

Operating Instructions for ATEX Radial Fans Cat. 2 and 3

A. General section

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1. General

1.1 Introduction

These operating instructions are intended for persons involved in the installation, the operation and the maintenance of the fan. The complete operating instructions with data sheet should always be kept close to the fan.

All such persons must have read and understood the operating instructions before using the fan, and must observe all the points contained in the instructions. Only with the knowledge of these operating instructions can faults with the fan be avoided, and problem-free operation ensured.



Since this fan is operated with combustible media and in areas subject to the risk of explosion, there is a risk of combustion or explosion in the event of faults.

Repairs to fans used in areas subject to the risk of explosion must be carried out only by specially trained persons who have been qualified and approved for this purpose by the manufacturer. Only approved original spare parts must be used.

We accept no liability for damages caused due to failure to observe these operating instructions.

In the event of doubt, please contact Meidinger, we will be happy to help you.

Important information on the fan is contained in the data sheet of the fan in Section B of the operating instructions. These operating instructions refer only to the fan type described in the data sheet.

We reserve the right to make technical changes for the improvement of the fan.

1.2 Proper use

The fan is intended only for the type of use described in the data sheet. Any other form of use constitutes improper use, and may result in dangers.

Specific operating parameters for the fan (pressure, volume flow, density) are defined in the data sheet. If the volume flow is reduced by more than 10%, or the density of the medium increased by more than 10%, this can lead to heating of the medium above the permissible limit.

When operated with a frequency converter, the speed limits specified in the data sheet and on the rating plate must be observed at all times. Only motors specifically approved for the purpose may be operated with frequency converters.

The operator or purchaser of the fan provides with his order all relevant information on the medium (constituents, concentration, temperature...), the operation (pressure difference, volume flow ...) and information on the area subject to the risk of explosion. As a rule, the information is provided to the manufacturer in a questionnaire. This information forms the basis for the equipment design and category according to ATEX.

The operator is obliged to select suitable equipment (fan) for the intended area and the intended application. For explosive environments, it must be ensured in particular that the equipment category used to Directive 94/9/CE complies with the Ex-zones in question in accordance with Directive 1999/92/CE.

1.3 Scope of the operating instructions

The operating instructions consist of

- a general Section A
- specific additions in Section B, with the data sheet, performance curve and other technical information if necessary.

The documents in Section A and B form an integral part of this documentation, and must be observed in full.

1.4 Copyright

The copyright to these operating instructions belongs to Meidinger AG. The documentation is intended solely for the operator of the fan. It contains instructions and drawings of a technical nature, which must not be distributed, duplicated, disclosed to third parties in any other way, in whole or in part, without the express permission of Meidinger AG.

1.5 Additional regulations and standards

For the operation of fans, particularly in an explosive environment, there are legal regulations, standards or ordinances which must be followed by the operator.

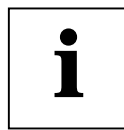
For fans used for methane gas pressure boosting, attention is drawn to the "Guidelines for construction, maintenance and operation of gas compressors systems with an operating pressure up to 1 bar – G6" of the "Schweizerischer Verein des Gas- und Wasserfaches (SVGW)."

2. Safety

2.1 Safety symbols



This symbol is found against all instructions in these operating instructions which involve danger to the life and limb of persons. Follow these instructions and take particular care in these cases. Pass on all safety instructions to other users.



This symbol appears against instructions in these operating instructions which must be observed in order to prevent damage or destruction of the fan.

2.2 Work safety instructions

2.2.1 Use

The fan is designed and constructed according to the accepted rules of the technology, and is safe to operate. Dangers may also be presented by the machine if it is used or maintained by untrained personnel.

The fan must therefore be operated and maintained only by suitably authorised and trained personnel. Such personnel must in particular have received training about the possible dangers which may occur.

2.2.2 Safety devices

Before starting, a check must be carried out to ensure that all safety devices are fitted. The fan must be stopped before removing safety devices for repair purposes.

Equipment intended for installation in piping must not be operated without this piping, since access to dangerous areas is possible via the inlet and outlet openings.

2.2.3 Modifications

Conversions or modifications are prohibited without our express, written agreement.

2.2.4 Danger zone

The danger zone due to flying parts with high-pressure fans is essentially located in the radial direction (see also Section 6.3).

In case of installation in an Ex-zone, the fan must be suitable and designated for the zone in question.

