# LIVONIA CHRYSLER-JEEP

## SAFETY & HEALTH MANUAL

# INTRODUCTION

**LIVONIA CHRYSLER-JEEP** Safety & Health manual serves to document policies, procedures and training that will enable management to implement an effective Safety & Health program.

THE PROGRAM CONTAINED IN THIS MANUAL HAS BEEN ESTABLISHED TO ACCOMPLISH THE FOLLOWING:

- ✓ Protect and promote the health and safety of the employees and customers of **LIVONIA CHRYSLER-JEEP,** who are affected by the dealership business activities.
- ✓ Comply with all pertinent Federal, State and Local regulations.
- ✓ Assure that safety, health and environmental programs are given the proper priority and attention, and are achieving the required results.

THIS MANUAL WILL BE REVISED AS NECESSARY IN ORDER TO KEEP OUR SAFETY & HEALTH PROGRAM CURRENT AND RELEVANT AND TO MEET ANY CHANGES REQUIRED BY REGULATION CHANGES.

# LIVONIA CHRYSLER-JEEP

## SAFETY & HEALTH POLICY

**30777 PLYMOUTH ROAD**
**LIVONIA, MI 48150**
**PHONE: (734) 525-5000 FAX: (734) 525-0169**

**Dave McDonald, General Manager**

**LIVONIA CHRYSLER-JEEP** considers no part of its operation more important than the safety & health of all of its employees. We will provide and maintain safe and healthful working conditions and have established and insist upon safe work methods and practices at all times.

Safety and health shall be an integral part of all operations including, *ADMINISTRATION*, *SALES, SERVICE, BODY SHOP* and *PARTS*. Accidents have no place in our dealership.

We will work consistently to maintain safe and healthful working conditions, to adhere to proper operating practices and procedures designed to prevent injury and illness, and to observe Federal, State and Local Safety & Health Regulations.

Each level of management must reflect an interest in dealership safety and health objectives and is required to set a good example by always observing the rule as a part of their normal job responsibilities. Management interest must be vocal, visible and continuous, from the president to all department managers.

All employees are expected to follow safe work practices, obey rules and regulations and to work in a way, which maintains the high safety and health standards developed and sanctioned at **Livonia Chrysler-Jeep**.

We urge all employees to make our Safety & Health Program an integral part of their daily operations. Then the total elimination of accidents will become not just an objective but also a way of life.

Sincerely,

**David McDonald**
**General Manager**

# LIVONIA CHRYSLER-JEEP

## ASSIGNMENT OF RESPONSIBILITY

### A. OBJECTIVE

Provide guidelines for the responsibility of **Livonia Chrysler-Jeep** safety program.

### B. SCOPE

Designation of responsibility to implement the company program.

### C. REFERENCES

Federal, State and Local standards

### D. RESPONSIBILITY

It is the responsibility for the safety coordinator of **Livonia Chrysler-Jeep** to effectively communicate with all company employees the following responsibilities of safety decorum set forth by management.

### E. PROCEDURES

#### 1. DAVID MCDONALD ~ GENERAL MANAGER

a) Has overall responsibility for the establishment of policy and program implementation.

#### 2. JOHN BELANGER ~ MANAGEMENT SAFETY COORDINATOR

a) Responsible for maintaining this Safety Manual
b) Responsible for ensuring that all safety & health programs set forth in this manual has been implemented.
c) Review and implement any changes to the Safety Program.
d) Responsible for assuring proper notification (internal & external) in the event of an accident, incident or fatality.

**ASSIGNMENT OF RESPONSIBILITY CONTINUED:**

### *3. DEALERSHIP MANAGEMENT*

a) At the discretion of the **John Belanger**, he reviews and approves safety programs designed to meet the safety goals **Livonia Chrysler-Jeep.**
b) Implementation of the Safety Program through motivation, training, counseling and enforcement.
c) Responsible for initiating compliance for all safety program elements applicable to their department.
d) Identify hazards through safety inspections and develop timely corrective actions.
e) Responsible that all required safety training, for their department employees have been completed and the new employee orientation form is filed in their personnel file.
f) Responsible for timely injury/accident investigation and reporting.

### *4. DEALERSHIP EMPLOYEES*

a) Employees shall be responsible to learn and comply with all safety and health rules and regulations applicable to their work. It is their further responsibility to support dealership management in providing a safe place to work, and to protect themselves and co-workers against injury.
b) Employees shall report all safety and health hazards to management and shall take all necessary actions to establish an immediate temporary control of the hazard until permanent control can be accomplished.
c) Employees shall immediately report **ALL** (no matter how slight) accidents or injuries occurring on the job to their manager.
d) Employees shall cooperate and assist in the investigation of all accidents or injuries.
e) Employees shall wear **ALL** personal protective equipment provided by **Livonia Chrysler-Jeep** and required under any federal, state or local safety standards.
f) Employees shall practice sanitary health habits.

# LIVONIA CHRYSLER-JEEP

## RECORDKEEPING POLICY

**A. OBJECTIVE**

Provide guidelines for recordkeeping practices.

**B. SCOPE**

All records mandated by Federal, State and Local Laws

**C. REFERENCES**

Federal, State and Local standards

**D. RESPONSIBILITIES**

The following records shall be maintained by the **Elaine Moore, Office Manager,** to ensure that all required policies, programs and training will be properly maintained and updated.

**E. PROCEDURES**

1. **ELAINE MOORE** shall maintain originals & copies of the following items. These copies & originals shall be kept as described below:

   a. Employees' report of injury **(FORM 301),** a copy in the employee's personnel file, original kept in main office file.
      - ✓ All other claim supporting documentation (with **FORM 301**)

   b. **MIOSHA 300 LOG:** all recordable injuries shall be logged on this form within 6 working day from date if injury. This form will be kept in the main office file.

   c. Every February 1st until April 30th of each year a copy of the **MIOSHA 300A LOG** shall be posted on the employee bulletin board.

2. The dealership shall maintain **EMPLOYEE MEDICAL RECORDS** for the term of their employment or 30 years. These records shall be kept in their personnel file.

3. Current **CERTIFICATES OF INSURANCE** for all contracted services shall be kept in the main office.

**RECORDKEEPING CONTINUED:**

**JOHN BELANGER, Safety coordinator**, shall maintain originals & copies of the following items. These copies & originals shall be kept as described below:

1. The dealership shall maintain any **ENVIRONMENTAL; NOISE & EMPLOYEE EXPOSURE RECORDS** as required and shall be kept in this manual.

2. The dealership shall maintain all **EMPLOYEE TRAINING RECORDS**.
   a) The training attendance sheet shall be kept in this manual.
   b) Any test or quizzes shall be kept in the employee's personnel file.

3. The dealership shall maintain **EMPLOYEE RESPIRATOR MEDICAL EVALUATION & ANNUAL FIT TESTING** in each employee's personnel file.

4. The Dealership shall maintain a copy of each **EMPLOYEE'S NEW EMPLOYEE ORIENTATION** form in his or her personnel file.

5. **EMPLOYEE DISCIPLINARY WRITE UP FORMS** shall be kept in the employee's personnel file.

# LIVONIA CHRYSLER-JEEP

## ACCIDENT INVESTIGATION

**A. OBJECTIVE**

Assist in prevention of accident recurrence and provide consistency of investigation, and reporting.

**B. SCOPE**

All occupational accidents, illnesses, and near misses (those unplanned events that do not result in injury, financial loss, and property damage) shall be investigated.

**C. RESPONSIBILITIES**

Employees shall immediately report all occupational accidents, illnesses and near misses to their immediate supervisor.

The manager of the department in which the accident, illness or near miss occurred should complete the Supervisor's Accident Investigation Report. Copies of the report shall be given to the Safety Coordinator for processing and follow-up.

The Safety Coordinator shall review the report for completeness and accuracy. He should determine what was the underlying cause and corrective action should be made.

The Supervisor Accident report shall be kept with the MIOSHA form 301. If no form 301 has been completed this form should be kept in the employee's file.

If a Fatality/Catastrophe has occurred the Safety Coordinator shall report within 8 hours to the proper authorities.

**D. PROCEDURES**

PROVIDE for First Aid

GO to the scene of the accident at once

TALK with injured person, if possible. Talk to witnesses. (Stress getting the facts, not placing blame of responsibility) Ask open-ended questions.

**ACCIDENT INVESTIGATION CONTINUED:**

LISTEN for clues in the conversations around you. Unsolicited comments often have merit.

ENCOURAGE people to give their ideas for preventing a similar accident.

STUDY possible causes – unsafe conditions – unsafe practices.

CONFER with interested persons about possible solutions.

WRITE your accident report giving a complete, accurate account of the accident.

FOLLOWS UP to make sure unsafe conditions is corrected. If the condition cannot be corrected the area should be roped off or equipment should be tagged out and not be used.

PUBLICIZE corrective action taken so that all may benefit from the experience.

**IN ORDER FOR THE ACCIDENT INVESTIGATION REPORT TO BE EFFECTIVE IT SHOULD CONTAIN, AS A MINIMUM, A DETAILED ANSWER TO THE FOLLOWING QUESTIONS:**

WHAT HAPPENED? Indicate in detail what took place; describe the accident, the type of injury and the part of parts of the body affected and whether the employee was wearing appropriate safety equipment.

WHAT CAUSED THE ACCIDENT? Explain in detail the condition, act malfunction, etc. that caused the accident.

WHAT CAN BE DONE TO PREVENT A SIMILAR ACCIDENT? Indicate corrective action to prevent recurrence.

# LIVONIA CHRYSLER-JEEP

## SUPERVISOR'S ACCIDENT INVESTIGATION REPORT

**NAME**_____ **TIME**_____ **DATE**_____

**DEPARTMENT**_____ **JOB TITLE**_____ **DATE OF HIRE**_____

**WHAT HAPPENED?** (DESCRIBE WHAT TOOKPLACE OR WHAT CAUSED YOU TO MAKE THIS INVESTIGATION)

_____
_____
_____
_____
_____

**WHY DID IT HAPPEN?** (GET ALL THE FACTS BY STUDYING THE JOB & SITUATION INVOLVED: WHO, WHAT, WHERE, WHEN)

_____
_____
_____
_____
_____

**WHAT SHOULD BE DONE?** (DETERMINE WHAT NEEDS ATTENTION: TRAINING, MAINTANANCE, INSPECTIONS, DISCIPLINE)

_____
_____
_____
_____

**WHAT HAVE YOU DONE THUS FAR?** (TAKE OR RECOMMEND ACTION, DEPENDING UPON YOUR ATUTHORITY- FOLLOW UP)

_____
_____
_____
_____

**HOW WILL THIS IMPROVE OPERATIONS?** (HOW WILL IT REDUSE HAZARDS THAT CAN CAUSE INJURIES OR PROPERTY LOSS)

_____
_____
_____
_____

**INVESTIGATED BY**_____ **DATE**_____

**REVIEWED BY**_____ **DATE**_____

**PROPER ACCIDENT INVESTIGATION PAYS OFF!!!**

# LIVONIA CHRYSLER-JEEP

## EMPLOYEE ORIENTATION

**A. OBJECTIVE**

Assure that all new and transferred employees receive necessary orientation information.

**B. SCOPE**

All new employees

**C. REFERENCES**

Federal, State and Local Standards

**D. RESPONSIBILITY**

1. **JOHN BELANGER, MANAGEMENT SAFETY COORDIANTOR,** shall be responsible for assuring required training is conducted.

2. **EACH DEPARTMENT MANAGER** will review the orientation checklist with each new hire that will become a permanent personnel document.

3. The employee should sign and date the training and orientation checklists.

**E. PROCEDURE**

**INFORM THE EMPLOYEE OF THE FOLLOWING:**

1. Required personal protective equipment and where and when it is to be used.
2. General hazards and hazards specific to the job assigned.
3. Safety Rules
4. Hazard Communication Program
5. Injury Prevention Program
6. Disciplinary Procedures

# LIVONIA CHRYSLER-JEEP
# ORIENTATION CHECKLIST

| EMPLOYEE | DEPARTMENT | DATE OF HIRE |
|---|---|---|
| MANAGER | | DATE |

**The supervisor and the new employee shall complete this report on the first day of employment.**

| | YES | NO | N/A |
|---|---|---|---|
| Has the employee taken a physical examination? | ❑ | ❑ | ❑ |
| Has the employee taken a drug test? | ❑ | ❑ | ❑ |
| Has MVR check been completed? | ❑ | ❑ | ❑ |

What physical limitations are there, if any?

