

Stricter compliance to rules and regulations will require industrial safety measures and monitoring systems

Laws and regulations about both environmental impact and workers health and safety are getting stricter and reporting requirements is hence increasing. Industries will have to take greater measures to show legal compliance and to be able to report their numbers. It´s no longer a choice, a branding advantage or a subject for environmentalists. It´s how every company needs to act, or they´ll get outperformed by competitors and may risk to face league consequences.

In this white paper you´ll learn about:

- **How to ensure legal compliance**
- **OSHA, NFPA & ATEX directives**
- **Dust classifications and explosion risks**
- **How to create a safe and futureproof industry**

We have created an industry that we are all now dependent on. The demand is there and production industries are going to keep produce. There´s clear links between industries and air pollutions, health issues and millions of deaths. Also to factory explosions, fires and workplace accidents. But the amount of factory industries we have created and the production demand we depend on, is not the problem. We have the technique for sustainable industries, the knowledge is there. All we need is to adjust. So how do we do that?

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Regulations in three levels

Rules and regulations comes from different directions, but always with the same purpose - to protect. To protect the planet and to protect the people. We have Global Climate goals, such as the United Nations (UN) Paris agreement which is a legally binding international treaty on climate change. Every country has to follow the agreement, improve and report measures and results. We have local society health directives to protect the people and get a healthy population. And we have regulations for workplace environments, to ensure health and safety at work.

- **Global Climate goals**
- **Society health directives**
- **Workplace environment regulations**

Industries are a big contributor to the air pollution in the world and industry workers are the ones most exposed to emissions, and also to factory explosions and fire accidents due to dusty environments. Welders and metal workers are exposed to welding fumes and oil mist every day. Using a mask or helmet helps the individual worker but doesn't make the inside air any cleaner and doesn't protect people in the near society, if the welding fumes spreads outside. Laboratory workers and dentist are exposed to gases, fumes and contaminated air which exposes both workers and patients for health risks. Mechanics within vehicle industries as well as firefighters at emergency stations are also exposed to toxic fumes, from diesel and gasoline exhausts. Industrial workers within woodworking and composite machining, food processing and agriculturist are all spending their working days in dusty environments and even though all raw materials doesn't seem that harmful at first sight, the longtime exposure and the explosion risks does highly expose the workers for safety risks. Workplace environmental regulations is important to ensure a safe and healthy workplace and to prevent both direct and indirect health consequences.

Welding fume, oil mist, different kinds of dust, smoke, exhausts and other air pollutions needs to be captured at source, or it will eventually cause harm not only to the workers and the industry itself, but also have negative consequences on the local civilization and the planet. Meaning workplace regulations is not only for the individual worker or company, it effects society health and in the long term global health and climate.

What's your responsibility as industrial worker or manager?

Today 95% of the earth population breath polluted air every day and air pollution is the 4th most common cause of death in the world. Factory fires and explosions are reported constantly, most of them accrue due to combustible dust, one of the most serious risks caused by dust in manufacturing environments. In 2018 alone there were over 250 reported factory fires or explosions related to combustible dust.

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Air pollutions from industries, as well as factory explosions can be minimized, hence the importance of regulations, awareness and compliance. In the United States, OSHA has developed federal standards for workplace safety and the National Fire Protection Association (NFPA) has developed standards on the fundamentals of combustible dust. In Europe, the ATEX regulations stipulate what companies and organizations that operate in the European Union member states must comply with. And requirements on industries will only get stricter as global directives strengthens. Assessments, risk analyses and different preventions as well as monitoring, control and measurement systems, are required to be able to guarantee a safe workplace and to report emissions caused by industry operations.

Governments already demands sustainability reports and other detailed documentations from businesses. This to be able to compile the outcome from different regions in order to report further to UN, EU, World Health Organization (WHO) etc.

It is the owner, employer or end user that has the responsibility to ensure that the regulations are followed. Regardless if it replies to the individual worker to comply with the workplace regulations, or the organisation to follow the laws and standards for the industry, not following or not be able to report accurately, will in many cases have direct consequences.

Regulations and directives differs within different industries and different regions, but the overall purpose is always the same - to protect.

European Union Emissions Trading System

The EU Emission Trading System (ETS) is an international system for lowering greenhouse gas emissions and to reach our global climate goals. Emissions trading is a cornerstone of the EU strategy to tackle climate change and since 2005 EU ETS has set a cap on the total amount of greenhouse gas emissions allowed. The cap is reduced over time so that total emissions fall, meaning that the allowed amount of emissions will get lower and requirements on measures and monitoring from industries will strengthen.

The system covers around 10,000 installations in the manufacturing industry, focusing on sectors as energy-intensive industry and sectors including oil refineries, steel works and production of iron, aluminum, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals, among others. It's the world first and largest emission trading system but interest is growing around businesses and government leaders around the world and similar concepts have already been introduced outside the EU.

U.S. Occupational Safety and Health Administration

Occupational Safety and Health Administration (OSHA) under the direction of United States Department of Labor enforces certain mandatory, federal standards within industries for construction, maritime, agriculture as well as general industry standards and requires employers to keep their workplace free of serious recognized hazards.

OSHA standards on combustible dust, concerning workplace safety precautions as well as material handling issues. For welders, OSHA PEL for Cr(VI) is 5 µg/m³ but many health and safety organizations recommend much lower limits and specific materials within the fume are even lower. Some states and U.S. territories have adopted their own OSHA-approved State Plans, standards and enforcement programs, which are required to be at least as effective as those of OSHA. Companies and organisations that fail to comply with OSHA regulations expose their employees to well-documented safety risks. Violations of these regulations can also result in significant fines.

