ZERAX®
AXIAL FLOW FANS STANDARD, ATEX AND EX

Member of SCHAKO Group
NOVENCO
Building & Industry

PRODUCT FACTS

PRODUCT

The Novenco® ZerAx® series of axial flow fans uses innovative design to reduce power consumption and to better fan efficiency. The work environment benefits from the low fan sound levels.

APPLICATION

ZerAx fans are well-suited for both comfort and industrial ventilation. Versions for installation in ATEX zones and versions for marine EX application are also available.

RANGE

ZerAx fans for duct installation are designated AZN or AZW.
Fans for building in to air handling units are designated AZL and have integrated inlet cones.

Fan casing thicknesses are either 2 or 3 mm for AZL, 2 or 4 mm for AZN and 10 mm for AZW.

Hub sizes are Ø160 or Ø350 for AZL, Ø160, Ø350 or Ø560 for AZN and Ø350 or Ø560 for AZW.

Impeller diameters lie between Ø250 and Ø500 for Ø160 hubs, between Ø500 and Ø1250 for Ø350 hubs and between Ø1000 and Ø2000 for Ø560 hubs.

Blade angles lie between 25° and 75°, depending on the desired pressure.

Air flow rates go from 0.1 to 110 m^3/s and pressure increases up to 3400 Pa.

Part of the range is standardised as Standard Range, which comprises a number of fixed size-airflow-pressure combinations.

MOTORS

Mounting: Depending on size either enclosed in motor mount or outside the motor mount through a long hub.
Terminal boxes: Boxes of steel or plastic mounted on fan casing
Dimension standard: IEC-72
Electrical standard: IEC-34
Enclosure: IP54, IP55, IP56 or IP65
Insulation: Class F or H
Balancing: IEC 60034-14
Structural shape: B14 and B5 for flanges

EFFICIENCY

The ZerAx fan efficiency run above 90%, i.e. without taking the motor into account.

ZerAx fans can run in reverse for shorter periods at speeds up to the max. allowable speed for normal direction. In reverse the air flow is reduced to approx. 50% of normal and the pressure to 25%.

MATERIALS

Blades: Aluminium
Hub: Aluminium
Hub cover: Aluminium
Inner hub: Cast steel galvanised
Inner tube: AluZink
Fan casing: AluZink for light motors and hot-dip galvanised steel for heavy motors
Guide vanes and motor mount: Sea-water resistant aluminium

CLASSIFICATIONS

Flange standards: Eurovent 1/2 for AZN and AZL; DIN 24154 R4 for AZW
Technical capacity: BS 848-1:2007 and EN ISO 5801:2008
Environment: DS/EN ISO 12944-2, corrosion category C3, C4 or C5
Temperature range, standard: -20 to 50 °C
Temperature range, max.: -40 to 120 °C
Marine motor classification: Refer to AirBox program for available registers
ATEX and marine EX: AZN ATEX meet directive 2014/34/EU for category 2G/D; AZW EX meet guideline IACS F29/2005
Calculation software: AirBox program is certified by TÜV

ACCESSORIES

- Fan casing extension
- Hub cover
- Inlet cone with wire guard
- Inlet wire guard
- Outlet wire guard
- Acoustic diffusers type YAD with cores or type YAZ with or without cores
- Short diffuser
- Long diffuser
- Silencers type YAA or YAH with or without core
- Painted for C4/5 environments
- Support frame for horizontal mounting
- Plate for vertical mounting
- Anti-vibration mountings
- Anti-vibration mounting plate
- Flexible connection (PERL / Maritex)
- Counter flange
- Duct spigots
- Measuring pipe
- Roof hood type HAN
- Damper type SBC

DESCRIPTION

The ZerAx fans build on Novenco's renowned NovAx design. Almost all aspects of the fans are improved with this next generation fan. The materials and the use thereof have been refined. The design is made contemporary. And the efficiency is much improved, thus lowering overall power consumption and noise. All of this makes the ZerAx fans ready to comply with future environmental legislation.

As with previous fan series, the ZerAx application span is as wide as the product range. The fans already help keep high levels of performance at minimum costs within as diverse areas as the windmill sector, residential housing, carpark ventilation and built into air handling units.
On-board ships and in offshore facilities, the fans save barrels of oil and improve crew conditions by lowering noise levels.

DESIGN

Central to the design is the impeller assembled from aluminium cast hub parts and blades. The impeller is fitted in an inner tube, in which cast profiled guide vanes are mounted on the motor mount.

Common to all ZerAx versions is the exact installation of the impeller arrangement and motor in the fan casing. The installation is a precise operation and is essential to the fan efficiency and the very little blade clearance.

MATERIALS

The materials and characteristics of the surface textures are key to the performance. Focus is on low weight by using light and strong materials. Most parts are of aluminium and optimised to withstand high strains.

To save further on weight the fan casing is shortened and parts are cast and machined with high precision.

GROUNDBREAKING EFFICIENCY

Isolated measurements of the fan efficiencies show these to be above 90%. To complement these the ZerAx fans are offered with motors in efficiency classes IE1 - IE4. The future IE5 class is also supported by the design.

All ZerAx fans are built to withstand operation in reverse for shorter periods.

CLASSIFICATIONS

The design has been tested and specifications verified according to the standards EN ISO 5801 and AMCA 300 and BS 848 by the largest laboratory in Northern Europe.

OPTIMUM BLADE ANGLES

Fan performance depends on speed and blade angle. The optimum blade angles are found with the AirBox program and input to the production. Angles lie between 25° and 75° in 5° increments for ø350 hubs and in 1° increments for Ø160 and Ø560 hubs.

ATEX AND EX APPLICATIONS AND CLASSIFICATIONS

The AZN ATEX fans with hub sizes Ø160 and Ø350 comply with the directive 2014/34/EU for equipment installed in explosive atmospheres and environments. The fans are suited for removal of hot smoke from fires and for service in hazardous gas environments.
The AZW EX fans with hub size Ø350 for marine follow the guidelines in IACS F29/2005 for non-sparking fans. The fans are intended for transport of air containing flammable gases.
All ZerAx ATEX and marine EX fans are CE-certified and approved in accordance with EN12101-3.

AIRBOX CALCULATION PROGRAM

The AirBox program is Novenco's calculation and configuration tool. Input to the program are requirements for air flow and pressure as well as specific characteristics of the operating environment. Further requirements for the fan, motor and accessories are also input and form the basis for calculation of possible solutions.

Novenco AirBox is free and available on www.novenco-building.com. It is certified by TÜV Süd in Germany, requires registration and checks automatically for updates.


ZERTIFIKAT ◆ CERTIFICATE ◆ CERTIFICADO ◆ CERTIFICAT

Novenco Building & Industry A/S

Design Software

„Novenco AirBox 3.x.x.x"
„DLL OEM package 1.x.x.x"

„ZerAx AZL-AZN-AZW"

AIRBOX TÜV CERTIFICATE

ZERAX INSIDE

MINIMUM BLADE TIP CLEARANCE

The clearance between the impeller blade tips and the fan casing is decisive for the performance. The high precision in the casing production, in the fan assembly and in the milling of the impeller blades, are key to the minimum clearance.

UNIQUE BLADE EFFICIENCY

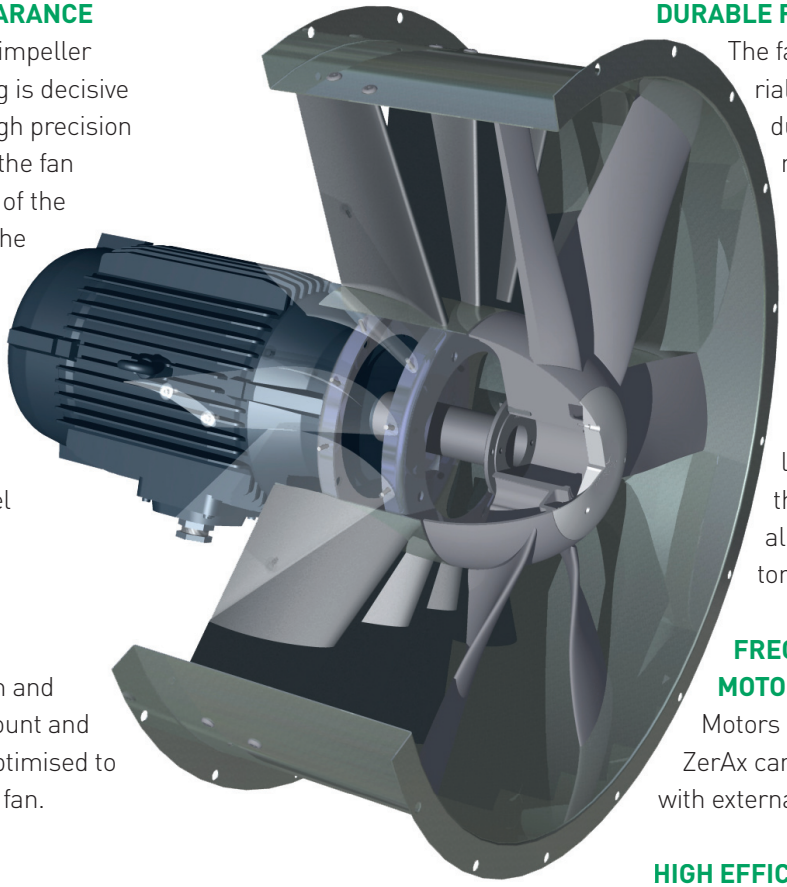
The design of the blades brings the efficiency above 90%. This is the highest level ever for axial flow fans.

PROFILED GUIDE VANES OF ALUMINIUM

Vanes are cast in aluminium and screwed on to the motor mount and fan casing. The vanes are optimised to reduce air rotation after the fan.

INNOVATIVE HUB DESIGN

The hub and hub cover are designed for optimum performance. Both parts are cast in aluminium.



DURABLE FAN CASING

The fan casing is of strong material and kept short to optimise durability. The design and material add rigidity and minimises critical vibrations.

EXTENDED FAN CASING (OPTIONAL)

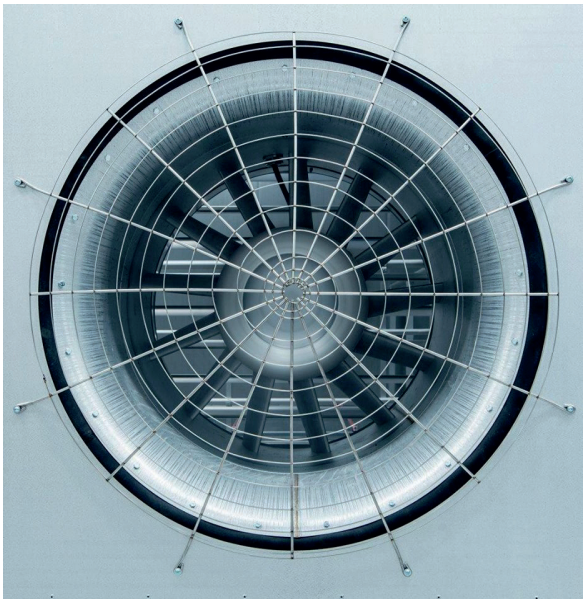
Large motor sizes are accommodated through a long hub and extension of the fan casing. The long hub allows for position of the motor outside the motor mount.