_____

| | YES | NO | N/A |
|---|---|---|---|
| Review; dealership safety manual, safety policy and rules explained | ❑ | ❑ | ❑ |
| Review; disciplinary procedures | ❑ | ❑ | ❑ |
| Review; personal protective equipment and use (Distribute PPE) **(SHOW MADSIF PPE VIDEO ~ PPE QUIZ)** | ❑ | ❑ | ❑ |
| Review; safe lifting technique **(SHOW MADSIF DEALERSHIP SAFETY VIDEO)** | ❑ | ❑ | ❑ |
| Review; housekeeping procedures | ❑ | ❑ | ❑ |
| Review; locations of First Aid Kit, Eyewash, Fire Blanket, Fire Extinguishers **(WALK AROUND)** | ❑ | ❑ | ❑ |
| Right to Know Program training **(SHOW MADSIF RTK VIDEO ~ RTK QUIZ)** | ❑ | ❑ | ❑ |
| Review; job specific hazards **(CONTINUED TRAINING FROM MADSIF TRAINING MANUAL)** | ❑ | ❑ | ❑ |
| Review; injury reporting & unsafe conditions procedures | ❑ | ❑ | ❑ |
| Emergency Action Plan training | ❑ | ❑ | ❑ |
| Lockout/Tagout procedures training (IF REQUIRED) | ❑ | ❑ | ❑ |
| Respiratory Protection Program training | ❑ | ❑ | ❑ |

**I ACKNOWLEDGE THAT INFORMATION ON THE ABOVE SUBJECTS WAS FURNISHED TO ME DURING MY ORIENTATION.**

| EMPLOYEE SIGNATURE | DATE | MANAGER SIGNATURE | DATE |
|---|---|---|---|

# LIVONIA CHRYSLER-JEEP
# EMPLOYEE SIGNATURE FORM

**I have received, read & understand the**
**LIVONIA CHRYSLER-JEEP**
**New Employee Safety & Health Orientation Packet.**

Signature: _____

Manager: _____

Date: _____

**I have received all personal protective equipment necessary to perform my job in a safe manor & understand the MIOSHA requirements of using them.**

Signature: _____

Manager: _____

Date: _____

# LIVONIA CHRYSLER-JEEP

## DISCIPLINARY PROCEDURES

**A. OBJECTIVE**

To provide guidelines for fair and consistent enforcement of safety rules, policies, procedures and directives from appropriate management personnel.

**B. SCOPE**

All employees

**C. REFERENCES**

Federal, State and Local standards

**D. RESPONSIBILITIES**

1. **LIVONIA CHRYSLER-JEEP** employees will be subject to disciplinary action for violations of safety rules. Such action may include any one or more of the following depending on the severity of the violation.

2. **LIVONIA CHRYSLER-JEEP** employees shall be afforded instructive counseling and/or training to assure a clear understanding of the infraction and the proper conduct under dealership guidelines. However, nothing in this policy or Safety Manual will preclude management from terminating an employee for a safety violation. This is not a progressive discipline system and any safety violation may lead to an employee's termination without prior instruction or warning. Management reserves the right to impose whatever disciplinary action it deems appropriate.

    a. A verbal warning with documentation in personnel file
    b. Written warning outlining nature of offense and necessary corrective action with documentation in personnel file
    c. Disciplinary suspension with documentation in personnel file
    d. Employment review

3. Management shall be subject to disciplinary action for the following reasons:
    a. Repeated safety rule violation by their department employees.
    b. Failure to provide adequate training prior to job assignment.
    c. Failure to report accidents and provide medical attention to employees injured at work.
    d. Failures to control unsafe work conditions or practices.
    e. Failure to maintain good housekeeping standards and cleanliness in their departments.

# LIVONIA CHRYSLER-JEEP
# DISCIPLINARY POLICY

All employees of **LIVONIA CHRYSLER-JEEP** are required to follow all safety and work rules and use personal protective equipment as stated in the ***Hazard Assessment*** and dealership policies.

Failure to comply will result in the following disciplinary actions being taken:

1st offense - Verbal Warning (Employee file)

2nd offense - Written Warning (Employee file)

3rd offense – 1 to 3 Days off without pay

4th offense - Employment review

***THIS POLICY OF THE ENFORCEMENT IN NO WAY MODIFIES THE "AT WILL" EMPLOYMENT RELATIONSHIP IN EFFECT AT THIS DEALERSHIP.***

# LIVONIA CHRYSLER-JEEP

## SAFETY OBSERVATION REPORT
## &
## VERBAL/WRITTEN WARNING

_____ **Planned Observation** **Department**_____

_____ **Impromptu Observation**

**Name**_____ **Employee No.**_____

**What was observed?** _____
_____
_____
_____
_____

**CHECK ONE:**

_____**Unsafe condition** _____**Unsafe act**

_____**Violation of rule/policy**

**Action taken or recommended (disciplinary action, training, maintenance)**
_____
_____
_____
_____
_____

**Employee comments:** _____
_____
_____
_____

**Department Manager:** _____ **Date**_____

**Employee:** _____ **Date**_____

**Dealer/General Manager:** _____ **Date**_____

# LIVONIA CHRYSLER-JEEP

## SAFETY & HEALTH RULES

**A OBJECTIVE**

Provide for a safe and healthful work environment through the establishment of work rules.

**B. SCOPE**

Applies to **ALL** dealership employees

**C. REFERENCES**

Federal, State and local standards

**D. RESPONSIBILITIES**

All persons, including management shall abide by safety, health and environmental rules.

Management personnel shall fairly and consistently enforce all safety & health rules. Please review disciplinary policy found in this manual.

All employees shall report any infraction of company safety & health rules to management.

**E. PROCEDURES**

**LIVONIA CHRYSLER-JEEP** has established safety & health rules that are to assist the company to provide a safe & healthful work environment. These rules can be found on the following pages.

# LIVONIA CHRYSLER-JEEP
## SAFETY & HEALTH RULES

### CODE OF SAFE PRACTICES

All persons shall follow these safe practice rules, render every possible aid to safe operations and report all unsafe conditions or practices to management.

Managers shall insist on employees observing and obeying every rule, regulation and order as is necessary to the safe conduct of the work, and shall take such action as is necessary to obtain observance.

All employees shall be given hazard awareness training

Anyone known to be under the influence of drugs or intoxicating substances shall not be allowed on the job in that condition.

Horseplay, scuffling and other acts which tend to have an adverse influence on the safety and well-being of the employees is prohibited.

No one shall knowingly be permitted or required to work when the employee's ability or alertness is so impaired by fatigue, illness or other causes that it might unnecessarily expose the employee or others to injury.

Employees shall not handle or tamper with any electrical equipment, machinery, air or water lines in the manner not within the scope of their duties unless they have received instructions from their supervisor.

All injuries shall be reported promptly to the manager so that arrangements can be made for medical or first aid treatment. If you are injured and do not report the occurrence to your manager, you may be responsible for any medical expenses incurred.

When lifting heavy objects, proper lifting techniques shall be used. *(employee discresion)*

Employees shall wash thoroughly after handling hazardous substances and follow special instructions for those products.

Employees shall be instucted that all guards and other protective devices are proper places and adjusted. All deficiencies shall be reported to management.

Smoking shall NOT be permitted in inside building.

Be sure that all electrical equipment (radios, heaters, coffee pots, etc.) is turned off at the end of the day.

All fire exits, fire protection and emergency equipment shall be clearly marked and kept accessible and free of obstructions for emergency use.

Employees must notify proper manager when a fire extingusher has been used.

## USE OF TOOLS AND EQUIPMENT

All tools and equipment shall be maintained in good condition.

Damaged tools or equipment shall be removed from service and tagged DEFECTIVE DO NOT USE.

Only appropriate tools shall be used for the job.

Do not remove guards from portable grinding tools or break off ground leads on portable electric tool plugs.

The tool rest on a grinder must **always be set within 1/8 inch** from the wheel. The tongue guard must **always be adjusted to within 1/4 inch** of the wheel.

Electrical cords shall not be exposed to damage from vehicle traffic.

Files shall be equipped with handles and not used to punch or pry.

## MACHINERY AND VEHICLES

Loose or frayed clothing, long hair, dangling ties, finger rings, etc., shall not be worn. Long hair may be put in a hair net or put up under a cap. Rings may be covered by tape or tight fitting glove.

Machinery shall not be serviced, repaired or adjusted while in operation, nor shall oiling of moving parts be attempted, except on equipment that is designed or fitted with safeguards to protect the person performing the work.

Employees shall not work under vehicles supported by jacks or chain hoists without protective blocking that will prevent injury if jacks or hoists should fail.

Only autorized persons shall operate machinery or equipment. All machinery and equipment shall be operated in accordance with manufacturer's procedures and job hazard training.

Appropriate Lockout procedures shall be used when working on machinery and equipment.

## HOUSEKEEPING

All stairways, passageways and accessways should be kept free and clear of materials, debris and other obstructions at all times.

Tools, materials, extension cords. hoses or other debris should not be strewn about in a manner which may cause tripping or other hazards.

General waste, scraps and rubbish should be cleaned after each vehicle has been serviced.

Metal containers shall be used in adequate numbers to handle all waste and rubbish disposal.

Materials shall be maintained in a safe, neat stockpiles for easy access and to prevent collapse or falling materials.

## SALES & GENERAL OFFICE SAFETY

When using file cabinets, never open more than one drawer at a time to avoid tipping.

Desk drawers, filing and storage cabinets must be kept closed when not in use.

Floors, work areas and hallways shall be kept cleared of boxes, papers, electric cords, and telephone wires.

Chairs shall be kept in a safe condition (properly adjusted, wheels secure, etc.)

Inspect electrical wires periodically to be sure that plugs and/or cords are in safe operating condition.

Good housekeeping shall be maintained at all times. All spills, whether water, chemicals, grease, oil or ink will be quickly cleaned up.

**ALL EMPLOYEES** shall wear safety glasses or goggles while in the service areas.

When stocking shelves, refrain from placing heavy, bulky objects on the top shelves. Ask for assistance when receiving, transporting or stocking heavy items.

Bookshelves, shelving and cabinets will be substantially braced to prevent them from tipping or falling.

When using ladders or short steps never stand on the top step or the first step down from the top, unless there are handrails on the ladder for the purpose of supporting you.

Make sure you use handcarts and other mechanical stock handling equipment when moving heavy loads.

Make sure that you follow procedures established for spill clean up involving chemical substances. Consult the MSDS's if you do not know the hazards associated with a particular chemical spill.

Ensure proper VDT or computer workstation arrangement for comfortable seating and distance from the terminal screen.

Always think safety awareness.

Refrain from horseplay that could endager you or you fellow employees.

Exercise care when using cutting devices.

## LADDERS – STEPSTANDS

Use the proper ladder for the job you are doing.

Do not use ladders with brojen or missing steps or rungs and report any unsafe ladders to your manager

Never place a ladder on boxes or other unstable bases to gain height.

Always place your ladder so that the siderails have secure footing.

Do not climb higher than the third rung from the top on straight ladders, or the second tread from the top of stepladders.

## PAINTING – BLASTING – BODY REPAIR

When welding or cutting, a portable fire extinguisher shall be kept at or near the work site.

Always use the proper respiratory protection when working around paints and dusts. If you aren't sure, see your manager after reading the MSDS for the product you are applying or using.

Make sure you follow all safety precautions on the MSDS and Environmental Regulations when using any chemical.

Always, wash thoroughly before eating.

# LIVONIA CHRYSLER-JEEP

## PERSONAL PROTECTIVE EQUIPMENT POLICY

**A. OBJECTIVE**

To provide a safe work environment from injuries or detrimental effects on health, which are not controllable through engineering or administrative approach.

