WHITEPAPER

DUST IN CONSTRUCTION

FOREWORD

The whitepaper highlights the outstanding work carried out in the construction industry, the hazards that are too often part of everyday life for those who work within it, and the commitment by Milwaukee to set industry standards.

The valuable information in this paper will assist suppliers, industry professionals, and the construction industry protects its workforce from preventable exposures and illnesses from unnecessary exposure to harmful Dust.

Like asbestosis, silicosis is terrible but ultimately preventable through awareness and safe, thoughtful planning. Suppliers, designers and manufacturers, and those with health and safety responsibilities throughout the life of any construction work should be aware of the risks from dust exposure and take all necessary steps to lessen its impact.

Remember, you only get one pair of lungs. Protect them.

David Cant, CFIOSH
Veritas Consulting Safety Services

Veritas Consulting is a specialist consultancy providing Health and Safety and CDM advice. The company supports, consults and coaches construction and the built environment industry professionals across the UK.

David Cant, Managing Director of Veritas Consulting, is a Chartered Safety and Risk Management practitioner (CFIOSH – Chartered Fellow of The Institution of Occupational Safety and Health) with over 20 years of industry knowledge, experience and expertise.

CONTENTS

ABOUT MILWAUKEE

Milwaukee Electric Tool Corp. is an industry-leading manufacturer and marketer of heavy-duty, portable electric power tools and accessories for professional users worldwide.

Since its founding in 1924, Milwaukee has focused on a single vision: To produce the best heavy-duty electric power tools and accessories available to the professional user. Today, the Milwaukee name stands for the highest quality, durable and reliable professional tools money can buy.

Milwaukee currently employs approximately 1,000 people globally. The company continues to set industry standards, targeting professional tool users of all types with a product line that includes more than 500 tools and over 3,500 accessories. Throughout its history

Milwaukee's commitment to quality remains steadfast, although the way that quality is ensured has changed drastically. Quality is designed in, using state-of-the-art technologies and sophisticated manufacturing techniques.

The people at Milwaukee are as much a part of the success as the tools themselves. All of Milwaukee's tool and accessory manufacturing operations have been arranged in manufacturing cells consisting of teams of motivated and empowered employees. Cellular manufacturing methods help Milwaukee employees focus on customer needs; allow for quick response to market demands; and increase employee productivity and product quality.

INTRODUCTION

Dust is responsible for a large number of the non-asbestos lung diseases including cancer, silicosis, asthma and chronic obstructive pulmonary disorder (COPD).

Every year in Great Britain over 500 construction workers are believed to die from lung cancer caused by silica dust alone. That is about 10 people a week.

This report *Dust in Construction* provides insight into this issue and why it has been a challenge to the industry. It looks at EU and UK regulations and guidance and how the industry is taking steps to ensure workers are not subjected to high levels of dust.

DUST IN CONSTRUCTION

According to an IOSH (Institute of Occupational Safety and Health) survey of construction workers, over half of responses (56.6 per cent) indicated that workers have no awareness of the health risks or idea of the significance of construction dust.

> **Having been a trainer for a number of years, construction workers are always surprised at the issue of the health hazards dust can cause and wonder why they have not been protected or been made aware before. In our experience, the understanding is low and the perception of risk very poor.**

Cutting, grinding, drilling, sawing, grit blasting and sanding are some of the common tasks on a construction site which can produce large quantities of dust.

> **Dust, like noise, affects people when they are older so they do not perceive it as a significant immediate risk to their wellbeing unlike falls from height, equipment etc.**

> **For many construction workers their perception is 'It's only dust what harm can it do. I'll wash it down with a pint.**

TYPES OF DUST

There are three main types of construction dust on a building site:

1

Silica dust

The dust created from cutting, grinding or drilling concrete, brick, mortar and sandstone contains harmful crystalline silica particles. As workers breathe in these very small 'respirable' dust particles, it can cause permanent damage to the lungs.

2

Wood dust

Working on softwood, hardwood and wood-based products such as MDF and plywood will create dust and cause serious health problems. Hardwood dust can cause cancer, particularly of the nose.

3

Lower toxicity dusts

Materials including gypsum (plasterboard), limestone and marble contain little or no silica but can lead to respiratory problems.