2.2.5 Foreign bodies and dust

It must be ensured that no foreign bodies can get into the fan during operation either on the intake or pressure side. If the fan is not connected to pipelines, the inlet or outlet opening must be fitted with a protective grille (mesh size, see EN294).



Before starting, it must be ensured that there are no foreign bodies remaining in the pipelines or in the fan.

To avoid the danger of ignition, there must be no rust or rust film in the fan or pipelines.

Dust in the medium being transported is only permissible if this is stated expressly in the data sheet. The fan will then be specially equipped for this application. Impermissible dust contamination will result in the danger of deposits. This can cause imbalance and consequent spark formation.

Dust clouds and deposits can ignite.

2.2.6 Temperature

The ambient temperature must be within the range -20 °C to +40 °C.

The fan for explosive environments must be installed and operated so that it is not heated excessively at any point, either by self-heating or outside heat sources. If installed in the open, the fan must be protected against direct sunlight.

The temperature class of the fan depends on the medium and the fan design, and is specified in the data sheet.

The limit values to EN 13463-1 are given below for information:

Table 1 – Maximum surface temperatures (EN 13463-1)

Temperature class	Maximum permissible surface temperature
T1	450 °C
T2	300 °C
T3	200 °C
T4	135 °C
T5	100 °C
T6	85 °C

The fan must only be used for the transport of media whose ignition temperature is below the temperature class of the fan.

Contact protection

Depending on the operating point, the gas temperature may rise above 70 °C, particularly in the case of high pressures and small volumes. In this case, contact with the surface will result in the **danger of burns/injury**.

If during commissioning, test running or during later operation, temperatures of over 70 °C occur, appropriate measures must be taken by the operator for the protection of persons and equipment. The use of insulation or protective covers must be expressly approved in individual cases by Meidinger, in view of the danger of heat build-up.

2.2.7 Safety devices

Required switches, flaps, valves, flame arresters and detonation traps outside the fan to ensure the safety of the complete system during operation, and during and after switching off are the responsibility of the installer / system manufacturer / operator.

2.2.8 Noise protection

The noise level generated depends on the installation type, the ambient conditions and the relevant operating point of the fan. Calculated noise emission levels are given in the noise data sheet in Section B.

For workplaces in the immediate vicinity of the fan, suitable personal noise protection equipment must be used to limit the noise level in accordance with work and environmental regulations.

2.2.9 Electrical energy

In areas assigned to an Ex-zone, only ATEX-approved equipment must be used.

Work on electrical equipment must be carried out only by a qualified electrician in accordance with the rules of the technology.

Fans on which inspection work is being carried out must be reliably secured against unintentional starting.

Electrical equipment must be checked regularly, and any faults identified must be rectified **immediately**.

2.2.10 conveyed gases

Depending on the type of conveyed gases, dangers may occur to people and the environment, amongst other things from

- Fire and explosion
- Poisoning
- Burns
- Chemical burns

The permissible conveyed medium and the limit values for temperature, and if applicable also dust content and moisture, are given in the data sheet in Section B.

The use of the fan for other media, or outside the specified limit values constitutes improper use, and is prohibited.

2.2.11 Corrosion protection

For Ex-fans, no corrosion is allowed on surfaces in contact with the media, since this can lead to spark formation.

The fan is provided with the corrosion protection or coating specified in the data sheets. No paints containing iron oxide or light metals must be used on fans for Ex-areas, including subsequent coatings.

Ex-motors must not be provided with subsequent coatings without the express approval of the motor manufacturer.

2.2.12 Additional safety instructions

Suitable safe climbing aids must be used for installation work above body height.

The fan itself or parts of the fan must not under any circumstances be used as climbing aids.

The fan must be kept free of dirt, rain, snow and ice.

Rating plates, maintenance, safety and danger instructions must be observed and kept in a legible condition at all times. Illegible or lost rating plates, maintenance, safety and danger instructions must be replaced immediately.

The intervals for checks, maintenance and inspections given in the operating instructions and/or on the machine must be observed.

In the event of faults, the fan must be stopped and secured **immediately**. Have faults rectified immediately. (See also Chapter 12).

3. Packaging/transport

3.1 Packaging

Packaging will be provided if necessary, depending on the scope of delivery and transport method.

Intake, outlet and other openings must always be closed off for transport.

3.2 Transport

For transport, the fan must be properly secured against the effects of outside forces, and against sliding and tipping. Impact stresses must be avoided at all times.