See all OSHA standards at www.osha.gov

National Fire Protection Association

The OSHA standards, as well as other federal and state combustible dust regulations, often have their foundation in standards made by The National Fire Protection Association (NFPA). The NFPA is an international organisation with expertise in eliminating death, injury, property and economic loss due to fire, electrical and related hazards. The NFPA standards on combustible dust provides guidance and recommendations for workers and workplace safety all over the world.

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According to the NFPA standards there is an obligation for the owner or end user to develop and document the factory situation in a Dust Hazard Analysis (DHA). Combustible dust is always potentially explosive dust and due to the fact that dust from most organic materials, synthetic materials and metals can explode, attention needs to be given to prevent dust explosions. The DHA is required to identify, assess and mitigate the risk and dangers of fires and explosions from combustible dust. It's a systematic review of the processes and areas of the facility where combustible particulate solids are present. The DHA will categorize facility locations into a classifying system for hazardous areas and each hazard identified must be managed and communicated to personnel. According to the general NFPA requirements it's the owner or operator of a facility with potentially combustible dust shall be responsible for:

- **Determining the combustibility and explosibility hazards of materials**
- **Identifying and assessing any fire, flash fire and explosion hazards**
- **Managing the identified fire flash fire and explosion hazards**
- **Communicating the hazards to affect personnel**

See all NFPA standards at www.nfpa.org

European explosive atmospheres directives - ATEX

The European Community addresses the ATEX directives for workplace safety and equipment in the EU to protect employees, the public and the environment from accidents with explosive atmospheres.

Since July 1, 2006 all existing industrial sites, as well as new industrial sites, in the EU must be fully ATEX EX compliant. The ATEX EX directives consist of two parts. The first directive, 2014/34/EU, deals with responsibilities placed upon manufacturers and suppliers of machinery and equipment for use in explosive atmospheres. While the second directive, 1999/92/EC deals with responsibilities placed upon owners and operators of the equipment.

The ATEX directives stipulate that companies and organizations that operate in the EU member states must comply with the ATEX Equipment Directive 2014/34/EU and the ATEX Workplace Directive 1999/92/EC. These directives regulate workplaces with potentially explosive atmospheres. More specifically: equipment and protective systems, and the safety and health of workers, respectively.

An explosive workplace atmosphere is one where there is a mixture of dangerous substances in the air. These can be different forms of dust, gases, mist, or vapours that, when ignited, can combust and spread throughout the facility. A combustible dust explosion is a perfect example of this. Neither the dust, nor the explosion, can be completely prevented. However, the ATEX directives force companies to invest in workplace safety solutions that reduce the risks posed by combustible dust and dust explosions.

It's the end user's responsibility to determine the possible explosion risk in their premises. One of the obligations is to classify the areas where explosive atmospheres may occur. It's also an obligation of the owner or end user to develop an "Explosion Protection Document" that demonstrates:

- **Explosion risk and assessment**
- **Adequate measures that will be taken to attain the aims of the directive**
- **The areas that have been classified into ATEX zones**
- **That the workplace equipment is operated and maintained with due regards for safety**

ATEX zone classifications

Zone 20: A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is present continuously, or for long periods or frequently. Examples: In general these conditions arise only inside equipment such as pneumatic conveying lines, mills, dry mixers, sieves etc. Zone 20 atmosphere is typically found inside equipment.

Zone 21: A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is likely to occur in normal operation occasionally. Examples: In general, these conditions can arise where dust clouds are frequently present during normal operation, e.g. grinding, sanding, open charging etc. The extent of zone 21 atmosphere is typically a distance of 1 meter around the source of release. Human beings typically find it extremely difficult to breathe in zone 21 atmospheres.

Zone 22: A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is not likely to occur in normal operation but, if it does occur, will persist for a short period only. Examples: In general, these conditions can arise in places with dust lying on the floor and other surfaces which can be dispersed and form explosive dust clouds. Normally, a manned area or an area close to people is most likely to be a no-zone (safe - non hazardous) area. For the general area to be classified even as Zone 22 there could be a thin layer of dust lying on part of the floor or other surfaces. Zone 22 atmosphere can occur in places where dust can escape through leaks and form hazardous quantities, in bag storage areas (bag breakage) etc. The extent of zone 22 atmosphere is typically a distance of 1 meter around the source of release.

ATEX Directives

- **European Commission ATEX directives:**
https://ec.europa.eu/growth/sectors/mechanical-engineering/atex_en
- **ATEX Equipment Directive 2014/34/EU:**
<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014L0034>
- **ATEX Workplace Directive 1999/92/EC:**
<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31999L0092>

Future regulations

The importance of clean air for both people and the planet cannot be emphasized enough and since the technique for sustainable industries exists and is increasingly developing, a clean air future is possible. The awareness of health issues and climate effects increases constantly, followed by lower acceptance and higher requirements. From individual workers on their employers as well as from customers on companies, and stricter global requirements on state law.

We have the technique to capture emissions and create clean air industries that doesn't effects either workers, society or the planet. We have the technique to capture combustible dust and to prevent explosions. If the directives for explosive atmospheres is followed, we don't have to count the amount of factory fires or explosions in the future.