

POINT PAPER

David L. Spelce, MS, CIH
NAVENVIRHLTHCEN
28 February 2000
(revised 7 February 2001)

AMBIENT AIR BREATHING APPARATUS AIR QUALITY

BACKGROUND:

- Ref: (a) OPNAVINST 5100.19D
(b) OPNAVINST 5100.23E, CH-1
(c) CGA G-7.1
(d) e-mail NAVHOSP, Corpus Christi Ms S. Lozano/NAVENVIRHLTHCEN
Mr. D. Spelce of 27 Oct 99
(e) PHONCON Bullard Mr. J. Parker/NAVENVIRHLTHCEN Mr. D. Spelce
of Oct 99
(f) PHONCON RhineAir Mr. E. Reinhorn/NAVENVIRHLTHCEN Mr. D. Spelce
of Oct 99
(g) PHONCON OSHA Mr. J. Steelnack/NAVENVIRHLTHCEN Mr. D. Spelce
of 29 Jan 98
(h) NAVENVIRHLTHCEN Technical Manual, Industrial Hygiene Field Operations
Manual, latest revision
(i) 29 CFR 1910.134
(j) NFPA 1500-1997
(k) NFPA 1404-1996

- Encl: (1) OSHA ltr of 14 Oct 99
(2) Bullard ltr of 16 Dec 99
(3) RhineAir ltr of 4 Nov 99

1. Paragraphs B06011 and 1506 of references (a) and (b) require testing air quality of compressors used to supply breathing air to atmosphere supplying respirators on a quarterly basis. This is to ensure that the breathing air delivered to atmosphere supplying respirators meets or exceeds Grade D quality air as defined in reference (c). The Navy uses numerous ambient air breathing apparatus (AABA) for supplying breathing air to low flow, continuous flow airline respirators. According to B06011 and 1506 of references (a) and (b), testing AABA breathing air quality is not required.

DISCUSSION:

1. Reference (d) stated that a local contractor questioned the Navy's policy of testing breathing air compressors quarterly and of exempting AABA from Grade D air quality testing. The contractor requested a letter of interpretation from the Dallas Area Office of the Occupational Safety and Health Administration (OSHA) regarding this issue. The question posed is summarized below:

Is the Rhine Air Pneumatic Driven Ambient Air Breathing Pump considered to be a compressor that must meet the requirements for Grade D breathing air and what is OSHA's recommendations on the frequency of testing breathing air?

2. In response to the contractor's inquiry, the Dallas OSHA Area Office gave the following reply: (see enclosure (1)):

The standard states that all compressed breathing air shall meet the requirements of Grade D breathing air. Since your product is a compressor for breathing air, it must comply with the standard [29 CFR 1910.134]. ... Since the breathing air system and the frequency of use vary among different users, there is no single testing frequency of air quality that will be satisfactory for all users.

3. In response to references (e) and (f), Bullard and RhineAir sent letters (enclosures (2) and (3)) addressing the issue of testing air quality of AABAs. Bullard states the following in enclosure (2):

OSHA regulations 1910.134 (i)(1) states that, "the employer shall ensure that compressed air used for respiration accords with the following specifications: [CGA G7.1-1989, for Type 1, Grade D]." This means that OSHA does not require testing of the air, but that the employer shall ensure that it will provide Grade D air. In addition, OSHA requires in paragraph (i)(6) that, "for compressors that are not oil lubricated, the employer shall ensure that carbon monoxide levels in the breathing air do not exceed 10 ppm."

In the preamble to the standard, OSHA states that this latter requirement can be met by several methods, including proper air intake location in an area free from contaminants (Federal Register, Vol. 63, No. 5, Jan. 8, 1998, p. 1256). There is no requirement to use CO alarms or to test the air. In conclusion, oil-less compressors are incapable of producing excess hydrocarbons (oil mist) or excess carbon dioxide because they do not contain oil, and because OSHA allows the use of proper air intake location to prevent the intake of CO (which would be the only way that CO could enter the breathing air). Therefore, there is no need to test the air for Grade D quality.

4. Similarly, RhineAir in enclosure (3) states:

The Ambient Air Pump is a highly portable stand-alone unit. ... Wherever the Inlet Filter is located will determine the quality of air the connected Respirator user will receive. It is basically designed to transfer already existing clean ambient air from one location to another through a designated hose and respirator.

5. According to reference (g), AABA do not require carbon monoxide monitors and alarms nor periodic monitoring for air quality, however the air intake must be located in an area free of contaminants. The Navy requires the air inlets of AABA to be located in areas with clean breathable ambient air (paragraphs B06011 and 13.b of references (a) and (h)), which meets OSHA's requirement in paragraph (i) (1) of reference (i) to ensure Grade D breathing air. It was recommended during reference (g) that permanently installed non-oil-lubricated compressors be equipped with carbon monoxide monitor and alarm systems.

