

J. DAMIANO

MR. E. BROOKS PARKER

PITTSBURGH OFFICE - 6 AB

ROCKDALE WORKS

1985 March 13

RE: MINI-SEMINAR "RESPIRATOR FIT TESTING IN ROCKDALE WORKS"

Ref: Alcoa Industrial Hygiene Conference, May 06-08, 1985

Thank you, Brooks, for your interest in giving the captioned presentation. I believe you will have an interested audience.

Your session will be on Wednesday morning, May 08. It will be an optional session attended by small groups, roughly 45 minutes in duration, including time for questions. To provide for small groups, the mini-seminars are repeated three times; and I hope you don't have a problem with the extra labor. Feel free to use any type of audio-visual aid.

To help you prepare, I have enclosed some materials I had on file, including the script to my presentation at the last Industrial Hygiene Conference in 1982.

I would like to provide the participants with written reference materials on your presentation. This could be a summary of your talk or other items. Please provide this to me at your earliest convenience so that we can reproduce the materials and assemble our manuals.

Personally, I would be interested in your presentation addressing the following areas:

Planning the Fit Test Program

- Address pretest announcements, supervisory/employee orientations, etc.?
- How did you set priorities?
- Did you fit test employees not specifically required to use respirators?

Fit Test Procedure

- Did you rigidly follow the written procedure? If not, where and why did you depart from the standard procedure?
- Was the saccharin method used for both 3M disposable and cartridge masks?
- If an employee used more than one model 3M mask (i.e., 3M 9915 and 3M 8710), did you fit test each mask?
- Did you fit test employees with beards? How did you handle the beard problem in Rockdale?

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Fit Test Results

- How many employees were fit tested in total?
- What percent of the subjects could not taste saccharin? Were they subsequently fit tested by another method?
- What percent of the employees failed the fit test? What were the reasons for failure (small face, wrinkles, etc.)? Were they subsequently tested with another type of respirator?
- What was the reaction of employees to this program?

Final Comments

What practical advice can you offer based upon your extensive experience?
Do you believe fit testing strengthens a plant's respirator program?

Many thanks.


J. DAMIANO

JD:wp

Attachments

ARD 003840

FIT TESTING DISPOSABLE RESPIRATORS

Presented by Joe Damiano, Alcoa IH Conference, November 1982.

Dale asked me to comment on qualitative fit testing of disposable dust masks. The most commonly used masks in Alcoa are the 3M8710, 9906 and 9920; however, there are other manufacturers with similar products.

I should start out by saying that although I have reviewed this subject very carefully, most of my experience is with irritant smoke fit testing of rubber facepiece masks. More recently, I have worked with Jim Richter of Rockdale Works to gear up for large scale saccharin mist fit testing.

The objective is to identify through testing, those individuals with significant facepiece leakage and find alternate respirators for their protection. The assurance of a good fit is particularly important when there is not a good method for biologically monitoring exposure or if the air contaminant does not have good warning properties. A good example is respiratory protection for cristobalite dust from a castable refractory.

Significant leakage may occur as a result of a poor seal at the bridge of the nose, at each side of the nose, under the chin, or at a facial crease that extends beyond the perimeter of the facepiece. We can expect some employees, notably employees with very large or very small faces, not to be adequately protected by disposable dust masks.

The saccharin method was developed by the 3M Company. It can be used to fit test any respirator; however, the test depends entirely upon the cooperation

of the subject. Some employees cannot detect the taste of saccharin especially after a soft drink or chewing tobacco. In addition, if your fit testing experience has been with irritant smoke or banana oil, you may find the saccharin method tedious and less discriminating. I have run into instances where the employee was uncertain whether he did, or did not taste saccharin, and I was uncertain on whether to accept or reject the fit of the mask.

The saccharin method was accepted by OSHA about one year ago when they published a respirator fit testing appendix to their lead standard. The appendix consists of three qualitative fit test protocols: isoamyl acetate, saccharin mist and irritant smoke. OSHA's acceptance of the saccharin method was based on three validation studies, two by Los Alamos and one by DuPont.

Photos

1. Explain FT-10 Apparatus #125
2. Explain Sensitivity Test (30 squeezes)

Actual Fit Test

Standard facial movements.

3. Have extra hoods on hand; expect fogging up from perspiration. Jim Richter of Rockdale Works has developed an aluminum hood with top vents to reduce this problem.
4. The standard facial movements during the fit test includes reading the "Rainbow Passage." Some employees can't read that well; have them count backwards from 25.
5. Use the lower part for irritant smoke testing.

6. If the taste of saccharin is not detected, the subject passes; he or she is allowed to wear the mask in atmospheres up to 10 times the PEL.

