



A Guide to the Correct Application of Fans With Explosion Proof Motors

in compliance with ATEX Directive 2014/34/EU and UKEX Regulations UKSI 2016:1107

Installation and Maintenance



1.0 SAFETY INFORMATION

- **WARNING:** This product has been designed for use in potentially explosive environments. It is only to be installed by a competent person who understands and acknowledges the risks associated with ATEX/UKEX environments and has appropriately assessed and mitigated these risks.

1.1 Symbols



Explosion Proof Motors

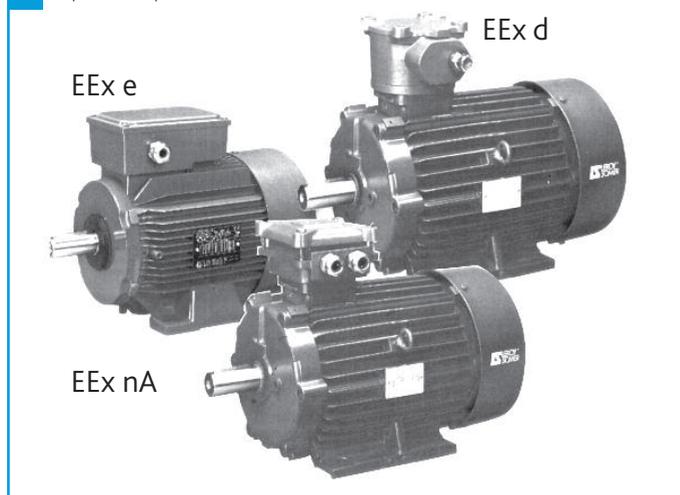
Products used in potentially explosive environments must carry the ATEX/UKEX logo. The installer must risk assess and identified and classified the zone and ensured that the product install is suitable for that zone.

2.0 OVERVIEW

The ATEX directive refers to the design, application, installation and maintenance of motors for potentially explosive atmospheres. In this particular instance, the use of motors in fan products intended for use in such atmospheres.

The directive is mandatory as of 20th April 2016 and in order that full compliance is met specific requirements are required of the manufacturer, the installer and the end user.

1 Explosion-proof Motors



Nuairé have taken all necessary due care to ensure compliance of products relevant. This document, when read in conjunction with the product standard Installation and Maintenance (I&M) document, provides the necessary information to enable both supplier and installer to meet their obligations under the ATEX Directive 2014/34/EU.

2.1 Products Affected

The AXUS range of axial flow fans

Fan Type	I&M Document Number
Long/Short Cased Axial	671220
Bifurcated Axial	671221

Before an enquiry or order is accepted for any product requiring compliance with ATEX Directive 2014/34/EU, confirmation of the risk assessment of significant environmental hazards having been completed is required.

This confirmation is held in the project file, together with certificates of conformance relevant to bought in items e.g. motor.

Upon completion of manufacture the product will have been the subject of functionality and compliance testing and a test certificate produced, a copy of the test certificate is also held in the project file. Copies of all documentation will be supplied with the fan and it is the purchaser's responsibility to ensure they are presented to the end user.

Upon delivery and prior to commencing installation it is incumbent on the installer to ensure that the product complies with the specified environmental risk by comparing the groups and categories laid down for the area against that shown on the fan rating plate and motor rating plate.

2 Typical Product Identification and Rating Label

Zone Ref.	Fan Code	Dossier File	Group	Category	Gas/Dust	Explosion Code	Flameproof Designation
							Gas Group
Product	Construction Date	Conditions of Use	Western Industrial Estate Caerphilly CF83 1NA UK Tel +44 (0)292088 5911		Temperature Class (surface)		Equipment Protection Level (EPL)
AX63D-21AKZ-0WE	11-12-23	Zone 1 Gas	IIC T4 Gb		ATEX groups & Categories		Fan Speed
Safety Marking	UK UKEX 23UKXT1136	CE ATEXT 03XT429	Ex	IIC T4 Gb	Order/File ref.		Product Weight
I & M Standard	Leaflet 671216	Number of Standard	GRP 2	CAT 2G			
Serial No	4097971	Speed	2870 rpm				
FLC	2.31 A	ARC No.	1234567				
Supply	400 v 50 Hz 3 ~	Weight	60.6 kg				
UK CA CE	40979716780679		Ex	Ex Denotes protection against explosion risk			
I&M Leaflet		Fan Serial No.		Compliant with European Directive			
Voltage		Fan Current					

