

Pure competence in air.

# AZN ATEX / AZN-AZW EX INSTALLATION AND MAINTENANCE

Building & Industry

**NOVENCO** 

SCHAKO Group



ENGLISH

924714-0

# ZerAx axial flow fan types AZN ATEX and AZN-AZW EX

## Installation and maintenance

### 1. Application

### 2. Handling

- 2.1 Marking
- 2.2 Weight
- 2.3 Temperature
- 2.4 Transport

### 3. Storage

### 4. Installation

- 4.1 Preparing for installation
- 4.2 Installation
- 4.3 Support frame for AZN
- 4.4 Duct connection
- 4.5 Electric connection

### 5. Start of operation

- 5.1 Prior to start-up
- 5.2 Motors with Y/ $\Delta$ -starting
- 5.3 Start-up procedure

### 6. Maintenance

- 6.1 Prior to inspection and maintenance
- 6.2 Cleaning
- 6.3 Vibration levels
- 6.4 Fan casing
- 6.5 Rotor
- 6.6 Motor
- 6.7 Dismounting of motor
- 6.8 Mounting of motor
- 6.9 Troubleshooting

### 7. Inspection and test

### 8. Sound

### 9. Safety

### 10. Trademarks, patents and copyright

### 11. Quality and environment

### 12. Warranty

### 13. Spare parts

### 14. Declaration of conformity for AZN ATEX

### 15. Declaration of conformity for AZN EX and AZW EX

### 1. Application

The axial flow fan types AZN and AZW are for duct installation in land and

marine environments, respectively. ATEX fans are category 2G/D equipment. EX fans are non-sparking fans. The fans are produced in accordance with the governing directives and guidelines for ATEX and EX equipment. For ATEX fans this include directive ATEX 2014/34/EU, with further approval for use in conformity with EU/99/92 ATEX 137.



**Important:** The intended use of ATEX fans exclude environments characterised by any of the following conditions; adiabatic compression and shock waves, lightning, electromagnetic waves, ionising radiation and ultrasound.

### 2. Handling

#### 2.1 Marking

The ATEX and EX fans are designed for operation under predetermined conditions. The conditions applicable to the fans are written on the fan type signs.

**Important:** Verify that the fan marking corresponds to the intended use, e.g. correct zone, inlet temperature or gas group.

ZerAx AZN ATEX fans are marked “CE  II 2G c Ex de IIC T4” or “CE  II 2D c Ex tb IIIC T135”.

	Fan size ØD, [mm]	Motor sizes										
		-90	-100	-112	-132 F	-160	-180	-200	-225	-250	-280	
Hub diameter 350	500	48.3	48.3	48.3	48.8	51.2	50.3					
	560	52.3	52.3	52.3	52.8	55.2	54.3					
	630	57.4	57.4	57.4	57.9	60.3	59.4					
	710	62.9	62.9	62.9	63.4	65.8	64.9					
	800	68.7	68.7	68.7	69.2	71.6	70.7					
	900	75.2	75.2	75.2	75.7	78.1	77.2					
	1000	81.1	81.1	81.1	81.6	84.0	83.1					
	1120	87.8	87.8	87.8	88.3	90.7	89.8					
Hub diameter 560	1250	94.6	94.6	94.6	95.1	97.5	96.6					
	1000				221.2	222.5	221.6	223.8	229.4 <sup>1</sup>	228.8 <sup>1</sup>	231.5 <sup>1</sup>	
	1120				250.9	252.1	251.2	253.5	259.0 <sup>1</sup>	258.5 <sup>1</sup>	261.1 <sup>1</sup>	
	1250				271.2	272.5	271.6	273.8	279.4 <sup>1</sup>	278.8 <sup>1</sup>	281.5 <sup>1</sup>	
	1400				298.1	299.4	298.5	300.8	306.3	305.7	308.4	
	1600				334.2	335.5	334.6	336.9	342.4	341.9	344.5	
	1800				367.4	368.7	367.8	370.1	375.6	375.1	377.7	
	2000				399.4	400.7	399.8	402.1	407.6	407.1	409.7	

