

AXUS AXR

High Temperature 300°C for 1hr, 400°C for 2hrs
Roof Mounted Axial Fan for Smoke Control
Installation and Maintenance

CE The EMC Directive
2014/30/EU
The Low Voltage
directive
2014/35/EU

Introduction

The Nuair AXR Roof mounted unit is designed to operate day to day as standard roof extract fan. However, in the event of a fire, the unit can extract smoke at temperatures up to 400°C for a maximum of two hours. The fans have airflow rates up to 23m³/s and static pressure up to 555Pa.

The unit is available in four case sizes

AXR 56, AXR 71, AXR 100, AXR 125.

(See page 3 for dimensions and weights). The 56 and 71 units are manufactured in aluminium alloy. 100 to 125 size units are manufactured in polyester powder painted galvanised steel.

All units have airflow operated shutters which are weather proof when closed. The bird/ safety guards on the outlet are designed to automatically displace if blocked by fire debris etc.

The fans incorporate a directly driven, high performance, temperature rated, form 'A' aluminium alloy (300°C) and steel (400°C) axial flow type impellers.

Access to the impeller/motor is made by removing the top cover assembly.

Coding

AXR100 A 4 1 3 A 7 T
| | | | | | | | |
1 2 3 4 5 6 7 8 9

- 1 AXUS roof mounted axial fan
- 2 Impeller diameter (mm)
- 3 Motor speed (poles)
- 4 Performance curve number
- 5 Impeller blade angle reference
- 6 Electrical supply in phases
3 = 400V, 50Hz
- 7 Impeller material
A = Aluminium alloy
S = Steel (mandatory for 400°C units)
- 8 Operating temperature
7 = 300°C for 1 hour
8 = 400°C for 2 hours
- 9 Other options (combinations possible)
T = Two speed, (full and half)
T6 = Two speed, (full and two thirds)
(4/6 pole only)
F = Flameproof (EExd IIBT4) (300°C only)

Handling

Units are delivered to site mounted onto wooden transit frames. In addition to making the fans easier to handle during transit, the frames also afford protection for the motor section. We advise that the wooden frames should remain on the fans until the moment of actual installation and fixing.

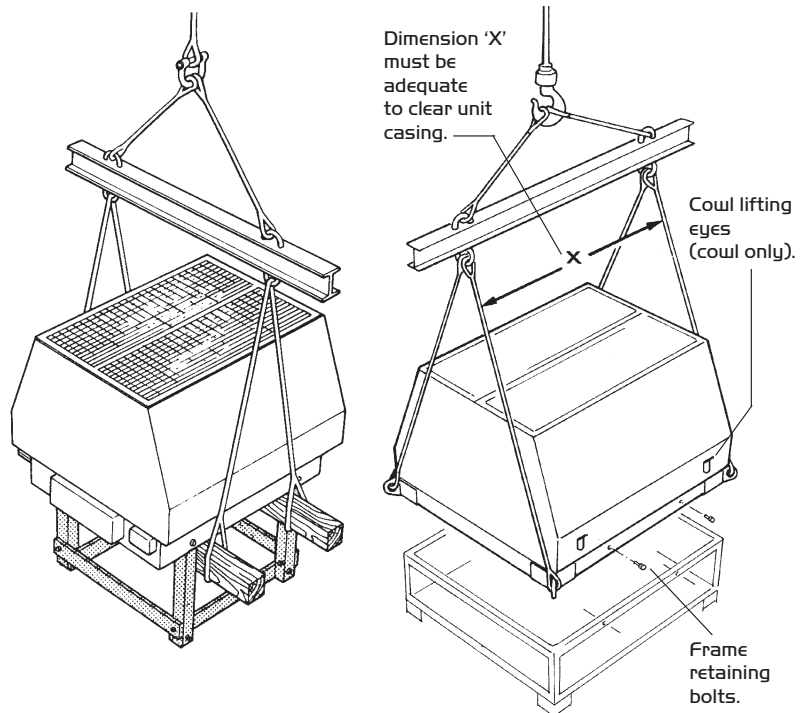
Handling the unit is best carried out with the unit fixed to the transit frame. When lifting, use spreader beams through the transit frame ensuring the unit is evenly balanced and that the lifting slings or webbing are not in direct contact with the casing (see fig 1a).

