

H10 – Opening Statement

Respirable Crystalline Silica

Silica dust has the potential to be one of the industry's long-term health concerns. However, if correctly controlled the effects on employees, contractors and visitors can be minimal.

This procedure will help you understand how silica affects the human body and the mechanism of harm that can occur. It outlines what to consider when undertaking a risk assessment and lists some typical areas of risk.

There is a list of duties for your employees and a section that explains your duties to comply with the social dialogue agreement.

Finally it can often take many years for exposure to silica to manifest itself into obvious symptoms. It is important to minimise all exposure but health screening can identify symptoms at a very early stage and the removal from exposure can stop further harm. There is a brief outline of health screening measures that will help identify workers at risk.



H10 – Respirable Crystalline Silica

What is this?

This is a written procedure which explains what both silica and silicosis are, how they affect the human body and how they should be controlled. This procedure should be read in conjunction with the COSHH procedure.

The person responsible for implementing this procedure is:

What is dust?

Dust is any solid substance that does not dissolve (at any significant rate) in lung fluid and is capable of being carried in an airflow.

It is divided into two types:

- Fumes where the size of the solid particles is below 1µm, and
 - Dusts which have a particle range of between 1µm and 1,000µm.
-

Why is dust hazardous?

All dusts can harm the human body if there is exposure on a large scale. Some dust such as silica and asbestos can be harmful even if exposure is negligible. These dusts are fibrogenic which means they cause a reaction inside the lung in a different way than inert dusts, and they can result in the following:

- Permanent alteration to, or the destruction of, the alveoli
 - Moderate to extreme reactions in the fibrous structure of the alveoli, and
 - Permanent scarring of the lungs.
-

What are the body's natural defence mechanisms?

The body has a number of defence mechanisms to combat dust, including saliva in the mouth and nasal hairs. Within the throat there are small hairs that push dust up the throat; as it rises the dust amalgamates to form phlegm and mucus.

However, these mechanisms are only effective when the dust particles are larger (>10µm). The finer particles are able to enter the lung and as they come into contact with the lung wall, they can cause damage.

How does silica harm the body?

It is not fully understood how inhaled silica particles induce a fibrogenic reaction. It could be due to the sharp edges of the crystalline structure, protein absorption on the particle surfaces causing an abnormal reaction, or the production of silicic acid which is believed to be toxic.



What is certain is that the body's immune system deploys cells to engulf the silica particles. These cells die and are further engulfed and so on until an inflammatory reaction occurs resulting in fibrosis.

What is silicosis?

Scar tissue can be produced which results in fibrosis, a stiffening of the lung. If the dust present is high in silica, this condition is often described as silicosis. There are a number of forms of crystalline silica but quartz is the main form encountered occupationally.

The main forms of silicosis affecting the extractives industry are:

Nodular silicosis	Associated mainly with exposure to quartz. The condition develops over a number of years. Small nodules of fibrotic tissue develop which grow and fuse together as the disease progresses.
Acute silicosis	Can occur after only a short exposure to very high concentrations of quartz. It is usually fatal with death occurring within as short a period of time as 12 months.
Mixed dust fibrosis	Quartz is inhaled with other materials, eg iron oxide as found in the steel industry.

What are the symptoms of silicosis?

In its early stages silicosis may only be diagnosed by x-ray examination. The silica deposits, mainly in the upper part of the lung, are identified by the pattern on the x-rays. At this stage there may only be limited areas of collagenous pneumoconiosis. Breathlessness on exertion, coughing with associated sputum, and chest pains all develop as the condition intensifies. In its later stages, impaired lung function puts a strain on the heart and death usually results from a combination of lung and heart failure.

There is an increased likelihood of developing tuberculosis and lung cancer in people with silicosis; it is believed that silicosis impairs the immunity to these diseases.

What is the social dialogue agreement?

The social dialogue agreement was introduced in 2006. The agreement imposes the implementation of good practices by industry, aiming for the prevention and elimination of the risk of silicosis. A 'Good practices document on dust prevention in the workplace: Respirable Crystalline Silica' has been drafted by the silica producers. The document is a contribution by the industry towards the protection of workers from possible exposure to respirable crystalline silica dust in the workplace. The principles are simple.

For the site:

- Is crystalline silica present on-site?
- Establish whether respirable crystalline silica is present.
- Identify the exposure levels.
- Introduce controls to eliminate or reduce the exposure.



For the employees:

(A conference must occur, discussing:)

- What respirable crystalline silica is
 - The adverse effects on health
 - The need to co-operate with exposure assessments, **and**
 - Involvement in deciding the control measures.
-

What does a responsible manager need to do?

The responsible manager must ensure that a COSHH dust assessment is undertaken for each location on the site. Typically, locations could be broken down as follows:

- Face activity (drilling, loading and hauling)
- Primary crushing and screening
- Secondary and tertiary crushing and screening
- Coated stone and concrete production
- Loading and stockpile management, **and**
- Workshops and offices.

The assessment ensures that each activity is considered under the following headings:

- Potential for exposure
- Existing control measure
- Effectiveness and likely exposure
- Further control measures
- Respiratory protective equipment
- Maintenance and testing
- Health surveillance.

Any required control measures should be transferred onto the site management action plan.

What do employees need to do?

Employees must:

- Contribute to the risk assessment process
- Follow safe working procedures
- Attend health surveillance
- Attend training
- Wear PPE
- Communicate any problems to their employer.



What health surveillance is necessary?

The company will carry out health surveillance where it is appropriate for the protection of the health of its employees.

At least every three years, each employee will be subjected to a comprehensive set of health surveillance tests that includes lung function, eyesight, audiometry, vibration white finger and dermatitis checks.

In intervening years, on high silica sites, lung-function tests only will be carried out. If the lung-function tests show signs of deterioration then chest x-rays may be undertaken. The records of health surveillance tests are sent to the company health professional for his/her analysis and advice where appropriate.

Legislation

- Control of Substances Hazardous to Health Regulations 2002
-

Associated documentation

- Hazardous substance list and employee matrix
- Manufacturer's Material Safety Data Sheets
- COSHH information sheets
- Site-specific airborne substance exposure assessment
- Examination and test record
- Personal exposure monitoring sheets
- Good practices document on dust prevention in the workplace: Respirable Crystalline Silica

