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INCORPORATED
WILMINGTON, DELAWARE

PETROCHEMICALS DEPARTMENT

April 6, 1981

TO: OH COORDINATORS

FROM: J. C. OLGUIN

FIT TESTING DISPOSABLE/SINGLE-USE RESPIRATORS

The attached describes the only effective method found to date to fit test single-use respirators. Employees must be told the method uses saccharin as the challenge atmosphere and the test can only be conducted if the employee does not object.

Should the employee object, a cartridge respirator, that would have organic vapor cartridges for fit testing with isomyl acetate, must be issued to that employee.

JCO/dc
attach.

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HASKELL LABORATORY
FOR
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DEPARTMENTAL OSH COORDINATORS

FIT TESTING OF DISPOSABLE/SINGLE-USE RESPIRATORS

OSHA's recent Directive CPL-2-2.29 provided guidelines for enforcing the fit testing requirements of OSHA's Respiratory Standard 29 CFR 1910.134(e)(5). The directive particularly emphasized the need for enforcement of the fit testing of single-use/disposable respirators.

Haskell Laboratory has examined several methods, including Zinc Stearate dusts and aerosolized sweetners, for fit testing single-use respirators. Currently, the 3M test method utilizing aerosolized saccharin is the only effective system. Standard operating procedures for this method are enclosed.

Although controversy exists over the use of saccharin in food, the FDA does allow its use for valid dietary reasons and technological purposes other than calorie reduction. Under the conditions of the fit test, exposure levels are very low compared to normal dietary levels. For example, a single fit test will result in exposure to less than 1-2% of the saccharin in a diet soda or a piece of sugar-free gum. These considerations, along with limited acute human inhalation experiments, indicate that the hazard potential is low for this test.

Haskell is continuing to search for alternative test agents and will keep you informed of progress; however, in the meantime, should an employee object to the use of saccharin he could be given a half-mask respirator and fit tested by the isoamyl acetate semi-quantitative method.

ORRIN T. SKRETVEDT
CONSULTANT - INDUSTRIAL HYGIENE

OTS/dar
Enclosure

STANDARD OPERATING PROCEDURE
SACCHARIN FIT TEST
SINGLE USE/DISPOSABLE RESPIRATORS

PURPOSE

The following method is recommended for meeting the requirements of 29 CFR 1910.134 (e)(5) concerning the fit testing of single use/disposable dust, mist, or fume respirators. The method has been tested and found to be suitable for assuring an adequate fit for this type of respirator.

MATERIALS

Glass Nebulizer

The DeVilbiss Company manufactures a Glass Nebulizer #40 used for aerosol therapy. The unit costs $15 and is available at most drug stores.

Saccharin

Sodium saccharin granular, unsized can be ordered from Sherwin-Williams Chemicals, P.O. Box 6506, Cleveland, Ohio, 44101; Attention: Kim Novak, $4.95/lb.

PREPARATION

1. Preparing the Test Solution

   Locate an approximate 100 ml bottle with screw cap - eyedropper combination. Dissolve 120 grams of saccharin for each 100 ml of water. This will produce a saturated solution of saccharin. To dissolve the saccharin place the bottle in warm water (~120°F) and agitate to bring most of the material into solution. If large amounts of saccharin should ever crystalize out, the solution should be warmed to increase the solubility.

2. Preparing the Nebulizer

Remove the large rubber stopper, holding the nebulizer in an upright position, insert the test solution into the nebulizer using the eye dropper. The test solution should be about one half inch above the rubber squeeze bulb. Reinsert rubber stopper until ready to test. The small rubber stopper should be left in place. Additional operating instructions are located on the packaging carton that comes with the nebulizer.

3. The fit test should be conducted in an area having adequate ventilation, preferably about three feet in front of a hood. With the test subject's eyes closed check his sensitivity to saccharin by gently directing an aspirated cloud of the solution towards his open mouth. Keep exposure as low as possible during this pre-test as a light exposure is all that is needed. If the subject is unable to detect the sweet taste of saccharin, a disposable respirator should not be used.

4. Have the test subject don and position the respirator, adjusting the nose bridge if one is present. Follow the manufacturer's donning instructions.

TEST PROCEDURE

1. Instruct the person to close his eyes and breathe through his mouth while taking regular deep breaths. Breathing through the mouth is essential because a leak will be detected by taste not smell.

2. Visually divide the respirator perimeter into quadrants. Holding the nebulizer four inches from the face, check the face seal in each quadrant by squeezing the bulb slowly twice, while moving back and forth along the respirator perimeter. See Figure 1. Be certain the subject takes a deep breath (full inspiration during one second) as you test each quadrant. Test each quadrant sequentially making two full revolutions.

3. With a proper fit the subject will not sense any change in taste. If the face seal is not adequate, a very sweet taste will be noted.

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4. If the subject has received adequate training on the donning of single use respirators and did not pass this test, another make or model of respirator should be issued.

5. After testing, reinsert the large stopper in the nebulizer to prevent clogging. A visible vapor cloud should be seen when the bulb is squeezed. If not, check the aspiration siphon inside the nebulizer to be certain saccharin crystals have not plugged the siphon.

6. When testing is completed, pour the remaining solution back into the bottle. Rinse the nebulizer thoroughly with warm water, drain, insert stopper, and store in a dry, clean place.

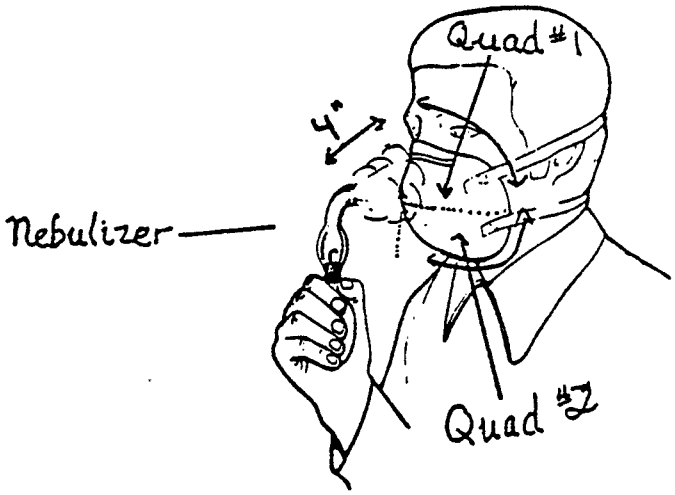

FIGURE 1

OTS/dar
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