Diamond Shamrock

Interoffice Correspondence

To: Lewis Payne
From: Ted Guth
Date: November 2, 1981

D 118-D

Subject: Respiratory Protection - 3M Vinyl Masks

Since the adoption of the VCM standard in 1974, industry has needed a light-weight, portable mask to provide workers with the mobility necessary in their operation. As you also know, OSHA included in the standard that all canister masks must be provided with an end-of-service-life indicator in order to be acceptable. By making this announcement in the VCM standard, OSHA has narrowed down the selection of available masks to one. The mask I am referring to is the mask supplied by the 3M Company, which has been approved by NIOSH with certain limitations. There is presently no other mask available, except bottled-air or other air supplied systems.

The 3M mask, which is in general use in our plant in areas slightly above the action-level, has presented many safety related problems to our workers, particularly in hot weather. We have found, in some instances, where workers have become extremely hyper-ventilated and dizzy from just ascending a flight of stairs. Many workers also complain of impaired vision.

On October 28, 1981, a representative for 3M was invited to our plant to discuss the 3M mask and to provide some additional training that he thought might be helpful to alleviate our problem. I want to say now that training is not our problem. We have a very good training program and an elaborate testing facility here at Diamond Shamrock, and our employees are retested annually.

While the 3M representative was here, I asked him if there was not someway that an exhalation valve could be installed on the VCM mask since I knew that they had other masks on the market with this feature. The 3M representative said that they had several masks with both an exhalation valve and an end-of-service-life indicator but they were not acceptable for VCM service.

I then asked the 3M representative to send us a couple of these masks so that we could test them on our employees to see if we could eliminate the hyper-ventilation and dizziness. Once we received the masks, we tested them on four different employees under stress conditions, climbing stairs, riding bicycles, excessive walking. All employees reported a great improvement in the masks fitted with an exhalation valve over the regular VCM mask.

Since I believe that 3M is very close to perfecting a mask that has both an end-of-service-life indicator and an exhalation valve acceptable for VCM service, I would like to see some of our people in the Environmental Service area lend their support through NIOSH to help 3M build a better mask for the VCM industry.

Ted Guth

Ted Guth

TG/sjo
cc: D. Frey
M. Pulley
Bob Adams - GCA
Paul Rogerson - 3M Company


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ENVIRONMENTAL
SERVICES

Title: D.P. Plastics (Ind. Hyg.)

Diamond Shamrock

Interoffice Correspondence

To: Ted Guth - Deer Park Plastics
From: Janet Irvin - IC Environmental Services
Date: June 30, 1981

D 118-D

Subject: Dust Survey of Paste Bagging Area

General

From April 28, 1981, intermittently to June 22, 1981, samples were taken for the purpose of measuring PVC dust levels at the Paste Bagging Area. Samples were collected both in the general area of the process and by personnel monitoring, using DuPont P-2500 Constant Flow Pumps, equipped with both a gravity-cyclone separator and a three-stage cassette, in order to measure both total and respirable dust quantities.

Presently considered to be inert, PVC dust is classified only as a nuisance dust, having no long-damaging properties. The current OSHA Standard for Nuisance Dusts allows a maximum exposure of 5 mg/m^3 respirable and 15 mg/m^3 total. NIOSH and ACGIH, however, recommend the total dust exposure not to exceed 10 mg/m^3, as referenced in the 1980 TLV Handbook, and that is the standard we like to try to stay within. It should be kept in mind, however, that more extensive study is currently underway on PVC dust, and it's very possible that more stringent control regulations may be enforced in the very near future.

Results

In most instances, area readings were found to be significantly higher than the personnel exposures. This is probably due to the use of fans located in various positions around the workers, which tend to cause the dust to collect on the sampler, sometimes covering it completely. Likewise, personnel readings also seemed to be influenced by the positioning of the fans around the workers. Results of the monitoring are listed in the attached table.

Recommendations

Since the dust levels are normally above the standard, it is important that the operators continue to wear respiratory protection while performing this particular task. I would like to suggest, however, switching from the paper mask, which is currently in use, to the 3M-9920 paper dust mask with exhalation valve. This mask is much cooler and easier to breathe through, and therefore is much more readily accepted by the employees. You will find information regarding it included with this report. Another possible alternative to the dust mask is

Recommendations (Cont'd.)

the Racal Air-Stream helmet. It protects the employee by providing a constant stream of fresh air across the face of the worker. They are a bit expensive as an initial investment, but well worth it in protection, comfort, and as a morale booster. Information regarding the helmets will also be included with the report.