Larger inhalable dust can generally be seen by the naked eye while smaller respirable dust is invisible to the naked eye hence the most hazardous.

HEALTH: FACTS & FIGURES

Europe

Occupational risk factors is a term used to describe the harmful effects of breathing in various particles, gases, fumes or smoke in the workplace. These different factors are often referred to as ‘agents’.

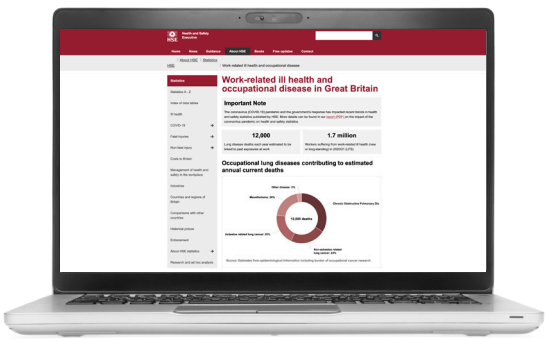
- Exposure to particles, gases, fumes or smoke in the workplace is responsible for 15% of all respiratory cancers in men and 5% in women
- Between 350 and 400 different agents are known to cause occupational asthma
- 15-20% of all adult asthma cases are work-related
- Symptoms of mesothelioma may take up to 50 years to appear
- 10% of all interstitial lung disease cases are work-related
- 15-20% of COPD cases are work-related

Source: https://www.europeanlung.org/assets/files/publications/lung_health_in_europe_facts_and_figures_web.pdf

UK

Work-related ill health and occupational disease in Great Britain.

- 12,000 lung disease deaths each year estimated to be linked to past exposures at work
- 1.4 million workers suffering from work-related ill health (new or long-standing) in 2018/19 (LFS)



Source: https://www.hse.gov.uk/statistics/causdis/

[1] Anonymous, Construction dust – An Industry survey IOSH

ACTIONS

Construction hazardous substances: Construction dust

Construction dust is not just a nuisance; it is a real risk to your lungs.

What you must do:

The Control of Substances Hazardous to Health (COSHH) Regulations says you must protect against the risks from hazardous construction dusts. Follow the 'Assess, Control and Review model'.

This includes steps: -

1. **Assess the risk**
2. **Control the risk**
   a. Can we stop it i.e. not generate dust – yes/no
   b. If no, how do we go about supressing it – through use of dust suppression equipment
3. **Review**

Documentation is available to provide further information as follows: -

What you should know:

Regular breathing of construction dust can cause diseases like lung cancer, asthma, Chronic Obstructive Pulmonary Disease (COPD) and silicosis. Construction workers have a high risk of developing these diseases because many common construction tasks can create high dust levels.

These diseases cause permanent disability and early death. Over 500 construction workers are believed to die from exposure to silica dust every year.

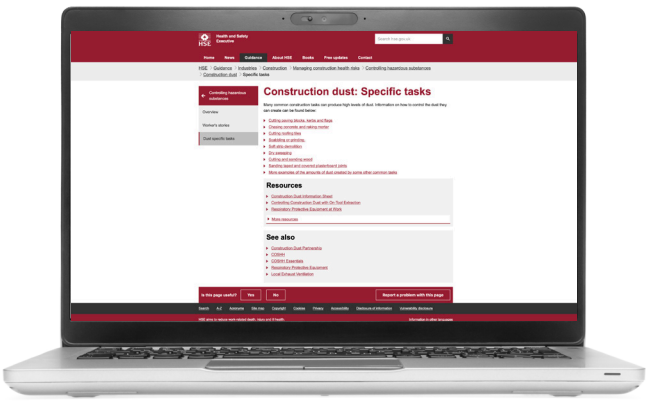
The Designers Responsibility

The responsibility to minimise silica dust exposure runs across the entire construction sector. Under the Construction Design and Management Regulations 2015 (CDM 2015), designers (i.e. architects,) when planning construction projects, should do everything to prevent RCS (Respirable Crystalline Silica) exposure.

As designers have a duty to eliminate dust, they have a responsibility to help create tasks that design out processes that produce harmful airborne particles and risks to workers' health on construction sites.

