NOVAX™
AXIAL FLOW FANS STANDARD, HOT SMOKE, ATEX AND EX

Building & Industry
NOVENCO
SCHAKO Group

PRODUCT FACTS

PRODUCT

Axial flow fans with adjustable blades.

- ACN and ARN for duct installation
- ACW for heavy duty
- ACG with free intake for duct connection
- ACP with free suction and exhaust, for wall mounting

APPLICATION

NovAx™ fans are available for both land and marine applications. The fans are made for comfort and industrial use in standard temperature, ATEX, EX and hot smoke versions.

RANGE

Fan sizes according to impeller diameters are between Ø250 and Ø1600 for standard temperature and between Ø400 and Ø1600 for hot smoke fans.

Hub sizes are between Ø160 and Ø578 for both standard temperature and hot smoke fans.

Airflow rates range from 0.1 to 65 m³/s with pressure increases up to 2000 Pa for standard temperature and from 0.2 to 65 m³/s with increases up to 2000 Pa for hot smoke fans.
Airflow rates for the ARN range from 5 to 50 m³/s with increases up to 1200 Pa.

Hub diameters (mm)	Number of blades
Ø160	4
Ø230	6
Ø280	8
Ø330	10
Ø380	12
Ø403	6
Ø578	10

NUMBER OF BLADES

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

MOTORS

Mounting: Enclosed in motor mount
Terminal boxes: Boxes of steel or plastic mounted on fan casing or motor. Frequency regulated hot smoke fans have steel terminal boxes and shielded motor cables.
Dimension standard: IEC-72
Electrical standard: IEC-34
Enclosure: IP-55 or IP-56
Insulation: Class B, F or H

Hub diameters (mm)	Motor sizes
Ø160 - ACN/W - ACP/G	71 - 80 71 - 100
Ø230	71 -100
Ø280	71 - 112
Ø330	80 - 132
Ø380	90 - 180
Ø403	112 - 180
Ø578	132 - 250 / 280 (ACN)

MOTOR SIZES

Balancing: ISO 2373
Structural shape: B14 and B5 for flanges

MATERIALS

Blades: Aluminium or glass fibre reinforced polyester (GRP).
Impellers with hub sizes Ø403 and Ø578 mm have aluminium blades.
Hot smoke fans have blades of aluminium.
Hubs: Aluminium for hub sizes Ø160 - Ø380 mm. Electro-galvanised steel for hub sizes Ø403 and Ø578 mm and for ACN-ACW with motor size 280
Fan housings: Hot-rolled, hot-dip galvanised sheet steel

CLASSIFICATIONS

Flange standards: Eurovent 1/2 for ACN and ARN; DIN 24154 R4 for ACW
Technical capacity: BS 848-1:2007; EN ISO 1940-1:2003; EN ISO 5801:2008
Environments: As standard for operation in unheated, low-corrosion environments in accordance with DS / EN ISO 12944-2 and corrosion category C3.
For special cases, fans can be delivered according to corrosion class C4.
The casing is also available in stainless steel as AISI 316L and with the impeller of aluminium, all in corrosion class C5 high.
Temperature range, standard: -20 to +50 °C
Temperature range, max.: -40 to +120 °C; GRP-blades limited to max. +70 °C. At -40 to -20 °C and +40 to +120 °C, RPMs are reduced and special motors required.
Temperature ranges, hot smoke fans: F200, F300 and F400 according to EN 12101-3 for all fans for at least 2 hours at 200 °C, 300 °C and 400 °C, respectively.
ATEX and marine EX: ATEX according to directive 2014/34/EU for category 2G/D; EX according to guideline IACS F29/2005
Calculation software: AirBox™ program is certified by TÜV.

ACCESSORIES

- Support frame
- Mounting plates
- Inlet cones with wire guard
- Counter flanges
- Duct spigots
- Flexible connections
- Silencers with or without cores
- Acoustic diffusers with or without cores
- Spark proof lining
- Anti-vibration mountings
- Diffusers
- Welding spigots
- Outlet wire guards
- Downstream guide vane arrangement

DESCRIPTION

NovAx are compact, robust, series produced axial flow fans with pre-settable blades.

The fans are installed in a wide range of ventilation systems on land and off-shore. Systems include comfort systems, industrial, process, parking and tunnel ventilation as well as environment-enhancement systems. The fans require little space, are easy to install and offer high operational reliability. ATEX and marine EX versions for hazardous environments are also offered.

NOVAX FAN TYPES

The NovAx impeller consists of a pressed, two-part, assembled hub with grooves in which the blades are fixed. The impeller is provided with a hub boss on one side for mounting onto the motor.

The impeller blades are fixed steplessly at the factory at an angle between 25° and 70°, depending on size and RPM.

The impeller is integrated with the motor in different designs of fan housings to form standard fan types with several applications.

- ACN and ARN for duct installation
- ACW for heavy duty
- ACG with free intake for duct connection
- ACP with free suction and exhaust for wall mounting

BLADE MATERIALS AND MOTORS

The impellers are fitted with blades of either aluminium or glass fibre reinforced polyester (GRP) – hot smoke fans, however, only with blades of aluminium. The two blade types have identical performance characteristics.

Impellers with hub sizes Ø403 and Ø578 mm are only made with aluminium blades.

In the temperature range -20 to +40 °C the lighter and more corrosion resistant GRP blades are standard. In the ranges -20 to –40 °C and +40 to +70 °C both blade types can be used. Please note that this is with reduced RPM and special lubricant in the motors.
In the range 70° to 120°C, aluminium blades are used exclusively and at reduced RPM.

All fan types use flange motors.

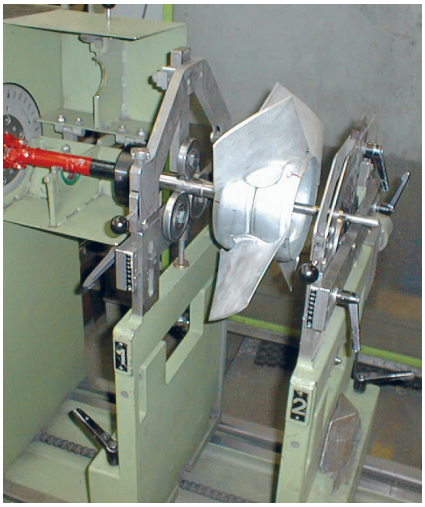
CLASSIFICATIONS

The fans are as standard delivered for operation in unheated low corrosive environments according to DS/EN ISO 12944-2 and corrosion category C3. Versions in stainless steel for category C5 is available as option.

The fans are furthermore approved as fans for removal of hot smoke according to EN 12101-3.

ADJUSTMENT OF BLADE ANGLES

The blade angle for the fan matching a specific capacity is calculated with the AirBox program. The blade angle is adjusted in the factory in a precision tool and the impeller is aligned and balanced.



AIRBOX CALCULATION PROGRAM

The AirBox program is Novenco's calculation and configuration tool. Input to the program are requirements for airflow 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.

MOTORS

The fans are fitted with 50 Hz motors as standard, and are available with 60 Hz motors also. Alternatively, fans can be speed controlled by means of frequency converter. See maximum speeds in the below table.
Nominal RPM for 50 Hz motors are found in the performance curves on pages 9 through 14.

NovAx fans are a good alternative to centrifugal fans in ventilation and air conditioning systems with varying airflow rate requirements.

FREQUENCY REGULATION

The fans are prepared for frequency converter operation with RFI filters according to the product standard EN 61800-3, class 2. Using frequency converters removes the limitations caused by net frequencies of 50 or 60 Hz.

Axial fans can almost always be placed within the maximum efficiency of up to 83%, while it remains possible to regulate the air quantities, if needed.
Hot smoke fans may, however, not run frequency regulated during fire. The frequency converter must in this case be bypassed, so that the motor runs at the maximum synchronous RPM.
Selection of hot smoke fans with frequency converters is done based on the synchronous RPM of the motors.

In most cases, the motors are run over-frequently in the range 70 - 80 Hz. This is due to the non-existent fall in power output for the motors in the range 50 - 100 Hz. Additionally, the best performance for fans is often found in just the over-frequent area.

Fans fitted with frequency drives require installation according to the EU standard for electromagnetic compatibility (EMC). The shielding and connection to ground eliminate interference and protect the fan motor bearings and windings.

Investment, operational cost as well as space requirements are lower for NovAx fans compared to fans without frequency regulation.

Hub diameters (mm)	Fan sizes [mm]													
	Ø250	Ø315	Ø400	Ø500	Ø560	Ø630	Ø710	Ø800	Ø900	Ø1000	Ø1120	Ø1250	Ø1400	Ø1600
Ø160	3865	3865	3865	3865										
Ø230			4000	4000	3865	3575	3275	2980						
Ø280				4012	3755	3536	3230	2930	2571					
Ø330				3977	3686	3448	3215	2973	2660					
Ø380					3674	3397	3097	2859	2651	2324				
Ø403									2179	2025	1885	1730	1575	
Ø578									2128	1957	1804	1685	1595	1410

MAXIMUM RPM FOR FREQUENCY REGULATED NOVAX IMPELLERS [1 2 3]

1. All RPM are at 20 °C.
2. The maximum RPM is reduced at higher and lower temperatures.
3. The maximum RPM for the motors are considerably higher than those for the impellers – typically 3.600 - 6.000 RPM.

TYPES

ACN, ACW AND ARN FOR DUCTS

The ACN, ACW and ARN fans are designed for duct installation. The ACW is with a thicker fan casing extra durable and made for heavy duty. The ARN has straight guide vanes for 100% reversible airflows and is otherwise identical to the ACN.

ACN (LEFT) AND ACW AXIAL FANS

The ACN-ACW range of axial fans comprises 14 fan sizes with impeller diameters from Ø250 to Ø1600 mm for standard temperatures and 12 fan sizes with impeller diameters Ø400 to Ø1600 mm for hot smoke.
There are seven hub diameter sizes from Ø160 to Ø578 mm for both fan types.
The ARN range of axial fans comprises six fan sizes with impeller diameters from Ø900 to Ø1600. There are two hub diameter sizes; Ø403 and Ø578 mm for ARN fans.

Airflow rates run from 0.1 to 65 m³/s and pressure increases up to 2000 Pa for standard temperatures and from 0.2 to 65 m³/s with pressure increases up to 1800 Pa for hot smoke.
Airflow rates for the ARN range from 5 to 50 m³/s and pressure increases up to 1200 Pa.

As hot smoke fans the range is F200, F300 and F400 approved according to EN 12101-3 to run for at least 120 min. at 200 °C, 300 °C and at 400 °C, respectively.

The fan housing is cylindrical with connection flanges at both ends.
The fan housing has a welded motor suspension of sheet steel that also forms a downstream guide vane. This produces an extremely high efficiency.
The housing and motor suspension are hot-dip galvanised. The fan housing has an inspection hatch.

The impeller unit is mounted directly on the shaft of the motor. If the motor cannot fit in the motor mount, it is displaced outside of this and connected to the impeller through a long hub.

The flange pitch diameter, number of holes and hole size are as standard in accordance with Eurovent 1/2 for ACN-ARN and according to DIN 24154 for ACW.

Mounting positions are in accordance with Eurovent for ACN-ARN – arrangement D, motor position B. See also section "Calculation examples" on page 28.

The motor is a flange motor, mounted on the outlet side, and is provided with an electrical cable that passes out through the fan housing to a terminal box for electrical connection.
The direction of airflow for ACN-ACW-ARN fans is impeller - motor.

ACG FOR DUCT CONNECTION
ACP FOR WALL MOUNTING

The ACG is designed for connection to duct ends. The ACP is for direct air transport through walls.

The ACG-ACP range of axial fans comprises 14 fan sizes with impeller diameters from Ø250 to Ø1600 mm for standard temperatures and 12 fan sizes with impeller diameters Ø400 to Ø1600 mm for hot smoke.
There are seven hub diameter sizes from Ø160 to Ø578 mm for both fan types.
Airflow rates run from 0.1 to 65 m³/s and pressure increases up to 2000 Pa for standard temperatures and from 0.2 to 65 m³/s with pressure increases up to 2000 Pa for hot smoke.

ACG (LEFT) AND ACP AXIAL FANS

As hot smoke fans the range is F300 approved according to EN 12101-3 to run for at least 60 min. at 300 °C.

The ACG fan housing is tubular with cone-shaped inlet for direct air intake and flange-terminated outlet. The ACP fan housing is short and tubular with cone-shaped inlet for direct air intake and flange outlet.
The impeller unit is mounted at the inlet with the motor facing the air intake.

The inlet is provided with a wire guard.
On the ACG a downstream guide vane is mounted on the outlet side of the impeller to achieve a very high efficiency.
The flange pitch diameter, number of holes and hole size are as standard in accordance with Eurovent 1/2.
Mounting positions are in accordance with Eurovent for ACG – arrangement B, motor position A and for ACP – arrangement A, motor position A. See section "Calculation examples" on page 28.

The motor is a flange motor with electrical connection in the terminal box.
The direction of airflow for ACG-ACP fans is motor - impeller.

MOTOR AND FAN COMBINATIONS

The combinations of motors and fans are general. Precise combinations of motors from specific suppliers and fans are available on direct request or via the AirBox calculation program. ARN fans are available with hub sizes Ø403 and Ø578.

