

Exposure Data For Fiber Glass, Rock Wool & Slag Wool

NAIMA, the trade association of North American manufacturers of fiber glass, rock wool and slag wool insulation products, continuing its members' commitment to safety, has established a renewed Product Stewardship Program. The NAIMA Product Stewardship Program embodies the components of the earlier OSHA-NAIMA Health and Safety Partnership Program (HSPP). The HSPP was a comprehensive eight-year partnership with OSHA, which NAIMA completed in May 2007.

A key element of NAIMA's Product Stewardship Program is the continuation of the occupational exposure limit for fiber glass, rock wool and slag wool insulation materials established by the HSPP with OSHA's endorsement. The voluntary permissible exposure limit or PEL, remains at 1-fiber-per-cubic-centimeter (1 f/cc), based on an 8-hour workday.

The industry for many years has recommended a 1 f/cc exposure limit based on irritation.* Continuation of the 1 f/cc PEL through the NAIMA Product Stewardship Program reaffirms the exposure limit recommended by various governmental and authoritative bodies over

the years, including: OSHA's proposed 1 f/cc PEL of 1992;¹ the American Conference of Government Industrial Hygienists' (ACGIH) adoption of a 1 f/cc Threshold Limit Value (TLV) in 1997;² the State of California's Air Contaminant Advisory Committee's recommendation of a 1 f/cc PEL in 1997;³ and the HSPP's OSHA endorsed recommendation of 1 f/cc from 1995 - 2007.⁴ By supporting the recommendations of these governmental and authoritative bodies, the industry establishes a clear, consistent, and unified message that eliminates confusion and uncertainty about the appropriate protection level.

NAIMA Exposure Database

To help contractors and workers determine the level of potential exposure to fiber glass, rock wool or slag wool for a given task, NAIMA established and has maintained an exposure database containing sample data about exposure levels categorized by product type and specific work task. NAIMA has analyzed exposure data involving typical exposure levels for many common jobs, which shows that most of these jobs currently can be completed without exceeding the exposure limit of 1 f/cc for an 8-hour



Table 1 – Fiber Glass, Rock and Slag Wool Respirable Fiber Exposure Data

Product Description	Time-Weighted Average (TWA)* Exposure Levels (f/cc)**	Product Description	Time-Weighted Average (TWA)* Exposure Levels (f/cc)**
Fiber Glass Mean (Average)		Fiber Glass Mean (Average)	
<i>Acoustical Panel</i>		<i>Metal Building Insulation</i>	
Cutting/Sawing with Power Tools	0.05	Installation	0.10
Handling	0.01	<i>Miscellaneous</i>	
<i>Aircraft Insulation</i>		Fabrication with Hand-Held Power Cutting Tools	
Cutting/Sawing with Power Tools	0.14	Manufacturing	0.31
Fabrication/Assembly	0.11	0.05	
<i>Appliance Insulation</i>		Product Description Time-Weighted Average (TWA)* Exposure Levels (f/cc)**	
Fabrication	0.11	Rock and Slag Wool Mean (Average)	
Installation	0.08	<i>Batts/Blankets</i>	
<i>Automotive Insulation</i>		Installation	
Fabrication/Assembly	0.06	Installation	0.09
Installation	0.01	<i>High Density Batts</i>	
<i>Batts/Blankets</i>		Installation	
Lamination	0.05	Installation	0.09
Installation	0.11	<i>Blowing Wool With Binder</i>	
Cutting/Sawing	0.17	Installation	
<i>Blowing Wool With Binder</i>		Installation	
Installation	0.28	Installation	0.21
<i>Blowing Wool - Without Binder</i>		<i>Cavity Fill Insulation</i>	
Installation	0.75	Installation	
<i>Cavity Fill Insulation</i>		Installation	
Installation	0.21	Installation	0.10
<i>Flex Duct</i>		<i>Ceiling Tiles</i>	
Installation/Assembly	0.01	Installation	
<i>Fiber Glass Mat</i>		Installation	
Forming	0.01	Installation	0.22
<i>Fiber Glass Residential</i>		<i>Industrial Board/Blanket</i>	
Removal	0.40	Removal	
Compressed Air Cleanup	0.24	Removal	0.09
<i>Filtration Products</i>		<i>Mobile Home Insulation</i>	
Fabrication	0.55	Installation	
<i>Duct Board</i>		Cutting/Sawing	
Fabrication	0.08	Lamination	0.03
Installation	0.02	<i>Pipe Insulation</i>	
Handling	0.01	Installation	
Cutting/Sawing with Power Tools	0.06	Installation	0.05
<i>Duct Liner</i>		<i>Safing</i>	
Fabrication	0.04	Installation	
Installation	0.10	Installation	0.10
<i>Duct Wrap</i>		<i>Spray-On Fire Proofing</i>	
Installation	0.35	Installation	
<i>Industrial Board/Blanket</i>		Feeding	
Fabrication/Installation	0.08	Installation	0.11
Removal	0.44	Feeding	0.05
Cutting/Sawing with Power Tools	0.06	<i>Manufacturing</i>	
<i>Pipe Insulation</i>		Bulk	
Installation	0.05	Commercial & Industrial	0.07
Removal	0.04	Ceiling Panels & Tiles	0.09
		Filtration	0.20
		Installation	0.21
		Spray-On Fire Proofing	0.07
		High-Density Board	0.06
		Pipe Insulation	0.20
		<i>Rock and Slag Residential</i>	
		Removal	
		Removal	0.15
		<i>Miscellaneous</i>	
		Fabrication with Hand-Held Power Cutting Tools	
			0.15