This could include dry cutting materials, chasing out concrete, brick or blockwork walls, or floors to install services. Alternative solutions must be considered before prevention of Dust control by applying the hierarchy of the "principles of prevention".

Construction dust: CIS 36 (PDF)- Portable Document Format
Construction dust: Specific tasks



CURRENT LEGISLATION

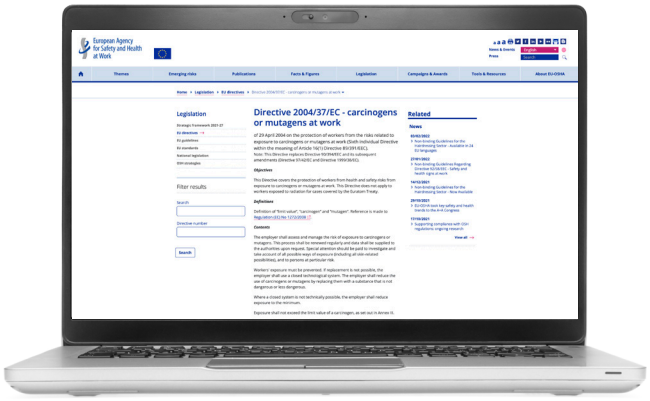
Current legislation across Europe relating to dust exposure limits primarily relates to the workplace and not directly to power tools. Some authorities do require mandatory dust certification of power tools, but this varies from country to country and does not overly affect what is discussed in this document.

Directive 2004/37/EC - carcinogens or mutagens at work is the latest EU directive which gives guidance on dust, which was updated on April 17th, 2020.

Essentially stating that the onus is on employers to ensure that dust levels at the place of work are kept to a legal minimum.

There are no uniform dust emission limits in Europe. Neither is there a European test code for dust emission of power tools. Because of this, the European Power Tools Association (EPTA) has initiated the preparation of test codes to measure the amount of dust emitted by power tools whilst conducting prescribed real life work processes. These will be integrated in time into new European (EN 50632) standards for the measurement of dust emission.

In general terms, EN50632 specifies requirements for the dust measurement of electric motor-operated tools supplied from mains or from batteries. This standard applies to those tools with and without a dust extraction unit where dust such as mineral dust containing silica or wood dust is expected.



According to BS EN 481:1993 (an additional European Directive which deals with workplace atmospheres) two categories are to be differentiated: the inhalable dust and the respirable dust fraction.

Inhalable Dust

Inhalable dust refers to the entire inhalable fraction of the dust through mouth and/or nose.

Respirable Dust

Respirable dust relates to the fraction of the inhalable dust that can reach the pulmonary alveoli due to its small particle size. This part of EN 50632 does apply to concrete grinders and disc-type sanders.

Workplace exposures are regulated by national laws for certain substances and by aforementioned European directive (2004/37/EC) on carcinogens and mutagens. The EU Commission proposes to introduce an amending directive for additional substances with binding occupational exposure limit values (OEL). This may include the proposal to add silica dust with a binding OEL at 0.1 mg/m³ 8 hour time weighted average (TWA) measured as respirable dust and change hard wood dust from 5 to 3 mg/m³ 8 hour TWA measured as inhalable dust.

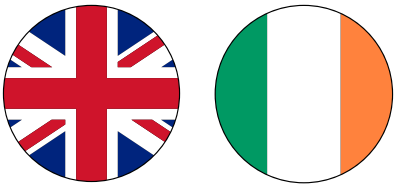
EPTA recommendations regarding dust extraction at the worksite require the addition of an appropriate dust extractor and filtration, depending on the application, in conjunction with the power tool. In particular, the use of an “M” class dust extractor for wood and silica is required to reduce the effects of respirable and inhalable dust.

There are no uniform dust emission limits in Europe. Neither is there a European test code for dust emission of power tools. So EPTA has initiated the preparation of test codes by CENELEC, (European Committee for Electrotechnical Standardisation) to measure the amount of dust emitted by power tools whilst conducting prescribed real life work processes. They will be integrated into the new EN 50632 standard for the measurement of dust emission.

These limits for inhalable dust using extractors will be 10 mg/m3 and respirable dust is 1,25 mg/m3. There are exceptions for quartz.

