave-shape, 1/3 of the supply air leaves the face upward and lateral directions and 1/3 downwards and lateral direction.

## Execution

- step diffuser WAVESTEP of steel plate, powder-coated, colour RAL 9010 matt (25% brilliance)
- spigot of galvanised steel plate
- fixing with central screw, retaining springs in the spigot

## Safety instructions



### CAUTION!

**Risk of injury from sharp edges and corners, ridges and thin-walled sheet metal parts!**

- Proceed carefully with all work.
- Wear protective gloves, safety shoes and protective helmet.



### WARNING!

**Danger from incorrect use. Misuse of the product may lead to dangerous situations.**

The product must not be used:

- in areas subject to explosion hazards;
- in the open air without sufficient protection against weather effects;
- in atmospheres that may have a damaging and/or corrosive effect on the product due to scheduled or unscheduled chemical reactions.



### CAUTION!

**Damage to the product due to improper handling. Check the device for damage and contamination prior to operation!**

Improper handling may lead to considerable material damage of the product.

- Do not use any acid or abrasive cleaning agents.
- Adhesives from sticky tape may lead to colour damage.
- Excessive moisture may lead to colour damage and corrosion.
- Use only cleaning agents, greases and oils that are expressly specified.

## 3

# Quick selection · Technical data

## Quick selection

Volume flow rate	20 m³/h 5.6 l/s	30 m³/h 8.3 l/s	40 m³/h 11.1 l/s	50 m³/h 13.9 l/s	
Pressure drop	6	14	24	38	Pa
Sound power level	<15	<15	18	25	dB(A)
Air velocity in the spigot	0.45	0.68	0.91	1.13	m/s

## Definitions

$\dot{V}$	m³/h; l/s	Volume flow rate per diffuser
$v_{gem}$	m/s	Blow-out velocity measured with a windmill-type anemometer
$v_{125}$	m/s	Velocity in the spigot: Ø 125 mm
$\Delta t_u$	K	Difference in temperature between the supply air and room air (see remark*)
$\Delta p_s$	Pa	Pressure drop
$D$	m	Distance between the diffusers
$X_{max}, Y_{max}$	m	Length of the diffusers
$L_{wA}$	dB(A)	A-weighted sound power level
$L_{wOkt}$	dB	Sound power level in the octave-centre frequencies
$f$	Hz	Frequency
$\Delta L_w$	dB	Corrections in relation to octave centre frequencies
$\zeta$	-	Resistance coefficient

### \*Remark:

The difference in the temperature of the supply air and the extract air depends on the height of the room as well as the type and position of the thermal loads.

## Example of application

### Given

Volume flow rate per diffuser	$\dot{V}$ 40 m³/h = 11.1 l/s
Temperature difference	$\Delta t_u$ -4 K

### Sought

Velocity	$v_{gem}$ m/s
Pressure drop	$\Delta p_s$ Pa
Sound power level	$L_{wA}$ dB(A)
Length of jet	$X_{max}$ m
Height of jet	$Y_{max}$ m
Sound power level in octavo volume	$L_{wOkt}$ dB