**Table 2.** Maximum total weights for AZN ATEX and AZN EX fans in kg, excl. motors and accessories

1. Includes an obligatory extension duct.

	Fan size, ØD, [mm]	Motor size					
		-90	-100	-112	-132	-160	-180
Hub diameter 350	500	114.0	129.1	136.6	191.1	231.8	292.2
	560	126.3	141.4	148.9	203.4	244.1	304.5
	630	138.1	153.2	160.7	215.2	255.9	316.3
	710	150.7	165.8	173.3	227.8	268.5	328.9
	800	165.2	180.3	187.8	242.3	283.0	343.4
	900	181.0	196.1	203.6	258.1	298.8	359.2
	1000	196.3	211.4	218.9	273.4	314.1	374.5
	1120	222.6	237.7	245.2	299.7	340.4	400.8
1250	242.7	257.8	265.3	319.8	360.5	420.9	

**Table 3.** Max. total weights for AZW EX fans in kg, excl. motors and accessories<sup>1</sup>

1. Weights are without the weight of the spark proof lining. This adds up to 7 kg extra for the biggest fan sizes.

Field value	Meaning
CE	European Conformity
Ex	Ex mark, comply with 2014/34/EU
II	Equipment group, Surface Industry
2	Equipment category, for use in zone 1 (gases) or zone 21 (dust)
G / D	Type of hazard, gaseous or dust filled atmospheres
c	Safety design, protection by constructional safety
Ex	Explosive atmospheres
de	Flameproof enclosure and increased safety
tb	Motor protection by enclosure
IIC	Apparatus group with most easily ignited hazards (hydrogen)
IIIC	Conductive dust
T4	Maximum surface temperature, gas explosion protected atmospheres, 135 °C
T135	Maximum surface temperature, dust explosion protected atmospheres

**Table 1.** ATEX marking

The drive motor and terminal box on the fan have separate ATEX markings, which may differ from the fan marking. The marking on the fan nameplate determines the suitability of the fan, and overrides the markings on the motor and terminal box.

The EX fans are fitted with nameplates with information on product type. The motors are also fitted with nameplates.

## 2.2 Weight

The total weight depends on the fan size and motor size.

Refer to the Airbox program for motor variations and calculation of weights for specific fan solutions. See table 3 for max. motor weights.

Lift the fan using a minimum of three holes in the flange. Bending of the flange must be avoided. Large motors are lifted in the eye-bolts on top of these.

## 2.3 Temperature

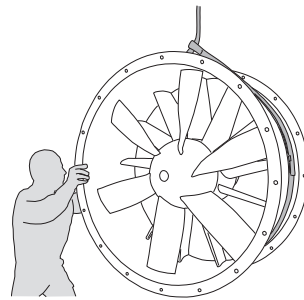
The AZN and AZW fans are designed for ambient and inlet temperatures between -20 and +40 °C.

## 2.4 Transport

Axial flow fan types AZN and AZW are delivered packed in boxes suitable for further transport.

Lifting and transport must be done with care, as the fans are vulnerable to vibrations and shocks which can result in imbalance and deformations. Check the blade clearance and fan before continuing with installation.

Further transport of the fan is done with the rotor placed downwards or with the fan casing in a vertical position using a strap around the casing.



**Figure 1.** Lifting the fan with a strap

## 3. Storage

The AZN and AZW fans withstand outdoor storage for 1 month provided the packing is intact. Unprotected fans, i.e. with no or broken packing, must be stored in sheltered locations.

The storage period may be extended to 6 months, if the fans are stored indoors in well-ventilated conditions and without risk of condensation. The storage location must be vibrations-free, which can damage the motor bearings. Prolonged storage can affect the ability of the rotor to rotate freely. It must therefore be turned regularly by hand and especially for storage periods exceeding 3 months.