Loading and unloading must be carried out with the necessary care and attention.

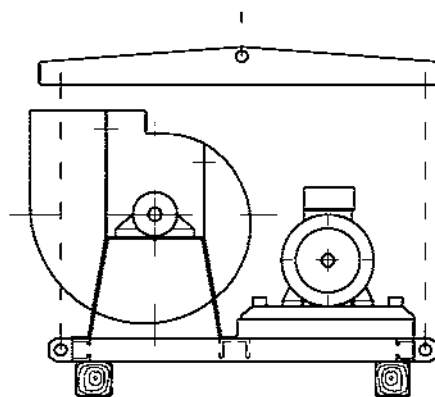
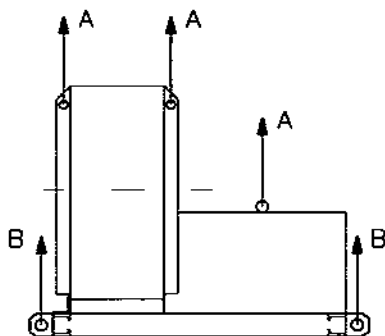
Careless handling can lead to deformation and bearing damage.

Lifting points

When transporting by crane, the lifting equipment should be attached only to the lifting eyes provided. Care must be taken to ensure that complete fans are lifted only by the lifting eyes of the base, and not by the eyeholes of components such as the housing or motor. When using forklifts, the forks must be positioned under the base. The fan must be lowered at the lowest possible speed onto a soft surface. Impacts, vibrations and falls can cause imbalances and deformation, and possible destruction, particularly of the bearings.



Check the secure connection between the fan and lifting equipment, note the position of the centre of gravity, do not tilt, do not stand or walk under suspended loads!



Lifting points A are only for individual components of the fan. Lifting points B are for transport of the complete fan. Lifting equipment must be positioned vertically by using a lifting beam.

Raise and lower loads slowly, onto a soft surface, e.g. wooden beams.

3.3 Scope of delivery and transport damage

The scope of delivery is specified on the delivery note, and the completeness of the delivery should be checked on receipt. Any transport damage and/or missing parts should be reported to the carrier immediately in writing. Please also notify Meidinger.

Damaged equipment should not be brought into operation without consulting the manufacturer.

4. Storage

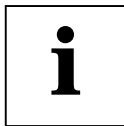
4.1 Short-term storage

With regard to later operating reliability and service life, proper interim storage of the fan is very important, even if it is stored only for a short time.

We recommend placing the fan in a dry, ventilated, vibration-free room on wooden supports, and storing it at a constant temperature (0 °C ... 40 °C). It should also be covered to prevent ingress of any foreign bodies, dust or damp.

The fan must not be stored outdoors.

4.2 Long-term storage



For long-term storage, and in addition to Section 4.1:

- For grease lubrication, ensure that the fan bearings are filled with grease.
- For oil lubrication, ensure that the fan bearings are filled with preservative oil.
- Relieve the tension of the belts.
- Turn the impeller several times for approx. 4 weeks (if necessary by hand). These measures will minimise the risk of bearing damage due to immobility.

Bearing damage due to immobility is not covered by the guarantee.

A sign with the message "Out of service" should be fitted to the fan.

5. Installation

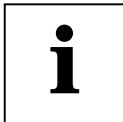
5.1 Installation immediately after delivery

5.1.1 General instructions

The fan was inspected and left our works in perfect condition. Please check the fan immediately after delivery for external damage, and report any complaints immediately to the carrier, and to Meidinger for information.

5.1.2 Setup

Care must be taken in the room planning to ensure that there is adequate space around the fan to allow installation and servicing work. Do not expose the fan to direct sunlight. Ensure adequate ventilation for the removal of leakage gases and to avoid heat build-up. The fan can be set up on a concrete floor or a stable steel construction on vibration dampers. It is important to bolt the fan carefully to the base. The fan must only be set up in the intended position, i.e. not tilted or inclined. Air-cooled motors are designed for ambient temperatures from -20 °C to +40 °C and installation heights ≤**1000 m** ASL.



Pipelines must be connected and supported so that there are no external forces which can act on the fan housing. Gas-tight flexible connections must be provided.

5.1.3 Connection

Remove any transport covers or safety devices fitted.



Before connecting the pipelines, check for foreign bodies in the fan housing or the pipelines, and remove them. Ensure that no foreign bodies can get into the fan. In case of doubt, protective grilles must be provided in the pipelines.

