General technical information

Important notes
- MAICO fans and associated control units comply with DIN VDE regulations within the framework of the Equipment and Product Safety Act.
- Pressure / volumetric flow characteristic curves and electrical data: The measurements are made using test stands that comply with DIN 24163 or ISO 5801.

CE marking
- MAICO fans meet the basic requirements laid down in the EU 2014/35/EU Low Voltage Guidelines, the EU 2014/30/EU Electromagnetic Compatibility Guidelines and the EU Directive VO 327/11.

Electrical connection
- Only qualified electricians are permitted to make the electrical connections.
- The fans must be connected to a permanent electrical installation. This must be equipped with a mains isolation device with contact openings of at least 3 mm at each pole.

Motor protection
- Most fans have an integrated thermal protection switch, which protects the motor against overheating better than would be the case with an overcurrent protection relay. This is particularly significant if the fan is controlled by voltage reduction as in this case, it is not possible to determine the exact level of over current.
- The thermal contacts are located in the motor winding. They open and interrupt the current feed to the fan as soon as the critical temperature is reached.
- Fans with fitted thermal contacts (two cable cores that are connected to the integrated thermal contact, identified in the wiring diagram by TK) must be connected to a motor protection switch in all cases.

Heat recovery
- Heat recovery rate: The relationship between supply and exhaust air enthalpy volumes according to DIN 45635-38:1986-0.
- Degree of heat provision: The relationship between the recovered heat, including the heat that enters the room through electrical equipment with the supply air flow, and the enthalpy difference.

Air volume
- Unless noted elsewhere, all details regarding air volumes relate to the free suction/free blowing status.

Speed controller
- MAICO fans are suitable as standard for speed controllers using variable voltage with a constant frequency, i.e. for operations on transformers or with phase angles. Speed control via frequency converter can be made on request for fans in special version.
- One benefit of the speed control is the clearly perceptible reduction in noise. This makes it particularly well suited for the night-time operation of ventilation and air conditioning systems.
  The level reduction can be up to:
  - $\Delta L \approx 50 \text{ Lg } (n/n_0)$ dB.
    (n_0: Nominal speed)
- Example: Halving the speed reduces the noise level by up to 15 dB.
- There can be **a physically induced humming noise** at lower speeds, through the use of phase angle technology. TRE 5-step transformers are therefore used for speed control in rooms requiring quiet fan operations.
- The I_{Max} value is quoted with the fans in the MAICO Main catalogue and on the internet pages for the configuration of speed controllers and transformers.
- Frequency converters can also be used for speed control with the EZ/DZ and DPK EC ranges with the following limit values:
  1) U peak < 1000 V
  2) du/dt < 500 V/µs
  The frequency converter must be fitted with additional sinus filters if these values are not complied with.
- If controlling speed with frequency converters, the factory must be consulted.

Speed control devices
- One or more fans can be operated with the offered speed control devices, up to the maximum nominal current.

Transformers

Level	1	2	3	4	5
Voltage, single-phase [V]	85 V	115 V	150 V	180 V	230 V
Voltage, three-phase [V]	105 V	150 V	190 V	250 V	400 V

Sound power level
- The sound power levels are measured at the rated voltage.
- L_{WA2} = Housing sound power level of duct fans in dB.
- L_{WA5} = Free inlet sound power level of duct fans in dB.
- L_{WA6} = Free outlet sound power level of duct fans in dB.
- L_{WA7} = Housing and free inlet sound power level of wall-mounted fans in dB.
- L_{WA8} = Housing and free outlet sound power level of wall-mounted fans in dB.

Sound power level of centralised ventilation units with heat recovery
- L_{WA2} = Housing sound power level in dB.
- L_{WA5} = Free inlet sound power level in dB. Sound power level emitted to the free surroundings. Measured at an operating point on the sockets facing the room (exhaust air).
- L_{WA6} = Free outlet sound power level in dB. Sound power level emitted to the free surroundings. Measured at an operating point on the sockets facing the room (supply air).

