

SILICA DUST COMPLIANCE GUIDE

How to ensur safe.



How to ensure that your workplace is silica dust

WHAT OUR CUSTOMERS ARE SAYING

WHAT WAS THE MAIN DECISION-MAKING FACTOR THAT MADE YOU DECIDE TO INSTALL AIR CLEANING BY **ZEHNDER?**

We are continually looking to improve the working conditions of our employees, their health, safety and welfare beyond the statutory requirements. We value and want to retain our highly skilled workforce, and by our commitment to providing safe working environments we feel we are motivating them to continue producing the highest quality crafted products. The wearing of air fed masks for the molders is compulsory due to total inhalable dust and RCS levels involved in handmade brick production.

PPE being the last line of defense, the ultimate elimination of its use by the development and introduction of engineering solutions is the reason we are proactive in our approach.

SOLUTIONS?

The brickmolders state is that there has been less dust settle on their equipment and surrounding area than before the Zehnder units were installed - particularly on Monday mornings. There is also a noticeable visual difference in the atmosphere.

When filters are being routinely replaced by the service engineers the effectiveness of the systems' dust collection and filtering capability has been observed. If the airborne dust had not been collected by the system, it would have still been in the air for people travelling through the space. The static air quality measurements taken by Zehnder prior to the installation, and subsequent readings have shown a good improvement in the air quality, and we have no reason to doubt the figures submitted.

Alan Spencer, Michelmersh Shepshed, UK

WHAT ARE THE MAIN IMPROVEMENTS THAT YOU HAVE NOTICED SINCE THE INSTALLATION OF CLEAN AIR

WHAT IT IS ALL ABOUT

GET COMPLIANCE PEACE OF MIND

Clean air is not a luxury; it's a necessity. Business owners must take responsibility for their employees' health and wellbeing, which means taking every possible measure to limit silica dust exposure.

Masks and standard air filtration don't cut it when it comes to silica – the toughest and most dangerous airborne particle. So, what can your business do? Adopt industrial air cleaning solutions. These systems effectively capture airborne silica before it can be inhaled or settle on surfaces, and they also remove several other harmful contaminants from the air your workers breathe. Try our clean air solutions today: there's no such thing as air that is too safe or too clean!



WHAT DOES THE LAW SAY?

Respirable crystalline silica exposure standards differ from country to country, each having its own limit on the 'safe' amount. Countries determine the level that is safe based on a worker's 8-hour shift.

LEGAL LIMITS IN YOUR COUNTRY

COUNTRY	LEGAL LIMIT
Austria	0.15 mg/m ³
Belgium	0.1 mg/m ³
Denmark	0.1 mg/m ³
Finland	0.05 mg/m ³
France	0.1 mg/m ³
Germany	0.05 mg/m ³
Italy	0.05 mg/m ³
Netherlands	0.075 mg/m ³
Norway	0.1 mg/m ³
Poland	0.3 mg/m ³
Sweden	0.1 mg/m ³
Switzerland	0.15 mg/m ³
United Kingdom	0.1 mg/m ³
United States	0.05 mg/m ³

FAILURE TO COMPLIANCE AND THE CONSEQUENCES

Governmental regulators are continuing to tighten restrictions on silica exposure, reducing the 'safe' amount, and raising fines against companies that don't adequately protect their workers.

UNITED KINGDOM

Fees begin in the thousands and can get far higher. Stonyhurst College was fined more than £100,000 for failing to take sufficient measures to control RCS in the air. Their negligence cost an employee the ability to work and left them with a life-threatening lung disease – so the cost was borne by their consciences as well as the company.

UNITED STATES

In the US, OSHA silica exposure fees can be up to \$7000 per day! According to the OSHA guidelines, businesses that have unsafe levels of respirable crystalline silica (RCS) in the air face a minimum fine of \$5,000. For every day that an issue goes unresolved, the business can be charged up to \$7,000!

GERMANY

Germany regulates silica as a carcinogen, meaning all exposures should be avoided. If companies do not comply, they risk fines and potentially being shut down.

THE NETHERLANDS

The current limit for crystalline silicon dioxide ('free silica'), is 0.075 mg/m³. This also covers quartz, cristobalite, and tridymite. It is estimated that the Netherlands is among the countries with the highest amount of employees exposed to silica dust.