If a **condensate drain** is fitted, this must be connected so that the opening of the drain does not allow the formation of any explosive atmosphere inside or in the vicinity of the fan. This can be done with the aid of a closed catchment tank or a gas-tight condensate lock. The condensate drain **must always remain closed during operation**.

The connection of the motor and the electrical components must be carried out by a qualified electrician. The drive must be protected against overload by a motor circuit-breaker.

The fan is provided with a marked **earth connection**, by which it must be earthed with the complete system. Cables must be fitted between the pipelines and the fan for the electrical potential equalisation.

Before commissioning, all sensors and monitoring devices must be connected, and a check carried out to ensure that the fan switches off on receipt of the corresponding signal. It must be ensured during system planning and connection that a malfunction or cable break with one of the sensors is detected by the system controls, and if necessary evaluated as an alarm.

Monitoring devices and their evaluation by the system

Component monitored	Limit value	Action on actuation
Motor circuit-breaker	see motor rating plate	Rectify the cause of the overload (too high air volume, wrong rotation direction, blocked impeller ...)
PTC motor winding protection *)	on/off, depending on temperature class of the motor	Rectify the cause of the overload (too high air volume, wrong rotation direction, blocked impeller ...)
Bearing temperature monitoring PT100*)	90°C Prelim. alarm	Rectify the cause of the overheating (lack of lubrication, excess lubrication, bearing damage ...)
	105° Alarm	Immediate shutdown of the fan
Housing temperature monitoring *) depending on T-class	T1 360 °C T2 240 °C T3 160 °C T4 108 °C	Switch off the fan, rectify the cause of the overheating (too low air volume, blocked filters, faulty housing cooling ...)
Vibration monitoring *)		see following table of RMS vibration values
Sealing gas monitoring *) for turbo-labyrinth seal 100mbar above internal pressure	min. 1.0 m ³ /h max. 1.5 m ³ /h	Switch off the fan, check the gas supply.

*) optional, only if fitted to the fan

Max. vibration values in RMS [mm/s] (=root mean square)

Cat.	fixed mounting	flexible mounting	fixed mounting	flexible mounting	fixed mounting	flexible mounting
	g		Preliminary alarm		Alarm = Shutdown	
BV-3	4.5	6.3	7.1	11.8	9.0	12.5

to ISO 14994 Table 5

5.2 Installation after extended interim storage

Following extended interim storage, and in addition to the instructions given in Section 5.1, the condition of the fan must be checked:

- The grease or oil filling of the fan bearings must be brought up to operating condition (see also Section B4).
- The motor and fan bearings must be checked for proper condition by means of a test run (vibration measurement), and replaced if necessary.
- In the case of fans with special integrity requirements, all seals and gaskets must be checked. Defective seals must be replaced.
- The belts must be correctly tensioned (see Section B3 "Correct tensioning of belts") Cracked or old belts must be replaced in sets.
- Inlet and outlet covers must be removed.

6. Commissioning

Our specialist personnel and the necessary measurement instruments are available by arrangement for assistance with commissioning.

6.1 General

During commissioning and test operation, a record should be kept of all checks and work carried out.

6.2 Checks and other work before commissioning

6.2.1 Integrity checks

Gas-tight fans are subjected to an integrity check in the works.



For the integrity check of the system with installed fan, the test pressure must be restricted to 250 mbar, unless specified otherwise. Higher test pressure will result in danger of rupture of housing.

6.2.2 Commissioning immediately after delivery

The following checks must be carried out:

- Turn the impeller by hand and listen for any abnormal noises. Grinding noises may occur at the air gap at the impeller inlet, at the seal or in the roller bearings.
- The gap at the impeller inlet must be at least 2 mm. With diameters over 200 mm, the value must be 1% of the greatest possible contact diameter, although a maximum of 20 mm. This also applies generally for shaft seal housings and safety devices.
- For fans with high integrity requirements, check the integrity (housing seal, shaft seal, flexible transitions).

- Check the safety devices
- Check the bolts.

