Construction Hazards

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Construction Hazards

Construction hazard refers to any condition or situation in a construction environment that has the potential to cause harm, injury, illness, or damage.

Common construction hazards include:

Falls, Scaffolding collapses, Electrical hazards, Struck-by falling objects or moving equipment, Lifting and manual handling, Chemical exposure, Noise and vibration, Working in Confined spaces, and Fire hazards.

Construction hazards encompass a range of substances, including:

1. Dust and fibers
2. Fumes
3. Mists, liquids, gases and vapors

Construction Dust

Dusts are solid particles suspended in air. They may be produced by crushing, grinding, sanding, sawing or the impact of materials against each other.

Types of construction dust:

1. **Silica dust** – created when working on silica-containing materials like concrete, mortar and sandstone (or respirable crystalline silica RCS);
2. **Wood dust** – created when working on softwood, hardwood and wood-based products like Medium-density fiberboard (MDF) and plywood;
3. **Lower toxicity dusts** – created when working on materials containing very little or no silica. These include gypsum (e.g., in plasterboard), limestone, marble and dolomite.

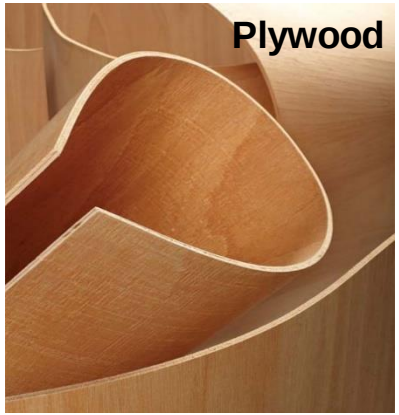
Hardwood vs Softwood

Hardwood (Teak)

Softwood (Pine)