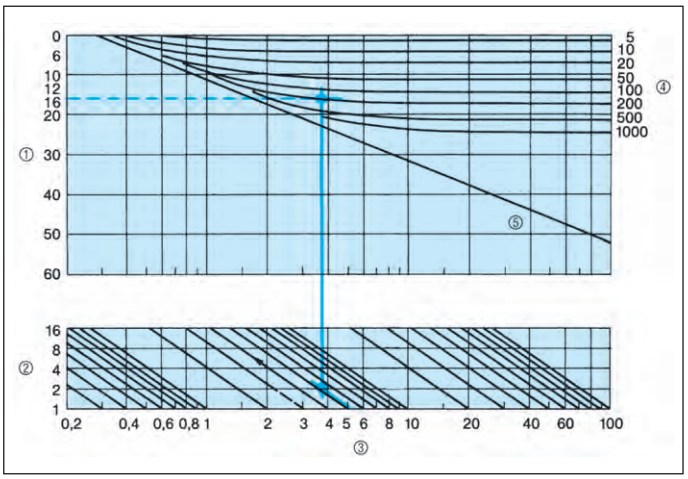
Sound measurements

- All measurements are made in an anechoic room using free-field conditions. The test equipment complies with DIN EN 60651 class 1.
- The sound power level L_{WA} is the acoustic power rating generated by a given sound source (fan). It is independent of the measuring distance or the room influences.
- The sound power level L_P varies relative to the sound source (fan) and the sound-absorbent properties of the environment.
- A-rated sound pressure level: The sound pressure levels indicated in the technical data apply to free inlet and free outlet wall fans, measured on the suction side. The values refer to free-field conditions with a distance of 1 m and a direction factor Q = 2.
- Sound power level L_{WA7} = Housing and free inlet sound power level in dB. For wall-mounted fans, free inlet and free outlet.

Conversion example

- Below you can see how sound power level L_{WA} converts to sound pressure level L_P using the EZQ 30/2 B fan as an example.
- The sound pressure level L_P should be determined for a distance of 5 m, an equivalent room absorption area of 200 m and a directional factor of Q = 2.
- Technical data for EZQ 30/2 B:
  - Housing and free outlet sound power level L_{WA8} = 88 dB (A).
  - Sound power level difference in accordance with the diagram = 16 dB (A).
  - L_P = 88 dB (A) - 16 db (A) = 72 dB (A).

Determination of sound level difference



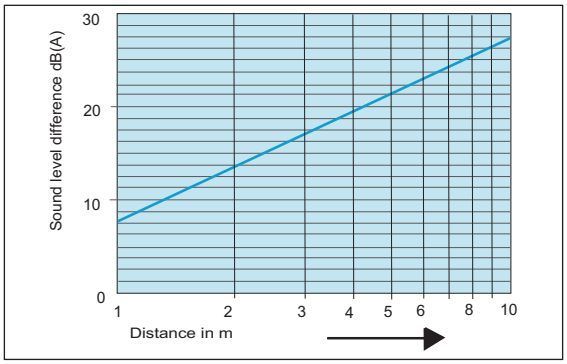
① Sound level difference in dB
② Directional factor Q for sound radiation, dependent on the ventilation installation position.
Q=1: Favourable, e.g. for installing a ceiling fan in the centre of the room. Optional spherical sound propagation on all sides.
Q=4: Less suitable, e.g. for ceiling-mounted fans. See VDI 2081 for the precise determination of Q.
③ Distance from the sound source in meters
④ Equivalent room absorption area in m^2
⑤ Free field

Sound level at the workplace

- As laid down by the workplace directive, the following levels should not be exceeded over the long-term.