Table 2 – Guideline values for tightening torques of bolts:

Bolt	Max. tightening torque (Nm)		
	St.8.8	A4-70	A4-80
M6	10	9	12
M8	25	21,5	29
M10	49	44	58
M12	86	74	100
M16	210	183	245
M20	410	370	494
M24	710	608	810

- If fitted, sealing air and/or extraction must be connected to the shaft seal. Over-pressure, under-pressure and throughflow must be ensured during operation. See Section B.
- Activate automatic grease dispensers if fitted. See Section B



Ensure the intended gas supply quantity at all times. If this is too high, this can result in overloading of the motor, and if it is too low or blocked, this can cause overheating of the fan and dangerously high surface temperatures. Unless specified otherwise, the volume flow must remain within -10% to +20% of the nominal volume flow.

6.2.3 Commissioning after interim storage

If the first test run is carried out after extended interim storage, the seals and bearings must also be carefully checked, in addition to the checks listed in Section 6.2.1. Damaged seals or bearings must be replaced. It must be ensured that the instructions given in Section 6.2.2 have been carried out.

6.3 Initial commissioning



The motor must only be switched on for the first time by the responsible electrician when the fan has been released by the fitter after carrying out all the points described in Section 6.2. The fan must be connected to the intended pipelines, in order to avoid an overload due to excessive volume flow.

All personnel must leave the centrifugal force area of the fan (safety measure). The motor must only be switched on briefly for the first time for the purpose of checking the direction of rotation.

No explosive medium must be transported when first switching on.

After switching on briefly, compare the direction of rotation at the motor fan with the arrow on the housing. In the event of the wrong direction of rotation, correct the motor connection. The direction of rotation must only be changed when the fan is stopped and switched off.



Depending on the type, a continually wrong direction of rotation can damage the impeller.

If the direction of rotation is correct, and no unusual noises were heard, the fan can be run up to the operating point.

6.4 Checks on initial commissioning

- Measure the power consumption of the motor and compare the figures with the data sheet.
- Recommendation: Measure the bearing condition with a shock pulse measurement device (optional measurement connections) and measure the running smoothness with a vibration measurement device. See the Table in Section 5.1 for permissible values.
- If a frequency converter is used, it must be determined during initial commissioning whether there are any critical speed ranges in which impermissibly high resonance vibrations occur. These speed ranges must then be blocked on the frequency converter, and traversed quickly during running up. Operation is permissible only within the speed ranges specified on the data sheet and rating plate.
- For fans with high integrity requirements, check the integrity (pressure test, smell test, leak test) (see Section 6.2.1)
- Note any unusual noises made by the fan.
- Check the correct operation of all sensors. They must all be in full working order for continued operation.

All measurement values must be documented.

We recommend that the operator also takes the opportunity to train future maintenance personnel during test running.

6.5 Commissioning after stoppage

Commissioning after inspection stoppage

See Sections 6.2.2, 6.3 and 6.4

Commissioning after extended stoppage

See Sections 6.2.3, 7.3 and 7.4

Storage duration	Less than 6 months	The fan can be operated without replacing the lubricant
	6 months to 1 year	Replace all lubricants before operation
	1 year to 5 years	Remove and clean the bearings and replace all lubricants
	Over 5 years	Replace lubricants and bearings completely

7. Operation / Maintenance

7.1 General

Proper and regular maintenance is important for trouble-free operation and for the safety of persons and the system, particularly in an Ex-environment. The ignition avoidance characteristics of the fan can only be preserved by regular and proper maintenance.

Inspection intervals (see Chapter 11) must be determined taking into account the prevailing operating conditions. In the event of particularly tough conditions (corrosion, vibration, dust...), the time intervals between inspections should be reduced accordingly.

Particular attention must be paid to unusual noises, temperatures or vibrations. If problems occur, the fan should be switched off as a precautionary measure and checked.

7.2 Bearings

7.2.1 Motor bearings

For motors without a relubrication device under normal operating conditions and in permanent operation, the calculated bearing life is 20,000 h for 2-pin motors, and 40,000 h for 4- and multi-pin motors.

Motors with a relubrication device are fitted with a plate with information on the grease type, relubrication interval and quantity.

7.2.2 Fan bearings

If the impeller is not mounted direct on the motor shaft, information on the lubricant and lubrication interval is given on the fan housing.

7.3 Drive elements



The drive elements of the drive belts, flat belts and clutch must be checked regularly for wear, tension and alignment, with the fan at a **STANDSTILL**. Information on the drive elements can be found in Section B3 "Drive".

Only "antistatic" or "electrically conductive" drive belts must be used (ISO 1813). ATEX-approved spare parts must be used for clutch inserts.

