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Atex appendix for axial fans

Supplement to general manual

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All the information in this Atex appendix must be carefully read and understood. Pay particular attention to the operating standards with ATTENTION signals as their non observance can cause damage to the persons and/or machine.

Remark:
Save this Atex appendix together with the general manual for possible future references. We reserve the right to improve or modify manual or products and fittings with any obligation to update previous productions and manuals.

This Atex appendix should be used together with the general manual.

Note: the directives quoted in this manual are available in the following agencies

Community Directives CEE/EEC: EUO, rue de la Lai 200/b – 1049 Brussels/ Belgio – Belgium
Harmonised Directives : CEN, rue de Stassart 36/b – 1050 Brussels/ Belgio - Belgium
Directives : UNI, via Sannio 2 – 20137 Milano / Italia Italy
Directives : CEI/IEC: CEI, Milano / Italia – Italy

List of directives and norms : 2006/42/CE; 2004/108/CE; 2006/95/CE; UNI 60204-1; EN 60947-3; ISO 12499; UNI EN 12101-3; Dlgs. 81/08; ISO 5801/5802; ISO 1940/1; ISO 14694/2003 ; ATEX 99/92/CE ; ATEX 94/9/CE ; EN 1227-1 ; UNI EN 1037.

In case of dubious interpretation it is always valid the original language.

0.0 INTRODUCTION

THE PRESENT INSTRUCTION BOOKLET REFER TO THE FAN ONLY.
REGARDING THE ELECTRIC MOTOR IS NECESSARY TO RELATE TO THE SPECIFIC MANUAL.

We recommend to read this booklet carefully
before the installation of the device.
The explosive atmosphere is a serious danger
for the health of the workers therefore all
the possible prevention measures must be activated .

FAN HAS BEEN DESIGNED AND MANUFACTURED IN CONFORMITY TO THE DIRECTIVE ATEX 94/9/CE, 2G (OR 3G), 2D (OR 3D), T3 (OR T4) WHEREBY IT SHALL BE INSTALLED IN ZONE CLASSIFIED AS HAZARDOUS AREA: ZONE 1 (IF 2G) OR 2 (IF 3G) ZONE 21 (IF 2D) OR ZONE 22 (IF 3D) ACCORDING TO THE DIRECTIVE 1999/92/EC.

ZONE 1 INDICATE THAT THE EXPLOSIVE ATMOSPHERE IS OCCASIONALLY PRESENT DURING THE NORMAL OPERATION

ZONE 2 INDICATE THAT THE EXPLOSIVE ATMOSPHERE IS NOT NORMALLY PRESENT IN THE STANDARD OPERATION, OR ELSE RARELY AND FOR SHORT PERIODS.

“G” INDICATE THAT THE EXPLOSIVE ATMOSPHERE IS DUE TO THE PRESENCE OF GAS, VAPOURS, FOGS.
“D” INDICATE THAT THE EXPLOSIVE ATMOSPHERE IS DUE THE PRESENCE OF COMBUSTIBLE DUST.
“T” INDICATES THAT THE MAXIMUM TEMPERATURE OF THE FAN SURFACES IS 135 °C (IF T4), 200°C(IF T3).
THE FLAMMABLE GAS INITION TEMPERATURE, FORESEEN FROM THE USER, SHALL BE CLEARLY HIGHER THAN 135°C (IF T4) OR 200°C (IF T3).

USER (EMPLOYER) HAS THE DUTY UNDER IS OWN RESPONSIBILITY TO CLASSIFY THE ZONES, THEN TO CHECK UNDER HIS OWN RESPONSIBILITY, THAT THE ZONE WHERE THIS DEVICE WILL BE INSTALLED IS COHERENT WITH THE CATEGORY 2 OR 3 ATEX. THE EXTENSION OF SUCH A ZONE DEPENDS OF THE CAPACITY OF RELEASE OF THE FLAMMABLE GAS AND THE LEVEL AND AVAILABILITY OF VENTILATION IN THE ENVIRONMENT WHERE THE FAN IS INSTALLED (CEI 31/30).
VENTINET IS NOT RESPONSIBLE OF THE EVENTUAL WRONG SELECTION OF THE CLIENT OR FOR THE INSTALLATION OF THE FAN IN ZONE OTHER THAN THE ONE WHICH IS INTENDED (AS FOR THE MARKING).

THE EVENTUAL USE OF THE DEVICE IN NORMAL ATMOSPHERE (NOT EXPLOSIVE) DO NOT COMPROMISE ITS OPERATION AND THE SAFETY OF THE WORKERS.
THE EVENTUAL USE OF THE FAN IN ZONE 0, IS A SERIOUS DANGER FOR THE HEALTH AND SAFETY OF THE PEOPLE.

USER SHALL ENSURE THAT THE SYSTEM WHERE THE FAN WILL BE INSTALLED HAS BEEN ADEQUATELY PUT IN SAFETY FROM THE POINT OF VIEW OF THE RISK OF EXPLOSION BEFORE THE START-UP AND THE “DOCUMENT ON THE PROTECTION AGAINST THE EXPLOSIONS” HAS BEEN COMPILED FOLLOWING THE DIRECTIVE ATEX 99/92/CE. FAN IS SUITABLE TO OPERATE EXCLUSIVELY IN ATEX ENVIRONMENT. TEMPERATURE BETWEEN -20 AND+40°C RELATIVE HUMIDITY 80% (UNLESS OTHERWISE SPECIFIED).

1.0 EXPLOSIVE ATMOSPHERES

WARNING signal for the hazardous areas

The explosive atmosphere arises by the presence of the a flammable substance dispersed in the air when the concentration is between the lower limit of explosiveness (LEL) and higher limit of explosiveness (UEL)

The presence of an ignition source inside the explosive atmosphere causes the explosion.
The ignition sources shall be hence moved away from the classified zones, else they shall be given inefficacious i.e. not able to flame an explosive atmosphere.

ATTENTION:

Before acting on the equipment is necessary to ensure that the environment has been cleared of the explosive atmosphere.

In the event that this conditions is not obtainable, keep in mind that the operations in explosive atmosphere shall be carried out only by specialized staff, trained on the specific risks, as well as furnished of the suitable protective devices

(i.e.: spark-proof tooling, etc…)

The ignition source is the physical element that, brings enough energy to the explosive atmosphere to cause the deflagration. The removal of the ignition sources is therefore a priority in the explosion preventions.