• = Standard temperature fans
! = Standard Range fans (ACN)
Δ = Hot smoke fans

Hub diameters (mm)	Motor sizes	Fan sizes [mm]													
		Ø250	Ø315	Ø400	Ø500	Ø560	Ø630	Ø710	Ø800	Ø900	Ø1000	Ø1120	Ø1250	Ø1400	Ø1600
Ø160	71	•	•	•	•										
	80		•	•	•										
	90			•	•										
Ø230	71			•	•	•	•	•	•						
	80			•!	•	•	•	•	•						
	90			Δ	•Δ!	•Δ	•Δ	•Δ	•Δ						
	100			Δ	•Δ	•Δ	•Δ	•Δ	•Δ						
Ø280	71				•	•	•	•	•	•					
	80				•	•	•	•	•	•					
	90				•Δ	•Δ!	•Δ	•Δ	•Δ	•Δ					
	100				•Δ	•Δ	•Δ	•Δ!	•Δ	•Δ					
	112				•Δ	•Δ!	•Δ	•Δ	•Δ	•Δ					
Ø330	80				•!	•	•	•	•	•					
	90				•Δ	•Δ	•Δ	•Δ	•Δ	•Δ					
	100				•Δ	•Δ	•Δ!	•Δ	•Δ	•Δ					
	112				•Δ	•Δ	•Δ	•Δ!	•Δ!	•Δ					
	132				•Δ	•Δ	•Δ!!	•Δ!	•Δ!	•Δ					
Ø380	90					•Δ!	•Δ	•Δ	•Δ	•Δ	•Δ				
	100					•Δ	•Δ	•Δ	•Δ	•Δ	•Δ				
	112					•Δ	•Δ	•Δ	•Δ	•Δ	•Δ				
	132					•Δ	•Δ	•Δ	•Δ!	•Δ!	•Δ				
	160					•Δ	•Δ	•Δ!	•Δ	•Δ	•Δ!				
	180						•Δ	•Δ!	•Δ	•Δ	•Δ				
Ø403	112											•Δ	•Δ		
	132									•Δ	•Δ	•Δ	•Δ	•Δ	
	160									•Δ	•Δ	•Δ!	•Δ	•Δ	
	180										•Δ	•Δ!	•Δ!	•Δ!	
Ø578	132										•Δ	•Δ	•Δ		
	160									•Δ	•Δ	•Δ	•Δ	•Δ	
	180									•Δ	•Δ	•Δ!!	•Δ	•Δ	
	200										•Δ	•Δ!	•Δ!	•Δ!	•Δ
	225											•Δ	•Δ!	•Δ	•Δ
	250												•Δ!	•Δ	•Δ
	280 (ACN)													Δ	Δ

ACN, ACW AND ARN

Hub diameters (mm)	Motor sizes	Fan sizes [mm]												
		Ø250	Ø315	Ø400	Ø500	Ø560	Ø630	Ø710	Ø800	Ø900	Ø1000	Ø1120	Ø1250	Ø1400	Ø1600
Ø160	71	•	•	•	•										
	80	•	•	•	•										
	90		•	•Δ	•Δ										
	100			•Δ	•Δ										
Ø230	71			•	•	•	•	•	•						
	80			•	•	•	•	•	•						
	90			•Δ	•Δ	•Δ	•Δ	•Δ	•Δ						
	100			•Δ	•Δ	•Δ	•Δ	•Δ	•Δ						
Ø280	71				•	•	•	•	•	•					
	80				•	•	•	•	•	•					
	90				•Δ	•Δ	•Δ	•Δ	•Δ	•Δ					
	100				•Δ	•Δ	•Δ	•Δ	•Δ	•Δ					
	112				•Δ	•Δ	•Δ	•Δ	•Δ	•Δ					
Ø330	80				•	•	•	•	•	•					
	90				•Δ	•Δ	•Δ	•Δ	•Δ	•Δ					
	100				•Δ	•Δ	•Δ	•Δ	•Δ	•Δ					
	112				•Δ	•Δ	•Δ	•Δ	•Δ	•Δ					
	132				•Δ	•Δ	•Δ	•Δ	•Δ	•Δ					
Ø380	90					•Δ	•Δ	•Δ	•Δ	•Δ	•Δ				
	100					•Δ	•Δ	•Δ	•Δ	•Δ	•Δ				
	112					•Δ	•Δ	•Δ	•Δ	•Δ	•Δ				
	132					•Δ	•Δ	•Δ	•Δ	•Δ	•Δ				
	160					•Δ	•Δ	•Δ	•Δ	•Δ	•Δ				
	180						•Δ	•Δ	•Δ	•Δ	•Δ				
Ø403	112									Δ	Δ	•Δ			
	132									•Δ	•Δ	•Δ	•Δ		
	160									•Δ	•Δ	•Δ	•Δ	•Δ	
	180									•Δ[1]	•Δ	•Δ	•Δ	•Δ	
Ø578	132									•Δ	•Δ	•Δ			
	160									•Δ	•Δ	•Δ	•Δ	•	
	180									•Δ	•Δ	•Δ	•Δ	•	
	200										•Δ	•Δ	•Δ	•Δ	•Δ
	225											•Δ	•Δ	•Δ	•Δ
	250												Δ	•Δ	•Δ

ACG AND ACP

1. Hot smoke fans with hub diameter Ø403, motor size 180 and fan size Ø900 are only made as type ACP.

STANDARD RANGE

The fans in the Standard Range are based on sales statistics from 2010 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 ACN fans for temperatures from -20 to +50 °C.
Hub sizes are between Ø230 and Ø578, and fan sizes between Ø400 and Ø1400.

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.

The Standard Range configurations are available in AirBox and are calculated the same way as custom configurations.

Fans in the Standard Range are marked in the ACN performance curves for 1470 and 2900 RPMs on the next pages. Please note that not all Standard Range fans are shown for all RPMs.

Refer to AirBox and our website for fan details.

Item no.	ACN fan type	Airflow [m3/s]	Airflow [m3/h]	Total pressure [Pa]	Static pressure [Pa]	Fan eff. [%]	Power input [kW]	Fan RPM	Fan max. RPM
30041558	500/330-10 50°	1.4	5,000	330	300	66.2	0.868	1420	3977
30041559	400/230- 6 40°	1.4	5,000	473	400	71.0	1.144	2830	4000
30041561	560/380-12 47°	2.1	7,500	343	300	64.9	1.315	1450	3674
30041565	500/230-6 39°	2.8	10,000	521	401	75.0	2.348	2870	4000
30041560	560/280-8 51°	2.8	10,000	276	200	73.9	1.240	1455	3755
30041564	630/330-10 52°	4.2	15,000	307	200	70.4	2.145	1435	3448
30041563	560/280-8 39°	4.2	15,000	672	500	75.0	4.186	2900	3755
30041562	710/280-8 51°	5.6	20,000	318	200	80.3	2.486	1440	3230
30041568	630/330-10 38°	5.6	20,000	790	600	73.2	6.919	2930	3448
30041566	710/330-10 58°	6.9	25,000	384	200	71.1	4.425	1450	3215
30041567	800/330-10 49°	6.9	25,000	415	301	79.0	4.150	1450	2973
30041570	630/330-10 44°	6.9	25,000	897	600	71.2	10.306	2925	3448
30041572	800/330-10 55°	8.3	30,000	465	300	74.7	5.925	1460	2973
30041569	800/380-12 56°	8.3	30,000	565	400	70.9	7.418	1460	2859
30041574	710/330-10 41°	8.3	30,000	966	700	77.5	11.950	2925	3215
30041571	710/380-12 40°	8.3	30,000	1,066	800	72.1	14.258	2945	3097
30041573	900/380-12 54°	11.1	40,000	583	400	74.7	9.861	1465	2651
30041576	710/380-12 47°	11.1	40,000	1,272	800	68.8	22.114	2950	3097
30041575	1000/380-12 52°	13.9	50,000	587	400	75.6	11.972	1465	2324
30041579	1120/578-10 40°	13.9	50,000	1,019	900	77.2	20.252	1470	1804
30041577	1120/403-6 45°	16.7	60,000	672	500	80.6	15.953	1465	1885
30041578	1120/403-6 47°	16.7	60,000	772	600	78.9	18.571	1470	1885
30041580	1120/578-10 47°	19.4	70,000	1,033	800	75.5	29.679	1470	1804
30041582	1120/578-10 51°	22.2	80,000	1,105	800	73.1	36.921	1480	1804
30041581	1250/403-6 49°	25.0	90,000	849	600	80.1	28.736	1470	1730
30041584	1400/403-6 45°	27.8	100,000	795	600	79.9	30.222	1470	1575
30041585	1400/578-10 41°	27.8	100,000	995	800	81.4	38.211	1480	1595
30041583	1250/578-10 46°	27.8	100,000	1,007	700	77.7	37.881	1480	1685
30041586	1250/578-10 49°	27.8	100,000	1,207	900	77.3	47.194	1475	1685
30041587	1250/578-10 50°	27.8	100,000	1,307	1,000	76.5	51.339	1480	1685

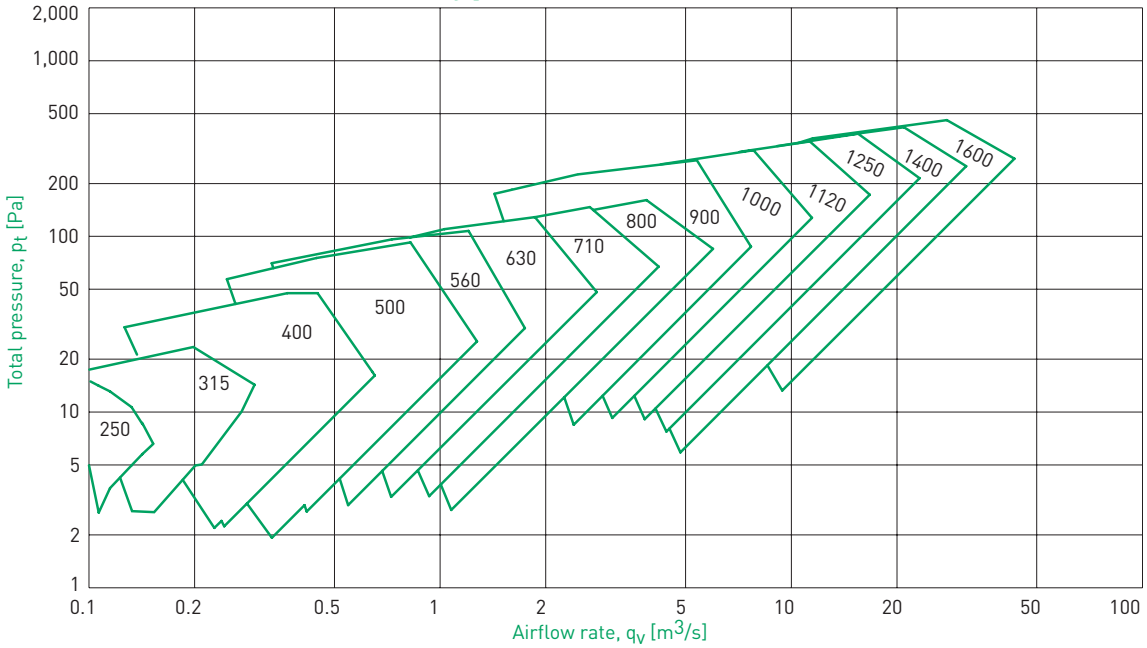
PERFORMANCE CURVES — ACN

The diagrams show the coverage for each fan size without taking the hub diameter into consideration.

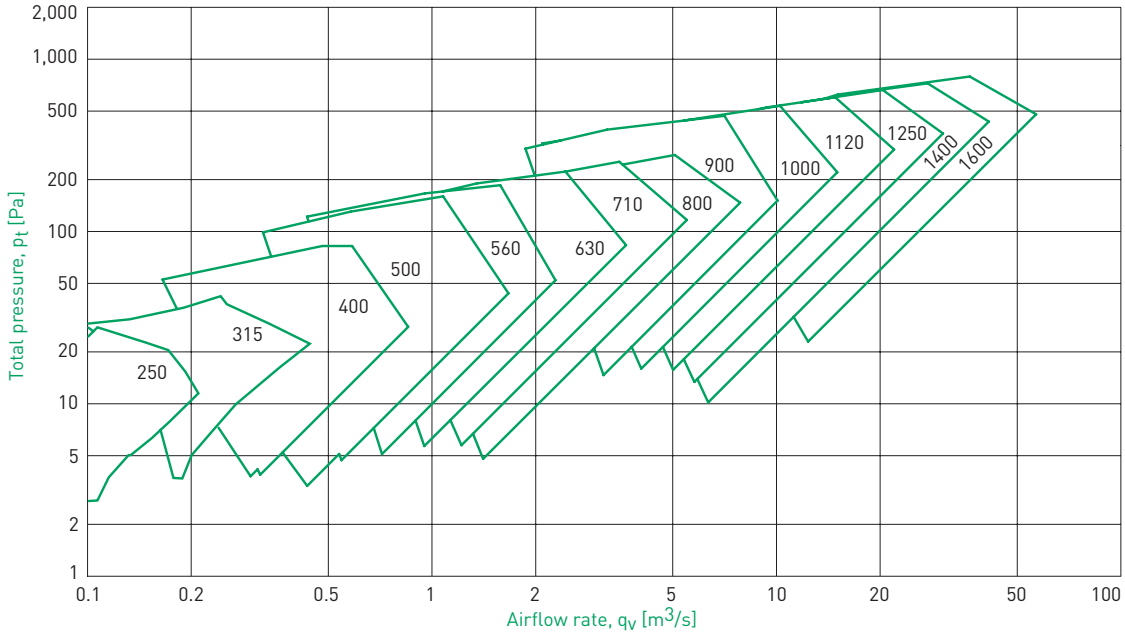
The capacities are based on fan installation in accordance with BS 848-1:2007, installation type D ((duct connection for inlet and outlet). Other installation types yield other data. The air density is p = 1.20 kg/m3.

