

**COMPANION REFERENCE GUIDE (by silica)**

**Silica Hazard Awareness**

**July 2019**

This course is offered by the Occupational Hygiene Training Association and available free of charge though the OHTA website [ohtatraining.org](https://w2.ohtatraining.org/)

**Copyright information**   
This Companion Reference Guide and the accompanying slides are provided under the Creative Commons Attribution - ShareAlike licence agreement. The material can be copied and redistributed in any medium or format and remixed, transformed and built upon for any purpose.

**Occupational Hygiene Training Association,**

**Website:** [**ohtatraining.org**](https://w2.ohtatraining.org/) **Email: team@ohtatraining.com**

**DEDICATION**

In memory of Dr. Leslie Nickels, who was a tireless supporter of OHTA and whose coordination efforts and leadership within NIOSH were central to the development of this module.

**ACKNOWLEDGEMENTS**

This Companion Reference Guide and accompanying materials were developed by OHTA with the informal technical and educational input of The National Institute for Occupational Safety and Health (NIOSH), part of the U.S. Centers for Disease Control and Prevention.

OHTA would like to express its gratitude to NIOSH for supporting this project and to the following individuals for their contribution:

* LCDR Catherine Beaucham
* Perry Gottesfeld, Occupational Knowledge International
* LCDR Reed Grimes
* Dr. Kevin Hedges, Workplace Health Without Borders (International) and Occupational Health Clinics for Ontario Workers Inc.
* CDR Marna Hoard
* Deborah Hoyer
* RADM (ret.) Dr. Margaret Kitt
* Marianne Levitsky, Workplace Health Without Borders and ECOH Management Inc.
* Nancy McClellan
* Terry McDonald
* Dr. Leslie Nickels
* Dr. Mary O'Reilly, Workplace Health Without Borders and SUNY School of Public Health at Albany

|  |  |  |
| --- | --- | --- |
| **Version** | **Release Date** | **Comments** |
| I.0 | July 2019 | Initial version |



**Supported by**

Companion Reference Guide for Silica Hazard Awareness Training

This Companion Reference Guide serves as a reference for interested learners to explore the hazards of silica and methods of controlling exposure. It is not meant to be fully inclusive, but provides a number of references for the learner to better understand silica, and more broadly, the field of occupational health.