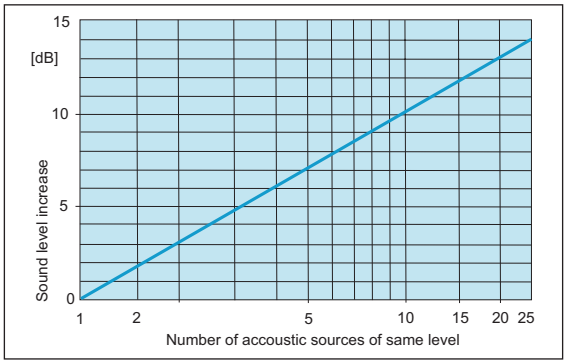
Task	db (A)
Principally mental work	55
Mechanical office work	70
All others (Max. permissible over-level 5 dB (A))	85
Break, sanitary, on-call and rest rooms	55

Difference from sound power level to sound pressure level over distance



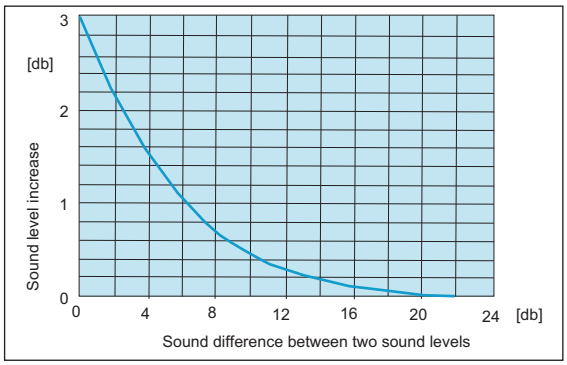
- Example: Fan sound power level = 70 dB (A)
  Sound pressure level at 1 m distance (without obstructions) = 70 dB (A) minus 8 = 62 dB (A)

Addition of several sound sources with the same sound levels



- Example: 10 sound sources at 60 dB (A)
  total volume: 60 dB(A) + 10 dB(A) = 70 dB(A)

Addition of several sound sources with different sound levels



- Example: 2 sound sources at 60 dB (A) and 64 dB (A) total volume: 64 dB(A) + 1.5 dB(A) = 65.5 dB(A)

Emission guide values for sound transfer

- Emission guide values = Guide values for sound pressure level L_P in dB (A).
- External measurement (in accordance with DIN VDI 2058, sheet 1) 0.5 m on the outside, just before the centre of an open window.

External guide values	Time of day	L_P dB(A)
For areas with commercial premises only	-	70
For mixed areas with commercial facilities and residential premises	during the day at night	60 45
For areas with exclusively residential premises	during the day at night	50 35
For health farms, hospitals, nursing homes	during the day at night	45 35

Ventilation of apartments in accordance with DIN 1946-6 Information about the following table

- The indicated values serve as a guideline for calculating the ventilation systems. The values that depend on local conditions vary in the case of modified external influences.
- The following tables are derived from DIN 1946-6:2009.
- Indicated air exchange values are just empirical values. They are intended solely to check the volumetric flows calculated from air flow rates or balances.
- The stated standards and guidelines must be taken into account during the planning and execution stages.
- The definitions between the customer and the planner must be taken into account before sizing a ventilation system in accordance with DIN EN 13779 or DIN EN 13779/DIN EN 15251.
- Ventilation measures are necessary in residential units if the volumetric flow for humidity protection $q_{v,ges,NE,FL}$ is bigger than the volumetric flow through infiltration $q_{V,Inf,wirk}$.
- Volumetric flow for humidity protection:
- $q_{v,ges,NE,FL} = f_{WS} \bullet (-0{,}001 \bullet A_{NE}^2 + 1{,}15 \bullet A_{NE} + 20)$
- Volumetric flow through infiltration:
- $q_{v,Inf,wirk} = f_{wirk,Komp} \bullet A_{NE} \bullet H_R \bullet n_{50} \bullet (f_{wirk,Lage} \bullet \Delta p/50)^n$
- Within which:
  - f_{WS} = 0.3 for thermal protection high (building with heat insulation at least according to WSchV 95) or 0.4 for thermal protection low
  - $f_{wirk,Komp}$ = 0.5 (simplified for the definition of ventilation measures)
  - $f_{wirk,Lage}$ = 1.0 (simplified for the definition of ventilation measures)
  - H_R = Room height
  - n_{50} = Measured value or standard value, see table on next page.
  - Δp = Configuration differential pressure
    for single-storey NE (residential units):
    areas with low winds = 2 Pa,
    areas with high winds = 4 Pa
    for multi-storey NE:
    areas with low winds = 5 Pa,
    areas with high winds = 7 Pa
  - n = Standard value 2/3 or measured value