**B. SCOPE**

All affected employees

**C. REFERENCES**

Federal, State and Local standards

**D. RESPONSIBILITIES**

1. The dealership will provide personal protective equipment required. (Exceptions: work/safety shoes, prescription glasses at dealership discretion)
2. Departmental managers shall enforce the use of personal protective equipment.
3. **ALL PERSONNEL**, including management personnel shall wear personal protective equipment when in areas so designated.
4. **ALL VISITORS**, including but not limited to, vendors, salespersons and subcontractors shall wear personal protective equipment when in areas so designated.

**E. PROCEDURES**

1. Safety coordinator/department manager shall perform a **HAZARD ASSESSMENT**, based on dealership conditions and claims history, to determine the necessity of personal protective equipment.
2. The **HAZARD ASSESSMENT** shall be verified with a written certification. Hazard Assessment and Written Certification shall be kept in this manual.
3. Safety coordinator/department manager shall train all employees required to wear personal protective equipment. Training shall include the use, care and limitations of each type of personal protective equipment. All training will be documented.
4. Retraining shall be performed where employees exhibit lack of understanding on the requirements of the policy and MIOSHA Part 33.

# PERSONAL PROTECTIVE EQUIPMENT QUIZ

**Name** _____ **Date** _____

**Department** _____

1. The use of splash goggles or full-face shield is required when?

    a) Using parts washers
    b) Using caustic/cleaning chemicals in the wash bay or prep area
    c) Spraying or mixing paint
    d) All of the above
    e) None of the above

2. A full-face shield or welding helmet are considered **secondary** eye protection and therefore must be worn over safety glasses?

    True False

3. Which of the following shoes **is acceptable foot protection** for all service areas of a dealership?

    a) Sandals
    b) Fully enclosed leather shoe or boot with puncture resistant sole
    c) Tennis or athletic shoes
    d) All of the above

4. Cut resistant gloves **should** be worn when handling sheet metal, using an air chisel or working on a frame rack?

    True False

5. **All** prescription eyeglasses are safety glasses and therefore are the only protection a person would need in the service areas of the dealership?

    True False

6. Chemical gloves should be worn when?
   ***(Circle all that apply)***

   a) Using a grinder
   b) Using a parts washer
   c) Using engine degreasers or white wall cleaners
   d) Making coffee
   e) Paint mixing and spraying

7. You are **only required** by law to use Personal Protective Equipment (P.P.E.) when?

   a) Management is present
   b) MIOSHA is at your dealership
   c) Using an air powered tool
   d) The Hazard Assessment states the need for P.P.E.

8. Sideshields are required on **ALL** industrial safety glasses?

   True False

9. Which of the following Personal Protective Equipment **must** your employer provide?

   a) Industrial safety glasses
   b) Cut resistant gloves
   c) Chemical resistant gloves
   d) All of the above

10. The Michigan Occupational Safety & Health (MIOSHA) laws **mandate** that your employer provides you with and enforce the use of personal protective equipment, it **also mandates** that you as employees use all provided personal protective equipment?

    True False

# HAZARD ASSESSMENT
# FOR
# LIVONIA CHRYSLER-JEEP

## SERVICE DEPARTMENT

### *FACE & EYE PROTECTION*

**1. Safety Glasses with side shields?**

These are provided and their use required by all employees.

**2. Splash goggles or full face shield?**

These are provided and their use required where potential exists of spraying or splashing of chemicals or solvents to the eyes or face. The following areas/conditions require the use of goggles: **parts washing, prep area, wash bay.**

**3. Tinted goggles or welding helmet?**

These are provided and their use required when, using gas fueled or electric welding equipment.

### *HAND PROTECTION*

**1. Chemical resistant gloves?**

These are provided and their use required when handling or using chemicals or solvents. The following areas/conditions require the use of proper chemical gloves: **parts washing, prep area, wash bay.**

**2. Thermal protective gloves?**

These are provided and their use required when using gas fueled or electric welding equipment.

**3. Cut resistant gloves?**

These are provided and their use required when handling or working with sharp materials.

### *FOOT PROTECTION*

**1. Leather work shoe/boot with puncture resistant sole?**

These are required by all service employees assigned to the service department or where a potential to foot injury exists from stepping on or bumping sharp materials.

**2. Steel toed safety shoes/boots?**

These are required where a potential to severe foot injury exists from falling or rolling material or objects. The following jobs require the use of steel toed shoes/boots. **Steel toed safety shoes/boots are not required at this time.**

**SERVICE DEPARTMENT CONTINUED:**

***FOOT PROTECTION CONTINUED;***

**3. Water or chemical resistant boots?**

These are required where a hazard exists due to chemical contact or continual exposure to water. The following jobs require the use of water/chemical resistant boots: **prep area / wash bay.**

***HEAD PROTECTION***

**1. Hard hats or bump caps?**

These are required where a potential to severe head injury exists from falling material or objects. **At this time we have no areas that require the use of hard hats.**

***RESPIRATORY PROTECTION***

**1. Respiratory protection?**

This is required where a potential to respiratory concerns exists from air contaminants and/or specific job functions. **At this time we have no areas/jobs that require the use of Respiratory Protection.**

# HAZARD ASSESSMENT CERTIFICATION

I, **John Belanger**, verify that a hazard assessment of **LIVONIA CHRYSLER-JEEP ~ SERVICE DEPARTMENT** was completed on **JANUARY 26, 2006**.

# HAZARD ASSESSMENT
# FOR
# LIVONIA CHRYSLER-JEEP

## BODY SHOP DEPARTMENT

### *FACE & EYE PROTECTION*

**1. Safety Glasses with side shields?**

These are provided and their use required by all employees.

**2. Splash goggles or full face shield?**

These are provided and their use required where potential exists of spraying or splashing of chemicals or solvents to the eyes or face. The following areas/conditions require the use of goggles: **paint mixing, paint spraying, clean up.**

**3. Tinted goggles or welding helmet?**

These are provided and their use required when, using gas fueled or electric welding equipment.

### *HAND PROTECTION*

**1. Chemical resistant gloves?**

These are provided and their use required when handling or using chemicals or solvents. The following areas/conditions require the use of proper chemical gloves: **paint mixing, paint spraying, clean up.**

**2. Thermal protective gloves?**

These are provided and their use required when using gas fueled or electric welding equipment.

**3. Cut resistant gloves?**

These are provided and their use required when handling or working with sharp materials.

### *FOOT PROTECTION*

**1. Leather work shoe/boot with puncture resistant sole?**

These are required by all body shop employees assigned to the body shop department or where a potential to foot injury exists from stepping on or bumping sharp materials.

**2. Steel toed safety shoes/boots?**

These are required where a potential to severe foot injury exists from falling or rolling material or objects. The following jobs require the use of steel toed shoes/boots. **Steel toed safety shoes/boots are not required at this time.**

**BODY SHOP DEPARTMENT CONTINUED:**

***FOOT PROTECTION CONTINUED;***

**3. Water or chemical resistant boots?**

These are required where a hazard exists due to chemical contact or continual exposure to water. The following jobs require the use of water/chemical resistant boots: **clean up / wash bay.**

***HEAD PROTECTION***

**1. Hard hats or bump caps?**

These are required where a potential to severe head injury exists from falling material or objects. **At this time we have no areas that require the use of hard hats.**

***RESPIRATORY PROTECTION***

**1. Respiratory protection?**

This is required where a potential to respiratory concerns exists from air contaminants and/or specific job functions. **The following areas/jobs require the use of respiratory protection: (paint mixing, paint spraying, grinding and sanding) also refer to Respiratory Protection Policy.**

# HAZARD ASSESSMENT CERTIFICATION

I, **Tony Saliba**, verify that a hazard assessment of **LIVONIA CHRYSLER-JEEP ~ BODY SHOP DEPARTMENT** was completed on **JANUARY 26, 2006**.

# HAZARD ASSESSMENT
# FOR
# LIVONIA CHRYSLER-JEEP

## PARTS DEPARTMENT

### *FACE & EYE PROTECTION*

**1. Safety Glasses with side shields?**

These are provided and their use required by employees while key cutting or performing any work that the employee's eyes may be injured by a flying object.

**2. Splash goggles or full face shield?**

These are provided and their use required where potential exists of spraying or splashing of chemicals or solvents to the eyes or face. The following areas/conditions require the use of goggles: **Splash goggles/full face shield are not required at this time.**

**3. Tinted goggles or welding helmet?**

These are provided and their use required when, using gas fueled or electric welding equipment.

### *HAND PROTECTION*

**1. Chemical resistant gloves?**

These are provided and their use required when handling or using chemicals or solvents. The following areas/conditions require the use of proper chemical gloves: **Chemical resistant gloves are not required at this time.**

**2. Thermal protective gloves?**

These are provided and their use required when using gas fueled or electric welding equipment.

**3. Cut resistant gloves?**

These are provided and their use required when handling or working with sharp materials.

### *FOOT PROTECTION*

**1. Leather work shoe/boot with puncture resistant sole?**

These are required by all parts employees assigned to the parts department or where a potential to foot injury exists from stepping on or bumping sharp materials.

**2. Steel toed safety shoes/boots?**

These are required where a potential to severe foot injury exists from falling or rolling material or objects. The following jobs require the use of steel toed shoes/boots.

**Steel toed safety shoes/boots are not required at this time.**

**PARTS DEPARTMENT CONTINUED:**

***FOOT PROTECTION CONTINUED;***

**3. Water or chemical resistant boots?**

These are required where a hazard exists due to chemical contact or continual exposure to water.

***HEAD PROTECTION***

**1. Hard hats or bump caps?**

These are required where a potential to severe head injury exists from falling material or objects. **At this time we have no areas that require the use of hard hats**

***RESPIRATORY PROTECTION***

**1. Respiratory protection?**

This is required where a potential to respiratory concerns exists from air contaminants and/or specific job functions. **At this time we have no areas/jobs that require the use of Respiratory Protection.**

# HAZARD ASSESSMENT CERTIFICATION

I, **Dan McKay**, verify that a hazard assessment of **LIVONIA CHRYSLER-JEEP ~ PARTS DEPARTMENT** was completed on **JANUARY 26, 2006**.

# LIVONIA CHRYSLER-JEEP

## EYE SAFETY POLICY

**A) OBJECTIVE**

Assure ALL employees wear certified eye protection while working in or traveling through all service areas.

Assure proper eye safety training for all employees

**B) SCOPE**

All dealership employees

**C) REFERENCES**

Federal, State and Local Standards

**D) RESPONSIBILITY**

Each department manager shall be responsible for issuing safety glasses, conducting training classes and reviewing with each employee this company policy

Employees *MUST* follow company policy on the wearing of safety glasses.

**E) PROCEDURE**

*ALL* employees including management are required to wear certified eye protection (Z87.1) while working in or traveling through service areas or when a hazard exists as described in Part 33-rule 3312(1).

Management will provide at no cost to each employee 1 pair of safety glasses. In the event that the glasses are damaged or are no longer usable due to normal wear, management will replace employee's glasses at no cost.

An employee who is assigned to the Service, Body Shop and Parts Departments and must wear prescription glasses to perform their jobs. The company will pay $120.00 toward the cost of safety glasses (which meets the ANSI Z-87-1). If an employee in the above mentioned departments chooses not to participate and all other departments not covered by this policy, the company will provide at no cost goggles or safety glasses that can be worn over the employee's own glasses. An employee who needs to wear prescription glasses to perform their job duties while in the service areas will be provided at no cost to that employee goggles or safety glasses that can be worn over employee's own glasses.

**EYE SAFETY POLICY CONTINUED:**

If an employee does not have his/her safety glasses at the start of their workday or needs a new pair due to abuse, the employee may purchase a new pair of glasses or get their original issued glasses with the time away from work being deducted from employee's pay.

The Safety Coordinator or Department Manger shall properly train each employee in the hazards of not wearing safety glasses, MIOSHA requirements and this company policy. Documentation of safety glass distribution will be kept in each employee personnel file.

An employee's failure to comply with the company eye protection policy will be subject to disciplinary action up to and including employment review a copy of the dealership disciplinary procedure may be found in the Safety & Health Manual.

