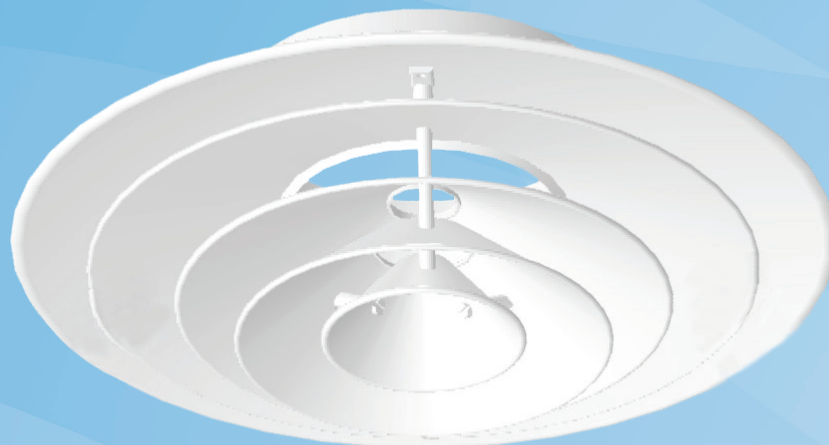


Halton CAR

Conical Diffuser



- Horizontal air supply, suitable also for exhaust
- Cooling applications with supply/room air temperature difference as low as -16 °C
- Suited also for heating
- Suitable for high airflow rates
- Installation flush to the ceiling or exposed
- Circular duct connection with rubber gasket
- Openable cone module, enabling the cleaning of the diffuser and ductwork

Product Models & Accessories

- Models available integrated in a panel for installation in modular 450 x 450 mm, 600 x 600 mm and 675 x 675 mm suspended ceilings
- Balancing plenum with adjustment functions (PLC) or even with measurement function (TRI)
- Adjustment module for balancing of the airflow

MATERIAL AND FINISHING

PART	MATERIAL	FINISHING
Diffuser	Steel	Epoxy-painted (White RAL 9010 or Grey RAL 7004)
Plenum box	Steel	

QUICK SELECTION

qv	Pa l/s m ³ /h	360 30 108	600 50 180	840 70 252	1080 90 324	1440 120 432	1800 150 540	2400 200 720	3000 250 900	3960 330 1188	5400 450 1620	7200 600 2160	10800 900 3240	18000 1500 5400	24000 2000 7200	36000 3000 10800
CAR-160	LpA	6	15	25	33	42										
	ΔPst	2	5	10	17	31										
	ΔPtot	3	9	18	29	52										
	Ld	-	-	-	-	-										
	Lmin	-	0,5	0,5	0,9	1,5										
	L0.2	1,0	1,6	2,2	2,6	3,4										
CAR-200	LpA	16	24	31	39	45										
	ΔPst	2	5	8	14	21										
	ΔPtot	4	8	13	22	35										
	Ld	-	-	-	-	-										
	Lmin	-	-	0,5	0,7	1,1										
	L0.2	1,0	1,4	1,8	2,2	2,6										
CAR-250	LpA				23	28	35	41								
	ΔPst				6	10	17	27								
	ΔPtot				10	15	27	42								
	Ld				-	-	-	-								
	Lmin				0,5	0,6	1,1	1,7								
	L0.2				1,8	2,0	2,6	3,0								
CAR-315	LpA				8	14	24	31	41							
	ΔPst				3	4	7	11	20							
	ΔPtot				4	6	11	18	31							
	Ld				-	-	-	-	-							
	Lmin				-	0,5	0,5	0,9	1,5							
	L0.2				1,2	1,4	1,8	2,2	2,6							
CAR-355	LpA						20	26	33	41						
	ΔPst						4	6	11	21						
	ΔPtot						7	11	18	34						
	Ld						-	-	-	-						
	Lmin						0,5	0,6	1,2	2,0						
	L0.2						1,6	2,0	2,4	3,0						
CAR-400	LpA						20	25	32	39	46					
	ΔPst						2	3	6	10	19					
	ΔPtot						4	6	10	18	32					
	Ld						2,0	2,2	2,6	3,0	3,4					
	Lmin						0,5	0,5	0,9	1,5	2,4					
	L0.2						2,0	2,4	3,0	4,2	5,6					
CAR-450	LpA								23	31	38	50				
	ΔPst								3	7	12	26				
	ΔPtot								6	11	20	45				
	Ld								2,4	2,8	3,2	4,0				
	Lmin								0,6	1,2	2,0	3,5				
	L0.2								2,8	3,8	5,0	7,4				
CAR-560	LpA										23	37	54			
	ΔPst										6	14	40			
	ΔPtot										10	22	62			
	Ld										3,0	3,6	4,6			
	Lmin										1,5	2,7	5,2			
	L0.2										4,0	6,2	10,0			
CAR-630	LpA										16	30	47			
	ΔPst										3	7	20			
	ΔPtot										5	12	34			
	Ld										2,6	3,2	4,0			
	Lmin										2,0	4,0	8,0			
	L0.2										3,2	5,0	8,2			
CAR-800	LpA										19	35	43			
	ΔPst										1	4	6			
	ΔPtot										3	9	16			
	Ld										2,6	3,4	3,8			
	Lmin										2,4	5,2	7,8			
	L0.2										3,6	6,0	7,8			
CAR-1000	LpA												22	32	45	
	ΔPst												2	3	7	
	ΔPtot												4	7	16	
	Ld												3,0	3,4	4,2	
	Lmin												4,4	6,4	10,6	
	L0.2												5,2	7,0	10,2	