It must be kept in mind that providing protective equipment constitutes only an interim measure until engineering controls can be implemented which will alleviate the problem. Although a general cleaning of the area is conducted after each shift, a lot of residual dust still remains in the area. This dust is being continually stirred up and circulated by movement of the forklift and the fans. An efficient dust collection system should reduce the amount of dust in the air, while a thorough clean-up of the area should reduce the additional burden caused by the forklift and the fans.

Conclusion

I hope you will find this survey sufficient to answer your questions regarding dust levels at Paste Bagging. Please be certain to notify the employees concerned of their results. Let me know if you should need more information or assistance.

JI/bh
Attachment

Janet Irvin
Industrial Hygienist

File: D.P. Plas. Ind. Hyg.

Diamond Shamrock

Interoffice Correspondence

To: Blackie Lochridge - Deer Park Plastics Compounding
From: Jan Mays - IC&P Environmental Services
Date: March 25, 1981

D 118-C

Subject: Dust Survey of Compound Area

On March 12, 16 and 17, 1981, samples were taken for the purpose of measuring dust levels at the No. 5 Warehouse, No. 6 Compound Area. The procedure which was requested to be sampled was the masterbatching process. Although this process varies in total time of action, it usually does not last for more than two hours.

Samples were collected both in the general area of the process and by personnel monitoring. DuPont P-2500 constant flow pumps equipped with both a gravity-cyclone and a three-stage cassette were used in order to measure both total and respirable dust quantities. In all cases, personnel readings were found to be significantly higher than the area samples (area samples were taken near the bag scale).

PVC dust is presently considered to be inert, and therefore constitutes only a nuisance dust, having no lung-damaging properties. More extensive studies are currently underway, however, and it's very possible that more stringent control regulations may be enforced in the near future. The current OSHA Standard for Nuisance Dusts allows for a maximum 5 mg/m^3 respirable exposure and a 15 mg/m^3 total. NIOSH and ACGIH, however, recommend a total dust exposure not to exceed 10 mg/m^3, as referenced in the 1980 TLV Handbook, and that is the standard we like to try to stay within. The proceeding table shows the dust levels found during the sampling period.

Recommendations

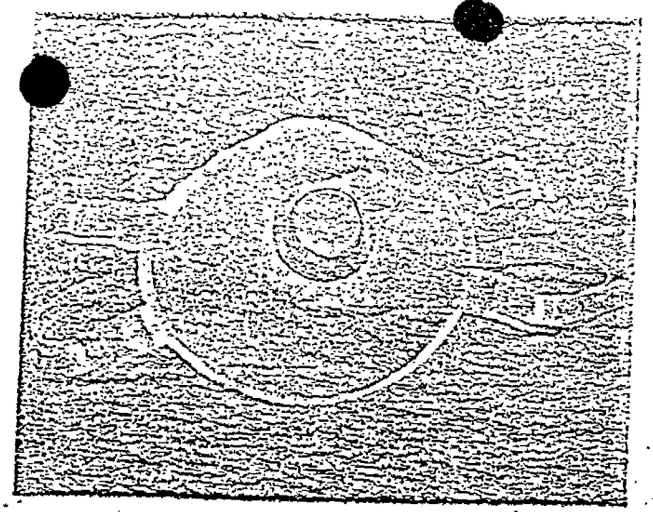
Since the dust levels are above the standard, it is important that the operators performing this particular task wear respiratory protection. We recommend the 3M 9920 paper dust mask with exhalation valve. This mask is much cooler and easier to breathe through, and therefore is much more readily accepted by the employees. You will find information regarding it in the back of this report. It should be remembered, however, that providing protective equipment constitutes only an interim measure until engineering controls can be implemented which will alleviate the problem. A more efficient dust collection system in the area would likely correct the problem.

I hope you will find this survey sufficient to answer your questions regarding dust levels at the Compound Area. I have enclosed your copy of the COHESS form containing these analyses for your record. Please be certain to notify

the employees concerned of their results. Let me know if you should need more information or assistance.

JM/bh
Attachments

Jan Mays
Industrial Hygienist



Important Facts on the 3M Brand #9920 Dust, Fume and Mist Respirator (TC-21C-202)

What is the 9920?

The 3M Brand #9920 Dust, Fume, and Mist respirator is a NIOSH/MSHA approved half-mask respirator made from non-woven fibers designed for worker comfort and protection.

