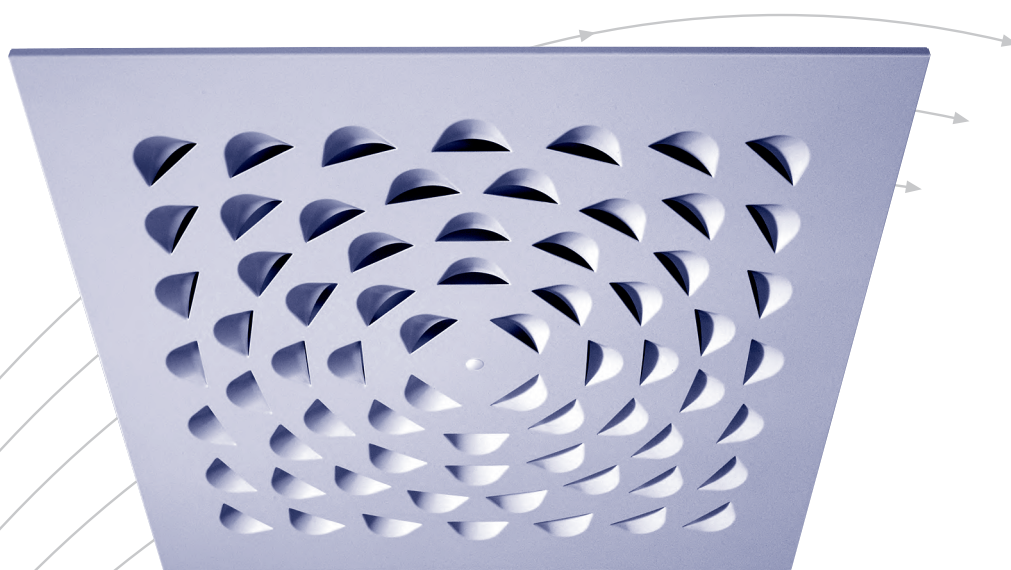


# Ceiling air diffuser WAVESTREAM

- Type WQ
- highly inductive



Int. mod. prot. reg.

**TROX**® **TECHNIK**



TROX HESCO Schweiz AG  
Walderstrasse 125  
Postfach 455  
CH - 8630 Rüti ZH

Tel. +41 55 250 71 11  
Fax +41 55 250 73 10  
[www.troxhesco.ch](http://www.troxhesco.ch)  
[info@troxhesco.ch](mailto:info@troxhesco.ch)

# Contents · Realisation · Application · Safety instructions

## Contents

Realisation · Application · Safety instructions	2
Dimensions and Installation	3
Quick selection	4
Definitions	5
Technical Data	6 and 7
Order details	8

## Realisation

- Ceiling air diffuser WAVESTREAM of steel plate, colour RAL 9010, matt, 25% brilliance
- Attachment by means of central screw

Informations about the plenum box see page 3.

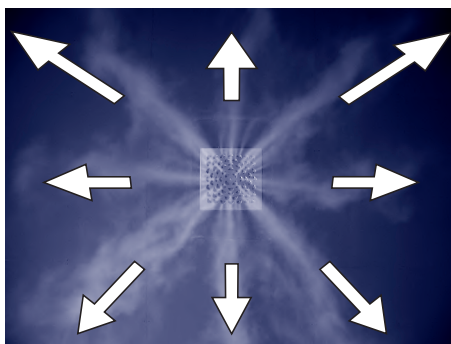
## Remark

The WAVESTREAM replaces a ceiling plate.

## Application

The WAVESTREAM square ceiling air diffuser is not only highly inductive, but also interesting from the energy standpoint. It can be installed in almost any room with a height of 2.4 to 4.4 m, for which a technical impeccable solution and perfect, aesthetic integration are considered important.

- Entirely metal design.
- Slim stamped design eliminates multiple edges and corners, known from plugged-nozzles diffusers.
- 8-jet outflow pattern with stronger diagonal jets promotes high volume rates per square-meter floor.
- Easy-to-attach and clean with one central screw.