6. With regard to the frequency of air quality testing, quarterly air testing was established to ensure consistency of Navy-wide breathing air quality testing. Paragraphs 5-3.7.2 and 7-1.2 of references (j) and (k) also require quarterly breathing air quality testing of compressors used to fill air cylinders of firefighters' self-contained breathing apparatus. The Navy believes that testing breathing air quality quarterly is appropriate and that there is no reason to change Navy policy on this issue.

CONCLUSION:

1. Based on the above discussion, NAVENVIRHLTHCEN recommends that Navy breathing air compressor policy remains unchanged. Sources of breathing air for atmosphere supplying respirators must be tested quarterly to ensure that at least Grade D quality air is supplied to respirator wearers. AABAs are exempt from quarterly Grade D air quality testing. AABA air intakes must be located in fresh clean ambient air.

2. The following is mentioned to complete the topic of Navy compressors used to supply breathing air. Paragraph 1506.(c) of reference (b) requires that newly purchased compressors (except AABA) must be equipped with continuous carbon monoxide monitor and alarm systems. Existing compressors must have continuous carbon monoxide monitor and alarm systems installed when they are upgraded during major over haul maintenance. This paragraph also requires that carbon monoxide monitor and alarm systems be calibrated according to manufacturers' instructions.

POC: Dave Spelce, MS, CIH, (757) 462-5524

U.S. Department of Labor

Occupational Safety and Health Administration
525 Griffin Street, Room 602
Dallas, Texas 75202-5024



Reply to the Attention of: 6OSHA (TOPS)

October 14, 1999

Dean Harwell
Quality Control/Safety Manager
Sikorsky Support Services, Inc.
Naval Air Station, Hangar 51
Corpus Christi, Texas 78419

Dear Mr. Harwell,

Your letter of October 7, 1999, inquired whether the Rhine Air Pneumatic Driven Ambient Air Breathing Pump must meet the requirements for Grade D breathing air. Your letter also asked for recommendations on the frequency of testing this air.

The standard states that all compressed breathing air shall meet the requirements of Grade D breathing air. Since your product is a compressor for breathing air, it must comply with the standard.

Since the breathing air system and the frequency of use vary among different users, there is no single testing frequency of air quality that will be satisfactory for all users. When a new breathing air system is used, the air quality should be tested more frequently to establish a baseline for changing the air purification agents. Once the baseline is established, the testing frequency can be adjusted according to the service life of the air purification agents.

Please feel free to contact our office should you have any questions. Your interest in workplace safety and health is appreciated.

Sincerely,


LUIS R. VILLANUEVA
Assistant Regional Administrator
for Technical Support and Outreach Programs



The Human Side of Safety.[®]
Since 1898.

Celebrating a Century of Safety!

December 16, 1999

Mr. Dave Spelce
US Navy Environmental Health Center
2510 Walmer Ave.
Norfolk, VA 23513-2617

Re: Bullard Free Air[®] Pumps

Dave,

I apologize for not getting back to you sooner regarding your request for a letter from Bullard regarding the need to test oil-less compressors for breathing air quality. You had sent me a letter from OSHA's Dallas regional office to someone at Corpus Christi Naval Air Station that responded to a question on the frequency of testing necessary for a Rhine air pump. The letter states that all compressors must comply with the standard. The letter also states that there is no simple answer to testing frequency because it depends on the type of system and frequency of use. The letter from OSHA does not come out and say in so many words that oil-less compressors must be tested for quality of air, but I know that you are inferring this conclusion from the letter. I would also point out that this letter is from a regional OSHA office and not an official OSHA Standards Interpretation and Compliance Letter from the Directorate of Compliance Programs. Any interpretation by OSHA that affects all users in the US would be issued by the Directorate of Compliance Programs, to the best of my knowledge. These letters are available on OSHA's web site.

OSHA regulations 1910.134 (i) (1) states that "the employer shall ensure that compressed air...used for respiration accords with the following specifications: [CGA G7.1-1989 for Type 1, Grade D]."

This means that OSHA does not require testing of the air, but that the employer shall ensure that it will provide Grade D air.

In addition, OSHA requires in paragraph (i) (6) that "for compressors that are not oil lubricated, the employer shall ensure that carbon monoxide levels in the breathing air do not exceed 10 ppm."

In the preamble to the standard, OSHA states that this latter requirement can be met by several methods, including proper air intake location in an area free from contaminants (Federal Register, Vol. 63, No. 5, Jan. 8, 1998, p. 1256). There is no requirement to use CO alarms or to test the air.

In conclusion, oil-less compressors are incapable of producing excess hydrocarbons (oil mist) or excess carbon dioxide because they do not have any oil, and because OSHA allows the use of proper air intake location to prevent the intake of CO (which would be the only way that CO could enter the breathing air), there is no need to test the air for

[continued on next page]

USA
1898 Stribby Way
Cynthiana, KY 40301-8000
Telephone: 606-234-9811
Facsimile: 606-234-8887

Europe
Lesangstraße 5
D-48224 Neu-Äm
Deutschland
Telefon: 0731-7053-0
Telefax: 0731-7053-29



Enclosure (2)

Page 2 Jay Parker to Dave Spelce

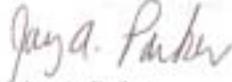
Grade D quality.