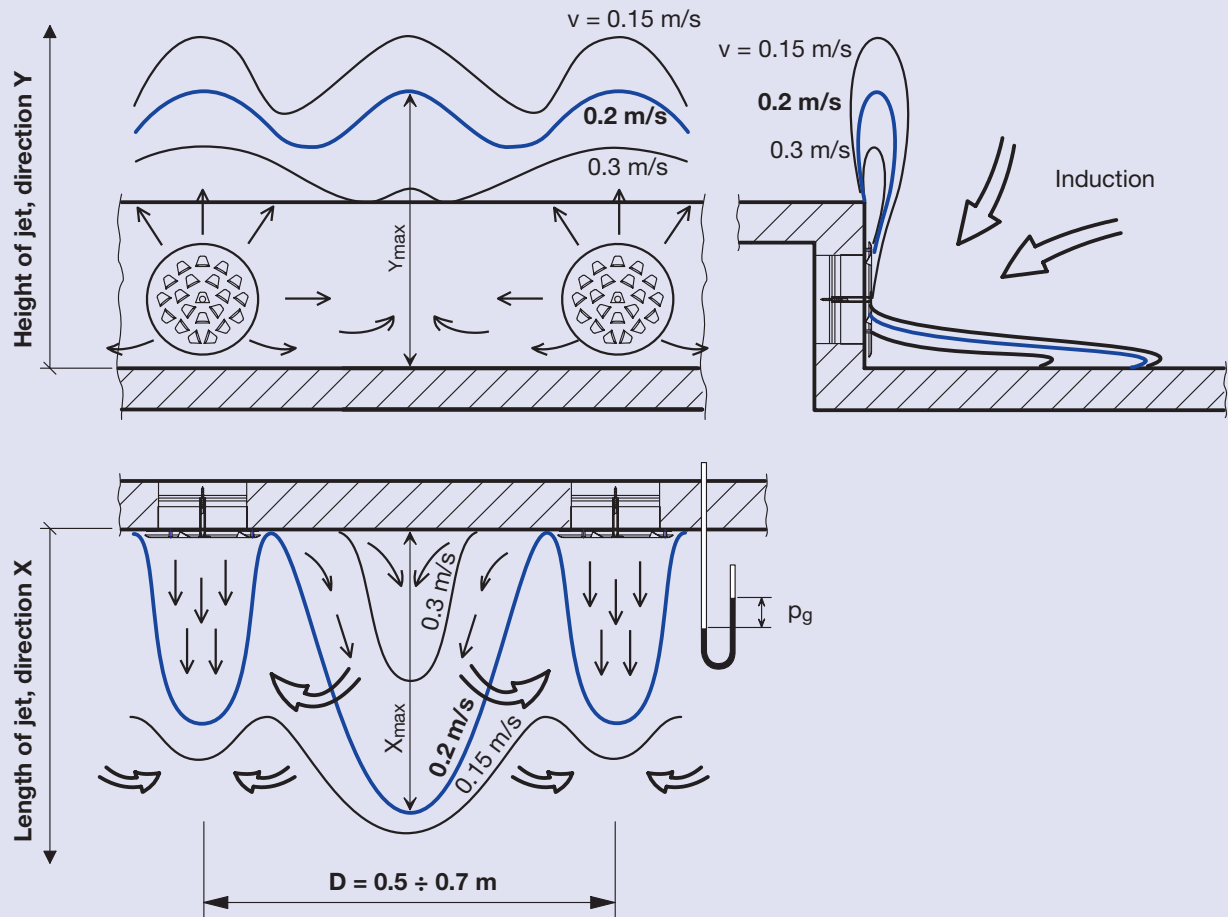
### Solution

Velocity	$v_{gem}$ 1.50 m/s
Pressure drop	$\Delta p_s$ 24 Pa
Soundpower level	$L_{wA}$ 18 dB(A)
Length of jet	$X_{max}$ 0.48 m
Height of jet	$Y_{max}$ 0.64 m

Sound power level in octavo volume  $L_{wOkt}$  see table

	Octave centre frequencies f							Hz
	125	250	500	1k	2k	4k	8k	
$L_{wA}$	18	18	18	18	18	18	18	dB(A)
Correction	0	-3	-3	-4	-11	-12	-9	dB
$L_{wOkt}$	18	15	15	14	7	6	9	dB

## Curves of the same speed (Isovels)



### Position of the velocity curve $v = 0.20 \text{ m/s}$

The table below shows the max. distance from the front of the diffuser at which the velocity is reduced to  $0.20 \text{ m/s}$ .