# LIVONIA CHRYSLER-JEEP

## SAFETY & HEALTH COMMITTEE

### A. OBJECTIVE

Assist the management of **LIVONIA CHRYSLER-JEEP** in establishing and maintaining a safe and efficient environment.

### B. MEMBERSHIP

Members will be chosen in view of the duties and responsibilities of the committee. One employee will be chosen from each department with **JOHN BELANGER – SAFETY COORDINATOR** serving as Committee Chair.

### C. SCOPE

A well - run Safety & Health Committee is an important part of the safety & health program. I can help reduce the cost of operation and produce many other effects, such as:

- **Reducing** the occurrence, frequency and/or severity of accidents.
- **Increase** productive output (quality& quantity)
- **Improve** use of equipment
- **Reduce** material waste
- **Enhance** employee satisfaction
- **Facilitate** employee loyalty, cooperation and contributions
- **Provide** analysis and evaluation of injury and incident data and program performance to management
- **Develop** countermeasures for identified problems per the dealership business plans

### D. GOALS

**LIVONIA CHRYSLER-JEEP** safety & health committee will be responsible for establishing annual goals for hazard control and accident prevention. Once the goals are set and specific objectives formulated, they will presented to management and employees for review.

## E. ACTIVITY AND DUTIES

**LIVONIA CHRYSLER-JEEP** safety & health committee shall meet on a regular basis to accomplish its goals.

**LIVONIA CHRYSLER-JEEP** safety & health committee shall also discuss accidents, near misses, new training requirements, employee hazard awareness forms, future educational needs as they relate to safety. Other actions should include:

- **Review** quality of supervisor's accident reports
- **Review** actions taken to prevent accident recurrences
- **Establish** a system for handling employee safety awareness forms
- **Developing** new employee orientation programs & follow up.
- **Establishing** and conducting a safety & health inspection program
- **Providing** or arranging special safety training programs

## F. ACTIVITY AND DUTIES

Good safety meeting require thorough planning and effort. Notices of meeting will be posted for employees review. The subsequent rules will be followed in all **LIVONIA CHRYSLER-JEEP** safety & health committee meetings:

- **Call to order**
- **Roll call be the secretary**
- **Introduction of visitors**
- **Review of minutes**
- **Unfinished business**
- **Review of accident reports**
- **Review of safety awareness forms**
- **Review of inspection results**
- **New business**
- **Adjournment**

# LIVONIA CHRYSLER-JEEP

## SAFETY & HEALTH COMMITTEE MINUTES

**Date of Meeting** _____ **Date of Next Meeting** _____

**Time In** _____ **Time Out** _____

**Names of Committee Members and Guests Present:**

_____ _____ _____

_____ _____ _____

_____ _____ _____

**Unfinished Business:** The following action was taken on the business pending before the committee.

Recommendations completed since last meeting _____

_____

_____

_____

Recommendations under consideration _____

_____

_____

_____

Recommendations rejected _____

_____

_____

_____

**New Business:** The following attached reports were read, discussed and approved:

Inspection Report of Safety Coordinator dated _____

Employee Safety Awareness Reports _____

**Accidents and Prevented Recommendations Made:** The records of all injuries reported by employees since the last General Safety Committee meeting were reviewed to determined what caused the injuries and what steps should be taken to prevent recurrence. The discussions develop the following action:

_____

_____

_____

_____

_____

# LIVONIA CHRYSLER-JEEP

## EMPLOYEE SAFETY CONCERN REPORTING POLICY

### A) OBJECTIVE

Establish a flow of information designed to benefit the employee and dealership in matters of safety and health.

### B) SCOPE

All employee safety or health concerns

### C) REFERENCES

Federal, State and Local Standards

### D) RESPONSIBILITY

**SAFETY COORDINATOR** shall administer the policy

### E) PROCEDURE

**THE SAFETY COORDINATOR** will make available to any employee an Employee Report of Safety Concern Form and in consultation with the appropriate department manager shall review the Employee Report of Safety Concern Form.

**JOHN BELANGER**, shall review ALL recommendations and he shall inform employee of actions to be taken and Employee Report of Safety Concern shall kept on file.

Actions taken by management will be based on MIOSHA standards, which require employers to provide a workplace & equipment free of recognized hazards that would cause death or serious injury.

# LIVONIA CHRYSLER-JEEP
## EMPLOYEE REPORT OF SAFETY CONCERN

**NOTE: This form is provided to assist an employee making the report and does not constitute the exclusive means for notification of safety hazards.**

**I believe that a condition or practice exist at the following location that constitutes a safety & health concern for fellow employees and me.**

1. Identification of the location and the unsafe condition, operation, equipment or employee practice.

   Location: _____

   Condition/Situation_____
   _____
   _____
   _____
   _____

2. Recommendation to correct or improve condition or situation.
   _____
   _____
   _____
   _____

3. Management Evaluation of reported condition or situation
   _____
   _____
   _____
   _____

4. Action Taken_____
   _____
   _____

Employee_____ Date Submitted_____

Safety Coordinator _____ Date Received_____

General Manager _____ Completion Date_____

# EMERGENCY ACTION/CONTINGENCY PLAN

# FOR

# LIVONIA CHRYSLER-JEEP

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PREPARATION DATE: JANUARY 26, 2006

**EMERGENCY ACTION/CONTINGENCY PLAN**
**For**
**LIVONIA CHRYSLER-JEEP**
**30777 PLYMOUTH ROAD**
**LIVONIA, MI 48150**
**PHONE: (734) 525-5000 FAX: (734) 525-0169**

## PURPOSE

This Emergency Action/Contingency Plan was written to provide response procedures that will protect people and property during an emergency or disaster situation. This plan identifies and assigns personnel to various emergency tasks and responsibilities. The plan provides coordination between dealership personnel and governmental authorities to ensure effective response.

## VULNERABILITY

**LIVONIA CHRYSLER-JEEP** is susceptible to Hazardous Materials Incidents, Bomb Threats, Fire and Explosion, Severe Weather, Medical and Utility Emergencies. If a disaster were to occur on site, the primary concerns would be injury to personnel and customers, damage to the buildings, damage to equipment and potential damage to the environment.

## RESPONSE PROCEDURES

Response to an emergency situation or disaster affecting **LIVONIA CHRYSLER-JEEP** is a cooperative effort between the employees, management and governmental authorities. Different emergency situations may require unique response/action procedures. In general, **LIVONIA CHRYSLER-JEEP** will respond in this manner during most emergency situations. Notification of an impending emergency or disaster situation is normally received from local government authorities by television, radio or telephone. The designated Emergency Action Plan Coordinator(s) is responsible for making protective action decisions. The designated Coordinator is responsible for activating the Emergency Action/Contingency Plan, implementing protective action procedures, and coordinating response activities.

**Each Department Manager** is responsible for carrying out Emergency Procedures for their department. Upon notification of an emergency or disaster situation the on site warning system of paging or the Emergency Coordinator will notify key personnel to take immediate action as described in hazard-specific conditions contained in this document.

The Emergency Action personnel may be assisted by local government field forces and/or volunteers organizations as necessary. The Emergency Action Coordinator is responsible for notifying local government authorities of onsite emergency situations such as fires, medical emergencies, chemical spills, bomb threats, and explosion by telephone.

## SITE EMERGENCY COORDINATOR

**John Belanger** is designated as the Site Emergency Coordinator for **LIVONIA CHRYSLER-JEEP.**

The Site Emergency Coordinator's primary responsibilities are:

1. Maintaining a current Site Emergency Plan
2. Deciding what protective actions should be taken for emergency or disaster situations
3. Training personnel to perform emergency tasks, including Managers from each Department to serve as Departmental Emergency Coordinators
4. Organizing and maintaining adequate communications capabilities
5. Ensuring that vital records are identified and protected.
6. Activating the site emergency plan, coordinating onsite response personnel, and implementing protective actions.
7. Notifying the local governmental authorities for an onsite emergency or disaster situation
8. Implementing recall procedures for all evacuated and/or sheltered personnel

## DEPARTMENTAL EMERGENCY COORDINATORS

Managers from each Department are designated as the Departmental Emergency Coordinators.

Departmental Emergency Coordinator's primary responsibility is:

1. Participating in site emergency plan review and updates
2. Training departmental personnel in site emergency procedures
3. Identifying, before an emergency, vital departmental records that need protection.
4. Notifying persons onsite of the need to evacuate or seek protective shelter
5. Directing persons to designated evacuation assembly areas or protective shelters.
6. Ensuring that all persons take the appropriate protective actions
7. Coordinating shut down procedures with appropriate personnel.
8. Assisting in controlling the movement of people and vehicles.
9. Accounting for all personnel at the evacuation assembly areas or in protective shelters.
10. Issuing further instructions and updates to personnel as necessary
11. Assisting with disaster assessment as necessary.

## CHEMICAL SPILL PROCEDURES

The "HAZWOPER" Standard requires **LIVONIA CHRYSLER-JEEP** to have either an Emergency Response Plan or an Emergency Action Plan. Since it is the intention of the dealership to evacuate the employees in the event of an emergency and not permit the employees to assist in emergency response, we will not implement an Emergency Response Plan. In accordance with R.325.52125, we will implement an Emergency Action Plan complying with 29 C.F.R. 1910.38(a) of the Federal Standards, which have been adopted by reference. When changes occur in our operations, or as regulations change that mandate the alterations of various provisions or procedures outlined in this program, affected employees will be notified.

In the event of a large spill or release that could threaten human health outside of our facility, or if we have reason to believe that the spill has reached surface water or soil.

### NOTIFICATION AND WARNING:

1. Notification of a large Chemical spill/release onsite is made through the paging system
2. If needed, notify **(734) 942-5289** the **NATIONAL RESPONSE CENTER** using the 24 hour toll free number **1(800) 424-8802**, **CHEMTREC 1(800) 424-9300**

### GENERAL RESPONSE:

1. Personnel should evacuate the site upon hearing the alarm and report to the Assembly Area
2. Department Emergency Coordinators will check their work areas to ensure that all persons have taken the appropriate action.
3. Department Emergency Coordinators will account for their personnel at the evacuation assembly area and report this information to the Emergency Response Coordinator.
4. Personnel should remain at the assembly area for further instructions.
5. The Emergency Response Coordinator will authorize reentry into the facilities after being cleared to do so by the fire official in charge of the scene.
6. The all-clear will be disseminated to personnel at the assembly area.

In the event of small chemical spills, employees should follow procedures outlined by the manufacturer on the Material Safety Data Sheets (MSDS).

## FIRE OR EXPLOSION PROCEDURES

### NOTIFICATION AND WARNING:

1. Notification of a fire or explosion onsite is made through the paging system
2. The first person spotting a fire should activate the notification system and contact the **Fire Department at 911**
3. The site is protected by fire extinguishers and sprinkler systems in designated areas.

### EMERGENCY RESPONSE COORDINATOR CHECKLIST:

1. If necessary, evacuate to the evacuation assembly area:
   **REPORT TO EMPLOYEE PARKING LOT**
2. Determine the extent of the fire
3. Determine what staff and personnel should do during interim period.
4. Ensure the Fire Department has been notified
5. Ensure the Fire Alarm system has been activated.
6. Coordinate with maintenance personnel, utility companies, and the fire department in shutting down utility lines or systems that might present an additional hazard
   **DTE ELECTRICAL EMERGENCIES: (800) 477-4747**
   **CONSUMER'S GAS LEAK EMERGENCIES: (800) 477-5050**
7. Coordinate actions of personnel with those of offsite responders
8. Ensure that emergency medical care is provided to injured persons
9. Coordinate offsite medical assistance, ambulance calling/pickup, etc.
10. Collect and compile fire/explosion-related health/medical information
11. Coordinate utility start-up procedures with maintenance personnel, utility companies, and the fire department.
12. Recall evacuated personnel when it is safe to do so.