LpA values presented with room attenuation 4 dB (red 10m² - sab). When using room attenuation 8 dB (red 25m² - sab):
LpA - 4dB.

Pa Supply air cooling capacity, W
LpA A-weighted sound pressure level, reduced by total equivalent absorption surface of 10m², dB(A) red 10m² - sab
ΔPst Static pressure drop, Pa

ΔPtot Total pressure drop, Pa
Ld Distance from the supply unit, at which air jet detaches from ceiling, m
Lmin Minimum distance between central lines of two supply units, m (V3 = 0,25m/s at 1.8m height)
L0.2 Isotermal throw length, m when residual velocity of supply air jet 0,2 m/s
Room temperature (Tr) = 24 °C
Supply air temperature (Ta) = 14 °C
Room height = 2,8 m

ACCESSORIES

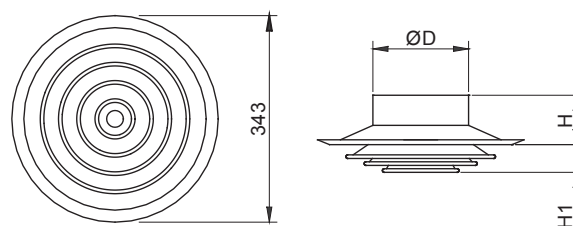
ACCESSORY	CODE	DESCRIPTION
Plenum	PLC	Plenum for duct connection (with or without insulation)
Balancing plenum with airflow measurement and adjustment unit	TRI/N	For balancing, equalising the airflow
Sound attenuation	IN	Polyester fibre as sound attenuation material in the TRI plenum. Mineral wool as sound attenuation material in the PLC plenum
Airflow measurement and adjustment unit	MSM	For supply installation
Airflow adjustment unit	LD	Circular galvanised steel unit for flow adjustment (inside the coupling sleeve)
Airflow adjustment damper	DC	Circular galvanised steel blade damper for flow adjustment (inside the coupling sleeve)
Airflow adjustment unit	CU1	Circular galvanised steel unit for flow adjustment in the plenum

