Woods
AIR MOVEMENT

ATEX AXIAL FAN

Safety, installation and maintenance instructions

Part Number 923578

CONTENTS

PAGE

STANDARD VENTILATION FANS

TABLES

FIGURES

THIS LEAFLET MUST BE PASSED TO THE USER
TO ENABLE THE FAN TO BE MAINTAINED IN A SAFE CONDITION

1. SAFETY

Warning and safety information relevant to specific operations are contained within each section. The following warning or advice categories are used:

DANGER! Failure to follow these instructions may result in serious injury or death to the user in addition to serious damage to the equipment.

WARNING! Failure to follow these instructions may result in minor injury or damage to the equipment.

CAUTION! Failure to follow these instructions may result in malfunction or damage to the equipment.

NOTE! Additional instructions to consider.

2. INTRODUCTION & PURPOSE - GENERAL

The Direct Drive Aerofoil ATEX Fans, which are compliant to EN 14986:2024, are designed to operate in locations where fumes, dust or flammable/explosive gases may be present and within a temperature range of -20° to +40°C (as standard). When operating at higher temperatures, components must be suitably rated, and the design must be reviewed by Woods Air Movement to provide additional precautions for the fan.

Each fan assembly has been manufactured specifically to fulfil the requirement of the installation for which it was designed. No deviation from the original requirement must be implemented without referring to Woods Air Movement head office (located in Colchester, UK). Any queries regarding safety or operating problems must be referred to your local Woods Air Movement office, sales centre or representative, together with full fan/motor nameplate details. Should a fan failure occur whilst the product is under warranty, the Woods Air Movement service centre in Colchester must be contacted before any repair work is undertaken.

Only approved, qualified personnel familiar with the assessment of hazards and risks associated with fans, and with the use of tools and test equipment required to service such fans, should install, operate, and maintain the product. Special care must be exercised when connecting such units to an electrical supply to ensure that a secure and safe ATEX/hazardous area connection is achieved. If the installer or user is unable to understand the information in this manual or has any doubt that safe and reliable installation, operation, and maintenance of the equipment can be assured, Woods Air Movement or their representative must be contacted for advice.

If speed control is to be provided by means of a frequency inverter, please seek drive selection and compatibility advice from Woods Air Movement.

CAUTION! The motor should not be removed from the product or modified in any way.

3. INSPECTION, STORAGE & HANDLING

WARNING! When storing fan assemblies, please ensure that access by unauthorised personnel is prevented by using guards, barriers, or secure premises so that fan impellers, which may be rotating (wind milling), do not present a hazard.

Check immediately on receipt that the fan is as ordered and that it has not been damaged in transit.

Where the fan is delivered in a crate (or similar) the crate must be considered as a protective device for transit only.

In cases of onward transit, the fan should not be subjected to humid or dirty conditions, excessive shock loads or vibration or excessive extremes in temperature.

The crate must not have other equipment stacked on top of it and it must not be stacked on top of other equipment. The crate structure must not be used as a lifting aid, unless otherwise indicated.

Where a fan is packed inside a crate, a fork-lift truck or similar must be used to transport the product. The fan must be stored in a safe, clean, dry, vibration free location. If such storage conditions are not available, the motor anti-condensation heater (where fitted) should be connected to an appropriate electrical power supply to prevent motor condensation forming, while the fan should be stored in an appropriate enclosure. Each month, the fan impeller should be given a manual rapid spin to help prevent grease from hardening and possible bearing brinelling. If the impeller must not remain in the same angular position after rotation.

When dismantling the crate to gain access to the fan assembly care must be taken to avoid injury from sharp edges, nails, staples, splinters, etc.

If the fan is to be stored for 12 months or more then the activities described in Section 7.3 should be carried out. It is highly recommended that the fan is inspected by a member of the Woods Air Movement service team before commissioning is undertaken.

4. MECHANICAL INSTALLATION

DANGER! It is recommended that suitable safety guards form part of the installation. Advice on these, and similar safety devices, are available from Woods Air Movement.

WARNING! Where the fan is delivered in a crate (or similar), the crate must be considered as a protective device only and must not be used as a lifting aid unless clearly indicated otherwise.

All lifting aids used during installation must be appropriately certified to carry the weight of the equipment being lifted.

The correct protective clothing (including hard hats, eye protectors and ear defenders) should always be worn when working with and in the vicinity of the fan assembly.

During lifting of the fan all personnel must be clear of the area below and around the suspended fan.

NOTE! Before fan assembly installation, check that no damage has occurred in transit, that there is no fan casing deformation, that the impeller rotates freely and that the fan and motor nameplate data complies with its required use. If the fan assembly has been stored for longer than a month, please refer to Section 7.3.

Fan assemblies can sometimes be very heavy (depending on fan and motor size and any attached ancillary equipment), which can make them unwieldy during handling. They must therefore be lifted slowly to prevent damage or distortion. Proper precautions must be taken and certified lifting aids used to ensure that the fan is well supported and stable before lifting into position. Care must be taken when installing fans to ensure that the product orientation is correct in relation to direction arrows which indicate direction of air movement and impeller rotation direction.

Flange holes or mounting feet holes can be used for lifting but more than one hole must be used to spread the load. If special lifting points are provided then they must be used. The fan must be installed such that it is correctly positioned in accordance with the required airflow direction. An airflow indication arrow is shown on the fan nameplate.

Sharp bends in the ductwork close to the fan must be avoided and connections between the fan and ductwork must be correctly sized and aligned to provide a smooth airpath. Adequate room must be allowed around the fan for inspection and maintenance. When ancillary component parts are included in the fan assembly, such as anti-vibration mounts, attenuators, bellmouth/conical entries, air operated dampers, flexible connectors (and their clips), weather proofing, platforms, supports, chains, and harnesses, etc. they must be fully aligned before being bolted together to prevent distortion of the equipment. **Air operated dampers must be installed downstream of the fan (on the fan discharge) to ensure that fan performance is not adversely impacted.**

The fan mounting and support structure must be strong and rigid enough to take the weight and operating forces of the fan and any other weight applied during installation. Consideration must be given to mitigation of vibration transmission. If vibration isolators are used they must be appropriate for the weight and thrust of the fan and must not be used to compensate for misaligned component fixing points. If any component parts do not easily fit together the root cause must be investigated and rectified.

After installation all packing materials must be disposed of in accordance with the instructions advised in Section 10.

5. ELECTRICAL INSTALLATION

DANGER! Before any work can be attempted, the fan assembly, its anti-condensation heater (if fitted) and all controls must be completely isolated from electrical supplies. Ensure that rotating parts are fully at rest.

The fan assembly contains rotating parts and electrical connections which can be a danger and cause injury. If there is any doubt that a safe and reliable fan installation can be achieved Woods Air Movement or their representative must be contacted for advice.

WARNING! Before entering the area where the fan is installed, please ensure that all fumes, dust, toxic emissions, heat etc. have dispersed from the local environment, and that the fan blades are not likely to rotate.

Always wear appropriate protective clothing (including hard hats, eye protectors and ear defenders etc.) when working in the vicinity of the fan assembly.

