

2. Generated aerosol quantitative fit testing protocol

Apparatus

(a) Instrumentation. Aerosol generation, dilution, and measurement systems using particulates (corn oil or sodium chloride) or gases or vapors as test aerosols shall be used for quantitative fit testing.

(b) Test chamber. The test chamber shall be large enough to permit all test subjects to perform freely all required exercises without disturbing the challenge agent concentration or the measurement apparatus. The test chamber shall be equipped and constructed so that the challenge agent is effectively isolated from the ambient air, yet uniform in concentration throughout the chamber.

(c) When testing air-purifying respirators, the normal filter or cartridge element shall be replaced with a high-efficiency particulate air (HEPA) filter supplied by the same manufacturer in the case of particulate QNFT aerosols or a sorbent offering contaminant penetration protection equivalent to high-efficiency filters where the QNFT test agent is a gas or vapor.

(d) The sampling instrument shall be selected so that a computer record or strip chart record may be made of the test showing the rise and fall of the challenge agent concentration with each inspiration and expiration at fit factors of at least 2,000. Integrators or computers which integrate the amount of test agent penetration leakage into the respirator for each exercise may be used provided a record of the readings is made.

(e) The combination of substitute air-purifying elements, challenge agent and challenge agent concentration shall be such that the test subject is not exposed in excess of an established exposure limit for the challenge agent at any time during the testing process based upon the length of the exposure and the exposure limit duration.

(f) The sampling port on the test specimen respirator shall be placed and constructed so that no leakage occurs around the port (e.g. where the respirator is probed), a free air flow is allowed into the sampling line at all times and so that there is no interference with the fit or performance of the respirator. The in-mask sampling device (probe) shall be designed and used so that the air sample is drawn from the breathing zone of the test subject, midway between the nose and mouth and with the probe extending into the facepiece cavity at least 1/4 inch.

(g) The test set up shall permit the person administering the test to observe the test subject inside the chamber during the test.

(h) The equipment generating the challenge atmosphere shall maintain the concentration of challenge agent constant to within a 10 percent variation for the duration of the test.

(i) The time lag (interval between an event and the recording of the event on the strip chart or computer or integrator) shall be kept to a minimum. There shall be a clear association between the occurrence of an event and its being recorded.

(j) The sampling line tubing for the test chamber atmosphere and for the respirator sampling port shall be of equal diameter and of the same material. The length of the two lines shall be equal.

(k) The exhaust flow from the test chamber shall pass through a high-efficiency filter before release.

(l) When sodium chloride aerosol is used, the relative humidity inside the test chamber shall not exceed 50 percent.

(m) The limitations of instrument detection shall be taken into account when determining the fit factor.

(n) Test respirators shall be maintained in proper working order and inspected for deficiencies such as cracks, missing valves and gaskets, etc.

4. Procedural Requirements

(a) When performing the initial positive or negative pressure fit check the sampling line shall be crimped closed in order to avoid air pressure leakage during either of these fit checks.

(b) The use of an abbreviated screening QLFT test is optional and may be utilized in order to quickly identify poor fitting respirators which passed the positive and/or negative pressure test and thus reduce the amount of QNFT time. The use of the CNC QNFT instrument in the count mode is another optional method to use to obtain a quick estimate of fit and eliminate poor fitting respirators before going on to perform a full QNFT.

(c) A reasonably stable challenge agent concentration shall be measured in the test chamber prior to testing. For canopy or shower curtain type of test units the determination of the challenge agent stability may be established after the test subject has entered the test environment.

(d) Immediately after the subject enters the test chamber, the challenge agent concentration inside the respirator shall be measured to ensure that the peak penetration does not exceed 5 percent for a half mask or 1 percent for a full facepiece respirator.

(e) A stable challenge concentration shall be obtained prior to the actual start of testing.

(f) Respirator restraining straps shall not be over tightened for testing. The straps shall be adjusted by the wearer without assistance from other persons to give a reasonably comfortable fit typical of normal use.

(g) The test shall be terminated whenever any single peak penetration exceeds 5 percent for half masks and 1 percent for full facepiece respirators. The test subject shall be refitted and retested.

(I) Calculation of fit factors.

