



ATEX: Støvsugere Zone 22/21/20



14.11.2019

ATEX: Vacuums Zone 22/21/20

> Allan Schmidt Dimitri Di Salvo















Rumfylde/volume: 8 mm³ Overfladeareal/surface area: 24 mm² Rumfylde/volume: 8 mm³ Overfladeareal/surface area: 48 mm²











Established : 1982 Start of production: 1991 Production: 100% made in Italy (Settimo Torinese) N. of employees (Italy) :102 N. of employees (foreign branches): 29



PRODUCT: INDUSTRIAL VACUUM CLEANERS

- > Product range with over 140 standard models. Over 1500 different configurations.
- > Specific machines for each industrial sector.
- > High quality construction and 24 months' warranty.
- > Possibility of machines total customization.
- Products and components MADE IN ITALY
- > Wide range of ATEX-certified Vacuum cleaners.











Your safety, our priority!

Delfin believes that safety is not just an abstract concept, but a real philosophy. From design to certification, our goal is to provide our customers with top quality, **safety and functionality products.**











VISION & MISSION

Vision: CREATE VALUE

IN EVERY ACTION IN EVERY DETAIL

Mission: design and build THE BEST INDUSTRIAL VACUUMS solutions, worldwide







CORE VALUES

- SPECIALIZED
- FLEXIBLE
- CUSTOMER FOCUSED









A synthetic guideline to ATEX Directive,

and the handling of combustible dust through vacuum

and dust collection equipment

Dimitri Di Salvo – Global Sales Director



2014/34/UE Directive



ATEX= EXPLOSIVE ATMOSPHERE

Equipment to be used in atmospheres with potentially explosive gas or dust

Equipment used in potentially explosive atmospheres (ATEX)

The European Union has adopted a law on the sale and putting into service of equipment and protective systems intended for use in potentially explosive atmospheres (ATEX). Such atmospheres occur when a mixture of air, gases, vapours, mists or dusts combine in a way that can ignite under certain operating conditions.

ACT

Directive 2014/34/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres (recast).

SUMMARY

WHAT DOES THIS DIRECTIVE DO?

The ATEX directive lays down uniform, EU-wide rules on the sale and putting into service of equipment and protective systems intended for use in potentially explosive atmospheres. It seeks to ensure that products fulfil certain requirements to ensure a high level of protection of the health and safety of persons, especially workers, and, where appropriate, the protection of domestic animals and property. It applies to a wide range of products, including equipment used on fixed offshore oil and gas platforms, in petrochemical plants, mines, flour mills (airborne flour particles are highly flammable) and other areas where a potentially explosive atmosphere may be present.

https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=LEGISSUM:2403020202 2&from=IT





Why ATEX ?







1. Prevent creating an enviroment with risk of explosion (reduce / eliminate the accumulation of dust)

2. Make sure the vacuum itself does not become a source of ignition that may trigger an explosion





Dust explosion - EXAMPLES



DIDION MILLS , Wisconsin, U.S.A. June 2017





2014/34/UE Directive: Dust combustible materials



Among potentially explosive materials we can find:

- Natural organic substances (flour, wood, sugar, cereals, corn, alfalfa)
- Synthetic organic substances (plastics, pigments, pesticide, chemical products, pharmaceutical powders, etc.)
- Carbons
- Metals (aluminium, magnesium, zinc, iron, etc.)







Dust explosion





Primary Explosion: explosion which involves the airborne portion of dust and causes, following turbulence, both expansion and convective motions. Convective motions cause not only direct structural damage, but also dust raising if settled in ducts or in the environments involved.

Secondary Explosion: explosion in which powders raised by the primary explosion make part of the explosive reaction, substantially amplifying the destructive effects of the primary explosion.