FREQUENCY REGULATED MOTOR (OPTIONAL)

Motors offered in connection with ZerAx can be frequency regulated with external converters.

HIGH EFFICIENCY MOTORS

Motors in efficiency classes IE1 to IE4 are available. The ZerAx fans are furthermore also ready for motors in efficiency class IE5.



TYPES

AZN FOR DUCT INSTALLATION

The AZN fans for duct installation can be fitted with cones or diffusers and thereby easily turned into fans with free inlet or outlet. The fan casing is quite durable and with a thickness that depends on motor size. It is made in either 2 mm AluZink or 4 mm galvanised steel plate.

AZN 1000 WITH Ø350 HUB

The standard range comprise seven installation sizes with Ø160 hubs and impeller diameters from Ø250 to Ø500, nine installation sizes with Ø350 mm hubs and impeller diameters from Ø500 to Ø1250 and seven installation sizes with Ø560 mm hubs and impeller diameters from Ø1000 to Ø2000.

Air flow rates for AZN in the standard range run from 0.1 to 110 m^3/s and pressure increases up to 3400 Pa.

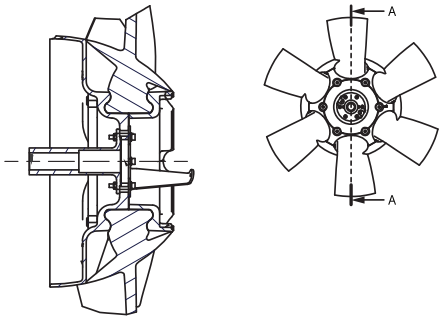
The fan casing is cylindrical with connection flanges at both ends.
The motor mount is aerodynamically designed to optimise air flow.

The motor mount and fan casing are of AluZink or hot-dip galvanised steel.

The impeller unit is mounted directly on the motor shaft. Large motors, that do not fit in the motor mount, are displaced outside of this and connected to the impeller through an extended hub.

The flange pitch diameter, number of holes and hole sizes are as standard in accordance with Eurovent 1/2.

The motor is a flange motor, mounted on the outlet side, and fitted with an electrical cable that passes out through the fan casing to a terminal box.



AZN 1000 IMPELLER WITH Ø560 HUB

The direction of air flow for AZN fans is impeller - motor.

AZW FOR HEAVY DUTY

The AZW fans display the same charateristics and have almost specifications identical to the AZN. The main difference is the 10 mm thick fan casing. This much thicker casing makes the AZW well-suited for rough conditions, for example marine environments, where durability is essential.

AZW 1000 WITH Ø350 HUB

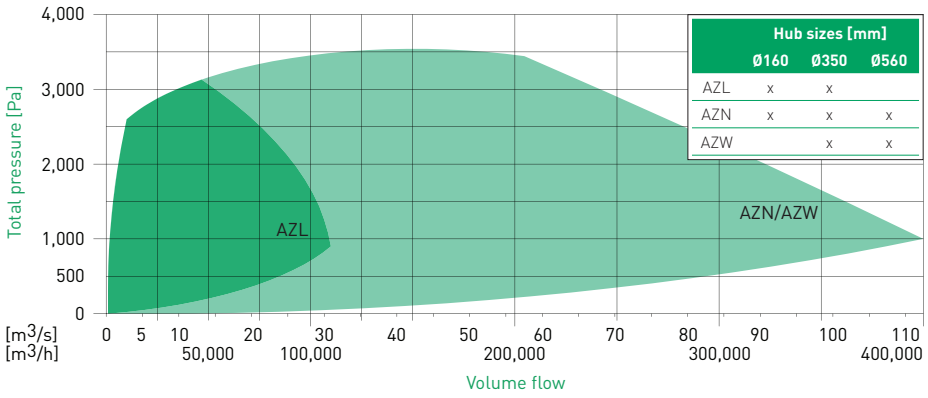
The flange pitch diameter, number of holes and hole sizes follow the DIN 24154 R4 standard.

AZL FOR AHUS AND RETROFIT

The AZL fans are compact and with integrated inlet cones intended for installation in air handling units.
The design and specifications are similar to the AZN fans with some modifications. The fan casing thickness is kept to a minimum of 2 or 3 mm and impeller diameters lie between Ø250 and Ø1000, depending on hub size.

AZL 315 WITH Ø160 HUB

The flange pitch diameter, number of holes and hole sizes follow the Eurovent 1/2 standard.



FAN OVERVIEW

FAN SIZES

The fans are fitted with 50 or 60 Hz motors as standard, but can also be delivered with special motors. Speed control is either through direct start or through a frequency converter.

The ZerAx fans present an alternative to centrifugal fans in ventilation and air conditioning systems with varying air flow rate requirements.

The fans are prepared for frequency converter operation with RFI filters according to the product standard EN61800-3, class C2. Frequency converters remove the limitations caused by fixed net frequencies.

The fans can often be configured to operate near optimum efficiency. At the same time the air quantities can of course be regulated, if needed.

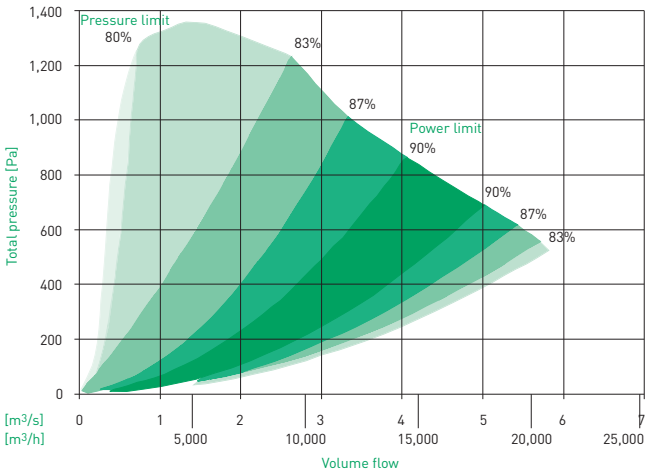
Operational cost and space requirements are low for ZerAx fans, as fan sizes quite often are smaller than other fans with similar flows and pressures.

Hub diameters	Impeller diameters [mm]																		
	Ø250	Ø280	Ø315	Ø355	Ø400	Ø450	Ø500	Ø560	Ø630	Ø710	Ø800	Ø900	Ø1000	Ø1120	Ø1250	Ø1400	Ø1600	Ø1800	Ø2000
Ø160 [2]	4919	4747	4570	4408	4269	4145	4086												
Ø350							3660	3460	3238	3000	2751	2498	2270	2029	1809				
Ø560													2034	1893	1751	1599	1419	1262	1130

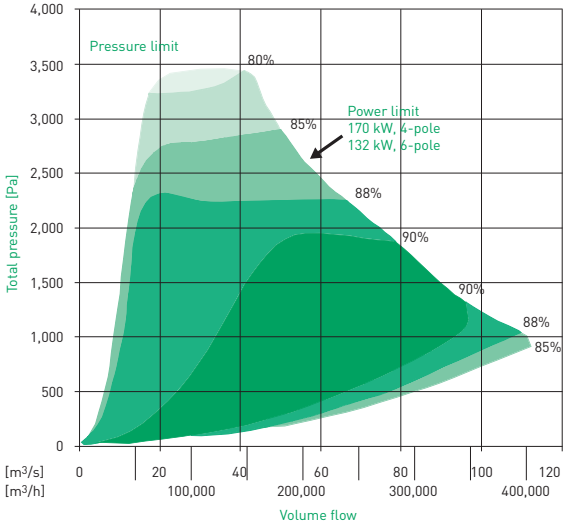
OPTIMUM RPMS FOR FREQUENCY REGULATED ZERAX IMPELLERS [1]

1. The RPMs for optimum installation conditions at 20 °C. At other temperatures the RPMs are reduced.
2. For hub size Ø160 the RPMs are maximum values. Values for optimum installation conditions are unavailable at the time of publication.

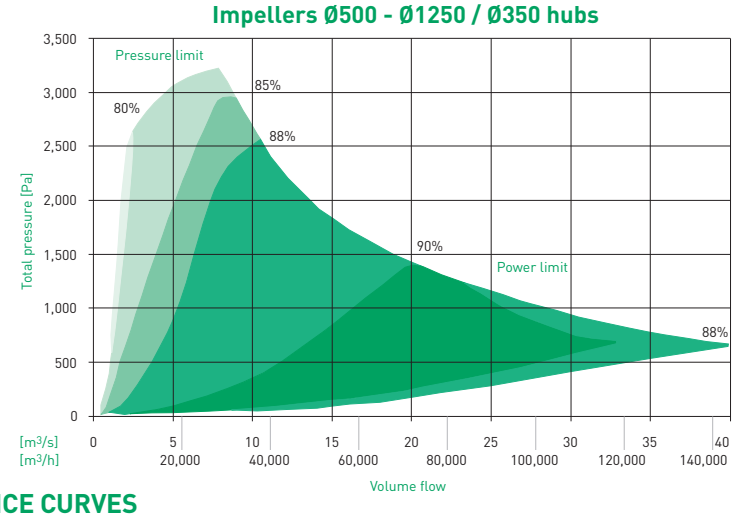
Impellers Ø250 - Ø500 / Ø160 hubs



Impellers Ø1000 - Ø2000 / Ø560 hubs



Impellers Ø500 - Ø1250 / Ø350 hubs



GENERAL PERFORMANCE CURVES

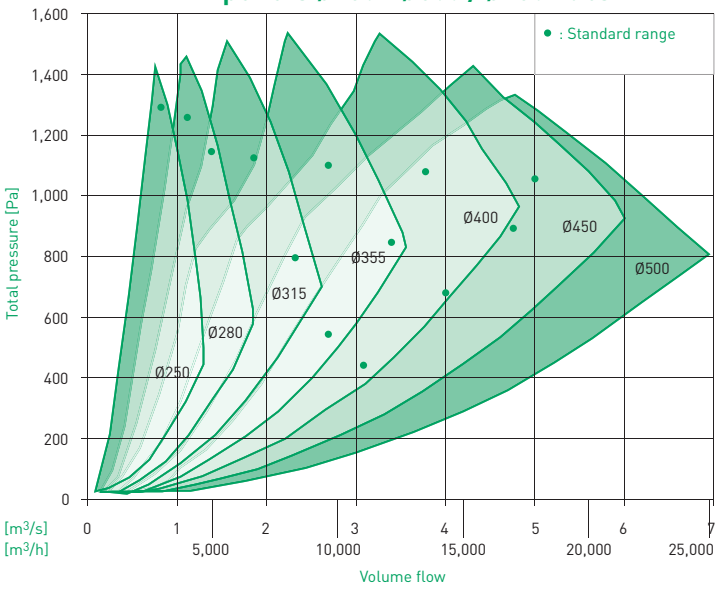
TYPICAL WORK AREAS

The work areas are for fans with variable speeds, i.e. frequency drives, and variable blade angles.