Final dimensioning, including calculation of blade angles, choice of motor, power consumption and sound calculation, is done with AirBox. See section "AirBox calculation program" on page 3.

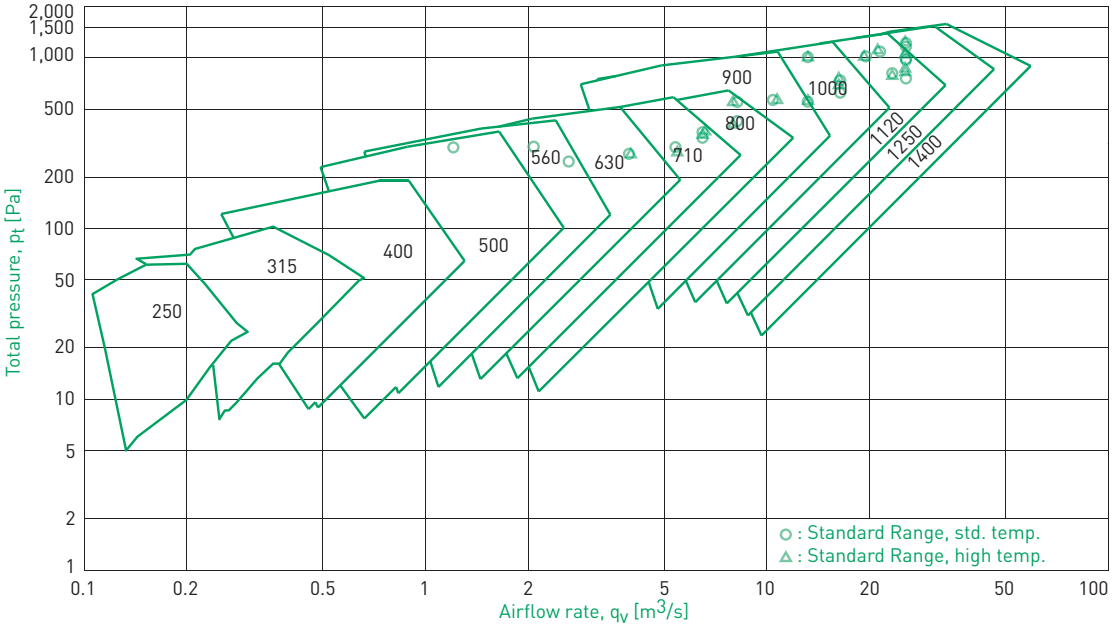
Type ACN — 725 RPM



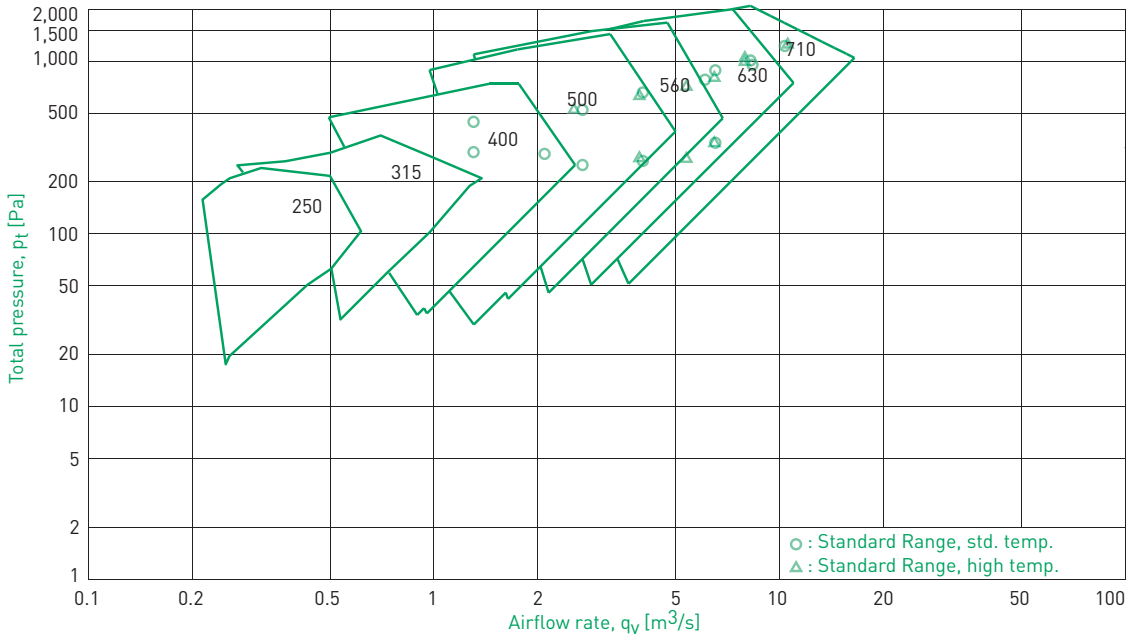
Type ACN — 970 RPM



Type ACN — 1470 RPM



Type ACN — 2900 RPM



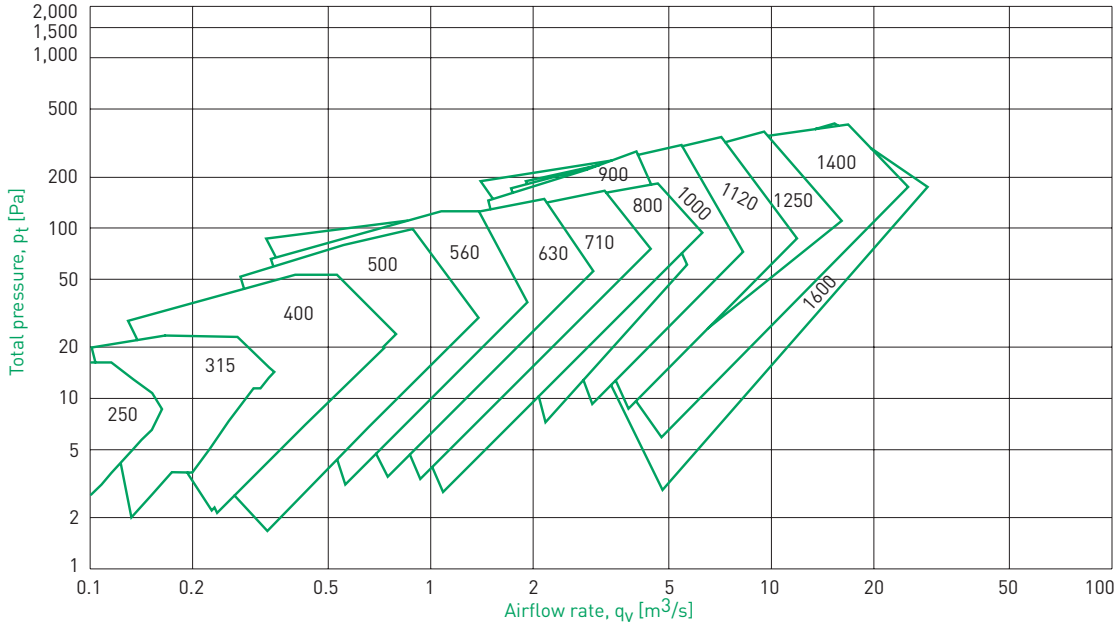
PERFORMANCE CURVES — ACG

The diagrams show the coverage for each fan size without taking the hub diameter into consideration.

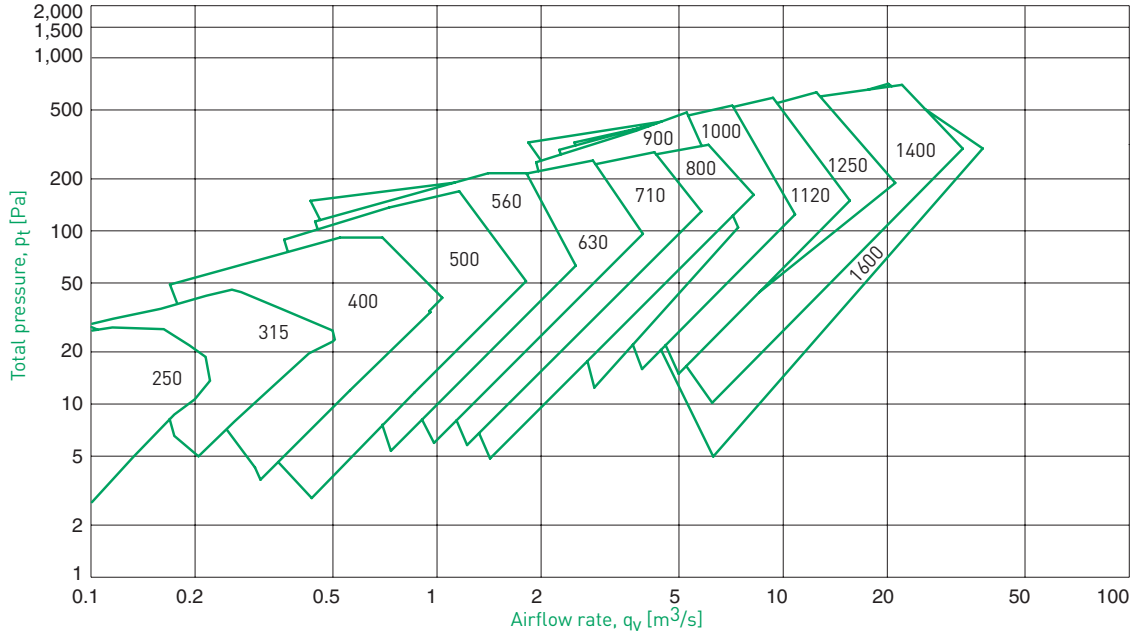
The capacities are based on fan installation in accordance with BS 848-1:2007, installation type B (free inlet and duct connection for outlet). Other installation types yield other data. The air density is p = 1.20 kg/m3.

Final dimensioning, including calculation of blade angles, choice of motor, power consumption and sound calculation, is done with AirBox. See section "AirBox calculation program" on page 3.