MDF

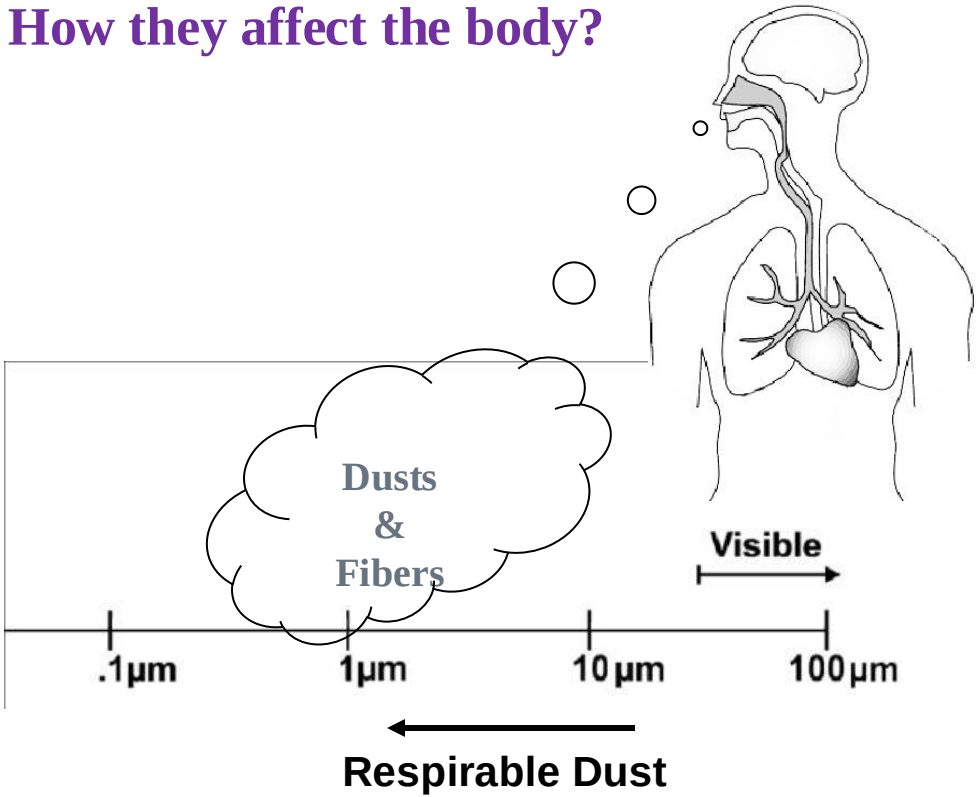
Limestone



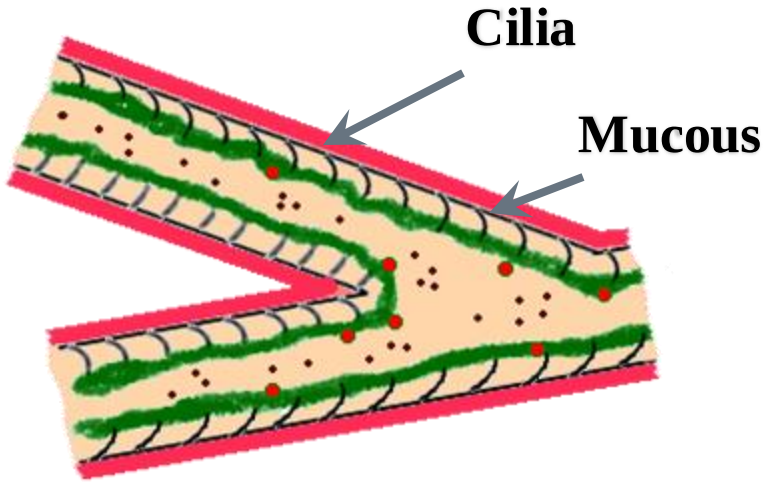
Dolomite

Dusts & Fibers

How they affect the body?



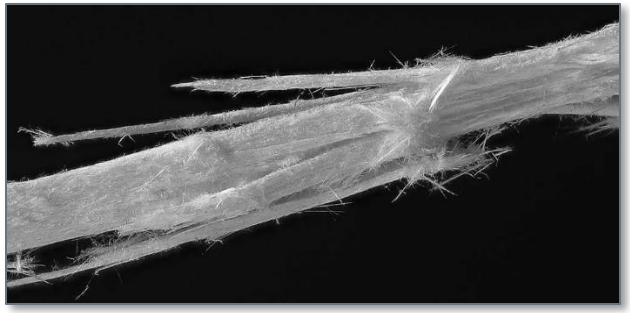
Body's Defense Against Dust:



Construction Dusts & Fibers

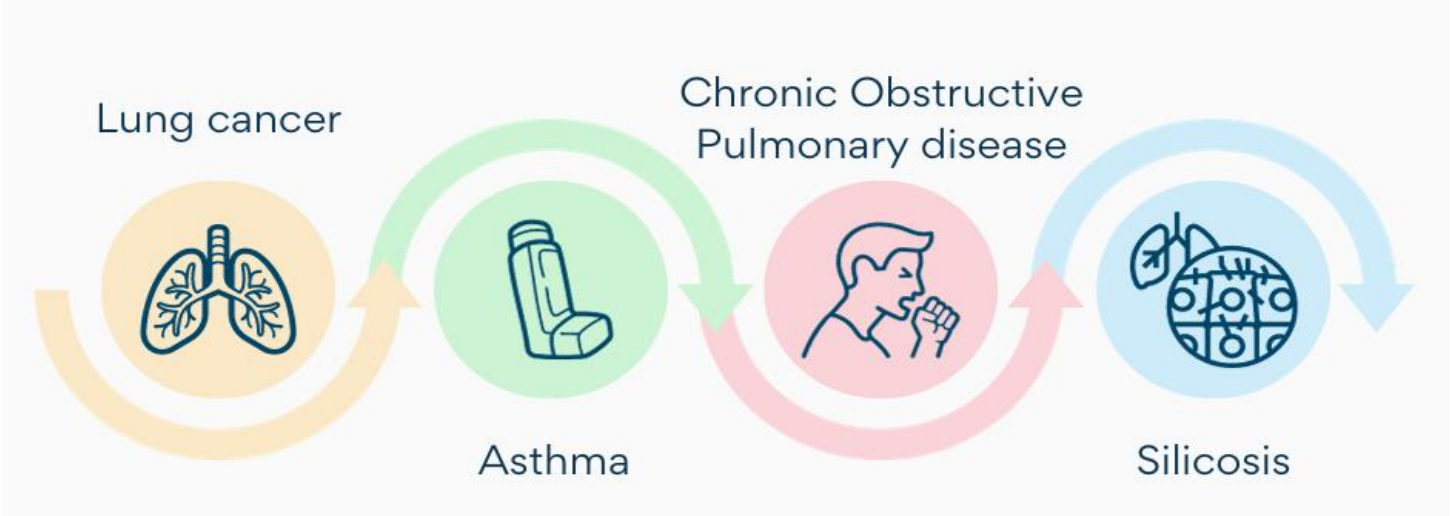
Other examples of Dusts & Fibers found in construction include:

- Crystalline Silica
- Asbestos fibers
- Lead-Based Paint
- Fiberglass



Health Effects of Dust Exposure

Individuals exposed to airborne dust must understand the potential harm it poses to their lungs and airways such as:



Dust can build up in the lungs and harm them gradually over time.

Unfortunately, by the time it is noticed the total damage done may cause permanent disability and early death!

Crystalline Silica

Crystalline silica is a common mineral found in the earth's crust. It is found in:

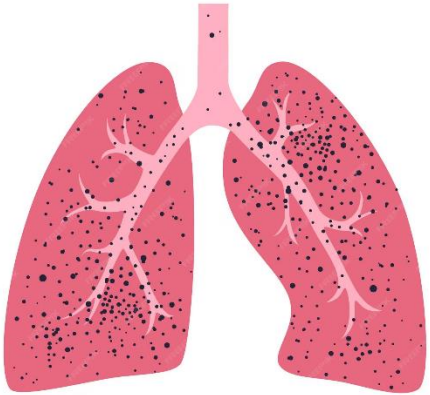
- Quartz
- Sand
- Gravel
- Clay
- Granite
- Other forms of rock

Exposures to Crystalline Silica Dust include:

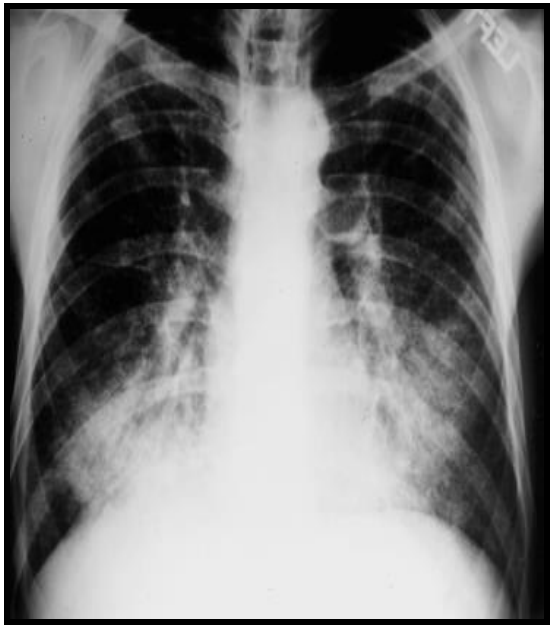
- Concrete cutting.
- Sandblasting for surface preparation.
- Crushing and drilling rock and concrete.
- Masonry and concrete work (e.g., building, road construction, street cutting and repair).
- Mining & tunneling.
- Demolition work.
- Cement and Asphalt pavement manufacturing.