3 Typical Product Identification and Rating Label

MOT. 3 ~ FLSD 225 M4						
F - 90500 BEAUCOURT N° 703 481 00 MA 002 kg : 388 0080						
IP 55 IK 08		I cl. F		40°C S 1		% d/h
V	Hz	min ⁻¹	kW	cos φ	A	
Δ 380	50	1465	45	0,86	86	
Δ 400	-	1470	-	0,84	84	
Λ 690	-	-	-	-	48	
II 2G - EEx d IIB T4 - T amb : -25°C à 40°C						
GRAISSE ESSO UNIREX N3			INERIS 01ATEX0001 X			
DE	6313 C3	23 cm ³	8300 / 6500		H 50/60 Hz	
NDE	6312 C3	20 cm ³	8300 / 6500		H 50/60 Hz	

Line 1.

- MOT = 3 Phase A.C. motor
- FLSD = FLSD range
- 225 = Frame size regreasing
- M = Housing symbol
- CE = Compliant with European Directive
- 0080 = INERIS I.D. No.

Line 2.

- No. = Batch No.
- M* = Production year/*L = 2002/*L = 2001, M = 2002
- A** = Production month (January)**A = January,
- B = February
- 022 = Serial No.
- kg = weight

Line 3.

- IP55 = Protection index
- I cl. F = Insulation class F
- 40 °C = Max ambient operation temperature
- S1..% = Duty operating factor
- ...d/h = NO. cycles per hour

Line 4.

- V = Supply voltage
- Hz = Supply frequency
- min⁻¹ = Revolutions per minute
- kW = Rated power output
- cos φ = Power factor
- A = Rated current

Line 5/6.

- Ex symbol = Denotes protection against explosion risk
- EEx = Denotes switchgear designed for potential explosive atmospheres
- d = Protection type
- II = Explosion group
- B = Gas sub-division
- T4 = Temperature class
- INERIS = Notified body
- 01ATEX0001X = EC-type examination certificate No.

Bearings

- DE = Drive end bearings
- NDE = Non drive end bearings
- 23cm³ = Amount of grease at each regreasing (in cms³)
- 8300 h = Regreasing interval
- UNIVEX N3 = Type of grease

△ / Λ = Connection symbol

A duplicate motor rating label is affixed to the outside of the fan product adjacent to the product rating label.

3.0 INSTALLATION

Installation must be completed by competent and suitably qualified persons, in accordance with good industry practice and should conform to all governing and statutory bodies i.e. IEE, HVCA, CIBSE, COSHE, ATEX, BSI & EN standards etc.

Installation procedure will be generally as detailed in the standard I&M document with the following additional requirements, necessary to conform to the ATEX directive.

In accordance with BS EN 14986, fans installed with open inlet and/or outlet, shall be protected against unintended ingress of particles or objects that may cause ignition, by directly attached guards. Where fans are installed in ducted systems, the installer / end user shall ensure that the fan is similarly protected.

3.1 Mechanical

The supplied axial and any flange connected equipment or ductwork to that axial should be self-supporting. Connected equipment or any ductwork must be connected to the supplied axial fan so that it is mounted flush and perpendicular to the bolted flange connection. No force or torsion should be applied to the flange connection that could cause distortion and reduce vital clearances between spinning and stationary components resulting in a potential contact risk.

Prior to installation and as part of the regular routine maintenance programme, referring to the rating label and test certificate, complete the following checks:

3.2 Mechanical Pre Installation Checks

- | | |
|--|---|
| <input type="checkbox"/> Overall structural integrity | <input type="checkbox"/> Impeller rotational freedom |
| <input type="checkbox"/> Impeller tip clearance | <input type="checkbox"/> Impeller balance weights |
| <input type="checkbox"/> Torque settings of blade bolts | <input type="checkbox"/> Torque settings of motor feet bolts |
| <input type="checkbox"/> Torque settings and impeller security | <input type="checkbox"/> Torque set of motor support brackets |
| <input type="checkbox"/> Security of anti spark ring | <input type="checkbox"/> Security of inlet / outlet guards |

Any damages or deviations should be immediately reported to NUAIRE quoting the order and product details from the identification/rating plate.