(1) The fit factor shall be determined for the quantitative fit test by taking the ratio of the average chamber concentration to the concentration measured inside the respirator for each test exercise except the grimace exercise.

(2) The average test chamber concentration shall be calculated as the arithmetic average of the concentration measured before and after each test (i.e. 8 exercises) or the arithmetic average of the concentration measured before and after each exercise or the true average measured continuously during the respirator sample.

(3) The concentration of the challenge agent inside the respirator shall be determined by one of the following methods:

(i) Average peak penetration method means the method of determining test agent penetration into the respirator utilizing a strip chart recorder, integrator, or computer. The agent penetration is determined by an average of the peak heights on the graph or by computer integration, for each exercise except the grimace exercise. Integrators or computers which calculate the actual test agent penetration into the respirator for each exercise will also be considered to meet the requirements of the average peak penetration method.

(ii) Maximum peak penetration method means the method of determining test agent penetration in the respirator as determined by strip chart recordings of the test. The highest peak penetration for a given exercise is taken to be representative of average penetration into the respirator for that exercise.

(iii) Integration by calculation of the area under the individual peak for each exercise except the grimace exercise. This includes computerized integration.

(iv) The calculation of the overall fit factor using individual exercise fit factors involves first converting the exercise fit factors to penetration values, determining the average, and then converting that result back to a fit factor. This procedure is described in the following equation:

$$\text{Overall Fit Factor} = \frac{\text{Number of exercises}}{1/ff_1 + 1/ff_2 + 1/ff_3 + 1/ff_4 + 1/ff_5 + 1/ff_7 + 1/ff_8}$$

Where ff_1 , ff_2 , ff_3 , etc. are the fit factors for exercise 1, 2, 3, etc. [Results of the grimace exercise (7) are not used in this calculation.]

(j) The test subject shall not be permitted to wear a half mask or quarter facepiece respirator unless a minimum fit factor of 100 is obtained, or a full facepiece respirator

unless a minimum fit factor of 500 is obtained.

(k) Filters used for quantitative fit testing shall be replaced whenever increased breathing resistance is encountered, or when the test agent has altered the integrity of the filter media. Organic vapor cartridges/

canisters shall be replaced if there is any indication of breakthrough by a test agent.

2. Ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol

The ambient aerosol condensation nuclei counter (CNC) quantitative fit testing

(Portacount™) protocol quantitatively fit tests respirators with the use of a probe. The probed respirator is only used for quantitative fit tests. A probed respirator has a special sampling device, installed on the respirator, that allows the probe to sample the air from inside the mask. A probed respirator is required for each make, model, and size in which your company requires and can be obtained from the respirator manufacturer or distributor. The CNC instrument manufacturer Dynatech Nevada also provides probe attachments (TSI sampling adapters) that permits fit testing in an employee's own respirator. A fit factor pass level of 100 is necessary for a half-mask respirator and a fit factor of at least 10 times greater than the assigned protection factor for any other negative pressure respirator. The Agency does not recommend the use of homemade sampling adapters. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) Portacount Fit Test Requirements.

(1) Check the respirator to make sure the respirator is fitted with a high efficiency filter and that the sampling probe and line are properly attached to the facepiece.

(2) Instruct the person to be tested to don the respirator several minutes before the fit test starts. This purges the particles inside the respirator and permits the wearer to make certain the respirator is comfortable. This individual should have already been trained on how to wear the respirator properly.

(3) Check the following conditions for the adequacy of the respirator fit: Chin properly

placed; Adequate strap tension, not overly tightened; Fit across nose bridge; Respirator of proper size to span distance from nose to chin; Tendencies for the respirator to slip, Self-observation in a mirror to evaluate fit and respirator position.

(4) Have the person wearing the respirator do a fit check. If leakage is detected, determine the cause. If leakage is from a poorly fitting facepiece, try another size of the same type of respirator.

(5) Follow the instructions for operating the Portacount and proceed with the test.

(b) Portacount Test Exercises.

(1) *Normal breathing.* In a normal standing position, without talking, the subject shall breathe normally for 1 minute.

(2) *Deep breathing.* In a normal standing position, the subject shall breathe slowly and deeply for 1 minute, taking caution so as to not hyperventilate.