Silicosis

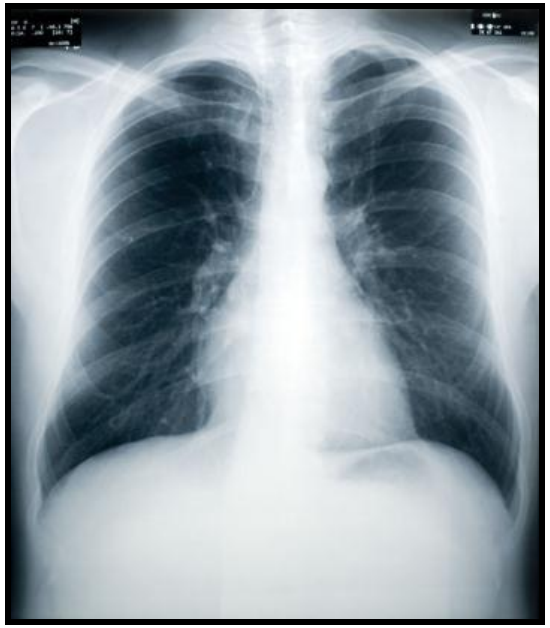
- Disease of the lungs due to the breathing of dust containing crystalline silica particles.
- An incurable disease that can lead to disability and death!
- Concrete cutting with no engineering control or PPE!



Silicosis Damage



Silicotic Lungs



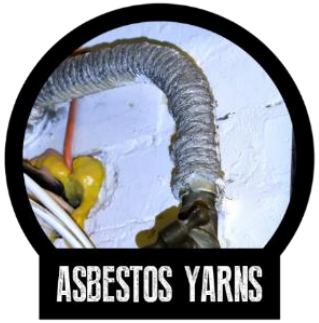
Normal Healthy Lungs

Silicosis Damage vs. Healthy Lungs

Asbestos

- Asbestos is a naturally occurring fibrous silicate mineral.
- There are six types of asbestos, composed of long and thin fibrous crystals, each fiber being composed of many microscopic fibrils that can be released into the atmosphere by abrasion and other processes.
- Asbestos has many uses in construction fireproofing and chemical and noise resistance.
- It is usually mixed with other materials to produce asbestos-containing materials (ACM).

Where is Asbestos generally found?



How can Asbestos harm us?

Asbestos generally isn't dangerous until it is disturbed, when it releases fibers.

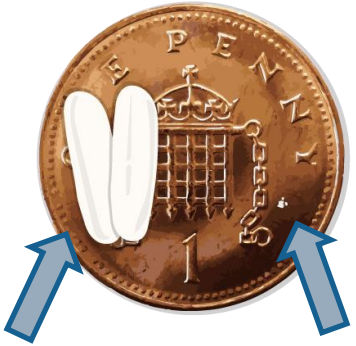
- Respirable asbestos fiber is invisible to the naked eye.
- When breathed in, they become trapped in the lungs.
- Over time this can cause serious illness including fatal cancers; such as:

Asbestosis:

A long-term inflammation and scarring of the lungs due to asbestos fibers.

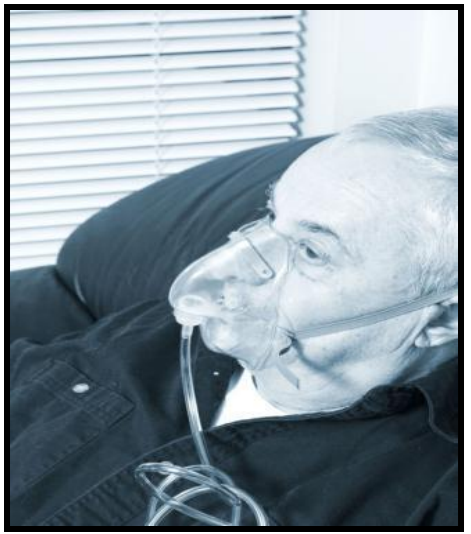
Mesothelioma:

Rare form of cancer that develops in the lining that covers the outer surface of some of the body's organs such as lungs, abdomen and heart.