PRODUCT MODELS

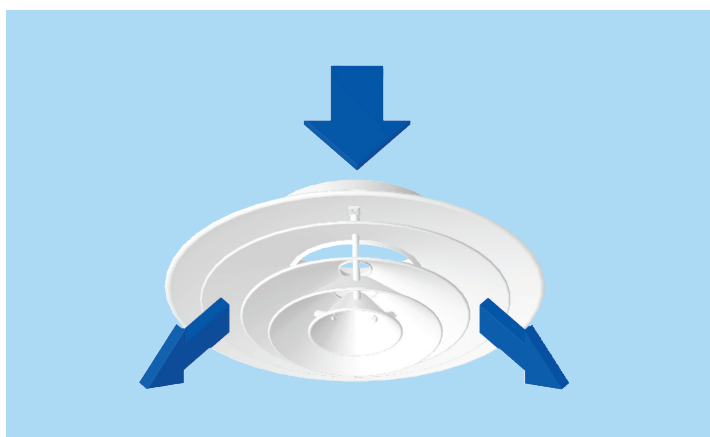
PRODUCT MODEL	CODE	DESCRIPTION
Diffuser integrated in front panel, 600 x 600 mm	CAR/B	Sizes 160, 200 and 250 are available integrated in a steel panel for installation in a modular 600x600 mm suspended ceiling. The external dimensions of the front panel are 595 mm x 595 mm.
Diffuser integrated in front panel, 450 x 450 mm	CAR/C	Sizes 160 and 200 are available integrated in a steel panel for installation in a modular 450x450 mm suspended ceiling. The external dimensions of the front panel are 445 mm x 445 mm.
Diffuser integrated in front panel, 670 x 670 mm	CAR/D	Sizes 160, 200, 250 and 315 are available integrated in a steel panel for installation in a modular 675x675 mm suspended ceiling. The external dimensions of the front panel are 670 mm x 670 mm.

DIMENSIONS

NS	W	H	H1	ØD
160	343	65	54	159
200	457	80	70	199
250	571	87	88	249
315	686	91	106	314
355	857	102	133	354
400	857	100	133	399
450	1030	120	157	449
560	1200	124	184	558



Special dimensions are not available.



Function

Supply air is divided into several jets through the cones.

The divergent sections of the diffuser create negative pressure under the diffuser so room air is induced into the supply air terminal. Room air and supply air mix.

This internal induction reduces temperature and the air velocity into the space.

The process is the same outside the diffuser between the supply and mixed room air, with external induction further reducing velocity and the temperature difference between supply and room air.

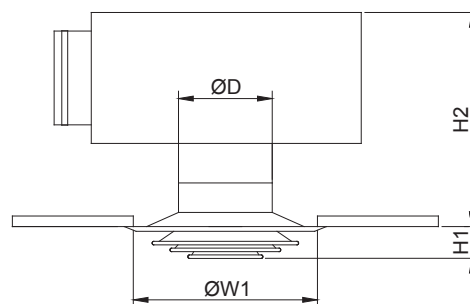
The diffuser can also be used as an exhaust unit.

Installation

The CAR diffuser can be installed flush with a suspended ceiling or fully exposed in the space. The diffuser is connected directly to the duct using a PLC plenum or TRI balancing plenum. When it is connected directly to ductwork, a safety distance of minimum 3D upstream of the diffuser should be maintained.

The technical performance for the combination of supply air diffuser and TRI plenum is presented separately for the two different installations. See HIT Design software.

Installation with plenum TRI or PLC



CAR	ØD	TRI	H2	H1
160	159	TRI-160-160	304...334	54
200	199	TRI-200-200	369...399	70
250	249	TRI-250-250	440...470	88
315	314	TRI-315-315	490...520	106

CAR	ØD	PLC	H2	H1
160	159	PLC-160	290...320	54
200	199	PLC-200	395...425	70
250	249	PLC-250	402...432	88
315	314	PLC-315	556...686	106
355	349	PLC-355	567...597	133
400	399	PLC-400	565...595	133
450	449	PLC-450	785...815	157
560	559	PLC-560	789...819	184

When the TRI spigot is installed in the plenum, the H dimensions can be reduced by 60 mm.

Dimensions of the ceiling opening

CAR	ØW1
160	290
200	406
250	510
315	610
355	760
400	760
450	915
560	1065

Adjustment

The airflow rate can be adjusted and measured only when the diffuser is installed.