Irrespective of whether it concerns a new building or a renovation, just remove the ceiling panels and install WAVESTREAM – there are no cut-outs or projections. The WAVESTREAM is the correct choice for either VAV or constant volume, because a large number of wave-shaped outlet openings ensure maximum induction.

## Safety instructions

### 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.

### 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:

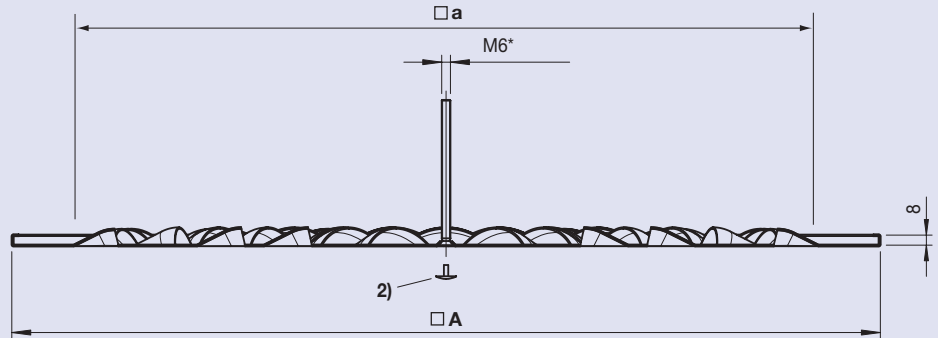
- in areas subject to explosion hazards;
- in the open air without sufficient protection against weather effects;
- in atmospheres that may have a damaging and/or corrosive effect on the product due to scheduled or unscheduled chemical reactions.

# Dimensions and Installation

## Dimensions and installation



- 2) Plastic plug
- \*) Central screw is delivered as a loose part M6 × 100 mm



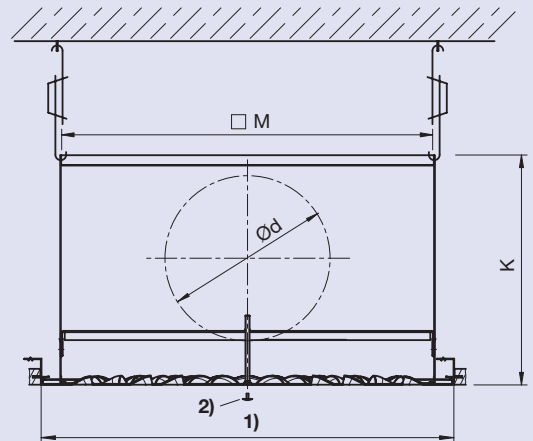
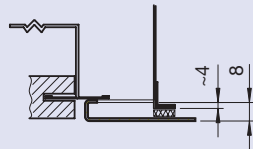
Type	ND	□ A	□ a	Grid dimension [mm]
WQ	598×500	598	512	600×600
	623×500	623	512	625×625

### Type WQ

for grid dimensions □ 600 or □ 625 mm  
**pressed** onto ceiling profile **from below**, with **square** plenum box.



- 1) Grid dimension
- 2) Plastic plug

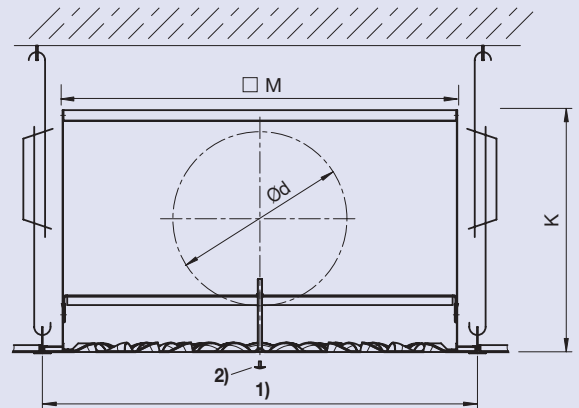
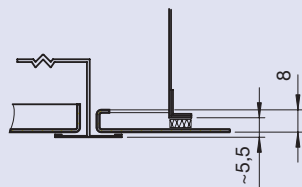


### Type WQ

for grid dimensions □ 600 or □ 625 mm  
**inserted** in ceiling profile **from above**, with **square** plenum box.