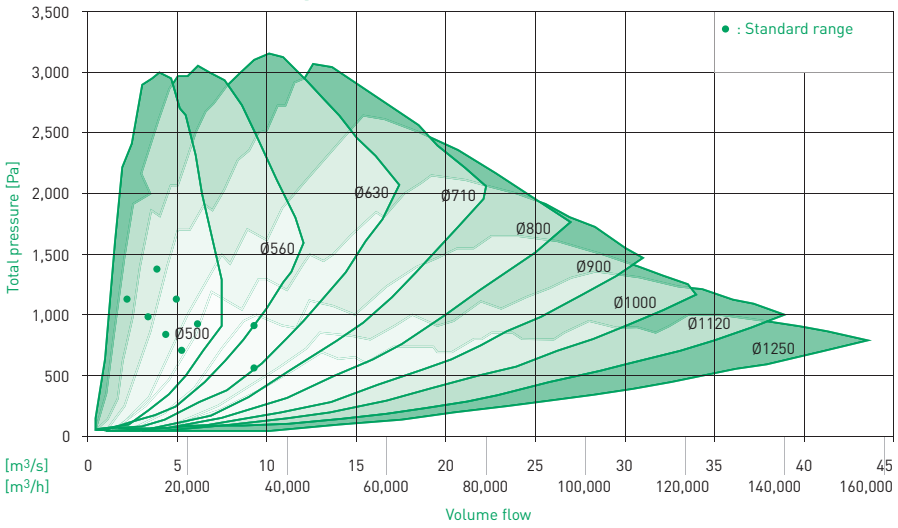
The capacities are based on installation in accordance with BS 848 1980, installation type D, i.e. duct connection for inlet and outlet. The air density is p = 1.20 kg/m³.

Please refer to Novenco AirBox for final dimensioning, calculation of blade angles, choice of motor, power consumption and sound calculation. See section "AirBox calculation program" on page 3.

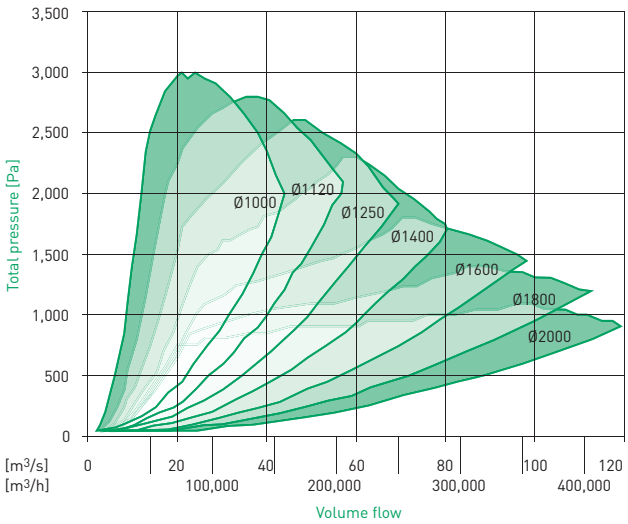
Impellers Ø250 - Ø500 / Ø160 hubs



Impellers Ø500 - Ø1250 / Ø350 hubs



Impellers Ø1000 - Ø2000 / Ø560 hubs



STANDARD RANGE

The fans in the standard range are based on sales statistics from the introduction of ZerAx in 2010 and to 2015. The analysis shows a demand for relatively small and high efficient fans. Big fans and fans with high air volumes are, however, also in the standard range.

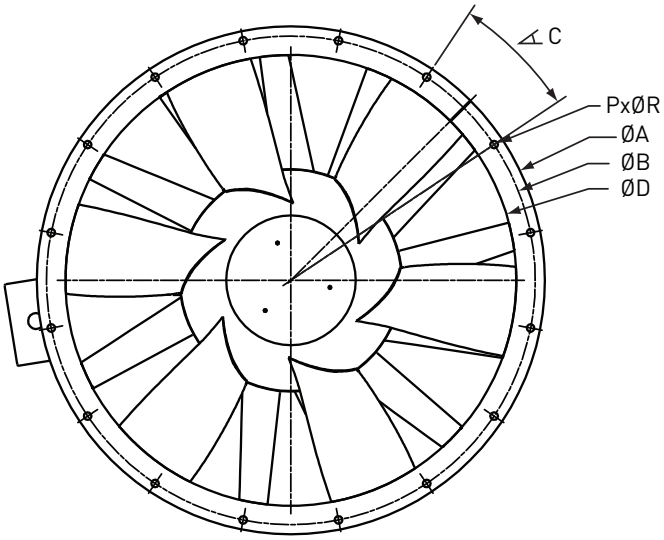
The standard range comprises fans for operation at temperatures between -20 to +50 °C. The range covers AZL fans with Ø160 hubs and AZN fans with Ø160 and Ø350 hubs.

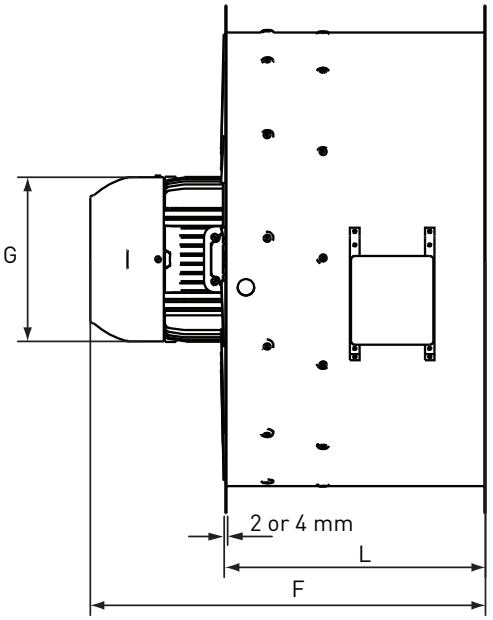
The standardisation encompass rotor diameters, hub sizes, blade angles and motors. The fan configurations are locked with respect to these parameters. It is, however, possible to fit parts from the accessory programme.

All standard range configurations are available in AirBox and are calculated the same way as custom configurations.

DIMENSIONS

AZN FOR DUCT INSTALLATION



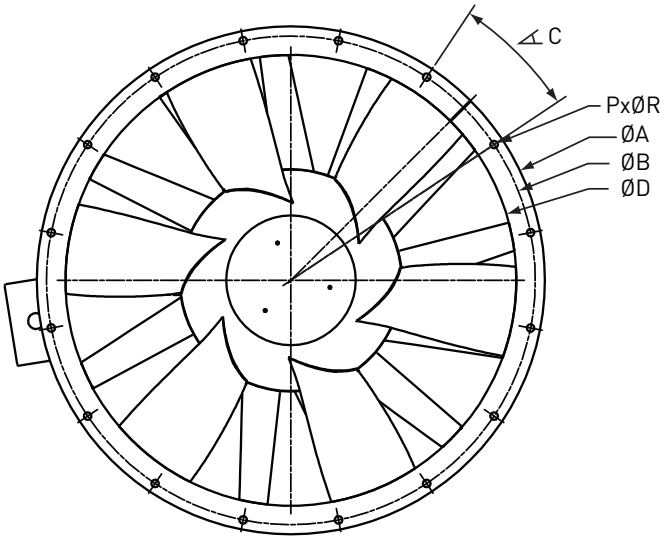


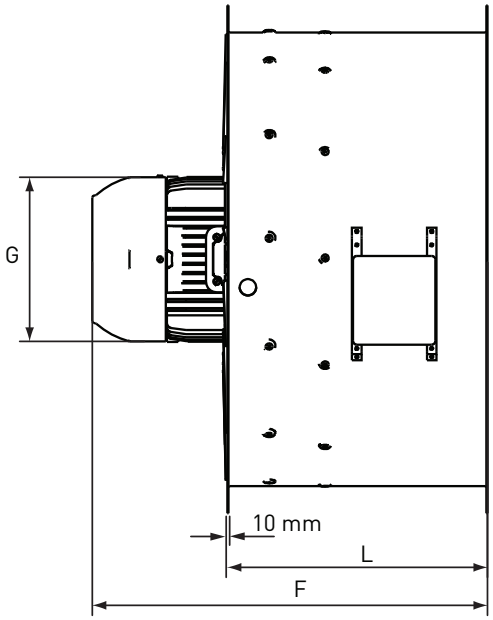
Hub sizes [mm]	ØD [mm]	ØB [mm]	ØA [mm]	C [º]	P	ØR [mm]
Ø160	250	280	310	90	4	10
	280	320	350	90	4	10
	315	355	385	45	8	10
	355	395	435	45	8	10
	400	450	480	45	8	12
	450	500	530	45	8	12
	500	560	590	30	12	12
Ø350 [1]	500	560	590	30	12	12
	560	620	650	30	12	12
	630	690	720	30	12	12
	710	770	800	22.5	16	12
	800	860	890	22.5	16	12
	900	970	995	22.5	16	15
	1000	1070	1095	22.5	16	15
	1120	1190	1215	18	20	15
	1250	1320	1345	18	20	15
Ø560 [1]	1000	1070	1100	22.5	16	15
	1120	1190	1230	18	20	15
	1250	1320	1375	18	20	15
	1400	1470	1540	18	20	15
	1600	1680	1760	15	24	19
	1800	1880	1970	15	24	19
	2000	2080	2170	15	24	19

1. The AZN ATEX is only available with Ø350 and Ø560 hubs. Refer to AirBox for the ATEX motors.

Hub sizes [mm]	Motor sizes	F [mm]	G [mm]	L [mm]
Ø160	71	450	141	450
	80	450	159	
	90	450	179	
	100	527	199	
	112	574	222	
Ø350 [1]	90S	452	179	410
	90L	477		
	100L	514	199	
	112M	531	222	
	132S	585	270	
	132M	623		
	160M	832	312	
	160L	876		
	180M	898	358	
	180L	936		
Ø560 [1]	132S	754.5	271	700
	132M	792.5		
	132M/L	817.5		
	160M	870.5	329	
	160L	914.5		
	180M	936.5	360	
	180L	974.5		
	200M	1001.5	402	
	200L	1039.5		
	225S/M	1338.5	455	
	250S/M	1417.5	486	
	280S/M	1523.5	599	