Samples taken from the following sources:

- Johns Hopkins University Study
- Rock and Slag Wool Installers Study
- Fluor Daniel Study of Worker Exposures During Removal of SVF
- NAIMA Member Company Studies
- Insulation Contractors Association of America Installers Study
- NAIMA/Clayton Study
- Other Studies

* Sample Duration of 240 Minutes or Longer.

** As Evaluated by the NIOSH 7400 "B" Sampling and Analytical Methodology.

Source: Data provided to NAIMA by Arizona State University following a thorough review and analysis by A.S.U. on September 29-30, 2016.

time weighted average (TWA). The NAIMA exposure database currently includes data collected from a variety of sources, including manufacturers, contractors, academic institutions and third-party organizations.

As of 2016, the database contains well over 16,000 data points. This is a living database; samples are added yearly. The database has been the subject of several peer-reviewed articles.⁵

Contractors Can Rely on the NAIMA Database

Contractors are not required to conduct exposure monitoring. Rather, contractors can rely on the information contained in the NAIMA exposure database to quickly and easily determine their potential exposure level and need for respiratory protection. When OSHA endorsed the HSPP, OSHA fully supported the ability of contractors to rely on the NAIMA exposure database as the means for determining exposure levels.

Specifically, the preamble to OSHA's 1998 Respiratory Protection Rule states that "OSHA recognizes that there are many instances in which it may not be possible or necessary to take personal exposure measurements to determine whether respiratory protection is needed."⁶ In addition, OSHA's Respiratory Protection Rule states that the "Final rule permits employers to use other approaches for estimating worker exposures."⁷ For example, OSHA approved the use of "data from industry-wide surveys by trade associations"⁸ and noted that such information is "often useful in assisting employers...to obtain information on employee exposures in their workplaces."⁹ In fact, OSHA specifically cited NAIMA's database in the preamble as an example of industry data that could be relied upon by employers.¹⁰

NAIMA's Product Stewardship Program recommends that any exposure to airborne respirable fibers in excess of the 1 f/cc PEL averaged over an 8-hour workday will need controls to reduce exposures below the PEL. Engineering controls are preferred, but if these are not feasible or practical, then properly used respiratory protection can be an effective control. The NAIMA Product Stewardship Program recommends respiratory protection whenever



exposures on the job exceed the 1 f/cc TWA PEL. Appropriate respiratory protection is a NIOSH certified filtering facepiece dust respirator (certified N95 or greater) or equivalent.

Based on typical exposures for blowing unbonded loose fill insulation, NAIMA's Product Stewardship Program recommends respiratory protection.