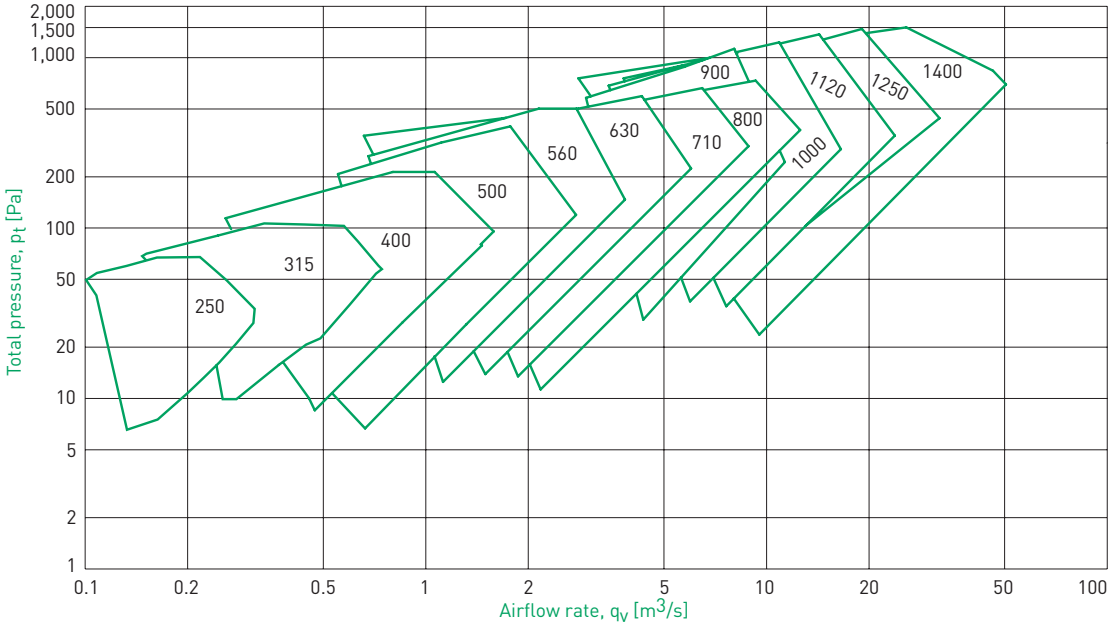
Type ACG — 725 RPM



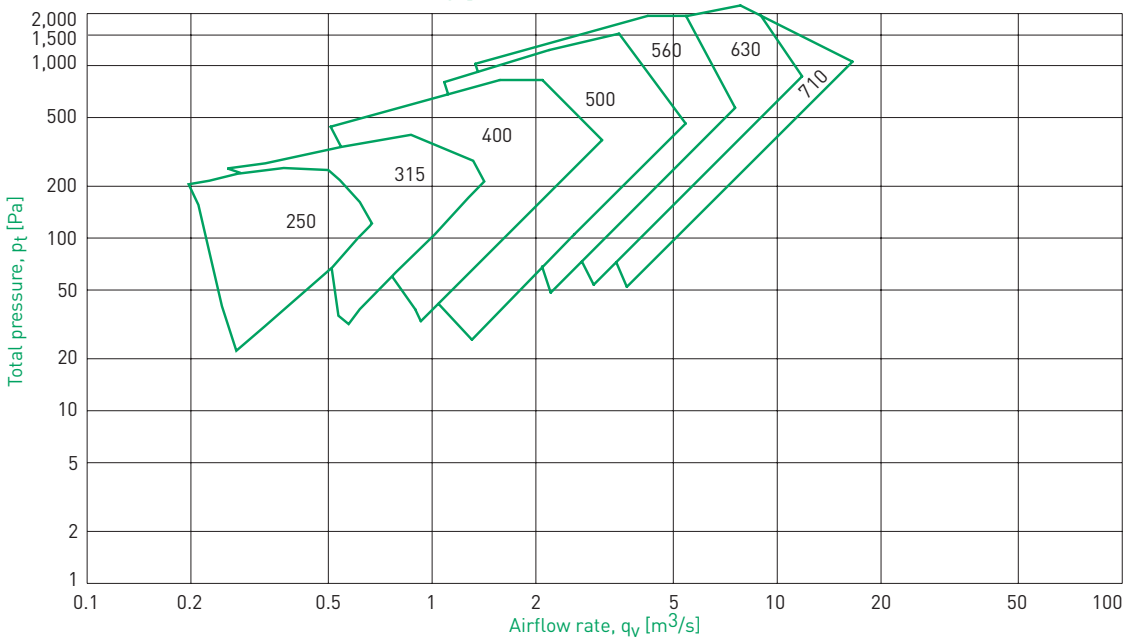
Type ACG — 970 RPM



Type ACG — 1470 RPM



Type ACG — 2900 RPM



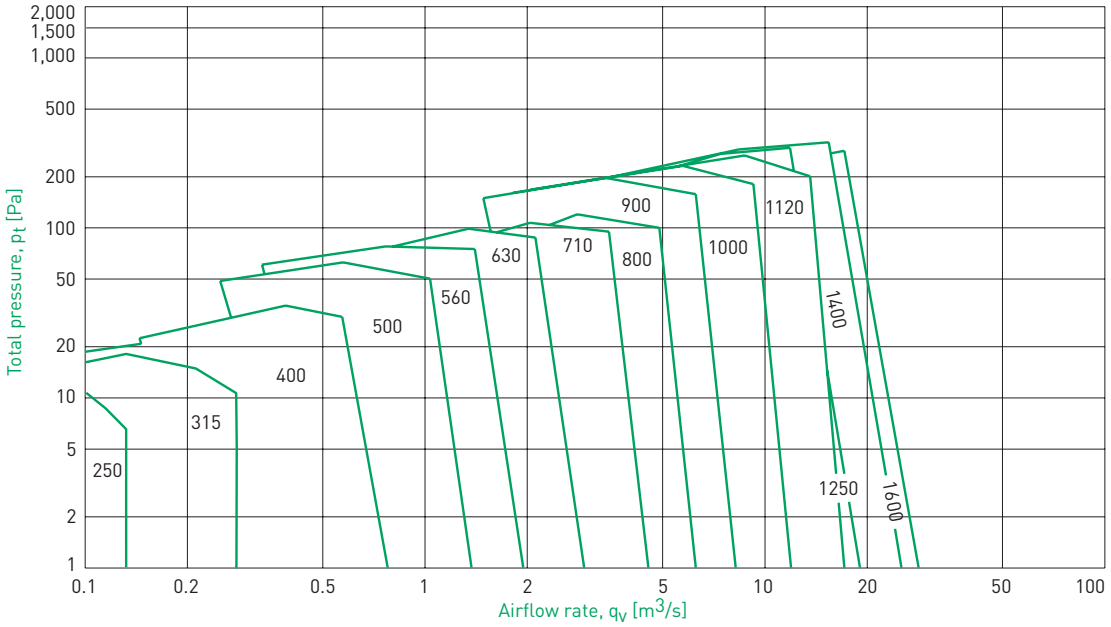
PERFORMANCE CURVES — ACP

The diagrams show the coverage for each fan size without taking the hub diameter into consideration.

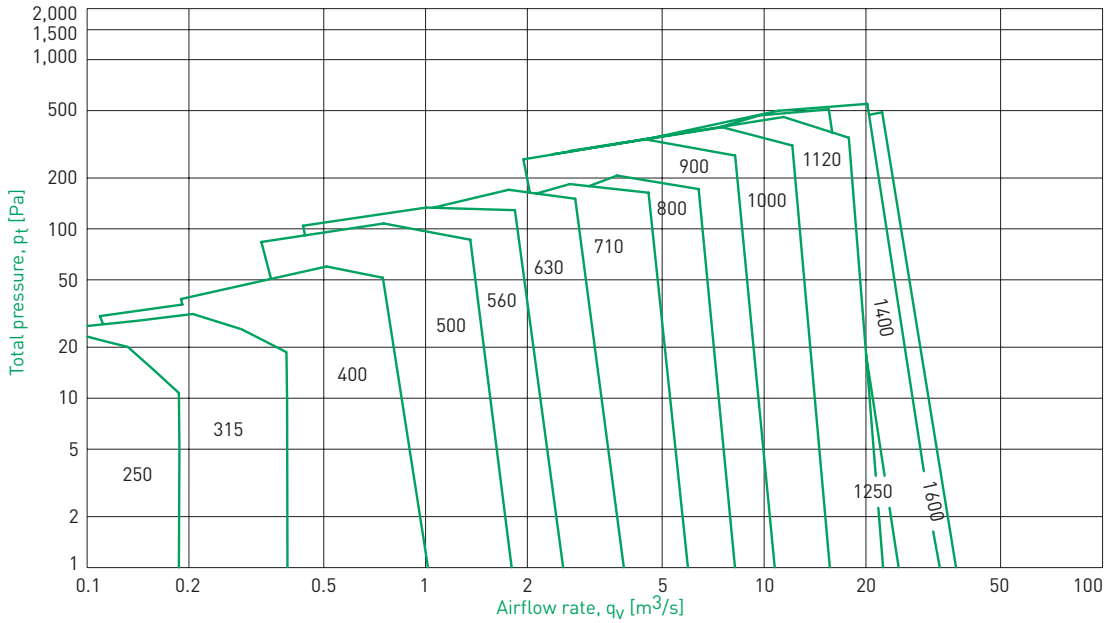
The capacities are based on fan installation in accordance with BS 848-1:2007, installation type B (free inlet and duct connection for outlet). Other installation types yield other data. The air density is p = 1.20 kg/m3.

Final dimensioning, including calculation of blade angles, choice of motor, power consumption and sound calculation, is done with AirBox. See section "AirBox calculation program" on page 3.

