



The seriousness of the health hazard associated with crystalline silica exposure has been supported by recent studies that indicate a statistically significant increase in lung cancer among workers exposed to respirable crystalline silica particles in the air. The Occupational Safety and Health Administration (OSHA) launched a National Special Emphasis Program in 1996 to reduce worker silica dust exposures. Diseases associated with the inhalation of silica containing dusts include silicosis, chronic airway obstruction and bronchitis, tuberculosis and lung cancer.

In October of the same year, the International Agency for Research on Cancer classified crystalline silica as “carcinogenic to humans.” The National Toxicology Program's 9th Report on Carcinogens (May 2000) upgraded it from a “reasonably anticipated” to “known” human carcinogen. Exposure studies indicate that some workers may still be exposed to very high levels of silica. Over 30 percent of the silica samples from various industries collected by OSHA between 1982 and 1992 exceeded the current limit, which was set in 1974. Additionally, several studies suggest that the current OSHA standard may be insufficient to protect against silicosis.

Crystalline Silica - What is it? - Crystalline or free silica is a substance in which molecules of silicon dioxide (SiO_2) are arranged in a fixed pattern. Amorphous silica has a random pattern and is said by toxicologists to pose little or no hazard. OSHA is expected to propose a lower Permissible Exposure Limit (PEL) in a Notice of Proposed Rulemaking currently scheduled for June 2001. The Agency has also concluded that

a full and comprehensive “expanded” silica standard is necessary.

The expanded standard would likely include provisions for product substitution, engineering and work practice controls, training and education, respiratory protection, and medical surveillance. A full standard would improve worker protection, ensure adequate prevention programs, and further reduce the incidence of silica-related diseases. It would also, obviously, increase the cost of using the material.

Compliance with the current OSHA PEL for crystalline silica is calculated from sampling and analytical data. For example, the 8-hour time weighted average PEL for respirable quartz ranges from 3.33 to 0.1 mg/m^3 , depending on the percentage of quartz in the respirable dust. See http://www.osha-slc.gov/SLTC/silica_advisor/compare_to_limit/pel/pel.html for details.

The National Institute for Occupational Safety and Health (NIOSH) has recommended exposure limits. Its recommendations for the four

following forms of crystalline silica (respirable fraction of the dust) are:

Material	CAS #	mg/m ³
Quartz	14808-60-7	0.05
Cristobalite	14464-46-1	0.05
Tridymite	15468-32-3	0.05
Tripoli	1317-95-9	0.05

Because of these events, OSHA believes that it will be necessary to conduct its own risk assessment to determine how much lower the PEL needs to be to adequately protect worker health.

Any new PEL would apply across all industries, however. Trades that would be most affected by the new standard are building and road construction, foundries, mining, masonry, and ceramics. Some aerospace operations may also be affected. Exposure may occur when performing the following processes: paint sanding, abrasive blasting, adhesive grinding, water jet cutting of ceramic insulation boards and foundry casting. Also exposure may occur when working with: paints, refractory insulating materials, surface fillers, polishing compounds, foam cores, and dye penetrant powders.



Vacuum Controlled Scuff Sanding of Primer at Boeing St. Louis

Crystalline silica is used in some aerospace coatings as a flattening agent and to improve coverage. Exposures are more likely during sanding of cured coatings than during a spray application. Scuff sanding of primer is often done in preparation for painting. Sanding also is done during depainting operations.

The timing and exact nature of any future OSHA changes to crystalline silica regulations is uncertain. However, we have elected to reassess our current uses of these materials using our best current understanding of their potential hazards.

Our initial search of St. Louis materials in the Boeing corporate MSDS system identified 105 items containing one of the targeted crystalline silicas. We are narrowing that list by identifying specific current (versus historical) applications. This will define the scope of our efforts to eliminate or reduce St. Louis usage.

Earlier this year, a Natural Work Group was formed to: ensure all crystalline silica use has been identified at Boeing St. Louis; find/test replacement candidates; conduct shop trials and implement replacements where necessary. Compliance with existing and proposed PELs will be verified/determined and all necessary process specification revisions will be made. Risk will be reduced in identified areas by either eliminating or reducing product use.

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Free Online Resource Helps Companies Merge Environmental and Economic Success

The following site has been linked to Boeing Commercial Aircraft's SM&P Environmental Web site. It has been recommended by Pat Doscher, BCA SM&P SHEA Manager.

A new online resource center is offering a wealth of free information to help companies "align environmental responsibility with business success," say its creators.