The larger unit (125) has lifting lugs fitted to each lower corner to which the slings can be attached which makes the use of spreaders unnecessary. See figure 1b.

Note. When releasing a larger unit from its metal transit frame the weight of the unit should first be supported by jacks under the unit motor supports before attempting to remove the frame fixing screws.

Figure 1a. Correct method of lifting using a spreader.

Figure 1b. Lifting a larger unit with lifting lugs on each lower corner.



IMPORTANT

1000 & 1250 units are supplied with eyelets bolted to the cowl, THESE ARE ONLY TO BE USED TO REMOVE THE COWL FROM THE BASE.

Under no circumstances must they be used to lift the complete unit. Note also that units must not be stacked.

Installation and General Advice

Installation must be carried out by competent personnel, in accordance with good industry practice, the appropriate authority and in conformance with all statutory and governing regulations e.g. IEE, CIBSE, COSHH, HVCA, ATEX, BSI & EN standards etc.

Fixing

All the units are designed to be fixed onto curbs (by others) although pre-fabricated curbs manufactured in aluminium alloy are available from Nuair as optional extras. More information about the curb fixing arrangements is shown on the following pages.

Installation Builder's upstand

The AXR fan unit must be securely attached to the curb or mounting to prevent damage by wind or vibration. Holes are provided which allow the unit to be directly attached. Fixing bolts should be of non corrodible type).