AZW FOR HEAVY DUTY



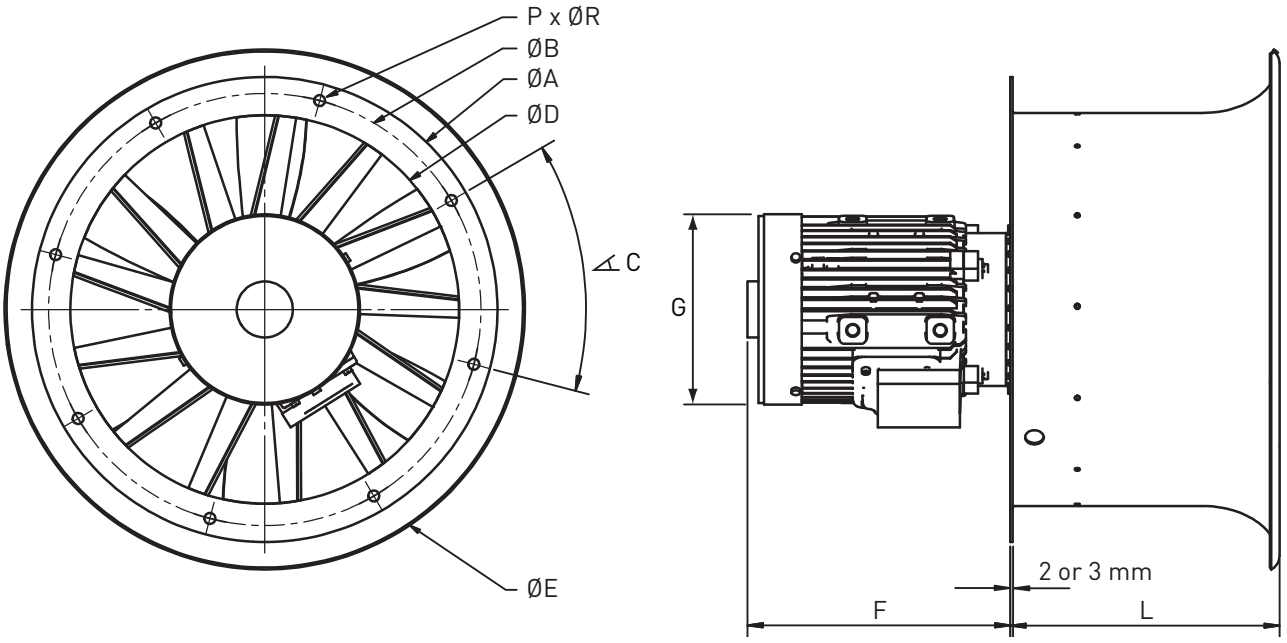


Hub sizes [mm]	ØD [mm]	ØB [mm]	ØA [mm]	C [º]	P	ØR [mm]
Ø350 [1]	500	551	592	30	12	12
	560	629	672	22.5	16	14
	630	698	742		16	14
	710	775	822		16	14
	800	861	912	15	24	14
	900	958	1012	15	24	14
	1000	1067	1113	15	24	14
	1120	1200	1263	11.25	32	18
	1250	1337	1393	11.25	32	18
Ø560	1000	1067	1113	15	24	14
	1120	1200	1263	11.25	32	18
	1250	1337	1393	11.25	32	18
	1400	1491	1543	11.25	32	18
	1600	1663	1753	9	40	18
	1800	1856	1953	9	40	18
	2000	2073	2153	9	40	18

1. The AZW EX is only available with Ø350 hubs. Refer to AirBox for the marine EX motors.

Hub sizes [mm]	Motor sizes	F [mm]	G [mm]	L [mm]
Ø350 [1]	90S	452	179	410
	90L	477		
	100L	514	199	
	112M	531	222	
	132S	585	270	
	132M	623		
	160M	832	312	
	160L	876		
	180M	898	358	
	180L	936		
Ø560	132S	754.5	271	700
	132M	792.5		
	132M/L	817.5		
	160M	870.5	329	
	160L	914.5		
	180M	936.5	360	
	180L	974.5		
	200M	1001.5	402	
	200L	1039.5		
	225S/M	1338.5	455	
	250S/M	1417.5	486	
	280S/M	1523.5	599	

AZL FOR FREE INLET



Hub sizes [mm]	ØD [mm]	ØB [mm]	ØA [mm]	ØE [mm]	C [º]	P	ØR [mm]	L [mm]
Ø160	250	280	310	335	90	4	10	225
	280	320	350	375	90	8	10	231
	315	355	385	422	45	8	10	238
	355	395	425	475	45	8	10	246
	400	450	480	536	45	8	12	255
	450	500	530	602	45	8	12	265
	500	560	590	669	30	12	12	275
Ø350	500	560	590	669	30	12	12	410
	560	620	650	753	30	12	12	
	630	690	720	842	30	12	12	
	710	770	800	948	22.5	16	12	
	800	860	890	1068	22.5	16	12	
	900	970	1000	1202	22.5	16	15	
	1000	1070	1100	1338	22.5	16	15	

Hub sizse [mm]	Motor sizes	F [1] [mm]	G [mm]
Ø160	71	218	141
	80	236	159
	90	279	179
	100	316	199
	112	363	222
Ø350	90S	452	179
	90L	477	
	100L	514	199
	112M	531	222
	132S	585	270
	132M	623	
	160M	832	312
	160L	876	
	180M	898	358
	180L	936	

1. Depends on motor size.

ACCESSORIES

ACCESSORIES FOR ANY PURPOSE

The ZerAx is offered with a wide choice of accessories that make it possible to customise fan solutions for virtually all installation conditions. Refer also to the AirBox program.

Feature	AZN	AZW	AZL
Acoustic diffuser type YAD with core	•		•
Acoustic diffuser type YAZ with or without core	•		•
Fan casing extension [1]	•	•	•
Hub cover [2]	•		•
Inlet cone with wire guard	•	•	
Inlet wire guard	•	•	•
Outlet wire guard	•	•	•
Long diffuser	•		•
Short diffuser	•		•
Painted impeller for C4/5 environments	•	•	•
Silencer type YAA with or without core		•	
Silencer type YAH with or without core	•	•	•
Thermal motor protection	•	•	•
Space heater for motor	•	•	•
Kit for lubrication of motor	•	•	•
Low temperature motor option	•	•	•
Frequency converter for motor	•	•	•
Mounting			
Anti-vibration mounting plate	•	•	
Anti-vibration mountings	•	•	
Support frame for horizontal mounting	•		•
Vertical mounting plate	•		•
Connection			
Counter flange	•	•	•
Duct spigots	•	•	•
Flexible connection (PERL / Maritex)	•	•	•
Measuring pipe	•		•
External			
Damper type SBA-SBC	•	•	•
Roof hood type HAN	•		
Roof hood type HAT		•	

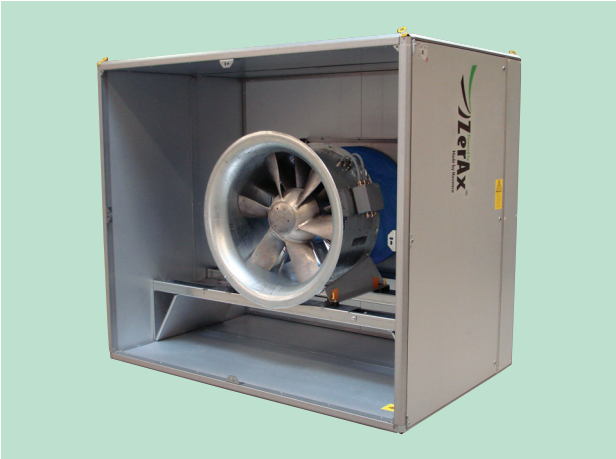
1. The fan casing extension is made of 2 mm AluZink and is usually selected for fans where the motors cannot be encased otherwise. It is also refered to as an extension duct.
2. The hub cover prevents water, ice, dirt and bacteria to enter into hub cavities, which can result in impeller imbalance.

ANTI-VIBRATION MOUNTINGS

The fitting of anti-vibration mountings is an effective way to prevent spreading of vibrations from fan units to the installation environment and vice versa. The kind of mountings depends on the fan size. Smaller and medium fans are typically fitted with cylindrical rubber discs on the support frame or on the mounting plates. Larger fans are fitted with steel springs as rubber discs cannot provide sufficient damping due to heavy weight and low speeds.

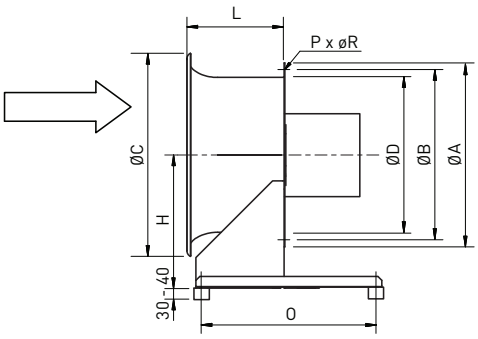
The anti-vibration moutings are available in different size combinations. Types and sizes are dimensioned by Novenco based on fan type and size, air pressure and accessories.

AZN WITH ACOUSTIC DIFFUSER TYPE YAZ

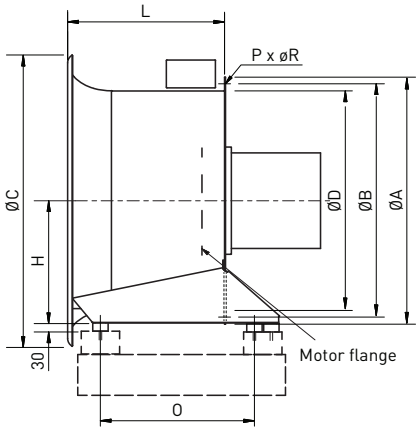


BUILT-IN AZL IN AHU SECTION

SUPPORT FRAMES, DIFFUSERS AND CASING EXTENSIONS



Support frame for AZL with Ø160 hubs



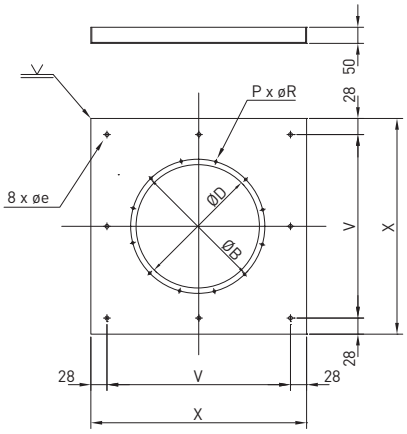
Support frame for AZL with Ø350 hubs

		Installation sizes (impeller diameters) [3]													
		Hub Ø160							Hub Ø350						
		Ø250	Ø280	Ø315	Ø355	Ø400	Ø450	Ø500	Ø500	Ø560	Ø630	Ø710	Ø800	Ø900	Ø1000
Support frames for AZL [2]	ØA	310	350	385	425	480	530	590	590	650	720	800	890	1000	1100
	ØB	280	320	355	395	450	500	560	560	620	690	770	860	970	1070
	ØC	333	373	420	473	545	600	675	675	753	842	948	1068	1202	1338
	ØD	250	280	315	355	400	450	500	500	560	630	710	800	900	1000
	O [4]	290	290	290	290	290	290	290	340	340	340 691.5	380 702.5	380 701.5	430 712.5	430 691.5
	P	4	8	8	8	8	8	12	12	12	12	16	16	16	16
	ØR	10	10	10	10	12	12	12	12	12	12	12	12	15	15
	H [5]	303	318	348	373	348	368	388	300.5	301	400.5 401	400.7 401	450.9 451	501 501	550.3 551
	L [5]	225	231	238	246	255	265	275	460	485	485 485.5	515 516	515 516	555 556	555 556
	Weight [1]	7	9	10	12	13	15	16	36 52	43 61	50 72	58 84	70 97	80 115	91 130

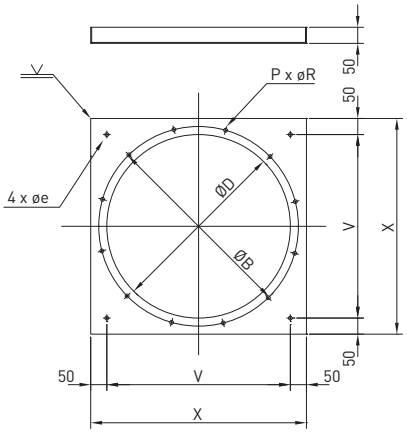
1. Weights include fan and casing, but exclude motors. For hub sizes Ø350 top values are for fans with 2 mm casings and bottom values are for 3 mm casings.
Refer to Novenco AirBox for weights of specific configurations.