2 grains of rice

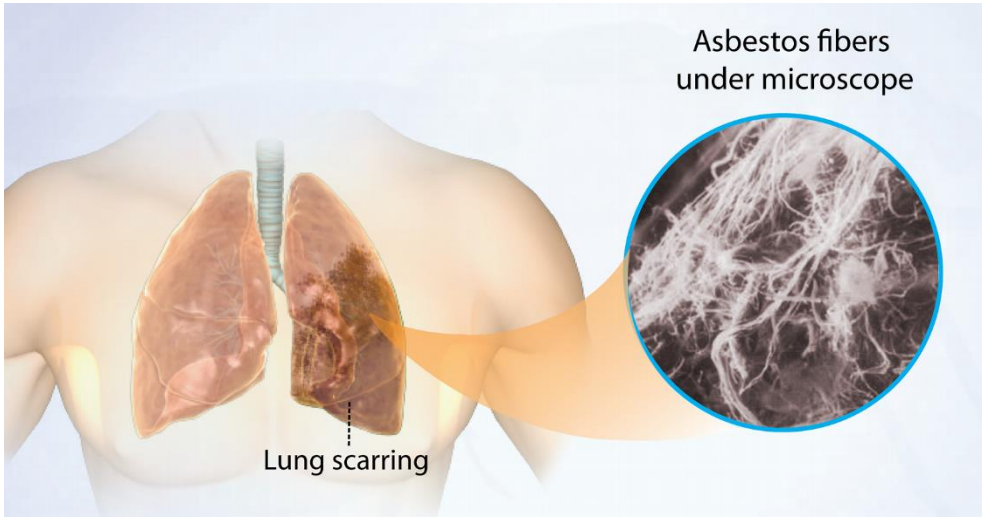
20,000 asbestos fibers

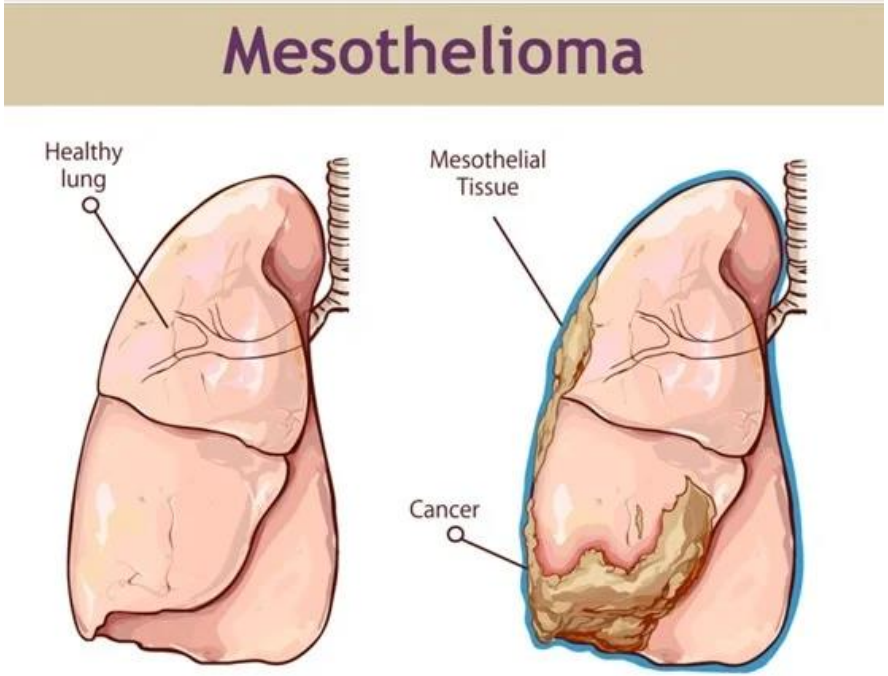


Worker with chronic health problems; he needs oxygen.