(3) *Turning head side to side.* Standing in place, the subject shall slowly turn his or her head from side to side between the extreme positions on each side for 1 minute. The head shall be held at each extreme momentarily so the subject can inhale at each side.

(4) *Moving head up and down.* Standing in place, the subject shall slowly move his or her head up and down for 1 minute. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling).

(5) *Talking.* The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from 100,

or recite a memorized poem or song for 1 minute.

(6) *Grimace.* The test subject shall grimace by smiling or frowning for 15 seconds.

(7) *Bending Over.* The test subject shall bend at the waist as if he or she were to touch his or her toes for 1 minute. Jogging in place shall be substituted for this exercise in those test environments such as shroud type QNFT units which prohibit bending at the waist.

(8) *Normal Breathing.* Remove and re-don the respirator within a one-minute period. Then, in a normal standing position, without talking, the subject shall breathe normally for 1 minute.

After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become uncomfortable, another model of respirator shall be tried.

(c) Portacount Test Instrument.

(1) The Portacount will automatically stop and calculate the overall fit factor for the entire set of exercises. The overall fit factor is what counts. The Pass or Fail message will indicate whether or not the test was successful. If the test was a Pass, the fit test is over.

(2) A record of the test needs to be kept on file assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model and size of respirator used, and date tested.

BILLING CODE 4510-26-P

2. Please describe what you do during a typical work day. Be sure to tell about your work with BD.

3. Please check any of these chemicals that you work with now or have worked with in the past:

| | | | |
|--|-----|-------------------------------------|-----|
| benzene | ___ | carbon tetrachloride ("carbon tet") | ___ |
| glues | ___ | arsine | ___ |
| toluene | ___ | carbon disulfide | ___ |
| inks, dyes | ___ | lead | ___ |
| other solvents, grease cutters | ___ | cement | ___ |
| insecticides (like DDT, lindane, etc.) | ___ | petroleum products | ___ |
| paints, varnishes, thinners, strippers | ___ | nitrites | ___ |
| dusts | ___ | | |

4. Please check the protective clothing or equipment you use at the job you have now:

| | |
|-------------------------|-----|
| gloves | ___ |
| coveralls | ___ |
| respirator | ___ |
| dust mask | ___ |
| safety glasses, goggles | ___ |

Please circle your answer of yes or no.

5. Does your protective clothing or equipment fit you properly? yes no

6. Have you ever made changes in your protective clothing or equipment to make it fit better? yes no

7. Have you been exposed to BD when you were not wearing protective clothing or equipment? yes no

8. Where do you eat, drink and/or smoke when you are at work? (Please check all that apply.)

| | |
|--------------------------------|-----|
| Cafeteria/restaurant/snack bar | ___ |
| Break room/employee lounge | ___ |
| Smoking lounge | ___ |
| At my work station | ___ |

Please circle your answer.

9. Have you been exposed to radiation (like x-rays or nuclear material) at the job you have now or at past jobs? yes no

10. Do you have any hobbies that expose you to dusts or chemicals (including paints, glues, etc.)? yes no

11. Do you have any second or side jobs? yes no

If yes, what are your duties there? _____

12. Where you in the military? yes no

If yes, what did you do in the military? _____

Family Health History

1. In the FAMILY MEMBER column, across from the disease name, write which family member, if any, had the disease.

| DISEASE | FAMILY MEMBER |
|------------------------------|----------------------|
| Cancer | |
| Lymphoma | |
| Sickle Cell Disease or Trait | |
| Immune Disease | |
| Leukemia | |
| Anemia | |

2. Please fill in the following information about family health:

| <u>Relative</u> | <u>Alive?</u> | <u>Age at death?</u> | <u>Cause of death?</u> |
|-----------------|---------------|----------------------|------------------------|
| Father | | | |
| Mother | | | |
| Brother/Sister | | | |
| Brother/Sister | | | |
| Brother/Sister | | | |

Personal Health History

Birth Date ___/___/___ Age ___ Sex ___ Height ___ Weight ___

Please circle your answer.