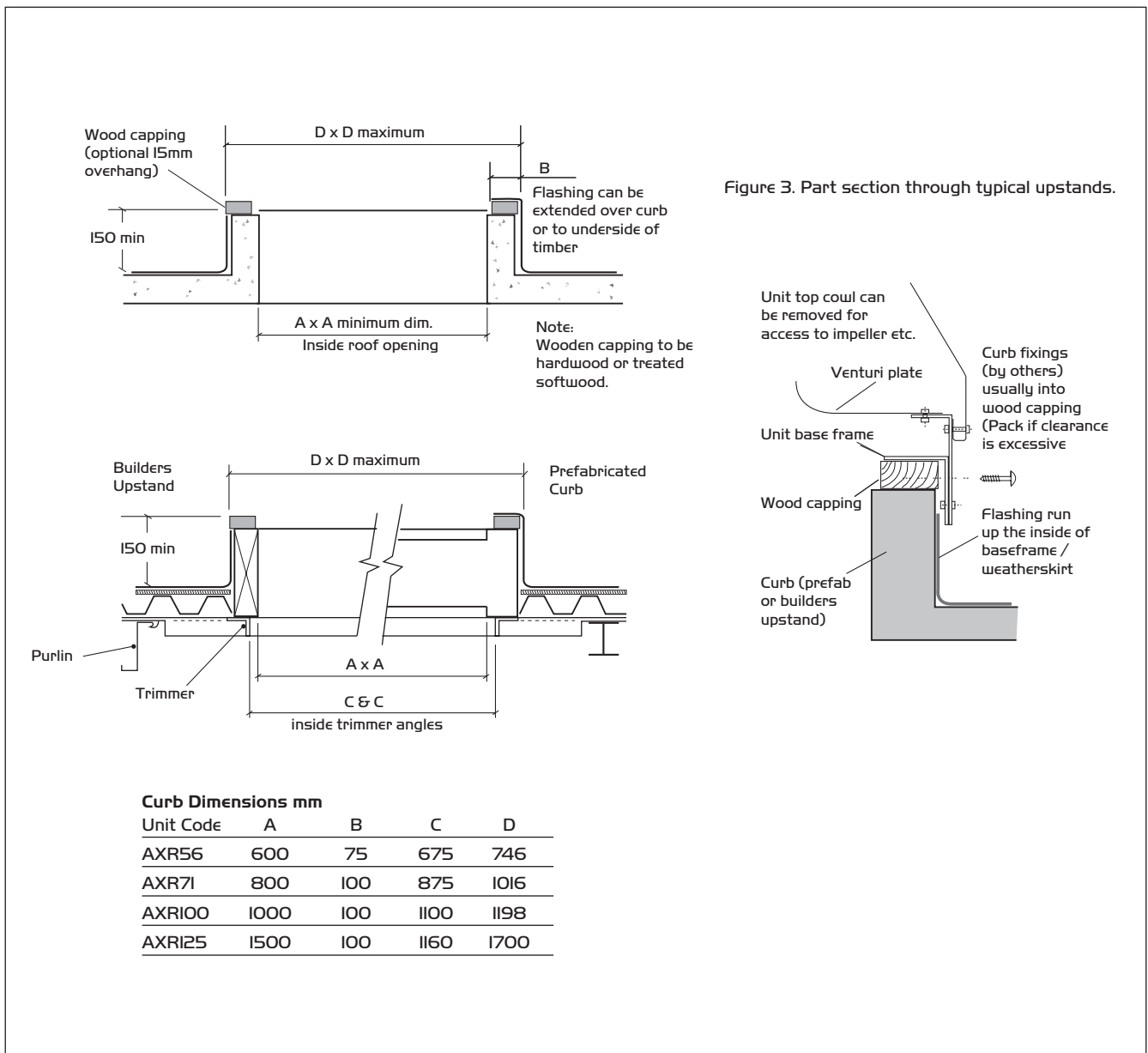
Mounting angle

The unit may be installed at any angle up to 40° from the horizontal but the shutters **MUST** run up the slope to ensure satisfactory shutter operation and weather sealing.

IMPORTANT

Danger: This equipment incorporates rotating and moving parts as well as electrical components and conductors. It is the responsibility of the installer to ensure that any such items that remain externally accessible once the equipment is installed are adequately guarded. This precaution is necessary to avoid the possibility of accidental injury or death. Particular attention must be paid to the inlet side of rotating impellers.

Figure 2. Section through curbs / upstands.



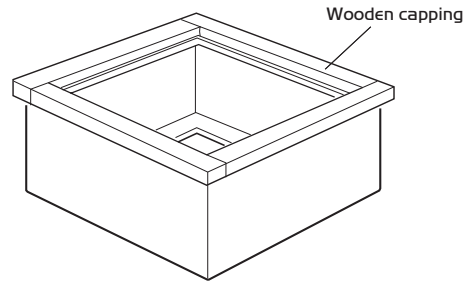
Installation using a pre-fabricated curb

Nuaire pre-fabricated curbs are manufactured in aluminium alloy with adjustable wooden cappings set to the maximum overhang position of 15mm.

The roof flashing can be run up the sides of the curb to finish just beneath the top. Alternatively if adequate clearance is available the flashing could be run over the top of the capping prior to lowering the unit onto the curb.

When installed the curb must be bolted securely to the roof trimmer angles.

Figure 4. Nuaire pre-fabricated curb.