DUST LEGISLATION AND ADVICE BY COUNTRY

The advice is very standard from country to country with the onus on the employer - and this covers all of Europe including the Nordic areas and other non-EU countries. Additional research and legislation have been introduced in the Germany, France and the UK and these have been included in this document and are typical of what is available country by country.



UK and Ireland

In the UK, The Health and Safety at Work Act 1974 states it is the duty of every employer or self-employed person to provide and maintain, so far as is reasonably practicable, a safe working environment and ensure the health, safety and welfare of all their employees and anyone else who may be affected by the company's activities.

Due to the properties found in construction dust, the Control of Substances Hazardous to Health Regulations 2002 (COSHH) stipulates that a risk assessment must be completed detailing how the risk from the hazardous substance will be prevented or controlled and what measures are in place before the work commences. This is in line once again with the onus being on the employer to ensure the safety of operatives

In Ireland, the Guide to Safety Health and Welfare at Work Act, 2005 (S.I. No 10 of 2005 - requires the provision of a safe place of work; this applies to employees, employers and the self-employed. Section 19 of the Safety, Health and Welfare at Work Act (2005), requires that employers and those who control workplaces to any extent must identify the hazards in the workplaces under their control and assess the risks to safety and health at work presented by these hazards. The results of any risk assessments should be written into the safety statement.

INDUSTRY INITIATIVES

Germany

Initiatives have been launched in Germany over the past 10 years, in particular an investigation into Mineral Dust: https://www.baua.de/EN/Service/Legislative-texts-and-technical-rules/Rules/TRGS/pdf/TRGS-559.pdf?__blob=publicationFile&v=2 These are technical rules under German Law.

This is the part of the document which relates to machines and devices:

4.3 Machines and devices

(1) Machines and devices must be selected and operated in such a way that as little dust as possible is released. Dust-emitting installations, machines and devices must be fitted with an effective extraction system which is state of the art, where the release of dust is not prevented by other measures.

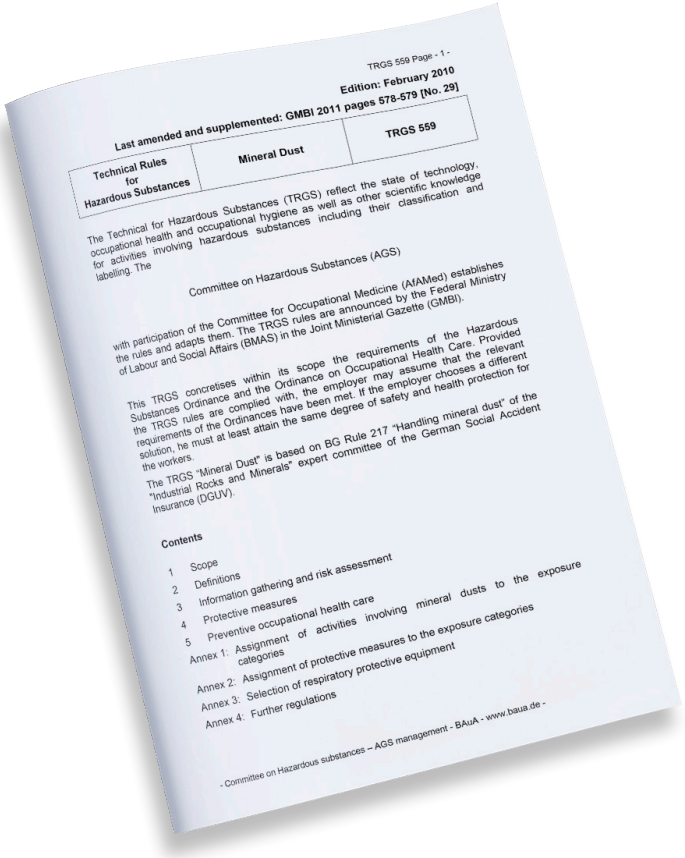
(2) This may be achieved, for example, by using machines and devices 1. Whose emission rate is in accordance with the state of the art, 2. Whose dust sources are encased, 3. For which the dust is extracted at work openings, source points and outlets, 4. Which are cladded and 5. For which adequate dust reduction is achieved by wetting or a water feed.