The electrical supply and electrical earthing must be connected to the terminal box by a qualified and competent electrician. If anti-vibration mounts are used, equipotential bonding must be used above and below the mount.

It is good practice to fit a clearly marked isolator switch close to the product, preferably of the lockable type which will allow the operator or maintenance engineer to isolate the product from the electrical supply before working on the assembly. Alternatively, we recommend the use of a second clearly marked and accessible switch remote from the product to provide an enhanced level of safety when isolating the product during maintenance. The mains supply must be from a guaranteed or separately maintained source to enable the fan to provide continuous operation.

Sufficient cable length must be provided to allow for movement of the fan on its mountings.

A connection diagram providing wiring details is supplied with all fan assemblies (typically inside the terminal box lid). See Section 13 for general wiring terminal details.

Electrical control circuit fuses must be correctly selected to carry the rated starting current as indicated on the motor or fan nameplate but should only be regarded as offering protection against wiring short circuits or earth faults. Fuses are not designed to provide overload protection. To provide full protection for the motor, a starter panel with overload protection must be used.

ATEX fans can either run Direct-on-Line (DOL) or via a variable speed drive (VSD).

If the fan is powered by a VSD it must be suitably ATEX certified if located in a hazardous environment. Appropriately shielded cable and adequate earthing must be used to minimise the impact of electrical harmonic distortion. The use of effective voltage waveform filters is recommended. Where required, a voltage waveform, radio frequency interference (RFI) or harmonic filter should also be fitted between the VSD and the fan drive motor depending on the application. If in doubt, please seek advice from Woods Air Movement.

If a speed controller, or other control equipment, forms part of the system it must be able to control the fan within safe limits. When running fans at low speed, care must be taken to ensure that any shutters (dampers), which may be mounted in the airflow, will open and operate correctly. Control equipment should be securely located, and should not be, or cause, an electromagnetic radiation hazard.

Fans with a duct-mounted terminal box must have their electrical supply cables routed through an entry point in the side of the box. Unused entry points must be sealed with weatherproof ATEX certified plugs or grommets. Fans with a motor-mounted terminal box must also have the electrical supply routed through an entry point in the side of the terminal box and the seal must be correctly fitted. Cables must be routed via an ATEX certified gland assembly. The ATEX certified gland assembly should be tightened sufficiently to hold the cable and provide a weatherproof seal, but it must not be over-tightened.

Great care must be taken to ensure that the ATEX certified cable gland or conduit thread standards match their corresponding connector thread standard, so that the entire installation achieves the required level of protection.

Long cased, fully ducted fans fitted with ENV89 motors are not fitted with an external duct-mounted terminal box. The electrical supply cable must be routed through a conduit entry in the fan duct and connected directly into the motor terminal box before the fan is fully installed (i.e. before the inlet and outlet ducts are fitted).

Any electrical control gear (including a capacitor in the case of single-phase motors) must be located outside the hazardous area, if these items are not certified for use in that zone.

The motor must not be allowed to become coated with dirt/dust, etc. as this reduces motor cooling capability and will consequently raise the temperature of the motor carcass, which could then create an additional risk.

5.1 TEMPERATURE AND VIBRATION MONITORING

If monitoring sensors or devices are fitted into the fan control system, then they must be either wired to automatically switch the fan off if a fault occurs, or used to provide a fault indication. If the fan is automatically switched off by a monitoring sensor then the control system (via a programmable logic controller (PLC) for example) must ensure that the fan is fully isolated from the electrical supply so that it will not automatically reset and re-start.

Motor over-heat detection sensors or devices can be used in single-phase and three-phase motors. Overheat detection device options are listed below:

- Thermostats must be wired to separate terminals (K – K) within the terminal box; they operate by opening and closing, depending on the temperature and must be wired to directly control the motor start contactor.

- Thermistors must be wired to separate terminals (S –S) within the terminal box; they operate by changing their resistive value with temperature and must be wired to control the motor start contactor via a suitable relay

- Resistance temperature detectors (RTDs) such as PT100's must be wired to separate terminals within the terminal box; they operate by changing their resistive value linearly with temperature and must be wired to control the motor start contactor via a suitable relay and threshold logic.

Vibration monitoring sensors must be used to automatically switch the fan off in any of the following categories:

- The ATEX fan will be used in 2G or 2D explosive atmosphere environments (Zone 1 or Zone 21).
- The ATEX fan will be used in environments where IIC gases (other than hydrogen) are likely to be present.
- The ATEX fan will have an ambient inlet temperature above 60°C.

NOTE! When a motor cools down, an over-heat protection device will reset. However, the motor must not be allowed to start until the motor start contactor is manually reset.

5.2 ANTI-CONDENSATION HEATER

Anti-condensation heaters are terminated in a terminal box on the fan and must be wired to an appropriate electrical separate supply when the motor is switched off. When the motor is switched on the anti-condensation heater is not required and thus must be automatically switched out of circuit.

5.3 SWITCH ON

Before switching on,

- confirm that the electrical supply is fully compliant with the requirement of the motor as detailed on the motor or fan nameplate,
- confirm that the fan is correctly installed,
- confirm the clearances between rotating and stationary parts are greater than the minimum acceptable clearances (refer to Table 4)
- confirm that the fan has equipotential bonding and is earthed to minimize electrostatic hazards
- check all component parts and fixings are secure (see Figure 1 (Page 21) for torque setting details),
- confirm that safety guards are in place,
- check that no loose items or associated equipment are present in the vicinity,
- check insulation resistances between phases and different phases to earth

Immediately after switch-on,

- check that the direction of impeller rotation and air movement is correct. If incorrect, switch off the fan,
- for three phase motors, if the rotation direction is incorrect, then this can be rectified by interchanging any two incoming phase connections of the electrical supply at the motor terminal block,

After switch-on,

- the fan motor must not be repeatedly or rapidly switched on and off as this could cause overheating of the motor or its associated wiring connections,
- check that the current consumption is within the full load current specified on the nameplate,
- check the assembly for smooth, low noise and low vibration running (refer to Section 6 Operation and Table 2),
- record the base line vibration level of the fan and check it does not exceed the alarm limits stated ISO 14694 (refer to Table 2),
- set vibration alarm threshold 50% higher than the recorded base line vibration,
- check that the air flow rate is above the minimum air flow rate (as indicated on the markings) to maintain temperature classification of fan. If the ventilation system is designed to be adjusted, then carry out this check at the most restricted configuration.
- If the fan is supplied from a variable speed drive, carry out the above check at maximum speed and ensure that the fan cannot be subsequently operated below 20% of rated fan speed, and check there is no system resonance at different fan speeds,

6. OPERATION

The equipment must only be used within the following atmospheric condition limits:

- absolute pressures ranging from 0.8 bar to 1.1 bar,
- maximum volume fraction of 21 % oxygen content,
- an aerodynamic energy increase of less than 25 kJ/kg (equating to fan total pressure of 30,000 Pa).

The fan must be operated within the temperature range stated on the markings of the equipment and on the fan datasheet. The normal range is -20° to +40°C, however specially designed fans can accommodate higher temperatures.