In order to enable airflow adjustment and measurement of airflow rate, it is recommended to connect the diffuser to a plenum equipped with the MSM module.

The supply flow rate is determined using measurement and adjustment module MSM.

Detach the conical central core and pass the tubes and control spindle through the diffuser. Measure the differential pressure with a manometer. The flow rate is calculated using the formula below.

$$q_v = k * \sqrt{\Delta p_m}$$

Adjust the airflow rate by rotating the control spindle until the desired setting is achieved.

Lock the damper position with a screw.

Replace the tubes and spindle in the plenum and push the conical central core back into place.

K factor for installations with different safety distances (D= duct diameter)

PLC/TRI	>8XD	min 3XD
125	9.9	12.6
160	16.9	21.9
200	28.3	31.0
250	47.9	51.5
315	78.6	-

Airflow adjustment damper DC

The airflow rate is adjusted by turning the damper blades behind the diffuser with a screwdriver. The measurement is carried out when the diffuser is installed.

Servicing

Remove the conical central core by unscrewing it from the frame (the central core is fixed by small screws). Clean the parts by wiping them with a damp cloth. Put each screw back in place, and screw on until the conical central core fits in place.

Option: with balancing plenum TRI + MSM or PLC + MSM

Remove the measurement and adjustment module by pulling gently on the shaft (not the control spindle).

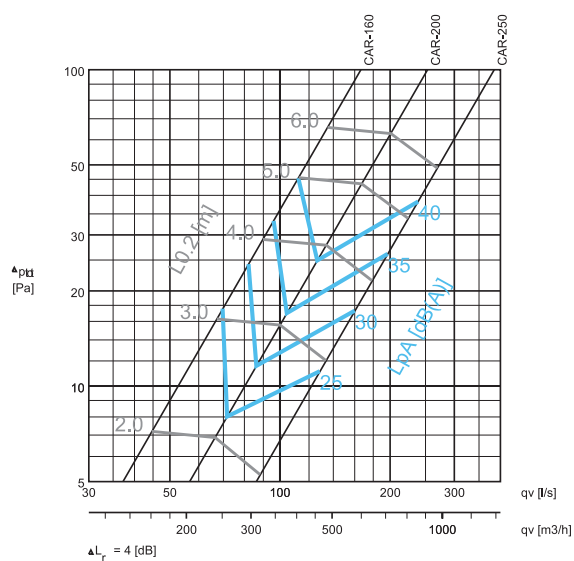
Wipe the parts with a damp cloth, instead of immersing in water.

Reassemble the measurement and adjustment module by pushing the shaft until the module meets the stopper.

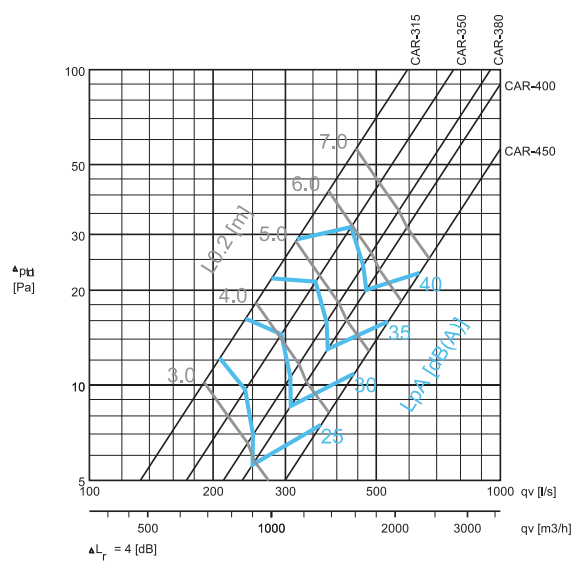
Put each screw back in place, and screw on until the conical central core fits in place.