**DEPARTMENT EMERGENCY COORDINATORS CHECKLIST:**

1. Notify persons of the need to evacuate
2. Ensure that non-duplicated vital records in the department are preserved
3. Coordinate unit shut-down procedures as necessary
4. Direct persons to the assembly areas
5. Determine the extent of the fire or explosion (if safely possible) and report the information to the Emergency Response Coordinator
6. Ensure that all persons in the department have evacuated
7. Account for all department at the assembly area
8. Inspect the work area for damage as soon as conditions permit. Report damage to the Emergency Response Coordinator
9. Coordinate department start up procedures as necessary

## TORNADO PROCEDURES

### NOTIFICATION AND WARNING

1. Notification of a tornado warning is received by Television weather alerts, radio alerts and warning sirens.
2. Then a tornado watch is issued, or when severe or threatening weather conditions exist, the Emergency Response Coordinator will dispatch trained personnel to serve as weather spotters.
3. Personnel sighting a funnel could should immediately report it to the **Livonia Police DEPARTMENT BY CALLING (734) 466-2470 OR 9-1-1**
4. The Department Emergency Coordinators should also be notified so that the onsite warning system can be activated
5. The onsite warning signal for a tornado consists of paging or word of mouth communication.

### GENERAL RESPONSE:

1. When a tornado watch is issued, the Emergency Response Coordinator will monitor weather conditions.
2. If a tornado warning is issued, personnel should seek protective shelter:
   **OFFICE/SALES PERSONNEL – REPORT TO GENERAL OFFICES**
   **SERVICE/BODY SHOP PERSONNEL – REPORT TO CONFERENCE ROOM**
   **PARTS DEPARTMENT PERSONNEL – REPORT TO WARRANTY AREA**
3. Departmental Emergency Coordinators will check their work areas (if possible) before seeking shelter to ensure that all persons have received the warning notice and have gone to a shelter
4. Departmental Emergency Coordinators will account for their personnel at the tornado shelter and will report the information to the Emergency Response Coordinator
5. When the tornado warning is cancelled or downgraded, the Emergency Response Coordinator will determine if continued weather monitoring is advisable and take the appropriate steps as necessary
6. Personnel should remain in the tornado shelter until the all-clear notice is given
7. If the site has been damaged, the Emergency Response Coordinator will coordinate recovery efforts.

### EMERGENCY RESPONSE COORDINATOR CHECKLIST:

1. Activate the Site Emergency Plan
2. Dispatch weather spotters as necessary to watch for threatening weather formations and funnel clouds
3. Ensure that the onsite tornado warning system is activated if a tornado is sighted , or is a tornado warning is issued by the National Weather Service
4. If a tornado has been spotted, or a warning issued, seek protective shelter immediately
5. Ensure that a working battery powered radio is present in the shelter to listen for changed in weather conditions

6. Control the movement of people and vehicles at the site
7. Maintain access lanes for emergency vehicles and personnel
8. Ensure that Medical Care is provided to injured persons
9. Collect and compile tornado-related health/medical information
10. As conditions permit, dispatch personnel to inspect the site for damage.
11. If necessary, coordinate with maintenance personnel, utility companies, and the fire department in shutting down utility lines or systems that might present an additional hazard:
    a. **DTE ELECTRICAL EMERGENCIES: (800) 477-4747**
    b. **CONSUMER'S GAS LEAK EMERGENCIES: (800) 477-5050**
    c. **LIVONIA FIRE DEPARTMENT: 9-1-1 OR (734) 466-2444**
12. Recall sheltered personnel when the tornado warning notice has been terminated or when conditions are safe.
13. Coordinate actions of personnel with those of offsite responders
14. Coordinate utility start up procedures with maintenance personnel, utility companies, and the fire department.

**DEPARTMENTAL EMERGENCY COORDINATOR CHECKLIST:**

1. Notify personnel of the need to seek protective shelter
2. Ensure that non-duplicated vital records located in the Department are preserved
3. Coordinate Department shut down procedures as needed
4. If a tornado is sighted, or if a warning is issued, direct persons to the tornado shelter.
5. Ensure that all persons in the department have sought shelter. Account for Department personnel at the Tornado shelter
6. As conditions permit, inspect the work area for damage and report to the Emergency Response Coordinator
7. Coordinate Department start-up procedures as necessary.

## SEVERE WINTER WEATHER PROCEDURES

### NOTIFICATION AND WARNING:

1. Notification of a severe winter weather watch or warning is received by television and or radio alerts
2. Personnel will be notified of severe winter weather by means of paging system or direct contact by management

### GENERAL RESPONSE

1. When a severe weather watch is issued, the Emergency Response Coordinator will monitor weather conditions.
2. If a severe winter weather warning is issued, personnel may be released early as deemed appropriate. Onsite operations may be minimized or curtailed as necessary
3. Personnel released early will be recalled when conditions permit

### EMERGENCY RESPONSE COORDINATOR CHECKLIST:

1. Monitor weather conditions
2. Determine whether personnel should be released early
3. Determine what staff and personnel should do if isolated at the Dealership
4. Inspect the Dealership for damage
5. If necessary, coordinate with maintenance personnel and utility companies in shutting down utility lines or systems that might present additional hazards
    a. **DTE ELECTRICAL EMERGENCIES: (800) 477-4747**
    b. **CONSUMER'S GAS LEAK EMERGENCIES: (800) 477-5050**
    c. **LIVONIA FIRE DEPARTMENT: 9-1-1 OR (734) 466-2444**
6. Coordinate Dealership start up procedures as necessary

## RESCUE AND MEDICAL DUTIES

In an emergency situation where an evacuation of our facilities has been ordered, no employee will remain behind to perform rescue and medical duties. Emergency Fire/Medical Professionals contacted by management, if needed, will take on these actions.

It is important to remember the procedures outlined in this program are intended to deal with major emergency situations. These procedures are not intended to prohibit "Good Samaritan" acts administered by qualified individuals.

## BOMB THREAT PROCEDURES

### NOTIFICATION AND WARNING:

1. Notification of a bomb threat against the Dealership may be received by telephone, mail, or message at any time.
2. Telephone threats may be received at the Switchboard, General or Departmental Offices, on public phones or may be directed to the home telephones of staff members.
3. When a bomb threat is received, the Emergency Response Coordinator will contact:
   a. **LIVONIA FIRE DEPARTMENT: 9-1-1 OR (734) 466-2444**
   b. **Livonia Police DEPARTMENT BY CALLING (734) 466-2470 OR 9-1-1**
4. Dealership personnel will be alerted by means of the paging system or contact by the Department Manager

### GENERAL RESPONSE:

1. The Emergency Response Coordinator will monitor the situation and coordinate response actions.
2. The Bomb Threat Call Checklist attached to these procedures should be used by personnel receiving a telephone bomb threat to obtain as many details as possible about the caller and the alleged bomb and its location. An accurate analysis of the telephone threat can provide Sheriff's with many valuable clues. The caller could reveal personal characteristics, and may unwittingly provide a clue to his location by background noises. He may intentionally or unintentionally provide accurate information on the type of bomb and its exact location. If possible, another staff member should be listening in on all bomb threats
3. If a letter is received, it should be preserved for the Sheriff's investigator. To preserve fingerprints, it should not be handled once the letter is opened.
4. The Emergency Response Coordinator, in cooperation with Sheriff's and Fire officials at the scene, shall determine the necessity of searching and/or evacuating the Dealership.
5. The Emergency Response Coordinator will brief Departmental Emergency Coordinators of the situation as soon as possible and inform them of the actions

to be taken. Departmental Emergency Coordinators will immediately brief personnel within their Department

6. If the decision is made to evacuate, all personnel should report to the onsite assembly area identified on the Dealership Diagram
7. Departmental Emergency Coordinators will check their work areas to ensure that all personnel have taken the appropriate actions
8. Departmental Emergency Coordinators will account for their personnel at the assembly area and report to the Emergency Response Coordinator
9. The Emergency Response Coordinator will authorize re-entry into the Dealership after being cleared to do so by the Sheriff's and Fire officials at the scene.
10. The all clear notice will be disseminated to all personnel at the assembly site.
11. If the decision is made to search without evacuation, all available personnel will make a prompt and thorough visual inspection of their work areas. Any suspicious objects or packages found should be reported immediately to the Emergency Response Coordinator. The object or package should not be touched or moved.

## Emergency Response Coordinator Checklist:

1. Notify:
    a. **Livonia Police Department by calling (734) 466-2470 or 9-1-1**
    b. **Livonia Fire Department: 9-1-1 or (734) 466-2444**
2. Determine, if possible, the location or alleged location of the bomb
3. Determine the extent of the bomb threat and decide whether to evacuate or have staff search without evacuation.
4. Notify Departmental Emergency Coordinators of the situation
5. Ensure that all personnel on site are notified if the decision is made to evacuate
6. If necessary, evacuate to the evacuation assembly area identified on the Dealership Diagram
7. Coordinate with maintenance personnel, gas and electric companies, and the fire department is shutting down utility lines or systems that might present a hazard if an explosion occurs
    a. **DTE Electrical Emergencies: (800) 477-4747**
    b. **Consumer's Gas Leak Emergencies: (800) 477-5050**
8. Coordinate actions of personnel with those offsite responders
9. Augment personnel and resources as necessary
10. As conditions permit, coordinate utility start-up procedures with maintenance personnel, gas and electric companies, and the fire department
11. Recall evacuated personnel when it is safe to do so.

## Departmental Emergency Coordinators:

1. Brief personnel in the Department of the situation
2. If the decision is made to search without evacuation, direct personnel to make a prompt and thorough search of their work area. Any suspicious objects or packages should be reported immediately to the Emergency Response Coordinator.

3. If the decision is made to evacuate, notify persons of the need to evacuate and direct them to the onsite assembly area identified on the Dealership Diagram
4. Ensure that non-duplicated vital records located within the Department are preserved.
5. Coordinate Department shut down procedures as necessary
6. Ensure that all personnel in the Department have evacuated
7. Account for all Department personnel at the assembly area
8. As necessary, inspect the work area for damage as soon as conditions permit.
9. Coordinate Department start-up procedures as necessary

Use this form to help officials analyze the threat. If possible, keep a copy at each telephone. Train operators to respond calmly to a bomb threat phone call.

## BOMB THREAT CALL CHECKLIST

**QUESTIONS TO ASK:** **EXACT WORDING OF THE THREAT:**

1. When is bomb going to explode? _____
2. Where is it right now? _____
3. What does it look like? _____
4. What kind of bomb is it? _____
5. What will cause it to explode? _____
6. Did you place the bomb? _____
7. Why? _____
8. What is your address? _____
9. What is your name? _____

Sex of Caller _____ Age _____ Race _____ Length of call _____

**EXACT WORDING OF THE THREAT:**

_____
_____
_____

# FBI BOMB DATA PROGRAM

Note: May Reduce to 70% and attach to rolodex

**CALLER'S VOICE**

| | | | |
|---|---|---|---|
| ☐ Calm | ☐ Laughing | ☐ Lisp | ☐ Disguised |
| ☐ Angry | ☐ Crying | ☐ Raspy | ☐ Accent |
| ☐ Excited | ☐ Normal | ☐ Deep | ☐ Familiar |
| ☐ Slow | ☐ Distinct | ☐ Ragged | If voice is familiar, who did it sound like |
| ☐ Rapid | ☐ Slurred | ☐ Clearing throat | |
| ☐ Soft | ☐ Nasal | ☐ Deep berating | |
| ☐ Loud | ☐ Stutter | ☐ Cracking voice | |

**BACKGROUND SOUNDS**

| | | | |
|---|---|---|---|
| ☐ Street noises | ☐ House noises | ☐ Factory machinery | ☐ Local |
| ☐ Crockery | ☐ Motor | ☐ Animal noises | ☐ Long distance |
| ☐ Voices | ☐ Office | ☐ Clear | ☐ Booth |
| | | | ☐ Other |

**THREAT LANGUAGE**

| | | | |
|---|---|---|---|
| ☐ Well spoken (educated) | ☐ Foul | ☐ Incoherent | ☐ Message read by threat maker |
| | ☐ Irrational | ☐ Taped | |

**REMARKS:** _____
_____

**REPORT CALL IMMEDIATELY TO:** _____ **PHONE NUMBER:** _____

Fill out completely, immediately after bomb threat, Date ___/___/___ Phone number _____