End of Photos

Let me share with you some of my thoughts on fit testing. I have itemized the following suggestions:

- o First and most importantly, be sure to plan your work carefully and thoroughly. Fit testing is a labor intensive endeavor.
- o Review your respirator program, specifically your list of jobs and areas requiring respiratory protection. Is the list complete? Is it overprotective?
- o Prioritize the job groups to be fit tested. In Point Comfort the only work groups we have fit tested have been selected maintenance employees. Other larger work groups use masks for nuisance dust situations; they are a lower priority and they are scheduled to be fit tested next year.
- o Publicize the impending fit test program, or at least provide some orientation; possibly during a refresher training program.
- o Use a written protocol; maybe the OSHA procedure. If personnel other than yourself will be administering the tests, they should be trained to do so in a reproducible fashion.

- o The test should be conducted privately. If you have an audience, it becomes a three-ring circus.
- o At the time of test, consider reviewing how to properly don the mask; explain what air contaminants the mask is good for.
- o If the subject is not clean shaven, don't do the test; rather reinstruct him on the policy concerning beards and masks.
- o Talk up a storm. You need a cooperative, motivated individual. Explain the purpose of the fit test and explain what you are going to do before you do it.
- o A mirror is helpful to show the employee where the mask is positioned on his face.
- o Be prepared for employees that fail the sensitivity test for saccharin. Retest them at another time or use a different test agent such as irritant smoke.
- o Finally, be prepared for employees that fail the fit test. Sometimes readjustment of the mask and retesting will work. If not, try a 3M9920 or a rubber facepiece mask.

I had one employee in Point Comfort with facial creases that extended beyond the perimeter of an 8710. He was certain to fail a fit test with

any half mask respirator. The solution was to have him wear a Racal powered air purifying respirator.

That concludes my comments. Again, my strongest suggestion is please plan your work carefully and thoroughly. Are there any questions?

J. Damiano
1983 October 31

Additional Notes:

1. How often should fit testing be conducted? Who knows!
2. Sensitivity to saccharin:

In the validation study by Mr. March of Los Alamos, 2 out of 50 subjects could not detect saccharin.
3. How long does it take? If you follow the OSHA procedure 30 minutes/person.
 - (a) The OSHA procedure requires masks to be worn at least 5 minutes to assess comfort in the selection process and then 10 minutes after the sensitivity test.
 - (b) I think it can be done in about 10 minutes but allow yourself 15 minutes/person.
 - (c) If there is a fitting problem, the time spent with an individual will lengthen considerably. Consider rescheduling these individuals for a later date.
4. Specifics on respirator test:
 - (a) The test subject may not eat, drink or chew gum for at least 15 minutes before the test.
 - (b) Saccharin is a subtle test. If saccharin is not tasted after 30 squeezes, the test subject may not perform the saccharin fit test.

(c) Every 30 seconds, the aerosol concentration shall be replenished using one half the number of squeezes initially required to elicit a taste response.

5. Saccharin Fit Test - OSHA Accepted November 12, 1982

3 studies			<u>Number of Subjects</u>
1.	Los Alamos	James Marsh	144
2.	Los Alamos	Bruce Held	79
3.	DuPont	Steve Dixon	68

6. Quantitative Fit Testing

DuPont has determined that fit factors from quantitative fit tests were not dependable as quantitative predictors of the protection actually provided while respirators were used in the workplace.

7. Beards and Masks

I frown upon employees using respirators over beards no matter what the situation. It sets a bad example. However, I only energetically enforce the no-beards rule if the bearded employee is working at a job where respiratory protection is required.

I explain that a respirator is a filtering device, and like any filtering device, it will leak at the point of least resistance which will be at

the perimeter of the mask, rather than through the filter. Consequently, hair at the facial seal will void the protection of the mask.

8. Test Materials

MSA Part No. 5645 Stannic oxychloride. Isoamyl acetate (Isopentyl acetate)

9. Qualitative Fit Tests are Over-Protective

Method may result in large number of employees failing the test that may actually have adequate fit.

3M Study: Masks were notched at perimeter; employees failed saccharin fit tests but PF was still 50-80!

Qualitative fit tests do not indicate how well or how poorly an individual performed, because it is a go/no go test. These tests must commit a high percentage of Type 1 errors to avoid letting subjects with poor fit tests pass. This type of error rejects individuals who obtain an adequate fit and is costly in that it requires the company to perform additional fit testing. More importantly, it will reduce a user's choice and selection so that the most desirable respirator cannot be used.

10. Benefits

The difficulty is attempting to fit a device to the most irregularly shaped part of the body. There is a great deal of benefit in visually inspecting the fit and fitting practices of individuals, apart from the test itself.