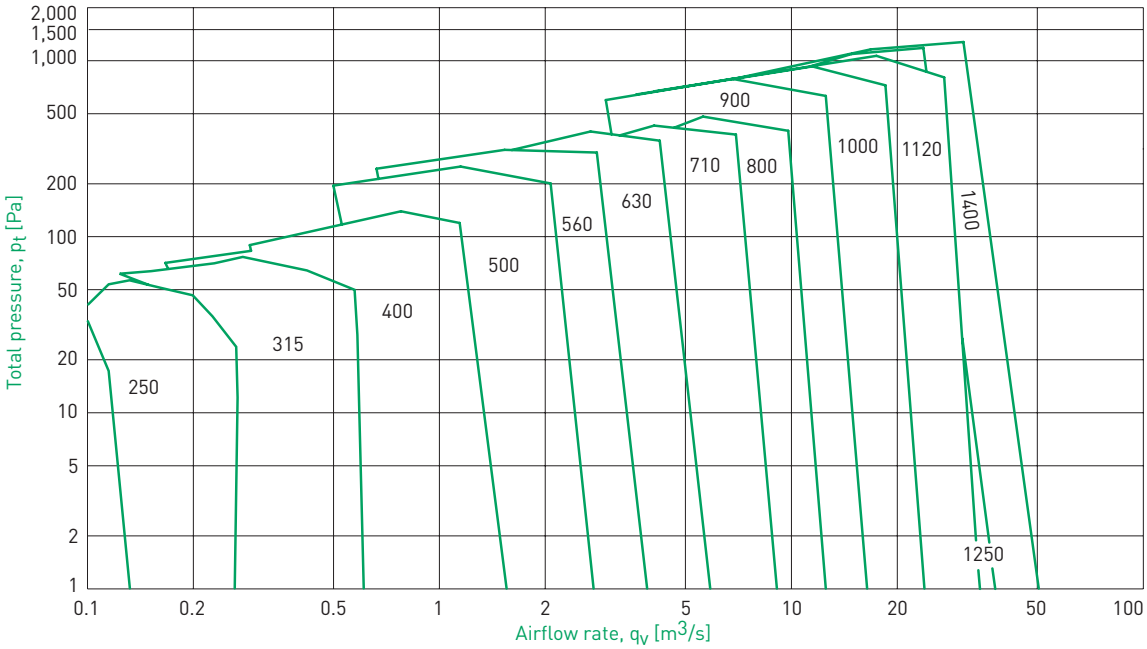
Type ACP — 725 RPM



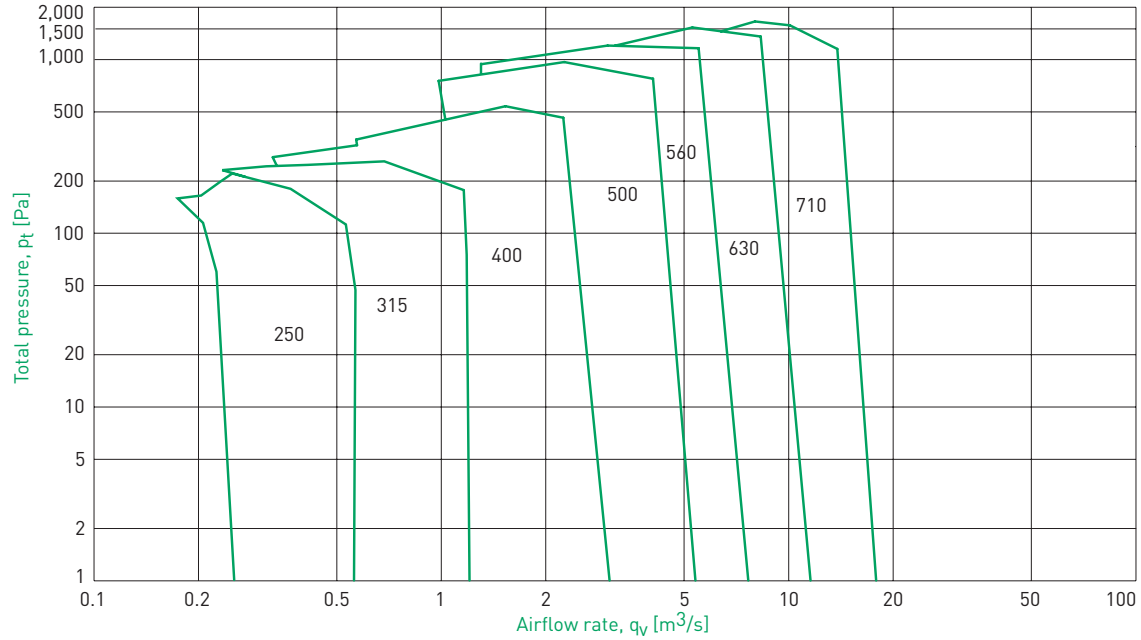
Type ACP — 970 RPM



Type ACP — 1470 RPM

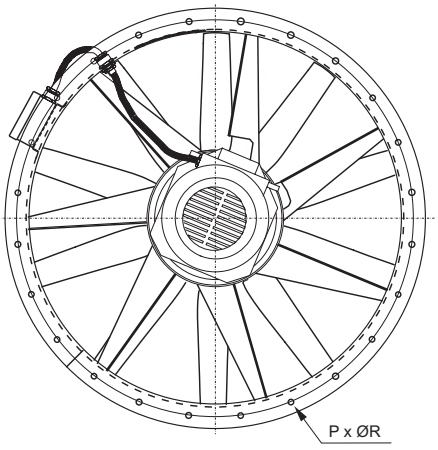


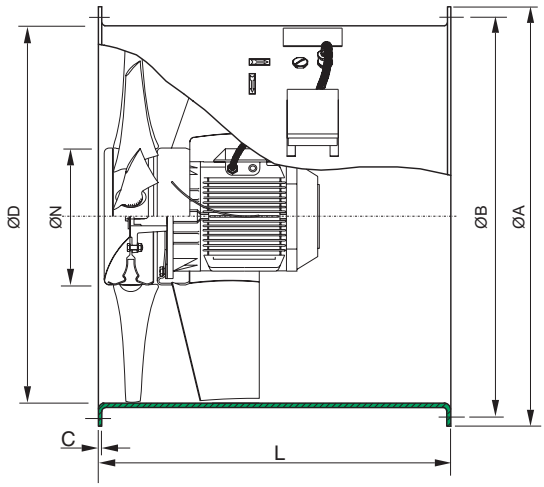
Type ACP — 2900 RPM



DIMENSIONS

ACN, ACW AND ARN



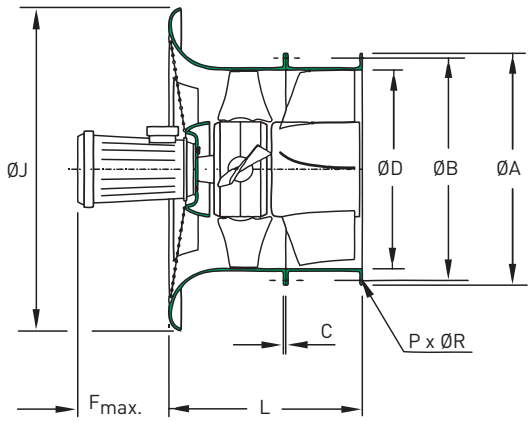


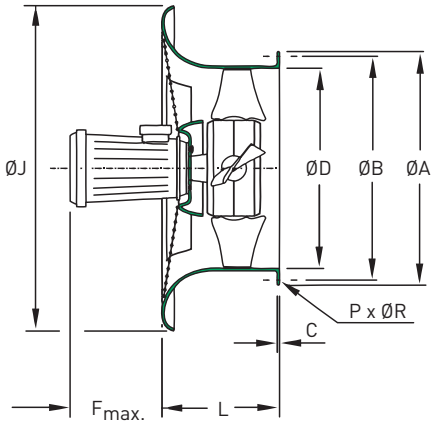
	Hub diameter ØN [mm]	Motor size	Fan sizes [mm] [2]													
			Ø250	Ø315	Ø400	Ø500	Ø560	Ø630	Ø710	Ø800	Ø900	Ø1000	Ø1120	Ø1250	Ø1400	Ø1600
ØA [5]	All	All	310 334	385 409 or 407	480 494 or 492	590 594 or 592	650 674 or 672	720 744 or 742	800 824 or 822	890 914 or 912	1000 1015 or 1012	1100 1115 or 1113	1220 1255 or 1263	1360 1385 or 1393	1510 1535 or 1543	1720 1745 or 1753
ØB [4]			280 292	355 366	450 448	560 551	620 629	690 698	770 775	860 861	970 958	1070 1067	1190 1200	1320 1337	1470 1491	1680 1663
ØD			250	315	400	500	560	630	710	800	900	1000	1120	1250	1400	1600
P [4]			4 8	8	8 12	12	12 16	12 16	16	16 24	16 24	16 24	20 32	20 32	20 32	24 40
ØR [4]			10 12	10 12	12	12	12 14	12 14	12 14	12 14	15 14	15 14	15 18	15 18	15 18	19 18
C [3]	All	All	2 6	2 6 or 10	3 6 or 10	3 6 or 10	3 6 or 10	3 6 or 10	3 6 or 10	3 6 or 10	3 6 or 10	3 or 4 [1] 6 or 10	3 or 4 [1] 6 or 10	3 or 4 [1] 6 or 10	4 6 or 10	4 6 or 10
L	160-380		360	400	520	560	620	620	730	750	850	900				
Max. weight, without motor [kg] [5]			11 23	14 32 or 44	27 48 or 68	42 69 or 96	55 90 or 123	60 99 or 137	73 121 or 172	82 138 or 195	98 166 or 239	134 190 or 278				
L	403	112											650	750		
		132									850	750	650	750	850	
		160									850	750	750	750	850	
		180										900	850	850	850	
Max. weight, without motor [kg] [5]											117 182 or 256	154 207 or 294	167 260 or 365	184 306 or 437	202 351 or 506	
L	578	132										750	650	750		
		160									850	750	750	750	850	
		180									850	900	850	850	850	
		200										900	950	950	950	900
		225											950	950	950	1120
		250												1060	1120	1120
		280													1120	1120
Max. weight, without motor [kg] [5]											153 217 or 291	192 243 or 330	219 300 or 405	269 350 or 481	329 425 or 580	366 497 or 675

ACN, ACW AND ARN

1. Depends on motor size
2. ARN fans are limited to fan sizes Ø900 to Ø1600.
3. Top values indicate casing thickness for ACN and ARN. Bottom values are for ACW.
4. Top values apply to ACN and ARN. Bottom values are for ACW. Single values apply to all fan types.
5. Top values apply to ACN and ARN. Bottom values are for ACW with casing thicknesses of 6 (1st) or 10 mm.

ACG AND ACP





	Hub diameter ØN [mm]	Motor size	Fan sizes [mm] [4]													
			Ø250	Ø315	Ø400	Ø500	Ø560	Ø630	Ø710	Ø800	Ø900	Ø1000	Ø1120	Ø1250	Ø1400	Ø1600
ØA	All	All	310	385	480	590	650	720	800	890	1000	1100	1220	1360	1510	1720
ØB			280	355	450	560	620	690	770	860	970	1070	1190	1320	1470	1680
ØD			250	315	400	500	560	630	710	800	900	1000	1120	1250	1400	1600
P			4	8	8	12	12	12	16	16	16	16	20	20	20	24
ØR			10	10	12	12	12	12	12	12	15	15	15	15	15	19

ACG AND ACP

	Hub diameter ØN [mm]	Motor size	Fan sizes [mm] [4]													
			Ø250	Ø315	Ø400	Ø500	Ø560	Ø630	Ø710	Ø800	Ø900	Ø1000	Ø1120	Ø1250	Ø1400	Ø1600
C	All	All	2,5	2,5	3	3	3	3	3	3	3	3	3	4	4	4
ØJ			333	420	545	675	760	840	950	1055	1200	1333	1500	1650	1800	2000
L	160		350	350	355	355										
F_{MAX}			197	235	259	259										
Max. weight, no motor [kg]			13	16	24	30										
L	230-578	All			355	355	410	415	415	410	430/665 [2]	450/687 [2]	715	739	739	739
F_{MAX}			197	235	250	370	479	544	505	510	490	470	610	579	644	644
Max. weight, no motor [kg]					26	40	52	57	65	72	139 [3]	171 [3]	188 [3]	234 [3]	258 [3]	297 [3]

ACG WITH GUIDE VANES

	Hub diameter ØN [mm]	Motor size	Fan sizes [mm] [4]													
			Ø250	Ø315	Ø400	Ø500	Ø560	Ø630	Ø710	Ø800	Ø900	Ø1000	Ø1120	Ø1250	Ø1400	Ø1600
C	All	All	2,5	2,5	3	3	3	3	3	3	3	3	3	4	4	4
ØJ			333	420	545	675	768	840	950	1055	1200	1332	1500	1650	1800	2000
L	160		200	200	205	205										
F_{MAX}			197	235	259	259										
Max. weight, no motor [kg]			9	11	15	19										
L	230-578	All	200	200	205	205	260	265	265	260	280/415 [2]	300/437 [2]	465	489	489	489
F_{MAX}			197	235	250	370	479	544	505	510	490	470	610	579	644	644
Max. weight, no motor [kg]					18	28	38	42	48	53	106 [3]	134 [3]	147 [3]	188 [3]	207 [3]	238 [3]

ACP WITHOUT GUIDE VANES

1. F_{Max} is the maximum dimension based on motor make type ABB.
2. Values on the left are for fan size Ø900 with Ø280 hub and for fan size Ø1000 with Ø380 hub. Values on the right are for all other hub diameters.
3. For hub diameter Ø578 mm. The weight is lower for other hub diameters.
4. ACP-ACG fans size Ø1250 with Ø578 hubs and motor size 132 are unavaiailable.

ACCESSORIES

SUPPORT FRAMES, VERTICAL MOUNTING PLATES AND ANTI-VIBRATION DAMPERS

Support frames are for fan installations where the arrangements become too heavy or where there, for example, is a need for an elevated fan position.
The frames are of sheet steel and can be fitted with rubber discs or springs for vibration damping.

Mounting plates for installation on to walls or other plane surfaces are also part of the mounting accessory programme.

INLET CONES

Inlet cones screw directly on to the fan flanges. They even out the inlet airflow, improve performance and reduce the noise level.

WIRE GUARDS FOR INLET CONES AND DUCTS

Wire guards are for mounting on fans with free inlet to prevent contact with the impellers and to stop objects from entering the fans. The guard nets attach with screws to inlet cones or in ducts.

Duct pieces and inlet cones with integrated wire guards for flange mounting are also available.

The wire guards cause a loss of 2% of the total pressure when fitted on inlet cones and a loss of 5% of the dynamic pressure when fitted in ducts.

SPARK-PROOF LININGS

The linings prevent flying of sparks from blade tips in case these come in contact with the fan casing. The material is either aluminium for ATEX and brass for EX fans. Brass executions are primarily for marine environments.

INSPECTION HATCHES

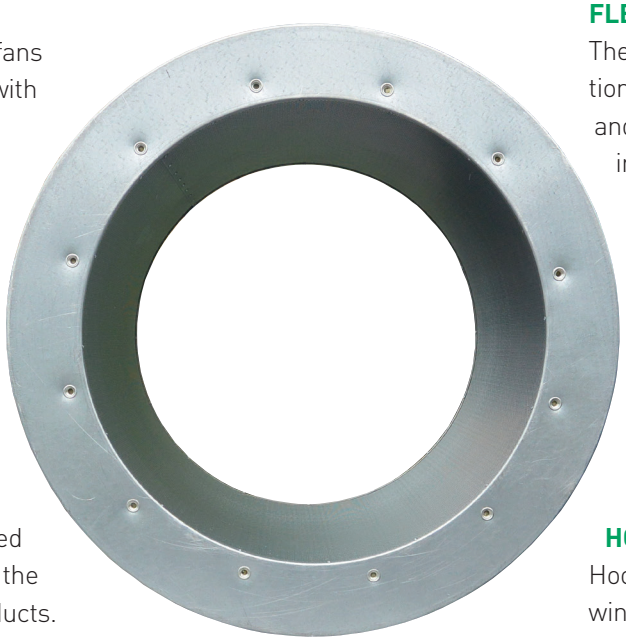
The hatches are square holes in the fan casing, which are closed off with metal hatches. The hatches are for verification purposes.

COUNTER FLANGES

Counter flanges duplicate the hole patterns of the fan flanges. They are produced in different kinds of materials depending on the intended use. Counter flanges in sheet steel are for welding on to existing ducts to enable fan attachment, while counter flanges in galvanised material are for installation as backing on wall-like surfaces.

DUCT SPIGOTS

Duct spigots mount on to the fan flanges and allow for connection to ducts. Ducts are fitted to the spigots with clamping rings.



WELDING SPIGOTS

Welding spigots mount on the fan flanges and allow for connection to ducts. Ducts are welded directly on to the spigots.

SILENCERS

Silencers have round connection profiles, attenuate noise in installations and are available with or without cores. Versions with cores remove high frequency sounds.
Two silencers can be joined with a standard clamping ring. More than two silencers in series require other measures for joining.

DIFFUSERS AND ACOUSTIC DIFFUSERS

The diffusers are for use in installations for comfort and industrial ventilation. The basic versions have limited noise reduction capabilities, smooth airflow, reduce pressure loss and are available in short or long lengths. The acoustic diffusers attenuate noise well and are available with cores for removal of high frequency sounds.

FLEXIBLE CONNECTIONS

The flexible material in these connections absorb vibrations from the fans and ducts. The pressure loss is minimal due to the strength and short length of the material. Versions with one or two connection spigots are available.

DAMPERS

Dampers shut off, regulate and mix airflows in ventilation systems and air handling installations.

HOODS

Hoods are for roof mounting to prevent wind, rain and objects from entering ventilation systems with subsequent noise-generation and clogging. The design and materials are very durable.

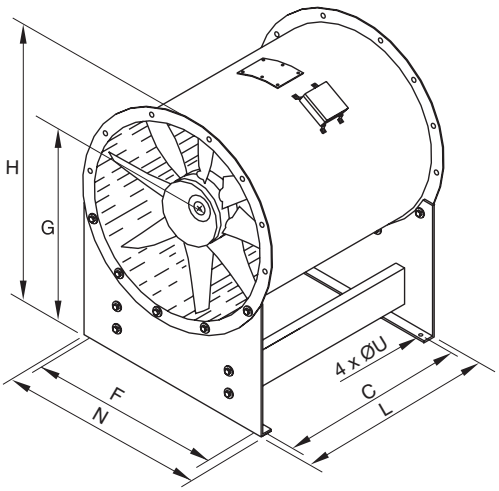
• = All versions ; ° = Limited number of versions

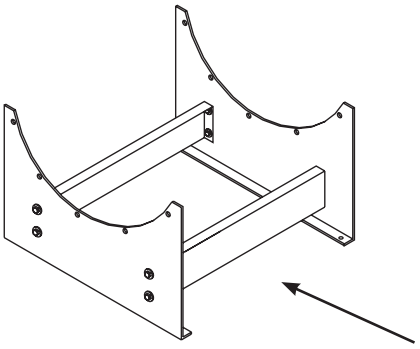
	ACN-ARN	ACW	ACG	ACP
Support frames	•	•	•	•
Vertical mounting plates	•	•	•	•
Inlet cone with wire guard [5]	•	•		
Counter flanges	•	•	•	•
Duct spigots	•	•	•	•
Welding spigots	•	•	•	•
Flexible connections	•	•	•	•
Silencer with or without core	YAH [1]	YAH [1]	YAH [1]	YAH [1]
Acoustic diffuser with core	YAD	YAD	YAD	YAD
Wire guard in casing (pressure side) [2] [5]	•	•	•	•
Wire flange (pressure side)	•	•		
Spark-proof linings [3]	○	○	○	○
Anti-vibration mountings	•	•	•	•
Diffusers for outlet (short or long)	•	•	•	•
Downstream guide vane arrangements [4]				•
Inspection hatches	•	•		

ACCESSORIES FOR STANDARD TEMPERATURE AND HOT SMOKE FANS

1. A standard clamping ring is used for joining two silencers type YAH. It is inadvisable to join more than two silencers with standard clamping ring.
2. Wire guard in casing comes with an installation duct for sizes up to and including Ø1000.
3. The number of versions with spark-proof lining is among others limited by the blade angle. Information on the versions offered with spark-proof linings is available on request and in the AirBox calculation program.
4. The ACG is as standard fitted with downstream guide vanes. The ACP can be retrofitted with guide vanes and is then called ACG.
5. Installation of a wire guard in the inlet cone reduces the total pressure by 2%.
A wire guard in the duct reduces the dynamic pressure by 5%.