Silica-specific References

* Annals of Work Exposures and Health.
  + *Evaluation of Misting Controls to Reduce Respirable Silica Exposure for Brick Cutting*. This article details how using misting as a wet method can reduce exposures to airborne silica. <https://academic.oup.com/annweh/article/49/6/503/176889>.
* International Agency on Research of Cancer (IARC).
  + Monograph for Silica. The IARC monograph provides a comprehensive report, concluding that there is strong evidence that silica is linked to lung cancer, and thus classified as a known human carcinogen. <https://monographs.iarc.fr/wp-content/uploads/2018/06/mono100C-14.pdf>.
* International Commission on Occupational Health (ICOH).
  + *Preventing Tuberculosis among Silica Dust Exposed Workers*. This Position Statement calls for a concerted effort to use occupational safety and health strategies to prevent TB in high-risk occupations, particularly in those individuals exposed to silica dust. <http://www.icohweb.org/site/multimedia/news/pdf/OEM%20ICOH%20TB%20STATEMENT%20oemed-2018-105315.pdf>.
* Journal of Occupational and Environmental Hygiene
  + *Silica Exposures in Artisanal Small-Scale Gold Mining in Tanzania and Implications for Tuberculosis Prevention*. This article details how silica exposures occur in the artisanl small-scale gold mining industry, and how it can impact high-burden TB countries. <https://www.tandfonline.com/doi/abs/10.1080/15459624.2015.1029617>.
* National Institute for Occupational Safety and Health (NIOSH)
  + Health Effects of Occupational Exposure to Respirable Crystalline Silica. A comprehensive report on the health effects related to occupational silica exposures. <https://www.cdc.gov/niosh/docs/2002-129/default.html>.
  + NIOSH Topics webpage on silica. This webpage provides background of silica and resources for controlling exposure. <https://www.cdc.gov/niosh/topics/silica/default.html>.
* National Toxicology Program (NTP).
  + Report on Carcinogens, 14th edition. The NTP provides an excellent background on silica and review of its cancer-causing potential. This review provides information about the properties of silica, the use and production of the material, exposure mechanisms, and occupational exposure limits used in the United States. <https://ntp.niehs.nih.gov/ntp/roc/content/profiles/silica.pdf>.
* NEPSI (The European Network on Silica).
  + Good Practice Guide. A comprehensive guide to silica hazards and methods for controlling exposure. The NEPSI Good Practices Guide provides a Task Manual to help occupational safety and health professionals practically apply controls during specific work tasks. https://www.nepsi.eu/good-practice-guide.
* Occupational Health and Safety Online.
  + *United Nations (UN) Prioritizes Tuberculosis Prevention for High-Risk Occupations*. This article highlights the UN’s priority to consider TB prevention through the lens of occupational safety and health preventive measures. <https://ohsonline.com/articles/2018/09/26/un-prioritizes-tuberculosis-prevention.aspx?m=1>.
* Occupational Knowledge (OK) International.
  + *International Silica Standards: Countries Must Update Exposure Limits*. This article provides information about the established occupational exposure limits for silica throughout the world, and the need to update these limits. <http://www.okinternational.org/docs/Gottesfeld%20ISHN1018_Silica.pdf>.
  + *Reduction of Respirable Silica Following the Introduction of Water Spray Applications in Indian Stone Crusher Mills*. This article addresses the impact that instituting we methods can have on a high-risk industry in India. <http://www.okinternational.org/docs/IJOEH%20gottesfeld.pdf>.
  + *Short Report on Health Survey of Lal Kuan Victims*. The final report of silica exposures and health effects in stone crushers in Lal Kuan, India. <http://www.okinternational.org/docs/LKscan2.pdf>.
* Occupational Safety and Health Administration (OSHA).
  + Safety and Health Topics webpage: Silica. The OSHA Safety and Health Topics webpage provides an overview of the health effects related to exposure to silica, with videos that show how to control exposure. <https://www.osha.gov/dsg/topics/silicacrystalline/>.
  + OSHA-NIOSH Hazard Alert: Worker Exposure to Silica during Hydraulic Fracturing. A Hazard Alert co-branded by OSHA and NIOSH that describes high exposures to silica in the “fracking” industry in the United States. <https://www.osha.gov/dts/hazardalerts/hydraulic_frac_hazard_alert.html>.
* Public Health Reports.
  + *Engineering Control Technologies to Reduce Occupational Silica Exposures in Masonry Cutting and Tuckpointing*. This short report discusses technologies available to prevent silica exposures. <http://journals.sagepub.com/doi/pdf/10.1177/00333549091244S112>.

