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NIOSH Docket Office
Reference Docket – 002
Robert A. Taft Laboratories
M/S C:34
4676 Columbia Parkway
Cincinnati, OH 45226

Reference: CBRN Escape Respirator Standard

MSA offers the following comments to the NIOSH Concept for CBRN Air-Purifying Escape Respirator Standard (June 30, 2003 Draft for Discussion).

Logistics

Due to the substantial time and cost of conducting pre-submittal testing it is critical that the associated NIOSH CBRN Standard Test Procedures (STPs) are verified, completed, and available at the time the standard is released. For CBRN APR, it was necessary to re-run tests due to requirement modifications that were conveyed in the STPs. *We recommend that NIOSH release all applicable NIOSH Standard Test Procedures at the same time that the standard is released.*

2(b) Escape Respirator Multi Gas Vapor/Particulate Requirements General Category

Gas/Vapor Test Challenge and Breakthrough Concentrations

1. The proposed Formaldehyde, Hydrogen Cyanide, Hydrogen Sulfide and Phosphine breakthrough concentrations are currently based on the Emergency Response Planning Guideline (ERPG) values, specifically the ERPG-2 values, which are less stringent than the current recommended exposure limits. ERPG values were developed by the ERPG Committee of the American Industrial Hygiene Association as planning and emergency response guidelines. ERPG values are not exposure guidelines; they do not contain safety factors normally incorporated into exposure guidelines to prevent ill effects. ERPG-2 values are defined by the ERPG Committee as the “maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual’s ability to take protective action.” Based on the definition and intended use of ERPG values, we caution NIOSH on the use of the ERPG-2 values as breakthrough criteria. *We recommend that NIOSH base the Formaldehyde, Hydrogen Cyanide, Hydrogen Sulfide and Phosphine breakthrough*

concentrations on current NIOSH and OSHA recommended exposure limits (STELs, TWA TLV, PELs, RELs) and require the breakthrough concentrations to be as follows:.

Challenge Gas/Vapor	Test Concentration (ppm)	Breakthrough Concentration (ppm)
Formaldehyde	250	1
Hydrogen Cyanide	470	4.7
Hydrogen Sulfide	500	5
Phosphine	150	0.3

2. Nitrogen Dioxide, NO₂, could reduce to Nitric Oxide, NO during gas life testing and also use against NO₂. The current NIOSH REL and also OSHA PEL for NO is 25 ppm TWA. The CBRN APR Standard requires both NO₂ and NO to be monitored. The breakthrough is determined by which quantity, 1 ppm NO₂ or 25 ppm of NO, is reached first. *We recommend that both NO₂ and NO breakthrough be monitored during NO₂ gas life testing. We recommend that 25 ppm NO be included in the breakthrough criteria for NO₂ service life performance requirement.*

2 (c) Escape Respirator Multi Gas/Vapor/Particulate GENERAL Category with Carbon Monoxide Requirements:

We would like to know the rationale for the proposed test concentration of 3600 ppm, breakthrough requirement of 350 ppm, and also test conditions. *We request the opportunity to comment on the Carbon Monoxide Requirements after review of the NIOSH rationale.*

4 (c) Particulate Filtration

Research has shown that electrostatic respirator filters can be degraded by exposure to organic vapors. The existing NIOSH CBRN APR standard requires filter efficiency to be measured following Cyclohexane gas life testing to verify particulate filtration performance. *We recommend filter efficiency testing be required following Cyclohexane gas life testing to verify particulate filtration performance.*

6 (a) Chemical Agent Permeation and Penetration Resistance Against Distilled Mustard (HD) and Sarin (GB) Agent Requirements:

Per Table: “Simultaneous Liquid and Vapor Challenge of Escape Respirator with Distilled Sulfur Mustard (HD)”, the HD liquid volume is proposed to be 0.43 to 0.86 ml and applied as 25 drops of equal size. The liquid drops should be applied in the same procedure being followed for CBRN APR and CBRN SCBA testing. Placement of droplet via syringe onto the system with no movement of the device by the Test Technician *We recommend that the location of the HD liquid droplets be clearly identified and the HD liquid challenge concentration of 0.43 to 0.86 ml be based on the design configuration of the device. We recommend that the liquid drops be of a constant size and the number of drops be based on what is necessary to achieve the challenge concentration and properly evaluate the device.*

6(e)Field of View

NIOSH Standard Test Procedure CET-APRS-STP-CBRN-0314 specifies EN136 for dimensions and position of the head form and also references a test fixture with a Sheffield Head Form. The head form dimensions specified in EN 136 differs from a

Sheffield Head Form. *We recommend to use the EN 136 head form dimensions and position to maintain consistency in testing.*

6(l) Laboratory Respirator Protection Level

The required laboratory respirator protection level (LRPL) for each respirator is proposed to be “2000, sampled in the breathing zone of the respirator and 150, sampled outside the breathing zone (under the hood)”. A LRPL of 150 could pose a risk for the user based on eye and possibly ear exposures. *We recommend that the LRPL requirement for the oral-nasal area and the eye area be based on possible use conditions and assigned protection factors.*

Certification of devices with a mouthbit/noseclip arrangement should include verification of the ability of the noseclip to seal and maintain its seal. *We caution NIOSH on allowing a lower protection level in the hood area without verifying the performance of the noseclip.*

The proposed size categories relate Neck Circumference with Head Circumference, Face Length and Face Width. Anthropometric studies are limited in data and the relation of Neck Circumference to Head Circumference, Face Length and Face Width proposed in the CBRN Escape Sets Concept is questionable. Size selection should be based on actual fit testing, initially trying one size and if necessary moving to other sizes until the best fit size is determined. *We recommend that LRPL testing allow for correct size selection and not restrict design to meeting specific size.*

MSA is committed to provide quality safety products and services that protect the health and safety of our customers. We value the opportunity to work with NIOSH in developing standards that help define the requirements of these much needed products. Please contact us, if you require any further expertise and recommendations.

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