2. The width and design of the mounting support construction depend on hub size.
3. The flange standards are according to Eurovent 1/2.
4. For hub size Ø350 the top values are for motor sizes <=132 and bottom values for motor sizes >132. Data for fan diameters Ø500 and Ø560 is unavailable.

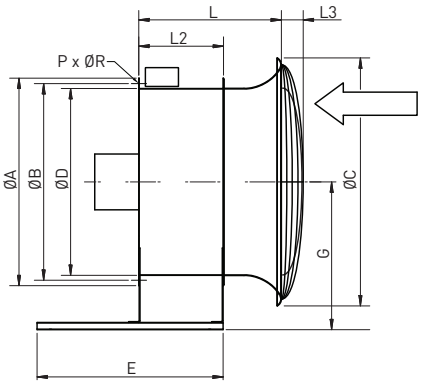
Dimensions are in mm. Weights are in kg.



Vertical mounting plate for AZL-AZN with Ø160 hub



Vertical mounting plate for AZN-AZW with Ø350 and Ø560 hubs

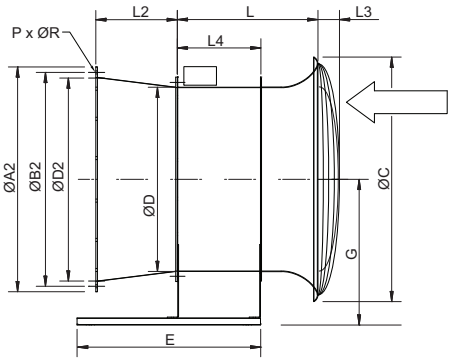


Support frame, inlet cone and wire guard for AZN

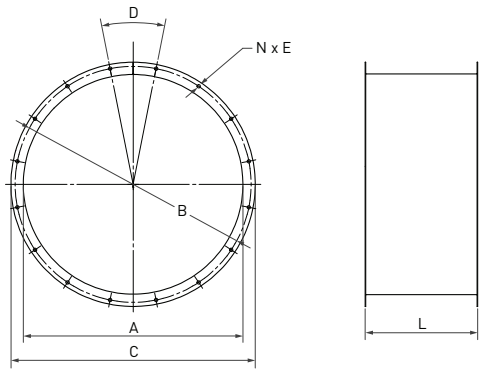
		Installation sizes (impeller diameters) [3]																						
		Hub Ø160							Hub Ø350									Hub Ø560						
		Ø250	Ø280	Ø315	Ø355	Ø400	Ø450	Ø500	Ø500	Ø560	Ø630	Ø710	Ø800	Ø900	Ø1000	Ø1120	Ø1250	Ø1000	Ø1120	Ø1250	Ø1400	Ø1600	Ø1800	Ø2000
Vertical mounting plates	ØB	280	320	355	395	450	500	560	560	620	690	770	860	970	1070	1190	1320	1070	1190	1320	1470	1680	1880	2080
	ØD	250	280	315	355	400	450	510	510	570	640	720	810	910	1010	1130	1260	1010	1130	1260	1410	1610	1810	2010
	Øe	8	8	8	8	12	12	12	12	12	12	18	18	18	18	18	18	18	18	18	18	19	19	19
	P	4	4	8	8	8	8	12	12	12	12	16	16	16	16	20	20	16	20	20	20	24	24	24
	øR	10	10	10	10	12	12	12	12	12	12	12	12	15	15	15	15	15	15	15	15	19	19	19
	V	544	544	544	544	544	544	510	510	570	640	720	810	920	1020	1140	1280	1030	1140	1280	1490	1680	1880	2080
	X	600	600	600	600	600	600	604	610	670	740	820	910	1020	1120	1240	1380	1130	1240	1380	1590	1780	1980	2180
	Weight	11.2	11.2	11.2	11.2	11.2	11.2	6.7	7	8	9	10.5	12	19	22	25	30	20.4	23.8	27.9	32.7	66.3	77.7	90.2
Support frame and frames, inlet cone and wire guard for AZN [2]	ØA	310	340	385	435	480	530	590	590	650	720	800	890	1000	1100	1220	1360	1100	1220	1360	1510	1720	1922	2170
	ØB	280	320	355	395	450	500	560	560	620	690	770	860	970	1070	1190	1320	1070	1190	1320	1470	1680	2122	2080
	ØC	335	375	422	475	536	602	669	669	765	845	952	1060	1205	1338	1505	1569	1338	1505	1569	1757	2007	2257	2508
	ØD	250	280	315	355	400	450	500	500	560	630	710	800	900	1000	1120	1250	1000	1120	1250	1400	1600	1800	2000
	E [4]	900							700 940	700 940	700 940	700 940	700 940	700 940	700 940	700 940	700 940	880 1500	880 1500	880 1500	880 1500	880 1500	880 1500	880 1500
	P	4	4	8	8	8	8	12	12	12	12	16	16	16	16	20	20	16	20	20	20	24	24	24
	ØR	10	10	10	10	12	12	12	12	12	12	12	12	15	15	15	15	15	15	15	15	19	19	19
	G	350	365	395	420	395	415	435	435	485	525	575	625	725	785	845	895	812	872	972	1072	1172	1322	1422
	L	650	650	650	650	655	655	655	615	670	675	675	670	690	710	730	730	1000	1046	1055	1083	1120	1158	1195
	L2	450							410									700						
	L3	31	37	45	57	73	89	60	60	74	92	116	142	90	111	138	138	111	138	138	176	223	280	342
	Weight [1]								128 290	137 301	145 318	154 284	164 297	179 314	192 330	207 347	221 364	385 554	423 590	469 622	512 659	573 707	636 814	709 876

1. Weights are total weights including motor sizes 132 (top) or 180 (bottom) with lowest rated power and speed.
2. The length of the side members on the support frame depends on the motor size.
3. The flange standards are according to Eurovent 1/2 for AZL and AZN, and DIN 24154 R4 for AZW.
4. For AZN with Ø350 hubs the top values are for motor sizes 90-132 and the bottom values for sizes 132-180. For AZN with Ø560 hubs the top values are for motor sizes 132-200 and the bottom values for sizes 225-280.

Dimensions are in mm. Weights are in kg.
Refer to Novenco AirBox for specific weights.