$X_{\text{max}}$  = distance in horizontal direction

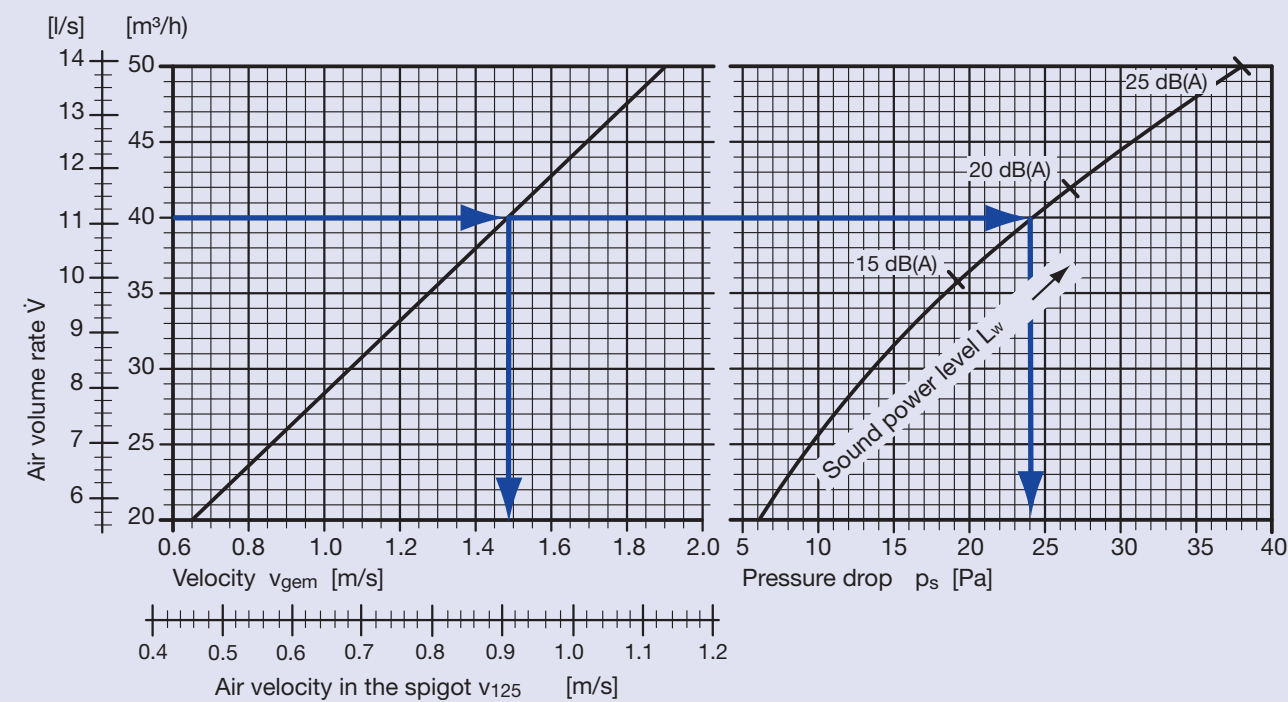
$Y_{\text{max}}$  = distance in vertical direction

$\Delta t_u$  is the difference in the temperature of the supply air and the room air at a height of about  $1.1 \text{ m}$ .

	20 m³/h 5.6 l/s		30 m³/h 8.3 l/s		40 m³/h 11.1 l/s		50 m³/h 13.9 l/s	
$\Delta t_u$ [K]	$X_{\text{max}}$ [m]	$Y_{\text{max}}$ [m]	$X_{\text{max}}$ [m]	$Y_{\text{max}}$ [m]	$X_{\text{max}}$ [m]	$Y_{\text{max}}$ [m]	$X_{\text{max}}$ [m]	$Y_{\text{max}}$ [m]
0	0.11	0.32	0.23	0.52	0.36	0.72	0.49	0.92
-3	0.20	0.26	0.32	0.46	0.45	0.66	0.58	0.86
-6	0.28	0.20	0.41	0.40	0.54	0.60	0.67	0.80