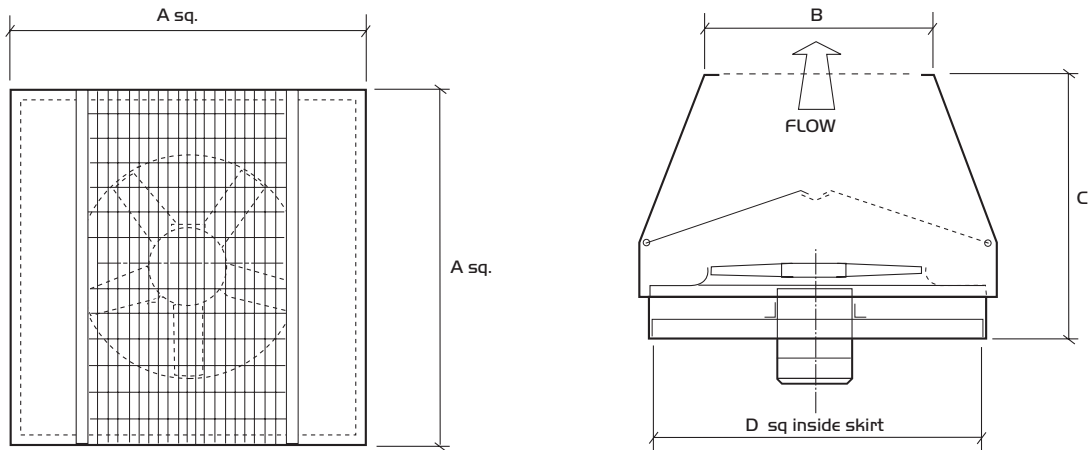
Soaker sheet

Soaker sheets are manufactured in GRP and can be supplied to match most roof profiles. The soaker sheet should be placed over the prefabricated curb, trimmed to height and built into the roof in accordance with standard building practice.

Unit Dimensions (mm) & weights (kg)

Figure 5.

Dimensions mm					Unit weight kg
Unit Code	A	B	C	D	
AXR56	845	570	535	746	93
AXR71	1100	770	760	1016	146
AXR100	1295	1000	880	1198	364
AXR125	1795	1300	1160	1700	615



Electrical Installation - Motors

Motors comply with BS5000 and IRC34-I; they have sealed for life ball bearings, IP55 enclosures and class H insulation.

Motors are tested for high temperature operation in accordance with BS7346 (Part 2) and PR EN 12101-3.

NB Please note the requirements for maintenance of the motor. Failure to comply with the recommendations will invalidate any warranty claim.

Wiring General

Electrical supply wiring connection is to an externally mounted terminal box on the case exterior. The box is pre-wired to the motor with heat resisting cable.

NOTE: We recommend D.O.L. starting whenever possible. Units of 4kW and above have provision for Star/Delta starting if this is required (and is permitted by the relevant authorities). Two speed motors must be wired for D.O.L. starting only. Two speed motors, allowing normal ventilation at reduced noise levels, are available on all units.

Connection details

Fans with motors up to 3.0kW are suitable for connection in the STAR method and also to a Direct On Line (DOL) starter. The Star connection will be made at works on all but the EEXD motors..

Fans with motors of 4.0kW and above will have all six ends of the motor windings brought out to the terminal box on all but the EEXD motors. These motors should be connected in the DELTA mesh for connection to a DOL starter.

4.0kW motors and above are also suitable for connection to a STAR / DELTA controller, but as smoke fans are required to start with the minimum of delay in an emergency, this method of control is not recommended.

Motor overload protection should be provided for continuous running and routine testing. This protection must be defeated for emergency operation to allow the fan to run to destruction. Supply fuses should be H.R.C. type.

Start up procedure

Ensure that the impeller rotation follows the label arrow indicator on the casing. Should the direction be incorrect on three phase units, reverse any two of the supply leads. Care should be taken to set correct rotation as incorrect rotation may result in damage to the motor.

Equipment should be run for approx. 30 minutes to ensure correct operation.

If any fault occurs, the equipment should be switched off. Do not re-start until the fault has been rectified.

IMPORTANT

This equipment incorporates rotating and moving parts as well as electrical components and conductors. It is the responsibility of the installer to ensure that any such items that remain externally accessible once the equipment is installed are adequately guarded.

Wiring

Customer/installer wiring to the terminal box located on the fan casing.

Single Speed Units with motors rated below 4kW

Are wired for D.O.L. starting only.

For safety reasons Nuair recommends that all Smokefoil units are wired for D.O.L. starting.

All two speed units must be wired for D.O.L. starting.

Note: Star /Delta starting is available but must only be used where permitted by the appropriate approval authorities

Controls

A range of matching starters / controls are available. Contact us to discuss your specific requirements. Please specify D.O.L.or Star / Delta.

Testing Warning!

Before carrying out any test, check that no loose items, tools etc. are left inside the unit. The fan should not be operated with panels removed. If this proves impractical (during testing for example) ensure that all personnel are well clear of the unit.