Support frame, inlet cone and diffuser for AZN

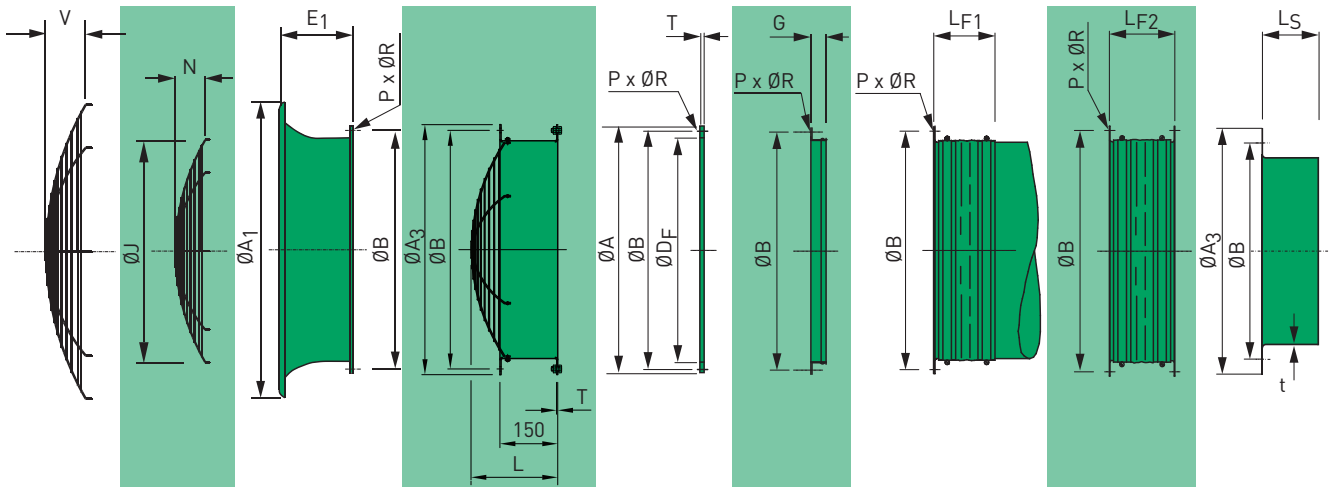


Fan casing extension

		Installation sizes (impeller diameters)																								
		Hub Ø160							Hub Ø350									Hub Ø560								
		Ø250	Ø280	Ø315	Ø355	Ø400	Ø450	Ø500	Ø500	Ø560	Ø630	Ø710	Ø800	Ø900	Ø1000	Ø1120	Ø1250	Ø1000	Ø1120	Ø1250	Ø1400	Ø1600	Ø1800	Ø2000
AZN with support frame, inlet cone, diffuser and wire guard [3]	ØD	250	280	315	355	400	450	500	500	560	630	710	800	900	1000	1120	1250	1000	1120	1250	1400	1600	1800	2000
	ØD2 [6]	279 314	314 354	354 399	399 449	449 499	499 559	559 630	559 629	630 710	710 800	800 900	900 1000	1000 1120	1120 1250	1250 1400	1400 1600	1120 1250	1250 1400	1400 1600	1600 1800	1800 2000	— —	—
	ØA2 [6]	340 375	375 415	415 470	470 520	520 580	580 640	640 710	660 710	730 810	810 910	888.5 1010	1010 1110	1103 1223	1223 1363	1363 1513	1513 1723	1223 1363	1363 1513	1513 1723	1723 1923	1923 2123	2125 —	2365 —
	ØB2 [6]	320 355	355 395	395 450	450 500	500 560	560 620	620 690	620 690	690 770	770 860	860 970	970 1070	1070 1190	1190 1320	1320 1470	1470 1680	1190 1320	1320 1470	1470 1680	1680 1880	1880 2080	2080 —	2320 —
	ØC	375	375	422	475	536	602	669	669	765	845	952	1060	1205	1338	1505	1569	1338	1505	1569	1757	2007	2257	2508
	L	661	—	650	—	655	—	655	615	670	675	675	670	690	710	756	765	1000	1046	1055	1083	1120	1158	1195
	L2 [6]	125 250	140 280	157.5 315	175 355	200 400	225 450	250 500	250 500	280 560	315 630	355 710	400 800	400 900	500 1000	560 1100	600 1400	500 1000	560 1100	600 1400	800 1600	800 1600	900 1800	1000 2000
	L3	—	—	45	—	73	—	60	60	74	92	116	142	90	111	138	138	111	138	138	176	223	280	342
	L4	450							410									700						
	E [5]	—							1000				1300				1600	1600 2100 2100			2900			
	P [6]	4 8	8	8	8	8 12	12	12	12	12	12	16	16	16 20	20	20	20 24	20	20	20 24	24	24	24 —	32 —
	ØR [6]	10	10	10 12	12	12	12	12	12	12	12	12	12 15	15	15	15	15 19	15	15	15 19	19	19	19 —	19 —
	G	350		395					433	483.5	523.5	573	623	723.5	783	843.5	893.5	812	872	972	1072	1172	1322	1422
	Total weights with short diffuser [1]	—	—	—	—	—	—	75 107	135 260	146 269	155 284	167 297	180 313	212 347	232 370	255 395	278 421	425 594	471 639	526 680	589 736	659 793	751 929	849 1016
	Weights of long diffusers	4.6	5.7	7.1	8.9	11.1	13.7	16.9	16.9	20.9	22.9	—	—	52	62	74	102	62	74	102	123	139	—	—
Fan casing extensions	A	250	280	315	355	400	450	500	500	560	630	710	800	900	1000	1120	1250	1000	1120	1250	1400	1600	1800	2000
	B	280	320	355	395	450	500	560	560	620	690	770	860	970	1070	1190	1320	1070	1190	1320	1470	1680	1880	2080
	C	310	350	385	435	480	530	590	590	650	720	800	890	1000	1100	1220	1350	1100	1220	1350	1540	1760	1916	2180
	L [2]	410 or 550																410 or 850						
	D	90	90	45	45	45	45	30	30	30	30	22.5	22.5	22.5	22.5	18	18	22.5	18	18	18	15	15	15
	E	10	10	10	10	12	12	12	12	12	12	12	12	15	15	15	15	15	15	15	15	19	19	19
	N	4	4	8	8	8	8	12	12	12	12	16	16	16	16	20	20	16	20	20	20	24	24	24
	Weights [4]	—							12.4 15.9	13.8 17.7	15.5 19.9	17.5 22.4	19.6 25.2	22.3 28.6	24.8 31.7	27.7 35.5	30.9 40.0	49.5 93.1	55.4 104.2	63.1 117.6	70.6 131.6	81.3 151	91.4 169.8	101.5 188.6

1. Weights are for 2 mm casing thicknesses including motor sizes 132 (top) and 180 (bottom) with lowest rated power and speed and with short diffusers. For Ø160 hubs weights exclude support frame and are for motor sizes 75 (top) and 112 (bottom).
2. Extensions for fans with Ø160 or Ø350 hubs are available in two lengths. Extensions for fans with Ø560 hubs are made in a short version for motor sizes <= 200 and a long version for larger motor sizes or casing thicknesses of 10 mm.
3. The length of the side members on the support frame depends on the motor size.
4. Weights for Ø350 hubs for casing lengths L = 410 (top) and for lengths L = 850 (bottom). Weights for Ø560 hubs for casing lengths L = 410 (top) and for lengths L = 850 (bottom).
5. Lengths for Ø560 hubs with or without short extensions (top), with long extensions (middle) and with acoustic diffusers (bottom).
6. Short diffusers (top), long diffusers (bottom) and identical values only one value
Dimensions are in mm. Weights are in kg.

WIRE GUARDS, CONES AND FLANGES

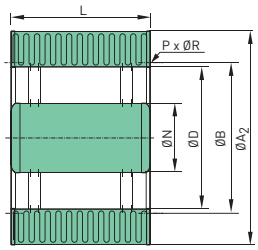


Wire guard for cone | Wire guard for installation in pipe and flange | Inlet cone | Extension duct with wire guard | Counter flange | Duct spigot | Flex. connection with duct spigot | Flex. connection with two duct spigots | Welding spigot

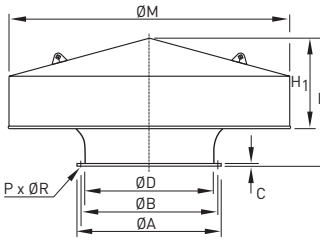
		Installation sizes (impeller diameters)																		
		Ø250	Ø280	Ø315	Ø355	Ø400	Ø450	Ø500	Ø560	Ø630	Ø710	Ø800	Ø900	Ø1000	Ø1120	Ø1250	Ø1400	Ø1600	Ø1800	Ø2000
Wire guard	V	31	—	45	—	73	—	60	69	87	111	137	85	106	133	133	171	218	275	337
	Weight	0.1	—	0.2	—	0.3	—	0.5	0.6	0.8	0.9	1.1	2.5	3.0	3.6	3.6	4.2	5.7	6.6	7.8
Wire guard for installation in pipe and flange	N	19	—	29	—	43	—	68	88	55	69	87	111	137	85	106	133	171	218	275
	ØJ	246	—	310	—	396	—	496	556	626	706	796	896	996	1114	1244	1394	1594	1794	1994
	Weight	0.1	—	0.1	—	0.2	—	0.3	0.3	0.5	0.6	0.8	0.9	1.1	2.5	3.0	3.6	4.2	5.7	6.6
Wire guard for installation on flanges	N	29	—	43	—	68	—	88	55	69	87	111	137	85	133	133	171	218	275	337
	ØJ	310	—	396	—	496	—	556	626	706	796	896	996	1114	1520	1650	1800	2000	1994	2194
	Weight	0.1	—	0.2	—	0.3	—	0.3	0.5	0.6	0.8	0.9	1.1	2.5	4	4.5	5	6	6.6	7.8
Inlet cone	E_1	200	200	200	200	205	205	205	260	265	265	260	280	300	325	320	320	320	458	495
	$ØA_1$	335	375	422	475	536	602	675 669	760	840	947	1055	1200	1333	1500	1650	1800	2000	2252	2503
	Weight	3.2	3.6	4.2	4.9	5.8	6.7	12.5 7.7	17	19	22	26	32	38	45	51	57	66	130	155
Extension duct with wire guard	L	—	—	340	—	—	—	478	498	465	479	497	521	687	635	656	543	581	1125	1187
	$ØA_3$	—	350	—	425	490	540	590	650	720	800	890	1000	1100	1220	1350	1540	1760	1970	2170
	ØB	280	320	355	395	450	500	560	620	690	770	860	970	1070	1190	1320	1470	1680	1880	2080
Counter flange	T	—	—	—	2	2	—	4	4	4	4	4	8	8	8	8	8	8	8	8
	$ØD_F$	260	290	325	365	410	460	510	570	640	720	810	910	1010	1130	1260	1410	1610	1805	2005
	Weight	—	3.8	—	5.6	—	9.1	2.2	2.4	2.7	3.0	3.4	8.5	9.4	10.2	12.2	14.2	17.2	22	24
Duct spigot	G	55	55	55	55	55	55	55	55	55	55	55	85	85	85	85	85	85	85	85
	Weight	1.0	1.2	1.4	1.6	1.8	2.1	2.4	2.7	3.1	3.5	3.9	5.9	6.6	7.4	8.6	9.6	11.3	12.7	14.1
Flexible connection	L_{F1}	Min. 65 mm - max. 100 mm											Min. 110 mm - max. 175 mm							
	Weight w. 1 spigot	1.3		1.7		2.3		3.0	3.5	3.8	4.3	5.0	7.8	8.9	10.0	11.6	13.1	20	18	20
	L_{F2}	Min. 120 mm - max. 145 mm											Min. 210 mm - max. 250 mm							
	Weight w. 2 spigots	2.3		3.0		4.2		5.5	6.2	6.9	7.8	8.8	13.7	15.5	17.4	20.2	22.7	26.6	31	34

Dimensions are in mm. Weights are in kg.
Values for ØA and ØR are in section "Dimensions" on page 8.

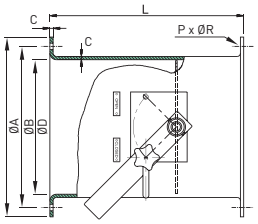
SILENCERS, HOODS AND DAMPERS



Silencer type YAH



Hood type HAN



Damper type SBC

		Installation sizes (impeller diameters, ØD)																		
		Ø250	Ø280	Ø315	Ø355	Ø400	Ø450	Ø500	Ø560	Ø630	Ø710	Ø800	Ø900	Ø1000	Ø1120	Ø1250	Ø1400	Ø1600	Ø1800	Ø2000
All	ØD	250	280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250	1400	1600	1800	2000
	ØB	280	320	355	395	450	500	560	620	690	770	860	970	1070	1190	1320	1470	1680	1880	2080
	ØA	310	350	385	425	480	530	590	650	720	800	890	1000	1100	1220	1360	1510	1720	1922	1880
	P	4	4	8	8	8	8	12	12	12	16	16	16	16	20	20	20	24	24	24
	ØR	10	10	10	10	12	12	12	12	12	12	12	15	15	15	15	15	19	19	19
Silencers type YAH	L	250	280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250	1400	1600	1800	2000
	ØN	125	—	160	—	200	—	250	280	315	355	400	450	500	560	578	578	578	578	578
	$ØA_2$	463	495	526	570	614	665	715	775	845	925	1015	1115	1215	1335	1463	1613	1813	2013	2213
	ØR	M8	—	M8	—	M10	—	M10	M10	M10	M10	M10	M12	M12	M12	M12	M12	M16	M16	M16
	Weight without core	6.2	—	8.9	—	12.5	—	19.1	22.8	27.6	33.8	41.3	50.6	61.1	74.5	122	148	188	270	327
	Weight w/ core	7.9	—	11.5	—	16.8	—	26.5	32.8	40.8	52.1	69.2	86.8	110	134	184	220	277	351	417
Hoods type HAN	H	361	—	412	—	476	—	540	641	694	744	811	868	890	1140	1252	1402	1602	—	—
	H_1	180	—	228	—	290	—	364	405	450	506	569	645	710	800	853	983	1153	—	—
	ØM	598	—	724	—	906	—	1106	1266	1406	1586	1766	2016	2236	2436	2810	3110	3510	—	—
	C	2.5	—	2.5	—	3	—	3	3	3	3	3	3	3	3	4	4	4	—	—
	Weight	13	—	19	—	40	—	58	79	97	120	151	206	250	313	625	776	1020	—	—
Dampers type SBC	L	360	—	400	—	520	—	560	620	670	730	810	910	1010	1130	1250	1400	—	—	—
	C	2	—	2	—	3	—	3	3	3	3	3	3	4	4	5	6	—	—	—
	Weight	9.5	—	12.5	—	24	—	32	41.5	49	63	86	107	149	183	274	386	—	—	—

Dimensions are in mm. Weights are in kg.