To ensure sufficient cooling of the motor and limit excessive temperature rises between inlet and outlet, fans must not be operated below the minimum indicated air flow rate. The ambient temperature at the inlet of fan must be below the indicated maximum temperature. When the fan is operated from a variable speed drive, the rotational fan speed must not be lower than 20% of the rated speed.

Fans must not be operated in a stalled or unstable condition.

Fans must not be run in reverse unless specific advice is sought from Woods Air Movement.

Fans must be protected against the ingress of foreign particles. The size of particles entering the fan must be less than 25% of minimum tip gap clearance of the fan (refer to Table 4).

Fans must be operated within the range of explosive atmospheres that is permitted by the ATEX code (see Table 1) on the fan markings, as explained on page 9:

- Equipment marked Group IIA cannot be used be used for applications requiring Group IIB or Group IIC equipment, and can be only used for applications requiring Group IIA equipment.
- Equipment marked IIB is suitable for applications requiring Group IIA or IIB equipment but cannot be used for applications requiring Group IIC.
- Equipment marked IIC is suitable for applications requiring Group IIA, Group IIB or Group IIC equipment.
- Equipment marked for hydrogen is suitable for applications requiring Group IIA or Group IIB equipment but cannot be used for applications requiring generic IIC equipment.
- Equipment marked Group IIIA cannot be used be used for applications requiring Group IIIB or Group IIIC equipment, and can be only used for applications requiring Group IIIA equipment.
- Equipment marked IIIB is suitable for applications requiring Group IIIA or Group IIIB equipment but cannot be used for applications requiring Group IIIC.
- Equipment marked IIIC is suitable for applications requiring Group IIIA, Group IIIB equipment or Group IIIC equipment.
- Equipment marked T4 is suitable for applications requiring Temperature Classification T1, T2, T3 or T4 equipment.
- Equipment marked T3 is suitable for applications requiring Temperature Classification T1, T2 or T3 equipment and cannot be used for applications requiring Temperature Classification T4 equipment.
- Equipment marked T2 is suitable for applications requiring Temperature Classification T1 or T2 equipment and cannot be used for applications requiring Temperature Classification T3 or T4 equipment.
- Equipment marked T1 is suitable for applications requiring Temperature Classification T1 equipment and cannot be used for applications requiring Temperature Classification T2, T3 or T4 equipment
- Equipment marked 2G is suitable for applications requiring Equipment Category 2G or Equipment Category 3G.
- Equipment marked 3G is suitable for applications requiring Equipment Category 3G and cannot be used for applications requiring Equipment Category 2G.
- Equipment marked 2D is suitable for applications requiring Equipment Category 2D or Equipment Category 3D.
- Equipment marked 3D is suitable for applications requiring Equipment Category 3D and cannot be used for applications requiring Equipment Category 2D.

For ATEX fans with installation type A, B or C (according to ISO 13349), the Equipment Category requirements must be the same inside and outside of the fan. For ATEX fans with installation type D (according to ISO 13349) where the leakage rates are not known, the Equipment Category requirements must be the same inside and outside of the fan. For ATEX fans with installation type D (according to ISO 13349) where the leakage rates are known, the Equipment Category requirements can be different inside and outside of the fan and the leakage rates will be stated on the markings. Where equipment categories are different, seals shall be inspected and if necessary, replaced (refer to Table 2).

The fan must not operate above its in-situ vibration limits (refer to Table 2) as determined by the fan application category. The fan application category is BV-3 (according to ISO 14694:2003) when the fan has a motor with a power rating of less than or equal to 37 kW. The fan application category is BV-4 (according to ISO 14694:2003) when the fan has a motor with a power rating of greater than 37 kW.

The fan must not be installed in areas where the risks from lightning, electromagnetic and radio waves, ionizing radiation, ultrasonic waves, adiabatic compression waves and shock waves will result in ignition of explosive atmospheres.

7. MAINTENANCE

DANGER! Before any maintenance work can be attempted, the fan assembly, its anti-condensation heater (if fitted), and all controls from electrical supplies must be completely isolated. Ensure that rotating parts are fully at rest and that fan blades are temporarily restrained to prevent rotation of the impeller.

WARNING! Before entering the area where the fan is installed, please ensure that all fumes, dust, toxic emissions, heat etc. have dispersed from the local environment.

All lifting aids used during maintenance, and all lifting points utilized, must be adequately certified to carry the weight of the equipment being lifted.

Always wear appropriate protective clothing (including hard hats, eye protectors and ear defenders etc.) when working in the vicinity of the fan assembly.

Fan maintenance must be carried out by appropriately qualified and competent personnel using the correct tools and equipment. A regular maintenance schedule should be established and a record kept. It is recommended that the maintenance activities given in Table 3 (page 18) are followed and recorded in the Routine Maintenance Record (see Section 15). Maintenance records are required to be documented and retained.

Where the environment is particularly dirty or corrosive, it may be necessary to reduce maintenance / service interval time to minimise the risks from electrostatic hazards. Internal and external fan surfaces may be cleaned with low pressure clean water and non-abrasive additives.

If the fan exhibits unexpected noise, temperature increase or vibrations levels it must be taken out of service and inspected.

After maintenance has been conducted and before the fan is re-started, always ensure that there are no loose items of equipment present in the vicinity of the fan, that all safety guards, chains, or steel ropes, etc., are properly secured into their original location and that any temporary device used to prevent the fan impeller from rotating has been removed.

7.1 FIXINGS

It is essential to ensure that all fan assembly fixings are secure. When examining and checking the security of fixings during routine maintenance (see Table 3 Items 11 and 12), any fixings which have locking devices fitted or are painted over, need not be disturbed if it can be seen that they are secure. Any locking devices that are disturbed during maintenance must be discarded and replaced with new identical devices. Thread forming screws must have locking compound applied when being reused. Any fixings which have no locking devices fitted and are not painted over, must be checked at 95% of their original torque setting to ensure that no unnecessary disturbance of the fixing has occurred. See Figure 1 (Page 21) for torque setting details. If in doubt, please contact Woods Air Movement for advice in relation to specific fixing torque values.

7.2 LUBRICATION

In addition to routine maintenance, motor bearings will, in the longer term, require attention. Only the approved grease type should be used, and it is essential that all traces of water and dirt are removed from around the grease points and that a clean grease gun is used. It is only necessary to apply a small amount of pressure to inject the specified quantity of grease. If a high pressure is required then the cause should be investigated.

Where motors require re-lubrication, a separate instruction is normally issued with each fan/motor configuration. This gives details of lubrication intervals and well as the type and quantity of grease to be used. If further details are required, please contact Woods Air Movement directly.

7.3 INFREQUENT USE

If the fan assembly is used less frequently than once a month the following additional maintenance procedures must be carried out and a record kept:

- Resistance of motor windings to earth must be measured with a 500 V DC insulation tester each month. If these readings are less than 10 MΩ (Megaohm), the motor must be dried out in a warm airflow (typically at 40°C) and re-checked before running the motor.
- The fan should be operated between 15 and 30 minutes each month to ensure that correct lubricant conditions are maintained within the bearings (i.e., to prevent grease hardening).
- If anti-condensation heaters are fitted, check each month that they automatically switch on (i.e., they are drawing current) when the motor is switched off.