What NIOSH/MSHA approvals did the #9920 receive?

The #9920 Dust, Fume and Mist Respirator was approved under Subpart K of 30 CRF 11 (TC-21C-202, November 20, 1978) for respiratory protection against:

a) Dusts, including but not limited to aluminum, flour, iron ore, free silica, coal, cadmium, chromium, lead and manganese.

b) Fumes of various metals including but not limited to aluminum, antimony, cadmium, chromium, copper, iron, lead, magnesium, manganese and zincs.

c) Mists produced by spray coating with vitreous enamels, chromic acid mist produced during chromium plating, and other mists of materials whose liquid vehicle does not produce harmful gases or vapors.

d) Radon daughters and radon daughters attached to dusts, fumes and mists.

e) Asbestos containing dusts and mists.

Is the 9920 classified as a HEPA filter?

No. HEPA refers to a high efficiency particulate filter. The HEPA filter must be at least 99.97% against 0.3 μm DOP particulates. The #9920 was tested against 0.4 to 0.6 μm silica particulates and against lead oxide fume particulates. In these tests, the 9920 is at least 99.9 + % efficient.

Does the 9920 offer protection against gases and vapors?

No. The 9920 offers protection against particulate materials only. Do not use the 9920 for protection against gases or vapors associated with spray paint.

How long can the 9920 be used?

The 9920 is designed for use during a normal work period. It can be used for longer periods provided that:

a) breathing is not difficult, and

b) the respirator is not physically damaged.

Can the 9920 be used for protection against welding fumes?

Yes. The 9920 is approved for respiratory protection against metal fumes generated in welding operations for fumes of metals with a threshold limit value — time weighted average (TLV-TWA) concentration greater than 0.05 mg/m³. The American Conference of Governmental Industrial Hygienists recommends a TLV-TWA for welding fumes of 5 mg/m³ if no toxic elements are present in the welding rod.

In welding operations, will the 9920 protect against the nitrogen oxides, carbon monoxide and ozone that may be generated?

No. The 9920 offers no protection against gases and vapors. However, these gases are not normally at concentrations that would require respiratory protection.

Is there an OSHA standard or NIOSH recommendation on welding?

No. Each contaminate is considered separately. The following is a table of metal fumes and gases that may be associated with welding operations.

Maximum Exposure Levels of Welding Fumes and Gases

Material	Threshold Limit Values[a]						Possible Health Hazard When TLV Is Exceeded
	Time-weighted averages (TWA), mg/m^3 in 8 hours			Short-term exposure limits (STEL), mg/m^3 in 15 min.			
	ACGIH[b]	OSHA	NIOSH	ACGIH[b]	OSHA	NIOSH	
Fumes							
Alundum (Al_2O_3)	10	—	—	20	—	—	Nuisance dust
Arsenic (As)	0.5	0.5	—	0.5		0.002	Lung & lymphatic cancer, respiratory irritant
Beryllium (Be)	0.002	0.002	—	0.025	0.005	0.005 (130 min)	Lung cancer, pneumonitis
Cadmium Oxide (Cd)	0.05	0.1	0.04	0.15	0.3	0.2	Lung and kidney effects, pulmonary edema
Chromium (Cr)	1[c] —[d]	1.0[c] —[d]	0.001[c] 0.025[d]	— —	— —	0.05[c] —	Lung cancer, skin ulcers, nasal perforation
Cobalt (Co)	0.1	0.1	—	—	—	—	Chemical pneumonitis
Copper Fume (Cu)	0.2	0.1	—	—	—	—	Irritant, fume fever
Fluoride (F)	2.5	2.5	2.5	—	—	—	Kidney and bone effects
Iron Oxide (Fe_2O_3)	5	10	—	10	—	—	Nuisance dust
Lead, Inorganic (Pb)	0.15	0.2	<0.05	0.45	—	—	Systemic poisoning
Magnesium Oxide (MgO)	10	15	—	—	—	—	Fume fever
Manganese (Mn)	5	—	—	—	5	—	Nervous system disorders
Molybdenum (Mo)	5[e] 10[f]	5[e] 15[f]	— —	10[e] 20[f]	— —	— —	Respiratory irritant
Nickel (Ni)	1	1	0.015	—	—	—	Lung and nasal cancer, skin effects
Tin Oxide (SnO_2)	10	—	—	20	—	—	Nuisance dust
Titanium Dioxide (TiO_2)	10	—	—	20	—	—	Nuisance dust
Vanadium (V)	0.05	—	—	—	0.1	0.05	Eye, skin, and lung effects
Zinc Oxide (ZnO)	5	5	5	10	—	15	Fume fever
Welding fumes	5	—	—	—	—	—	Depends on constituents
Gases							
Carbon Dioxide (CO_2)	5,000	5,000	10,000	15,000	—	30,000 (10 min)	Respiratory effects
Carbon Monoxide (CO)	50	50	35	400	—	200	Asphyxiant
Hydrogen Fluoride (HF)	3	3	2.5[g]	—	—	5[g]	Skin, eye irritation, bone effects
Nitrogen Dioxide (NO_2)	5	5	—	—	—	1	Airway effects
Nitrogen Monoxide (NO)	—	25	25	—	—	—	Blood effects
Ozone (O_3)	0.1	0.1	—	0.3	—	—	Pulmonary edema
Phosgene ($COCl_2$)	0.1	0.1	0.1	—	—	0.2	Airway effects