TECHNICAL DATA FOR SILENCER YAH

YAH - Pressure loss

Without core: Insignificant
With core: 0.2 x p_{dF}
Two YAH in series: 0.35 x p_{dF} (dynamic pressure)

Inlets on AZN-AZW use silencers without cores.

EXAMPLE

YAH-800 WITH CORE

Conditions: Air flow rate, q_v = 5 m^3/s; Air speed, inlet = 10 m/s; P_{dF} = 60 Pa
Pressure loss: 0.2 x 60 Pa = 12 Pa

AVERAGE VALUES FOR SOUND ATTENUATION

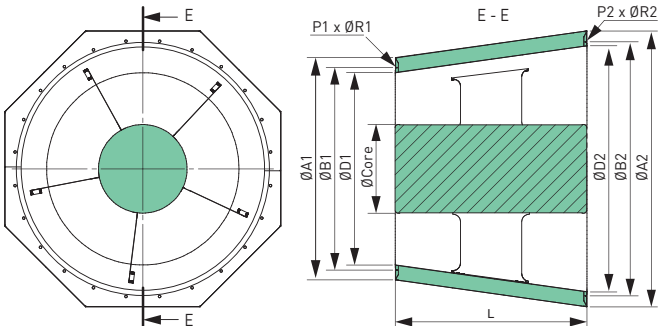
Type	Octave band [Hz]							
	63	125	250	500	1k	2k	4k	8k
Without core [dB]	0	1	10	13	11	9	7	7
With core [dB]	2	4	10	17	17	15	12	11

ACOUSTIC DIFFUSERS

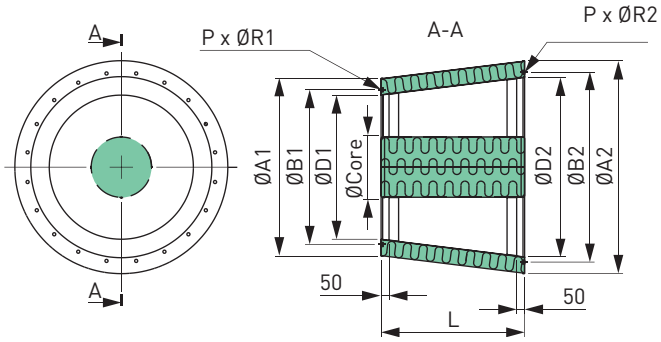
Acoustic diffusers are an effective and easy way of attenuating fan noise. The YAD and YAZ diffusers may be mounted directly on the fan casing flanges. Some diffusers, with relatively large cores, may require casing extensions to be fitted between the fans and diffusers.
The diffusers should be supported separately at installation.

The types YAD and YAZ are designed for comfort and industrial ventilation. Cores are fitted in both types. The YAZ is also made in a version without core.

The outer dimensions of the YAZ are identical for versions with or without cores.



Type YAZ with core



Type YAD with core

ENVIRONMENT

The diffusers are intended for temperatures between -40 and +120 °C.

The basic versions are designed to operate in environmental category C3. Refer to DS/EN ISO 12944.

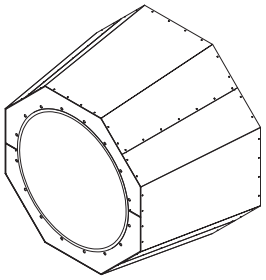
Sizes	ØCore [mm]	Fan side [mm]				Duct side [mm]				L	Weights [kg]		Availability	
		ØA1	ØB1	ØD1	P1 x ØR1	ØA2	ØB2	ØD2	P2 x ØR2		No core	With core	YAD	YAZ
250	160	463	280	253	4 x M8	614	450	404	8 x M10	250	—	12	•	—
315		526	355	318	8 x M8	716	560	504	12 x M10	315	—	18	•	—
400		614	450	404	8 x M8	776	620	564	12 x M10	400	—	23	•	—
500		716	560	504	12 x M10	846	690	634	12 x M10	500	—	31	•	—
500	330	700	560	504	12 x M10	830	690	634	12 x M10	500	24.8	N/A	—	•
560	380	760	620	564	12 x M10	910	770	714	16 x M10	560	29.6	N/A	—	•
630		830	690	634	12 x M10	1000	860	804	16 x M10	630	37.0	N/A	—	•
710		910	770	714	16 x M10	1100	970	904	16 x M12	710	44.9	N/A	—	•
800		1000	860	804	16 x M10	1200	1070	1004	16 x M12	800	54.9	N/A	—	•
900		1100	970	904	16 x M12	1320	1190	1124	20 x M12	900	67.4	N/A	—	•
1000	578	1200	1070	1004	16 x M12	1450	1320	1254	20 x M12	1000	82.9	157	—	•
1120		1320	1190	1124	20 x M12	1600	1470	1404	20 x M12	1120	100	130	—	•
1250		1450	1320	1254	20 x M12	1800	1680	1604	24 x M12	1250	122	198	—	•
1400		1600	1460	1404	20 x M12	2000	1880	1804	24 x M12	1400	158	274	—	•
1600		1800	1680	1604	24 x M12	2200	2080	2004	24 x M12	1600	192	320	—	•
1800		1960	1880	1800	24 x M16	2380	2320	2240	32 x M19	1800	390	482	—	•
2000		2164	2080	2000	24 x M16	2640	2580	2500	32 x M19	2000	480	582	—	•

ATTENUATION VALUES FOR YAZ WITHOUT CORE

External diameters	Hub diameters	Octave band [Hz]							
		63	125	250	500	1k	2k	4k	8k
500	350	0	0	3	14	12	8	6	5
560		0	0	3	14	13	8	7	5
630		0	1	11	13	9	6	4	3
710		0	1	5	15	11	6	5	4
800		0	3	8	16	12	6	5	4
900		0	1	9	16	9	6	4	3
1000		1	3	7	14	6	3	4	4
1120		1	3	7	11	6	4	4	4
1250		1	2	7	5	4	4	4	3

External diameters	Hub diameters	Octave band [Hz]							
		63	125	250	500	1k	2k	4k	8k
1000	560	0	4	9	19	14	8	6	5
1120		0	1	11	19	12	8	5	4
1250		1	4	8	13	7	5	5	5
1400		1	3	8	6	5	5	5	4
1600		1	3	8	6	5	4	4	4

Dimensions are in mm. Attenuation values are in dB.



ACOUSTIC DIFFUSER TYPE YAZ WITHOUT CORE

ATTENUATION VALUES FOR YAD AND YAZ WITH CORE

External diameters	ØHub	ØCore	Octave band [Hz]							
			63	125	250	500	1k	2k	4k	8k
250	160 [1]	160	1	1	2	9	11	11	8	5
315			1	1	2	9	11	11	8	5
400			0	2	3	12	11	11	7	4
500			0	1	4	10	12	10	6	4
400		230	0	2	2	11	14	13	10	6
500		230	0	2	9	12	12	12	8	5
		280	0	2	2	12	15	15	11	7
		330	0	2	3	15	18	18	13	8

External diameters	ØHub	ØCore	Octave band [Hz]							
			63	125	250	500	1k	2k	4k	8k
500	350	330	0	2	3	15	18	18	13	8
560		380	0	2	3	15	19	18	14	8
630			0	2	11	15	15	15	11	6
710			0	1	5	14	16	13	9	6
800			1	3	8	16	15	11	7	6
900			0	1	9	16	15	11	7	5
1000			1	3	7	14	11	8	6	6
1120		403	1	3	7	14	11	8	6	5
1250			2	2	7	9	10	7	6	5
1000	560	578	0	4	9	19	18	13	9	7
1120			0	1	11	19	17	13	8	5
1250			1	4	8	16	13	9	7	6
1400			2	3	8	10	11	8	6	5
1600			2	3	8	9	10	8	6	5

1. Diffusers for fans with hub sizes Ø160 are type YAD.
Dimensions are in mm. Attenuation values are in dB.

CALCULATION EXAMPLES

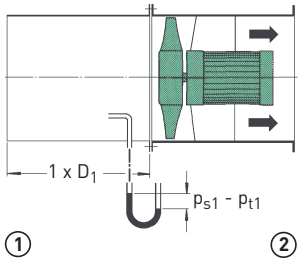
BASIS

The basis for the calculation of solutions is the arrangements C and D.

Installing a fan with free outlet (arr. C) causes loss of the entire velocity energy. However, fitting a diffuser on the outlet side lowers the outlet velocity, whereby some of the dynamic pressure loss is recovered as static pressure. Hence, the energy consumption of the fan is reduced. Novenco diffusers are designed to achieve optimal recovery of the dynamic energy.

ARR. C — DUCT ON INLET AND FREE OUTLET

$$p_{tF} = p_{t2} - p_{t1}$$
$$= p_{s2} + a \times p_{d2} - (p_{s1} + p_{d1})$$



A-FACTOR

This is a loss factor, which is used if the fan is used with free outlet (arrangement C). It is related to the speed loss (Δp_d) which results from the difference in air speed between the net inlet area and the total outlet area.

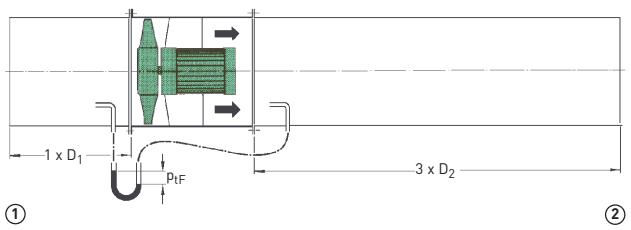
The effect of the a-factor is reduced if a diffuser is mounted on the outlet side.

The AirBox program compensates for the a-factor when the fan outlet is to a duct or as free outlet.

ARR. D — DUCT ON INLET AND OUTLET

$$p_{tF} = p_{t2} - p_{t1}$$
$$= (p_{s2} - p_{s1}) + (p_{d2} - p_{d1})$$

If $p_{d2} = p_{d1}$; then $p_{tF} = p_{s2} - p_{s1}$



RUN UP TIME

The run up time of axial flow fans is found with the formula to the right.