Following listed the predictable ignition sources:
FREE FLAMES (oxydrogen welding)
ELECTRICAL MATERIAL MECHANICAL SPARKS/ ABRASION (grinding, cutting, abrasion, welding)
HOT SURFACES (welding)
ELECTROSTATIC CHARGES (insulating materials)
ESOTERMIC REACTIONS (chemical reactions)
SHOCK WAVE THUNDERBOLT IONIZING RADIATIONS AND NOT HIGH POWER ELECTROMAGNETIC WAVES

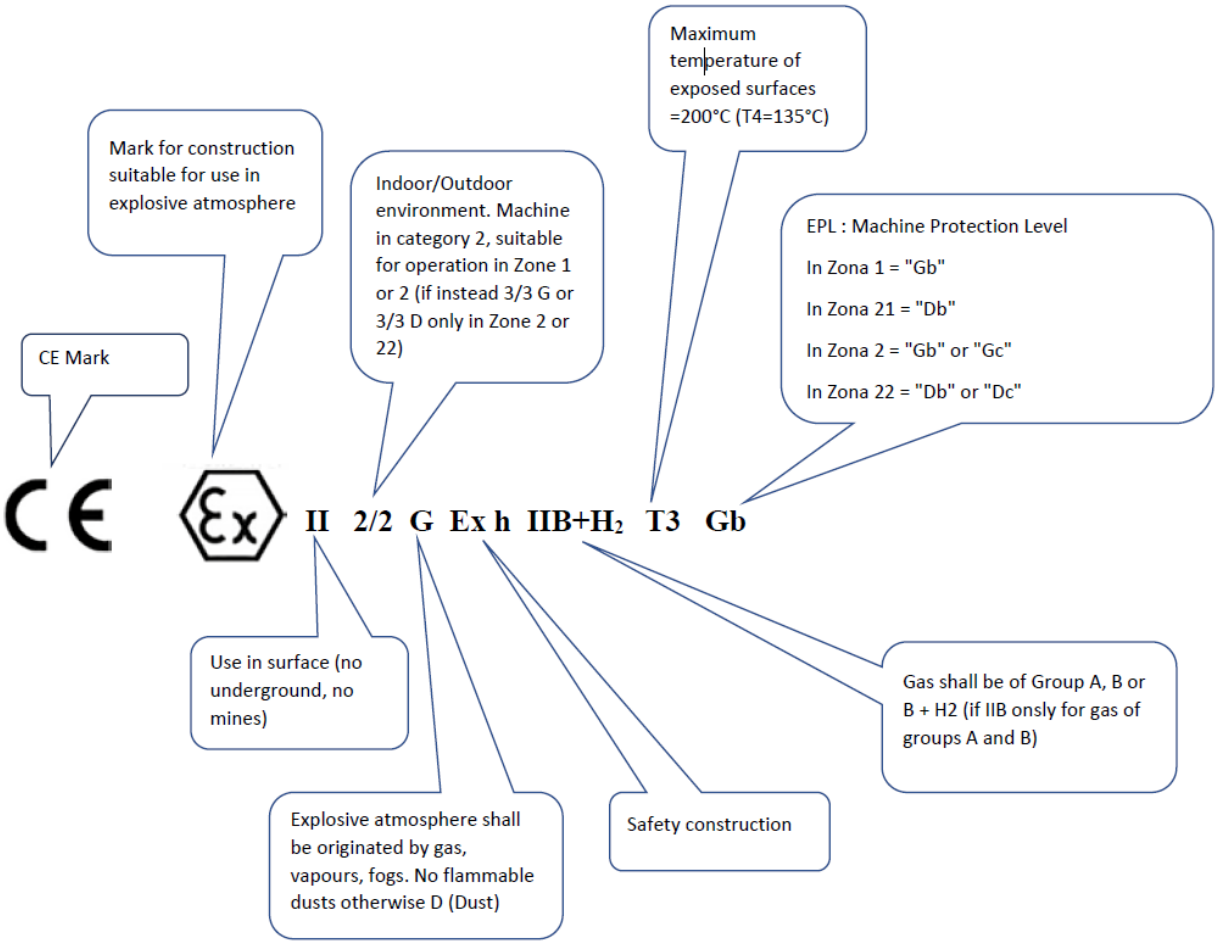
ZONE OF PROPAGATION

Our fans fulfill the normative ATEX 2014/34/UE, consequently the leakage through flanges, welding, bolting, etc. are reduced below the threshold maximum permissible but not totally prevented. Therefore, the presence of an hazardous area around the fan is possible. For this reason all around is compulsory to use components in accordance with the category of fan; otherwise equipment of a lower category must be located outside the hazardous area. To grant the safety in the zone of application of the fan is mandatory to foresee a suitable number of air exchanges.

2.0 IMPORTANCE OF THE MARKING

Example marking of the non electrical part.

All anti-sparkle fans are certified 2/2G, 2/2D (or 3/3G, 3/3D) Ex h T4-T135 or T3-200 referring to the fan inside and outside. The law is valid for ambient temperatures between -20 and +40°C, atmospheric pressure between 0.8 and 1.1 bar, the air containing max 21% or oxygen and for aeraulic energy of max. 25 kJ/kg. SEE EXAMPLE:



ATTENTION

The motor fan assembly is made of two separate elements, assembled together, but following two separate procedures of certification (electrical related to the motor and non electrical related to the fan). The electric motor shall rate a marking label quoting a maximal surface temperature (T1:T6) different from the one of the fan (more precautionary). Cases with motor of a category higher than the fan shall also occur.

User shall be aware that the reference rating label of the assembly is always and only the one of the fan. Thus the rule that, within the assembly, the lower category assigns the assembly category is valid.
Example: 1) fan cat.3 + motor cat. 2 = assembly category 3;
Example:2) fan T3 + motor T4 = assembly T3;

3.0 ATEX FAN NAMEPLATE

In accordance with the ATEX directive 2014/34/EU (Ref Chapter III, art. 10), fans designed to operate in potentially explosive atmospheres are identified by nameplate. In the figure below there is a copy of the ATEX fan nameplate.

Picture 2 - ATEX fans nameplate

4.0 DECLARATION OF CONFORMITY

EU DECLARATION OF CONFORMITY
To the Directives of The European Community

Ventinet B.V.
Cartografenweg 26
NL 5141MT Waalwijk, The Netherlands

The undersigned declares under his own responsibility that the NON electrical partly completed machines of the series in object as been distributed in the market by Ventinet and made by Elektrovent srl (Via Pozzette 18, 25080 Soiano D/Lago) in conformity to the essential requirements of Safety and Health defined according to the annex II of the directive 2014/34/EC and it is destined to be used in potentially explosive areas according to the annex I of the:

Community Directive 2014/34/EU of 26 February 2014
Devices in potentially explosive atmospheres
And with complete conformity to the following standards
EN 80079-36:2016 ; EN 80079-37:2016; EN 14986:2017
and
Community Directive 2006/42/CE "Machinery" of 17 May 2006
DECLARATION OF INCORPORATION (according to annex IIB)
The partly completed machinery in object responds to the essential safety requirements of the annex I:
1.1.1 – 1.1.2 – 1.1.3 – 1.3.1 – 1.3.4 – 1.5.1 – 1.5.4 – 1.5.5 – 1.5.8 – 1.5.9
1.5.13 – 1.6.1 – 1.6.5 1.7.1 – 1.7.2 – 1.7.3 – 1.7.4 – 1.7.4.1 – 1.7.4.2 – 1.7.4.3

The NON-electrical part according to directive is called upon to the keeping of documentation n. file :

CE Ex

No file : IMQ CY 16 ATEX 0205709 X Issue : 01

The present fan shall not be put in service before the machine into which it has been incorporated has not been declared conformed to the provisions of the Directives in force.