Dust explosion - AREAS

Explosions of industrial dusts causing extended damages are exceptional, unlike less devastating explosions which are very frequent. Currently, more than one dust explosion a day occurs in Europe. On a total of 400 explosions in just agri-food industries, the types of plants involved have been:

- Conveyors (elevators) 26,7%
- Silos 22,9%
- Mills 18,1%
- Dedusting (filters) 9,5%
- Dryer 7,6%
- Sieving 2,8%
- Rooms with ovens 1,9%
- Other 10,5%







INDUSTRIES CONCERNED

The following list shows some of the industries that, due to the type of manufacturing, products and materials involved, ae often exposed to a risk of explosion (the number of industries and situations with a risk of explosion is actually much wider):

- •Food industry (dairy , cereal, baking, sweets , spices, etc...)
- Powder coating
- Pharmaceutical
- Airports and aircraft maintenance
- •Automotive and aerospace
- Military grounds, warehouses
- Flour mills , sugar mills
- •Carbon and nuclear power plants
- •Oil and gas / Refineries
- •Chemical plants
- Bakeries
- Animal food plants
- •Cereal plants and warehouses
- Wood industries
- Aluminum industries
- Paintshops / Spraybooths













ATEX HAZARDOUS AREAS FOR DUSTS



- ZONE 20: a place where an explosive atmosphere in the form of a cloud of combustible dust in the air is ever or frequently present (eg.: hoppers, silos, cyclones and filters – dust conveying system, the interior of mixers, grinders, dryers, bagging equipment, etc.). Range: more than 1000 hours / year
- ZONE 21: a place where it is likely to have an explosive atmosphere, in the form of a cloud of combustible dust in the air, sporadically during ordinary operations. Range : 10-1000 hours year
- ZONE 22: a place where it is unlikely to have an explosive atmosphere in the form of a cloud of combustible dust in the air - during ordinary operations or, if it occurs, it is just for a short period Range : 1 to 10 hours year



ATEX HAZARDOUS AREAS FOR DUSTS

ANY HAZARDOUS AREA MUST BE ASSOCIATED WITH AN EQUIPMENT WITH A SPECIFIC CATEGORY





ATEX HAZARDOUS AREAS FOR GAS

ANY HAZARDOUS AREA MUST BE ASSOCIATED WITH AN EQUIPMENT WITH A SPECIFIC CATEGORY







| Classification of ATEX risk areas | | | | | | |
|-----------------------------------|------|---|----------|--|--|--|
| Explosive substance | Zone | Risk | Category | | | |
| GAS | 0 | Constant (More than 1000 hours / year) | 1 G | | | |
| | 1 | Occasional (10-1000 / hours / year) | 2G | | | |
| | 2 | Rare (1 – 10 hours / year)* | 3G | | | |
| DUST | 20 | Constant | 1D | | | |
| | 21 | Occasional | 2D | | | |
| | 22 | Rare | 3D | | | |

*Source : RAMBOLL Engineering (Denmark)





PRODUCT CERTIFICATION



Zone 20/21: independent test certificate from authorized 3° party

| | | | TALNORD | | | |
|-------------------|--|---|--|--|--|--|
| | | | IUVNURD | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| (1) | EU-Type-Exam | ination Certificate | | | | |
| (2) |) Equipment and protective systems | | | | | |
| | intended for use in potenti | ntended for use in potentially | | | | |
| | explosive autospheres, o | | | | | |
| (3) | Certificate Number | TUV CY 19 ATEX 0206176 | X | | | |
| (4) | for the equipment: | Vacuum cleaner ZFRELTRE | X1/3D-IIIII | | | |
| (5) | of the manufacturer: | DELFIN S.r.I. | | | | |
| (6) | Address: | Strada della Meria 49/A | 2 | | | |
| | | ITALY | 0 | | | |
| | Order number | 0206176 | | | | |
| | Data of issue: | 2018-03-15 | | | | |
| (7) | The design of this equir | ment or protective system and a | any acceptable variation thereto are | | | |
| (1) | specified in the schedule | to this EU-Type-Examination Ce | artificate and the documents therein | | | |
| (9) | referred to. | ad body No. 2261 in accordance w | ith Article 17 of the Council Directive | | | |
| (0) | of 2014/34/EU of Februar | ry 26, 2014, certifies that this equi | pment or protective system has been | | | |
| | found to comply with the construction of equipme | ent and protective systems interview | ded for use in potentially explosive | | | |
| | atmospheres given in An | nex II to the Directive. The examin | ation and test results are recorded in | | | |
| | Compliance with the Ess | ential Health and Safety Requirem | ents has been assured by | | | |
| (9) | compliance with: | | | | | |
| (9) | Company of the | | | | | |
| (9) | EN 1127-1:2011 | EN 80079-36:2016 | EN 80079-37:2016 | | | |
| (9) | EN 1127-1:2011 | EN 80079-36:2016 after the certificate number, it indic | EN 80079-37:2016 ates that the equipment or protective | | | |
| (9) | EN 1127-1:2011 I) If the sign "X" is placed a system is subject to spec | EN 80079-36:2016 after the certificate number, it indic ial conditions for safe use specifie | EN 80079-37:2016 sates that the equipment or protective d in the schedule to this certificate. | | | |
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Zone 22: manufacturer's self certification