Name _____ Position _____

SP - 38 Michigan State Police Emergency Management Division

## UTILITY EMERGENCY PROCEDURES

### NOTIFICATION AND WARNING:

1. Warning of a gas line rupture/release is disseminated to persons by the paging system.
2. A major gas line rupture/release could lead to an explosion. Every effort should be made to evacuate personnel from the Dealership as quickly as possible
3. The Emergency Response Coordinator will determine the extent of the utility emergency and contact the appropriate repair and emergency response personnel as necessary
4. Situations of an isolated nature (power outage or water main breakage) that can be resolved quickly and safely may only require a partial evacuation or temporary shut down of operations

### GENERAL RESPONSE:

1. The Emergency Response Coordinator will fully activate the Emergency Response for a gas line rupture/release due to the serious nature of the threat
2. If evacuation is necessary, Departmental Emergency Coordinators will ensure that all persons in their unit have received the warning and taken the appropriate action.
3. If conditions warrant, an Emergency Response may be activated for a water main break or electric power failure
4. If the situation cannot be resolved within a reasonable amount of time, personnel may be dismissed early.
5. Personnel dismissed early will be recalled by telephone

### EMERGENCY RESPONSE COORDINATOR CHECKLIST:

#### GAS LINE RUPTURE/RELEASE

1. Ensure that the **LIVONIA FIRE DEPARTMENT: 9-1-1 OR (734) 466-2444** has been notified
2. Determine the extent of the leak, if possible
3. Notify **CONSUMER'S GAS LEAK EMERGENCIES: (800) 477-5050**
4. Provide warning and/or instructions to personnel and initiate full or partial evacuation to the evacuation assembly area, depending on the circumstances
5. Coordinate with maintenance personnel, utility companies, and the fire department in shutting down other utility lines or systems that might present an additional hazard:
   **DTE ELECTRICAL EMERGENCIES: (800) 477-4747**

6. Coordinate actions of personnel with those of offside responders
7. Ensure that the Dealership is properly ventilated to disperse accumulated natural gas
8. Coordinate utility start up procedures with maintenance personnel, utility companies and the fire department
9. Recall evacuated personnel when it is safe to do so

### ELECTRIC POWER FAILURE

1. Determine the extent of the power outage
2. Notify personnel to remain at their work areas if it is a short term problem.
   Notify **DTE ELECTRICAL EMERGENCIES: (800) 477-4747**
3. Activate the Emergency Action Plan if conditions warrant
4. Coordinate start-up procedures with maintenance personnel and the electric company

### WATER MAIN BREAK

1. Determine the location and extent of the break
2. Notify the **LIVONIA WATER DEPARTMENT – (734) 466-2650**
3. Initiate evacuation, depending on circumstances
4. Coordinate with maintenance personnel in shutting down water lines and pumping out flooded areas
5. Coordinate with maintenance personnel and utility companies as necessary in shutting down utility lines or systems that might present an additional hazard (i.e., electrical systems)
   **DTE ELECTRICAL EMERGENCIES: (800) 477-4747**
   **CONSUMER'S GAS LEAK EMERGENCIES: (800) 477-5050**
6. Coordinate utility start up procedures maintenance personnel and utility companies
7. Recall evacuated personnel when it is safe to do so

## DEPARTMENTAL EMERGENCY COORDINATORS

### GAS LINE RUPTURE/RELEASE

1. Notify personnel of the need to evacuate
2. Ensure that non-duplicated vital records located within the department are preserved
3. Coordinate department shut down procedures as necessary
4. Direct persons to the on-site assembly area identified on the Dealership Diagram
5. Ensure that all persons in the Department have evacuated
6. Account for all personnel at the assembly area
7. Inspect work area for damage as soon as conditions permit. Report any damage to the Emergency Response Coordinator
8. Coordinate department start-up as necessary

### ELECTRIC POWER FAILURE

1. Determine the extent of the power failure, if possible. Report the information to the Emergency Response Coordinator
2. Notify personnel to remain at their work areas, or evacuate, depending upon the situation
3. Report to the Emergency Response Coordinator
4. Coordinate department shut-down and start-up procedures as necessary

### WATER MAIN BREAK

1. Determine the location and extent of the break (if possible) and report to the Emergency Response Coordinator
2. Ensure that non-duplicated vital records located within the department are protected from water damage
3. Coordinate department shut down procedures as necessary
4. If necessary, direct personnel to the onsite assembly area
5. Ensure that all persons in the unit have evacuated
6. Account for all department personnel at the assembly area
7. Inspect the department for damage as soon as conditions permit. Report damage to the Emergency Response Coordinator.

## TRAINING

Employee training regarding all aspects of this program will be accomplished before implementation. New employees will be instructed concerning their responsibilities regarding our Emergency Action and Contingency Plan before they begin work at our dealership. The instruction will include information on the purpose of the plan and the specific emergency escape route. Training will be the responsibility of each department manager.

As information is received that could cause the dealership to change any of the aspects of this plan, employees will be notified

## Emergency Phone Numbers

### Emergency Coordinators:

| | | | |
|---|---|---|---|
| John Belanger | Extension: 1263 | or | (734) 838-1156 |
| Jack Holden | Extension: 1244 | or | (734) 838-1146 |
| Tony Saliba | Extension: 1280 | or | (734) 838-1165 |

### Departmental Emergency Coordinators:

| | | |
|---|---|---|
| John Belanger | (Service) | Extension: 1263 |
| Tony Saliba | (Body Shop) | Extension: 1280 |
| Dan McKay | (Parts) | Extension: 1220 |
| Elaine Moore | (Front Office) | Extension: 1212 |

### Emergency Services:

Livonia Police Department by calling (734) 466-2470 or 9-1-1
Livonia Fire Department: 9-1-1 or (734) 466-2444
Electrical Emergencies: DTE Electrical Emergencies: (800) 477-4747
Gas Leak Emergencies: Consumer's Gas Leak Emergencies: (800) 477-5050

Business Health Services: (734) 464-9955
Poison Control: (800) 222-1222

Local Emergency Planning Committee: (734) 942-5289
For Spill Control Response

National Response Center: (800) 424-8802

Michigan Pollution Emergency: (800) 292-4706

## WEEKLY HAZARDOUS WASTE MAINTENANCE CHECKLIST

The Department Manager is responsible for ensuring that the Hazardous Waste generated or stored in the Department is checked to ensure: (Use the checklist on the following page. Completed checklists should be stored in this section)

1. All drums and other containers are properly labeled (Hazardous Waste and waste number)
2. The Accumulation Start Date on the Hazardous Waste Label is filled in on the date the accumulation began and that the container has not been in use/stored for over 90 days or 180 days.
3. Make sure all containers are closed (bungs are in drums, ring tops on drums are secure, funnel tops are closed, funnel valve is closed)
4. Make sure containers are not leaking
5. Make sure there is no degradation of containment protection.

The manager will date and initial the checklist after completing the required inspection.

## HAZARDOUS AND LIQUID INDUSTRIAL WASTE MANIFESTS

**THE FOLLOWING PROCEDURE HAS BEEN IMPLEMENTED AND HAS BEEN FOLLOWED REGARDING THE HANDLING AND PROCESSING OF MANIFESTS FOR HAZARDOUS AND LIQUID INDUSTRIAL WASTES.**

**RESPONSIBILITY:**

1. **John Belanger** has been assigned the responsibility for maintaining all manifests by complying with Tracking System Outline on the following page. The information required on the Manifest Tracking Log.
2. The Manifests and the Tracking Log will be maintained in the Warranty Office.
3. Department Managers, generating hazardous or liquid industrial wastes, are responsible for ensuring the information of the manifest is correct and completely filled out when the wastes are picked up by the Waste Hauler.
4. It is the responsibility of the Department Manger signing the manifest to provide the copies to **John Belanger** for processing and filing.

**PROCEDURES:**

The procedures for handling of manifests required by Part 111, R299.9304 and Part 121, Section 12103 as outlined in the Tracking System document on the following page is being followed.

Changes in personnel or procedures will be noted as addendums as they occur.

## WASTE PROCEDURES

### LABELING:

1. Departmental Mangers will ensure that all Hazardous Waste Containers are properly labeled so that the types of waste and associated hazards are clear. If waste is hazardous, it must be labeled as hazardous waste.
2. Make sure that labels will not be destroyed by weather conditions out-of-doors

### STORAGE INDOORS:

1. Solvents, oils, or other liquid wastes being accumulated in containers for future use, recycling, or disposal maintains an accurate waste log.
2. Provide different containers to segregate the types of waste. When waste containers are full, move them to a separate storage area away from the active work area.
3. Keep bungs on the tops of drums to prevent spills if the drums are tipped over.
4. Flammable liquids (waste thinner, waste gasoline, etc.) stored in drums should be grounded to avoid fire hazards. Use of a bonding strip and ground clamps should be used.
5. Drip pans should be used under spigots of chemical and oil containers. Drip pans must be periodically emptied into an appropriate waste container.

### OUTDOOR STORAGE:

1. Keep bungs on at the tops of drums in place to prevent the entry of rainwater, and the prevent spills if the drums are tipped over
2. Avoid overfilling containers-especially if stored out of doors. Fifty-five gallon drums of some hazardous liquids can expand to sixty gallons when exposed to the heat of the sun and will overflow.
3. Berms and dikes are required for outdoor storage areas. Always store hazardous substances on an impervious surface such as concrete.
4. Before pumping rainwater for disposal down the sanitary sewer make sure that it has not been contaminated with spilled material.
5. A pole shed or permanent covering is required for outdoor storage.

### SPILLS

1. Keep spillage of hazardous waste substances confined to the smallest possible area and clean it up immediately. Keep absorbent material on hand for use in emergency spill clean ups. Dispose of contaminated absorbent materials as hazardous waste, if applicable.
2. Do not wash spilled substances down the sanitary sewer without approval from the wastewater treatment plant.
3. Never wash spilled material down a storm sewer. The material will end up in a body of surface water and will require extensive and costly clean-up.
4. For other than minor spills, the supervisor should be notified of spills to ensure the proper clean-up and disposal.

For spills or leaks reaching a storm or sanitary sewer, notify the Emergency Response Coordinator who will, in turn, notify the proper governmental authorities.

# LIVONIA CHRYSLER-JEEP

## RESPIRATORY PROTECTION PROGRAM

## TABLE OF CONTENTS



**Appendix Contains**

# 1. GENERAL STATEMENT

**LIVONIA CHRYSLER-JEEP** has determined that employees working in the body shop may be exposed to respiratory hazards during routine operations. These hazards may include mists, vapors or gasses from welding, lacquer or enamel spray painting and/or dust particulate from various body grinding and sanding operations. The purpose of this program is to ensure that all employees are protected from over exposure to these respiratory hazards. Engineering controls, for instance ventilation and substitution of less toxic materials, are the first lines of defense to reduce over exposure. However, engineering controls have not always been feasible for some of our operations, or have not controlled the identified hazard. In these situations, respirators and other protective equipment must be used.

In addition, some employees have expressed a desire to wear respirators during certain operations that do not require respiratory protection. In voluntary use situations employees may be required to provide their own respiratory equipment. As a general policy the Program Administrator will review these request on a case-by-case basis.

This program applies to all employees who are required to wear respirators during normal work operations. There will be no cost for training, medical evaluations and respiratory equipment for employee required to use respirators. Employees who voluntarily wear filtering facepieces (dust masks) are not subject to the medical evaluation, cleaning, storage, and maintenance provisions of this program.

# 2. RESPONSIBILITIES

**TONY SALIBA has been named Program Administrator** and is responsible for administering the respiratory protection program Duties of the Program Administrator include:

* Evaluating hazards and identifying work areas, processes or task that require the use of respirators.
* Selection of respirator protection options.
  Monitoring respirator use to ensure they are being used as certified.
  Arrange for or conduct employee use training.
* Ensuring proper storage and maintenance of respiratory protection equipment.
* Conducting qualitative fit testing with.
* Administering the medical surveillance program.
* Maintaining records required by the program.
* Evaluating the program.
* Updating written program as needed.

## 3. IDENTIFICATION AND LOCATION OF HAZARDOUS EXPOSURES

The **PROGRAM ADMINISTRATOR** or a qualified individual will, survey work areas and practices to determine potentially hazardous air contaminants. Following a review of work practices and the Material Safety Data Sheets of chemicals used, it has been determined that the body shop employees are currently the only employees required to wear respirators during normal work operations.