Minimum total outside air volume flows for residential units including infiltration

	Area of the residential unit A_{NE} (in m^2)									
	<=30	50	70	90	110	130	150	170	190	210
Ventilation for humidity protection thermal insulation high $q_{v,ges,NE,FLH}$ (m^3/h)	15	25	30	35	40	45	50	55	60	65
Ventilation for humidity protection thermal insulation low $q_{v,ges,BE,FLG}$ (m^3/h)	20	30	40	45	55	60	70	75	80	85
Reduced ventilation $q_{v,ges,NE,RL}$ (m^3/h)	40	55	65	80	95	105	120	130	140	150
Nominal ventilation $q_{v,ges,NE,NL}$ (m^3/h)	55	75	95	115	135	155	170	185	200	215
Intensive ventilation $q_{v,ges,NE,IL}$ (m^3/h)	70	100	125	150	175	200	220	245	265	285

Total exhaust air volumetric flows $q_{v,ges,R,ab}$ with fan-assisted ventilation for individual rooms, with or without windows. Including effective infiltration

	Nominal ventilation	Ventilation for humidity protection LF	Reduced ventilation RL	Intensive ventilation IL
Housework room Cellar (hobby) corridor (optional) WC	25	$q_{v,ges,FL} = (q_{v,ges,NL} / q_{v,ges,NE,NL}) \bullet q_{v,ges,NE,FL}$	$q_{v,ges,RL} = (q_{v,ges,NL} / q_{v,ges,NE,NL}) \bullet q_{v,ges,NE,RL}$	$q_{v,ges,IL} = (q_{v,ges,NL} / q_{v,ges,NE,NL}) \bullet q_{v,ges,NE,IL}$
Kitchen, kitchenette Bathroom with or without WC Shower	45			
Sauna / Fitness room	100			

Determination of the exhaust air flow through infiltration

- $q_{v,Inf,wirk} = f_{wirk,Komp} \bullet V_{NE} \bullet n_{50} \bullet (\Delta p \bullet f_{wirk,Lage} / 50)^n$

Standard values for the configuration of air exchange at 50 Pa differential pressure

Air exchange configuration $n_{50,conf.}$ new construction and renovations in 1/h Category [1]		
A	B	C
1,0 [2]	1,5 [3], [5], [6]	2,0 [4], [5], [6]

1) The mid-range building stock is described with an $n_{50,conf.}$ of 4.5 1/h.
2 Fan-assisted ventilation in single and multi-storey residential units
3) Free ventilation with new construction in single and multistorey residential units and by renovation in single-storey residential units (e.g typical in mutiple-family units)
4) Free ventilation with renovation in multi-storey residential units, e.g. in single family houses (SFH)
5) The renovation measure envisages at least a permanently airtight building envelope in line with the recognised rules of technology.
6) In the case of a partial renovation of the building envelope, e.g. when exchanging some of the windows, it is recommended that the ventilation measures are laid out in line with the quoted n_{50} values for a complete renovation of the building envelope.

Correction factor for the effective infiltration air proportion $f_{wirk,Komp}$

Ventilation system	Free ventilation		Fan-assisted ventilation			
	Cross ventilation	Cross vention and ventilation shaft	Supply / exhaust air system (balanced)	Exhaust air or supply air system		
Apartment type	All residential units			single-storey residential units (MFU)		Multistorey building units (SFH)
				with installation shaft	without installation shaft	
Outside air openings	0,5	0,6	–	0,65	0,7	0,8
Overcurrant air openings	0,15		0,45		0,15	
Shaft	-	0,35	-			
Fan	-	-	0,45	0,15		0,2

Total outside air volumetric flow
- $q_{v,ges} = q_{v,LtM} + q_{v,Inf,wirk} + q_{v,FE,wirk}$

Outside air volumetric flow per residential unit, humidity protection Thermal protection high (new building after 1995, complete renovation)
- $q_{v,ges,NE,FL} = 0,3 \bullet q_{v,ges,NE,NL}$