## 4. Installation

### 4.1 Preparing for installation

To ensure a safe work environment and fan functionality, make sure of the following.

#### Checklist prior to installation

- The rotor must rotate freely in the fan casing and have equal blade tip distances to the casing around the circumference.
- Remove any potential hazards for explosions in the installation area.
- Secure the installation location to at least IP20, i.e. protect it against foreign particles with wire guards and filters in front and after the fan.
- Duct installation, i.e. connection of the fan using the flanges cannot be considered completely air tight or leak proof. If the inside of the AZN ATEX fan casing is a Zone 1 atmosphere, the outside is Zone 2 with matching requirements for

installed equipment.

- Avoid static electricity by grounding the fan during installation. For instance by assembly on non-conducting vibration dampers and foundations.

## 4.2 Installation

Handle the fan carefully and place it in accordance with the airflow direction arrow on the fan casing.

It is recommended to install the fans on support frames, which are available as optional extras. It may also be suspended in the casing flanges or using special carriers.

The air inlet and outlet must be kept free from all sides to avoid risk of stalling and to achieve optimal performance.

Minimum distances required for undisturbed airflow are described in section "4.4 Duct connection".

Duct installations should be without bends before and after the fans for at least three fan diameter (D) lengths. See figure 6.

When the fan is in position and secured, make sure the rotor rotates freely.

Motor size	-71	-80	-90	-100
Weight [kg]			35	46

Motor size	-112	-132	-160	-180
Weight [kg]	60	99	197	240

Motor size	-200	-225	-250	-280
Weight [kg]	260	400	650	700

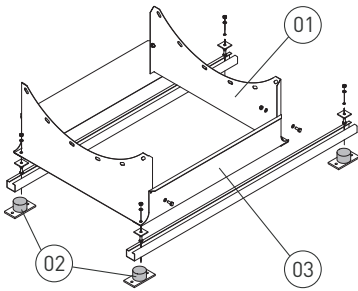
**Table 4.** Max. motor weights

**Important:** Motors with drain holes, require the fans to be positioned so that the holes point downwards at the lowest point.

## 4.3 Support frame for AZN

The support frame consists of two mounting plates (see figure 2 item 01). Two stiffeners (item 02) are mounted between the plates with screws M10x20.

**Important:** The support frame must be grounded to prevent electrical shocks.



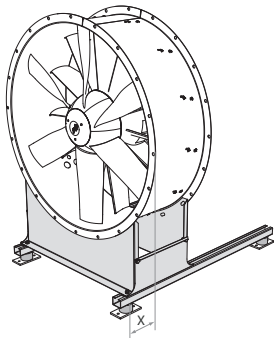
**Figure 2.** Support frame for AZN

To prevent spreading of vibrations to the surroundings, anti-vibration mountings may be inserted between fan and support, and flexible connections can be fitted in the ducts before and after the fan. The connections are available as optional extras.

Secure anti-vibration mountings (figure 2) in the support frame by means of bolts. Mount base plates for attachment in the foundation/floor at the bottom of the rubber element.

**Important:** The natural frequency of the support must differ at least 20% from the fan speed.

The anti-vibration mountings serve to ensure the natural frequency of the system is kept below 10 Hz and that the damping is at least 80%.



**Figure 3.** Fan with support frame

To load the vibration dampers evenly the fan must be the distance X from the front damper. The distance is found in the specific AirBox calculation. See figure 3. Loading of dampers vary depending on air pressure.

Uneven loading can strain and impair the function of the dampers.

#### 4.4 Duct connection

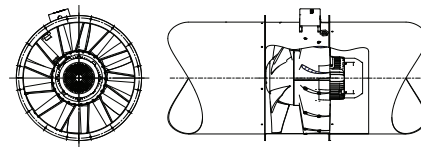
The duct or inlet cone on the inlet side are to ensure smooth and undisturbed airflows. Installation space must be

optimal for the fans to run at max. allowable speed. Fan speeds must be reduced if the installation space is less than optimal. See table and figures below.

