Hazards of Respirable Particulates – Standards, Assessment and Controls - the 2016 OSHA Silica Standard

ASSE Valley Coastal Chapter
January 17, 2016

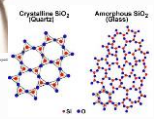
Presented by:
James Kapin, MPH, CIH
ACTenviro

What's New?

- New Construction & GI /Maritime Standards
  - 29 CFR 1910.1153 & 29 CFR 1910.1053
  - 8 CCR 1532.3 & 8 CCR 5204
- PEL for respirable crystalline silica of 50 µg/m^3
  - "Action Level" of 25 µg/m^3
- Employers Must:
  - Assess exposures:
  - Implement eng./admin controls, respirators if needed
  - Develop exposure control plan, limit access to high exposure areas;
  - Medical exams for over exposed workers, training for all workers
- Affects Many New Industries
- Effective June 23, 2016 (unless delayed in court)
  - Requirements phase-in over 1 – 5 years

Crystalline Silica

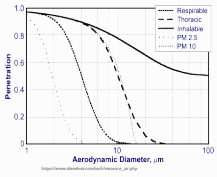
- Silica dioxide (SiO_2) –
  - Found in sand, concrete, stone and mortar
  - Used in glass, pottery, ceramics, concrete and more
- Over-exposure leads to silicosis, lung cancer, other respiratory diseases
- Direct measurement requires analysis of air samples
  - Real-time measurement can estimate silica exposures

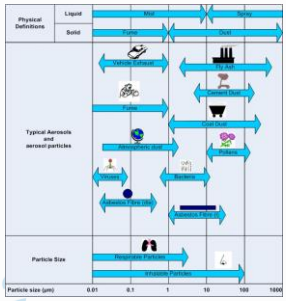


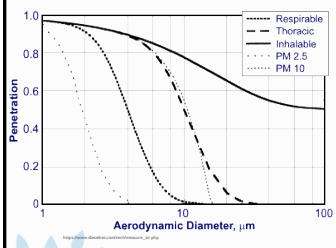
James Kapin MPH, CIH
Manager of EM Services
619-990-5955, jkapin@actenviro.com

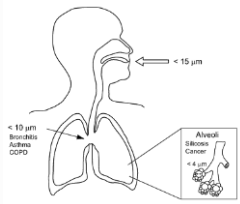
Hazardous Exposures

- Inhalation of very small ("respirable") particles
- "Respirable" particles are small – median size 4μ
- 100 times smaller than beach or playground sand
- Generated by cutting, sawing, grinding, drilling or crushing









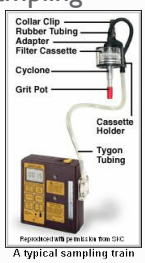
James Kapin MPH, CIH
Manager of EM Services
619-990-5955, jkapin@actenviro.com

"Size Selective" Sampling

Sze	50% Cutpoint	
Inhalable	100 µm MMAD	Able to enter respiratory System (special sampler)
"Total"	30 µm MMAD	Effective cut-point of 37 mm CFC (4 mm orifice)
Thoracic/ PM10	10 µm MMAD	Penetrates to the larynx (impactor)
Respirable	4 µm MMAD	Can penetrate to alveoli (cyclone or impactor)
PM2.5	2.5 µm MMAD	

- 37 mm CFC traditionally used for IH sampling
- New particulate TLVs (ACGIH) are size-selective

Respirable Sampling



A typical sampling train

Why new Silica Standards?

- PELs outdated, inconsistent and not protective
  - Const./shipyards exposures > 2x general industry
  - 50 µg/m^3 can be achieved (OSHA believes) using engineering/administrative controls
- Silicosis has declined but still a serious problem
  - 2.3 million workers are exposed to RCS
  - OSHA predicts 600 fewer deaths/yr from silica diseases, > 900 fewer cases of silicosis each year.
- Cal/OSHA adopted new standards unchanged
  - Former Cal/OSHA PELs were > proposed PEL/AL

James Kapin MPH, CIH
Manager of EM Services
619-990-5955, jkapin@actenviro.com

Industries with Potential Exposures

- Construction - excavation/grading, concrete cutting/grinding
- Manufacture - stone cutting, abrasive blasting
- Oil & Gas - hydraulic fracturing
- Others??

Hazards of Respirable Particulate Materials - The OSHA Silica Standard 10

Work Activities with Silica Exposures

- Abrasive blasting with sand;
- Hand-held/walk-behind masonry or concrete saw
- Sanding or drilling into masonry, concrete or rock;
- Grinding mortar, masonry or concrete (tuck point grinding)
- Jackhammer / chipping gun
- Cutting or crushing stone
- Mixing concrete, grout, etc
- Sweeping shoveling sand, dust, etc.
- Road mill
- Manufacturing brick, concrete blocks, or ceramic products
- Backhoe, excavator, bulldozer, skid-steer operation

Hazards of Respirable Particulate Materials - The OSHA Silica Standard 11

What Do the new Standards Require?