Authorized Signature
Antoon Maes

Waalwijk
20.01.2020

5.0 GENERAL INFORMATION

The present instructions apply to series ATEX fans. Each fan is balanced and verified before shipment. The identification of the fan (non electrical part) is made according to the data quoted on the recognition nameplate sticked both on the fan casing and the manual. Our fans are guaranteed by law. The guarantee becomes effective from the date of delivery and it covers all the defects recognized to the manufacturing quality or material defects. For any evidence of damages discovered upon receipt of the goods, notify them immediately to the forwarder and contact us, Ventinet B.V. isn't liable of the damages occurred during the transport. Do not use or repair damaged fans, every form of guarantee will be lost.

The range of our fans is complete of protection fittings (guards in conformity with directive UNI EN ISO 12499) (see technical sheet) except when they are destined to ducting, frames, plants. It is therefore a user responsibility to arrange for such structures to fulfil as a protection towards the dangerous components. We decline any liability for damages to persons or things for the absence of such protection devices. In order to protect the staff responsible of maintenance, the user must supply the fan with the necessary electrical insulation devices: lockable multi-polar switches. These fittings are available on request. Our fans are not fitted with active safety functions as they are destined to plants that check supply and drive. We decline every liability for damages to persons or things consequential of a lack of such protection fittings. Check the conformity of the fan with the order (arrangement, rotation, power and polarity of the installed motor, fittings etc.). Check the integrity of the product, the presence and correct tightening of the bolts and nuts. We don't accept any returns of non-complying fans after installation. We refuse any responsibility for damages due to improper use and/or the non-observance of the instructions quoted in this manual.

6.0 DESCRIPTION AND TECHNICAL SPECIFICATIONS OF FANS DEFINITION OF FAN

6.0.1 FANS

Our range of ATEX fans is suitable for the use in areas classified ZONE 1 if the fan is 2G and ZONE 2 if the fan is 3G. Only clean and not corrosive air shall be conveyed.

6.0.2 DESTINATION OF USE

The fans have been designed and manufactured to convey gaseous fluids with preponderance of clean air, not abrasive nor corrosive and for indoor installation. There are specific types suitable to convey air and dusts while the PLASTIC lines and other fans in stainless steel shall convey corrosive gases but in some cases only. Any other use shall be considered improper, therefore not allowed.
The environment temperature shall be comprised between -20°C and +40°C and pressure between 0.8 bar and 1,1 bar. Installation shall be indoor or outdoor, provided that it is protected by the atmospheric agents (for instance under a shelter).These lines are suitable for high and medium capacities and medium low pressures. Performances of every single fan are quoted in the technical catalogues, which reference is mandatory in order to identify the suitability of the fan to the plant for which is destined.

6.0.3 UNCORRECT USES/NOT ALLOWED

The machine and/or the environment of installation must not present:
- Exposition to corrosive smokes;
- Exposition to high humidity (more than 80%);
- Exposition to high dust concentration;
- Exposition to abrasive dusts;
- Exposition to water vapour or condensate;
- Exposition to oily vapours;
- Exposition to salty air;
- Exposition to vibrations, impacts or anomalous shocks;
- Exposition to absolute pressure above 1.1 bar;
- Staying in an ATEX Zone 1, 2, 21 or 22 different from the one for which the fan has been certified;
- Presence of nuclear radiation.

ATTENTION: the fan is made of the following materials: aluminum, plastic, steel etc. User shall verify attentively that the device isn't affected by fluids that shall create anomalous chemical reactions (for instance exothermic chemical reaction) or deteriorate the fan.

ATTENTION: the fan is not designed to be controlled through frequency converter as the nominal speed of the motor shall never be exceeded and because the temperature of the motor at lower speed increases. In case the control of the speed is required, customer shall previously contact the supplier to install the necessary supplementary protection devices (motor thermal protection, etc...)

ATTENTION: the fan noise values are quoted in the technical catalogues and sheets, expressed in dB(A) and related to readings in free field with ducted inlet and outlet. Noise level higher than 80 dB(A) are highlighted. The end user could relieve values different from the ones indicated, due to the environmental installation. We always recommend to isolate the fan from the ground and canalization, with isolator supports and joints and when necessary, to predispose effective sound reducer barriers. It is responsibility of the user to protect the health of the staff according to the norm 81/08 and subsequent modifications (*). To this purpose suitable accessories are available.

(*) National rules on protection of health and safety in the workplace.

ATTENTION: fan construction does not guarantee the perfect air tight between the inside and outside atmosphere. This characteristic must be considered by the user, to the purpose of the classification of the zone surrounding the fan itself (see 0.2).

7.0 INSTALLATION

ATTENTION: INSTALLATION MUST BE CARRIED OUT BY SKILLED STAFF. FURTHERMORE IT IS FORBIDDEN TO PROCEED WITH INSTALLATION BEFORE THE FAN IS PUT IN SAFETY CONDITIONS AND ITS INTEGRITY IS VERIFIED.

From now on, in this manual, we will indicate with the message “put the device in safety conditions” the following operations:

- Be sure that the fan is disconnected from all the electrical supplies.
- Be sure that all moving parts are completely in still position.
- Wait until the possible flammable mixture inside the fan is completely deposited.
- Mechanically block all the moving parts.