- 1) Grid dimension
- 2) Plastic plug

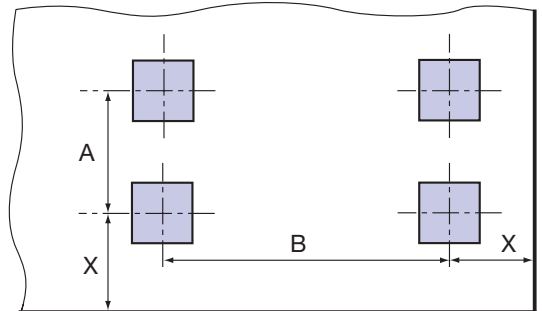
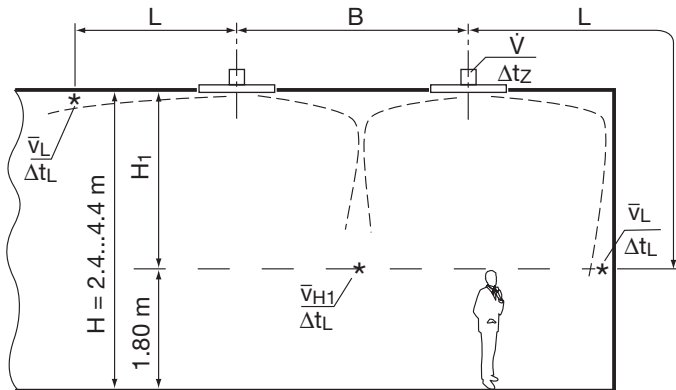


Type	ND	Grid dimension [mm]	Plenum box Details see prospect L-04-1-31e (TROX HESCO) or 2/16.4/... (TROX)			
			K	□ M	Ød	Type
WQ	598×500	600×600	345	567	1×248	AKH04 ZL M0 (TROX HESCO) [AK004 ZL M0 (TROX)]
	623×500	625×625				

# Quick selection

ND	A <sub>eff</sub> [m <sup>2</sup> ]	q <sub>v</sub> [l/s] V̇ [m <sup>3</sup> /h]	55.6		69.4		83.3		111.1		138.9 nominal 500		166.7		194.4	
			200		250		300		400		600		700			
598x500	0.0339	p <sub>t</sub> [Pa]	6		10		15		26		41		59		81	
		L <sub>wA</sub> [dB(A)]	<20		<20		23		31		37		42		46	
623x500		L <sub>0.5</sub> /L <sub>0.3</sub> [m]	—	—	—	1.7	—	1.9	1.8	2.3	2.0	2.7	2.3	3.1	2.5	3.5
		v̄ <sub>H1</sub> [m/s]				0.13		0.15	0.19	0.16	0.22	0.17	0.24	0.19	0.26	0.20
Distance		A [m]	—			3.4		3.7	3.6	4.6	4.0	5.5	4.6	6.3	5.1	7.0

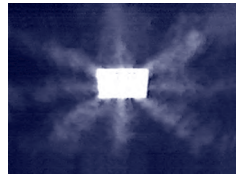
**Base to v̄<sub>H1</sub>:**  
 room height H = 3.3 m  
 height of occupied zone = 1.8 m  
 H<sub>1</sub> = 1.5 m  
 distance A, see table  
 distance B = 4.0 m  
 difference of temperature = -8.0 K