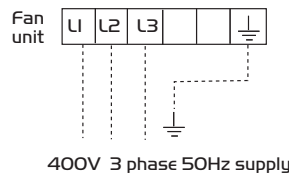
Testing - Switch on the fan unit for a sufficiently long period to ensure that the impeller runs correctly. Switch off during the rundown period check for correct direction of rotation and for evidence of any fault as follows:-

- a) Check that impeller is rotating freely with no signs of slipping.
- b) Check direction of rotation. A single phase unit is unlikely to be incorrect, as the unit was carefully checked at works prior to delivery. To change the direction of rotation on a three phase unit simply reverse any two of the supply connections in the isolator box.

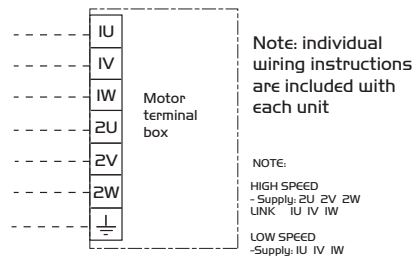
Wiring Diagrams

THREE PHASE UNITS

Single Speed 3 phase (below 4kW))



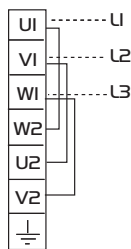
2 SPEED TAP/PAM WOUND MOTORS (D.O.L. starting both speeds)



400V 3 phase 50Hz supply
For DUAL WOUND motors call Nuair for details

For specialist connections not shown always refer to the wiring diagram supplied with the unit. In the event of query or uncertainty contact NUAIRE directly before any connection is made.

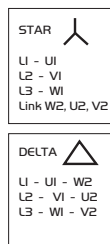
3 phase for DOL STARTING (4kW and above)



400V 3 phase 50Hz supply

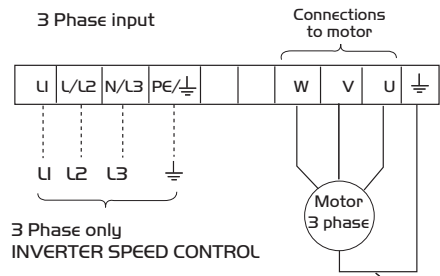
3 phase for connection to a STAR /DELTA STARTER (4kW and above)

Note:
For all D.O.L. (Direct On Line) operation or Inverter type Speed Control wire in DELTA Δ



400V 3 phase 50Hz supply

Matched Frequency Inverter



Notes:
Total length of motor leads should not exceed 50 metres. If a screened motor cable is used, maximum length should be 25 metres. Consult our Technical Department if you wish to use longer leads. Inverters are configured to suit specific fans and control applications as described on the Customer Order free of charge.

400V 3 phase 50Hz supply

IMPORTANT

Inverter control

Under fire conditions the electrical supply must not run through the inverter - **The inverter must be bypassed.**

Where fans are connected to frequency inverter controls the electrical supply to the fan must bypass the inverter under fire conditions.

Maintenance

Nuair recommends all products maintained in accordance with the HVCA “Standard Maintenance Specification for Mechanical Services in Buildings” - Volume II Ventilating and Air Conditioning and BS5588 Pt. I2.

Motor Maintenance

On going maintenance

Induction motors, by their very nature require minimal maintenance. However, a regular regime of inspection is recommended to ensure minor problems do not escalate into breakdowns. Typical intervals would be 1000 hours of operation or 3 months, whichever is the sooner.

Maintenance Checklist

Item	Tick
No visible damage i.e. impeller cracked, fan cowl bent, foot cracked etc.	
No accumulation of dust or fibres on the frame or around the fan inlet.	
No significant corrosion of the lifting lugs/ eyebolts.	
No excessive vibration.	
No loose fasteners.	
Cables and earths are sound.	
Sealing of the motor and gland plate in good condition.	
Insulation resistance adequate, imperative this is checked after prolonged shutdown.	
Regreasing of bearings required, IGO frames and above.	
Bearing condition.	

Motor must be returned to manufacturer for repair.