7.4 Running smoothness

The rotating parts of the fan have been balanced in accordance with ISO 1940. Increasing imbalance must be expected during operation due to accumulation of dirt on the impeller. According to ISO 14694 and ISO 10816-3, the following vibration levels v_{eff} in mm/s must be noted:

Table 3

Vibration levels on commissioning				max. permissible vibration level (effective value)	
Fan performance	Standard	Fan class	min. balancing quality	fixed mounting	flexible mounting
kW	-	-	-	mm/s	mm/s
<75	ISO 14694	BV-3	G 6.3	4.5	6.3

Table 4

Vibration levels after commissioning				max. permissible vibration level (effective value)			
Fan performance	Standard	Fan class	min. balancing quality	Alarm		Switch off	
				fixed mounting	flexible mounting	fixed mounting	flexible mounting
kW	-	-	-	mm/s	mm/s	mm/s	mm/s
<75	ISO 14694	BV-3	G 6.3	7.1	11.8 *)	9.0	12.5

*) it is recommended to set this value to 7.1 mm

The impeller blades must be checked visually at least once annually in order to identify any damage which might cause imbalance. To do this, the flexible connection on the pressure side must be removed in order to see into the housing, or alternatively the available cleaning openings may be used.

The checks must be carried out with the fan at a standstill.

Caution: Explosive gas mixtures may be formed by escaping gas or air entering the housing.

7.5 Seals

The seal type of the impeller shaft is described in the data sheet. Standard seals without special requirements need no maintenance. Special seals are described if applicable in Section B under "Shaft seals".

In case of different Ex-categories inside and outside, the seals must be checked particularly carefully, and replaced if necessary.

In the case of gas-tight housings, the integrity must be checked regularly with a leak detector or leak test spray. The flexible connections to the pipeline in particular can become cracked due to movements.

7.6 Inspection

In order to ensure reliable operation of the fan, an inspection must be carried out after **20,000 h** of operation, and at the latest after **36 months**.



Inspections must be carried out only by the manufacturer or other personnel authorised by Meidinger.

See also Chapter 11

If the ambient temperature is over 30 °C for an extended period, or the storage temperature exceeds 70 °C, the above periods must be reduced.

8. Switching off

8.1 General

The fan is switched off by disconnecting the power supply. Required switches, flaps, valves to ensure the safety of the system during and after switching off are the responsibility of the installer / system manufacturer / operator.

8.2 Normal switching off

When the fan is switched off, care must be taken to ensure that it cannot be started again by unauthorised persons. If the gas supply is not disconnected, the fan must be checked regularly for integrity. In the case of hot air or hot gas fans, it must be ensured that the heat flow to the pipelines is cut off. Please note that fans with cooling elements must be cooled down with cold medium before switching off, since switching off from the hot condition also stops the effect of the cooling elements, which can lead to overheating.

If this is not possible, external equipment must be cooled separately.

8.3 Switching off before inspection

Prior to inspection, it must be ensured that the gas supply lines are closed. The fan must be flushed in order to ensure that no explosive atmosphere can form either in the pipelines or in the fan.

It must be ensured that the fan cannot be switched on by unauthorised persons. If the fan is dismantled, the motor must be disconnected from the power supply.

Before dismantling the fan, the remaining pipelines must be closed. Work on gas networks must be carried out only by suitably qualified persons.

In the case of dismantled fans, the operator must ensure that any deposits remaining in the fan do not present any danger to people or the environment. In the case of media harmful to health, the operator must make a safety declaration (confirmation of decontamination).

8.4 Switching off for an extended period

In addition to Section 9.2, and depending on how long the fan is to be switched off, the precautions described in Section 4.2 "Long-term storage" must also be taken.

9. Cleaning

9.1 General

Cleaning must be carried out only when the fan is switched off. If it is possible that layers of dust might accumulate on the impeller or other components, these must be cleaned at regular intervals in order to prevent imbalance or overheating.

9.2 Cleaning in the system

Before cleaning the fan with water or steam jet (high-pressure cleaner) or other cleaning equipment, all openings into which water, steam or cleaning agent must not be allowed to penetrate for safety and/or operating reasons must be covered or masked off. This refers particularly to electrical equipment.

Use only cleaning agents which are compatible with the fan and its environment. After cleaning the impeller or the inside of the housing, it must be ensured before restarting that there is no water inside the housing. The covers or masking must be completely removed after cleaning. Check the fan for leaks, loosened connections and damage. Rectify any faults immediately. Cleaning openings must be closed off properly. It must be ensured that all safety devices are fitted, and that maintenance, safety and danger instructions on the fan are still legible (see Section 2.2.12).