Additional References and Resources

* British Occupational Hygiene Society (BOHS).
  + Breathe Freely Campaigns in Construction and Manufacturing. The BOHS seeks to provide a healthy working environment for everyone. The Breathe Freely Campaign is a BOHS initiative aimed at reducing occupational lung disease in the United Kingdom. <http://www.breathefreely.org.uk/what-is-breathe-freely.html>.
    - Trade Fact Sheets. Easy to use and readily available fact sheets with known hazards in specific trades. Provides information about the hazards and risks, occupational exposure limits, controls options, and methods of managing risk related to silica. <http://www.breathefreely.org.uk/trade-fact-sheets.html>.
    - Worker Case Studies. This website details the work, medical treatment and subsequent suffering of an individual afflicted with silicosis. <http://www.breathefreely.org.uk/worker-case-studies.html>.
    - Respiratory Protective Equipment Fact Sheet. Information about the appropriate use of respirators and the impact of facial hair on using respiratory protection. <http://www.breathefreely.org.uk/assets/rpe-fact-sheet.pdf>.
* The Institute for Health Metrics and Evaluation (IHME).
  + The IHME is an independent global health research center at the University of Washington in Seattle, Washington, U.S.A. Through the Global Burden of Disease Results Tool, the IHME allows users to visualize country-specific data about specific causes of disease, including silicosis <http://ghdx.healthdata.org/gbd-results-tool>.
* The Institute for Work and Health (IWH).
  + The IWH is a not-for-profit research organization in Toronto, Canada. The IWH aims to protect and improve the health and safety of working people by providing research to prevent work-related injury and illness, and promote recovery and functioning following an injury or illness. <https://www.iwh.on.ca/>.
    - The Burden of Occupational Cancer, IWH. This report provides information about the contribution of occupational hazards to the overall burden of cancer diagnoses in Canada. A specific section on silica outlines the number of workers exposed, the industry breakdown to total lung cancers attributed to occupational silica exposure, exposure reduction strategies and policy recommendations for silica. <http://www.occupationalcancer.ca/wp-content/uploads/2017/09/Burden-of-Occupational-Cancer-in-Ontario.pdf>.
* International Commission on Occupational Health (ICOH).
  + Creating a Safe and Healthy Workplace: A Guide to Occupational Health and Safety for Entrepreneurs, Owners and Managers. This short guide is geared towards business owners and managers in the developing world, to help identify, reduce, and eliminate hazards in the workplace <http://www.icohweb.org/site/oh-guide.asp#oh-guide>.
* National Institute of Health.
  + Haz-Map®. Haz-Map is a relational occupational health database that shows diseases linked to hazardous occupational agents. Haz-Map features links to occupational diseases with clear associations with silica exposure. <https://hazmap.nlm.nih.gov/>.
* National Institute for Occupational Safety and Health (NIOSH).
  + Frequently asked questions about control banding. This reference provides information about the practice and use of control banding. <https://www.cdc.gov/niosh/topics/ctrlbanding/ctrlbandingfaq.html>.
  + Global Outreach webpage. One of NIOSH’s three strategic goals is to enhance worker safety and health through global collaborations. This webpage describes some of NIOSH’s global collaborations and provides information about access to global data, classification systems, and essential resources to improve worker safety and health. <https://www.cdc.gov/niosh/topics/global/default.html>.
  + Health Hazard Evaluation (HHE) program. The NIOSH HHE program helps employees, employers, and union officials learn whether health hazards are present in their workplace and recommends ways to reduce hazards. <https://www.cdc.gov/niosh/hhe/default.html>.
    - The HHE Program has authority to enter U.S. workplaces when employees, employers, or unions submit a valid request. The HHE program has performed technical assist visits for global partners, most notably the Pan-American Health Organization (PAHO). <https://www.cdc.gov/niosh/hhe/request.html>.
    - You can search the HHE database to review prior evaluations looking at silica, and recommendations on ways to control exposures. <https://www.cdc.gov/niosh/hhe/default.html>.
  + Improving Workers’ Health across the Globe: Advancing the Global Plan of Action for Workers’ Health, NIOSH-Finnish Institute of Occupational Health. This booklet provides examples of activities and achievements of the Global Network of WHO Collaborating Centers for Occupational Health. <https://www.cdc.gov/niosh/docs/2016-118/pdfs/success-stories_v01_nr04_n-compressed.pdf>.
  + NIOSH Manual of Analytical Methods (NMAM). The NMAM is a collection of methods for sampling and analysis of contaminants in the workplace air, including analyzing respirable crystalline silica by X-ray diffraction. <https://www.cdc.gov/niosh/docs/2003-154/pdfs/7500.pdf>.
  + The NIOSH Science Blog. This webpage periodically updates and distributes information about improving and protecting workers’ health. This link provides information about the use of real-time respirable dust monitors, and how they are used to help assessing silica exposures. <https://blogs.cdc.gov/niosh-science-blog/2018/04/05/dust-monitors/>.
* Occupational Knowledge (OK) International.
  + OK International is a non-profit organization headquartered in the United States that seeks to improve public health through innovative strategies to reduce exposures to industrial pollutants. OK International’s webpage features a section on silica, including a succinct background, history of large-scale silica exposures in the developing world, and a list of resources. <http://www.okinternational.org/home>.
* Occupational Hygiene Training Association (OHTA).
  + The OHTA is a registered charity in the United Kingdom that was formed to promote better standards of occupational (industrial) hygiene practice throughout the world. Training materials are available to teachers and students, in an effort to raise the standard of occupational (industrial) hygiene practice worldwide. [http://www.ohtatraining.org/about-ohta/purpose-and-principles.aspx](http://www.ohlearning.com/about-ohta/purpose-and-principles.aspx).
* Workplace Health Without Borders (WHWB).
  + Mentoring Program. The WHWB Mentoring program pairs experienced occupational (industrial) hygienists with mentees interested in learning more about occupational (industrial) hygiene. This program is open to mentors and mentees globally, as long as the individual has access to internet for mentoring sessions. <http://www.whwb.org/mentoring/>.
  + General Occupational Health Resources. This website is a compilation of excellent occupational health resources for interested learners. <http://www.whwb.org/resources-2/training-resources/>.
* World Health Organization.
  + Hazard Prevention and Control in the Work Environment: Airborne Dust. A comprehensive report on the hazards associated with respirable dust, the health effects to the global workforce, and strategies for controlling exposure. <http://www.who.int/occupational_health/publications/airdust/en/>.