SUPPORT FRAMES FOR ACN, ACW AND ARN



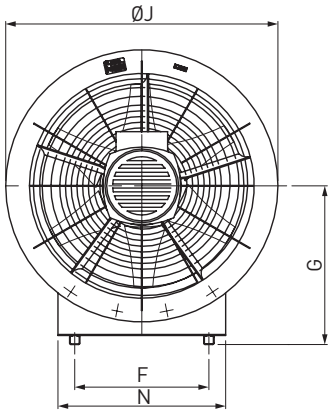


Two braces from size 630 to 1600

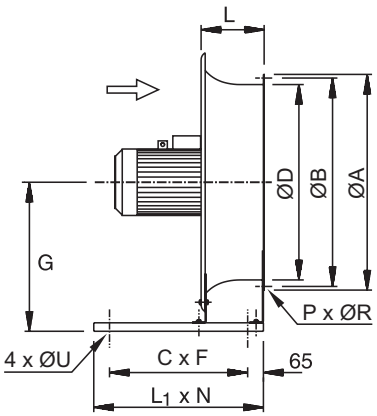
	Fan sizes [mm]													
	Ø250	Ø315	Ø400	Ø500	Ø560	Ø630	Ø710	Ø800	Ø900 [1]	Ø1000 [1]	Ø1120	Ø1250	Ø1400	Ø1600
G	240	280	330	390	440	480	530	580	680	740	800	850	925	1025
H	395	473	570	685	765	840	930	1025	1180	1290	1410	1530	1680	1885
C[2]	296	336	454	494	554	554	664	684	794/784	834/832	882	992	1052	1052
L[2]	360	400	520	560	620	620	730	750	860	900	950	1060	1120	1120
F[2]	170	200	250	325	370	400	450	520	590	680/670	750	810	920	1060
N	260	290	360	435	480	530	580	650	720	800	880	980	1090	1230
ØU	8	8	8	10	12	12	12	12	12	12	14	14	14	14
Weight [kg]	1,5	2,8	3,8	4,4	7,2	11,4	13,2	14,9	21,0	23,5	26,0	32,6	34,6	46,5

1. Where C and F dimensions depend on the hub diameter, the values for hub diameters Ø230 - Ø380 are on the left and for the hub diameters Ø403 - Ø573 on the right.
2. The specified data is based on maximum casing length. Other casing lengths have other data.

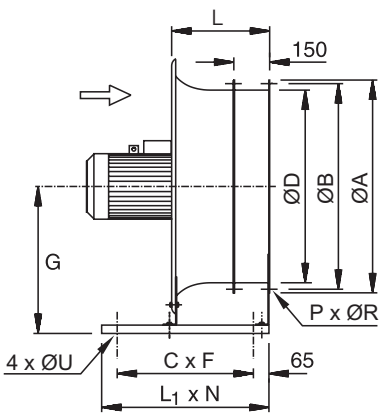
SUPPORT FRAMES FOR ACG AND ACP - VERTICAL MOUNTING PLATES FOR ALL FANS



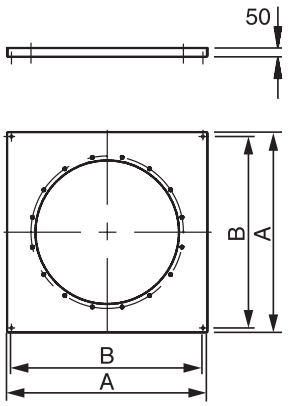
Support frame for ACG and ACP
- all hub sizes



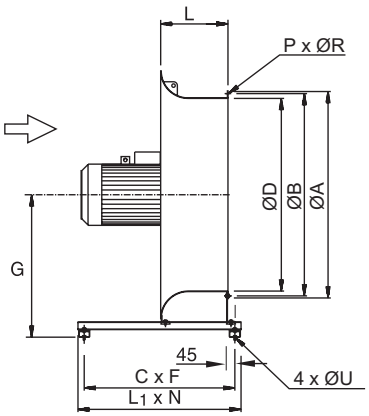
Support frame for ACP
hub sizes Ø160 - Ø380



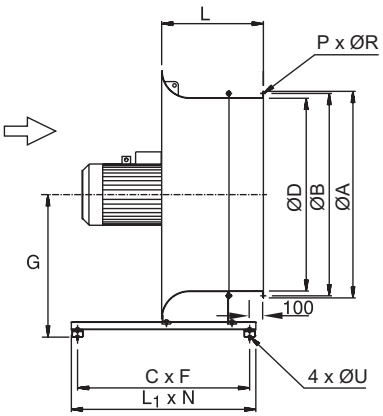
Support frame for ACG
hub sizes Ø160 - Ø380



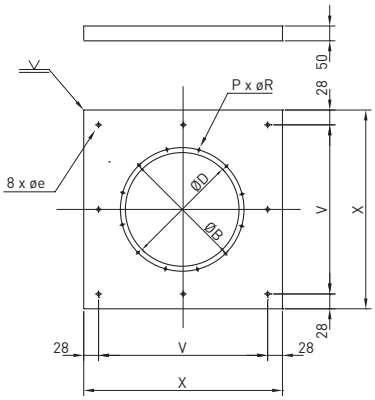
Vertical mounting plate for fan
sizes Ø250 - Ø500



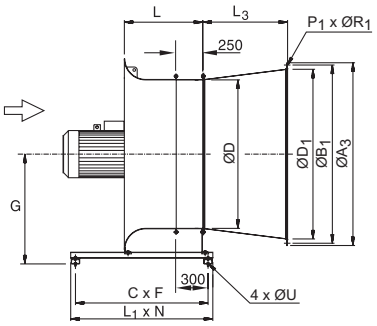
Support frame for ACP
hub sizes Ø403 and Ø578



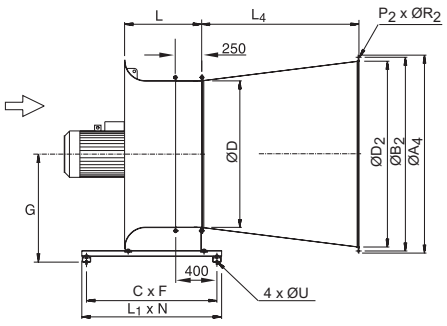
Support frame for ACG
hub sizes Ø403 and Ø578



Vertical mounting plate for fan
sizes Ø560 - Ø2000



Support frame for ACG with short
diffuser - hub sizes Ø403 and Ø578



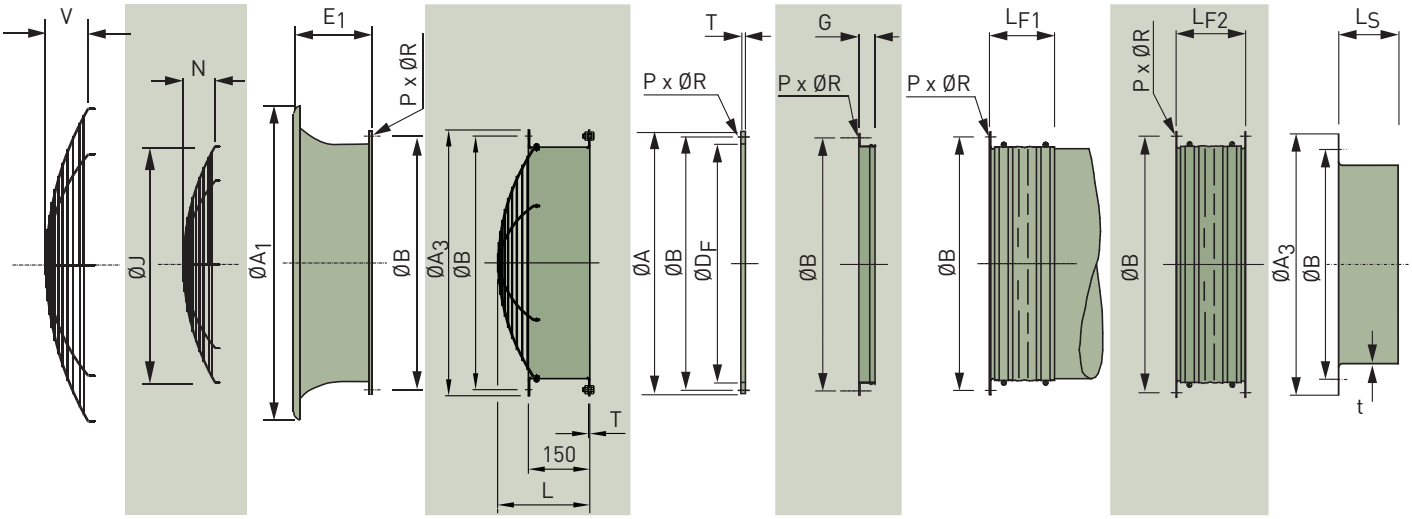
Support frame for ACG with long
diffuser - hub sizes Ø403 and Ø578

The ØA, ØB, ØD, L, P and ØR dimensions are found on pages 15 to 16. Other dimensions are on the next page.

		Fan sizes [mm]													
		Ø250	Ø315	Ø400	Ø500	Ø560	Ø630	Ø710	Ø800	Ø900	Ø1000	Ø1120	Ø1250	Ø1400	Ø1600
Vertical mounting plates	Ax	580	645	730	830	670	740	820	920	1020	1120	1250	1390	1690	1790
	Bv	530	595	680	780	570	640	720	820	920	1020	1150	1290	1590	1690
	Weight [kg]	7.8	8.9	10.4	12.4	9.0	11.0	12.0	15.0	17.0	22.0	27.0	33.0	46.0	56.0
Support frames for ACG / ACP	ØJ	333	420	545	675	768	840	947	1055	1200	1333	1500	1650	1800	2000
	G [1]	275	315	365	425	475	515	565	615	715/790	775/850	910	960	1035	1135
	C	420	420	420	420	420	570	570	570	570/1120 /1000 [3]	770/1120 /1000 [3]	1120	1250/1120 [4]	1250	1250
	F	170	200	250	325	370	400	450	520	590	670	750	810	920	1060
	L_1 [2]	550	550	550	550	550	700	700	700	700/1210	900/1210	1210	1340	1340	1340
	N [2]	260	290	360	435	480	530	580	650	720/900	800/1000	1120	1250	1400	1600
	ØU	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Weight [kg]	5.7	5.7	5.7	6.3	8.5	10.2	11.2	12.2	15.3	18.1	61.8	62.1	68.6	76.7
Support frame for ACG with short diffusers	G									790	850	910	960	1035	1135
	C									1120/1000 [4]	1120/1000 [4]	1120	1250/1120 [4]	1250	1250
	F									590	670	750	810	920	1060
	L_1									1210	1210	1210	1340	1340	1340
	N									900	1000	1120	1250	1400	1600
	ØU									12	12	12	12	12	12
	Weight [kg]									52.4	57.2	61.8	62.1	68.6	76.7
Short diffusers	L_3									400	500	560	600	800	800
	$ØD_1$									1000	1120	1250	1400	1600	1800
	$ØB_1$									1070	1190	1320	1470	1680	1880
	$ØA_3$									1103	1223	1363	1513	1723	1923
	P_1									16	20	20	20	24	24
	$ØR_1$									15	15	15	15	19	19
	Weight [kg]									33	40	48	57	77	86
Support frame for ACG with long diffusers	G									790	850	910	960	1035	1135
	C									1120/1000 [4]	1120/1000 [4]	1120	1250/1120 [4]	1250	1250
	F									590	670	750	810	920	1060
	L_1									1210	1210	1210	1340	1340	1340
	N									900	1000	1120	1250	1400	1600
	ØU									12	12	12	12	12	12
	Weight [kg]									52.4	57.2	61.8	63.8	68.6	76.7
Long diffusers	L_4									900	1000	1100	1400	1600	1600
	$ØD_2$									1120	1250	1400	1600	1800	2000
	$ØB_2$									1190	1320	1470	1680	1880	2080
	$ØA_4$									1223	1363	1513	1723	1923	2123
	P_2									20	20	20	24	24	24
	$ØR_2$									15	15	15	15	19	19
	Weight [kg]									52	62	74	102	123	139

1. For Ø900 fan diameters the left value is for hub sizes Ø280, Ø330 and Ø380 the right is for hub sizes Ø403 and Ø578. For Ø1000 fan diameters the left value is for hub size Ø380 and the right is for hub sizes Ø403 and Ø578.
2. In fields with two values, the right are for hub diameters Ø403 and Ø578.
3. The first value is for hub diameters Ø160 to Ø380. The second and third values are for hub diameters Ø403 and Ø578.
4. The first value is for ACG and the second is for ACP.