(3) Furthermore, this is achieved by 1. Using closed instead of open means of conveyance, 2. Avoiding open material transfer points and 3. Operating machines and devices under (partial) vacuum.

(4) When machines and devices which are approved, with respect to dust emissions, are used it may be assumed that the emission rate is in accordance with the state of the art applying at the time the approval test was conducted. TRGS 559 Page - 14 - - Committee on Hazardous substances – AGS management - BAuA - www.baua.de –

(5) When masonry saws are being used with which dust is to be reduced by feeding water and where the water is fed in a circulation system without treatment, the circulating water must be replaced daily.

(6) When machines with enclosed operator cabins are being used and they are fitted with a filter to clean the outside air (this is normally the case for air-conditioned cabins), the doors and windows must be kept shut during operation.



TRGS 559 Page - 1 -

Edition: February 2010

Last amended and supplemented: GMBl 2011 pages 578-579 [No. 29]

Technical Rules for Hazardous Substances	Mineral Dust	TRGS 559

The Technical for Hazardous Substances (TRGS) reflect the state of technology, occupational health and occupational hygiene as well as other scientific knowledge for activities involving hazardous substances including their classification and labelling. The

Committee on Hazardous Substances (AGS)

with participation of the Committee for Occupational Medicine (AfAMed) establishes the rules and adapts them. The TRGS rules are announced by the Federal Ministry of Labour and Social Affairs (BMAS) in the Joint Ministerial Gazette (GMBl).

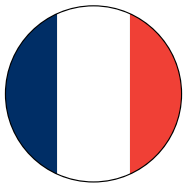
This TRGS concretises within its scope the requirements of the Hazardous Substances Ordinance and the Ordinance on Occupational Health Care. Provided the TRGS rules are complied with, the employer may assume that the relevant requirements of the Ordinances have been met. If the employer chooses a different solution, he must at least attain the same degree of safety and health protection for the workers.

The TRGS "Mineral Dust" is based on BG Rule 217 "Handling mineral dust" of the "Industrial Rocks and Minerals" expert committee of the German Social Accident Insurance (DGUV).

Contents

1 Scope
2 Definitions
3 Information gathering and risk assessment
4 Protective measures
5 Preventive occupational health care
Annex 1: Assignment of activities involving mineral dusts to the exposure categories
Annex 2: Assignment of protective measures to the exposure categories
Annex 3: Selection of respiratory protective equipment
Annex 4: Further regulations

- Committee on Hazardous substances – AGS management - BAuA - www.baua.de -

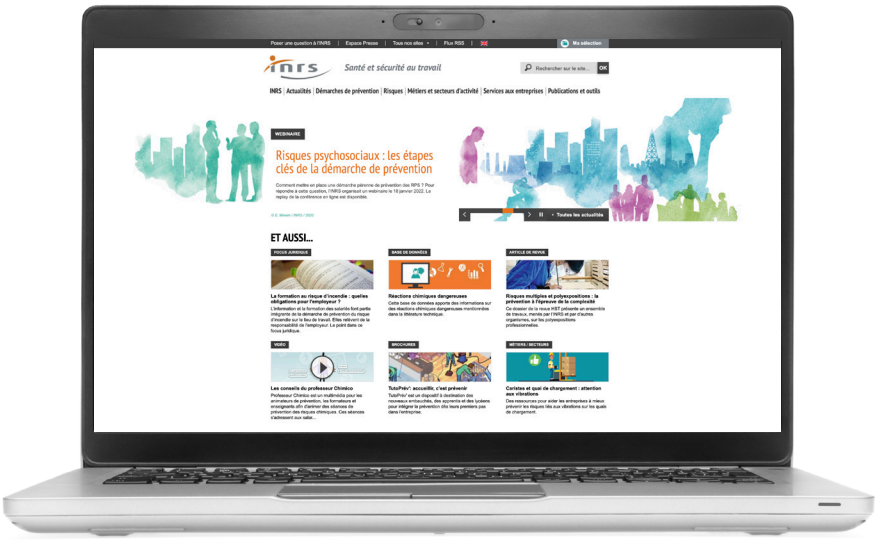


France

INRS, www.inrs.fr the French occupational safety and health institute are looking at alternative test methods for power tools that would enable different machines to be classified for the same work process according to the level of the dust emissions.

