

National Personal Protective Technology Laboratory

PHOSPHINE PARAMETERS

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PHOSPHINE TESTING SITUATION

An industrial PAPR gas mask was being evaluated in the laboratory for Phosphine. Two canisters were run at 1500 ppm; 115 Lpm, 25° C, 25% Rh. The canisters passed the gas life test.

During the airflow measurements (after gas life), when the PAPR unit was turned on, the facepiece and chamber filled with smoke. The phosphine detector measured above the 0.6 ppm, the limit of the detector.

PHOSPHINE EXPOSURE LIMITS

NIOSH REL: TWA 0.3 ppm
ST 0.1 ppm

OSHA PEL: TWA 0.3 ppm

IDLH = 50 ppm

Incompatibilities and Reactivities:

Air, Oxidizers, Chlorine, Acids, Moisture, Halogenated Hydrocarbons, Copper

Note: May ignite SPONTANEOUSLY on contact with air

NIOSH Pocket Guide to Chemical Hazards, Sept 2005

PHOSPHINE RESPIRATOR RECOMMENDATIONS

3 ppm: Supplied-air respirator (Sa)

7.5 ppm: Any supplied-air respirator

operated in continuous-flow mode (Sa:Cf)

15 ppm: Any air-purifying, full facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern (GmFS)

Any self-contained breathing apparatus w/ full facepiece (ScbaF)

Any supplied-air respirator with a full facepiece (SaF)

50 ppm: Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode (Sa:Pd,Pp)

NIOSH Pocket Guide to Chemical Hazards, Sept. 2005

PHOSPHINE RESPIRATOR RECOMMENDATIONS

**Emergency or planned entry into unknown concentration
or IDLH conditions:**

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode (ScbaF:Pd,Pp)

Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode (SaF:Pd,Pp:AScba)

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PHOSPHINE RESPIRATOR RECOMMENDATIONS

ESCAPE

Any air-purifying, full facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern (GmFS)

Any appropriate escape-type, self-contained breathing apparatus (ScbaE)

NIOSH Pocket Guide to Chemical Hazards, Sept 2005

PHOSPHINE CONCERN

**Should air-purifying devices be
allowed for escaping from an
unknown concentration of
PHOSPHINE?**

NIOSH PHOSPHINE TESTING PARAMETERS

CBRN - Gas Mask (14G)

3- 300 ppm, 25% Rh, 25° C,

3- 300 ppm, 85% Rh, 25° C

3- 300 ppm, 50% Rh, 25° C (High Flow)

APR 64 Lpm

PAPR 115 Lpm / # of Canisters (57.5 Lpm; 38.3 Lpm)

Breakthrough 0.3 ppm

NIOSH PHOSPHINE TESTING PARAMETERS

Industrial

Escape Gas Mask (14G)

3- as received, 1500 ppm, 50% Rh, 25° C

2- preconditioned, 1500 ppm, 25% Rh, 25° C

2- preconditioned, 1500 ppm, 85% Rh, 25° C

APR 64 Lpm

PAPR 115 Lpm

Breakthrough 0.3 ppm

PHOSPHINE RESEARCH

Areas to investigate

1. Heat of reaction for different carbons.
2. Limitation of concentration allowed to escape from using APR / PAPR.
3. Which impregnated carbons can be used for phosphine?
4. Should an evaluation be performed by NIOSH to determine limits on heat of reaction?

PHOSPHINE PARAMETERS

Questions?

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