WIRE GUARDS, FLANGES, SPIGOTS ETC. FOR ALL NOVAX TYPES

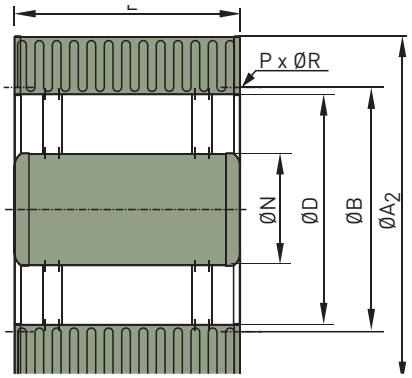


Wire guards for inlet cones | Wire guard for installation in ducts and flanges | Inlet cones | Duct pieces with wire guard | Counter flanges | Duct spigots | Flexible connection with one duct spigot | Flexible connection with two duct spigots | Welding spigots

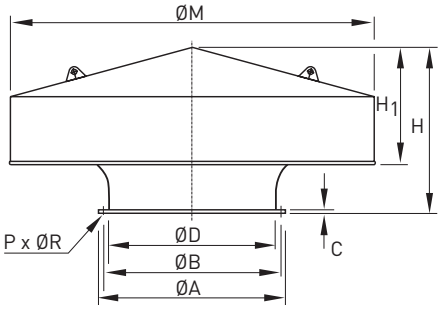
		Fan sizes [mm]													
		Ø250	Ø315	Ø400	Ø500	Ø560	Ø630	Ø710	Ø800	Ø900	Ø1000	Ø1120	Ø1250	Ø1400	Ø1600
Wire guards	V	29	43	68	55	69	87	111	137	85	106	133	133	171	218
	Weight [kg]	0.1	0.2	0.3	0.5	0.6	0.8	0.9	1.1	2.5	3.0	3.6	3.6	4.2	5.7
Wire guards for installation in ducts	N	19	29	43	68	88	55	69	87	111	137	85	106	133	171
	ØJ	246	310	396	496	556	626	706	796	896	996	1114	1244	1394	1594
	Weight [kg]	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
Wire guards for installation on flanges	N	29	43	68	88	55	69	87	111	137	85				
	ØJ	310	396	496	556	626	706	796	896	996	1114				
	Weight [kg]	0.1	0.2	0.3	0.3	0.5	0.6	0.8	0.9	1.1	2.5				
Inlet cones	E_1	200	200	205	205	260	265	265	260	280	300	320	320	320	320
	$ØA_1$	333	420	545	675	760	840	947	1055	1200	1333	1520	1650	1800	2000
	Weight [kg]	4.5	5.5	9.5	12.5	17	19	22	26	32	38	45	51	57	66
Duct pieces with wire guard	L	155	164	178	203	223	190	204	222	246	272				
	T	2	2	3	3	3	3	3	3	3	3				
	Weight [kg]	2.6	3.5	6.8	8.9	10	11.3	12.8	14.5	17	18.9				
Counter flanges	T	4	4	4	4	4	4	4	4	8	8	8	8	8	8
	$ØD_F$	260	325	410	510	570	640	720	810	910	1010	1130	1260	1410	1610
	Weight [kg]	0.7	1.1	1.5	2.2	2.4	2.7	3.0	3.4	8.5	9.4	10.2	12.2	14.2	17.2
Duct spigots	G	55	55	55	55	55	55	55	55	85	85	85	85	85	85
	Weight [kg]	1.0	1.4	1.9	2.4	2.7	3.1	3.5	3.9	5.9	6.6	7.4	8.5	9.5	11.3
Flexible connections	L_F	Min. 65 - Max. 100								Min. 110 - Max. 175					
	Weight w.1 spigot [kg]	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	20.0
	L_F	Min. 120 - Max. 145								Min. 210 - Max. 250					
	Weight w.2 spigots [kg]	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
Welding spigots	L_S	100	100	100	100	100	120	120	120	120	150	150	150	150	150
	t	4	4	4	4	4	6	6	6	6	6	6	6	6	6
	ØB	280	355	450	560	620	690	770	860	970	1070	1190	1320	1470	1680
	$ØA_3$	310	385	480	590	650	720	800	890	1000	1100	1220	1360	1510	1720
	Weight [kg]	3.1	3.9	5.4	6.7	7.5	15.0	16.9	19.0	21.4	29.0	32.4	36.2	40.5	46.3

The ØA and P x ØR dimensions are found on pages 15 and 16.

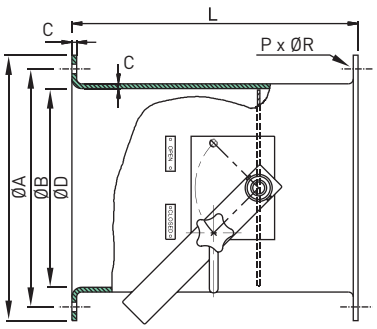
SILENCERS, HOODS AND DAMPERS



Silencer type YAH



Hood type HAN



Damper type SBC

		Fan sizes [mm]													
		Ø250	Ø315	Ø400	Ø500	Ø560	Ø630	Ø710	Ø800	Ø900	Ø1000	Ø1120	Ø1250	Ø1400	Ø1600
All	ØD	250	315	400	500	560	630	710	800	900	1000	1120	1250	1400	1600
	ØB	280	355	450	560	620	690	770	860	970	1070	1190	1320	1470	1680
	ØA	310	385	480	590	650	720	800	890	1000	1100	1220	1360	1510	1720
	P [number]	4	8	8	12	12	12	16	16	16	16	20	20	20	24
	ØR	10	10	12	12	12	12	12	12	15	15	15	15	15	19
Silencers type YAH	L	250	315	400	500	560	630	710	800	900	1000	1120	1250	1400	1600
	ØN	125	160	200	250	280	315	355	400	450	500	560	578	578	578
	$ØA_2$	463	526	614	715	775	845	925	1015	1115	1215	1335	1463	1613	1831
	ØR	M8	M8	M10	M10	M10	M10	M10	M10	M12	M12	M12	M12	M12	M16
	Weights without core [kg]	6.2	8.9	12.5	19.1	22.8	27.6	33.8	41.3	50.6	61.1	74.5	140	168	192
	Weights with core [kg]	7.9	11.5	16.8	26.5	32.8	40.8	52.1	69.2	86.8	109.6	134.4	170	205	247
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
	Weights [kg]	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	
	Weights [kg]	9.5	12.5	24	32	41.5	49	63	86	107	164	200	274	386	

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 ACN use silencers without cores

EXAMPLE

YAH-800 with core
Airflow rate, q_v = 5 m³ /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 DIFFUSER TYPE YAD

Acoustic diffusers type YAD are standard products for use in normal installations for comfort and industrial ventilation.

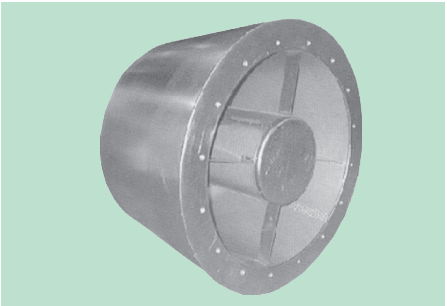
The YAD is available in 14 external diameters from Ø250 to Ø1600 mm with and without cores in seven sizes from Ø160 to Ø578 mm fitted according to the hub sizes in the NovAx range.

ENVIRONMENT

Acoustic diffusers type YAD are designed for the temperature range -40 to +120 °C.

The basic version is, in terms of materials, designed to operate in the environmental category C3 as formulated in DS/EN ISO 12944.

Please note that sound data and attenuation values are based on measurements with the NovAx axial flow fan type ACG.



ACOUSTIC DIFFUSER TYPE YAD

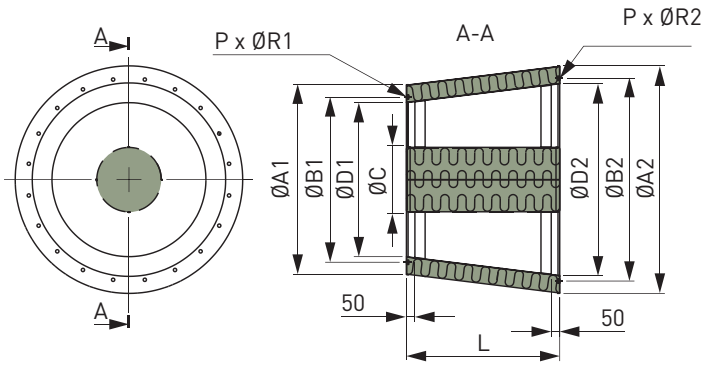
External diameters (mm)	Core diameters (mm)	Octave band (Hz)															
		63		125		250		500		1 k		2 k		4 k		8 k	
		Without (dB)	With (dB)	Without (dB)	With (dB)	Without (dB)	With (dB)	Without (dB)	With (dB)	Without (dB)	With (dB)	Without (dB)	With (dB)	Without (dB)	With (dB)	Without (dB)	With (dB)
250	160	1	1	0	1	2	2	8	9	5	11	1	11	1	8	2	5
315	160	1	1	0	1	2	2	8	9	5	11	1	11	1	8	2	5
400	160	0	0	0	2	3	3	11	12	6	11	1	11	1	7	1	4
500	160	0	0	1	1	4	4	11	10	7	12	3	10	3	6	2	4
400	230	0	0	0	2	2	2	10	11	8	14	3	13	3	10	3	6
500	230	0	0	0	2	9	9	11	12	7	12	3	12	2	8	2	5
560	230	0	0	1	1	4	4	12	12	8	13	4	11	4	7	3	5
630	230	0	0	2	2	5	5	13	13	8	13	4	10	3	6	3	5
710	230	0	1	3	3	6	6	13	13	9	12	4	9	3	6	3	5
800	230	0	0	1	1	8	8	14	14	7	12	4	9	3	6	2	4
500	280	0	0	0	2	2	2	11	12	9	15	5	15	4	11	4	7
560	280	0	0	0	2	10	10	12	13	7	12	3	13	3	9	2	5
630	280	0	0	1	1	4	4	12	12	8	14	5	11	4	7	3	5
710	280	0	0	3	3	7	7	14	14	10	13	5	9	4	7	3	5
800	280	0	0	1	1	9	8	15	15	8	13	5	10	3	6	3	4
900	280	1	1	3	3	7	7	13	13	5	11	2	7	3	6	4	5
500	330	0	0	0	2	3	3	14	15	12	18	8	18	6	13	5	8
560	330	0	0	0	3	4	4	16	17	11	16	6	16	4	10	3	6
630	330	0	0	0	2	10	10	12	13	8	13	4	13	3	9	3	5
710	330	0	1	2	2	5	5	15	15	10	15	5	12	4	7	3	5
800	330	0	1	3	3	7	7	15	15	10	14	5	10	4	7	4	5
900	330	0	0	1	1	9	9	15	15	8	14	5	10	4	7	3	4

ATTENUATION VALUES FOR YAD WITH AND WITHOUT CORE

External diameters (mm)	Hub diameter (mm)	Octave band (Hz)															
		63		125		250		500		1 k		2 k		4 k		8 k	
		Without (dB)	With (dB)	Without (dB)	With (dB)	Without (dB)	With (dB)	Without (dB)	With (dB)	Without (dB)	With (dB)	Without (dB)	With (dB)	Without (dB)	With (dB)	Without (dB)	With (dB)
560	380	0	0	0	2	3	3	14	15	13	19	8	18	7	14	5	8
630	380	0	0	1	2	11	11	13	15	9	15	6	15	4	11	3	6
710	380	0	0	1	1	5	5	15	14	11	16	6	13	5	9	4	6
800	380	0	1	3	3	8	8	16	16	12	15	6	11	5	7	4	6
900	380	0	0	1	1	9	9	16	16	9	15	6	11	4	7	3	5
1000	380	1	1	3	3	7	7	14	14	6	11	3	8	4	6	4	6
900	403	0	0	1	1	10	10	17	17	10	15	6	11	4	7	3	5
1000	403	1	1	4	4	7	7	15	15	6	12	3	8	4	7	4	6
1120	403	1	1	3	3	7	7	11	14	6	11	4	8	4	6	4	5
1250	403	1	2	2	2	7	7	5	9	4	10	4	7	4	6	3	5
1400	403	1	2	2	2	7	7	5	8	4	9	3	7	3	5	3	4
900	578	0	0	1	1	6	6	18	18	15	20	10	16	7	11	5	7
1000	578	0	0	4	4	9	9	19	19	14	18	8	13	6	9	5	7
1120	578	0	0	1	1	11	11	19	19	12	17	8	13	5	8	4	5
1250	578	1	1	4	4	8	8	13	16	7	13	5	9	5	7	5	6
1400	578	1	2	3	3	8	8	6	10	5	11	5	8	5	6	4	5
1600	578	1	2	3	3	8	8	6	9	5	10	4	8	4	6	4	5