Thermal protection low (non-renovated old building pre-dating 1995)
- $q_{v,ges,NE,FL} = 0,4 \bullet q_{v,ges,NE,NL}$

Outside air volumetric flow per residential unit, reduced ventilation
- $q_{v,ges,NE,RL} = 0,7 \bullet q_{v,ges,NE,NL}$

Outside air volumetric flow per residential unit, nominal ventilation
- $q_{v,ges,NE,NL} = - 0,001 \bullet A_{NE}^2 + 1,15 \bullet A_{NE} + 20$

Outside air volumetric flow per residential unit, intensive ventilation
- $q_{v,ges,NE,IL} = 1,3 \bullet q_{v,ges,NE,NL}$
- $q_{v,ges}$ = Effective total outside air volumetric flow
- $q_{v,LtM}$ = Air volumetric flow through ventilation measures (free or fan-assisted)
- $q_{v,Inf,wirk}$ = Effective air volumetric flow through infiltration
- $q_{v,FE,wirk}$ = Effective air volumetric flow through active window opening (is not used for the specification of ventilation measures in accordance with DIN 1946.6:2009)
- $q_{v,ges,FL}$ = Ventilation for humidity protection
- $q_{v,ges,NE,FL}$ = Outside air volumetric flow per residential unit, for ventilation for humidity protection
- $q_{v,ges,RL}$ = Total outside air volumetric flow reduced ventilation
- $q_{v,ges,NE,RL}$ = Outside air volumetric flow per residential unit at reduced ventilation
- $q_{v,ges,NL}$ = Total outside air volumetric flow nominal ventilation
- $q_{v,ges,NE,NL}$ = Outside air volumetric flow per residential unit, for nominal ventilation
- $q_{v,ges,IL}$ = Total outside air volumentric flow intensive ventilation
- $q_{v,ges,NE,IL}$ = Outside air volumetric flow per residential unit, for intensive ventilation
- $q_{v,Inf,wirk}$ = Effective air volumetric flow through infiltration in m^3/h
- $f_{wirk,Komp}$ = Correction factor for the effective infiltration air proportion with one ventilation component in m^3/h, value according the table
- $f_{wirk,Lage}$ = Correction factor for the effective infiltration air proportion dependant on the building location in m^3/h, standard value = 1
- V_{NE} = Residential unit air volume in m^3
- n_{50} = Air exchange in 1/h, standard value $n_{50,conf.}$ from table or measured value of the air exchange at 50 Pa
- n = Pressure exponent (value is 0.67 if there is no data from air tightness tests)
- Δ_p = Configuration differential pressure in Pa
  - Single-storey residential unit: low wind = 2 Pa, high wind = 4 Pa; single-storey residential units are typically apartments in multiple-family units
  - Multi-storey residential unit: low wind = 5 Pa high wind = 7 Pa; multi-storey residential units are for example a single-family unit or maisonette apartments.

General technical information

Ventilation of non-residential buildings in accordance with DIN EN 13779, DIN EN 15251 and workplace guidelines

Volumetric flow calculation through the air exchange value

- Air exchange values (see table below) are empirical values without any particular load caused by harmful substances or contamination.
  $V = V_R \bullet LW/h$ [m^3/h]
  VR: Room volumes m^3
  LW: Air exchange 1/h from the table below

Volumetric flow calculation through the person headcount

- $V = P \bullet A_{RP}$ [m^3/h]
  P: Person headcount
  A_{RP}: outside air flow per person from the table below

Volumetric flow calculation for heat dissipation

- $V = (Q \bullet 3600) / (p \bullet c_p \bullet \Delta\vartheta)$ [m^3/h]
  Q: Heat output to be dissipated kW
  c_p: specific air heat kJ/(kg * K)
  (Air 20 °C: c_p approx. 1)
  $\Delta\vartheta$: Temperature difference between fresh air and heated air K
  p:Air density kg/m^3 (Air 20 °C, 1013 mbar = 1,2 kg/m^3
  (1 kWh = 3600 kJ))