FRANCE

France's ANSES determines the safe level of silica exposure for the more than 350,000 workers who come into contact with the substance every year. Estimates suggest that up to 30,000 workers are currently exposed to unsafe levels above the present limit of 0.1 mg/m³. Estimates also suggest that 60,000 workers may be exposed to levels above the lowest international level of 0.025 mg/m³.

BEING COMPLIANT IS EASIER THAN YOU THINK

Fortunately, proactive companies can avoid fines and protect themselves and their employees by turning to the correct industrial air cleaning solution. It's far cheaper than the fines, it saves on cleaning by capturing a range of particles and dust at the source, and it can save lives!



SILICA, WHICH IS ALSO KNOWN AS SILICON DIOXIDE, IS A NATURALLY OCCURRING CRYSTALLINE OXIDE. IT IS INCREDIBLY COMMON, MAKING UP AROUND A QUARTER OF THE PLANET'S CRUST, AND IT CAN BE FOUND IN MANY TYPES OF ROCK, SAND, AND CLAY.

IT CAN ALSO COMMONLY BE FOUND IN CONSTRUCTION MATERIALS SUCH AS BRICKS, MORTAR, CONCRETE, AND TILES. WORKING WITH THESE MATERIALS, ESPECIALLY WHEN CUTTING, DRILLING, GRINDING, OR POLISHING, PRODUCES SILICA DUST.

WHAT IS CRYSTALLINE SILICA AND WHERE DOES IT COME FROM?

How much do you really know about the construction materials that you work with every day? Our graphics will give you an indication of the amount of silica in these materials.





HEALTH RISKS ASSOCIATED WITH LONG-TERM EXPOSURE TO SILICA DUST

Silica dust is one of the most significant causes of work-related diseases worldwide. This is because silica is a common material, and many workers in a variety of industries cut, drill, grind, and polish silica-containing materials. These tasks create the dust, and once it is in the workplace, it is difficult to get rid of even basic cleaning tasks like sweeping disturb the dust and make it easier to inhale. Long-term exposure to silica dust can cause various health risks, as the dust can make its way deep into the lungs. Here are a few of the conditions linked to exposure to silica dust:



LUNG CANCER

Over one hundred studies have identified a strong link between silica dust exposure and lung cancer, the most frequently deadly form of cancer. The mechanism by which silica dust exposure may cause cancer remains unclear. The International Agency for Research on Cancer suggests the most likely reason is that dust deposits in the lungs cause constant irritation and inflammation, irritating the immune system, which in turn can damage the DNA and cause cancer in some people.

SILICOSIS

Silicosis is an irreversible chronic respiratory illness caused by a build-up of silica dust particles in the lungs. The particles are too fine to be filtered out by the body's defences, and they build up in the alveolar sacs, deep within the lungs. The body has no way of expelling them once they are here, and they can cause scarring, limiting lung capacity. Symptoms include shortness of breath and a persistent cough, but they may not appear until years after exposure, making the disease hard to track. In severe cases, silicosis can lead to disability and death.

OTHER RESPIRATORY ILLNESSES

Silica dust exposure can also cause a range of other illnesses. For instance, chronic obstructive pulmonary disease (COPD) is a group of conditions characterised by impaired lung function, and it is more common among workers exposed to silica dust. Affected workers are frequently diagnosed with workrelated emphysema or chronic bronchitis.

MEDICAL RESEARCH

Scientists and medical professionals are continuing to research silica dust exposure to better understand how it affects the body. Toxicology research on crystalline silica has shown that the biological response is largely determined by the dust particles' surface properties. Cellular experiments have demonstrated that adding a chemical coating to the surface of a quartz particle dramatically reduces the inflammatory response. Similarly, quartz particles coated with clay or other materials show less toxicity than freshly crushed rock.

Some scientists have suggested that for there to be a risk for lung cancer, it is first necessary to develop silicosis. However, the evidence for this is weak, and other research shows increased cancer risks among workers who don't have silicosis. The only thing we can be sure of is that decreasing exposure to silica will reduce the risk for both diseases.



SMART SOLUTIONS FOR PREVENTING SILICA DUST EXPOSURE

Protecting workers from silica dust must begin with a thorough understanding of the dangers and a comprehensive risk assessment. Businesses must consider where dust is generated, where it gathers, and what protections are necessary. Many companies already take a variety of measures, such as requiring appropriate respiratory protective equipment (RPE) and using local exhaust ventilation (LEV), as well as regular cleanings. Workers must ensure that their RPE is fitted correctly, and businesses should provide the option to wear gloves and overalls wherever appropriate. The US Occupational Safety and Health Administration (OSHA) and Britain's Health and Safety Executive (HSE) offer further guidelines on protecting workers.