The above principle has been accepted by respirator users, manufacturers, regulators and other experts for as long as I remember these pumps being used to supply breathing air, which is at least the last 20 years.

Another good reference is the ANSI Z88.2-1992 standard, which in Table 4 recommends air sampling for odor only for oil-less compressors operating at less than 35 psi. Over 35 psi, they recommend sampling for water vapor and odor.

I hope the above information proves helpful. If you have any further questions, please let me know.

Best regards,

A handwritten signature in cursive script that reads "Jay A. Parker".

Jay A. Parker

Laboratory Manager

The use of Oil-less Ambient Air Pumps for Supplied Air Respiratory Protection

A Company Perspective

Since their introduction in the early 1970's, Portable Ambient Air Pumps have been accepted and widely used throughout commercial and government sectors of industry. They have also been recognized by major Safety & Health Regulatory Institutions as a viable source of air to operate inline Respiratory Protection Systems. Why is the use of these devices steadily increasing? What advantages do they offer over other traditional sources on the Market? The following answers to these questions reflect one manufacturer's experience and perspective.

Product Safety and Liability

The Rhine Air Oil-less Ambient Air Pump is designed for one purpose only. To supply the necessary air pressure and volume to properly operate NIOSH approved Supplied Air respirators or hoods. Unlike other devices used to supply breathable air, the Rhine Air Pump carries product liability insurance for its intended use. Believe it or not, other widely used traditional sources of air supply such as oil lubricated industrial air compressors have never been designed for supplying breathable air nor are they covered under their product liability coverage for this application. This scenario is also true even if the oil lubricated air compressor is fitted with an aftermarket air filtration and carbon monoxide alarm system. These filter / alarm panel kits are manufactured by completely separate companies that carry liability insurance coverage for their product only. This creates the problem of two different companies covering their own particular manufactured product without anyone covering the system as a whole. Oil Lubricated Air Compressor manufacturer's continue to warn customers that their product is designed only to operate pneumatic driven tools, etc. and should not be used as a source of breathable air no matter what aftermarket filter system is attached to it. Oil lubricated air compressors can not only potentially generate carbon monoxide through the pumping process but other contamination can affect air quality. Years of water vapor, mold and mildew build up within the receiver tank and attached pipe plumbing is also a considerable factor.

The Rhine Air Ambient Air Unit features a completely oil-less Air Pump that does not include a receiver tank. Ambient Air is drawn into the oil-less pump during operation and is immediately discharged out of the unit. Since the air pump component is oil-less there is no chance of internal generation of carbon monoxide. Without a receiver tank or high temperature air discharge the ambient air pump is much less likely to accumulate contamination within its manifold.

Simple to use, Easy to understand and Cost Effective

The Ambient Air Pump is a highly portable stand-alone unit. Its operational principal is easy for the average layman to understand. Wherever the Inlet Filter is located will

determine the quality of air the connected Respirator user will receive. It is basically designed to transfer already existing clean ambient air from one location to another through a designated hose and respirator. There are no electronic parts or chemicals to intimidate the end user. Maintenance requirements are kept to a minimum.

After 25 years of business and thousands of pumps sold, Rhine Air does not know of any serious safety related mishap or incident involving the use of our ambient air pumps.

NOTE: Recently the U.S. Department of Labor (OSHA) added a provision that Air within the immediate vicinity of the ambient pump intake filter must be periodically tested for Grade D quality. While understanding the reasoning and intended spirit of this requirement a few points should be considered.

It is Rhine Air's opinion that the Air Quality Standard (Grade D) was probably established for compressed air supply devices because the traditional sources of air supply (Standard oil lubricated air compressors and charged Bottle air systems) could discharge a quality of air lower than Grade D. Shop air compressors are a threat by the reasons given earlier. Changed Air bottle systems could be filled with a mixture of gases that would not constitute a healthy level for typical breathing air. It is true that the potential of dangerous air contamination can exist for an ambient air pump but those scenarios only involve a situation where a high concentration of fume, vapor or gas contaminate is introduced within the immediate location of the inlet filter. In contrast the occasional discharge of exhaust vapors or fumes from a vehicle passing by will defuse within the overall outside atmosphere and will rarely increase the overall levels commonly evident with ambient air to pose a health threat to the ambient air pump user.

NOTE: It is the experience of Rhine Air that the way an ambient air pump is packaged can directly influence its operational capability. Examples include: (Metal Frame and Enclosure Lid that prevents damage in case of rollover, Large, easy to recognize Instructional Decals and Air Motor preparation Accessories). These features can contribute dramatically to increase service life, lower the rate of attrition and prevent accidental misuse.

We invite you to review our unique designs. I think you will agree that they are built like no other Oil-less Ambient Air Pump on the Market.

Sincerely,



Eric Reinhorn
Technical Sales and Service
Rhine Air, Inc.