EU DECLARATION OF CONFORMITY (FOR EQUIPMENT NOT INCLUDED IN ENCLOSURE IV, ref. D. Lgs. 17/2010) Directive 2006/42/CE, enclosure II, section A





The manufacturing company **DELFIN Srl** Strada della Merla 49/A – 10036 Settimo Torinese (TO) – ITALY Tel + 390118005500 / Fax + 390118005506 www.delfinvacuums.it – delfin@delfinvacuums.it

> DECLARES Under its responsibility, that the vacuum cleaner

Model: Identification nr.:

Year: 2019 Customer:

to which this declaration refers, is complying with the essential safety norms, as stated by the directive 2006/42/CE, by the directive 2014/30/EU on electro-magnetical compatibility, by the directive ATEX 2014/34/EU.

The regulations according to which the equipment has been manufactured, are listed in the technical report, which is filed in Delfin premises EN 60079-0 EN 60079-31

This declaration loses its validity in case the equipment is modified without authorization from the manufacturer.



The users' operating instructions manual is to be considered part of the equipment, and must be carefully read before operating the equipment

Technical file: DLF.VAC.3D

Settimo Torinese(TO)02/04/2019

Silan Antonias (Antonino Siclari)

The Chairman





Using dust collectors in ATEX environment : the great misunderstaning (zone 22, 21 or 20?)







1. Is a zone 22 vacuum designed and compliant to be used in ATEX 22 area?

<u>YES</u>

2. Is a zone 22 vacuum designed and compliant to collect explosive dust ?

<u>NO</u>

3 What is required to vacuum also explosive dust?

A ZONE 20 certified vacuum



Non atex vs. ATEX









ATEX CONSTRUCTION

Depending on the type of ATEX classified area it is certified for (22, 21 and / or 20) equipment must be designed and manufacurted with specific features:

Zone 22 (auto – certified)

- 1. Full antistatic grounding of machine (avoid sparks from static energy)
- 2. Class M atistatic filter (avoid sparks from static energy penetration of fine dust particles in motor)
 - 3. Pressure relief valve (avoide ignition from heat)



ATEX CONSTRUCTION



Depending on the type of ATEX classified area it is certified for (22, 21 and / or 20) equipment must be designed and manufacurted with specific features:

Zone 21/20 (third party certificate)

- 1. certified electrical components (motor , switches) with original third party ATEX certificate
 - 2. Sparkproof deflector (reduce chances of sparks from mechanical impact)
 - 3. Stainless steel container (reduce chances of sparks from mechanical impact)
 - 4. Full antistatic grounding of machine (avoid sparks from static energy)
- 5. Class M atistatic primary filter (avoid sparks from static energy penetration of fine dust particles in motor)
 - 6. Additional HEPA filter (separate microparticles)
 - 7. Pressure relief valve (avoide ignition from heat)









ELECTRIC MODELS

PNEUMATIC MODELS (working on compressed air)





delfin



DHV HEAVY DUTY RANGE

PNEUMATIC CONVEYORS



CVS – Centralized vacuum systems





Delfin produces and installs **centralized vacuum systems** and designs them on specific needs. Thanks to a fixed piping, the system can remove and transport material from one point to another, but also stockpile and discharge it into a chosen point. **ATEX certified systems** are the only choice for large industrial plants.

CASE STUDY



Antistatic accessories











Delfin offers a wide range of rubber or stainless steel antistatic accessories The antistatic **accessories suitable for use in ATEX environment ensure maximum operators safety**



The importance of certified safety



EU DECLARATION OF CONFORMITY (FOR EQUIPMENT NOT INCLUDED IN ENCLOSURE IV, ref. D. Lgs. 17/2010) Directive 2006/42/CE, enclosure II, section A



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The manufacturing company **DELFINS rd** Strada della Merla 49/A – 10036 Settimo Torinese (TO) – ITALY Tel + 390118005500 / Fax + 390118005506 www.delfinvacuums.it – delfin@delfinvacuums.it

> DECLARES Under its responsibility, that the vacuum cleaner

Model:

Identification nr.:

Customer:

Year: 2019

to which this declaration refers, is complying with the essential safety norms, as stated by the directive 2006/42/CE, by the directive 2014/30/EU on electro-magnetical compatibility, by the directive ATEX 2014/34/EU.