Because the unit is certified to EN12101-3 and complying with the construction products directive, the motor must be returned to the motor manufacturer for replacement.

Enquiries

Please contact Nuair Limited for information on any aspects of the motor performance that may need clarification. Contact must be made prior to any remedial action being taken under guarantee.

Please quote the motor serial number in all such cases with detailed description of the problem.

Policy

Our policy is one of continuous technical improvement and we reserve the right to alter any detail of our product at any time without prior notice.

Warranty

The 3 year warranty starts from the day of delivery and includes parts and labour for the first year. The remaining 2 years covers replacement parts only.

This warranty is void if the equipment is modified without authorisation, is incorrectly applied, misused, disassembled, or not installed, commissioned and maintained in accordance with the details contained in this manual and general good practice.

The product warranty applies to the UK mainland and in accordance with Clause I4 of our Conditions of Sale. Customers purchasing from outside of the UK should contact Nuair International Sales office for further details.

Specific Commissioning and Service Requirements

Motors for Smoke Extract Fans

These motors are used to provide a SAFETY FUNCTION for people in the event of fire in public premises, they are therefore subject to strict constraints concerning their operating and maintenance.

Operating Constraints

- i. Check on the nameplate that the selected motor corresponds to the maximum exposure temperature and duration.
- ii. AFTER THE MOTOR HAS BEEN SUBJECTED TO ONE EMERGENCY DUTY OPERATION, IT MUST BE REPLACED.
- iii. With variable speed control. Ensure that the maximum speed never exceeds the speed of the motor supplied by the mains and that the delivered power corresponds to the previous definitions. The motor should be equipped with PTC thermistors connected to the protection system during day to day (SI duty) and switched off during S2 duty (operation during an emergency).

Maintenance Constraints

Regular service visits must be performed on the installation and EVERY 6 MONTHS, completing the following checks:

i. Checking the insulation resistance

- a) If the drain holes are blocked, open them to eliminate any accumulated condensation.

ii. Condition of motor

- a) Ensure there is no dust and grease e.g. motor, housing fins, motor cover/fan if fitted driven fan.
- b) Ensure the motor runs normally when switched on for a few minutes.

iii. Bearing check

Run the motor during each maintenance visit. When the motor is cold, a high level of noise is caused by the texture of the grease. This does not indicate a bearing fault.

a) Permanently greased bearings.

Replace on 2 pole motors after 10,000 hours of operation and on motors with 4 poles or more after 20,000hours.

b) Re-greaseable bearings

The information on the motor nameplates must be strictly respected (grease quantity, grease quality and re-greasing frequency). The bearings must be replaced after 20,000 hours of operation.

Note: Any maintenance, repair or bearing replacement on the motor must only be undertaken by the motor manufacturer in accordance with the requirements of the construction products directive of Ref. 89/106/EEC.

Tel: 02920 858 400

DECLARATION OF INCORPORATION AND INFORMATION FOR SAFE INSTALLATION, OPERATION AND MAINTENANCE

We declare that the machinery named below is intended to be assembled with other components to constitute a system of machinery. All parts except for moving parts requiring the correct installation of safety guards comply with the essential requirements of the Machinery Directive. The machinery shall not be put into service until the system has been declared to be in conformity with the provisions of the EC Machinery Directive.

Designation of machinery: High Temperature Roof Axial Fan

Machinery Types: AXR


Relevant EC Council Directives: 2006/42/EC (Machinery Directive)

Applied Harmonised Standards: BS EN ISO 12100-1, BS EN ISO 12100-2, EN60204-1, BS EN ISO 9001, BS EN ISO 13857

Applied National Standards: BS848 Parts 1, 2.2 and 5

Note: All standards used were current and valid at the date of signature.

Signature of manufacture representatives:

Name:	Position:	Date:
1) C. Biggs 	Technical Director	26. 01. 11
2) A. Jones 	Manufacturing Director	26. 01. 11

INFORMATION FOR SAFE INSTALLATION, OPERATION AND MAINTENANCE OF NUAIRE VENTILATION EQUIPMENT

To comply with EC Council Directives 2006/42/EC Machinery Directive and 2014/30/EU (EMC).