8. OVERHAUL / EXTENDED MAINTENANCE

Motor overhaul, bearing /seal replacement, motor replacement, motor rewinding, refurbishment, etc. must be carried out by Woods Air Movement service centre in Colchester or appointed representative of Woods Air Movement.

After 40,000 hours of running, we strongly recommend that an ATEX qualified and competent electrician performs a motor "health check" (as described within Section 9, Fault finding) to determine the motor insulation condition.

NOTE! The motor manufacturer's specification sheets are available through Woods Air Movement. After overhaul/extended maintenance the fan assembly must be correctly installed back into its original position.

9. FAULT FINDING

WARNING Always refer to the safety warnings ("attention" items) stated within Section 1 and 7.

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NOTE! Routine maintenance procedures detailed in Section 7, and Table 1 of this document are designed to help keep your fan operational and fault free.

9.1 ELECTRICAL

Check that electrical connections to the fan are secure and are in accordance with the wiring connection diagram.

Check that the voltage applied at each fan terminal is as specified on the fan nameplate and is balanced. Measure the current on each phase of the motor in turn and check that the current consumption is within the full load current specified on the motor or fan nameplate.

Measure each motor winding to earth, and between each winding, using a 500 V DC insulation tester. If the reading is less than 10 MΩ the reason is likely to be dampness within the motor. To dry out the motor place it in a warm dry airstream (typically at 40°C) and regularly monitor the motor until the insulation reading is restored to 10 MΩ or greater. If the reading remains at less than 10 MΩ, then this could indicate that a break-down in motor winding insulation has occurred, which may require the motor to be either rewound/overhauled by a specialist ATEX motor manufacturer.

If a smell of burnt motor insulation is detected, then please seek immediate advice from Woods Air Movement Colchester.

9.2 MECHANICAL

Check that there are no obstructions to the motor shaft or impeller blades, that the blades are clean, and that there are no loose components, items, or debris in the vicinity.

Rotate the motor shaft by hand. Investigate any grinding noises, internal chafing, rubbing or stiffness. If any of these defects are observed, this may indicate that bearings require lubrication or replacement.

Ensure that all fixings are secure and tightened to the correct torque values.

10. DISPOSAL

NOTE!

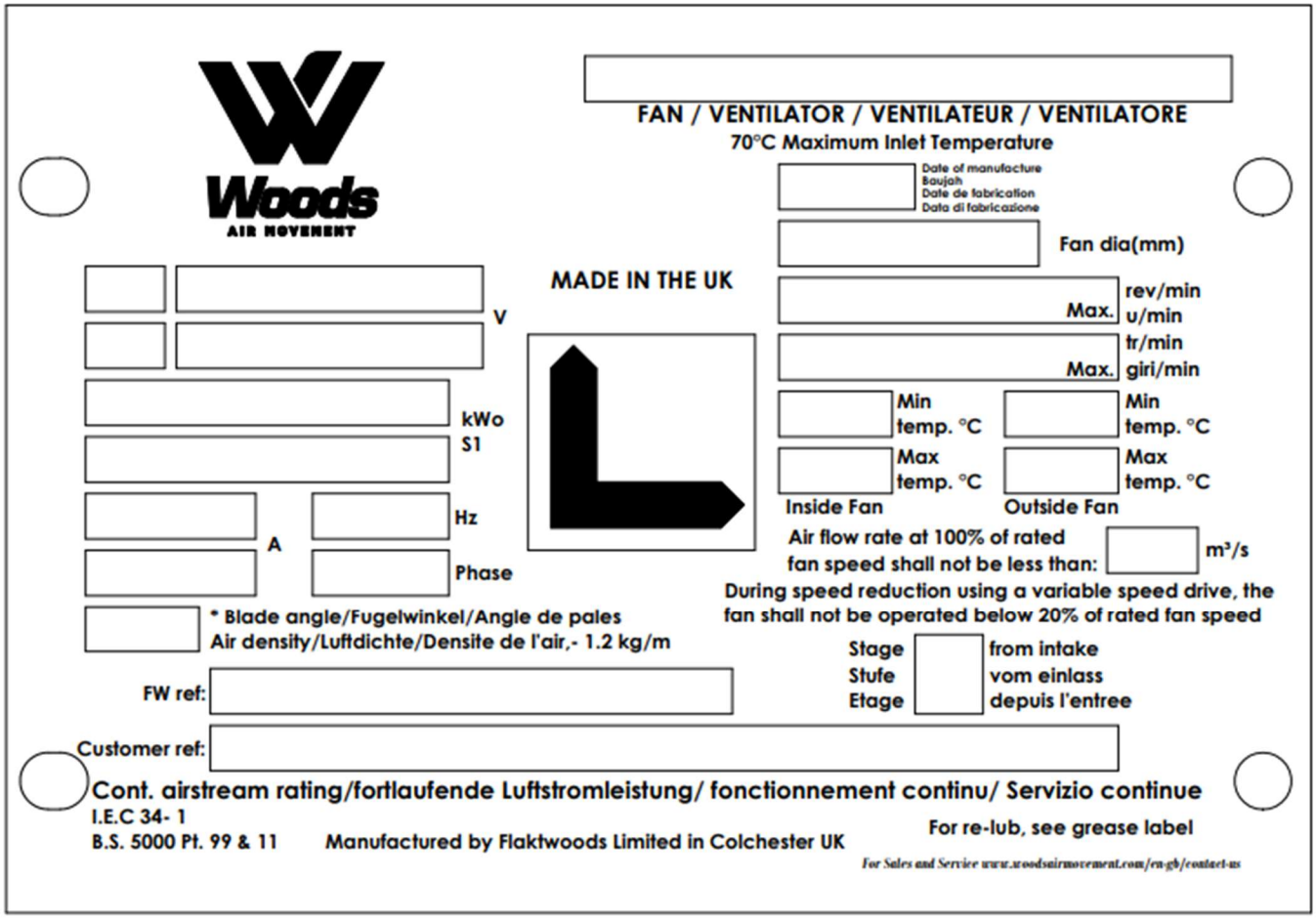
Metal components of the fan/motor should be segregated and separately recycled. The following items of material should be safely disposed of in accordance with local health and safety regulations:

- electrical lead coverings,
- motor winding insulation materials,
- bearing lubricant,
- motor/fan terminal block,
- paintwork,
- plastic parts,
- packing materials,
- silencer infill

WARNING! A face mask and gloves must be worn when handling the infill. If the infill is particularly dry or is damaged it should be damped down before disposal.