Pressure drop, volume flow rate, velocity



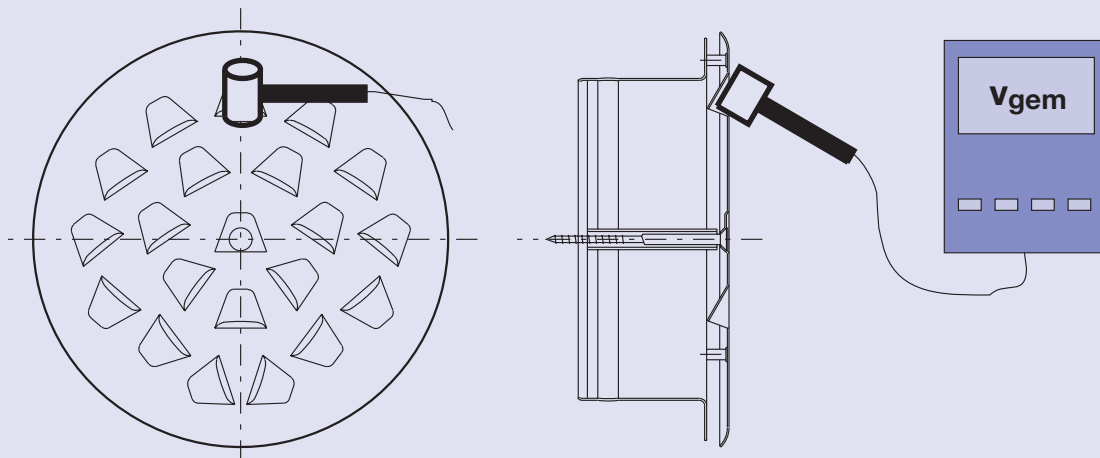
**Resistance coefficient  $\zeta_{125} = 50$**   
The resistance  $\zeta_{125}$  relates to the connection diameter 125 mm.

**Linear sound power level in the octave band**

**Correction table  $\Delta L_w$  in relation to  $\text{dB(A)}$**

	Octave centre frequencies f							
	125	250	500	1k	2k	4k	8k	Hz
$\square L_w$ to $\text{dB(A)}$	0	-3	-3	-4	-11	-12	-9	$\text{dB}$

## Measurement method - determination of the volume flow rate via $v_{\text{gem}}$

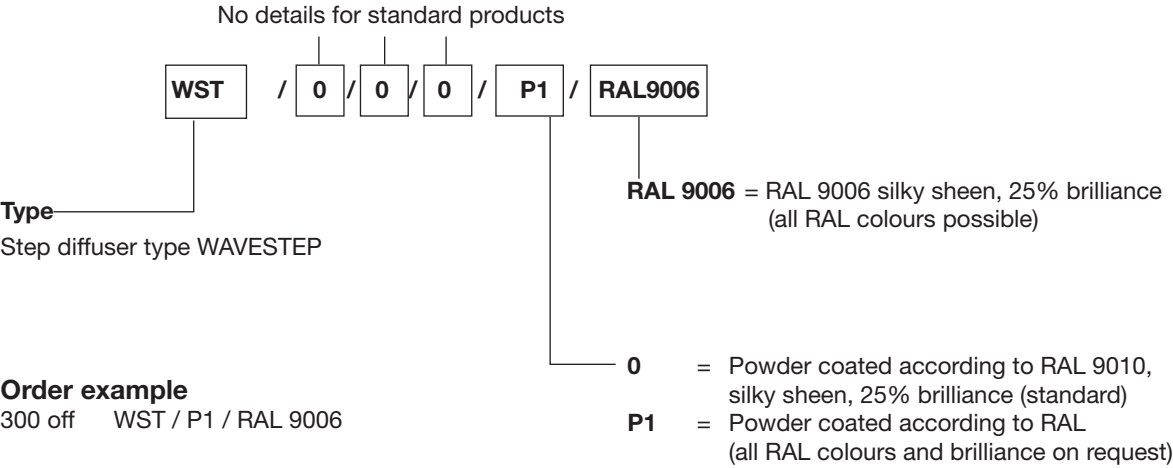


**Remark:**  $v_{\text{gem}}$  is measured on the uppermost nozzle.

Measuring device for blow-out velocity  $v_{\text{gem}}$ : Mini-Air 5, windmill-type anemometer, probe diameter = 20 mm  
(Tolerance up to  $\pm 20\%$ )

# Order details

## Order codes



## Order example

300 off    WST / P1 / RAL 9006

## Text for tendering purposes

Step diffuser type WAVESTEP with concave shaped openings arranged in a circle. High induction due to a number of individual pulsating air jets. Low resistance. Fixation of the step diffuser by means of retaining springs and central screw.

### Material:

Step diffuser - steel plate, powder coated according to RAL 9010, 25% brilliance.  
Spigot - galvanised steel  
Nominal diameter: Ø 125 mm  
Outside dimension: Ø 160 mm

- Options:
- without retaining springs
  - without slots in the spigot
  - screw head lacquer finish according to RAL...
  - other RAL colours