The regulations according to which the equipment has been manufactured, are listed in the technical report, which is filed in Delfin premises EN 60079-0. EN 60079-31

This declaration loses its validity in case the equipment is modified without authorization from the manufacturer.



The users' operating instructions manual is to be considered part of the equipment, and must be carefully read before operating the equipment

Technical file: DLF.VAC.3D

Settimo Torinese(TO)02/04/2019

The Chairman

(Antonino Siclari)





THANK YOU !

Dimitri Di Salvo – Global Sales Director

Separators – explosion relief vents





 $\langle \mathbf{x} \mathbf{x} \rangle$

low-mass valve plate and low response pressure. This flameless vent reacts within fractions of a second in the event of an explosion. Following an explosion, they immediately seal again, lowering the risk of secondary explosions and costly replacement.



Dust explosion - EXAMPLES



IMPERIAL SUGAR – U.S.A. , 2008



Savannah (IISA)

Savannah (USA), 7th February 2008





Dust explosion



Fossano (CN), explosion of «Molino Cordero»

5 dead



Monday, 16th July 2007



WHAT DOES IT TAKE TO GENERATE AN EXPLOSION ?





- 1. Oxygen (or other combustible gases)
- 2. Fuel (any gas or powder that can explode in given conditions)
- 3. Source of ignition

These elements must be present in sufficient quantities, depending on their natures and external conditions.





Dust explosion





Dust explosions may occur only if all following conditions are present at the same time:

- Dust is flammable
- Dust generates a **cloud**
- Dust has the adequate granulometry
- Dust concentration is contained within the **explosibility range**
- Dust cloud must come into contact with a **source of ignition** with sufficient power
- The atmosphere in which the dust cloud is generated must contain sufficient **oxidising substance** (OXIGEN)





MOST FREQUENT IGNITION SOURCES

- Sparks generated by the accumulation of static energy on surfaces
- Heat
- Sparks from mechanical impact







MARKING

| <u>/C</u> | |
|-----------|----|
| \C | X/ |
| | |

| mod. Æx〉 | DUST MARKING | |
|-------------|--|--|
| <u>د</u> | GAS MARKING | |
| | indications about in of Type certificate arenive in agency | |



WHAT THE ATEX MARKING REPRESENTS



Ex II 1/2D Ex h IIIC T160°C Da/Db Certification vacuum cleaners Area 20 internal/Area 21 external

Ex II 3D Extc IIIB T135°C X Dc Certification electrical vacuum cleaners Area 22

Ex II 3D Ex h IIIC T85°C Dc Certification non-electrical vacuum cleaners Area 22

Ex II 2D Ex h IIIC T85°C DbEx II 2G Ex h IIB T6 GbCertification non-electrical vacuum cleaners AIREX models

Ex II 3D Extc IIIC T135°C X IP65 Dc Certification electrical vacuum cleaners with SPARK TRAP





| AREA | 0 | 20 | 1 | 21 | 2 | 22 | |
|--|------------|------------|------------------------------------|------------------------------------|------------|------------|--|
| Type of atmosphere | G Gas | D Dust | G Gas | D Dust | G Gas | D Dust | |
| Explosive atmosphere | Continuous | Continuous | Irregular | Irregular | Infrequent | Infrequent | |
| Equipment category | 1 | | 2 Electrical 2 Mechanical | 2 Electrical 2 Mechanical | 3 | 3 | |
| Self-certification (Conformity Declaration) | | nical File | UE-T from | ype Certificate Independent | e par | | |
| Protection systems O – Dust G – Gas | | | | | | | |
| | | | | | | | |



Dust explosion - materials



Data concerning about 6.000 accidents occurred in Germany

| Materials/products | Cases occurred (%) | | |
|---------------------|--------------------|--|--|
| Food and Pet Food | 32 | | |
| Wood | 22 | | |
| Coal/peat | 14 | | |
| Metals | 11 | | |
| Synthetic materials | 7 | | |
| Paper | 1 | | |
| Other materials | 13 | | |