$L$	m	Distance against the wall
$L_{0.5}/L_{0.3}$	m	Distance in relation to the final velocities 0.5 m/s or 0.3 m/s
$\dot{q}_v$	l/s	Volume flow rate per diffuser
$\dot{V}$	m <sup>3</sup> /h	Volume flow rate per diffuser
$\dot{V}_{\text{nominal}}$	m <sup>3</sup> /h	Nominal volume flow rate (with VAV: $\dot{V}_{\text{max}} = 1.19 \times \dot{V}_{\text{nominal}}$ )
$v_{\text{eff}}$	m/s	eff. discharge velocity
$A, B$	m	Distance between the axes of two diffusers
$X$	m	Distance between diffuser centre and wall
$H$	m	Room height
$H_1$	m	Distance between ceiling and occupied zone
$\bar{v}_{H1}$	m/s	Mean flow velocity of room air between two diffusers in ceiling distance $H_1$
$\bar{v}_L$	m/s	Mean flow velocity of room air between wall in ceiling distance $H_1$
$t_R$	°C	Room air temperature
$t_L$	°C	Jet air temperature
$\Delta t_z$	K	Difference between room air and supply air temperature
$\Delta t_L$	K	Difference between room air and jet air temperature at distance
		$L = A/2 + H_1$
		$L = X + H_1$
$A_{\text{eff}}$	m <sup>2</sup>	Effective air outlet surface area
$\Delta p_t$	Pa	Total pressure drop (supply air)
$L_{wA}$	dB(A)	A-weighted sound power level
$L_{wNC}$		NC rating of sound power level
		$L_{wNC} = L_{wA} - 6 \text{ dB}$
$L_{wNR}$		$L_{wNR} = L_{wNC} + 2 \text{ dB}$
$L_{pA}, L_{pNC}$		A-weighting or NC curve respectively of room sound power level
		$L_{pA} \sim L_{wA} - 8 \text{ dB}$
		$L_{pNC} \sim L_{wNC} - 8 \text{ dB}$
$L_{w\text{okt}}$	dB	Sound power level in the octave-centre frequencies
$\Delta L$	dB	Insertion attenuation in the octave-centre frequencies
$\Delta L_A$	dB	Octave-centre frequencies, correction value
$f$	Hz	Octave-centre frequencies

# Technical Data

## Type WQ



### Correction table, octave-centre frequencies

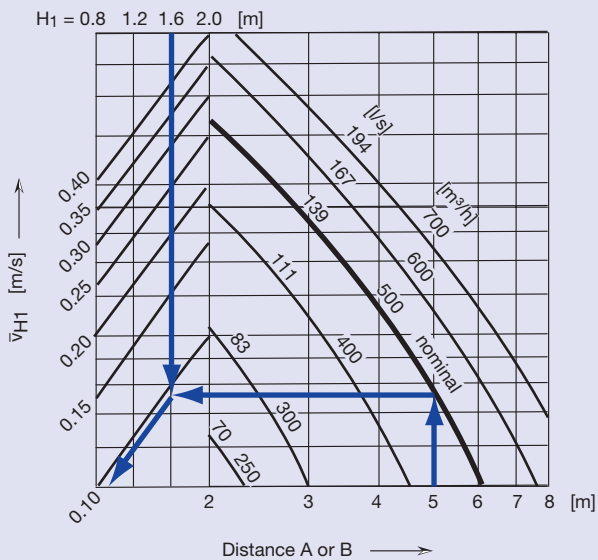
f	125	250	500	1k	2k	4k	8k	[Hz]
$\Delta L_A$	+6	+5	-2	-7	-12	-17	-19	[dB]

### Insertion attenuation (incl. end reflection) Interior of box not insulated

f	125	250	500	1k	2k	4k	8k	[Hz]
$\Delta L$	11	6	4	5	8	10	9	[dB]