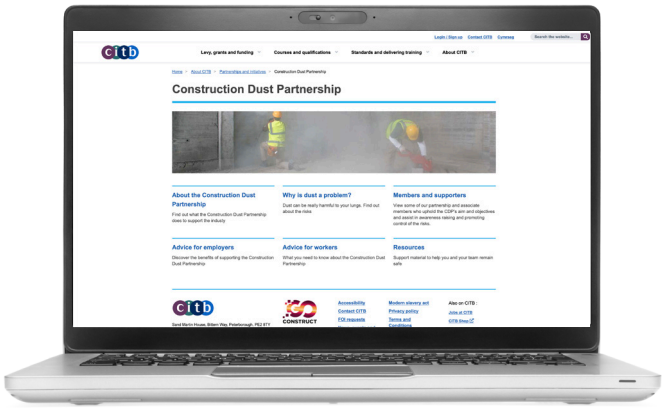
CENELEC has set up a working group, TC 116/WG 04, which is developing specific Type C standards (the EN 50632 series) describing methods for the measurement of wood or silica dust emissions from hand-held electric tools.

Parties represented on this standards committee are primarily machinery manufacturers (Bosch, Stanley Black and Decker, Hilti, Makita, Hitachi, Festool, Metabo, Fein, Varo, etc who are members of the EPTA) and test and certification bodies (SGS, Intertek, VDE Testing, etc.). The INRS is involved in this working group in order to contribute its expertise in the measurement of dust emissions from machines.



United Kingdom

With regards to dust many companies have become part of a CITB (Construction Industry Training Board) Initiative – the Construction Dust Partnership – to make more construction workers aware of the hazards. This link below has further details has further details, but it should be noted that amongst the member companies are two Milwaukee competitor's – Hilti and Makita – who are part of this programme.



www.citb.co.uk/cdp

The CITB launched their initiative to reduce the number of deaths in the UK and Ireland from dust inhalation (see introduction). In a survey to better understand the risk, the CITB highlighted a poor understanding and use of on-tool extraction; and an over-reliance on respiratory protective equipment as a main form of control.

For full survey see:

www.citb.co.uk/documents/topics/health-safety/hs%20cdp%20control%20resources/construction%20dust%20-%20industry%20survey.pdf

This has resulted in Britain's Health and Safety Executive (HSE) running inspection initiatives focusing on respiratory risks and occupational lung disease. The initiative looks at the control measures businesses have in place to protect their worker's lungs from construction dust. HSE's campaign activity is currently focused on health in the construction industry, with an emphasis on lung disease – in particular where lung disease has been caused by exposure to asbestos and dust.

The key messages for action will be:

- **Know the risks**
- **Use the right controls**
- **Plan your work**

This however means that the employer still has to make the judgement on what is healthy. At the time of writing it does not appear that any additional information will be introduced.

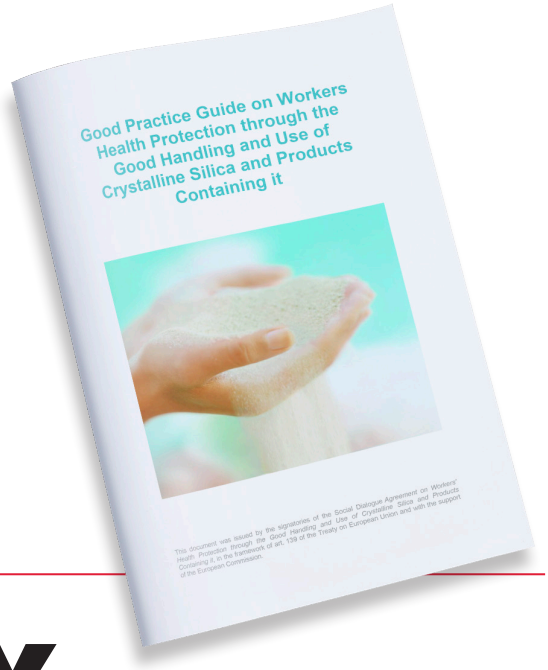
With the lack of any direct legislation, European tool manufacturers have instigated their own tests in conjunction with the EPTA and this has also been adopted by the HSE.