Ensure that any ancillary equipment used during installation e.g. flexible duct connections, silencers, shutters, isolator etc. are also compliant and are the subject of similar checks.

3.3 Electrical

The hazard group identified from the customer/specifier environmental risk assessment carried out at pre order stage dictates the motor type, and therefore its mode of electrical connection. Prior to installation and as part of the regular routine maintenance programme, referring to the rating labels and test certificate, complete the following checks:

3.4 Electrical Pre Installation Checks

- | | |
|---|---|
| <input type="checkbox"/> Structural integrity of pre installed motor wires | <input type="checkbox"/> Structural integrity of termination / glanding box |
| <input type="checkbox"/> Insulation and continuity of pre installed wires | <input type="checkbox"/> Motor insulation and winding resistance |
| <input type="checkbox"/> Ensure conductor cross section is appropriate to fan loading | <input type="checkbox"/> Ascertain motor winding configuration e.g. STAR, DELTA, 2 Speed etc. |
| <input type="checkbox"/> Correct thermal protection if appropriate | <input type="checkbox"/> Selection of correct cable glands |

Fans with explosion proof motors are not supplied with external termination boxes, it is the installers responsibility to connect directly to the motor termination box with the correct cable and gland and giving due consideration to accessibility when the fan is being sited.

It is essential, in order that the level of protection is maintained and the flameproof properties of the motor are not compromised, that the correct cable glands, type and size are used.

3.5 Cable Glanding Specifications

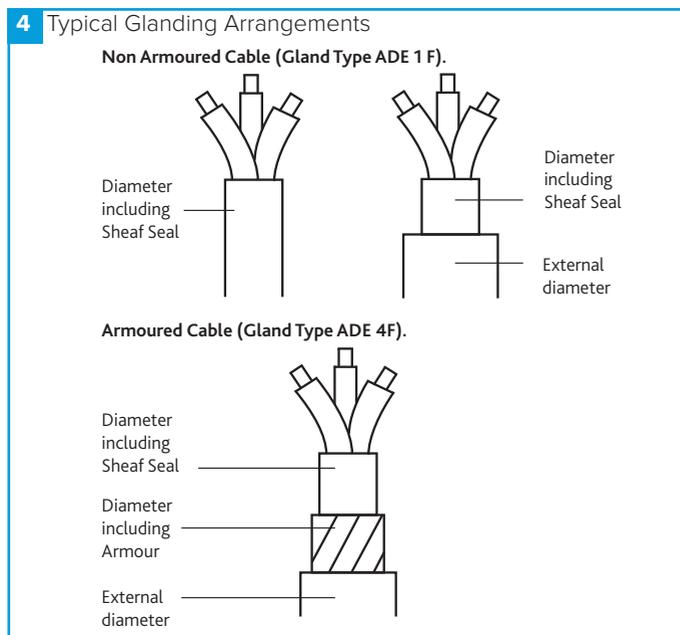
Below are typical gland examples:

EXD Motor	ADE 1F non armoured cable
	ADE 4F for armoured cable

3.6 Typical Glanding Arrangements

The sheath seal diameter of the cable must correspond to a permissible diameter of the gland, the sheath diameter is compressed by the gland ring thus creating the flameproof seal.

The below are typical examples:



- Ensure selection of cable and glands is appropriate to the applicable standards.
- Ensure local isolator is appropriate to the applicable standards.
- When the connection is complete and before switching on, ensure no solid object can be drawn to the fan, turn power on and complete the following checks

3.7 Mechanical & Electrical Load Checks

- | | |
|---|---|
| <input type="checkbox"/> Correct rotational direction (on both speeds of a two speed motor) | <input type="checkbox"/> Check and record starting current |
| <input type="checkbox"/> Check and record supply voltage | <input type="checkbox"/> Monitor noise and vibration |
| | <input type="checkbox"/> Check and record full load current |

Air-balance & commission the system to an industry standard.

4.0 Speed Control

Explosion proof motors are only speed controllable by way of a matched inverter variable speed drive. If intending to use such a drive it is critical to state this at design stage so that the motor can be manufactured with the appropriate thermistors fitted.