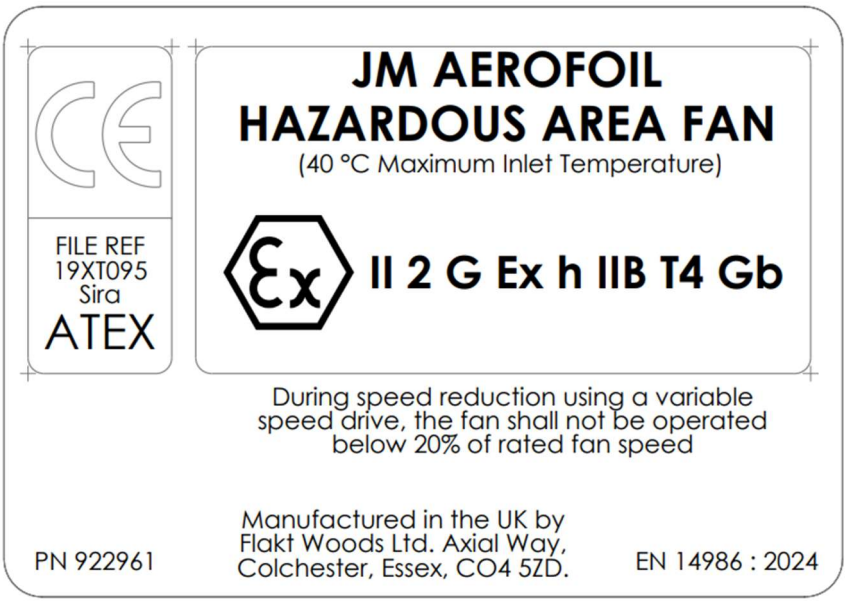
11. MARKINGS

The details of the fan are described on the fan name plate label as shown below. The minimum air flow rate of the motor at rated fan speed relates to the specific fan application.

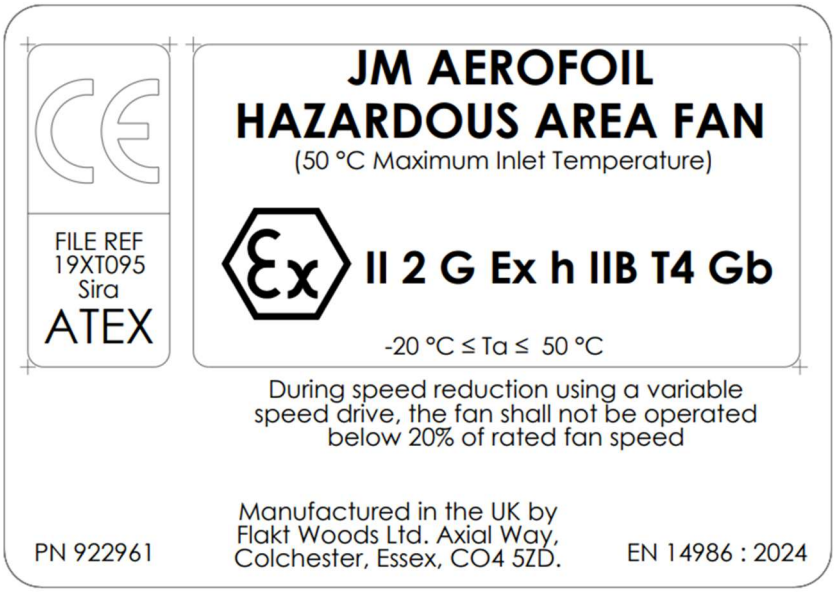


An additional label bears the CE marking of the product and the defines hazardous area classification markings as required by the ATEX Directive. The maximum inlet temperature and ATEX code are modified to the specific fan application.

ATEX Label Example 1 – Normal Ambient Temperature Range in Service (-20 °C ≤ Ta ≤ 40 °C)



ATEX Label Example 2 – Special Ambient Temperature Range in Service (-20 °C ≤ Ta ≤ 50 °C)



12. DECLARATION OF CONFORMITY

Herewith we declare that the air movement equipment designated below, on the basis of its design and construction, in the form brought on to the market by us, is in accordance with the relevant health and safety requirements of the **EC Council directives on ATEX products, Machinery and Electromagnetic Compatibility.** If alterations are made to the machinery without prior consultations with us, this declaration becomes invalid. We further declare that the equipment identified below may be intended to be assembled with other equipment/machines to constitute machinery, which shall not be put into service until the assembled machinery has been declared in conformity with the provisions of these EC Council directives.

Series / type:	
Fläkt Woods Limited order no:	
ATEX Code:	
Relevant EC Council directives:	ATEX Directive (2014/34/EU) (Fläkt Woods Technical Documentation Ref: EPS 106, held by SIRA: NB 0518) Machinery Directive (2006/42/EC) Electromagnetic Compatibility Directive (2014/30/EU) where applicable (1)
Applied harmonized standards in particular (2):	EN 14986:2024 (& parts of EN 1127-1:2011, EN ISO 80079-36:2016, EN ISO 80079-37:2016 where referenced), EN ISO 12100:2010, EN 60204-1:2018, EN ISO 12499:2008 EN ISO 5801:2017, EN 61000-2:2002/A1:2017, EN 61000-6-1:2007, EN 61000-6-3:2007/A1:2011/AC:2012, EN 61000-6-4:2007/A1:2011
Basis of self attestation:	Quality Assurance to BS EN ISO 9001:2015 BSI Reg Firm Cert No. FM 155.
Technical file compiled by:	Iain Kinghorn Fläkt Woods Limited, Axial Way, Colchester, CO4 5ZD, United Kingdom
Date: dd/mm/yyyy	

(1) Fläkt Woods fans are driven by AC induction motors which are inherently compliant if supplied with a truly sinusoidal AC supply. Where the fan motor is supplied via an inverter or other electronic control, verification of its compatibility together with cabling should be sought from the control supplier.

(2) For a complete list of applied standards and technical specifications see Fläkt Woods documentation.

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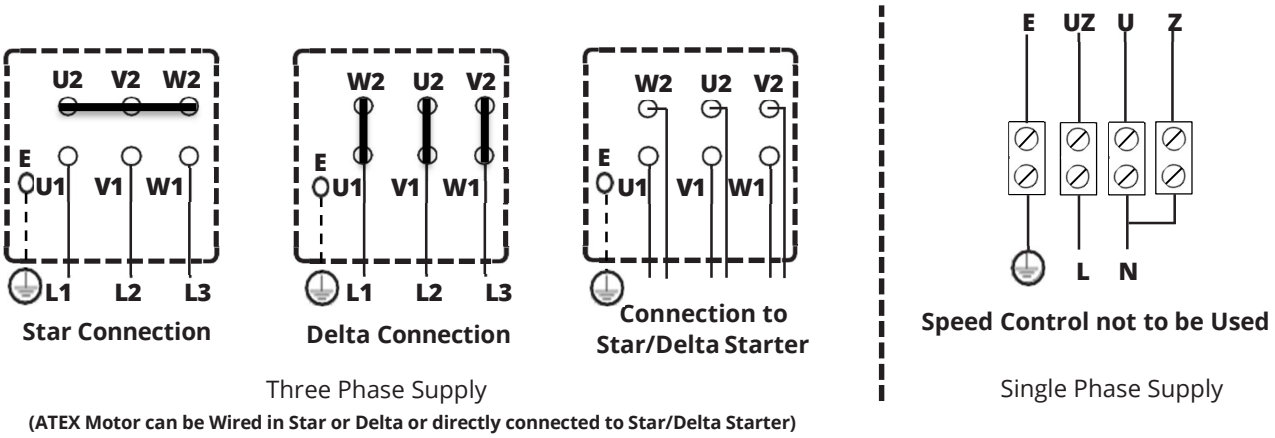
13. ATEX GENERAL WIRING DIAGRAMS