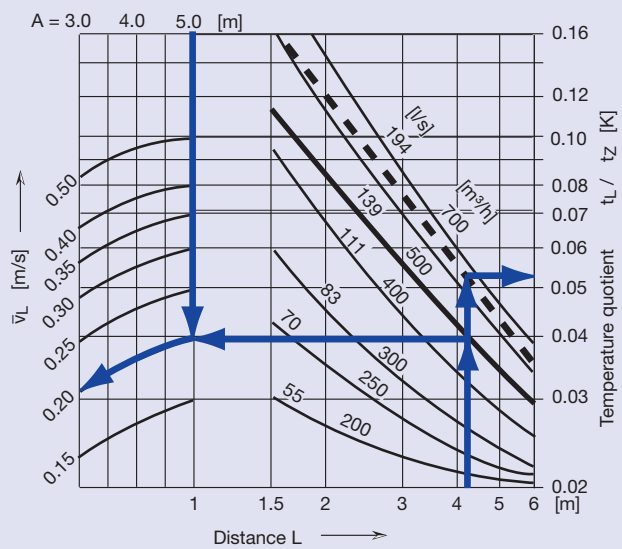
### Room air velocity $\bar{v}_{H1}$

$\Delta t_z = +8 \text{ K}$   $A = B$



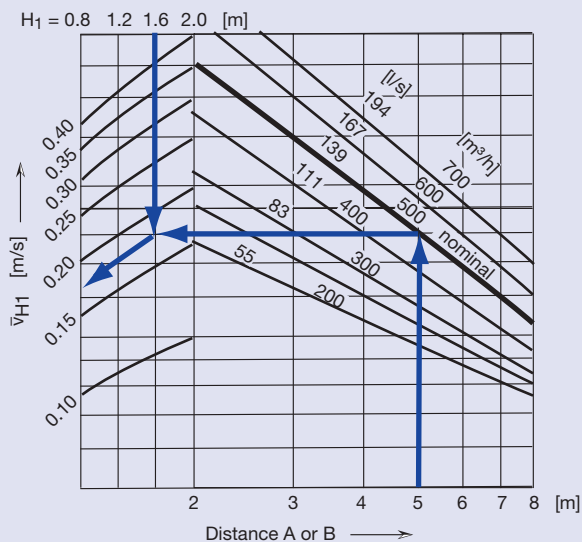
### Room air velocity by the wall $\bar{v}_L$

$\Delta t_z = -8 \text{ K}$



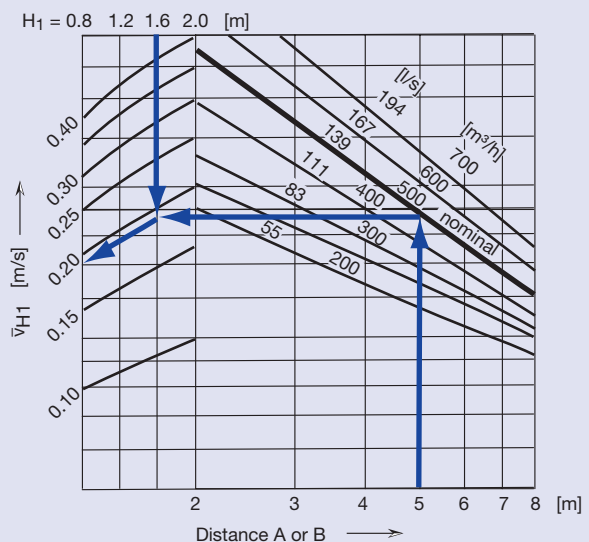
### Room air velocity $\bar{v}_{H1}$

$\Delta t_z = -8 \text{ K}$   $A = B$



### Room air velocity $\bar{v}_{H1}$

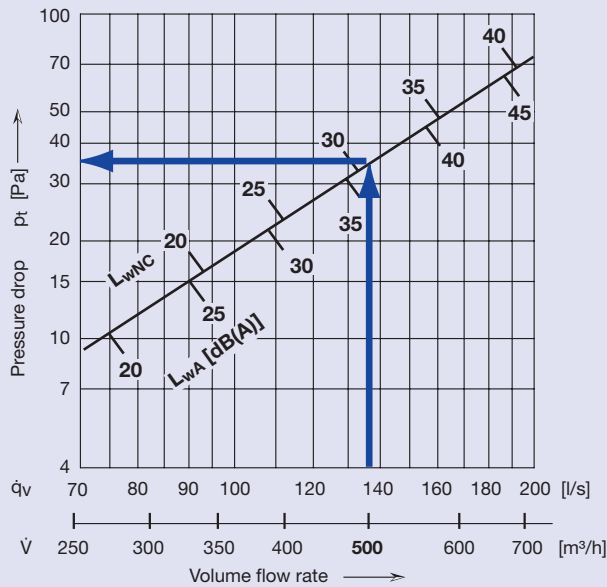
$\Delta t_z = -12 \text{ K}$   $A = B$



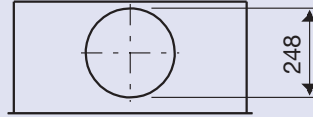
## Type WQ



### Sound power level and pressure drop



### Connection diameter



### Eff. velocity of exhaust air

$\dot{V}$ [m³/h]	$\dot{q}_v$ [l/s]	$v_{eff}$ [m/s]	$A_{eff} = 0.0339 \text{ m}^2$
200	55	1.7	
250	70	2.1	
300	83	2.5	
350	97	2.9	
400	111	3.3	
450	125	3.7	
500	139	4.1	
550	153	4.5	
600	167	4.9	

