

**Respirator Use and Practices in the Food and Kindred Products Manufacturing
Establishments: Results of a National Survey of Private Sector Employers**

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Introduction

In 2001, the *Survey of Respirator Use and Practices* gathered information on respirator use from 40,002 randomly selected U.S. establishments (BLS/NIOSH, 2003). The survey collected data on the types of respiratory protection used by workers at an establishment, types of respirator fit tests performed, and presence of substances that prompted the decision to use respiratory protection.

The findings of the survey raised questions regarding respirator usage practices and how these practices compare with Occupational Safety and Health Administration (OSHA) regulations (Respiratory Protection Standard, 29 C.F.R. 1910.134, 1998) and National Institute for Occupational Safety and Health (NIOSH) recommendations (NIOSH, 2005a).

This report focuses on information from the respirator use and practices survey collected from establishments in the *Food and Kindred Products* (Standard Industrial Classification 20) industry (Office of Management and Budget, 1987). This industry includes establishments manufacturing or processing foods and beverages for human consumption, and certain related products, such as manufactured ice, chewing gum, vegetable and animal fats and oils, and prepared feeds for animals and fowls. Dusts and chemicals released during these processes can result in adverse health effects in workers. Respiratory protection may be the only protection available to workers in some circumstances where ventilation or substitution with a less toxic chemical is not an option.

Findings and Discussion

In 2001, approximately 16.2% (an estimated 3,586) establishments in the *Food and Kindred Products* industry used respirators for required purposes compared with 4.5% (an estimated 12,680) establishments in *All Private Industry*. Similar proportions of workers in *Food and Kindred Products* and *All Private Industry* used respirators (2.9 and 3.1%, respectively). Compared with *All Private Industry*, a smaller proportion respirator-using establishments in *Food and Kindred Products* used disposable dust masks (53.4% vs. 71.3%), and a larger proportion used air-supplied respirators (3.4% vs. 0.7%) (BLS/NIOSH, 2003).

Respiratory Protection Program Quality Indicators

Each of the elements listed below [developed on the basis of OSHA requirements (Respiratory Protection Standard, 29 C.F.R. 1910.134, 1998) and NIOSH recommendations (NIOSH, 2005a)] is an important part of an effective respirator program. The percentage of *Food and Kindred Products* establishments using respirators with indicators of a potentially inadequate respiratory protection program is listed in parenthesis.

- Does the program require use of the manufacturer user's instructions or NIOSH certification labels to adjust the airflow for airline respirators? (94% of establishments using airline respirators did not require such use of instructions or labels or didn't know how airflow was adjusted)
- Is there a written change-out schedule for air-purifying gas/vapor filters? (73% of respirator-using establishments using gas/vapor filters did not have a written change-out schedule)

- Are airline respirator couplings incompatible with other gas systems at the establishment? (52% of airline respirator-using establishments did not assure the incompatibility)
- Has management adopted a written respirator program that determines how respirators are used? (36% of respirator-using establishments had not adopted a written program)
- Does the program include a trained respirator program administrator? (34% of respirator-using establishments did not have a trained program administrator)
- Do written procedures include a regularly scheduled evaluation of the effectiveness of respirators used at the establishment? (27% of respirator-using establishments did not include such an evaluation or were unaware if evaluations had been conducted)
- Are wearers of tight-fitting respirators fit tested? (21% of respirator-using establishments with tight-fitting respirators did not provide fit testing or didn't know if fit testing was conducted)
- Are employees assessed for medical fitness to wear respirators? (20% of respirator-using establishments did not provide the assessment or didn't know if an assessment was conducted)
- Does the program include written procedures for maintaining respirators? (17% of respirator-using establishments did not include such procedures or didn't know if there were procedures)

- Does the program provide training regarding the need, use, limitations, and capabilities of respirators? (12% of respirator-using establishments did not provide the training)
- Are dust masks used (filtering-facepiece respirators) to protect only against dusts, but not gases or vapors? (9% of respirator-using establishments did not use dust masks only against dust)