According to international standards the torque of the motor can vary within the following limits.

M_s : -15% + 25% of the catalogue value

M_k : -10% + 0% of the catalogue value

The above factors may increase the run up time more than calculated.

RUN UP TIME FORMULA

$$t_s = \frac{0.24 \times n^2 \times (I_m + I_v)}{10^4 \times P\ (M_s/M + M_k/M - P_v/P)}$$ where

t_s = Run up time [s]

P = Rated output of motor [kW]

P_v = Required power of fan [kW]

n = Fan speed [RPM]

$\frac{M_s}{M}$ = The ratio between the starting torque of the motor and the nominal torque

$\frac{M_k}{M}$ = The ratio between the maximum torque of the motor and the nominal torque

I_v = Polar moment of inertia for the fan [kgm²]

I_m = Polar moment of inertia for the motor [kgm²]

Designations	Symbols	Units	Formula
Mass flow	q_m	kg/s	
Air quantity, volume flow	q_v	m³/s	$\frac{q_m}{\rho}$
Inlet diameter	D_1	mm	
Outlet diameter	D_2	mm	
Density	ρ	kg/m³	
Flow area	A	m²	
Mean speed of plane	c_x	m/s	$\frac{q_v}{A_x}$
Static pressure of plane	p_{sx}	Pa	
Dynamic pressure of plane	p_{dx}	Pa	$0.5\ \rho \times c^2$
Total pressure of plane	p_{tx}	Pa	$p_{sx} + p_{dx}$
Total pressure of fan	P_{tF}	Pa	
Dynamic pressure of fan	P_{dF}	Pa	$0.5\ \rho \times c_2^2$
Static pressure of fan	P_{sF}	Pa	$p_{tF} - p_{dF}$
System loss	p_t	Pa	
Power consumption	P	kW	
Correction factor	a		

TOTAL EFFICIENCY

The total efficiency tells how effective the fan arrangement is.

$\eta_{total} = \eta_{fan} \times \eta_{motor} \times \eta_{drive}$, where

η_{total} : Total efficiency
η_{fan} : Fan efficiency
η_{motor} : Motor efficiency
η_{drive} : Frequency drive

The EU directive 2009/125/EU describes how to calculate total efficiency with regard to Eco-design requirements. Values for the total efficiency, measurement category, efficiency category and more are calculated by AirBox and included on the report. The information is also written on the fan nameplates.

Hub diameters	Fan sizes, ØD [mm]	RPM	
		Optimum	Reduced
Ø160	250	4919	—
	280	4747	—
	315	4570	—
	355	4408	—
	400	4269	—
	450	4145	—
	500	4086	—
Ø350	500	3660	3483
	560	3460	3286
	630	3238	3059
	710	3000	2804
	800	2751	2523
	900	2498	2217
	1000	2270	1918
	1120	1900	1568
	1250	1500	1201
Ø560	1000	2034	1904
	1120	1893	1727
	1250	1751	1552
	1400	1599	1371
	1600	1419	1166
	1800	1262	1002
	2000	1130	878

MAX. ALLOWABLE SPEEDS AT 20 °C [1 2 3]

1 Fan speeds depend on the installation space.
2 Fans with Ø160 hubs can run at maximum RPMs irrespective of the installation conditions. See table on page 6.
3 All fans are subject to run with reduced RPMs when installed for operation at temperatures outside the standard range between -20 and 50 °C. Refer to AirBox for specific RPMs.

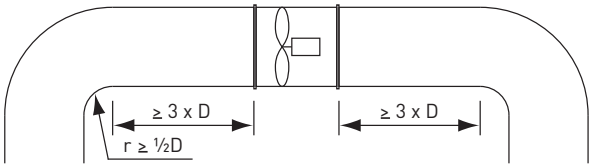
INSTALLATION CONSIDERATIONS

Whether ZerAx fans are built into ducts or installed as part of other installations, minimum distances to nearby objects in the airflow path must be observed.

The space at the inlet side must be optimum to ensure a smooth and undisturbed air flow. At less than optimum conditions, the fan speed must be reduced.

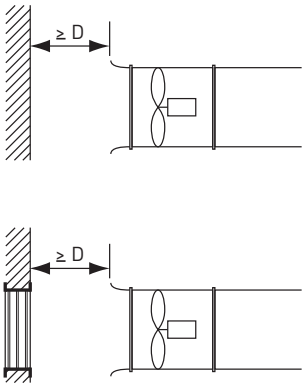
Free inlet requires an inlet cone to get optimum performance with regard to efficiency and sound.

Built into duct



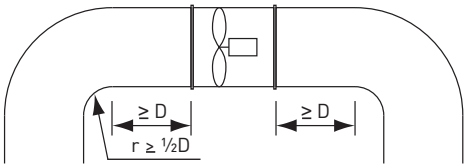
Free inlet

D = Fan diameter



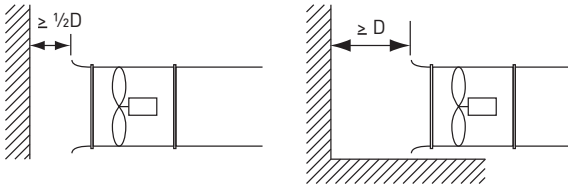
OPTIMUM INSTALLATION

Built into duct



Free inlet

D = Fan diameter



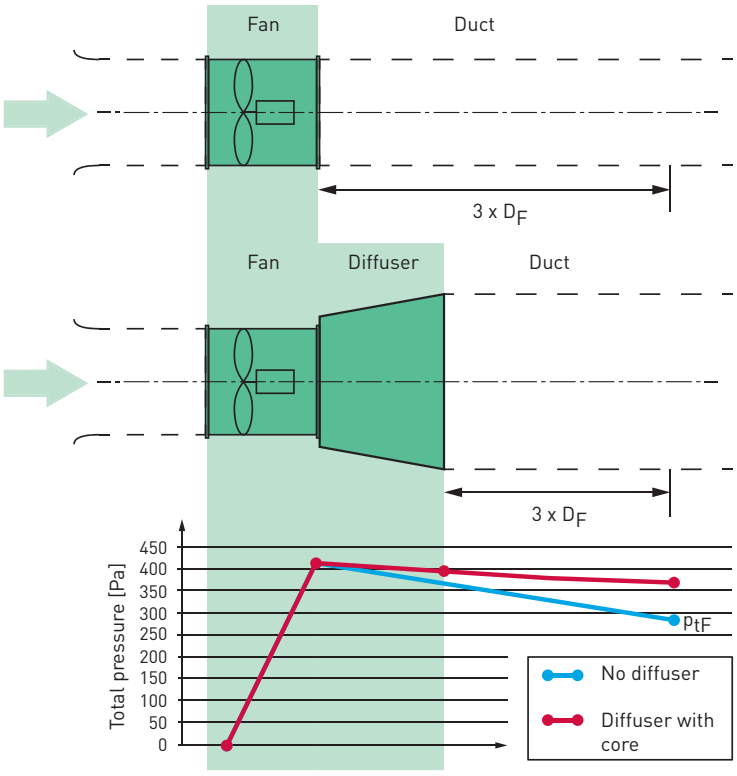
MINIMUM INSTALLATION

PRESSURE LOSS EXAMPLE

The air pressure builds up across the fan whereafter it decreases. In this example an acoustic diffuser controls the profile of the airflow and most importantly recovers a large part of the pressure loss.
AirBox calculates the desired total pressure available at the system outlet. Here this is the diffuser outlet.

The example here was calculated with AirBox for the following fan and conditions.

Fan type	:	AZN
Volume flow	:	3 m^3/s
Total pressure, p_{tF}	:	369 Pa
Fan diameter, D_F	:	Ø500 mm
Hub size	:	Ø350 mm
Blade angle	:	60°
Efficiency	:	87%



PRESSURE LOSS EXAMPLE

QUALITY AND SERVICE

REST ASSURED

The ZerAx axial flow fans are produced in accordance with Novenco's well-known quality standards.
Novenco Building & Industry A/S is ISO certified and all fans are inspected and tested.

The fans are offered with options for technical guidance on installation, test of function and training of personnel.

WARRANTY

Novenco provides according to law a standard 12 months warranty from the product is sent from the factory. The warranty covers materials and manufacturing defects. Wear parts are not covered.
Extended warranty can be agreed upon.

IMPORTANT

This document is provided 'as is'. Novenco Building & Indsutry A/S reserves the right to changes without further notice due to continuous product development.

Some pictures in the catalogue show products with accessories fitted.

The fans are designed for continuous operation. The following kinds of operation may cause fatigue break in the impellers and endanger people.

- Operation in stall area
- Operation with pulsating counter pressure – called pump mode
- Daily operation with exceedingly starting and stopping

If in doubt, Novenco should be contacted to assess the suitability of the fans.

PATENTS AND TRADEMARKS

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The ZerAx® manufacturing processes, technologies and designs are patented by Novenco A/S. Pending patents include Brazil no. BR 11 2012 008607-3, BR 11 2012 008543-3, BR 11 2012 008545 0, BR 11 2014 002282 8 and BR 11 2014 002426 0; Canada no. 2,777,140; 2,777,141; 2,777,144; 2,843,131 and 2,843,132; China no. 201080045884.2, 2012280037965.7 and 201280038721.0; EU no. 10778838.2, 12740606.4 and 12740612.2; India no. 4140/CHENP/2012, 4077/CHENP/2012, 4073/CHENP/2012, 821/CHENP/2014 and 825/CHENP/2014; South Korea no. 10-2012-7012252, 10-2012-7012154, 10-2012-7012155, 10-2014-7005746 and 10-2014-7003829; US no. 14/234,654;14/234,735; 29/541,413; 29/541,418 and 29/541,422; and PCT no. EP2012/064908 and EP2012/064928.
Granted patents include Brazil no. BR 30 2012 003932-0; Canada no. 146333; China no. CN 102612603 B, ZL201080046427.5, 1514732, 1517779, 1515003, 1555664 and 2312963; EU no. 2488759, 2488761, 001622945-0001, 001622945-0002, 001622945-0003, 001622945-0004, 001622945-0005, 001622945-0006, 001622945-0007, 001622945-0008, 001622945-0009 and 001985391-0001; Germany no. 602010030578.3; India no. 246293; Italy no. 502016000045500; South Korea no. 30-0735804; Spain no. 300192470; Sweden no. 1000082460; and US no. 9,273,696 B2; 9,200,641; 8,967,983; D665895S; D683840S; D692119S; D704323S; D712023S; D743018S and D755363S.

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QUALITY AND ENVIRONMENT

Novenco Building & Industry A/S is certified in accordance with ISO 9001 and 14001.

ISO 9001
ISO 14001
BUREAU VERITAS
Certification

All Novenco Building & Industry's products are designed, developed and manufactured in Denmark.

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