### Example

#### Given

WAVESTREAM type WQ	Spigot $\varnothing 248 \text{ mm}$	
Volume flow rate	139 l/s	$\dot{q}_v$
	500 m³/h	$\dot{V}$
Room height	3.4 m	H
Occupied zone height	1.8 m	
Distance to the ceiling	1.6 m	$H_1$
Distance between diffusers	5.0 m	A = B
Difference of temperature	-12 K / -8 K / +8 K	$\Delta t$

#### Solution

Sound power level	37 dB(A)	$L_{wA}$
Limite curve	31	$L_{wNC}$
Pressure drop	36 Pa	$\Delta p_t$

### Octave spectrum

f	125	250	500	1000	2000	4000	8000	[Hz]
<b>L<sub>wA</sub></b>	37	37	37	37	37	37	37	<b>[dB(A)]</b>
<b><math>\Delta L_A</math></b>	+6	+5	-2	-7	-12	-17	-19	<b>[dB]</b>
<b>L<sub>wOkt</sub></b>	43	42	35	30	25	20	18	<b>[dB]</b>

### Insertion attenuation see page 6

Room air velocity 1.8 m over ground		
at -12 K	= 0.19 m/s	$\bar{v}_{H1}$
at -8 K	= 0.17 m/s	$\bar{v}_{H1}$
at +8 K	= <0.10 m/s	$\bar{v}_{H1}$

Velocity by the wall 1.8 m over ground		
Throw of the jet = $A/2 + H_1$	= 4.1 m	L
at -8 K	= 0.20 m/s	$\bar{v}_L$

Difference of temperature	0.053	$\Delta t_L / \Delta t_z$
$(t_R - t_L)$ bei $\Delta t_L - 8 \text{ K} = 0.053 \times 8$	= ~0.5 K	$\Delta t_L$

# Order details

## Order codes

No details for standard products

WQ AKH04 ZL M0 / ... x ... / 0 / 0 / P1 / RAL 9006

**Type**  
WAVESTREAM

- 0** = Without plenum box
- AKH04** = TROX HESCO-plenum box
- AK004** = TROX-plenum box

**ZL** = Supply air

- M0** = Spigot with volume control, without lip seal (standard)
- ML** = Spigot with volume control, with lip seal
- 00** = Spigot without volume control, without lip seal
- 0L** = Spigot without volume control, with lip seal



**Nominale dimension**  
External dimension x avtice surface

RAL 9006 matt, 25% brilliance

- 0** = Powder coated according to RAL 9010, matt, 25% brilliance (standard)
- P1** = Powder coated according to RAL (other RAL colours and brilliance on request)

## Order examples

- 45 off WQ / 623x500 / P1 / RAL 9006
- 30 off WQ AKH04ZL M0 / 598x500

## Text for tendering purposes

WAVESTREAM ceiling air diffuser with concave, wave-shaped outlet openings arranged in a circle. High induction thanks to the fine division of the air volume into a large number of individual pulsating air jets. Low flow resistance. Entirely metal design. Attachment by means of central screw.

Standard plenum box of galvanised steel, with integrated cross bar for the M6 central screw, for quick and simple installation of the ceiling panel air diffuser. A connection with volume control for connecting a coiled tube or hose is included; the inlet box also contains an air distributor element. Central screw will be delivered separately.

## Material

- Ceiling air diffuser steel, powder-coated, RAL 9010, matt, 25% brilliance
- Plenum box galvanised steel plate

Informations about the plenum box see page 3.

## Options

- Other RAL colours
- Application for the extraction of air.