Any operation on the fan (installation, maintenance and cleaning), shall be carried out by operators equipped with proper individual protection devices (IPD):

- Antistatic accident-prevention shoes (certified)
- Antistatic protective clothes (certified)- Helmets- Anti-cut gloves - Protective masks

During the operation of unpacking and placing don’t use catching points on the motor (they are exclusively designed to move the motor only), neither on the impeller nor safety grids, but use suitable means and catching points. Check for the absence of corrosion points. Check that impeller didn’t suffer any impact or deformations during the displacing, it must be properly fixed on his rotation shaft, no foreign body interferes with the impeller itself and it free rotation on its own axis. Besides verify that the "space" between the terminal part of the impeller and the casing is that foreseen by the manual (GRAPH 1).
We recommend foundations preferably of reinforced concrete, suitable to bear the static and dynamic load, with a minimum weight which should be equal to four times the weight of the rotary mass (around twice the total static weight of the fan).
In the case of installation on steel structures, it is essential that they are adequately rigid and have their minimum natural frequency more than 50% of the fan speed. A correct leveling of foundations or support frames and their strength are fundamental to prevent vibrations. Intending to avoid the spread of vibrations, we recommend the application, in appropriate points between the fan and its interfaces (floor and ducting), absorbing fittings as shock-absorbers and flexible joints. Shock-absorbers should not be completely crushed (compressed) and should withstand a base frame of the fan (and not individual elements).For axial fans fix firmly to the flanges and/or brackets (feet). In case of use of motors equipped with drain plug, it must be located at the lowest point of the motor at installation completed. Discharge plug must be definitely removed in case of condensation due to high temperature variations or humidity, or periodically removed to allow the drainage of possible condensation.

ATTENTION: When the access to inlet and outlet (rotating parts in motion) is not ducted or protected by any other means, it is necessary to install a protection guard according to UNI EN ISO 12499 and subsequent (fitting provided on request). Failing to install the protection guards may be cause of serious accidents. Ventinet does not know the final use of the fan, it is therefore up to the user to protect the uncovered dangerous parts of the fan with guards, grids, switches, barriers, ducting, frames, components, part of machinery or systems.

ATTENTION: User has the duty to assess the risk originated by the eventual entrance of foreign bodies inside the fan, that shall originate dangerous situations to the purpose of the safety against the explosions (sparks, etc...). The caution measures depend on the specific practical situation (for instance: grids, spark interceptors, magnetic detectors, etc...). For assistance in the choice, user is invited to consult the norm EN 1127-1 or supplier.

8.0 ELECTRICAL CONNECTION

ATTENTION: THE ELECTRICAL WIRING SHALL BE CARRIED OUT BY SKILLED STAFF.

Note: Always refer to the use and maintenance manual specific of the electrical motor that is preponderant. In order to provide instructions of general character we recommend the following: System, components and relevant wiring of the ATEX fan shall comply with the ATEX directive 2014/34/UE.
Wiring shall be coherent with the category which the fan is destined. The standard electric plant is not suitable to operate in any hazardous area.

8.1 Check that the electric phases, frequency and voltage quoted on the motor plate correspond to the main supply.
8.2 Foresee a multipolar service switch nearby the fan, in case of installation far from the electric panel and/or drive point.
8.3 Foresee a motor protection system, which prevent detrimental overheating.
8.4 Use supply cables with sections suitable to the full load current of the motor, as quoted on the motor plate. In order to avoid overheating and voltage drops during the starting phase.
8.5 Carry out the connection according to the diagram quoted on the motor plate and/ or included in the terminal box.
8.6 Tighten the nuts of terminals on the lugs of the power cables with torque (Nm) indicated in the table below.

Terminal	M4	M5	M6	MB	M10	M12	M14	M16
Steel	2	3,2	5	10	20	35	50	65
Brass	1	2	3	6	12	20	35	50

Do not interpose washers and/or nuts between the motor lugs and those of powering cables.

8.7 Electrically connect the fan to the ground in the following points:
1. terminal placed inside the terminal box.
2. grounding placed in the external part of the motor casing.
3. grounding placed outside the structure/ volute of the fan.

For the wiring follow the norms in force in the installation place.

8.8 Verify and in case identify the presence of ancillary devices (for instance thermal protections or heaters) correctly apply what is showed in the wiring diagram and consult the use and maintenance manual of the motor. Motors driven through frequency converter shall be equipped with PTC thermistors to avoid motor overheating. DO NOT PROCEED in case of doubts contact the supplier.

ATTENTION:

- For the use of thermal protections, provide the appropriate steps to avoid dangers of a sudden undesired restarting. The condensation heaters must have a separate line feeding. THEY DON'T HAVE TO BE FEEDED WHILE MOTOR IS OPERATING.
- Variable speed applications are not allowed, if not expressly agreed in phase of order with the supplier. Anyway rotation speeds different than the nominal are not admitted.
- If agreed with the supplier a range of speed that can become a source of danger, must be provided a protection against the over-speeds of the electric motor according to EN 60204-1. Motors controlled through the frequency converter (inverter) in any case, must not operate to a number of Hz higher than given (usually 50Hz) and shall not fall under the half the nominal number of Hz.

9.0 START-UP

ATTENTION: VERIFY THAT THE CONDITIONS OF DANGER OF THE ZONE IN PRESENCE OF POTENTIALLY EXPLOSIVE ATMOSPHERE ARE NOT HIGHER THAN THE ONES FOR WHICH THE FAN IS DESTINED.

Note: Installer shall interface the device with the necessary on/off controls, emergency stop, reset after emergency stop, complying with the actual standards (CEI EN 60204-1, UNI EN 1037, UNI EN 1088, UNI EN 953).

Note: When the access to inlet and outlet (rotating parts in motion) is not ducted or protected by any other means, it is necessary to install a protection guard according to UNI EN ISO 12499 and subsequent (fitting provided on request).

Note: All the electrical components that the installer is going to use to connect to the fan must be certified according to ATEX Directive 2014/34/CE.

ATTENTION: START-UP MUST BE CARRIED OUT BY QUALIFIED STAFF

9.1.0 OPERATIONS TO CARRY OUT BEFORE START-UP:

9.1.1 Check the tightening of all bolts and nuts paying particular attention to the impeller head screws, and motor to the support.
9.1.2 Check the free rotation of the impeller, manually rotating it and checking that the opening (space) between the impeller and the casing is as quoted in the manual (GRAPH 1) and ascertain the absence of foreign objects .
9.1.3 Verify the position of any shutters or volume dampers: open position for the axial fans (during start-ups it prevents dangerous overloads of the motor).
9.1.4 Check the proper lubrication of the rotating parts and eventual inspection doors to be closed.

9.1.5 Check the insulation resistance between the phases and between the winding and the casing. It shall be, with winding at 25°C, higher than 10 Mega ohm. Lower values are usually indicate the presence of humidity into windings. Then DO NOT PROCEED and arrange to dry up applying to a specialized company.

ATTENTION: DO NOT TOUCH TERMINALS DURING AND IMMEDIATELY AFTER THE MEASUREMENT SINCE THEY ARE UNDER VOLTAGE.

9.1.6 Note down the direction of rotation of the impeller (showed by a special arrow placed on the product or on the blades of the impeller itself) and the values of maximum absorbed current on all phases (indication placed on the motor or and/or fan plate).

Note: In case non conforming values are detected, correct the anomaly and repeat the check before proceeding.