GreenBiz.com, produced by the nonprofit **Green Business Network**, features a wide range of information, tools, reports, news, and other resources. Calling itself "The Resource Center on Business, the Environment, and the Bottom Line," the site brings together information from companies, government agencies, business groups, activist groups, academic institutions, and other organizations.

GreenBiz.com's offerings include:

- **Business Toolbox**, containing more than 100 reports, backgrounders; how-to articles, checklists, and other hands-on tools;
- **Government Gateway**, featuring descriptions of more than 300 government programs that help companies improve their environmental and economic performance;
- **Mentor Center**, a database of more than 250 companies, agencies, and other organizations offering hands-on technical assistance on environmental issues to large and small companies;
- **Awards Directory**, with detailed information on dozens of national and local award and recognition programs that honor environmental leadership companies; and
- **Descriptions** of nearly 500 Web sites on business environmental issues.

Additional features include a daily news service on environmental business topics, monthly columnists, an electronic newsletter, an events calendar, and bookstore. All information is searchable in database form. All of the information is free, without restriction, registration, or passwords.

"**GreenBiz.com** helps solve an Information Age paradox," says Joel Makower, president of **Green Business Network**. "There's an overwhelming amount of information on business and the environment, but no easy means

of accessing it -- or of harnessing it to gain business value. Our goal is to make high-quality information and tools available to the broadest possible business audience."

One key role played by **GreenBiz.com** is to cross organization and sector boundaries, says Makower. While the number of business environmental organizations is growing, most operate under a tacit "not-invented-here" policy. Few promote information or resources created by other organizations, he says.

As a result, "Many of the best tools and resources get into the hands of a relatively small circle of friends, failing to reach the broader mainstream business audience to which they could potentially provide value," says Makower. "We expect to change that."

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The Greening of St. Louis

By Daryl Stephenson

(From Boeing News, 30 June 2000)

Many departments and employees at Boeing St. Louis have helped the company reduce hazardous waste by 73 percent between 1987 and 1999, and air emissions by 81 percent between 1989 and 1998.

Recently, the St. Louis site was honored for its efforts to minimize or eliminate the use of hazardous materials as well as for its improvements to commuter assistance and recycling.

The award came from Choose Environmental Excellence- Gateway Region, an organization that establishes partnerships with individuals, organizations, businesses and government to foster environmental excellence in the St. Louis area.

The Boeing initiatives drew special praise from Laura Neuman, director of Choose Environmental Excellence. "Boeing is taking great steps in the areas of reducing hazardous waste, improving air emissions, treating wastewater, conserving energy, optimizing employee transportation and recycling a variety of materials," she said in a letter to Boeing officials.

About 20 Boeing engineers and specialists in the Environmental Assurance Division work primarily toward development of pollution prevention technologies. They annually develop an Environmental Strategic Operating Plan, in conjunction with the Safety Health and Environmental Affairs (SHEA) organization, that identifies cost-effective solutions to benefit the environment and the health and safety of employees.



Sam Stauffer, left, chemical process operator, and Steve Gaydos, Associate Technical Fellow, work on converting solvent vapor degreasers into aqueous tank cleaners

One byproduct of these plans was the elimination of the vast majority of production-

related substances that potentially could deplete the stratospheric ozone layer. Boeing has, for example, voluntarily converted chlorinated solvent vapor degreasers to aqueous tank cleaners and has replaced most solvent cold cleaners with aqueous cold cleaners. This reduces both air emissions and hazardous waste.

During the past two years, Boeing, working in conjunction with the St. Louis County Department of Health and Metropolitan St. Louis Sewer District, has provided facilities and volunteers for household hazardous waste and recycling collections. Residents and employees have brought hazardous wastes and materials to Boeing for collection and proper disposal. This effort was coordinated on-site by SHEA's Environmental and Hazardous Materials Services Group.

Boeing representatives also serve on a special, technical U.S. Navy "Green Hornet Team" that works to implement initiatives to minimize the environmental impact of F/A-18 operations. The team suggests solutions in regard to manufacturing, test and evaluation, integrated logistics support, training and ultimate disposal of aircraft at the end of their service lives.

The company-operated vanpool, in cooperation with the regional RideFinders program, operates 141 vans that transport 1,000 employees each day. The program has reduced the number of single-occupancy vehicles traveling daily by 850. The Boeing Commuter Assistance Office coordinates this effort.

In addition, Boeing St. Louis has recycled more than 10.6 million pounds of materials last year, including 1.4 million pounds of white paper, 1.25 million pounds of solid aluminum and 7,310 pounds of aluminum cans.

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