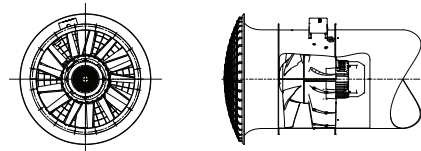
	Fan size, ØD, [mm]	RPM 1	
		Optimal	Reduced
Hub diameters 350	500	3660	3483
	560	3460	3286
	630	3238	3059
	710	3000	2804
	800	2751	2523
	900	2498	2217
Hub diameters 560	1000	2270	1918
	1120	1900	1568
	1250	1500	1201
	1000	2034	1904
	1120	1893	1727
	1250	1751	1552
	1400	1599	1371
	1600	1419	1166
	1800	1262	1002
	2000	1130	878

**Table 5.** Max. allowable speed at 20 °C

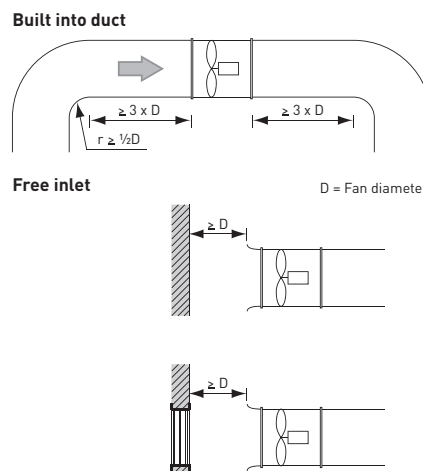
1. Fan speeds depend on the installation space.



**Figure 4.** Installation in duct

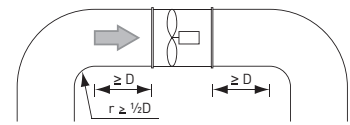


**Figure 5.** Duct installation with inlet cone and wire guard

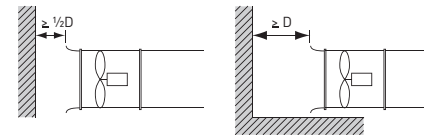


**Figure 6.** Optimal installation space

#### Built into duct



#### Free inlet



**Figure 7.** Reduced installation space

Flexible connections can be placed at least 1/2D in front of fan.

AZN and AZW fans are prepared for circular duct connections on inlet and outlet sides.

Flanges supplied as standard for type AZN comply with Eurovent 1/2, and for type AZW comply with DIN 24154 row 4.

Systems with higher vibration levels or more exacting performance requirements must be provided with expansion joints between fan and duct.

**Important:** The fan cannot be used for support of ducts.

It is important to allow for free areas to facilitate mounting and dismounting as well as ordinary maintenance.

#### 4.5 Electric connection

Connection of supply voltage is done directly in the terminal box mounted on the outside of the fan casing.

The motor cables are connected according to the connection diagram on the inside of the terminal box lid.

**Important:** The installation and connection to the supply network must be done by authorised personnel, follow current legislation and comply with EN 60079-14.

**Important:** Only fans with steel hubs may be run in reverse. Reversible operation increases the risk of fan stalling. The service life is shortened, if the fan stalls.

After making the connections in the

terminal box, check that the rotor rotation direction complies with the arrow placed on the outside of the fan. For ATEX fans the following minimum airflow rates must be ensured to keep the ATEX temperature rating.

Motor size	-71	-80	-90	-100
Flow [m <sup>3</sup> /s]			0.07	0.09
Motor size	-112	-132	-160	-180
Flow [m <sup>3</sup> /s]	0.11	0.21	0.47	0.54
Motor size	-200	-225	-250	-280
Flow [m <sup>3</sup> /s]	0.99	1.35	1.47	2.68

**Table 6.** Min. airflow rates for ATEX fans

## 5. Start of operation

Perform the steps described here every time the fan has been stopped for shorter or longer periods.