How can Asbestos harm us?

Asbestosis:





How to prevent Asbestos-related harm?

Eight simple steps:

1. Know where it is
2. Record where it is
3. Complete a risk assessment
4. Create a management plan
5. Planning to work on ACMs
6. Inform those who are potentially exposed
7. Train workers
8. Investigate asbestos incidents

Lead-Based Paint Dust

- As the lead paint gets older, it may be damaged by moisture or friction upon disturbance and produce lead dust.
- It causes **Lead Poisoning** for everyone, especially children and pets.
- At high levels of exposure lead attacks, the brain and central nervous system, causing coma, convulsions and even death.
- To avoid exposure to Lead Dust, maintain all painted surfaces in good condition and clean frequently.
- Use a lead-safe certified renovator to perform renovation, repair and painting jobs.

Fiberglass Insulation

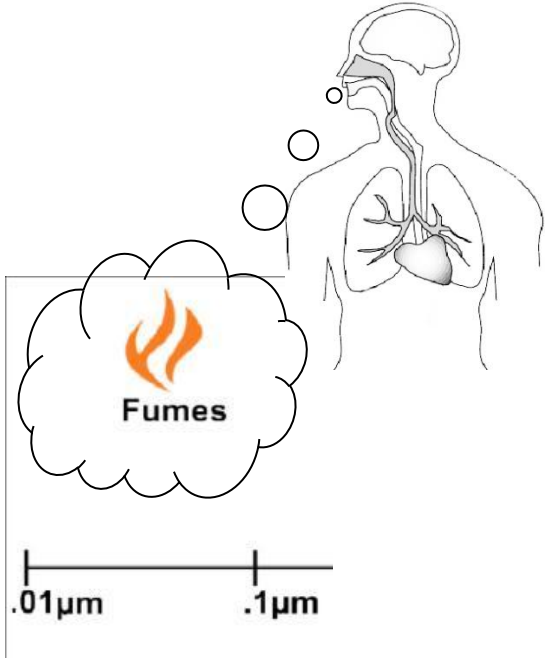
- Fiberglass insulation is made of plastic reinforced by tiny glass fibers.
- Exposure Hazards include:
  - Redness of Eyes and irritated skin.
  - Soreness in nose and throat can result when fibers are inhaled.
  - Asthma and bronchitis can be aggravated.
- To avoid fiberglass hazards, provide general or local exhaust ventilation systems and wear PPE.

Fumes

- Fumes can easily pass from the lungs into the blood stream; resulting in a systemic health effect.
- Irritate the skin, eyes and nose; causing an immediate (acute) health effect.

Examples of fumes found in construction are:

1. Welding Fumes
2. Asphalt
3. Naphtha – Coal Tar
4. Lead Fumes
5. Hexavalent Chromium (CrVI)



Fumes are respirable size particles that are inhaled and can enter the blood stream.

1. Welding Fumes:

Welding fumes are a complex mixture of metals, metallic oxides, silicates and fluorides.

Fumes are formed when a metal is heated above its boiling point and its vapors condense into very fine particles.

Hazards:

- Metal Fume Fever [Zinc (Galvanized Metal)]
- Siderosis [Iron, Iron Oxide (Rust)]
- Manganism (Manganese)

Welding fumes are some of the most hazardous exposures a construction worker may experience.

2. Asphalt Fumes

Asphalt fumes are small particle clouds created through condensation after volatilization of asphalt.

Health Effects include:

- Headache
- Skin rash
- Sensitization
- Throat & eye irritation
- Cough
- Suspect carcinogen

- Must wear appropriate PPE.