In the UK, this has led to the production of this documentation

www.hse.gov.uk/pubns/cis69.pdf

an information sheet which gives guidance on the use of power tools with on tool M Class extractors.

European nation states



As previously mentioned, with no direct legislation relating to power tools it has been down to the EPTA to drive the discussion and testing in this area. As a result it has generated a series of 'Best Practice' booklets with associate member.

One of these is with NEPSI, which looks at silica dust and access to its guide can be obtained via this link:

www.nepsi.eu/sites/nepsi.eu/files/content/editor/good_practice_guide_-_english_original_additional_task_sheets_-251006_modified_16072012-.pdf

TOOL SAFETY STANDARDS

In the absence of legislation, attention is focussing more on the cleaning of filters, the efficiencies of extractors etc and individual power tools are coming under scrutiny.

The legislation and test conditions can be found once again via EN 50632 with additional references as follows:

EN 50632-2-1 for drills

EN 50632-2- 3 for grinders

EN 50632-2-6 for hammer drills

EN 50632-2-22 for cut off tools

EN 50632-3-1 for table saws

CASE STUDY:
WILMOTT DIXON

ON-TOOL EXTRACTION ASSESSMENT IN CONJUNCTION WITH MILWAUKEE TOOLS

Willmott Dixon, in conjunction with Milwaukee Tools, initiated a programme to increase site employees' safety and comfort through the introduction of cordless, dust-reducing site-based tools.

Dust is an occupational hazard in construction, but its risks are severely underestimated. Each year in Great Britain more than 500 construction workers are believed to die from lung cancer caused by silica dust alone. The current policy for site personnel is the mandatory wearing of RPE (respiratory protective equipment) to protect against dust inhalation. Therefore, the objective of Willmott Dixon's on-tool extraction assessment was to test whether the reliance on RPE during silica and wood dust exposure could be minimised.

The scheme was part of Willmott Dixon's cordless jobsite programme and included a review of the use of on-tool extraction with various power tools. The cordless jobsite programme was launched during a building project at St John's Primary School for the London Borough of Croydon. The project saw the expansion of the school enabling the existing 1FE Primary School to grow to a full two-form entry site, ensuring that sufficient Primary School places are provided within the local area.

Following the success of the cordless jobsite programme, a second phase of the review involved an additional dust analysis test of Milwaukee Tools' products – in line with HSE guidelines – at Canterbury Mills Primary School site in Croydon.

Milwaukee Tools supplied its high-performance cordless drills and cutting saws for the review. These products are designed to reduce dust particles emanating from the cutting of soft and hard wood materials, or drilling of concrete containing silica. The following models of equipment were provided for testing: M12CH, M12 DE M18 CHX, M18 CDEX, M18CHPX, M18 CPDEX, M28 CHPX, M28 CDEX, M18CHM, PHD72, M18 CCS66, M18 CV2, M18 FMS254.

Milwaukee Tools requested to re-attend the site for further testing on dust hoods for grinders to supplement the line-up of tools that may be recommended for use by Willmott Dixon.

Test results found that all products had exceeded HSE requirements, with tool extraction for wood dust and silica dust being 10% and 20% below HSE limits respectively.

Given the positive results, the Willmott Dixon was able to write new risk assessments. This included the recommendation that the products that had been tested could be used on site without the need for RPE during certain applications such as drilling.

Such an outcome exemplifies Wilmott Dixon's commitment to optimising the comfort, health and wellbeing of construction workers throughout the industry and the benefit of modern tools that help to reduce and eliminate dust.

CASE STUDY: LOREM IPSUM

INTRODUCTION

Donec nec justo eget felis facilisis fermentum. Aliquam porttitor mauris sit amet orci. Aenean dignissim pellentesque felis.

Morbi in sem quis dui placerat ornare. Pellentesque odio nisi, euismod in, pharetra a, ultricies in, diam. Sed arcu. Cras consequat.