ATTENUATION VALUES FOR YAD WITH AND WITHOUT CORE, CONTINUED

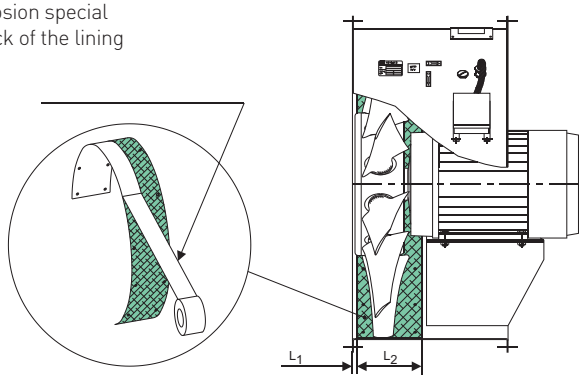
DIMENSIONS AND WEIGHTS FOR YAD



	External diameters [mm]	Hub, ØC [mm]	Fan side [mm]				Duct side [mm]					Weight (kg)
			ØA1	ØB1	ØD1	P x ØR1 (Qty. x size)	ØA2	ØB2	ØD2	P x ØR2 (Qty. x size)	L	
Micro hubs	250	160	463	280	253	4 x M8	614	450	404	8 x M10	250	12.0
	315		526	355	318	8 x M8	716	560	504	12 x M10	315	17.5
	400		614	450	404	8 x M8	776	620	564	12 x M10	400	23.0
	500		716	560	504	12 x M10	846	690	634	12 x M10	500	30.5
Medium hubs	400	230	614	450	404	8 x M10	776	620	564	12 x M10	400	24.5
	500	230	716	560	504	12 x M10	846	690	634	12 x M10	500	32.5
		280										34.0
		330										40.0
	560	230	776	620	564	12 x M10	926	770	714	16 x M10	560	40.0
		280										41.5
		330										44.0
		380										46.5
	630	230	846	690	634	12 x M10	1011	860	804	16 x M10	630	46.0
		280										40.0
		330										51.5
		380										56.0
	710	230	926	770	714	16 x M10	1116	960	904	16 x M12	710	62.0
		280										64.0
		330										70.5
		380										73.0
	800	230	1016	860	804	16 x M10	1216	1070	1004	16 x M12	800	77.0
		280										79.5
		330										83.0
		380										86.5
	900	280	1116	970	904	16 x M12	1336	1190	1124	20 x M12	900	94.5
		330										98.5
		380										109
	1000	380	1216	1070	1004	16 x M12	1466	1320	1254	20 x M12	1000	122
Maxi hubs	900	403	1116	970	904	16 x M12	1336	1190	1124	20 x M12	900	116
		578										132
	1000	403	1216	1070	1004	16 x M12	1466	1320	1254	20 x M12	1000	138
		578										157
	1120	403	1333	1190	1124	20 x M12	1613	1470	1404	20 x M12	1120	154
		578										175
	1250	403	1466	1320	1254	20 x M12	1816	1680	1604	24 x M12	1250	193
		578										216
	1400	403	1613	1460	1404	20 x M12	2013	1880	1804	24 x M12	1400	248
		578										274
	1600	578	1816	1680	1604	24 x M12	2216	2080	2004	24 x M12	1600	320

SPARK PROOF LINING FOR ACN, ACW AND ARN

To prevent galvanic corrosion special tape is applied to the back of the lining before installation.



		Fan sizes [mm]													
		Ø250	Ø315	Ø400	Ø500	Ø560	Ø630	Ø710	Ø800	Ø900	Ø1000	Ø1120	Ø1250	Ø1400	Ø1600
Spark proof lining hub Ø160 - Ø380 [1]	L_1	14	14	14	14	14	14	14	14	14	14				
	L_2	150	150	150	150	150	150	150	150	150	150				
	S_{Min} [2]	1.7	2.0	3.0	4.0	4.5	5.5	5.5	5.5	5.5	6.5				
	Weights [kg]	1.0	1.3	1.6	2.0	2.2	2.5	2.9	3.2	3.6	4.0				
Spark proof lining hub Ø403 and Ø578	L_1									24	24	24	24	24	24
	L_2									212	212	212	212	212	212
	S_{Min} [2]									5.5	6.5	7.5	8.5	9.0	9.0
	Weights [kg]									5.1	5.7	6.3	7.1	8.0	9.1

1. Tape with aluminium is used with ATEX fans, while tape with brass is used with EX fans.
2. $S_{Min.}$ is the minimum blade clearance of the impeller along the circumference of the casing. The value depends on the motor shaft diameter.

CALCULATION EXAMPLES

BASIS

NovAx fans are measured corresponding to the normal installation of the fans. See the following arrangements A, B, C and D.

Installing ACN or ACG fans 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 fans is reduced. Novenco diffusers are designed to achieve optimal recovery of the dynamic energy.

A-FACTOR

This is a loss factor, which is used if the fan is used with free outlet (arr. A and C). The a-factor is related to the speed loss (Δp_d) resulting 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.

For fans with duct connections on the outlet and otherwise unchanged dimensions (arr. B and D) the a-factor is included in the performance data and no correction is necessary.

	Symbols	Units	Formula
Mass flow	q_m	kg/s	
Air quantity, volume flow	q_v	m^3/s	$\frac{q_m}{\rho}$
Inlet diameter	D_1	mm	
Outlet diameter	D_2	mm	
Density	ρ	kg/m^3	
Flow area	A	m^2	
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	$0.5 \rho \times c2^2$
Static pressure of fan	p_{sF}	Pa	$P_{tF} - P_{dF}$
System loss	p_t	Pa	
Power consumption	P	kW	
Correction factor	a		

EXAMPLES

Fan type ACG
1470 RPM with free outlet
q_v = 20 m^3/s ; p_s = 500 Pa

The following is found with AirBox.

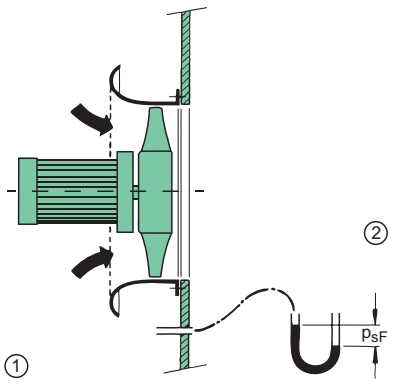
- ACG-1250 / 403-6-42°
  Required power with and without long diffuser is 14.7 and 17.5 kW, respectively. Hence, 2.8 kW is saved by mounting a long diffuser.

- ACG - 1400 / 403-6-38°
  Required power with and without long diffuser is 14.2 and 15.8 kW, respectively. Hence, 1.6 kW is saved by mounting a long diffuser.

ARR. A - FREE INLET AND OUTLET

Type ACP

$p_{SF} = ps_2 - pt_1$



FORMULAS FOR PRESSURE

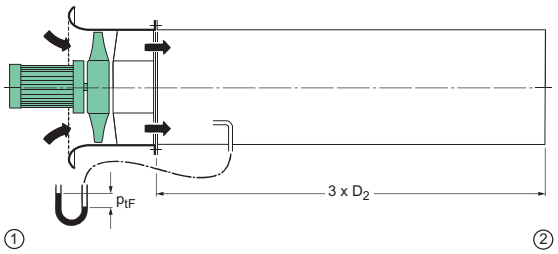
p_{tF} $= p_{t2} - p_{t1}$
$= p_{s2} + p_{d2} - (p_{s1} + p_{d1})$
$= (p_{s2} - p_{s1}) + (p_{d2} - p_{d1})$
p_{sF} $= p_{tF} - p_{dF}$ (Definition)

All inlet sizes of the fan are designated by sub-index 1 and all outlet sizes by sub-index 2.

ARR. B - FREE INLET AND DUCT ON OUTLET

Type ACG

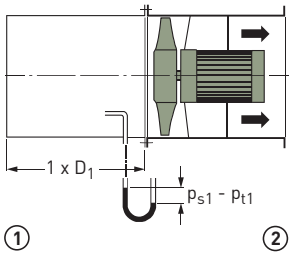
$p_{tF} = p_{t2} - p_{t1}$
$= (p_{s2} + p_{d2}) - (p_{s1} + p_{d1})$



ARR. C - DUCT ON INLET AND FREE OUTLET

Type ACN

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

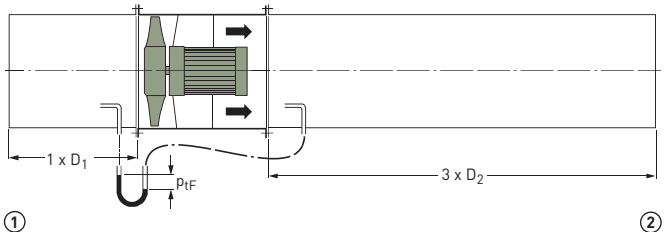


ARR. D - DUCT ON INLET AND OUTLET

Type ACN

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

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



RUN-UP TIME

The run up time of the axial flow fan is calculated with the following formula.

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

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 my increase the run time more than calculated.

FINDING THE TOTAL EFFICIENCY

The total efficiency tells how effective the complete arrangement is. The efficiency is found with the following formula.

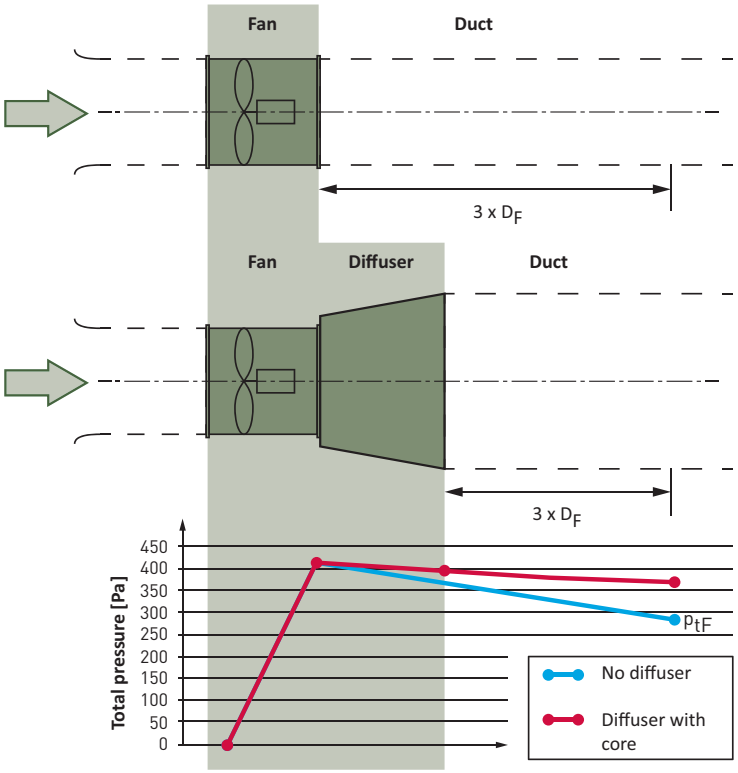
$\eta_{total} = \eta_{fan} \times \eta_{motor}$, where
η_{total} = Total efficiency
η_{fan} = Fan efficiency
η_{motor} = Motor efficiency

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 calculates with AirBox for the following fan and conditions.

Fan type	:	ACN
Volume flow	:	3 m^3/s
Total pressure, p_{tF}	:	369 Pa
Fan diameter, D_F	:	Ø500 mm
Hub size	:	Ø330 mm
Blade angle	:	60°
Efficiency	:	88%



PRESSURE LOSS EXAMPLE

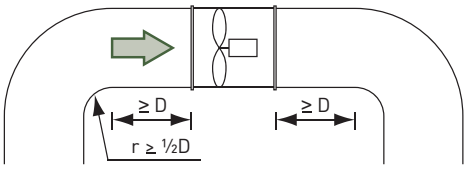
INSTALLATION CONSIDERATIONS

Whether NovAx 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 airflow. At less than optimum conditions, the fan speed must be reduced.

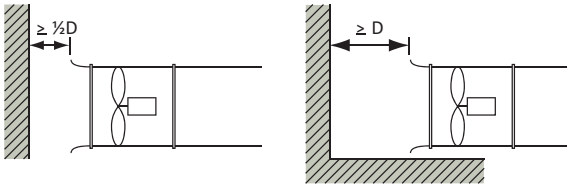
Free inlet requires an inlet cone to get optimum performance with regard to efficiency and sound.

Built into duct



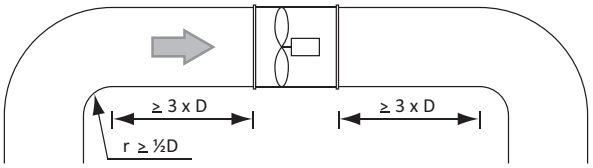
Free inlet

D = Fan diameter



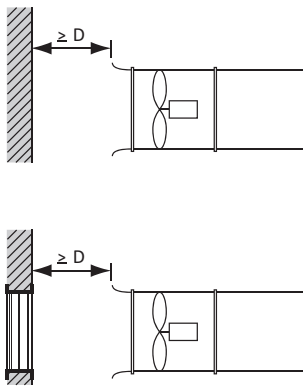
MINIMUM INSTALLATION

Built into duct



Free inlet

D = Fan diameter



OPTIMUM INSTALLATION

QUALITY AND SERVICE

REST ASSURED

The Novenco NovAx axial flow fans are produced in accordance with Novenco's well-known quality standards. Novenco is ISO 9001 certified and all fans are inspected and tested, before leaving the production.

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 & Industry A/S reserves the right to changes without further notice due to continuous product development.

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

- Operation in stall area
- Operation with pulsating counter pressure – called pump mode
- Operation with exceedingly starts and stops

Contact Novenco Building & Industry A/S for assessment of the fan suitability.

PATENTS AND TRADEMARKS

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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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