14. SUMMARY OF IGNITION HAZARD ASSESSMENT

Hazard(s)	Mitigation Measure(s)
Contact between Moving and Static Parts and Reduction of Gap between Moving and Static Parts	Rigidity of Fan, Minimum Clearances between Rotating and Static Parts, Impeller with Design Safety Factor, Spark Minimising Lining and Materials, Impeller Locking Devices, Vibration Monitoring (when necessary) and Instructions to User
Exothermic Reactions Electrostatic Ignition Excessive Fluid Temperature, General Environmental Influences Layers of Dust in Fan causing Ignition Risk, Lightning, Ionising Radiation, and Ultrasonic, Adiabatic Compression, Shock Waves and Infrared Waves	Temperature Classification of Fan, Earthing of Conductive Parts, Instructions to User and Suitable Ex Rated Electrical Equipment
Weakening of Materials	Use of Corrosion Resistant Materials
Transportation Damage and Storage Damage	Instructions to User
Different Electric Potentials & Stray or Unsymmetrical Currents	Earthing of Conductive Parts
Bearing Failure, Seal Failure and Failure of Electrical Components	Suitable Ex Rated Electrical Equipment

Table 1

***Temperature classification for dust is determined by the equiqment and how hot the surface temperature gets under a layer of dust.**

Range of ATEX Codes for ATEX Fans								
Directive 2014/34/EU			EN 80079-36					
Ex Explosion protection marking	Equipment Group	Equipment Category	Ex symbol		Group	Group Subdivision	Temperature Classification	Equipment Protection Level
Ex	II	2G	Ex	h	II	A	T1	Gb
Ex	II	2G	Ex	h	II	A	T2	Gb
Ex	II	2G	Ex	h	II	A	T3	Gb
Ex	II	2G	Ex	h	II	A	T4	Gb
Ex	II	2G	Ex	h	II	B	T1	Gb
Ex	II	2G	Ex	h	II	B	T2	Gb
Ex	II	2G	Ex	h	II	B	T3	Gb
Ex	II	2G	Ex	h	II	B	T4	Gb
Ex	II	2G	Ex	h		(H_2)	T1	Gb
Ex	II	2G	Ex	h	II	C	T1	Gb
Ex	II	2G	Ex	h	II	C	T2	Gb
Ex	II	2G	Ex	h	II	C	T3	Gb
Ex	II	2G	Ex	h	II	C	T4	Gb
Ex	II	2D	Ex	h	III	A	*TXXX°C	Db
Ex	II	2D	Ex	h	III	B	*TXXX°C	Db
Ex	II	2D	Ex	h	III	C	*TXXX°C	Db
Ex	II	3G	Ex	h	II	A	T1	Gc
Ex	II	3G	Ex	h	II	A	T2	Gc
Ex	II	3G	Ex	h	II	A	T3	Gc
Ex	II	3G	Ex	h	II	A	T4	Gc
Ex	II	3G	Ex	h	II	B	T1	Gc
Ex	II	3G	Ex	h	II	B	T2	Gc
Ex	II	3G	Ex	h	II	B	T3	Gc
Ex	II	3G	Ex	h	II	B	T4	Gc
Ex	II	3G	Ex	h		(H_2)	T1	Gc
Ex	II	3G	Ex	h	II	C	T1	Gc
Ex	II	3G	Ex	h	II	C	T2	Gc
Ex	II	3G	Ex	h	II	C	T3	Gc
Ex	II	3G	Ex	h	II	C	T4	Gc
Ex	II	3D	Ex	h	III	A	*TXXX°C	Dc
Ex	II	3D	Ex	h	III	B	*TXXX°C	Dc
Ex	II	3D	Ex	h	III	C	*TXXX°C	Dc

Table 2

Vibration Limits for Measurements Conducted in Situ					
Condition	Fan Application Category	Rigidly mounted (mm/s)		Flexibly mounted (mm/s)	
		Peak	r.m.s	Peak	r.m.s
Start-up	BV-3	6.4	4.5	8.8	6.3
	BV-4	4.1	2.8	6.4	4.5
Alarm	BV-3	10.2	7.1	16.5	11.8
	BV-4	6.4	4.5	10.2	7.1
Shutdown	BV-3	12.7	9.0	17.8	12.5
	BV-3	10.2	7.1	15.2	11.2

Table 3

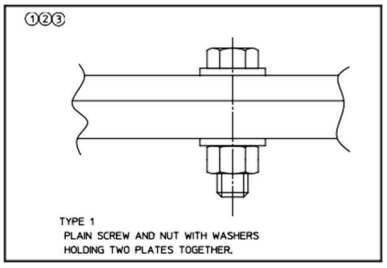
Routine Maintenance Schedule	Every 6 Months	Every 12 Months	Comments
1. Examine fan guards (if fitted) and seals (if fitted)	✓		Remove any debris that may have accumulated round or on the guard surface. Seals (if fitted) replaced if necessary.
2. Examine motor cooling fins	✓		Remove any material or dirt which has build-up between the motor cooling fins.
3. Examine impeller for dirt build-up or any physical damage which can cause unbalancing. Check the angle, the security of the impeller blades and impeller tip gap clearance (refer to Table 4).	✓		Remove any build-up of dirt. Replace impeller if it is damaged. Ensure that the gap between the impeller blade ends and the fan duct is even and adequate for all rotational positions of the impeller. If in doubt, please contact Woods Air Movement for advice related to blade tip gap.
4. Check condition and tautness of fan safety support chains/harnesses/ropes (if fitted)	✓		Clean and inspect safety supports. Replace if there is any deterioration / corrosion detected.
5. Examine and operate vibration sensors (if fitted), and temperature sensors (if fitted)	✓		Check operation using built-in sensor test features or dummy signals. Check that the fan is automatically switched off, or that a warning indication is provided, when the sensors / switches indicates a fault.
6. Examine condition of safety guards (if fitted) and associated fixings	✓		Clean safety guards. Replace if there are any signs of excessive corrosion or damage
7. Check operation of anti-condensation heaters (if fitted)	✓		Switch off power to the motor. Check that the anti-condensation heater is energised (i.e. it is drawing current).
8. Examine the clearance between rotating and stationary fan components fan (refer to Table 4).	✓		Ensure that the gap between the impeller and stationary parts is greater than 13mm. Ensure that the impeller blades are secure. Blade angle must not be changed without contacting Woods Air Movement for advice.
9. Check torque of fixings used to secure the fan to its support structure.		✓	It is essential to confirm that all fixings are properly fitted, are tight, and are fully driven home (see Figure 1). If in doubt, please contact Woods Air Movement for advice related to the torque value of a particular fixing.
10. Examine motor, fan and ancillary equipment fixings		✓	It is essential to confirm that all fixings are properly fitted, are tight, and are fully driven home (see Figure 1) If in doubt about the torque of a fixing contact Woods Air Movement for advice.
11. Check movement (deflection) of vibration isolators (if fitted)		✓	Check freedom of movement. Tighten anti-vibration mount fixings if necessary.
12. Check motor voltage and current consumption		✓	Ensure voltage and full load current are as specified on the motor nameplate
13. Inspect paintwork / galvanising finish		✓	Treat any areas of damage with suitable anti-corrosion paint.
14. Lubricate motor bearings (if necessary)		✓	Check requirement in accordance with Section 7.2
15. Check fan assembly wiring		✓	Check security and condition of all wiring (including the earth).
16. Check fan operation for excessive vibration levels		✓	Vibration levels, whilst the fan is operating, should not be excessive. If levels are seen to have increased since the previous inspection, the fan must not be operated until the root cause has been identified and rectified.