## 4. RESPIRATOR SELECTION

The **PROGRAM ADMINISTRATOR** will select respirators by following the National Institute for Occupational Safety and Health (NIOSH) Guide to the Selection and use of Particulate Respirators Certified under 42 CFR 84. Also information from the respirator equipment manufactures and Material Safety Data Sheets of the chemicals should be used.
A condensed version of these NIOSH Guidelines can be found in appendix. The following items should also be considered:

Review specific contaminant information on the MSDS.

If skin irritation or absorption is a problem, a respirator alone will not provide complete protection and special protective clothing will be needed.

At what level of exposure are there noticeable warning properties that can signal respirator failure? For example, at what level is the odor noticeable and how does this relate to the workers' actual exposure? If warning properties are nil, then supplied air is the only alternative.

If eye irritation is a problem at the exposed concentration, a full facepiece or hood type of respiratory protection will be needed.

If the concentrations approach the level of **Immediately Dangerous to Life and Health (IDLH)** or **Lower Flammable Limit (LFL),** then the only acceptable respirator is the Self-contained Breathing Apparatus (SCBA) or supplied air with auxiliary SCBA.

If the contaminant is a particulate, consider the health effects. If it is a systemic poison, then no single use respirator is acceptable.

If it is a particulate with a **Permissible Exposure Limit (PEL)** of less than 50 micrograms/m3, then a high efficiency particulate air (HEPA) filter of at least 99.97% efficiency is needed.

Where gases and vapors are of concern, is the sorbent efficiency of the air-purifying canister satisfactory? If not, supplied air is necessary. Select only respirators that are NIOSH-certified equipment and particulate filter respirators that are certified under 42 CFR 84. (Use NIOSH guide in the appendix)

# 5. MEDICAL EVALUATION

Medical evaluation to determine whether an employee is able to use a given respirator is an important element of an effective respiratory protection program. It is necessary to prevent injuries, illnesses, and even in rare cases death from the physiological burden imposed by respirator use.

Medical evaluations must be provided to all employees that use either positive or negative pressure respirators (except for filtering facepieces [dust mask]), this includes employees who are using tight-fitting facepiece respirators voluntarily. The medical evaluation must be provided BEFORE the employee is fit tested and uses the respirator in the workplace for the first time.

The required elements of the medical evaluations are as follows:

a. The employer must identify a Physician or Licensed Health Care Professional (PLHCP) [e.g. nurse practitioner, physician assistant, and occupational health nurse] to perform the medical evaluation, using a medical questionnaire or medical examination. In identifying a PLHCP, ensure they fully understand the requirements of PART 451. Respiratory Protection and can provide the required service.

b. The medical questionnaire shall be administered confidentially, during working hours that are convenient to the employee. The employer or other employees are not allowed to help in filling out the questionnaire. If the employee needs help in understanding the questions, it can be taken home for help from a family member or the help can be in the form of a consultation with the PLHCP.

c. The selected PLHCP must be provided with a copy of the employers written Respiratory Protection Program and a copy of the Respiratory Protection Standard.

d. The selected PLHCP must be provided with specific information needed to make an informed decision whether the employee is able to use a respirator. The information includes, description of the respirator used, types of chemical exposure for which the respirator is used and workplace conditions in which the respirator is used. (Form found in the appendix)

e. The employer must obtain a written recommendation on whether or not the employee is medically able to use a respirator. This recommendation shall be restricted to the following three elements: (Form found in the appendix)

    1. Any limitations on respirator use related to the medical conditions of the employee, or relating to workplace conditions.
    2. Whether or not there is a need for a follow-up medical evaluation or medical examination.
    3. The employee is provided with a copy of the PLHCP's written recommendation.

f. The employer must provide a follow-up medical examination to an employee who answers YES to any questions among questions 1 through 8 in Section 2, Part A of the medical questionnaire. (At the discretion of the PLHCP)

g. The employer may either transmit the PLHCP's written recommendation to the employee or arrange for the PLHCP to do so. The employer must also permit the employee to discuss the medical questionnaire results with the PLHCP.

h. If the PLHCP's medical evaluation finds that use of a negative pressure respirator would place the employee at increased risk of adverse health effects, but the employee is able to use a powered air-purifying respirator (PAPR), the employer is required to provide the employee with a PAPR.

i. The employer is to provide additional medical evaluations whenever there is any indication that a re-evaluation is appropriate.

j. The completed medical questionnaire and the physician's documented findings are confidential and are to remain at the PLHCP's office. The employer will only retain the PLHCP's written recommendation regarding each employee's ability to wear a respirator.

## 6. EMPLOYEE TRAINING/INFORMING & FIT TESTING

**Training/Informing**

Employee training is a critical part of a successful respiratory protection program and is essential for correct respirator use. An employee whose job function requires the use of a respirator must be (trained/informed) and be able to demonstrate knowledge of at least the following:

The **PROGRAM ADMINISTRATOR** will ensure that required respirator users are trained and refresher training is done on at least an annual basis thereafter. More frequent retraining may be required if workplace changes occur, employees knowledge of use appears inadequate or other situations arise that indicate retraining is necessary. Employees must be trained/informed in the following items:

a. Why the respirator is necessary and how improper fit, usage or maintenance can compromise the protective effect of the respirator.

   The user will be instructed in the nature of the hazard(s) for which the respiratory protection is being provided, and informed of possible consequences which may occur if exposed to the hazard without adequate protection. This portion of the training can be fulfilled by using the MADSIF "Employee Right-To-Know" video. The user will be instructed on proper fit and usage during the mandatory fit testing.

b. What the limitations and capabilities of the respirator are.

   The user must be instructed in how the respirator operates. Included must be an explanation of how the respirator provides protection by filtering the air, absorbing gas or vapor or by supplying clean air. Limitations on the use of the equipment must be discussed, such as prohibition against using an air-purifying respirator in an Immediately Dangerous to Life and Health (IDLH) atmosphere. This portion of your training will generally be covered during your Fit Testing.

c. How to use the respirator effectively in emergency situations in which the respirator malfunctions.

   Users are to be informed due to the conditions in which respiratory protection is used in a dealership (i.e. relatively low hazard), that if a respirator would become clogged or malfunction the procedure is to simply remove the respirator and leave the area of exposure.

d. How to inspect, put on and remove, use and seal-check the respirator.

   This portion of the required training will be covered in detail during the mandatory Fit Testing.

e. How to recognize medical signs and symptoms that may limit or prevent the effective use of respiratory protection.

   This portion of your training need not be medically sophisticated. Employees must be provided only with medical information sufficient for them to recognize the signs or symptoms of a medical condition (e.g. shortness of breath, dizziness) that may affect their use of respirators. This information is generally covered when the employee completes the medical evaluation form or consults with the PLHCP.

**Fit Testing**

All employees that are required to use tight-fitting facepiece respirators shall be fit tested at least annually, or more often if conditions that may affect the seal of the respirator change. A qualitative method of fit test shall be conducted by our Certified Fit Tester following the guidelines and using the forms contained in the appendix of this program. Documentation of this fit testing will be the Respirator Fit Test Results form kept in the employee file.

Upon completion of your annual fit testing and training, have employees take the Respirator Use Quiz. The correct answers to the quiz should be discussed with employees as part of your training. Both the quiz and the fit test results form must be kept for at least one year as proof that training and fit testing are being done. (Forms can be found in the appendix)

## 7. CLEANING, MAINTENANCE AND STORAGE

To ensure that respirators function properly for the longest period possible, employees must be instructed in the cleaning and storage of respirators. This portion of the required training should be done during the Fit Testing.

**Washing and Disinfecting:** Individually assigned respirators must be washed and disinfected after each day of use. While those used by more than one employee, shall be thoroughly cleaned and disinfected after each use by carrying out the following instructions:

Remove the air-purifying element from the respirator. An air-purifying element must never be washed and disinfected.

Immerse the respirator in warm (100-120 degree F.) mild detergent water solution. The respirator facepiece and parts may be scrubbed gently with a cloth or soft brush. Make sure that all foreign matter is removed from all surfaces of the rubber exhalation flap and plastic valve seal.

After washing and disinfecting the respirator, rinse the respirator in clean, warm (120-140 degree F.) water and then allow the respirator to dry.

**Removing Paint Accumulation:** To remove accumulation of paint from the respirator, wipe area so covered with a cloth that has been wetted with a commercially available paint-enamel-lacquer stripping agent. Mineral spirits, naphtha or turpentine may be substituted if they are found to be effective. Accumulation of water based paint enamel or lacquer may be removed with a soap and water solution.

**Warning:** Do not immerse and soak rubber and plastic parts in stripping agents, since this may damage the parts.

Never attempt to remove accumulation of paint, etc., from the air- purifying element: discard this element and replace with a new one when cleaning of the respirator is completed.

**Storage:** When the respirator is not in use, it should be placed in a plastic bag and then stored in a convenient, clean and sanitary location. Respirators should be stored in single layer with the facepiece and exhalation valve in a more or less normal position to prevent the rubber or plastic from taking a permanent distorted "set".

**Inspection of Respirator:** The respirator must be inspected daily during cleaning to insure that it will function properly. Examine each part of the respirator for defects and discard if defects are found, unless the defects may be eliminated by replacement of defective parts with new parts. Check for the following:

- Cracks, tears, decomposition, stiffening and distortion of the rubber facepiece.
- Distorted or badly worn plastic adapter.
- Rubber gaskets that contain cuts, cracks or scratches.
- Rubber inhalation valve flaps that are stiff, decomposed or cut.
- Snap fasteners on head straps that are stiff, decomposed or cut.
- Rubber head harness straps that are stiff, decomposed or cut.
- Plastic exhalation valve seat that is distorted or contains scratches or cracks on its sealing surface.
- Rubber filter clip that is distorted, decomposed or contains cuts.

Replacement parts **must** be from the same manufacturer and for the same model respirator. If other parts are substituted, the respirator may not function as intended and the manufacturer's guarantee is not valid.

## 8. PROGRAM EVALUATION

The **Program Administrator** will evaluate this program as needed to ensure it is complete and up to date. This program evaluation must be conducted when/if workplace conditions affecting the use of respiratory protection change. The areas to be re-evaluated would include, whether the respirator program is achieving proper respirator fit, selection, use and maintenance of the respirators.

# APPENDIX

Location of Potentially Hazardous Exposures
Employee Medical Evaluation Questionnaire (Forms A &B)
Physician/Licensed Health Care Professional Recommendation (Form)
Respirator Type and Use Analysis (Form)
Qualitative Fit Testing Instructions
The Rainbow Passage
Respirator Fit Test Results (Form)
Respirator Use Quiz (Form)
NIOSH Guide to the Selection and Use of Particulate Respirators
Voluntary Use Appendix-D (Form)

# Locations of Potentially Hazardous Exposure

The following areas and/or work practices have been reviewed for potentially hazardous air contaminants. It has been determined that all employees assigned to these areas or work practices will follow the companies program for proper respirator use. Should changes in raw material, procedures, ventilation conditions, etc., occur the areas and work practices will be re-evaluated.

| Location and Work Practices | Type of Respiratory Protection Required |
|---|---|
| Body Shop - Grinding/Buffing | Filtering Facepiece (dust mask) **3M** |
| Body Shop - Paint Booth (Isocyanates) | Supplied Air Respirator **3M BATTERY PACK W/HE FILTER** |
| Body Shop - Paint Booth (Non-isocyanate) | Organic Vapor Cartridge<br>R or P 95 Particulate Filter<br>Optional Prefilter **P 95** |
| Body Shop - Paint Prep (Isocyanates) | Supplied Air Respirator **3M BATTERY PACK W/HE FILTER** |
| Body Shop - Paint Prep (non-isocyanate) | Organic Vapor Cartridge<br>R or P Particulate Filter<br>Optional Prefilter **P 95** |