Calculation of the heat power rating for heating the outside air

- $QL = (V \bullet p \bullet c_p \bullet \Delta\vartheta) / 3600$ [m^3/h]
  Ventilation heat / heat power rating kW
  V: Volumetric flow m^3/h
- p:Air density 1,2 kg/m^3 (20 °C)
  c_p:specific heat kJ/(kg * K)
  $\Delta\vartheta$: Temperature difference (K) between ϑi room temperature and ϑa outside temperature
- $\Delta\vartheta = \vartheta i - \vartheta a$ [K]

Notes regarding the following table

- The indicated values serve as a guideline for calculating the ventilation systems. The values that depend on local conditions vary in the case of modified external influences.
- Indicated air exchange values are just empirical values. They are intended solely to check the volumetric flows calculated from air flow rates or balances.
- The stated standards and guidelines must be taken into account during the planning and execution stages.
- The definitions between the customer and the planner must be taken into account before sizing a ventilation system in accordance with DIN EN 13779.

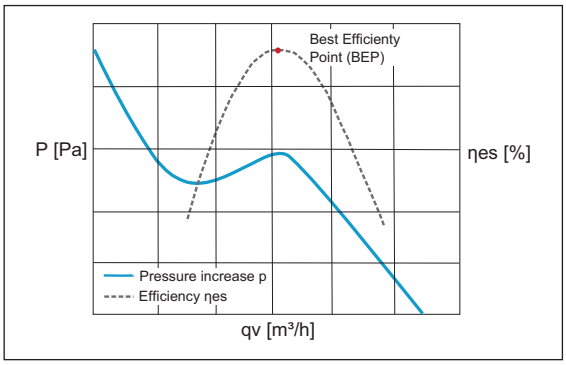
Guide values for non-residential buildings and workplaces

	Minimum outside air volumetric flow in accordance with DIN EN 15251 / DN EN 13779 Guidelines for working places		Hourly air exchange	Permissible sound pressure level in accordance with DIN EN 13779	Standards and guidelines	Notes for special requirements
	per person m^3 / h[1])	per m^2 m^3 / (h x m^2) [2]				
Garages: Low levels of entering/exiting traffic Other garages	–	6 12	approx. 5	70	VDI 2053 and state garage regulations	Reduction of the pollutant concentration (CO)
Sport and multi-purpose halls: per sportsman per spectator Exhibition halls	60 20 20	–	2 - 3	45 - 50	DIN 18032-1	–
Indoor swimming pools	–	–	3 - 4	45 - 50	VDI 2089	Dehumidification
Waiting rooms	–	–	4 - 7	40 - 45	–	–
Toilets	–	–	5	45	–	–
per urinal	25	–	–	–	–	–
per WC	25	–	–	–	–	–
Changing room	–	–	4 - 8	35	–	Air extraction
Laboratories	–	25	6 - 15	52	VDI 2051 DIN 1946-7	Air extraction Explosion protection Corrosion protection
Dying factories	–	–	5 - 15	55 - 65	–	Explosion protection
Foundries	–	–	8 - 15	55 - 65	VDI 3802	Heat balance Maximum workplace concentration values
Hardening shops	–	–	60 - 100	80	VDI 3802	Maximum workplace concentration values
Welding plants	–	–	20 - 50	70 - 80	VDI 2084	Local air extraction Maximum workplace concentration values
Assembly halls	20 - 50		5 - 7	60 - 70	ASR (guidelines for workplaces)	Depending on usage conditions
Workshops	–	–	4 - 8	–	ASR (guidelines for workplaces)	–
Measurement and test rooms	–	–	8 - 10	50 - 65	ASR (guidelines for workplaces)	–
Compressor rooms Computer rooms Transformer rooms	–	–	300 m^3 / h per kWh heat loss	–	–	–
Cafeteria, restaurant	40	–	–	40 - 45	–	–
Non-smoking zone	45	30	–	–	–	–
Smoking zone	90	60	–	–	–	–
Shop, department store	45	11,3	–	40 - 55	–	–
Conference room	45	15	6 - 8	30 - 40	–	–
Classroom	45	18	5 - 7	35	–	–
Open-plan office	45	3,8	–	40	–	–

1) DIN EN 13779, Table A11
2) DIN EN 15251, Standard values for the net floor space per person in acc. with Table B2

Product information as part of EU Regulation VO 327/11 (ErP)

- Product information as part of VO 327/11 is provided on the relevant web pages, main catalogue pages and on the product rating plates.
- Explanations for the terms used are provided below:
- The **best efficiency point** (BEP) is the highest possible efficiency of a fan. The calculation is based on the ratio of electric power consumers to ventilation performance.