3. Naphtha (Coal Tar)

A brown or black thick liquid that comes from coal; can cause:

- Acne
- Allergic skin reactions
- Cancer
- Photosensitivity – A condition in which a person becomes more sensitive to light.

4. Lead Fumes

Lead Poisoning:

- Joint or muscle aches, anemia
- Loss of appetite
- Nausea & vomiting
- Stomach cramps
- Constipation
- Fatigue

5. Hexavalent Chromium

A form of the metallic element chromium.

(CrVI) Compounds found in:

- Dyes, paints, primers, inks, and plastics.
- Welding and flame cutting fumes.

Health Effects:

- Lung cancer
- Irritation or damage to the nose, throat, and lungs.
- Irritation or damage to the eyes and skin.

Mists

Examples of mists found in construction include:

- Oil mist
- Paint mist
- Pesticides
- Aerosols

Harmful chemical or oil mists irritate eyes, skin and the respiratory system.

Figure 1: Construction worker spraying anti termite chemical treatment at the construction

Figure 2: Spray Painting

Control of Substances Hazardous to Health Regulations 2002 (COSHH)

There are three key things you need to do:

1. Assess (the Risks)

High dust levels are caused by one or more of the following:

1. **Task** – the more energy the work involves, the bigger the risk. High-energy tools like cut-off saws, grinders, and grit blasters produce a lot of dust in a very short time;
2. **Work area** – the more enclosed a space, the more the dust will build up. However, dust levels may not be low when working outside with high-energy tools;
3. **Time** – the longer the work takes, the more dust there will be;
4. **Frequency** – regularly doing the same work, day after day increases the risks.

2. Control (the Risks)

Stop or Reduce the dust:

Use different materials, less powerful tools or other work methods to stop or reduce the amount of dust. Use:

1. The right size of building materials so less cutting or preparation is needed;
2. Silica-free abrasives to reduce the risks when blasting;
3. A less powerful tool – e.g., A block splitter instead of a cut-off saw;
4. A different method of work altogether – e.g., a direct fastening system.

2. Control (the Risks)

Control the dust:

For work that produces high dust levels, stop the dust from getting into the air by:

1. **Water** – water damps down dust clouds. However, use the amount of water correctly.
2. **On-tool Extraction** – removes dust as it is being produced. It is a local exhaust ventilation (LEV) system that fits directly onto the tool.

   This system consists of several individual parts – the tool, capturing hood, extraction unit and hoses.

Water suppression on a cut-off saw

Wall chasing (On-tool Extraction)

Respiratory Protective Equipment (RPE)

RPE is a particular type of PPE, used to protect the individual wearer against the inhalation of hazardous substances in the workplace air.

Reusable Half Mask

Full Face Mask

Powered Helmet

Powered Hood

Disposable Half Mask

Respiratory Protective Equipment (RPE)

In cases where water or on-tool Extraction isn't sufficient to adequately reduce exposure, Respiratory Protective Equipment becomes essential.

Ensure the chosen RPE is:

1. **Appropriate for the dust type and quantity** – RPE comes with an Assigned Protection Factor (APF) indicating wearer protection. The typical APF for construction dust is 20, limiting inhalation to a twentieth of airborne dust.
2. **Properly fitted** – Tight-fitting masks require face fit testing.
3. **Worn correctly** – Close-fitting masks necessitate a clean-shaven face.
4. **Suited for the task** – Consider powered RPE for extended use, especially beyond an hour, as disposable or half masks might become uncomfortable over time.

3. Review (the controls)

Check the control measures through:

1. **Procedural adherence** to ensure correct work execution.
2. **Assessing effectiveness**; if dust remains, consider dust exposure monitoring.
3. **Worker involvement** for issue identification and solution generation.
4. **Equipment upkeep**, cleaning, storage, and maintenance of non-disposable RPE.
5. **Regularly examining** and testing on-tool extraction systems every 14 months.
6. **Supervision** to ensure control utilization and proper work methods are followed.

Thank You!