### 5.1 Prior to start-up

When the fan is installed and prior to start-up, check the distances important for safe operation of the fan. The blade clearance must be minimum 0.1x motor shaft diameter (min. 2 mm, max. 13 mm) all around the rotor circumference.

The axial distance between the rotor hub and stator must be min. 3.5 mm. Repair or replace the fan if these tolerances are not met.

Prior to start-up check that the fan and duct connections are clean and free from tools and objects obstructing the airflow. Also check the electric connections meet the prescribed requirements, that wire guards fitted on the inlet or outlet side are correctly mounted and that the fan rotates in the direction indicated by the arrow on the fan casing. Check the latter by flicking the fan power on and off.

### 5.2 Motors with Y/Δ-starting

The relay must be set to the calculated time.

### 5.3 Start-up procedure

Refer to the motor manual for specific information and procedures.

#### Start-up procedure

- 1 Start the fan.
- 2 Check that no abnormal noise is present.
- 3 Check that the vibration level is acceptable. The vibration level at the fan operating speed must be less than 7.1 mm/s for motors up to 37 kW, and

4.5 mm/s for motors over 37 kW. This is measured radially at 2 points, 90° offset and at the free shaft end of the motor. The fan must be balanced. See section "6.3 Vibration levels".

- 4 After 30 minutes of operation check that the fan operates normally.

**Important:** The fan is designed for continuous operation. The following kinds of operation may cause fatigue break in the rotor and endanger people.

- Operation in stall area - Operation with pulsating counter pressure - called pump mode
- Operation with repeated starting and stopping.
- Uneven flow velocity through fan.

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

## 6. Maintenance

### 6.1 Prior to inspection and maintenance

When the fan is out of operation, for example for inspection or maintenance, the electric system must be switched off and secured so that the fan cannot be unintentionally started.

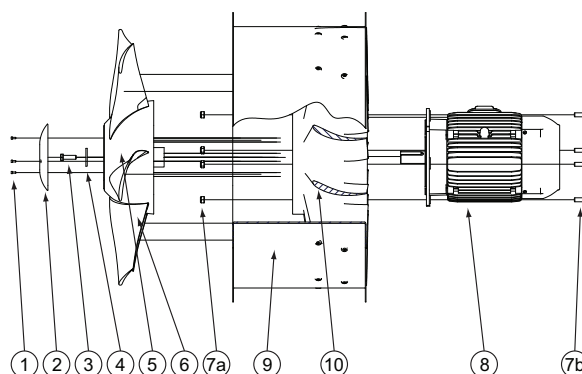
### 6.2 Cleaning

Cleaning must be done at least quarterly. The intervals may have to be adjusted, dependent on the operation and operating conditions. Corrosion and dust filled atmospheres typically reduce the intervals. Please note that deposits of dust can be ignited by high surface temperatures and constitute a safety risk.

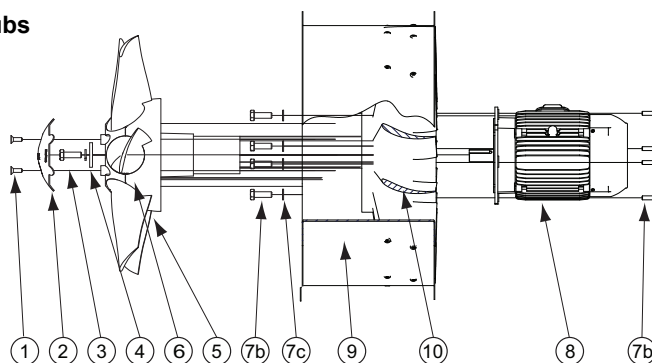
### 6.3 Vibration levels

After every 1000 hours of operation the vibration level must be checked. It must be less than 7.1 mm/s for motors up to 37 kW, and 4.5 mm/s for motors over 37 kW. Investigate and remove the

