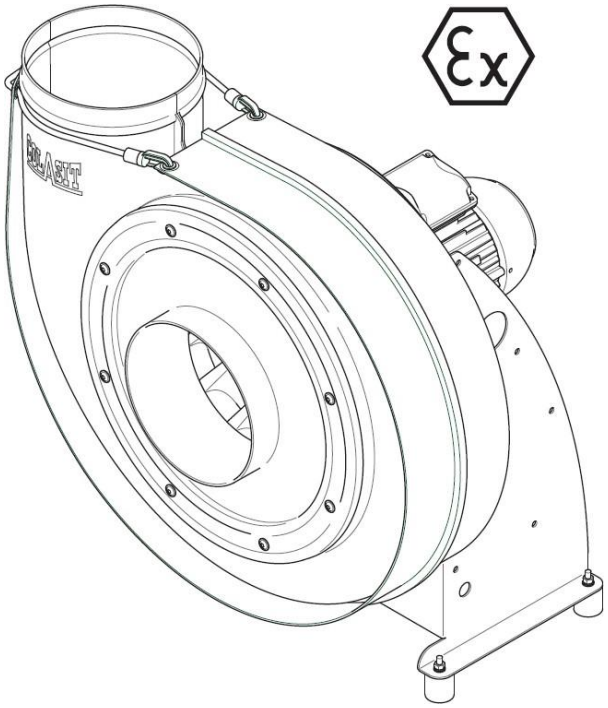
Explosion protection

ATEX Basics



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Revision history table

Revision		Description	Date	Name
1-en	EU/ATEX	First version published.	30.11.2021	A. Roth
2-en	EU/ATEX	Release Standard EN 14986	2.2.2026	A.Roth

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Translation of the original German operating instructions.
Colasit TD-000846

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1 Precondition for an explosion

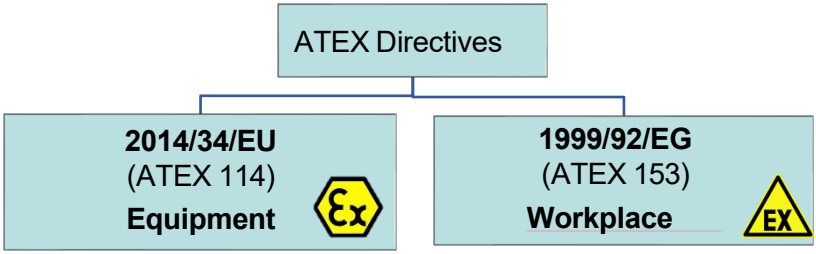
For an explosion to occur, three factors must be present at the same time. In this context, one often speaks of the hazard triangle.

Fuel and oxygen are the responsibility of the operator.

Based on risk and ignition hazard analysis, we as the manufacturer of the fan avoid that our device is an ignition source.

2 Standards and directives

Installers and operators of systems, as well as manufacturers of equipment, are obliged by law to comply with explosion protection measures.
Two EU directives are decisive for explosion protection throughout Europe.



In North America, a classification system according to NEC 500/505 applies for explosion protection, which differs from the system of the European Directive 2014/34/EU (ATEX).

ATEX standards applied:

EN ISO 80079-36: 2016	Explosive atmospheres. Non electrical equipment for explosive atmospheres Part 36: Basic method and requirements
EN ISO 80079-37: 2016	Non electrical equipment for explosive atmospheres Non electrical type of protection constructional safety "c", control of ignition sources "b", liquid immersion "k"
EN 14986:2024	Design of fans working in potentially explosive atmospheres

3 Ex-marking of fans

The explosion protection marking is located on the type plate of the fan and classifies the fan for use in a potentially explosive atmosphere.

Example of an explosion protection marking:

CE II 2/3G Ex h IIB+H$_2$ T3 Gb/Gc Without droplets

Directive section 2014/34/EU

Standard section EN ISO 80079-36

Symbol/ Code	Description
CE	CE-marking
Ex	Marking denoting prevention of explosions 2014/34/EU (ATEX)
II	Equipment category II, for all EX applications without mines and surface workings
2/3	Equipment category inside/outside the fan Category 2 = Zone 1 / Category 3 = Zone 2
G	Explosives gases
Ex h	Explosion protection (Ex) by type (h): Protection type „design safety“
IIB+H2	Equipment category II (explosives gases) of gas groups IIA, IIB and hydrogen (H2)
T3	Temperature classes for maximum surface temperatures: T3 (≤ 200 °C), T4 (≤ 135 °C)
Gb/Gc	Equipment protection levels (EPL) inside/outside the fan: Gb=Cat. 2 (Zone1) / Gc=Cat. 3 (Zone 2)
Without droplets	Note that there are no droplets in the air flow of this fan (in- fluence on materialisation)

The type plate of the electric motor also contains information on explosion protection, e.g. temperature class and type of protection.