To be read in conjunction with the relevant Product Documentation (see 2.1)

1.0 GENERAL

1.1 The equipment referred to in this Declaration of Incorporation is supplied by Nuaire to be assembled into a ventilation system which may or may not include additional components.

The entire system must be considered for safety purposes and it is the responsibility of the installer to ensure that all of the equipment is installed in compliance with the manufacturers recommendations and with due regard to current legislation and codes of practice.

2.0 INFORMATION SUPPLIED WITH THE EQUIPMENT

2.1 Each item of equipment is supplied with a set of documentation which provides the information required for the safe installation and maintenance of the equipment. This may be in the form of a Data sheet and/or Installation and Maintenance instruction.

2.2 Each unit has a rating plate attached to its outer casing. The rating plate provides essential data relating to the equipment such as serial number, unit code and electrical data. Any further data that may be required will be found in the documentation. If any item is unclear or more information is required, contact Nuaire.

2.3 Where warning labels or notices are attached to the unit the instructions given must be adhered to.

3.0 TRANSPORTATION, HANDLING AND STORAGE

3.1 Care must be taken at all times to prevent damage to the equipment. Note that shock to the unit may result in the balance of the impeller being affected.

3.2 When handling the equipment, care should be taken with corners and edges and that the weight distribution within the unit is considered. Lifting gear such as slings or ropes must be arranged so as not to bear on the casing.

3.3 Equipment stored on site prior to installation should be protected from the weather and steps taken to prevent ingress of contaminants.

4.0 OPERATIONAL LIMITS

4.1 It is important that the specified operational limits for the equipment are adhered to e.g. operational air temperature, air borne contaminants and unit orientation.

4.2 Where installation accessories are supplied with the specified equipment eg. wall mounting brackets. They are to be used to support the equipment only. Other system components must have separate provision for support.

4.3 Flanges and connection spigots are provided for the purpose of joining to duct work systems. They must not be used to support the ductwork.

5.0 INSTALLATION REQUIREMENTS

In addition to the particular requirements given for the individual product, the following general requirements should be noted.

5.1 Where access to any part of equipment which moves, or can become electrically live are not prevented by the equipment panels or by fixed installation detail (eg ducting), then guarding to the appropriate standard must be fitted.

5.2 The electrical installation of the equipment must comply with the requirements of the relevant local electrical safety regulations.

5.3 For EMC all control and sensor cables should not be placed within 50mm or on the same metal cable tray as 230V switched live, lighting or power cables and any cables not intended for use with this product.

6.0 COMMISSIONING REQUIREMENTS

6.1 General pre-commissioning checks relevant to safe operation consist of the following:

Ensure that no foreign bodies are present within the fan or casing.

Check electrical safety. e.g. Insulation and earthing.

Check guarding of system.

Check operation of Isolators/Controls.

Check fastenings for security.

6.2 Other commissioning requirements are given in the relevant product documentation.

7.0 OPERATIONAL REQUIREMENTS

7.1 Equipment access panels must be in place at all times during operation of the unit, and must be secured with the original fastenings.

7.2 If failure of the equipment occurs or is suspected then it should be taken out of service until a competent person can effect repair or examination. (Note that certain ranges of equipment are designed to detect and compensate for fan failure).

8.0 MAINTENANCE REQUIREMENTS

8.1 Specific maintenance requirements are given in the relevant product documentation.

8.2 It is important that the correct tools are used for the various tasks required.

8.3 If the access panels are to be removed for any reason the electrical supply to the unit must be isolated.

8.4 A minimum period of two minutes should be allowed after electrical disconnection before access panels are removed. This will allow the impeller to come to rest.

NB: Care should still be taken however since airflow generated at some other point in the system can cause the impeller to "windmill" even when power is not present.

8.5 Care should be taken when removing and storing access panels in windy conditions.

Technical or commercial considerations may, from time to time, make it necessary to alter the design, performance and dimensions of equipment and the right is reserved to make such changes without prior notice.