Ø350 hubs



Ø560 hubs



- |                 |                 |
|-----------------|-----------------|
| 1: Three screws | 7a: Nuts        |
| 2: Hub cap      | 7b: Bolts       |
| 3: Centre screw | 8: Motor        |
| 4: Centre disc  | 9: Fan casing   |
| 5: Hub boss     | 10: Guide vanes |
| 6: Rotor        |                 |

**Figure 8.** Disassembly and assembly

causes, if the limits are exceeded. Refer to ISO 14694.

For variable speed fans the maximum vibration level is likely to be exceeded at certain speeds. Continuous operation at these speeds must be avoided. A curve showing vibration levels at different speeds is part of the fan documentation for variable speed fans and should be reviewed by the user.

**Notice:** The vibration levels depend on the installation and should be measured after completing the installation.

**Important:** Constant vibration monitoring is mandatory for ATEX category 2D fans, i.e. fans operating in zone 21.

### 6.4 Fan casing

The fan casing requires no maintenance other than ordinary cleaning. If the casing is painted, the surface should be checked regularly and repaired where necessary.

### 6.5 Rotor

The rotor is manufactured with the blades mounted to the pitch corresponding to the desired operating point based on pressure, airflow and fan speed. To ensure vibration free operation the rotor has been carefully balanced. Vibrations occurring during operation may be due to accumulation of dust and dirt on the hub and blades. These disappear after cleaning. If vibrations persist, expert assistance should be called for immediately. Continued vibrations shorten the life of the motor bearings.

### 6.6 Motor

Refer to the motor manual for service information such as the number of running hours before inspection and replacement of bearings. It is recommended to check the motor bearings after 20,000 running hours and replace them when signs of wear and tear begin to show. Subsequently, the bearings must be checked after every 10,000 running hours.

### 6.7 Dismounting of motor

**Important:** Switch off the power and disconnect the motor cable in the terminal box, before beginning work on the rotor and motor.

Refer to figure 8 in the following.

#### Dismounting motor

- 1 Dismount any ducts on the inlet and outlet sides.
- 2 Remove the screws (pos. 1) holding the hub cap and remove the cap (pos. 2) itself.
- 3 Remove the rotor centre screw (pos. 3) and the centre disc (pos. 4).
- 4 Dismount the rotor by means of a puller fastened in the threaded holes of the hub boss (pos. 5).
- 5 Depending on the length of the installed motor cable; draw the cable free of the fan casing in order to handle the motor.
- 6 Support the motor. See table 3 for max. motor weights.
- 7 Detach the motor from the motor shell by removing the nuts and bolts (pos. 7a and 7b).

**Notice:** Nuts holding motors mounted in rear motor shells are accessed through the front motor shells.

- 8 Remove the motor (pos. 8).

**Important:** When working with the fan, avoid exposing parts to shocks. Motor bearings and other fan components are vulnerable parts.

### 6.8 Mounting of motor

**Important:** Replace lock washers and nuts during fan assembly.

Refer to figure 8 in the following.

Size	Torque [Nm]
M6	12
M8	30
M10	60
M12	100
M16	230
M20	470

**Table 7.** Motor and flange bolt tightening torques

### Mounting motor

- 1 Mount the motor (pos. 8) and make sure the motor shaft is concentrically placed in the fan casing.
- 2 Insert and tighten the nuts and bolts (pos. 7a and 7b). See table 7. "Motor and flange bolt tightening torques".