4 Definitions

4.1 Requirements to manufacturers and operator

Manufacturer	Operator
Definition of the area for use of the equipment , specification of the group of devices / category	Definition of zones in an installation; selection of the corresponding equipment
Category 1 or EPL Ga Category 2 or EPL Gb Category 3 or EPL Gc	Zone 0 Zone 1 Zone 2
The devices have to correspond to the essential safety and health requirements or to the relevant standards	Observance of the corresponding requirements for installation, commissioning and maintenance
Establishing a risk and ignition hazard analyses for the corresponding equipment	Establishing a risk analysis for operational area, coordination is required
Declaration of conformity to be made	Document of explosion protection to be made
Corresponding quality assurance	Continuous improvements

4.2 Explosion protection zones

Potentially explosive atmospheres in and around the fan are divided into different zones depending on the frequency and duration of the occurrence of an explosive atmosphere.
Consideration of the explosion hazard:

Zone 0 und 1 Normal operation and incident
Zone 2 Normal operation (without incident)
Responsible for the definition of zones: Operator

Combustible gases/substances	Zone	Probability of occurrence/risk
Combustible gases, Vapours and mists	0	Area with permanent, long-term or frequent explosive atmosphere.
	1	Area in which an explosive atmosphere may occasionally occur during normal operation.
	2	Area in which an ex-plosive atmosphere does not normally occur or only occurs briefly during normal operation.

Category 3G

Zone 2

Rarely and only for a short period

Review of the explosion hazard:
Normal operation without incident

Category 2G

Zone 1

occasionally

periodical

Review of the explosion hazard:
Normal operation and incident

Category 1G

Zone 0

permanently

long term

short term and often

Review of the explosion hazard:
Normal operation and incident

The Colasit ATEX fan is approved for explosion protection zones 1 and 2, not for zone 0.

4.3 Equipment Group

The units are divided into three groups.

Group	Device insert
I	Mine gas and/or dust endangered mining operations
II	Explosive gas atmosphere, excluding mine workings endangered by firedamp and/or dust
III	Explosive dust atmosphere, excluding mine workings endangered by firedamp and/or dust

The Colasit ATEX fan is intended for use in Group II.

4.4 Equipment categories

The equipment categories correspond to the zones of the operator.

For Colasit ATEX fans, a distinction is made between the indoor and outdoor category.

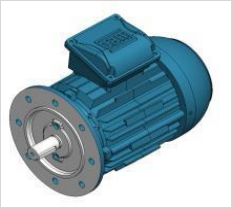
Atmosphere	Zone	Danger of explosion	Equip. group	Equip. category	Protection level
Flammable gases, mists, vapours	0	permanently, longterm or often	II	**1G**	very high
	1	occasionally	II	**2G**	high
	2	Rarely or for a short period	II	**3G**	increased

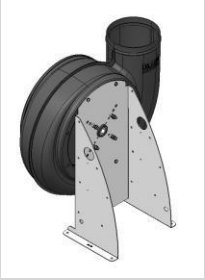
The Colasit ATEX fan is approved for equipment categories 2 and 3 of the gas atmosphere (G).

4.5 Types of protection

Types of ignition protection are constructive and electrical measures to avoid ignition sources in equipment.

Overview of ignition protection types applied to Colasit ATEX fans

Motor (electrical)	**type**	**Type of protection**
	ec	non-sparking
	eb	increased security
	db eb	flameproof enclosure with terminal boxes in "increased safety" design“
	db	flameproof enclosure

Device (non electrical)	**type**	**Type of protection**
	c	constructive safety
	b	control of ignition sources (optional fan ac- cessory)

4.6 Gas groups

The gas group provides information on the ignitability of an explosive atmosphere, depending on the flammable substances it contains.

Classification of the gas groups according to the following table

Gas group	**typical Gas**	**Ignition energy [µJ]**
II A	Propane	>180
II B	Ethylen	60…180
II B + H2	Hydrogen	
II C	Carbon disulfide	>60

4.7 Temperature classes

A temperature class provides information on the maximum permissible surface temperature of the fan/electric motor in relation to the ignition temperature range of an explosive atmosphere (gases, mists and vapours).

Temperature class	Max. permissible surface temp. [°C]	Ignition temp. [°C]	Ignition temp. of some substances [°C]
T1	450	> 200 ≤ 300	Propane 510°C
T2	300	> 135 ≤ 200	Acetylene 305°C
T3	200	> 200 ≤ 300	Gasoline 260-450°C, Diesel 220°C
T4	135	> 135 ≤ 200	Diethylester 170°C
T5	100	> 100 ≤ 135	
T6	85	> 85 ≤ 100	Carbon disulfide 95°C

The Colasit ATEX fan is generally approved for temperature classes T3 and T4.
The information on the nameplate is relevant.

4.8 Equipment Protection Level (EPL)

According to the EN 60079-0 standard, equipment for operation in potentially explosive atmospheres is classified into certain protection levels:

Prot. level EPL	Safety	Application area	
		Equipment categories	Zone
Ga	Very high	1G	0, 1, 2
Gb	High	2G	1, 2
Gc	Regular	3G	2

The protection levels are based on the probability of ignition under different opera- ting or fault conditions of the fan.