a. Threshold limit values for the measured elements and compounds, given in parentheses by their chemical symbols, are listed in mg/m^3 (milligrams per cubic metre) for particulate fumes and in ppm (parts per million) for gases.
b. ACGIH = American Conference of Governmental Industrial Hygienists.
c. Carcinogenic chromium.
d. Noncarcinogenic chromium.
e. Soluble molybdenum.
f. Insoluble molybdenum.
g. Reported as mg/m^3, milligrams of fluorine per cubic metre.

Source: NIOSH Research Report "Assessment of Selected Controlled Technology Techniques for Welding Fumes"; Report No. NIOSH 79-125.

Mike Huff ✓

VCM Storage Tanks
#1 Plant

(attach to file copy)

2601-3E

Diamond Shamrock

Interoffice Correspondence

To: Barry Sherman - Deer Park Plastics
From: Bob Adams - IC&P Environmental Services
Date: October 31, 1980

D 118-D

Subject: Breathing Air Quality at Plastics Plant

At Lloyd Davison's request, the breathing air system at PVC was sampled to compare with the Compressed Gas Association "Grade D" standards. This information was desired for comparison purposes after proposed system changes and improvements are implemented.

On October 20, a sample of breathing air was obtained by Jan Mays, Industrial Hygienist. Since the dew point is checked each shift by the operators, this test was omitted. The results of analysis by the Environmental Services laboratory were as follows:

Characteristic	Analysis	Grade "D" Spec.
Vol. % Oxygen	20.4	19.5 - 23.5
Water	--	--
Condensed Hydrocarbons, mg/m^3	None Detected	5 Max.
Carbon Monoxide, ppm	< 8	20 Max.
Odor	None	--
Carbon Dioxide	436	1,000 Max.
Gaseous Hydrocarbons, as Methane, ppm (vol.)	10.3	*

* Not required for Grade D air; the higher grade "F" air has a spec. of 25 ppm max.

Therefore, it was found that the breathing air at PVC meets all Grade "D" specifications.

If you have any questions or comments on this subject, please let me know.

Bob

BA/bh
Attachment

Bob Adams

OCC 11058

AIR SPECIFICATION

1. SCOPE

1.1 This document describes the specification requirements for air, including atmospheric air and air synthesized by blending oxygen and nitrogen in the proper proportions. It is different from other gas specifications because atmospheric air is not a manufactured product but is naturally occuring. Atmospheric air contains a large variety of trace constituents on many of which it is impractical to set individual limits. However, this specification qualifies certain grades of air by limiting the concentrations of specific trace constituents.

2. CLASSIFICATION

2.1 Types — Gaseous air is denoted as Type I and liquid air as Type II.

2.2 Grades — Table 1 presents the component maxima, in ppm (v/v) unless shown otherwise, for the types and grades of air. A blank indicates no maximum limiting characteristic.