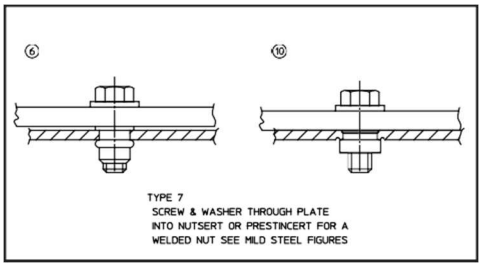
Table 4

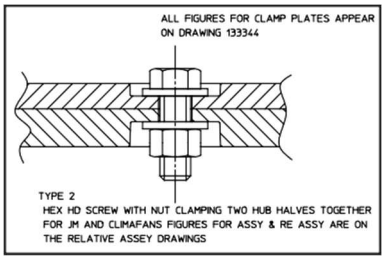
Clearance Distances	
Diameter (mm)	Minimum Clearance Between Impeller and Duct (Tip Gap) (mm)
315	2.00
355	2.00
400	2.00
450	2.25
500	2.50
560	2.80
630	3.15
710	3.55
800	4.00
900	4.50
1000	5.00
1120	5.60
1250	6.25
1400	7.00
1600	8.00
1800	9.00
2000	10.00
2240	11.20
2500	12.50
2800	13.00
3150	13.00
The minimum general clearance between rotating and stationary components is 13mm	
Minimum Tip Gap Clearance Check Procedure: • **Determine the minimum tip gap of each blade for all rotational positional positions of blade**	

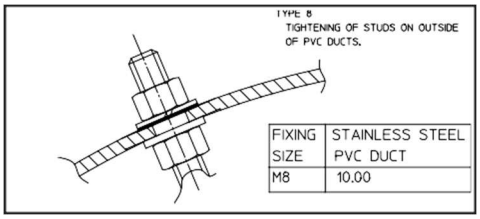
Figure 1

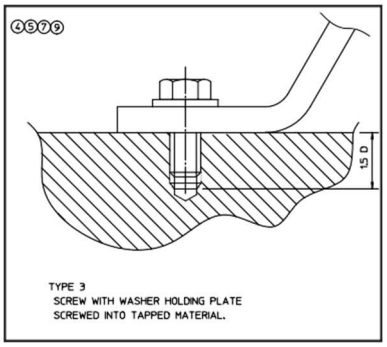
DRAWINGS OF FAN COMPONENTS WITH FIXING METHODS SHOWN

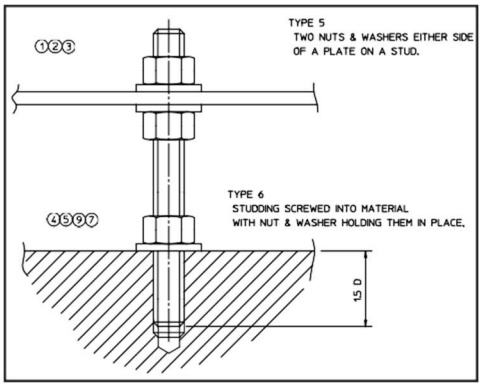


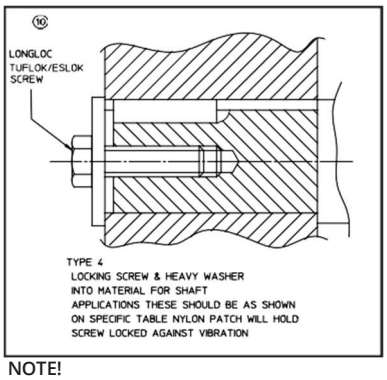












NOTE!

The numbers show thus ⊛ in the boxes are to show the screw types and tapped materials which are appliciable to the diagram shown.

NOTE!

1) These figures shown apply unless shown otherwise on specific assembly drawings.
2) All joints are to be dry except Stainless Steel which is to have MOLYCOTE 1000 Paste Compound, prior treatment of Loctite Activator T will decrease curing time if necessary.
3) All values are in Nm. The conversion factor is given for lbf-ft equipment.
   lbf-ft = Nm x 0.7375
4) There is a tolerance on Torque Wrenches up to ± 5%.
5) Nuts are to be tightened only once so no overtightening can occur.
6) The head of the Screw makes no difference to torque figures other than how the torque is supplied. The Screw or Base Material are the important factors for torque.
7) When using two materials always use the lowest figure of the two.
8) The figure to be used on AEG Capacitor Studs is 4 Nm.
9) The material being clamped is only to be taken into consideration if it is Hollow, very Ductile or Plastic. Please seek advice where necessary.

TABLE OF TORQUE SETTINGS FOR FIXINGS (DRAWING NO: D248284)

FIXING SIZE	① STEEL 8.8	② STAINLESS STEEL A2,A4 PROP 70	③ M.S. FIXINGS NOT 8.8 GRADE INCLUDES T BOLTS	④ STEEL INTO TAPPED M.S.	⑤ STEEL INTO EXTRUDED AL	⑥ NUTSERT	⑦ SCREW INTO CAST ALUM ALSO SEE MOTOR TABLE BELOW	⑧ TAPTITE SELF FORMING	⑨ INTO CAST IRON ALSO SEE MOTOR TABLE BELOW	② STAINLESS STEEL A2,A4 PROP 80	⑩ PRESTICERT
M1.6	0.2000	-----	0.1000	0.1000	-----	-----	-----	-----	0.050	-----	-----
M2	0.4000	-----	0.2000	0.2000	-----	-----	-----	0.400	0.100	-----	5
M3	1.5000	0.9000	0.8000	0.8000	-----	1.50	-----	1.400	0.400	1.2	6
M4	3.5000	2.0000	2.0000	2.0000	-----	3.50	-----	3.000	1.000	2.7	9
M5	7.0000	3.9	3.5000	3.5000	-----	7.00	-----	6.000	1.750	5.3	11.5
M6	12.000	6.9	6.0000	6.0000	5.00	12.00	7.00	10.000	3.000	9.2	12
M8	28.000	17.0	15.000	15.000	10.00	28.00	14.00	25.000	7.500	22.0	21
M10	55.000	33.0	30.000	30.000	20.00	40.00	28.00	55.000	15.000	43.0	23
M12	100.00	56.0	50.000	50.000	36.00	55.00	50.00	95.000	25.000	75.0	35
M14	155.00	89.0	80.000	80.000	60.00	-----	85.00	-----	40.000	119.0	-----
M16	245.00	136.0	120.00	120.00	95.00	-----	135.00	-----	60.000	181.0	-----
M18	335.00	191.00	170.00	170.00	-----	-----	-----	-----	85.000	254.0	-----
M20	475.00	267.00	240.00	240.00	178.00	-----	200.00	-----	120.000	356.0	-----
M22	645.00	364.00	325.00	325.00	245.00	-----	300.00	-----	-----	485.0	-----
M24	820.00	460.00	410.00	410.00	310.0	-----	420.00	-----	450.000	613.0	-----
M27	1200.0	671.00	600.00	600.00	-----	-----	-----	-----	-----	895.0	-----
M30	1640.0	915.00	820.00	820.00	-----	-----	-----	-----	-----	1220.0	-----
M33	2225.0	-----	1115.0	1115.0	-----	-----	-----	-----	-----	-----	-----
M36	2855.0	1600.00	1425.0	1425.0	-----	-----	-----	-----	-----	2121.0	-----
M39	3700.0	-----	1850.0	1850.0	-----	-----	-----	-----	-----	-----	-----
M42	4565.0	-----	2285.0	2285.0	-----	-----	-----	-----		-----	-----
M45	5690.0	-----	2840.0	2840.0	-----	-----	-----	-----	-----	-----	-----

