

Respiratory Protection Guidance for the Spray Foam Insulation Industry

Regulations:

29 CFR 1910.134 is the OSHA standard for respiratory protection.

http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=12716&p_table=standards

In any workplace where respirators are necessary to protect the health of the employee or whenever respirators are required by the employer, the employer shall establish and implement a written respiratory protection program with worksite-specific procedures. The program shall be updated as necessary to reflect those changes in workplace conditions that affect respirator use. The employer shall include in the program the following provisions of this section, as applicable:

- Procedures for selecting respirators for use in the workplace;
- Medical evaluations of employees required to use respirators;
- Fit testing procedures for tight-fitting respirators;
- Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations;
- Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators;
- Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators;
- Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations;
- Training of employees in the proper use of respirators, including putting on and removing them, any limitations on their use, and their maintenance; and
- Procedures for regularly evaluating the effectiveness of the program.

What are the typical respiratory hazards in the spray foam insulation industry?

There can be several hazards, but the hazards that typically prompt respirator use are the diisocyanates found in the A-side of SPF chemicals.

When should a respirator be used?

According to OSHA 1910.134, if hazards are present in the working environment with concentrations above the Permissible Exposure Limit (PEL), and the hazard cannot be eliminated or reduced with engineering or administrative controls, then, according to the standard, a written respiratory protection program should be established. As part of that program, a respirator should be selected and used according to the manufacturer's instructions.

How can I determine if the working environment has concentrations above the PEL?

The accurate method is to have an air sample taken and tested by a laboratory. One of the most popular resources for this is www.airtesting.com but a list of consultants is available at www.consultantslisting.org.

What types of respirators are appropriate?

Air-purifying respirators (APR) or Powered Air-Purifying Respirators can be used with organic vapor cartridges accompanied by a strict cartridge changeout schedule, but this is not considered the best practice due to the poor warning properties of diisocyanates. According to the American Chemistry Council (see resource below), Supplied Air Respirators (SAR) are considered to be best practice.

How can I determine the necessary Assigned Protection Factor (APF)?

To calculate the APF required, divide the hazard concentration by the PEL. $APF = \text{Hazard Concentration} / \text{PEL}$.

What are the requirements for breathing air when using an SAR?

Supplied breathing air must AT MINIMUM meet the requirements for Type 1 gaseous air described in the ANSI/Compressed Gas Association Commodity Specification G-7.1 for Grade D or higher quality as specified by Federal regulations 42 CFR, Part 84.141(b) and 29CFR1910.134(i). The requirements for Grade D breathable air include:

- Oxygen19.5-23.5%
- Hydrocarbons (condensed)in mg/m3 of gas5 mg/m3 max.
- Carbon monoxide.....10 ppm max.
- Carbon dioxide.....1,000 ppm max.
- Odor*

- No toxic contaminants at levels that make air unsafe to breathe.

* Specific measurement of odor in gaseous air is impractical. Air may normally have a slight odor. The presence of a pronounced odor should render the air unsatisfactory.

Grade D Breathing Air may come from an ambient air pump, compressor with proper filtration, or a compressed breathing air cylinder.

How often must I test the breathing air?

1910.134(c)(1)(ix) This section says that the employer must have procedures for regularly evaluating the effectiveness of the program.

"Regularly" is not defined in this sub part. In other parts of the standard, such as with fit testing, most tests are specified as at least annually.

1910.134(i)(5)(iii) This section says that the supplied air system must have suitable in-line air-purifying sorbent beds and filters to further ensure breathing air quality. Sorbent beds and filters shall be maintained and replaced or refurbished periodically, following the manufacturer's instructions. In addition, OSHA expects respirator wearers to follow manufacturer instructions for respirators and other equipment.

**In short, one won't find a simple answer.*

What records must I keep?

1910.134(m) This section requires the employer to establish and retain written information regarding medical evaluations, fit testing, and the respirator program. This information will facilitate employee involvement in the respirator program, assist the employer in auditing the adequacy of the program, and provide a record for compliance determinations by OSHA.

Resources:

Model Respiratory Protection Program from the American Chemistry Council
<http://polyurethane.americanchemistry.com/Resources-and-Documents-Library/7095.pdf>

Sample OSHA Respiratory Protection Program (See Appendix IV)
http://www.osha.gov/Publications/SECG_RPS/secgrev-current.pdf

NIOSH Respirator-Trusted Source Information Page
http://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/RespSource.html

NIOSH Workplace Safety & Health Topic
<http://www.cdc.gov/niosh/topics/isocyanates/>

Examples of Respiratory Protection for the Spray Foam Insulation Industry



Half Mask
(APF = 50)



Full Face Mask
(APF = 1,000)



Tychem Hood
(APF = 1,000)



3-Stage Filtration
with CO Monitor



7-Stage Filtration
with CO Monitor and
Remote Alarm

Ambient Air Pump Air Source:

Advantages: Portability, no CO monitoring required, high APF, more comfortable than APR.

**Note: The air inlet must be in a known clean air location.*

Compressed Air Source:

Advantages: High APF, can be configured with vortex-action tubes for cooling of up to 45 degrees, can be used with existing rig compressors.

Warnings:

This document is not a substitute for a proper hazard assessment by a trained health and safety professional. According to OSHA regulations, the employer is responsible for the health safety of the worker. Oil-lubricated compressors require a high temperature alarm or CO monitor.

Do not use after-market parts. Use ONLY Bullard replacement parts for Bullard respirators. A respirator that includes any replacement or spare part that has not been inspected as part of the respirator manufacturer's quality control plan is in a configuration not evaluated by NIOSH and therefore is not NIOSH approved. Please consult the respirator manufacturer before purchasing and installing replacement or spare parts to ensure the NIOSH approved configuration is maintained. Respirators which have been modified by the interchanging of subassemblies or other deviations using parts not produced and distributed under the respirator manufacturer's controlled system no longer meet the definition of being approved as a NIOSH certified respirator, and the use of the NIOSH approval label is not authorized for that unit.

<http://www.cdc.gov/niosh/npptl/usernotices/pdfs/UsersNotice05042007.pdf>

**Note: Ambient Air Pumps are not a part of the NIOSH approval, so a pump from one manufacturer may be used with a respirator from another manufacturer.*

Americas:

E.D. Bullard Company

1898 Safety Way
Cynthiana, KY 41031-9303
Toll free: 877-BULLARD (285-5273)
Tel: 859-234-6616
Fax: 859-234-8987
www.bullard.com

Europe:

Bullard GmbH

Lilienthalstrasse 12
53424 Remagen • Germany
Tel: +49-2642 999980
Fax: +49-2642 9999829
www.bullardextrem.com

Asia-Pacific:

Bullard Asia Pacific Pte. Ltd.

LHK Building
701, Sims Drive, #04-03
Singapore 387383
Tel: +65-6745-0556
Fax: +65-6745-5176
www.bullard.com