**Notice:** Nuts holding motors mounted in rear motor shells are accessed through the front motor shells.

- 3 Mount the rotor (pos. 6) on the motor shaft by means of a tool fastened in the threaded hole of the motor shaft. The rotor hub must rest against the motor shaft collar. Check that the rotor can rotate freely, i.e. that the blade clearance is the same throughout the circumference of the casing. Adjust the motor position if necessary.
- 4 Use a feeler gauge to check that the clearance between the rotor blade tips and fan casing is the same throughout the circumference and meets the following requirements.
  - Minimum 2 mm
  - 10% of the motor shaft diameter
  - Maximum 13 mm
 Refer to the motor manufacturer's documentation for the shaft diameter.
- 5 Adjust the motor position with reference to step 4.
- 6 Mount the centre disc (pos. 4) and the rotor centre screw (pos. 3).
- 7 Mount the hub cap (pos. 2) and mount the screws (pos. 1).
- 8 Connect the motor cable in the terminal box and connect the ducts.

To start the fan follow the procedure described in section "5. Start of operation".

### 6.9 Troubleshooting

In case of breakdowns, the following checklists should be completed, before calling for service.

#### Lacking performance

- Damper closed
- Ducts clogged
- Supply fan, if any, stopped
- Motor defective
- Motor disconnected
- Wrong direction of rotor rotation

## Noise and vibrations

- Bearings in electric motor defective
- Rotor out of balance
- Rotor worn/damaged
- Bolts/components loose

Fans operating in the stalling area, may result in breakdowns.

## 7. Inspection and test

Exhaust fans must always be kept operational and in perfect condition. The fans should be inspected twice a year to ensure a satisfactory function and long life.

### Extent of inspection

- Measuring of power consumption
- Check of torque for fixing bolts and – correction of it, if necessary.
- Cleaning
  - inside with pressure air
  - outside with water
- Visual inspection of rotor, fan casing, and connection to the electricity supply

It is recommended to enter all values and observations in a log.

## 8. Sound

The sound emission of the fans depends on installation and operating conditions, hence no general data can be given. Refer to the AirBox calculation program for specific emissions and to the product catalogue for more general data.

## 9. Safety

The ZerAx axial flow fans must be installed according to current and local safety regulations. At a minimum these include EN 13850.

It is recommended to review and revise safety procedures regularly.

### Safety check

- Test if safety procedures and installation work correctly.
- Check if safety regulations have been changed and if the installation needs revising.

## 10. Trademarks, patents and copy-right

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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, 2.843.131 and 2.843.132; China no. 2012280037965.7; 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; PCT no. EP2012/064908 and EP2012/064928; South Korea no. 10-2012-7012252, 10-2012-7012154, 10-2012-7012155, 10-2014-7005746 and 10-2014-7003829; and US no. 14/234.654. Pending designs include US no. 29/541.418 and 29/541.422.

Granted patents include Canada no. 2.777.141 and 2.777.144; China no. ZL2010800458842, ZL2010800460965, ZL2010800464275 and ZL2012800387210; EU no. 2488759 and 2488761; and US no. 8.967.983, 9.200.641, 9.273.696 B2 and 9,683,577. Granted designs include Brazil no. BR-30-2012-003932-0; Canada no. 146333; China no. 1514732, 1517779, 1515003, 1555664 and 2312963; EU no. 001622945-0001 to 001622945-0009 and 001985391 - 0001; India no. 246293; South Korea no. 30-0735804; and US no. D665895S, D683840S, D692119S, D704323S, D712023S, D743018S, D755363S and D756500S.

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## 11. Quality and environment

Novenco Building & Industry A/S is ISO 9001 and 14001 certified. All fans are inspected and tested.

## 12. Warranty

Novenco Building & Industry A/S 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.

## 13. Spare parts

Contact Novenco for information on and ordering of spare parts.

#### 14. Declaration of conformity for AZN ATEX

The Machinery Directive 2006/42/EU,  
part 2, A.

Novenco Building & Industry A/S  
 Industrivej 22  
 4700 Naestved  
 Denmark

hereby declares that the axial flow fans  
 type AZN ATEX have been  
 manufactured in accordance to and  
 comply with the European Council's  
 directives 2006/42/EU regarding  
 mutual approximation of the machinery  
 laws (the Machinery Directive) of the  
 member states.