9.1.7 Verify the correct grounding.

9.2.0 OPERATIONS TO CARRY OUT IMMEDIATELY AFTER START-UP:

9.2.1 Verify that the sense of rotation and the speed of the impeller correspond to the data given (indications on the motor plate and/or product). In case the sense of rotation requires to be changed, first switch off the fan, remove the electrical feeding and put the fan is safety, then proceed as for the following:

a- In the case of three-phase motor is sufficient to reverse two electrical phases.

b- In the case of single-phase motor follow the wiring diagram indicated.

9.2.2 Check that the absorbed current on all phases is lower than the rated motor current. To have a reliable data consider a reasonable stabilisation period. In case of delta-star switching, the reading must be done before commuting; if this is not possible, detect the phase current in one of the 6 conductors to the terminal box and multiply by 1,73. Avoid several consecutive motor starting; they cause continuous overloading that overheat the electrical parts. Before re- starting, leave the motor cooling-down sufficiently.

ATTENTION: If after verifications non conforming values are detected DON'T PROCEED, remove the power supply and contact the supplier.

9.2.3 Check by thermometer that the temperature of the bearings is regular; a temporary increase of the temperature followed by decrease is considered normal. The running temperature of the motor shall not be higher than the rated class of temperature of the motor (ex. T6=85°C,T5=100°C etc.).

9.2.4 Check by vibrometer that the vibrations are not excessive and they are within the limits of the norm ISO 14694:2003 category BV3 (see table 2.1). It is compulsory to install, on fans of category 2D, vibrations monitoring systems (available as accessories) and control that vibrations are within category BV3 (see table 2.1). On 2G fans also it is suggested to install vibrations monitoring systems (available as accessories) with relevant vibration control (see tab. 2.1) especially in the case it is not possible perform the vibration controls at least every 150 hours, in order to avoid unbalancing and blades breakage.

ATTENTION : If, as a results of the checks carried out, anomalous values are detected DO NOT PROCEED, disconnect the main supply and contact the supplier.

9.2.5 Check that the fan is working within the suggested zone of the curves (GRAPH 2 and GRAPH 3).

9.3.0 OPERATIONS TO BE CARRIED OUT AFTER A FEW HOURS FROM START-UP:

9.3.1 After few hours of operation check:

1 That vibrations haven't loose the tightening of all bolts and nuts. If necessary repeat the tightening.

2 That the "space" between the impeller and the case is as quoted in the manual (GRAPH 1), avoiding any possible contact between parts. If necessary restore.

ATTENTION: If, as a results of the checks carried out, anomalous values are detected DO NOT PROCEED, disconnect the main supply and contact Ventinet.

10.0 MAINTENANCE, INSPECTION AND CLEANING

ATTENTION: IT IS FORBIDDEN THE MAINTENANCE BY NON-COMPETENT STAFF.
BEFORE CARRYING OUT ANY KIND OF MAINTENANCE, BE SURE THAT THE FAN IS ELECTRICALLY DISCONNECT AND IT SHALL NOT ACCIDENTALLY OR CAUSALLY BE CONNECTED AND THE IMPELLER IS IN STILL POSITON: PUT THE FAN IN SAFETY CONDITIONS.

Use the points below together with the general manual fans.

ATTENTION: The ordinary maintenance of the fan is element of primary importance in the long term to maintain the safety functions of the devices. User shall peremptorily respect the TABLE 2 of maintenance quoted in the relevant chapter and the required periodicity. During maintenance and inspection appropriate clothing and personal protective equipment according to safety rules is recommended.
User shall select the products suitable for the cleaning according to the type of the plant and the safety schedule of product. In case of harmful and toxic products, the flowing back of the cleanness should be conveyed in a suitable closed tank and disposed according to the safety schedule of the product.

CONTROL OF VIBRATIONS
By mean of vibrometer carry out the control of the vibrations. Refer to the norm ISO 14694: 2003 category BV3 (see table 2.1) for what concerning the vibration limit values. In the case that during the general control, scheduled according to TAB. 2, excessive vibrations are detected, analyze the causes and operate. Fan should not have a degenerative performance, in this case, check that installation has been carried out properly as described. Bearings could be worn (20000 hours operation in optimal working conditions observing the correct lubrication intervals, the suitable applied loads and the choice of original or compatible materials). Impeller could be unbalanced (replace it with original spare part or re-balance according to UNI ISO 21940-11 degree G=6. 3).

CONTROL OF MINIMUM DISTANCES
To each maintenance operation is necessary to ensure that the interstices between the moving parts and fixed parts (GRAPH 1) remain unchanged or anyway such as to avoid any possible contact between the parties during operation.
In the case of reductions in the interstices the causes could be the following:
- some screws may have loosed because, during normal operation, the fan generates vibrations that can interfere with the preservation of correct tightening of the bolts, therefore it may be necessary a realignment and new tightening;
- fan may be strained therefore it would be necessary to replace some component or the whole structure.

Control the maintenance of correct grounding

Check that the noise of the fan is normal
The increase in noise may be a symptom of serious malfunctions of the equipment that may also lead to dangerous anomalies of a fan that operates in explosive atmospheres. In the case of unusual sounds, arrest immediately the fan and resolve the problem.

11.0 DISASSEMBLY AND RE-ASSEMBLY OF THE FAN

ATTENTION: BEFORE CARRYING OUT ANY KIND OF OPERATION, BE SURE THAT THE FAN IS ELECTRICALLY DISCONNECTED AND IT SHALL NOT ACCIDENTALLY OR CAUSALLY BE CONNECTED AND THE IMPELLER IS IN STILL POSITON. DISASSEMBLY AND RELATIVE ASSEMBLY ARE OPERATIONS OF EXTRAORDINARY MAINTENANCE; THEY MUST BE CARRIED OUT BY SKILLED STAFF HAVING EQUIPMENT SUITABLE FOR THE CATEGORY OF THE ENVIRONMENT.

Note: DURING THE ASSEMBLY TIGHTEN CORRECTLY AS FROM TABLE 1 (general manual).

11.1 MOTOR

ATTENTION: THE REPAIR OF EXPLOSION PROOF MOTORS MUST BE CARRIED OUT IN ACCORDANCE WITH THE STANDARDS IEC 60079-17 AND IEC 60079-19, AND MAY BE CARRIED OUT ONLY BY THE MANUFACTURER OR AUTHORIZED WORKSHOPS. THE INTERVENTION OF REPAIR OF THE MOTOR MUST BE CARRIED OUT RESPECTING ALL THE CHARACTERISTICS OF EXPLOSION PROOF.

