



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

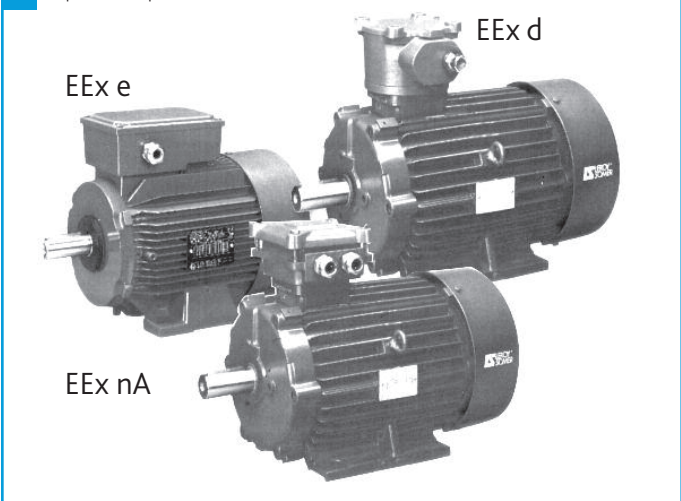
Products used in potentially explosive environments must carry the ATEX/UKEX logo. The installer must risk assess and identified and classified the zone and ensured that the product install is suitable for that zone.

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



Nuaire 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

Product **AX63D-21AKZ-0WE** **nuaire**

Construction Date **11-12-23** Conditions of Use **Zone 1 Gas** Western Industrial Estate Caerphilly CF83 1NA UK Tel +44 (0)29 2088 5911

Safety Marking **UK** **CE** **UKEX** **23UKXT1136** **ATEXT** **03XT429** **Ex** **II2G EEx d** **IIC T4 Gb**

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** **Ex** **Ex Denotes protection against explosion risk**

I&M Leaflet Fan Serial No. Compliant with European Directive Voltage Fan Current

Flameproof Designation Gas Group Temperature Class (surface) Equipment Protection Level (EPL) ATEX groups & Categories Fan Speed Order/File ref. Product Weight



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

- ☐ Structural integrity of pre installed motor wires
- ☐ Insulation and continuity of pre installed wires
- ☐ Ensure conductor cross section is appropriate to fan loading
- ☐ Correct thermal protection if appropriate
- ☐ Structural integrity of termination / glanding box
- ☐ Motor insulation and winding resistance
- ☐ Ascertain motor winding configuration e.g. STAR, DELTA, 2 Speed etc.
- ☐ 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

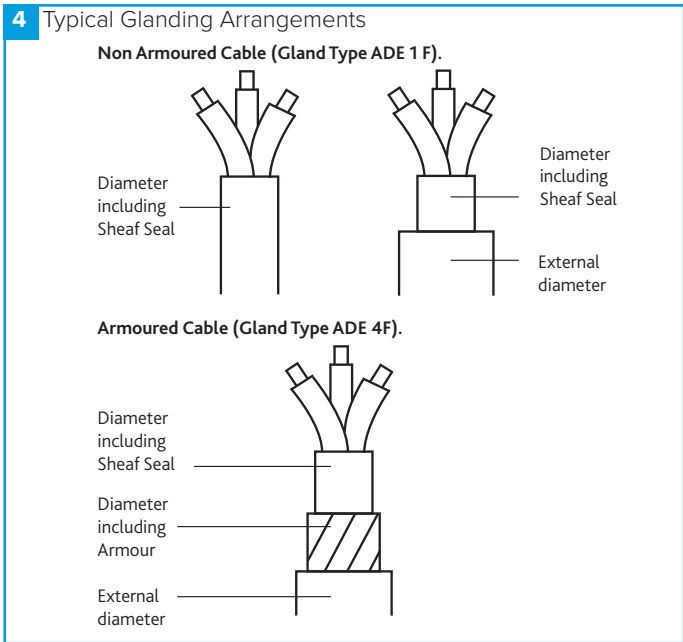
Below are typical gland examples:

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

- ☐ Correct rotational direction (on both speeds of a two speed motor)
- ☐ Check and record starting current
- ☐ Monitor noise and vibration
- ☐ Check and record supply voltage
- ☐ Check and record full load current

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

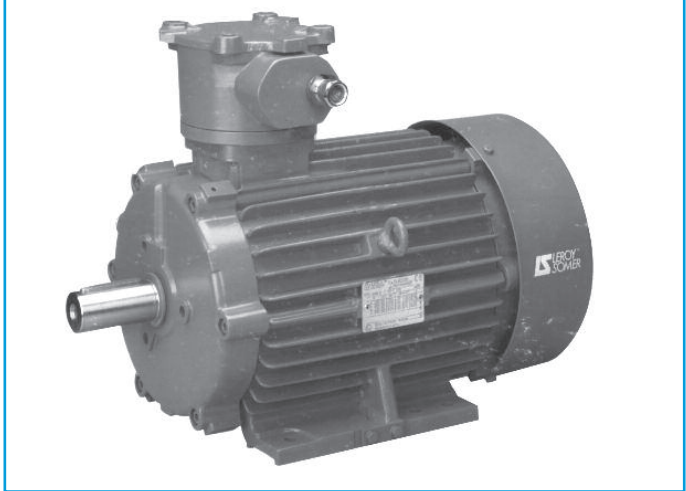
4.0 Speed Control

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