TABLE 1

	TYPE I (GASEOUS)									TYPE II (LIQUID)	
Limiting Characteristics	GRADES										
	A	B	C	D	E	F	G	H	J	A	B
% O_2 (v/v) Balance Predominantly N_2 (Note 1)	atm.	atm.	atm. 19.5-23.5	atm/ 19.5-23.5	atm/ 19.5-23.5	atm/ 19.5-23.5	atm. 19.5-23.5	atm/ 19.5-23.5	atm/ 19.5-23.5	atm/ 19.5-23.5	atm/ 19.5-23.5
Water		none condensed (per 5.3.1)	note 2	note 2	note 2	note 2	note 2	note 2	1 −10.4°F		note 2
Hydrocarbons (condensed) in Mg/m^3 of gas at NTP (Note 3)		none (per 5.4.1)	5	5	5						
Carbon Monoxide			50	20	10	5	5	5	1		5
Odor			see 5.1.5	see 5.1.5	see 5.1.5	see 5.1.5	see 5.1.5	see 5.1.5	see 5.1.5		none
Carbon Dioxide				1000	500	500	500	500	0.5		5
Gaseous Hydrocarbons (as methane)						25	15	10	0.5		10
Nitrogen Dioxide							2.5	0.5	0.1		0.5
Nitrous Oxide									0.1		
Sulfur Dioxide							2.5	0.5	0.1		0.5
Halogenated Solvents							10	1	0.1		1
Acetylene									0.05		0.5
Permanent Particulates											—.15

Note 1: The term "atm" (atmospheric) denotes the oxygen content normally present in atmospheric air; the numerical values denote the oxygen limits for synthesized air.

Note 2: The water content of compressed air required for any particular grade may vary with the intended use from saturated to very dry. If a specific water limit is required, it should be specified as a limiting dewpoint or concentration in ppm (v/v). Dewpoint is expressed in temperature °F at one atmosphere absolute pressure (760 mmHg). To convert dewpoint °F to °C. ppm (v/v), or mg/liter, see 7.1.

Note 3: No limits are given for condensed hydrocarbons beyond grade E since the gaseous hydrocarbon limits could not be met if condensed hydrocarbons were present.

2.3 Quality Tests — The supplier will assure, by his standard practice, the quality of the specified type and grade of air. If otherwise required, alternative control procedures are described in 2.3.1 — analytical procedures; 3.2.1 — lot definitions; 3.2.2 — samples per lot; and 4.2, 4.3 and 4.4 — samples. Other control procedures not listed in this specification are acceptable if agreed upon between the supplier and customer.

2.3.1 Analytical Procedures — Table 2 is a directory of the analytical procedures shown in 5 which are applicable for the specific types and grades.

TABLE 2

Limiting Characteristics	TYPE I (Gaseous) GRADES									TYPE II (Liquid) GRADES	
	A	B	C	D	E	F	G	H	J	A	B
Percent Oxygen											
5.2.1			*	*	*	*	*	*	*	*	*
5.2.2			*	*	*	*	*	*	*	*	*
5.2.3			*	*	*	*	*	*	*	*	*
5.2.4			*	*	*	*	*	*	*	*	*
5.2.5			*	*	*	*	*	*	*	*	*
5.2.6			*	*	*	*	*	*	*	*	*
Water											
5.3.1		*									
5.3.2			*	*	*	*	*	*	*		*
5.3.3			*	*	*	*	*	*	*		*
5.3.4			*	*	*	*	*	*	*		*
5.3.5			*	*	*	*	*	*	*		*
Condensed Hydrocarbons											
5.4.1		*									
5.4.2			*	*	*						
5.4.3			*	*	*						
Carbon Monoxide											
5.5.1			*	*	*	*	*	*			*
5.5.2			*	*	*	*	*	*			*
5.5.3			*	*	*	*	*	*	*		*
5.5.4			*	*	*	*	*	*	*		*
Odor											
5.6			*	*	*	*	*	*	*		
5.6.1											*
Carbon Dioxide											
5.7.1				*	*	*	*	*			
5.7.2				*	*	*	*	*			
5.7.3				*	*	*	*	*	*		*
5.7.4				*	*	*	*	*	*		*
Gaseous Hydrocarbons											
5.8.1						*	*	*	*		*
5.8.2						*	*	*	*		*
5.8.3						*	*	*	*		*
5.8.4						*	*	*	*		*
Nitrogen Dioxide											
5.9.1							*	*	*		*
5.9.2							*	*	*		*
5.9.3							*	*	*		*
Nitrous Oxide											
5.10.1									*		
Sulfur Dioxide											
5.11.1							*	*			*
5.11.2							*	*	*		*
5.11.3							*	*	*		*
5.11.4							*	*	*		*
Halogenated Solvents											
5.12.1							*	*	*		*
5.12.2							*	*	*		*
5.12.3							*	*	*		*
Acetylene											*
5.13.1									*		*
5.13.2									*		*
5.13.3		*							*		*
Permanent Particulates											
5.15.1											*