Pressure drop, throw pattern and sound data

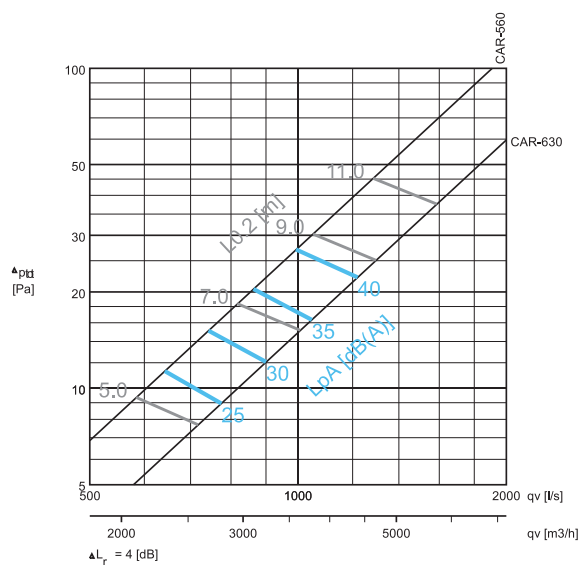
CAR-160, CAR-200, CAR-250



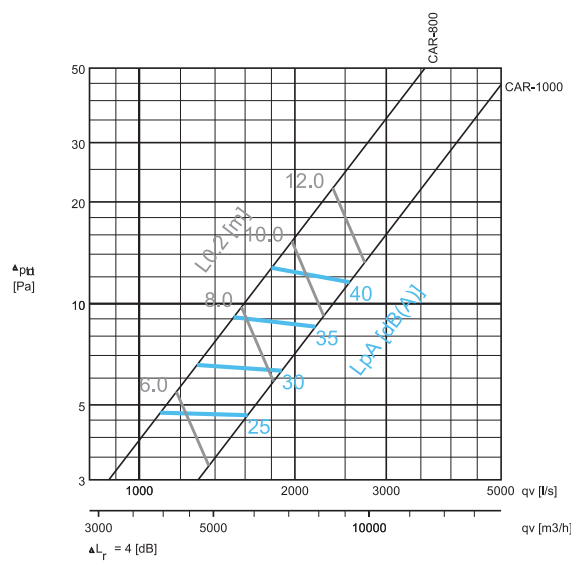
CAR-315, CAR-350, CAR-380, CAR-400, CAR-450



CAR-560, CAR-630



CAR-800, CAR-1000



Selection example :

Requirements : $qv = 100$ l/s Selection: CAR-200
 $L_p(A) < 35$ dB(A) $L_p(A) = 34$ dB(A)
 $L_{0.2} < 4.0$ m $L_{0.2} = 3.0$ m
 $\Delta p_{tot} = 16$ Pa