WARNING

The thermistors must be connected to a matching trip relay device in order to afford the required motor protection and isolation before the external surface temperature reaches its T class.

5 EEx d Type Explosion Proof Motor



5.0 Maintenance

Only appropriately qualified personnel, familiar not only with the electrical aspect of the work, but trained and authorised in the dangers and hazards of the zone, must carry out maintenance of electrical equipment in explosion risk zones. This person should also understand the risks posed by the product and the specific application it is serving.

Induction motors, by their very nature require minimal maintenance. However a regular regime of inspection is recommended to ensure that minor problems do not escalate into critical breakdowns.

Typical maintenance intervals would be one thousand operating hours or three months from commissioning whichever is the sooner and six monthly thereafter, unless site conditions dictate otherwise.

The maintenance programme must conform to 'good custom and practice' and to the published recommendations of associations such as the HVCA, CIBSE, ECA and BRECSU. The HVCA's publication 'Standard Maintenance Specification for Mechanical Services in Buildings' Volume 2 Ventilating and Air Conditioning is a recommended reference.

Reference must be made to the product rating plates, data sheet and the original test certificate. The competent person undertaking the work should then compare these to the current risk assessment (DSEAR or similar) for the ATEX application to ensure the product remains suitable for the application.

The advice given in the product I&Ms must be observed. Additionally, and to conform to the ATEX directive, consider the following maintenance record/check list on page 4 as typical of the items to be covered.

5.1 Maintenance Record / Check List

Product Code	
Product Serial Number	

Check/Record	Mechanical Item	Check/Record	Mechanical Item	Check/Record	Electrical/Operational Item
<input type="checkbox"/>	Structural integrity of case, flange fixing bolts, mounting feet, Av's etc.	<input type="checkbox"/>	Tension of impeller hub ring bolts.	<input type="checkbox"/>	Structured integrity of installed wiring, local isolator etc.
<input type="checkbox"/>	Structural integrity of motor, wiring terminations and glanding box.	<input type="checkbox"/>	Impeller tip clearance.	<input type="checkbox"/>	Insulation and continuity of installed field wiring.
<input type="checkbox"/>	Tension of motor fixing bolts.	<input type="checkbox"/>	Security of anti spark ring.	<input type="checkbox"/>	Check and record motor winding resistance.
<input type="checkbox"/>	Structural integrity of motor-support bracketry.	<input type="checkbox"/>	Inspect impeller for impact damage.	<input type="checkbox"/>	Check and record motor winding insulation.
<input type="checkbox"/>	Tension of motor bracket bolts.	<input type="checkbox"/>	Minimum 5mm clearance between impeller and fixed component.	<input type="checkbox"/>	Check and record starting current.
<input type="checkbox"/>	Blade/case tip clearance.	<input type="checkbox"/>	General cleanliness – remove excess dirt and debris.	<input type="checkbox"/>	Check and record full load current.
<input type="checkbox"/>	Impeller to shaft security.	<input type="checkbox"/>	Security and integrity of inlet / outlet guards.	<input type="checkbox"/>	Check and record supply voltage.
<input type="checkbox"/>	Security of impeller balance weights.	<input type="checkbox"/>	Greasing (See Section 5.2).	<input type="checkbox"/>	Monitor noise and vibration.

5.2 Lubrication

Not all motors are provided with re greasing facilities, the rating plate will advise greasing frequency, type and quantity of grease to use.

5.3 Repairs

In order to maintain the level of protection, only authorised repair agents are allowed to dismantle and repair motors designed for use in explosion risk zones, any repair or replacement must result in the reinstatement of an identical device.

5.4 Table of Torque Settings

Bolt Size	Torque (Nm)
M4	3.0
M5	5.9
M6	10.0
M8	25.0
M10	49.0
M12	85.0
M16	210.0

5.5 Blade Tip Clearance Table

Nominal Case Diameter (mm)	Minimum Tip Clearance (mm)
400	2.0
450	2.3
500	2.5
560	2.8
630	3.2
700	3.5
800	4.0
900	4.5
1000	5.0
1120	5.6
1250	6.3
1400	7.0
1500	7.5
1600	8.0