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E-Mailed Memo

Date: August 19, 2014

To: HTIW Coalition

From: L. Daniel Maxim and Ron Niebo, Everest Consulting Associates

Subject: N95 filtering facepiece respirators are appropriate for workers exposed to RCF

The refractory ceramic fiber (RCF) industry has established a recommended exposure guideline (REG) of 0.5 fibers per milliliter (f/cc) for RCF (8-hour time weighted average). This REG, which has been incorporated in the HTIW Coalition product stewardship program, was set on the basis of prudence and demonstrated feasibility, rather than proven risk. Moreover, the available epidemiological data on RCF exposed occupational cohorts have not shown any interstitial fibrosis, excess lung cancer, or any cases of mesothelioma.

The current version of the HTIW Product Stewardship Program (PSP 2012) lists P100 as the appropriate respirator for workplace exposures to RCF that exceed the REG. The listing of P100 in the PSP was in error. As discussed herein, the correct respirator is N95.

This result is supported by the NIOSH Pocket Guide to Chemical Hazards, reprinted at http://www.cdc.gov/niosh/npg/npgd0432.html. RCF is within the category of manmade mineral fibers. With respect to such fibers, the Guide provides:

> Respirator Recommendations
>
> NIOSH
>
> Up to 5X REL:(APF = 5) Any quarter-mask respirator.
>
> Up to 10X REL:

> (APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering face pieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100, P100.

Pursuant to these recommendations, N95 respirators are appropriate for exposures up to 10 times the NIOSH Recommended Exposure Limit (REL). With respect to RCF, both the NIOSH REL and the industry REG have been set at 0.5 f/cc. [1] Accordingly, N95 would provide the necessary protection for exposures up to 5 f/cc. In addition, the Respirator Selection Guide published by 3M Corporation, the primary respirator manufacturer, specifically recommends use of N95 respirators for RCF exposures. http://multimedia.3m.com/mws/mediawebserver?mwsId=SSSSSufSevTsZxtUOxmG4x_SevUqevTSevTSevTSeSSSSSS-- (page 84; copy attached).

We understand that the NIOSH CD recommends a 100 series filter because it has an assigned protection factor (APF) of 10 (p.7). However, the CD recommendation is not explained further, and the NIOSH guidance quoted above indicates that N95 respirators are considered to have an APF of 10. We believe it is clear from these materials that the use of N95 respirators is appropriate for the vast majority of workplace exposures that exceed the REL and REG. N100 is needed only in those few cases, such as furnace tearout operations, where exposures are shown reliably and consistently to be above 5.0 f/cc. In a meeting with HTIW Coalition representatives on August 7, 2014, NIOSH officials agreed that this recommendation is appropriate.

[1] See NIOSH, "Occupational Exposure to Refractory Ceramic Fibers, Criteria for a Recommended Standard" (May 2006). http://www.cdc.gov/niosh/nppm/upd-06-12-06.html. NIOSH did not distinguish between P100 and N100. However, N100 would be the appropriate reference since P100 respirators are meant to be used in oily environments, which does not apply to workplaces with RCF.

3M Occupational Health and Environmental Safety Division

2010 Respirator Selection Guide

3M

Sulfur pentafluoride	1	**0.01 (ceiling)**	Disulfur decafluoride	**AG**	Warning unknown
Sulfur tetrafluoride		**0.1 (ceiling)**		**AG**	Warning unknown
Sulfuryl fluoride	1000	**5**		**SA**	Warning unknown. Unknown sorbent effectiveness.
Synthetic vitreous fibers					
–Continuous filament glass fibers		**1 f/cc**		**N95**	
–Glass wool fibers		**1 f/cc**		**N95**	
–Refractory ceramic fibers		**0.2 f/cc**		**N95**	
–Rock wool fibers		**1 f/cc**		**N95**	
–Slag wool fibers		**1 f/cc**		**N95**	
–Special purpose glass fibers		**1 f/cc**		**N95**	
Talc (containing no asbestos)		**2 mg/m³* (respirable)**	Hydrous magnesium silicate, Steatite talc, Non-fibrous talc, Non-asbestiform talc	**N95**	
Talc (containing asbestos)			(See Asbestos)		
Tantalum, metal and oxide dusts (as Ta)		**5 mg/m³**		**N95**	
Tellurium and compounds (as Te)		**0.1 mg/m³**		**N95**	
Tellurium hexafluoride (as Te)	1	**0.02**		**SA**	Warning unknown. Unknown sorbent effectiveness.

* TLV is lower than PEL.