- For Work activities with potential silica exposures
  - Implement specified controls
  - Evaluate whether exposures do/do not exceed PEL
  - Document non-exposure ("negative exposure assessment")
- Where exposures potentially exceed PEL:
  - Establish Regulated Areas
  - Implement feasible engineering/administrative controls
  - Provide medical surveillance and respiratory protection (including respirator program) where needed
  - Provide worker training
  - Develop written Exposure Control Plan

Hazards of Respirable Particulate Materials - The OSHA Silica Standard 12

James Kapin MPH, CIH
Manager of EM Services
619-990-5955, jkapin@actenviro.com

Exposure Assessment

- Using air sampling or surrogate
  - For each job classification (worst case)
  - Repeated for exposures > AL or PEL until consecutive (> 7 days apart) < AL/PEL
  - Re-assess if process changes are made
  - Notify employees of results
- Industry surveys, studies or calculations.
  - "closely resembling" or higher exp. potential than current operations.
- Or use specific "control methods" including engineering/work practice controls and PPE

Use of Specified Controls

- Employers must use "feasible" engineering & administrative controls before PPE
  - Similar to existing requirement in Cal/OSHA 8 CCR 1530.1
- Specified engineering controls, work practices and respiratory protection based on work activities in Const. standard

8 CCR 1532.3 – Table 1

- "Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica"
  - Or alternate measures shown to be equally protective

Equipment/ task	Engineering and work practice control methods	Required resp. protection, min. APF	
		≤4 hr/ shift	>4 hr/ shift
Stationary masonry saws	• Use saw equipped with integrated water delivery system that continuously feeds water to the blade • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions	None	None

James Kapin MPH, CIH
Manager of EM Services
619-990-5955, jkapin@actenviro.com

Table 1 Activities

- Handheld power saws (any blade diameter)
- Handheld power saws for cutting fiber-cement board (with blade diameter of 8 inches or less)
- Walk-behind saws
- Drivable saws
- Rig-mounted core saws or drills
- Handheld and stand-mounted drills (including impact and rotary hammer drills)
- Dowel drilling rigs for concrete
- Vehicle-mounted drilling rigs for rock and concrete
- Jackhammers and handheld powered chipping tool
- Handheld grinders for mortar removal (i.e., tuckpointing)
- Handheld grinders for uses other than mortar removal
- Walk-behind milling machines and floor grinder
- Small drivable milling machines (less than half-lane)
- Large drivable milling machines (half-lane and larger)
- Crushing machines
- Heavy equipment

Respiratory Protection

- Where engineering/administrative controls cannot reduce exposures < PEL, respiratory protection is required
- Employee use of respirators for health protection is subject to Cal/OSHA Respirator standard (8 CCR 5144)
  - Mandatory medical surveillance, training, fit testing and other requirements
  - Exclusive of "voluntary use"

Written Exposure Control Plan

- Describes:
  - Tasks w/ potential exposures, applicable engineering controls, work practices and PPE (respiratory protection)
  - Housekeeping and procedures to restrict access to work areas where exposure potentially exceed PEL
  - Also medical surveillance, training and recordkeeping
- Reviewed annually or as needed based on operational changes
- "Competent person" w/ knowledge & ability to implement program
  - individual capable of identifying respirable crystalline silica hazards and who can take prompt corrective measures"

James Kapin MPH, CIH
Manager of EM Services
619-990-5955, jkapin@actenviro.com

Effective Dates and Applicability

- Effective June 23, 2016
- Program Implementation
  - Construction Industry - June 23, 2017 (1 year after effective date)
  - General Industry and Maritime - June 23, 2018 (2 yrs after eff. date)
  - Hydraulic Fracturing - June 23, 2018, (2 years after effective date with additional 3 years for Engineering Controls)
- Cal/OSHA
  - Adopted via "Horcher" process 10/17/ 216, same effective dates
- MSHA
  - Update to silica standard on regulatory rule-making agenda

Legal Challenges (as of 05/02/16)

- Construction, Manufacturing groups challenging cost, necessity and feasibility
  - NSSGA, AGC, NAHB, ABC
- Employee advocates challenged adequacy
  - AFL-CIO, UAW, United Steelworkers
- Consolidated lawsuit to be heard by Washington DC Circuit
  - Date: TBD
- Legal actions potentially disrupt implementation timeline

Building/Construction Concerns

- Feasibility
  - Industry argues that it is not practical or feasible to reduce to < 50 $\mu g/m^3$
  - Alternatively, it would cost too much
  - ACGIH TLV has been 25 ug/m^3 since 2010
  - Lab & field studies, as well as practical experience argues otherwise
- Necessity
  - Industry argues that there is no need for the standard, or the benefits are not worth the costs.
  - OSHA is required to do justification for new standard
- Legal process has just started – outcome TBD

James Kapin MPH, CIH
Manager of EM Services
619-990-5955, jkapin@actenviro.com

"What do I do now?"

1. Identify work activities/tasks with potential silica exposures
2. For each task/activity implement standard controls/PPE or conduct exposure assessment,
3. Develop appropriate SOPs indicating engineering controls/work practices and PPE requirements
4. (stand by for legal issues to be resolved)
5. Review/Update HazCom to address silica hazards
6. Review/Update/Implement RPP as needed
7. Prepare Silica Exposure Control Plan

James Kapin, MPH, CIH
Actenviro
Manager of EM Services
619-990-5955
jkapin@actenviro.com