Before to provide to disassemble and replace the motor is important to understand the reason of the failure and arrange for a resolution. To replace the motor proceed as below indicated:

- put the fan in safety conditions.
- electrically disconnect the motor checking the wiring (only qualified staff can take care of disconnection and later connection).
- disassembly the fan parts necessary to remove the motor from the impeller.
- assembly the new motor (check before that the characteristics are equivalent to the previous).
- align the impeller
- Proceed with start up phases as for chapter 9.0 START-UP (general manual).

ATTENTION: At the end of each maintenance assembling operation restore in original position all the safety equipment removed, verify the correct tightening of all nuts and screws (TAB.1), ensure of the absence of foreign objects inside the fan and proceed as described in chapter 9.0 START-UP (general manual).

12.0 TOOLS TO BE USED IN EXPLOSIVE ATMOSPHERE

(text extract by the norm EN1127-1 protection against the explosive atmosphere) Shall be differentiate two different types of tools:
a) tools that when used they shall only cause single sparks (for instance screwdriver, screws, percussion screwdriver);
b) tools that when used to saw or grind they generate a series of sparks. Within zone 0 and 20 tools producing sparks are not admitted.
Within zone 1 and 2 are only admitted steel tools conforming to a). Tools conforming to a b) are admitted only when it can be assured that no explosive atmosphere are present in the place of work. Anyway, the use of any kind of steel tool it is totally forbidden in zone 1 when there is an explosion risk due to the presence of substances belonging to group II c (according to EN 50014) (acetylene, carbon disulfide, Hydrogen, and Hydrogen sulfide, ethylene oxide, carbon monoxide, unless to ensure that there is no dangerous explosive atmosphere in the workplace during the work with such tools.
The use of tools within zone 1, 2, 21 and 22 should be under liability of "work authorization”

DO NOT USE TOOLS SPARK SPREADING WITHIN ZONES WITH DANGER OF EXPLOSION

DO NOT USE FREE FLAMES, DO NOT SMOKE

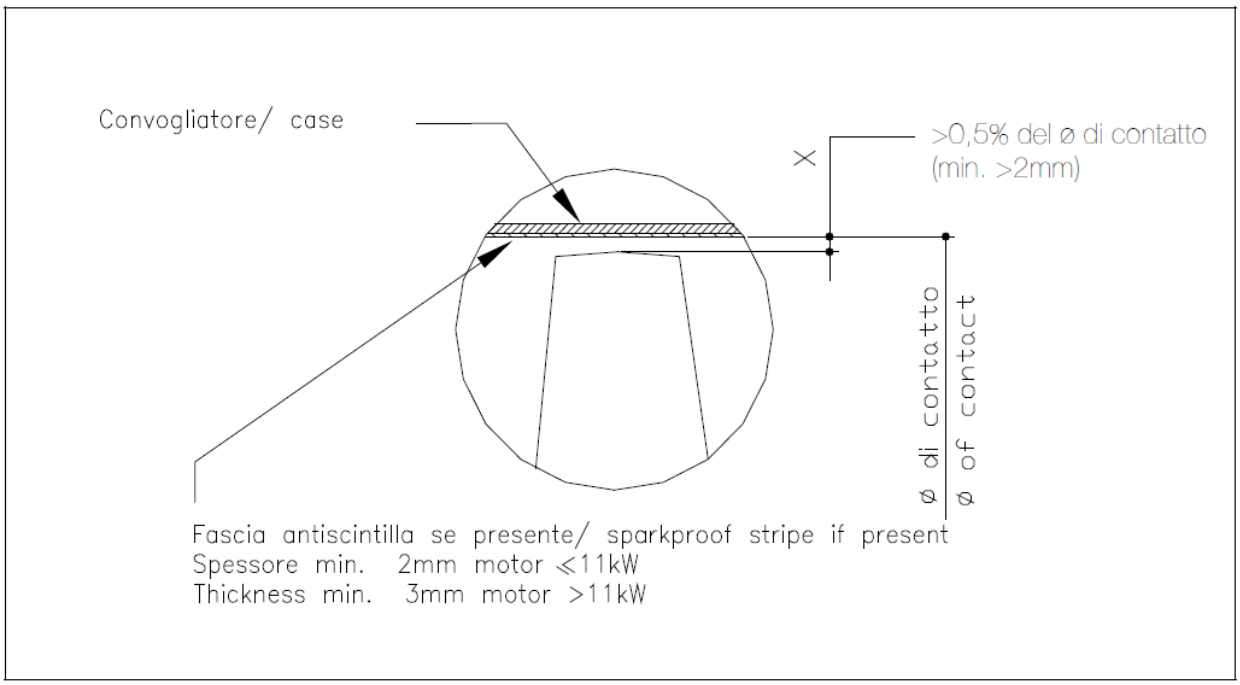
12.1 INFORMATION

The organizational measures, foreseen by the employer (user), in the field of prevention and protection against the explosions contemplate:
- processing of written instructions to the staff operating in the environments with danger of explosion,
- training of the workers in the subject of protection against the explosions,
- sufficient qualification of the workers,
- application of a system of authorizations to work for dangerous activities, whereas foreseen by the document on protection against the explosions (see following sheet)
- carrying out of the maintenance interventions,
- carrying out of controls and inspections,
- indication of the potentially explosive zones, with the sign Ex