The protection level

- "Ga" applies to equipment with very high safety requirements for which there is no danger of ignition during normal operation and in the event of foreseeable or infrequent faults or malfunctions.
- "Gb" applies to equipment for which there is no risk of ignition during normal operation or in the event of foreseeable faults or malfunctions.
- "Gc" applies to units with an extended level of protection where there is no risk of ignition during normal operation. The units have some additional protective measures so that there is no danger of ignition even in the case of normal faults.

The Colasit ATEX fan is approved for protection levels Gb and Gc.

4.9 Interaction between zone, equipment category and equipment pro- tection level (EPL)

IEC 60079-10-X	Directive 2014/34/EU		EN ISO 80079-36	
Zone	Equipment group	Equipment cat.	EPL	Group
0	II	1G	Ga	II
1	**II**	**2G**	**Gb**	**II**
2	**II**	**3G**	**Gc**	**II**

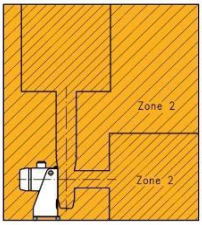
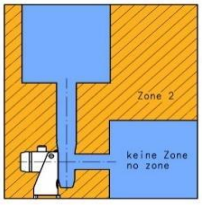
Colasit plastic fans are only available for zones 1 and 2, not for zone 0.

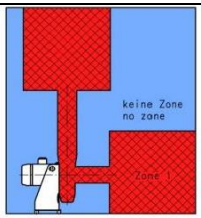
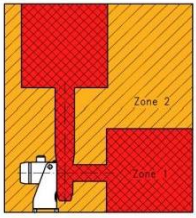
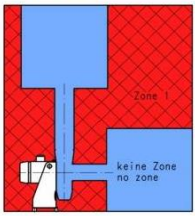
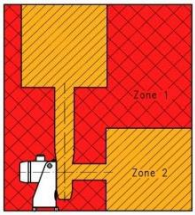
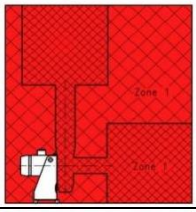
5 ATEX Measures

The zone classification has an influence on the choice of motor design and the choice of material for the fan impeller and casing.

If a frequency converter is also used, the manufacturer's operating instructions and EMC instructions must be observed.

The choice of material is defined depending on the zoning and with/without droplet formation by Colasit.

Zone inside / outside Marking	Illustration	Measures
2 / - Ⓔx II 3/- G …		with droplets: casing PPs-el[1] impeller PPs-el[1] without droplets: casing PPs, PVC, PVDF[2] impeller PPs, PVDF[2] The use of an Ex motor is not manda- tory [3]
2 / 2 Ⓔx II 3G …		with droplets: casing PPs-el[1] impeller PPs-el[1] without droplets: casing PPs, PVC, PVDF[2] impeller PPs, PVDF[2] motor: Ex ec, eb, db eb, db[3]
- / 2 Ⓔx II -/3G …		with droplets: casing PPs-el[1] impeller PPs-el[1] without droplets: casing PPs, PVC, PVDF[2] impeller PPs, PVDF[2] motor: Ex ec, eb, db eb, db[3]
2 / 2 Ⓔx II 3G … free sucking or free blowing out		with droplets: casing PPs-el[1] impeller PPs-el[1] without droplets: casing PPs, PVC, PVDF[2] impeller PPs, PVDF[2] motor: Ex ec, eb, db eb, db[3]

1 / - Ex II 2/- G …		with/without droplets: casing PPs-el impeller PPs-el motor: Ex eb, db eb, db[3]
1 / 2 Ex II 2/3 G …		with/without droplets: casing PPs-el impeller PPs-el motor: Ex eb, db eb, db[3]
- / 1 Ex II -/2 G …		with/without droplets: casing PPs-el impeller PPs-el motor: Ex eb, db eb, db[3]
2 / 1 Ex II 3/2 G …		with/without droplets: casing PPs-el impeller PPs-el motor: Ex eb, db eb, db[3]
1 / 1 Ex II 2G …		with/without droplets: casing PPs-el impeller PPs-el motor: Ex eb, db eb, db[3]
1/1 Ex II 2G … free sucking or free blowing out		with/without droplets: casing PPs-el impeller PPs-el motor: Ex eb, db eb, db[3]

[1] conductive according to FAQ BG-RCI

[2] flame resistant according to EN 14986

[3] Design depends on the operating mode (direct, belt or FU operation)

Innovative technology for the sake of the environment

- since 1945 -

When it comes to thermoplastics, Colasit AG is one of the world's leading brands in fan and system engineering. Our qualified staff impress with technical expertise and great dedication, guaranteeing you the highest quality on all five continents.

We set our targets high to see all our projects through to success and complete every job to your complete satisfaction. We combine tradition and innovation – our many years of experience are a foundational component of our work, just as is the incorporation of the latest technology.

Place your trust in us – we accompany you throughout all phases of your project, starting from planning with the manufacturer all the way down to commissioning.