- The following data is collected and published in the best efficiency point: Air volume$_{BEP}$, pressure p_{BEP}, speed n_{BEP}, power consumption P_{BEP}, current consumption I_{BEP} and the sound power level L_{WA}.
- The calculated parameter N is used for comparison with the efficiency level specified by the EU. The calculated **efficiency level N** must be greater than or equal to the specified efficiency level.
- The **overall efficiency η** is the fan's calculated static or total efficiency level depending on efficiency category.
- The **measurement category** states how and with what tools the fan's efficiency was measured:
  - A: free inlet and outlet conditions
  - B: free inlet condition and with duct fitted to the outlet
  - C: duct fitted to inlet and free outlet conditions
  - D: ducts fitted to inlet and outlet
- The **efficiency category** describes the measurement process used to determine the energy efficiency. Depending on measurement category the static or total fan pressure is used.
- The **specific ratio** for all ErP-relevant MAICO products is ≈ 1. It defines the ratio between the back pressure measured at the fan outlet and the back pressure at the fan's best efficiency point (BEP).
- The energy efficiency of all ErP-relevant MAICO products was measured without additional speed regulators. For this reason, an additional VSD (Variable Speed Drive) for reaching the BEP values is not needed with MAICO fans.
- Information about the disassembly and disposal of the fan can be found in the assembly instructions.
- Information about the installation, operation and servicing of the fan can also be found in the assembly instructions.
- When measuring the energy efficiency, only those objects described by the corresponding measurement category were used. Deviations are noted directly next to the affected product.

General technical information

Explosion protection according to Directive 2014/34/EU (ATEX).

- MAICO EX fans for deployment in areas subject to explosion hazards or for the transporting of gas, vapour and air mixtures at risk of explosion comply with the requirements of the 2014/34/EU (ATEX) Directive.
- The fans have an identifier (see table on the right) and have undergone the CE type-examination.
- MAICO Ex fans are suitable for:
  - Operation in areas subject to explosion hazards.
  - Transporting gas, vapour and air mixtures at risk of explosion.
- The Declaration of Conformity according to the 2014/34/EU Directive confirms the conformity of the product as well as the requirements and the evaluation process as defined in the European Directive.
- The MAICO quality control system is certified in accordance with the 2014/34/EU Directive, Appendix VII.
- The Ex fans fulfil the ignition protection type “e”, increased safety, for deployment in Zones 1 and 2, Device group II, Category 2G.
- The mechanical part is produced in accordance with DIN EN 14986.
- Make the connections in line with the relevant regulations.
- All binding specifications can be taken from the motor rating plate. So can the t_E-time for the motor protection switch and the t_A-time for the PTC thermistors in accordance with DIN EN 60079-0 / VDE 0170 / 0171 and DIN EN 60079-10 / VDE 0165-101.
- Speed control is only available with the specially designed types, in conjunction with the MVS 6 or TMS triggering device.

Device groups

- Device group I: Deployment in mining operations and mining equipment that can be at risk from mine gas and combustible dust.
- Device group II: Deployment in all other areas that can be at risk from explosive atmospheres.

Device categories

- 1 - Very high degree of safety
- 2 - High degree of safety
- 3 - Normal degree of safety
- Device group II categories have an additional letter appended - G for gases, D for dust.
- The Ex fans correspond to Device group II, Category 2G (see product-specific information) for operation in Zones 1 and 2 and if installed correctly, fulfil the essential health and safety requirements.

Ignition protection type

- Resource type:
  „e“ - Increased safety
- As a rule, ignition protection type “e” is added as a sub-group with fan motors with a terminal box.
- Ignition protection type “e” corresponds to Explosion group II.