SOUND LEVEL DATA, SUPPLY

	qv	ΔP_{st} (Pa)	ΔP_{tot} (Pa)	F (Hz)								LpA [dB(A)]	NR	NC	
	(l/s)			(m ³ /h)	63	125	250	500	1000	2000	4000				8000
CAR-160	70	252	10	18	3	29	31	28	23	21	6	3	25	20	17
	82	295	14	24	3	34	35	33	28	26	12	3	30	25	23
	96	346	20	33	3	39	39	38	33	31	19	3	35	30	28
	112	403	27	45	3	44	44	43	38	36	25	3	40	35	34
CAR-200	72	259	5	8	3	37	33	25	20	19	16	3	25	18	16
	86	310	7	12	3	41	38	30	25	24	20	3	30	24	21
	104	374	10	17	3	46	42	35	30	29	25	3	35	29	26
	127	457	15	25	3	50	48	41	36	35	29	3	40	34	32
CAR-250	128	461	7	11	3	32	27	25	15	26	5	3	25	25	22
	160	576	11	17	3	38	33	31	23	29	12	3	30	29	26
	197	709	17	26	3	44	39	37	30	33	19	3	35	32	30
	238	857	24	38	3	50	44	43	37	36	25	3	40	35	34
CAR-315	208	749	8	12	3	32	32	27	25	11	10	3	25	21	19
	240	864	11	16	3	38	37	32	30	17	15	3	30	26	24
	278	1001	14	22	3	43	41	37	35	23	20	3	35	31	29
	320	1152	19	29	3	49	46	42	39	28	24	3	40	35	34
CAR-355	240	864	6	10	3	36	34	26	20	14	9	3	25	19	16
	293	1055	9	14	3	42	38	32	26	20	15	3	30	24	22
	355	1278	13	21	3	47	43	37	31	25	20	3	35	29	27
	434	1562	20	32	3	52	48	42	36	30	26	3	40	34	33
CAR-400	250	900	3	6	3	37	34	26	21	15	9	3	25	19	16
	309	1112	5	9	3	42	38	31	26	20	15	3	30	24	21
	381	1372	8	13	3	47	43	36	31	25	20	3	35	29	27
	472	1699	12	20	3	52	48	42	36	31	26	3	40	34	33
CAR-450	366	1318	4	7	3	35	36	22	18	14	12	3	25	21	18
	441	1588	6	11	3	40	40	28	24	20	18	3	30	26	23
	534	1922	9	16	3	45	45	34	30	27	24	3	35	31	29
	637	2293	13	23	3	50	49	40	36	33	30	3	40	35	33
CAR-560	642	2311	7	11	3	24	26	28	24	21	13	3	25	20	18
	743	2675	10	15	3	29	31	33	28	26	18	3	30	25	23
	862	3103	13	20	3	34	36	38	33	31	23	3	35	30	29
	994	3578	17	27	3	39	41	43	38	36	28	3	40	35	34
CAR-630	775	2790	5	9	3	24	26	28	24	21	13	3	25	20	18
	900	3240	7	12	3	29	31	33	29	26	18	3	30	25	23
	1047	3769	10	16	3	34	36	38	34	31	23	3	35	30	29
	1219	4388	13	22	3	39	41	43	39	36	28	3	40	35	34
CAR-800	1097	3949	2	5	3	24	26	28	24	21	11	3	25	20	18
	1292	4651	3	7	3	29	31	33	29	26	13	3	30	25	23
	1521	5476	4	9	3	34	36	38	34	31	16	3	35	30	29
	1801	6484	5	13	3	39	41	43	39	36	19	3	40	35	34
CAR-1000	1619	5828	2	5	3	24	26	28	24	21	13	3	25	20	18
	1885	6786	3	6	3	29	31	33	29	26	18	3	30	25	23
	2190	7884	4	9	3	34	36	38	34	31	23	3	35	30	29
	2550	9180	5	12	3	39	41	43	39	36	28	3	40	35	34

LpA values presented with room attenuation 4 dB (red 10m² - sab). When using room attenuation 8 dB (red 25m² - sab): LpA - 4dB.
NR/NC noise criteria

Suggested Specifications

The diffuser shall be made of several stamped cones, made of epoxy-painted steel with a white (RAL 9010) or grey (RAL7004) standard colour.

The diffuser shall be suitable for installation on exposed ductwork or flush to the ceiling.

The diffuser shall be connected to the ductwork using a TRI balancing plenum, which utilises polyester fibre with a washable surface as sound attenuation material.

The diffuser shall be connected to the ductwork using a PLC plenum, which utilises mineral wool as sound attenuation material.

The plenum shall comprise an airflow measurement and adjustment unit.

The diffuser shall be suitable for installation in 450 x 450-mm, 600 x 600-mm and 675 x 675-mm suspended ceilings.

The conical central core shall be removable.

The air discharge pattern shall be radial around the full perimeter of the air diffuser.

The cones shall form divergent sections, which shall create underpressure inducing room air into the unit.

Product Code

CAR-D

D = Diameter of duct connection

160, 200, 250, 315, 355, 400, 450, 560, 630, 800, 1000

Specifics and accessories

WS = Width of suspended ceiling element

NA Not Assigned

450 450 x 450

600 600 x 600

670 670 x 670

CO = Colour

W White

G Grey

Code example

CAR-160, WS=NA,CO=W

Sub products

TRI Plenum (Diffusers)

PLC Plenum (Ceiling diffusers)