⑧ **NOTE** that Taptite screws may need a high torque to start the thread forming process

BINX NUTS

Binx Nuts Grade 6 are unmarked and should be tightened to torque value specified for Mild Steel fixings (all sizes).
Binx Nuts Grade 8 should be tightened to torque value specified for Grade 8.8 fixings.

RUBBER A/V

Where a rubber grommet or flexible mount is used a metal spacer tube or metal insert should be supplied. The rubber should never be crushed by the fixings for any special application seek advice from technical support.

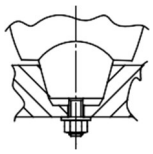
NOTE!

Brass fixings have half the shear strength of cast iron so use half the figures for tapped cast iron.

TYPE 9

Special arrangement of locking impeller blade into hub. For this application see specific assembly DRG only for correct torque figures.

The torque wrenches should be set to ±5%



PAD AND FOOT MOUNT TORQUE SETTINGS					
ON HOLLOW FOOT USE LOAD SPREADING WASHERS AND SAME TORQUE AS SOLID FOOT					
		MOTOR PAD TO ARM		FOOT MOUNT	
FRAME SIZE	THREAD/HOLE	ALUMINIUM	CAST IRON	ALL	WASHER
		TORQUE SETTING IN Nm			
63-71	M8 TAPSITE	20-25	20-25	20-25	
M8 TAPSITE REASSEMBLY		15	15		
63-71	M8	15	15		
	M10	35	35	50	
80	M12	55	55	85	83770
90	M12	55	55	85	1504
100	M12	55	55	85	411590
112	M12	55	55	85	411590
132	M16	135	135	180	251691
160-180	M20	240	240	350	251692
200-315	M24		450	450	267652
LARGER	M24		450	450	

NOTE

All foot mounted motor fixings should be applied with Loctite compound.
For any fixings exceeding M24 please contact Woods Air Movement for Advice.

TABLE 10 SHAFT END FIXINGS		
MOTOR SIZE	THREAD SIZE	TORQUE VALUE
80	M6	6
90	M8	15
100 & 112	M10	30
132	M12	50
160 & 180	M16	120
200, 225, 250 & 280S	M20	180
280M & 315	M24	295
LARGER	M24	295

15. CHECKLIST FOR ATEX FAN INSTALLATION & ROUNTINE MAINTENANCE RECORD

Fan Reference	Fan Location Site

Fan Nameplate Details

Fan Type:	Blade Angle:
Voltage:	Motor Current:
Motor Power:	Motor Frequency:
Order Number:	

1) Alignment

Visually check that installation anti vibration mounts, silencers, bellmouths, air operated dampers, flexible connectors (and their clips), weather proofing, platforms, supports, chains, harnesses, etc. are fully aligned before being and no distortion or stress is placed on the equipment.

Installation Appearance Correct	Installation Appearance Incorrect

Comments Regarding Corrective Action Required:

2) General

Check that the fans are undamaged and component parts and fixings have correct torque values for the installation.

Check that the fan casing has not been damaged during installation and the impeller rotates freely with minimum required tip clearance.

Installation Appearance Correct	Installation Appearance Incorrect

Comments Regarding Corrective Action Required:

3) Fan Electrical Checks
   a. Measured Insulation Resistance, Phase to Earth

Phase	U1	V1	W1
Megaohms			
Comment	**Pass > 10 Megaohms**	**Fail < 10 Megaohms**	

b. Measured Insulation Resistance, Phase to Phase

Phase	U1-V2	V1-W2	W1-U2
Megaohms			
Comment	**Pass > 10 Megaohms**	**Fail < 10 Megaohms**	

c. Fan Supply Electrical Connection

	Correct	Incorrect
Electrical cables fixings (e.g. ATEX certified cable/duct glands or grommets) and electrical cables runs (e.g. EMC screening of cable if VSD is used).		
Internal Wiring of Duct/Motor Terminal Box (Refer to Wiring Diagram)		
Check external connections into the control panel		
Check location and fixing the electrical control panel		

Comments Regarding Corrective Action Required:

d. Measured Voltages, Current and Vibration Levels

Voltage on Mains (V):	
Voltage While Fans Running (V):	
Running Current (A):	
Casing Vibration Level (Base Line) (mm/s):	

4) General Comments of Required Actions

Comments Regarding Corrective Action Required:

Checked by:
Date:

Routine Maintenance Record	1	2	3	4	5	6	Inspec 7
1. Examine fan guards (if fitted) and seals (if fitted)							
2. Examine motor cooling fins							
3. Examine impeller for dirt build-up or any physical damage which can cause unbalancing. Check the angle, the security of the impeller blades and impeller tip gap clearance (refer to Table 4).							
4. Check condition and tautness of fan safety support chains/harnesses/ropes (if fitted)							
5. Examine and operate vibration sensors (if fitted), and temperature sensors (if fitted)							
6. Examine condition of safety guards (if fitted) and associated fixings							
7. Check operation of anti-condensation heaters (if fitted)							
8. Examine the clearance between rotating and stationary fan components fan (refer to Table 4).							
9. Check torque of fixings used to secure the fan to its support structure.	-		-		-		-
10. Examine motor, fan and ancillary equipment fixings	-		-		-		-
11. Check movement (deflection) of vibration isolators (if fitted)	-		-		-		-
12. Check motor voltage and current consumption	-		-		-		-
13. Inspect paintwork / galvanising finish	-		-		-		-
14. Lubricate motor bearings	-		-		-		-
15. Check fan assembly wiring	-		-		-		-
16. Check and record fan operation for excessive vibration levels (mm/s)	-		-		-		-

tion (Date – DD/MM/YYYY)									
	8	9	10	11	12	13	14	15	16
		-		-		-		-	
		-		-		-		-	
		-		-		-		-	
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