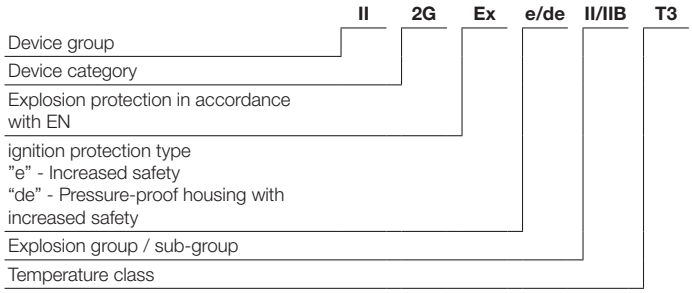
Zone classification, device groups and categories

Combus-tible materials	Zone in accordance with DIN EN 60079-10	Explanations	Device groups	Device categories
Gases, vapours, mist	Zone 0	Areas where dangerous, explosive atmospheres are present all the time or for long periods of time.	II	1G
	Zone 1	Areas where it can be assumed that dangerous, explosive atmospheres will occur from time to time.	II	1G or 2G
	Zone 2	Areas where it can be assumed that dangerous, explosive atmos-pheres occur only infrequently and then only for short periods of time.	II	3G, 2G or 1G

Temperature class, surfaces and ignition temperatures

Temperature class	Highest permitted surface temperature of the equipment	Ignition temperature of the combustible material
T1	450 °C	> 450 °C
T2	300 °C	> 300 °C
T3	200 °C	> 200 °C
T4	135 °C	> 135 °C
T5	100 °C	> 100 °C
T6	85 °C	> 85 °C

Labelling



Safety values of combustible gases and vapours

Material designation	Ignition temperature °C	Temperature class				Explosion groups		
Acetaldehyde	155				T4	II A		
Aceton	535	T1				II A		
Acetylene	305		T2					II C
Ethane	545	T1				II A		
Ethylacetane	470	T1				II A		
Ethyl ether	175				T4		II B	
Ethyl aldohol	400		T2				II B	
Ethyl chloride	510	T1				II A		
Ethylene	440		T2				II B	
Ethylene oxide	435 self-disintegration		T2				II B	
Ethyl alcohol	235			T3			II B	
Ammonia	630	T1				II A		
I-Amylacetate	380		T2			II A		
Benzine, gasoline, initial boiling point < 135°	220 to 300			T3		II A		
Special benzine, initial boiling point > 135°C	220 to 300			T3		II A		
Benzol (pure)	555	T1				II A		
N-butane	365		T2			II A		
N-butyl alcohol	325		T2				II B	
Cyclohexanone	430		T2			II A		
1.2 Dichlorethane	440		T2			II A		
Diesel DIN 516010/04.78	220 to 300			T3		II A		
Jet fuel	220 to 300			T3		II A		
Acetic acid	485	T1				II A		
Acetic anhydride	330		T2			II A		
Heating oil EL DIN 51603 Part 1/12.81	220 to 300			T3		II A		
Heating oil L DIN 51603 Part 2/10.76	220 to 300			T3		II A		
Heating oil M and S DIN 51603 Part 2/10.76	220 to 300			T3		II A		
n-Hexane	230			T3		II A		
Carbon monoxide	605	T1				II A		
Methane	595	T1				II A		
Methanol	440		T2			II A		
Methyl chlorid	625	T1				II A		
Naphthalin	540	T1				II A		
Oleic acid	250 self-disintegration			T3			- *	
Phenol	595	T1				II A		
Propane	470	T1				II A		
n-Propyl alcohol	385		T2				II B	
Carbon disulphide	95				T6			II C
Hydrogen sulphide	270			T3			II B	
Town gas (illuminating gas)	560	T1					II B	
Tetralin (Tetrahydronaphtaline)	390		T2			- *		
Toluol	535	T1				II A		
Hydrogen	560	T1						

* Excerpt from the tables “Safety-based parameters”, Volume 1 Combustible liquids and gases, Physikalisch-Technische Bundesanstalt (PTB), Braunschweig, from E. Brandes/W. Möller. ISBN 3-89701-745-8

-* The explosion group has not yet been determined for this material.