

Technical Data Bulletin

OH&ESD

#187 — Respiratory and Eye Protection For Volcanic Eruptions

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Background

Volcanoes are found throughout the world. Typically they form where tectonic plates come together. Examples include the volcanoes in the area known as the Pacific Ring of Fire which encircles the Pacific Ocean basin. They can also form where thin spots occur in the earth's crust such as in Yellowstone National Park. Most of the world's volcanoes are considered to be extinct or dormant with only a few actively erupting. It is possible, however, for a dormant volcano to become active and erupt with little advance warning. A volcanic eruption can range from being relatively gentle such as Hawaii's Kilauea volcano, to causing widespread damage and effects such as when Mount St. Helens erupted in Washington state.

Hazards

Depending on the type of volcano and the force of the eruption a number of different hazards may be present. They can include mudflows and flashfloods, landslides and rock falls, earthquakes, lava flow, falling ash, and the release of potentially harmful gases. According to the United States Centers for Disease Control and Prevention (CDC) the most common cause of death from a volcanic eruption is suffocation.

The concentration and type of gases emitted by volcanoes can vary greatly from one eruption to the next. Typically the gases emitted dissipate quickly in the atmosphere. However, people located close to the volcano or in low-lying areas may be exposed to levels that could affect their health. In addition to water vapor, the type of gases that may be released include acid gases such as carbon dioxide, sulfur dioxide, hydrogen chloride, hydrogen fluoride and hydrogen sulfide.

Usually, the most visible evidence of a major eruption is the plume of ash released high into the atmosphere. This plume of ash can travel long distances from the site of the eruption often causing health and safety issues along the way as it settles back to the ground. Ash is a gritty, abrasive, sometimes corrosive particle. Exposure to volcanic ash can cause irritation to the eyes as well as the respiratory system. For people with existing respiratory conditions such as asthma, emphysema or other chronic lung disease exposure to ash may pose serious health risks.

Respiratory and Eye Protection

The CDC has prepared a document titled "Key Facts About Protecting Yourself During a Volcanic Eruption". In this document the CDC recommends a number of tips to help protect against the

harmful effects from falling volcanic ash. These include:

- Stay inside, if possible, with windows and doors closed
- Use goggles to protect your eyes
- Use a NIOSH approved N95 respirator to help protect yourself while you are outdoors or while you are cleaning up ash that has gotten indoors
- Avoid driving in heavy ash fall. If you do have to drive, keep the car windows up and do not operate the air conditioning system.

3M Note: A NIOSH approved N95 or higher rated filter or respirator is capable of filtering volcanic ash. However, some people may also find the odors released during an eruption objectionable. In that case choosing an appropriate respirator or filter for the ash that also incorporates acid gas relief for the odors may be desirable. Goggles selected to help reduce ash from irritating the eyes should be designed to be used for dust. Goggles designed for liquid splash or gas environments are also appropriate. Other considerations for proper goggle selection include the need for impact resistance and use with prescription eye glasses.

Respiratory and Eye Protection For Volcanic Eruptions

Additional Resources

For further information concerning the use of respiratory protection for volcanic eruptions, contact 3M at 1-800-243-4630. For more information on volcanoes and the hazards associated with them contact your local emergency management office or one of the following agencies:

- CDC (<http://emergency.cdc.gov/disasters/volcanoes>)
- Federal Emergency Management Agency (<http://www.fema.gov/hazard/volcano/index.shtm>)
- U.S. Geological Survey (<http://vulcan.wr.usgs.gov/Hazards/framework.html>)
- Washington State Department of Health (<http://www.doh.wa.gov/phepr/handbook/volcano.htm>)

For more information, please contact:

3M Occupational Health and Environmental Safety Division (OH&ESD)

In the U.S., contact:

Customer Service

1-800-328-1667

Technical Assistance

1-800-243-4630

Fax On Demand

1-800-646-1655

Internet

www.3M.com/occSafety

For other 3M products

1-800-3M HELPS

In Canada, contact:

3M Canada Company, OH&ESD

P.O. Box 5757

London, Ontario N6A 4T1

Customer Service

1-800-265-1840

Technical Assistance (Canada only)

1-800-267-4414

Fax On Demand

1-800-646-1655

Internet

www.3M.com/CA/occSafety

Technical Assistance In Mexico

01-800-712-0646

5270-2255, 5270-2119 (Mexico City only)

Technical Assistance In Brazil

0800-132333

Fax On Demand O.U.S. Locations

1-651-732-6530



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