Certain hazardous airborne contaminants can be present during manufacturing and processing activities in the *Food and Kindred Products* industry. For example, ammonia, used as a refrigerant, fumigant, and cleaning agent (Stellman, 1998), can be released in high concentrations due to leaks while performing maintenance activities on piping. Contact with anhydrous ammonia can cause blindness, and breathing it can result in fluid accumulation in the lungs and death (Stellman, 1998). OSHA investigated ammonia release incidents in the *Food and Kindred Products* industry where employee injuries include chemical burns, asphyxiation and death (Close et al., 1980; OSHA, 2007). Carbon monoxide can be released from smokehouses, wine fermentation cellars, internal combustion engines, and grain silos. OSHA documented carbon monoxide poisonings (including unconsciousness) due to operation of propane or gasoline forklifts inside buildings (OSHA, 2007; Stellman, 1998; Washington State Department of Labor and Industries, 2007). Acids (e.g., phosphoric acid used to clean food processing equipment) and caustics (e.g., sodium hydroxide) are also used in this industry and can cause upper respiratory system irritation or pneumonia (NIOSH, 2005b). Maintenance workers and nearby workers in the *Food and Kindred Products* industry can be exposed to metal fumes from welding and thermal cutting metals

including stainless steel, silica dust (sand) from abrasive blasting, solvents from metal cleaning, and solvents and isocyanates from painting and coating metals (Stellman, 1998). Exposure to welding fumes can cause metal fume fever or lead intoxication (Stellman, 1998), exposure to silica (a component in sand and in rocks like sandstone and granite) can cause silicosis (CDC, 2005; NIOSH, 2003), and exposure to isocyanates (a common component of paint and primer) and flour can cause work-related asthma (NIOSH, 2003; Stellman, 1998). Blindness due to anhydrous ammonia eye contact can be prevented by wearing a full facepiece respirator. Respiratory protection is needed when carbon monoxide levels cannot be reduced through engineering controls below occupational exposure limits (NIOSH, 2005a; Stellman, 1998; Washington State Department of Labor and Industries, 2007).

While the survey design does not allow determination of particular substances that prompted respirator use specifically for the *Food and Kindred Products* industry, results of the survey provide such information for the parent industry, *Manufacturing*. There, *dust, paint vapors, solvents, welding fumes, and silica dust* were the substances for which respirators were most frequently used. Historical data from a NIOSH exposure survey conducted in 1981–1983 estimated that in *Food and Kindred Products* 181,000 U.S. workers were potentially exposed to sodium hydroxide (used in cleaning of brewery equipment and lye peeling of potatoes, fruit and vegetables), 132,000 to phosphoric acid (used in cleaning equipment), 61,000 to silica dust, 30,000 to ammonia, and 24,000 to xylene (used as a solvent) (NIOSH, 2007). Currently, similar numbers of workers can be potentially exposed because the number of workers employed in the

Manufacturing industry only changed approximately 5% from 16,441,000 in 1982 to 17,363,000 in 2001 (BLS, 2007).

Of the respirator-using *Food and Kindred Products* establishments, approximately 34% (1,227 of 3,586) of establishments had three or more indicators of a potentially inadequate respiratory protection program as measured against OSHA respirator program requirements and NIOSH recommendations listed in the previous section.

The survey findings are subject to some limitations. Public sector, self-employed, and agriculture establishments with less than 11 workers were not included in the survey. Although the instructions stated that the person most familiar with respiratory protection should complete the questionnaire, this may not have always happened. In spite of the cognitive and field testing of the survey at small, medium, and large establishments prior to its mailing, recipients may have misinterpreted the written questions. The survey was not designed to collect exposure information specifically for *Food and Kindred Products*, though it did collect such information for the broader industry category of *Manufacturing*.

Respiratory Protection Program Consultation Service

Employers who suspect their respiratory protection program is in need of improvement should consider contacting the OSHA free confidential consultation service available for small businesses in every state. OSHA also has a *Small Entity Compliance Guide for the Revised Respiratory Protection Standard* available at <http://www.osha.gov/Publications/secgrev-current.pdf>. Another resource is the American

Industrial Hygiene Association list of industrial hygiene consultants at
<http://www.aiha.org/Content/AccessInfo/consult/consultlisting.htm>.

Disclaimer: The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the National Institute for Occupational Safety and Health.

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