HSE HIERARCHY OF CONTROLS



The first priority, according to the HSE, is to eliminate sources of danger wherever possible. To avoid silica exposure, this may mean redesigning the

The second priority is replacing risky processes or high-risk materials with less dangerous alternatives. If there is another material that workers could

OSHA FACT SHEET

OSHA has published a fact sheet intended to help employers comply with the agency's standard on worker exposure to respirable crystalline silica.

1. MEASURE

Measure theamount of silica that workers are exposed to if it may be at or above an action level of 25 μ g/m³, averaged over an 8-hour day.

2. PROTECT

Protect workers from respirable crystalline silica exposures above the permissible exposure limit (PEL) of 50 μ g/m³, averaged over an 8-hour day.

3. LIMIT

Limit workers' access to areas where they could be exposed above the PEL.

4. USE

the PEL.

6. RESTRICT

Restrict housekeeping practices that expose workers to silica where feasible alternatives are available.

7. ESTABLISH & IMPLEMENT

Establish and implement a written exposure control plan that identifiestasks that involve exposure and methods used to protect workers.

8. OFFER

Offer medical exams including chest X-rays and lung function tests - every three years for workers exposed at or above the action level for 30 or more days per vear.

9. TRAIN

Use dust controls to protect workers from silica exposures above

5. PROVIDE

Provide **respirators** to workers when dust controls cannot limit exposures to the PEL.

Train workers on work operations that result in silica exposure and ways to limit exposure.

10. KEEP

Keep records of workers' silica exposure and medical exams.

SILICA DUST IS UNAVOIDABLE IN MANY **INDUSTRIES**

However, this doesn't mean that employees need tobe at risk. Don't stop with ventilation and PPE, you can go further to keep your employees safe. Capture silica dust directly at the source and remove it from the air, before it settles or is inhaled.

LET'S TACKLE SILICA DUST TOGETHER

Many companies invest in expensive systems that prove ineffective in addressing dust. Most solutions fail to reach even ISO coarse (MERV 6 – 8 levels), while levels of ePM1 (MERV 14 – 16) must be achieved in order to reduce contamination by even the smallest particles, including microorganisms.

WHATEVER YOUR DUST ISSUES, WE CAN FIND A SOLUTION

At Zehnder Clean Air Solutions, our industrial air cleaning systems filter dust and other airborne particles – including silica dust – before they can be inhaled or deposited on goods, machines, and people. These solutions are designed to cater to each customer's physical space with a variety of flexible installation options.

WHAT MAKES US UNIQUE

Our portfolio has several different types filter technologies for different applications. When you work with us, we will identify and set up the perfect combination of filters to meet your specific air cleaning needs.

Think of Zehnder Clean Air Solutions as your one-stop source for clean air.

We take care of everything and offer personalised advice to help you choose the most effective filter. We can also adapt your solution over time to reflect changes in your business. If your business is expanding, the correct solution today may be out of date in a few years – our team will work with you to meet both current and future needs.

HOW DO ZEHNDER'S AIR CLEANING SYSTEMS WORK?



Our air cleaning systems feature a plug and play operation with variable and flexible installation options. Filter changes are signalled via an alarm function, and users can programme a timer to control the airflow rate. Adjustable deflectors are used to determine the airflow direction.

Our **most powerful filter combination** is the patented Flimmer M. It consists of a Flimmer filter with very fine polypropylene fibres and a media filter.

The Flimmer filter is at the core of our units. Its superpower lies in attracting and binding dust particles – ranging from fine to coarse in size – using electrostatic forces. The subsequent downstream media filter captures anything that has not been trapped by the Flimmer filter, in accordance with its filter class.

This combination **absorbs high quantities of solid particles and boasts a long lifespan** because the filtration principle does not allow a large build-up of pressure over the filters.

THE PROOF IS IN THE OUTCOME

WHAT WE CAPTURE OUT OF THE FILTER

OSHA, for example, lowered the permissible exposure limit of RCS from 100 to 50 µg/m³. This is equivalent to a teaspoon of silica dust in the volume of a football field of 30 meters high (157,800 m³). What we find in one filter of RCS can be up to 3 kg!

This could be your business - contact us today!



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