9.3 Cleaning before inspection

Fans which are dismantled for inspection purposes must be properly cleaned. The operator must ensure that any deposits remaining in the fan do not present any danger to people or the environment. (See also Section 8.3)



Please note that repairs to Ex-fans may only be carried out by suitably authorised personnel.

10.4 Disposal

Please ensure safe and environmental disposal of operating materials and replaced parts.

11. Maintenance

Interval	Checks	Measures
Daily	General condition, noises, vibrations, heating, condensate accumulation*)	Visual check to identify general irregularities. Drain condensate (avoid gas escape / entry of air, see Section 5.1).
Weekly	Bearing temperature, integrity (if applicable), vibrations (see Section 8.4)	Thermometer Smell test, leak test spray Vibration measurement device
For dust: Weekly	Check for deposits inside (see Section 7.4)	Check via inspection openings, if necessary clean
Every 3 months	Belt tension, *) bearing condition, integrity of flexible connections*) Corrosion	Check and if necessary tighten SPM measurement device Visual check Repair coating
Annually	Check impeller for damage, lubricant cartridge *)	Visual check through outlet opening Replace cartridge
Annually	Functional check of all monitoring devices *) (5.1.3)	
Annually	Check symmetry and limit values of power consumption at the 3 phases	
Annually	Measure the insulation resistance at the warm motor (at test voltage 500V : > 0.5 MOhm)	Dry off any moisture in the motor
To lubrication instructions on the bearing / housing		Relubricate
Every 36 months or after 20,000h: Inspection	Housing, corrosion Housing seals Shaft seal Drive belts and clutch rubbers Bearing Check impeller Noises Vibrations Bearing condition	Replace defective parts Replace seal Replace seal Smell test, integrity test Replace belts Replace rubbers Replace if necessary Visual check for damage, balance if necessary Listen Vibration measurement device Thermometer, SPM measurement device
*) if fitted		



The monitoring data must be documented in order to allow a comparison with the new or commissioning condition. Any changes can be identified by comparing the actual condition with the values of the new or commissioning condition. The time progression of these changes enables an extrapolation to the point of probable damage, and the consequent planning of inspection work.

12. Faults

Operating faults with Ex-fans can lead to dangerous situations with the risk of explosion or fire.



They must therefore be rectified immediately on discovery. In case of doubt, switch the fan off.

Fault	Causes	Action	Remedy
		n switch off q check	
Too low volume flow	Incorrect rotation direction Pressure higher than specified Speed too low Pipelines blocked Impeller dirty	n q q n n	Check motor connection Check layout Adjust speed Clean pipelines Clean impeller
Pressure too low	Incorrect rotation direction Volume flow higher than specified Density lower than specified Speed too low Leak at the fan Leak in the system	n q q q n n	Check motor connection Check layout Check layout Adjust speed Replace seals Replace seals
Power consumption too high	Incorrect rotation direction Volume flow higher than specified Pressure lower than specified Density higher than specified Speed too high	q q q q n	Check motor connection Check layout Check layout Check layout Adjust speed
Abnormal noises	Impeller scuffing Seal defective Foreign body in housing Bearing damage Loose attachment bolts	n n n n n	Check impeller/gap Replace seal Remove foreign body Check for damage Repair Replace bearings Tighten bolts
Vibrations	Imbalance Incorrect rotation direction Alignment error Speed too high Bearing damage Turbulence in the system Turbulence in the fan Loose attachment bolts	n n n n n q q n	Clean and balance impeller Check motor connection Align Check speed Replace bearings Check airflow in the system Check layout Tighten bolts
Speed too low	Slippage at belt drive Wrong transmission Motor overloaded	q q n	Tighten or change belt Adjust transmission Check layout
High bearing temperature	Too much grease/oil in the bearing Wrong grease/oil in the bearing	n n	Correct grease/oil quantity Change grease/oil type

Fault	Causes	Action	Remedy
	Bearing damage Too high ambient temperature	n q	Replace bearings Cool
Gas smell	Shaft seal defective Housing seal defective Pipeline seal defective Cracks in housing or pipelines	n n n n	Replace shaft seal Replace seals Replace seals Repair

If faults occur which are not listed here, please contact Meidinger