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Phasellus ultrices nulla quis nibh. Quisque a lectus. Donec consectetuer ligula vulputate sem tristique cursus. Nam nulla quam, gravida non, commodo a, sodales sit amet, nisi.

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THE SOLUTION

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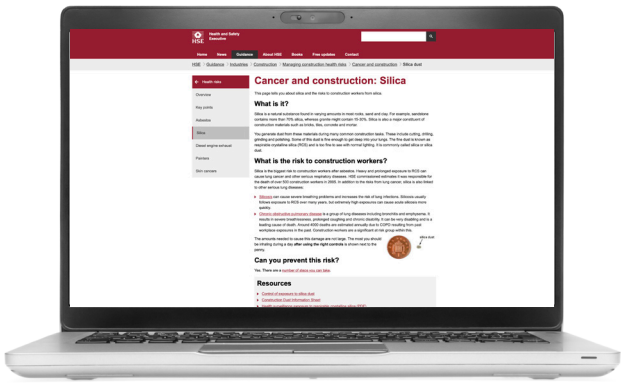
THE OUTCOMES

- Lorem ipsum dolor sit amet, consectetuer adipiscing elit.
- Aliquam tincidunt mauris eu risus.
- Vestibulum auctor dapibus neque.
- Nunc dignissim risus id metus.
- Cras ornare tristique elit.
- Vivamus vestibulum ntulla nec ante.
- Praesent placerat risus quis eros.
- Fusce pellentesque suscipit nibh.
- Integer vitae libero ac risus egestas placerat.

FURTHER READING

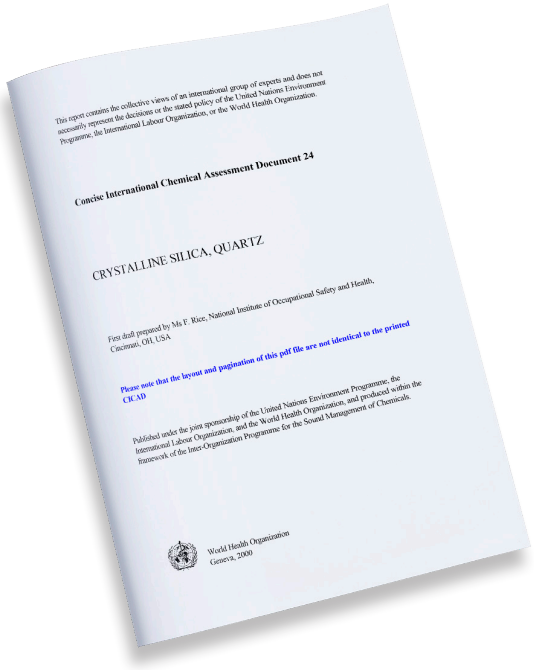
This is the major concern for all Health and Safety Bodies across Europe and the UK and there will at some time be additional legislation introduced to minimise this risk. Several campaign and booklets have been written regarding this challenge:

www.highspeedtraining.co.uk/health-and-safety/respirable-crystalline-silica-awareness-course.aspx?mkwid=s_dc&pcrid=&pkw=%2BSilica&pmt=p&dim=&msclkid=1d070f09a8401e08986351e297274e7a&utm_source=bing&utm_medium=cpc&utm_campaign=HST-248-Health%20%26%20Safety-Silica%20Awareness-Broad&utm_term=%2BSilica&utm_content=Silica%20%2F%20Broad



www.hse.gov.uk/construction/healthrisks/cancer-and-construction/silica-dust.htm

osha.europa.eu/en/guidance-national-labour-inspectors-on-addressing-risks-from-worker-exposure-to-respirable-crystalline-silica



www.who.int/ipcs/publications/cicad/en/cicad24.pdf?ua=1

CONCLUSION AND RECOMMENDATIONS

European Governments seem content to leave health and safety issues to the employer and this relates very much to dust in the workplace. As a result, EPTA has led the debate by introducing its own standards for testing for all types of power tools.

It is also likely that the growing debate around silica dust will only become stronger, and power tool manufacturers will be required to have a strategy and practical solutions to tackle this issue.

Manufacturers such as Milwaukee that can prove to have effective solutions to protect users from silica dust will have a strong commercial advantage in the years to come.

milwaukeetool.com