1. Do you smoke any tobacco products? yes no

2. Have you ever had any kind of surgery or operation? yes no

If yes, what type of surgery: _____

3. Have you ever been in the hospital for any other reasons? **yes no**

If yes, please describe the reason: _____

4. Do you have any on-going or current medical problems or conditions? **yes no**

If yes, please describe: _____

5. Do you now have or have you ever had any of the following? Please check all that apply to you.

- | | | | | | |
|----------------------|-----|----------------------|-----|-------------------------|-----|
| unexplained fever | ___ | bruising easily | ___ | still birth | ___ |
| anemia ("low blood") | ___ | lupus | ___ | eye redness | ___ |
| HIV/AIDS | ___ | weight loss | ___ | lumps you can feel | ___ |
| weakness | ___ | kidney problems | ___ | child with birth defect | ___ |
| sickle cell | ___ | enlarged lymph nodes | ___ | autoimmune disease | ___ |
| miscarriage | ___ | liver disease | ___ | overly tired | ___ |
| skin rash | ___ | cancer | ___ | lung problems | ___ |
| bloody stools | ___ | infertility | ___ | rheumatoid arthritis | ___ |
| leukemia/lymphoma | ___ | drinking problems | ___ | mononucleosis ("mono") | ___ |
| neck mass/swelling | ___ | thyroid problems | ___ | nagging cough | ___ |
| wheezing | ___ | night sweats | ___ | | |
| yellowing of skin | ___ | chest pain | ___ | | |

Please circle your answer.

6. Do you have any symptoms or health problems that you think may be related to your work with BD? **yes no**

If yes, please describe: _____

7. Have any of your co-workers had similar symptoms or problems?
yes no don't know

If yes, please describe: _____

8. Do you notice any irritation of your eyes, nose, throat, lungs, or skin when working with BD? **yes no**

9. Do you notice any blurred vision, coughing, drowsiness, nausea or headache when working with BD? **yes no**

10. Do you take any medications (including birth control or over-the-counter)? **yes no**

If yes, please list: _____

11. Are you allergic to any medication, food, or chemicals? yes no

If yes, please list: _____

12. Do you have any health conditions not covered by this questionnaire that you think are affected by your work with BD? yes no

If yes, please explain: _____

13. Did you understand all the questions? yes no

Signature

1,3 -Butadiene (BD) Update Health Questionnaire

DIRECTIONS:

You have been asked to answer the questions on this form because you work with BD (butadiene). These questions ask about changes in your work, medical history, and health concerns since the last time you were evaluated. Please do your best to answer all of the questions. If you need help, please tell the doctor or health care professional who reviews this form.

This form is a confidential medical record. Only information directly related to your health and safety on the job may be given to your employer. Personal health information will not be given to anyone without your consent.

Date: _____

Name: _____ SSN _____/_____/_____
 Last First MI

Job title: _____

Company's Name: _____

Supervisor's Name: _____ Supervisor's Phone No. () _____ - _____

Present Work History

1. Please describe any NEW duties that you have at your job: _____

2. Please list any additional job titles you have:
 _____ _____
 _____ _____
 _____ _____

Please circle your answer.

3. Are you exposed to any other chemicals in your work since the last time you were evaluated for exposure to BD? yes no
 If yes, please list what they are: _____