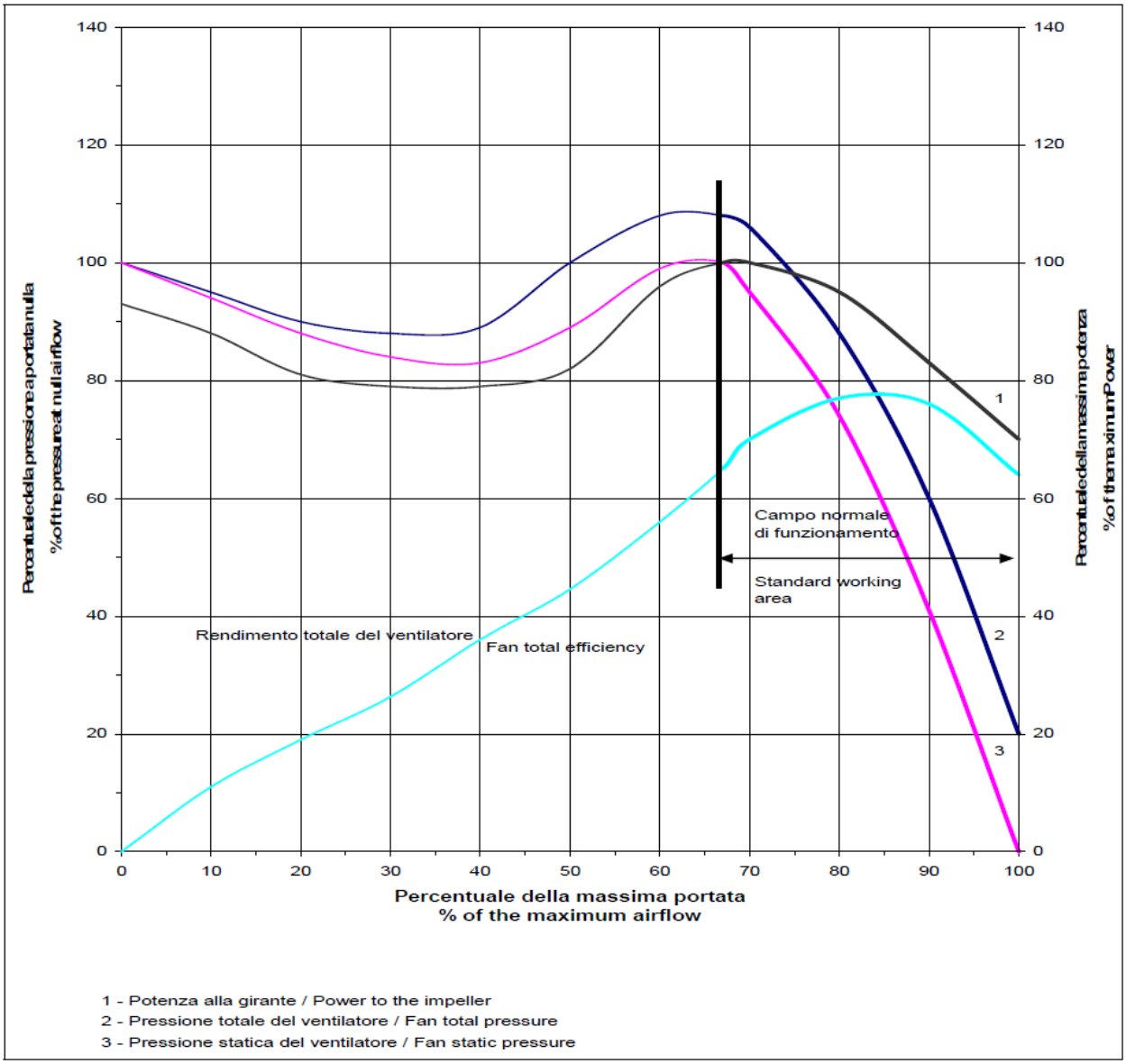
The organization measures shall be represented in the document on the protection against the explosions..
Figure 4.1 quotes some examples of organizational measures of prevention and protection against the explosions.

ATTENTION: when correctly used and maintained the product has a predictable duration, intended to the purpose of the safety and protection against the explosions, of 7 years. At the overcoming of such period, the safety protection functionality can be no longer guaranteed. User is liable to arrange for the fan to be revised completely or a san alternative to replace it.

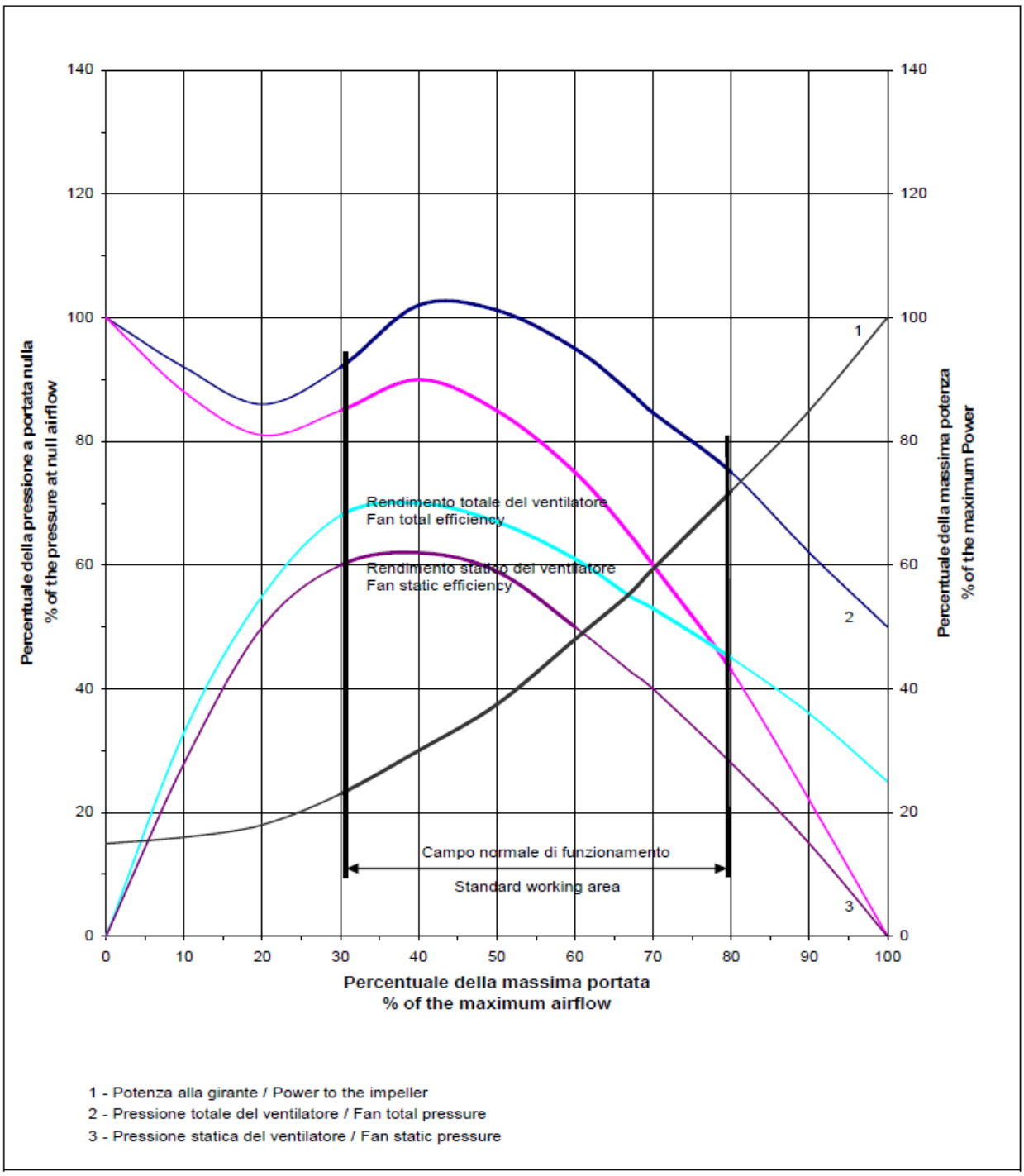
GRAPH 1


Convogliatore/ case
X
>0,5% del ø di contatto
(min. >2mm)
ø di contatto
ø of contact
Fascia antiscintilla se presente/ sparkproof stripe if present
Spessore min. 2mm motor ≤11kW
Thickness min. 3mm motor >11kW

GRAPH 2


Percentuale della pressione a portata nulla
% of the pressure at null airflow
Percentuale della massima potenza
% of the maximum Power
Percentuale della massima portata
% of the maximum airflow
Campo normale di funzionamento
Standard working area
Rendimento totale del ventilatore
Fan total efficiency
1
2
3
1 - Potenza alla girante / Power to the impeller
2 - Pressione totale del ventilatore / Fan total pressure
3 - Pressione statica del ventilatore / Fan static pressure

GRAPH 3



1 - Potenza alla girante / Power to the impeller
2 - Pressione totale del ventilatore / Fan total pressure
3 - Pressione statica del ventilatore / Fan static pressure

GRAPH 4

Note: Wheels are balanced according to ISO 1940/1, particular balancing degree G 6.3.