Using the NAIMA Database

The table contained herein summarizes the existing NAIMA exposure data collected for fiber glass, rock wool and slag wool insulation. The measurements are categorized by product and work task based on an 8-hour (TWA) workday.

Upon receiving a request for data from the NAIMA fiber exposure database, NAIMA will respond by providing the Fiber Exposure Database literature piece. Because this literature will contain the average exposures for the most common tasks and provide an explanation on the background and function of the database, this literature will also be provided so that recipients understand the nature of the database. If the request seeks exposure data points for tasks not identified within the literature, the Auditing Team will discuss whether action should be taken to acquire exposure data on that particular task.

NAIMA – Helping Contractors Work Safely with Fiber Glass, Rock Wool and Slag Wool

With the creation of NAIMA's Product Stewardship Program, NAIMA and its member companies will reaffirm their commitment to the safety of all those who handle fiber glass, rock wool and slag wool insulation products as established in the HSPP and earlier Product Stewardship programs. The exposure database described above is just one of the many tools created by NAIMA to help builders, installers, specifiers and consumers increase their level of confidence in handling these materials.

NAIMA has also created a free work practice DVD called "Play It Smart, Play It Safe," which provides workers with the basic work practice recommendations to follow on the job site. Along with the DVD is a detailed brochure outlining the specific work practice recommendations. Virtually all of these work practices were part of the HSPP and were endorsed by OSHA. The work practice recommendations can be found at www.insulationinstitute.org. These materials are also available by contacting NAIMA.

References

1. 57 Fed. Reg. at 26,002 (June 12, 1992).
2. ACGIH. 2001. Synthetic Vitreous Fibers. Supplement to documentation of the threshold limit values and biological exposure indices. American Conference of Governmental Industrial Hygienists. Cincinnati, OH.
3. <http://www.osha.gov/sltc/syntheticmineralfibers/table.html>
4. Toxicological Profile for Synthetic Vitreous Fibers (U.S. Department of Health and Human Services, Public Health Services, Agency for Toxic Substances and Disease Registry), September 2004, P.11, P.218 (Table 8-1).
5. G.E. Marchant, *et al.*, "A Synthetic Vitreous Fiber (SVF) Occupational Exposure Database: Implementing the SVF Health and Safety Partnership Program," *Applied Occupational and Environment Hygiene*, 17(4): 276-285, 2002.
Marchant, Gary; Bullock, Christopher; Carter, Charles; Connelly, Robert; Crane, Angus; Fayerweather, William; Johnson, Kathleen; and Reynolds, Janis (2009) "Applications and Findings of an Occupational Exposure Database for Synthetic Vitreous Fibers," *Journal of Occupational and Environmental Hygiene*, 6:30, 143-150.
L. Daniel Maxim, *et al.*, "Fiber glass and rock/slag wool exposure of professional and do-it-yourself installers," *Regulatory Toxicology and Pharmacology*, 37 (2003) 28-44.
6. 63 Fed. Reg. at 1151, 1199 (January 8, 1998).
7. *Ibid.*
8. *Ibid.*
9. *Ibid.*
10. *Ibid.*

About NAIMA

NAIMA is the association for North American manufacturers of fiber glass, rock wool, and slag wool insulation products. Its role is to promote energy efficiency and environmental preservation through the use of fiber glass, rock wool, and slag wool insulation, and to encourage the safe production and use of these materials.

For more information, contact:

NAIMA
11 Canal Center Plaza
Suite 103
Alexandria, VA 22314
Phone: 703-684-0084
Fax: 703-684-0427
www.insulationinstitute.org

NAIMA Member Companies:

Aislantes Minerales, S.A. de C.V.
D.F., México
Armstrong World Industries
Lancaster, PA
CertainTeed Corp.
Malvern, PA
Hollingworth & Vose
Corvallis, OR
Industrial Insulation Group, LLC
Brunswick, GA
Johns Manville
Denver, CO
Knauf Insulation
Shelbyville, IN
Owens Corning
Toledo, OH
Rock Wool Manufacturing Co.
Leeds, AL
Roxul, Inc
Milton, Ontario
Thermafiber, Inc.
Wabash, IN
USG Interiors, Inc.
Chicago, IL