4. Does your personal protective equipment and clothing fit you properly? yes no

5. Have you made changes in this equipment or clothing to make it fit better? yes no

6. Have you been exposed to BD when you were not wearing protective equipment or clothing?
 yes no

7. Are you exposed to any NEW chemicals at home or while working on hobbies?
 yes no

If yes, please list what they are: _____

8. Since your last BD health evaluation, have you started working any new second or side jobs?
 yes no

If yes, what are your duties there? _____

Personal Health History

1. What is your current weight? _____ pounds

2. Have you been diagnosed with any new medical conditions or illness since your last evaluation?
 yes no

If yes, please tell what they are: _____

3. Since your last evaluation, have you been in the hospital for any illnesses, injuries, or surgery?
 yes no

If yes, please describe: _____

4. Do you have any of the following? Please place a check for all that apply to you.

| | | | | | |
|----------------------|-------|----------------------|-------|-------------------------|-------|
| unexplained fever | _____ | bruising easily | _____ | still birth | _____ |
| anemia ("low blood") | _____ | lupus | _____ | eye redness | _____ |
| HIV/AIDS | _____ | weight loss | _____ | lumps you can feel | _____ |
| weakness | _____ | kidney problems | _____ | child with birth defect | _____ |
| sickle cell | _____ | enlarged lymph nodes | _____ | autoimmune disease | _____ |
| miscarriage | _____ | liver disease | _____ | overly tired | _____ |
| skin rash | _____ | cancer | _____ | lung problems | _____ |
| bloody rash | _____ | infertility | _____ | rheumatoid arthritis | _____ |
| leukemia/lymphoma | _____ | drinking problems | _____ | mononucleosis "mono" | _____ |
| neck mass/swelling | _____ | thyroid problems | _____ | nagging cough | _____ |
| wheezing | _____ | night sweats | _____ | yellowing of skin | _____ |

chest pain _____

Please circle your answer.

5. Do you have any symptoms or health problems that you think may be related to your work with BD? yes no

If yes, please describe: _____

6. Have any of your co-workers had similar symptoms or problems?
yes no don't know

If yes, please describe: _____

7. Do you notice any irritation of your eyes, nose, throat, lungs, or skin when working with BD?
yes no

8. Do you notice any blurred vision, coughing, drowsiness, nausea, or headache when working with BD? yes no

9. Have you been taking any NEW medications (including birth control or over-the-counter)? yes no

If yes, please list:

_____ _____ _____
_____ _____ _____

10. Have you developed any NEW allergies to medications, foods, or chemicals?
yes no

If yes, please list:

_____ _____ _____
_____ _____ _____

11. Do you have any health conditions not covered by this questionnaire that you think are affected by your work with BD? yes no

If yes, please explain: _____

12. Did you understand all the questions? yes no

Signature

PART 1915—[AMENDED]

Part 1915 of 29 CFR is hereby amended as follows:

1. The authority citation for 29 CFR part 1915 continues to read as follows:

Authority: Sec. 41, Longshore and Harbor Workers Compensation Act (33 U.S.C. 941); secs. 4, 6, and 8 of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, and 657); sec. 4 of the Administrative Procedure Act (5 U.S.C. 553); Secretary of Labor's Order No. 12-71 (36 FR 8754), 8-76 (41 FR 25059), 9-83 (48 FR 35736), or 1-90 (55 FR 9033), as applicable; 29 CFR part 1911.

§ 1915.1000 [Amended]

2. The entry in Table Z-1 of Section 1915.1000, for "Butadiene (1,3-Butadiene)" is amended as follows: remove the "1000" and "2200" from the

columns entitled ppm^a* and mg/m³ b* respectively; add "1 ppm/5 ppm STEL" in the ppm^a* column; and add the following to the butadiene entry: "; See 29 CFR 1910.1051; 29 CFR 1910.19(l)" so that the entry reads as follows: "Butadiene (1,3-Butadiene); See 29 CFR 1910.1051; 29 CFR 1910.19(l)."

PART 1926—[AMENDED]

Part 1926 of 29 CFR is hereby amended as set forth below:

Subpart Z—[Amended]

1. The authority citation for Subpart Z of 29 CFR part 1926 is revised to read as follows:

Authority: Sec. 107, Contract Work Hours and Safety Standards Act (40 U.S.C. 333); secs. 4, 6, 8, Occupational Safety and Health

Act of 1970 (29 U.S.C. 653, 655, 657); Secretary of Labor's Order No. 12-71 (36 FR 8754), 8-76 (41 FR 25059) 9-83 (48 FR 35736) or 1-90 (55 FR 9033), as applicable; 29 CFR part 1911.

Appendix A to § 1926.55 [Amended]

2. The entry in Appendix A to § 1926.55 for "Butadiene (1,3-Butadiene)" is amended as follows: remove the "1000" and "2200" from the columns entitled ppm^a and mg/m³ b respectively; add "1 ppm/5 ppm STEL" in the ppm^a column; and add the following to the butadiene entry: "; See 29 CFR 1910.1051; 29 CFR 1910.19(l)" so that the entry reads as follows: "Butadiene (1,3-Butadiene); See 29 CFR 1910.1051; 29 CFR 1910.19(1)."

[FR Doc. 96-27791 Filed 11-1-96; 8:45 am]

BILLING CODE 4510-26-P