RPM	*TOLLERABLE RESIDUAL ECCENTRICY et in µm (micron)*
300	200
600	100
950	63
1500	40
3000	20
6000	10

FIG.1 TRANSPORT AND INSTALLATION

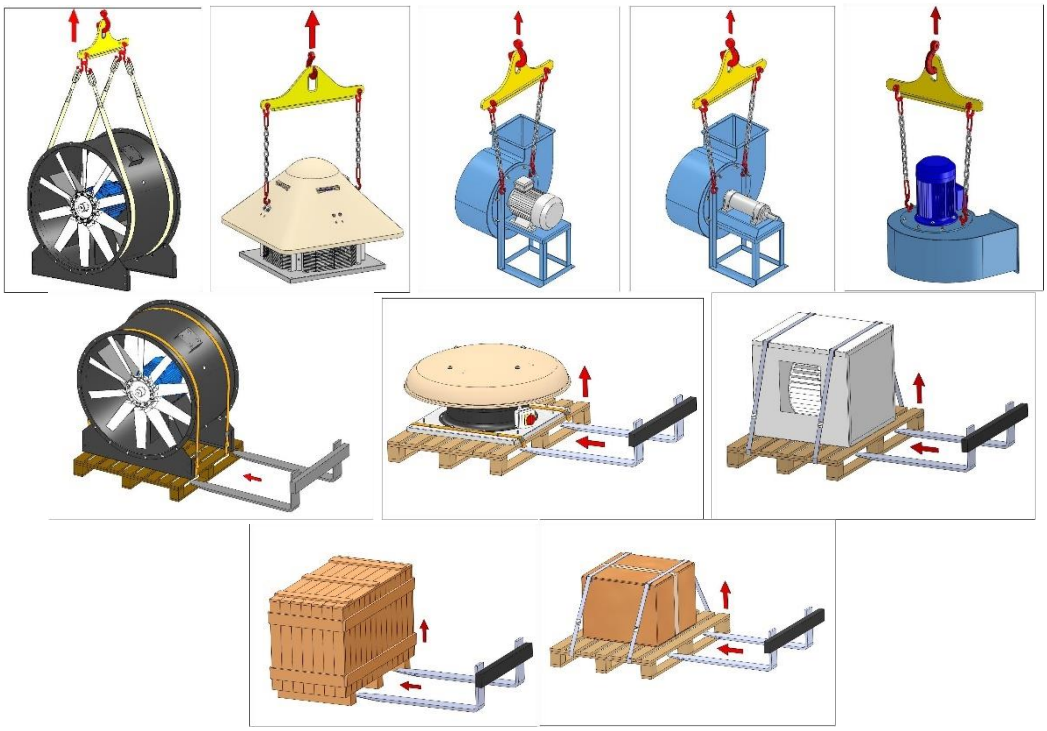


TABLE 2.1 ALLOWED VIBRATION LIMITS - ISO 14694 BV3

Condition	Rigidly mounted (Veff mm/s)	Flexibily mounted (Veff mm/s)
Startup	0	0
Normal condition	4.5	6.3
Alarm	7.1	11.8
Shutdown	9	12.5

ATTENTION

Ventinet B.V. recommends you do not exceed a Veff value equal to 3.5mm/s up to a motor power of 15kW, while beyond 15 kW the Veff value can reach 4.5 mm/s. If the effective Veff speed reaches the alarm value it is necessary to conduct some maintenance operations to bring the vibrations back to normal values as soon as possible. If Veff exceeds the shutdown threshold is necessary to immediately stop the fan and determine the cause and correct it.
If during the general inspection, conducted within the timeframes required by the table 2 excessive vibrations are detected, contact Ventinet B.V.

SUMMARY TABLE OF PROGRAMMED MAINTENANCE OPERATIONS

PERIODICAL CHECKS						
TYPE OF CONTROL OR MAINTENANCE	METHOD	INTERVAL	CONTROL DATE AND MAINTENANCE RESPONSIBLE			
GENERAL CONTROL OF FAN CONDITION	VISUAL OR MANUAL	DAILY SEE NOTE A				
CONTROL OF MINIMUM DISTANCES	INSTRUMENTAL	150 HOURS SEE NOTE B				
CLEANING	MANUAL	SEE NOTE C				
CONTROL OF BOLT TIGHTENING	MANUAL	150 HOURS (see TAB.1)				
CONTROL OF JOINTS AND SEALS CONDITIONS	VISUAL	150 HOURS				
VIBROMETRIC CONTROL	INSTRUMENTAL	150 HOURS (see note E)				
THERMAL CONTROL	INSTRUMENTAL	100 HOURS SEE NOTE D				

NOTE A - During the usual daily check, take care of possible sensitive increases in the vibrations compared to the previous starting of the fan, in this case see the cap.14: troubleshooting. The usual daily check includes also a quick visual check of the controls indicated above.

NOTE B - The minimum distances between a fixed and a mobile part, both radially and axially, should always be greater than 0,5% of the contact diameter and in any case never smaller than 2 mm and never bigger than 20 mm (see GRAPH 1).

NOTE C - The cleaning intervals are strictly linked to the kind of fluid transported and its concentration. Thus the final user shall fix a cleaning interval so that the rotor is always perfectly clean (heaps of materials on rotating parts cause unbalance) and heaps of material on fixed parts and be absence of phenomenon of corrosion.

NOTE D - The temperatures developing inside and at the outlet of the fan should be monitored. When they frequently reach 40°C it is necessary to provide a system of thermal probes connected to an electric release device otherwise a periodic check as per the above-mentioned table is enough. The temperature range foreseen by the standard is -20/+40°C with a maximum tolerance of 10%.

NOTE E – Foresee automatic systems of detection of vibrations compulsory in fans of Category 2D and also 2G, especially in the case it is not possible perform the vibration controls at least every 150 hours, in order to avoid unbalancing and blades breakage