#### Directives

- Machinery 2006/42/EU
- EMC 2014/30/EU
- LVD 2014/35/EU
- ATEX 2014/34/EU

#### Applied standards

EN 1127-1:2011

Explosive atmospheres – Explosion  
 prevention and protection Part 1: Ba-  
 sic concepts and methodology

EN ISO 12100:2011

Safety of machinery  
 - General principles for design  
 - Risk assessment and risk reduction

EN ISO 13348:2007, class AN3

Industrial fans - Tolerances, methods  
 of conversion and technical data pres-  
 entation

EN 13463-1:2009

Non-electrical equipment for poten-  
 tially explosive atmospheres Part 1:  
 Basic method and requirements

EN 13463-5:2011

Non-electrical equipment for poten-  
 tially explosive atmospheres Part 5:  
 Protection by constructional safety  
 "c"

EN 14986:2007

Design of fans working in potentially  
 explosive atmospheres

EN 14694:2003

Industrial fans – Specifications for  
 balance quality and vibration level

EN ISO 13857:2008

Safety of machinery - Safety distances

EN 60079-0:2012

Electrical apparatus for potentially

explosive atmospheres, General re-  
 quirements

EN 60204-1:2006 / A1:2009

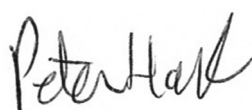
Safety of machinery - Electrical equip-  
 ment of machines Part 1: General Re-  
 quirements

EN 61800-3:2005, class C2:

Adjustable speed electrical power  
 drive systems, EMC requirements  
 and specific test methods

It is a condition that Novenco's  
 instructions for installation are followed.

Naestved, 01.01.2018



Peter Holt  
 Technical director  
 Novenco Building & Industry A/S



## 15. Declaration of conformity for AZN EX and AZW EX

The Machinery Directive 2006/42/EU,  
part 2, A.

Novenco Building & Industry A/S  
Industrivej 22  
4700 Naestved  
Denmark

hereby declares that the axial flow fan  
types AZN EX and AZW EX have been  
manufactured in accordance to and  
comply with the European Council's  
directives 2006/42/EU regarding  
mutual approximation of the machinery  
laws (the Machinery Directive) of the  
member states.

### Directives

- Machinery 2006/42/EU
- EMC 2014/30/EU
- LVD 2014/35/EU

### Guidelines

- IACS F29/2005:  
Non-sparking fans

### Applied standards and regulations

EU 327/2011

Fans driven by motors with electric  
power between 125 W and 500 kW

EN ISO 12100:2011

Safety of machinery

- General principles for design
- Risk assessment and risk reduction

EN ISO 13348:2007, class AN3

Industrial fans - Tolerances, methods  
of conversion and technical data pres-  
entation

EN ISO 13857:2008

Safety of machinery - Safety distances

EN 60204-1:2006 / A1:2009

Safety of machinery - Electrical equip-  
ment of machines Part 1: General Re-  
quirements

EN 61000-6-2:2005

EMC - Part 6-2: Generic standards -  
Immunity for industrial environ-  
ments

EN 61000-6-3:2007 / A1:2011

EMC - Part 6-3: Generic standards -  
Emission standard for residential,  
commercial and light-industrial envi-  
ronments

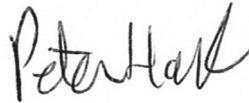
EN 61800-3:2005, class C2:

Adjustable speed electrical power

drive systems, EMC requirements  
and specific test methods

It is conditioned for the validity of the  
warranty that Novenco's instructions for  
installation and maintenance have been  
followed.

Naestved, 01.01.2018



Peter Holt  
Technical director  
Novenco Building & Industry A/S

Pure competence in air.

Building & Industry

**NOVENCO** 

SCHAKO Group

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