# Employee Medical Evaluation Questionnaire
## Part A Section 1
## (Mandatory)

1. Date: _____
2. Name: _____
3. Age (to the nearest year): _____
4. Sex (circle one): Male / Female
5. Height: _____ ft. _____ in.
6. Weight: _____
7. Job Title: _____
8. Phone number where you can be reached by health care professional who reviews this questionnaire (____) ____ _____
9. Best time to phone you at this number:
10. Has your employer told you how to contact the health care professional who will review this questionnaire? **Yes / No**
11. Check the type/types of respirator you will use:
    a. N, R, or P disposable respirator (filter-mask, non-cartridge type only)
    b. Other type (half or full-facepiece type, powered air purifying, supplies air or self-contained breathing apparatus).
12. Have you worn a respirator? **Yes / No**
    If yes what type/types _____

## Part A Section 2
## (Mandatory)

1. Do you currently smoke tobacco, or have you smoked tobacco in the last month? **Yes / No**
2. Have you ever had any of the following conditions?
    a. Seizures **Yes / No**
    b. Diabetes **Yes / No**
    c. Allergic reactions that interfere with your breathing **Yes / No**
    d. Claustrophobia (fear of closed in places) **Yes / No**
    e. Trouble smelling odors **Yes / No**
3. Have you ever had any of the following pulmonary problems?
    a. Asbestosis **Yes / No**

b. Asthma **Yes / No**
c. Chronic bronchitis **Yes / No**
d. Emphysema **Yes / No**
e. Pneumonia **Yes / No**
f. Tuberculosis **Yes / No**
g. Silicosis **Yes / No**
h. Pneumothorax (collapsed lung) **Yes / No**
i. Lung cancer **Yes / No**
j. Broken Ribs **Yes / No**
k. Any chest injuries or surgeries **Yes / No**
l. Any lung problems you have been told about **Yes / No**

4. Do you currently have any of the following symptoms of pulmonary or lung illness?
   a. Shortness of breath **Yes / No**
   b. Shortness of breath when walking fast on level ground or walking up a slight hill **Yes / No**
   c. Shortness of breath when walking with other people at an ace on level ground **Yes / No**
   d. Have to stop for breath when walking at your own pace on level ground **Yes / No**
   e. Shortness of breath when cleaning or dressing yourself **Yes / No**
   f. Shortness of breath that interferes with your job **Yes / No**
   g. Coughing that produces phlegm (thick sputum) **Yes / No**
   h. Coughing that wakes you early in the morning **Yes / No**
   i. Coughing that occurs mostly when you are lying down **Yes / No**
   j. Coughing up blood in the last month **Yes / No**
   k. Wheezing **Yes / No**
   l. Wheezing that interfere with your job **Yes / No**
   m. Chest pain when you breathe deeply **Yes / No**
   n. Any other symptoms that you think may be related to lung problems **Yes / No**

5. Have you ever had any of the following cardiovascular or heart problem?
   a. Heart attack **Yes / No**
   b. Stroke **Yes / No**
   c. Angina **Yes / No**
   d. Heart failure **Yes / No**
   e. Swelling in your legs or feet (not caused by walking) **Yes / No**
   f. Heart arrhythmia (heart beating irregularly) **Yes / No**
   g. High blood pressure **Yes / No**
   h. Any other heart problems that you have been told about **Yes / No**

6. Have you ever had any of the following cardiovascular or heart problems?
   a. Frequent pain or tightness in your chest **Yes / No**
   b. Pain or tightness in your chest during physical activity **Yes / No**
   c. Pain or tightness in your chest that interfere with your job **Yes / No**
   d. In the past two years have noticed your heart skipping or missing a beat **Yes / No**
   e. Heartburn or indigestion that is not related to eating **Yes / No**
   f. Any symptoms that you think may be related to heart or circulation problems **Yes / No**

7. Do you currently take medication for any of the following problems?
    a. Breathing or lung problems **Yes / No**
    b. Heart problems **Yes / No**
    c. Blood pressure **Yes / No**
    d. Seizures (fits) **Yes / No**

8. If you've used a respirator, have you ever had any of the following problems?
   (if you've never used a respirator, check the following space and go question 9)
    a. Eye irritation **Yes / No**
    b. Skin allergies or rashes **Yes / No**
    c. Anxiety **Yes / No**
    d. General weakness or fatigue **Yes / No**
    e. Any other problem that would interferes with your use of a respirator **Yes / No**

9. Would you like to talk to the health care professional who will review this questionnaire about your answers to any of these questions **Yes / No**

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-facepiece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

10. Have you ever lost vision in either eye (temporarily or permanently) **Yes / No**

11. Do currently have any of the following vision problems?
    a. Wear contact lenses **Yes / No**
    b. Wear eye glasses **Yes / No**
    c. Color blind **Yes / No**
    d. Any other eye or vision problems **Yes / No**

12. Have you ever had an injury to your ears, including a broken ear drum **Yes / No**

13. Do currently have any of the following hearing problems?
    a. Difficulty hearing **Yes / No**
    b. Wear a hearing aid **Yes / No**
    c. Any other hearing or ear problems **Yes / No**

14. Have you ever had a back injury **Yes / No**

15. Do you currently have any of the following musculoskeletal problems?
    a. Weakness in any of your arms, hands and legs **Yes / No**
    b. Back pain **Yes / No**
    c. Difficulty fully moving your arms and legs **Yes / No**
    d. Pain or stiffness when you lean forward or backward at the waist **Yes / No**
    e. Difficulty fully moving your head up or down **Yes / No**
    f. Difficulty fully moving your head side to side **Yes / No**
    g. Difficulty bending at the knees **Yes / No**
    h. Difficulty squatting to the ground **Yes / No**
    i. Difficulty climbing a flight of stairs or a ladder carrying more than 25 lbs. **Yes / No**

j. Any other muscle or skeletal problems that interfere with using a respirator **Yes /No**

## Employee Medical Evaluation Questionnaire
## Part B
## (Non-mandatory)

The questions in this part need only be answered at the discretion of the health care professional

1. In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen? **Yes / No**

If Yes do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when working under these conditions? **Yes / No**

2. At work or at home, have you ever been exposed to hazardous solvents, hazardous air borne chemicals or have you had skin contact with hazardous chemicals? **Yes / No**

If Yes name the chemicals if you know them _____
_____
_____

3. Have you ever worked with any of the materials, or under any of the conditions listed below:
   a. Asbestos? **Yes / No**
   b. Silica (e.g. sandblasting)? **Yes / No**
   c. Tungsten /Cobalt (e.g. grinding or welding this material)? **Yes / No**
   d. Beryllium? **Yes / No**
   e. Aluminum? **Yes / No**
   f. Coal? **Yes / No**
   g. Iron? **Yes / No**
   h. Tin? **Yes / No**
   i. Dusty environment? **Yes / No**
   j. Any hazardous exposure? **Yes / No**

   If Yes describe _____

4. List any second jobs or side business you have _____

5. List your previous occupation _____

6. List your current and previous hobbies _____

7. Have you been in the military service? **Yes / No**

If Yes have you ever been exposed to biological or chemical agents? **Yes / No**

8. Have you ever worked on a HAZMAT team? **Yes / No**

9. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire are you taking any other medications for any reason (including over the counter medications)? **Yes / No** If Yes name the medications _____

10. Will you be using any of the following items with your respirator:
    a. HEPA filters? **Yes / No**
    b. Canisters (for example gas masks)? **Yes / No**
    c. Cartridges? **Yes / No**

11. How often are you expected to use respirators:
    a. For escape only? **Yes / No**
    b. For emergency rescue only? **Yes / No**
    c. Less than 5 hours per week? **Yes / No**
    d. Less than 2 hours per day? **Yes / No**
    e. 2 to 4 hour per day? **Yes / No**
    f. Over 4 hour per day? **Yes / No**

12. During the period you are using the respirator is your work effort:
    a. Light (less than 200 kcal per hour)? **Yes / No**

If Yes how long does this last during an average work shift _____hrs _____mins

Light work effort would be sitting while writing, typing, drafting or performing light assembly or standing operating a drill press (1 to 3 lbs.)

    b. Moderate (200 to 350 kcals per hour)? **Yes / No**

If Yes how long does this last during an average work shift _____hrs_____mins

Moderate work effort is sitting while nailing or filing, driving a truck or bus in urban traffic, transferring a load (about 35 lbs) at trunk level or walking on level surface about 2 mph or pushing a wheelbarrow with a heavy load

    c. Heavy (above 350 kcals per hour)? **Yes / No**

If Yes how long does this last during an average work shift ____hrs_____mins

Heavy work effort is lifting a load of about 50 lbs from the floor to your waist or shoulders, working on a loading dock or climbing stairs with a load about 50 lbs or more.

13. Will you be wearing protective clothing and/or equipment while using your respirator? **Yes / No**

If Yes describe this clothing or equipment _____

14. Will you be working under hot conditions (above 77 deg. F)? **Yes / No**

15. Will you be working under humid conditions? **Yes / No**

16. Describe the work you will be doing while wearing your respirator

_____

17. Describe any special or hazardous conditions you might encounter while using your respirator (for example confined spaces)

    _____

18. Provide the following information if you know for each toxic substance you will be exposed to while using your respirator

Name of toxic substance _____

Estimated maximum exposure level per shift _____

Duration of exposure per shift_____

Name of toxic substance _____

Estimated maximum exposure level per shift _____

Duration of exposure per shift_____

19. Describe any special responsibilities you'll have while using your respirator that may affect the safety or well being of others.

    _____

    _____

# Physician/Licensed Health Care Professional Recommendation

As required by MIOSHA's Respiratory Protection Standard. We are forwarding our employees confidential medical questionnaire for your review and recommendation. Upon completion, please return this recommendation form to us as soon as possible. The completed medical questionnaire and your documented findings are confidential and must remain at your office. The following page contains information regarding the type of respiratory protection used and the work conditions in which the employee is required to wear respiratory protection.

Thank You,

**TONY SALIBA**
**PROGRAM ADMINISTRATOR, LIVONIA CHRYSLER-JEEP**

Based on my evaluation of the medical questionnaire, and use information provided _____(Employee name)

_____ Has no medical conditions, which would be aggravated or interfere with the use of respiratory protection.

_____ Should not be required to wear respiratory protection.

PLHCP's Signature: _____

Date: _____

Comments_____
_____
_____

# Respirator Type and Use Analysis

Employee Name_____

Department & Job Title_____

How long at present position? _____

How often do you wear a respirator? _____

Average hours /day_____ Average hours/week_____

What is the average level of physical exertion while wearing the respirator?
(Examples of the following exertions can be found in Medical Evaluation Questionnaire Part B question 12)

Low_____ Moderate_____ Heavy _____

Type of respirator used _____

Type of cartridge used _____

Type of particulate filter used _____

Is Prefilter used? Yes / No

Types of hazards for which the respiratory protection is being used may include

* Mist or vapor from enamel or lacquer spray painting

* Fumes or smoke from welding

* Dust from body sanding operations

If more detailed information regarding these chemical hazards is needed, Material Safety Data Sheets will be provided.

# Bitrex™ Qualitative Fit Testing Instructions

This fit testing need only be conducted on employees required to wear a positive or negative pressure tight-fitting half or full facepiece respirator. The subject must be tested wearing the same type, model and size respirator that will be using on the job. The respirator used must be an N, R or P series particulate filter respirator. A respirator with an organic vapor cartridge and a N95, R95 or P95 particulate filter can be used, these would be the same respirators used for spray painting.

Prior to conducting the fit testing, the subject should be given an explanation of the fit testing procedures. The test subject should be instructed to don his respirator and to adjust for proper feel and fit. He must then conduct a seal–check to ensure the respirator has been properly adjusted. This seal-check is done by placing the palms of the hands or a latex glove over the inhalation valves, inhaling gently and holding for ten (10) seconds. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

## A. Equipment Required

1. Hood
2. Nebulizer #1 (threshold screening for taste sensitivity)
3. Nebulizer #2 (fit test)
4. Two sets replacement nebulizer inserts
5. Fit test solution
6. Threshold screening solution
7. Respirator with N, R or P series filters (NIOSH 42 CFR 84)

## B. Preparation

1. Unscrew the bottom half of the nebulizer labeled #1 Threshold Screening Solution and pour a small amount (approximately one teaspoonful) of the threshold screening solution into it.

2. Pour the same amount of the fit test solution into the second nebulizer labeled #2 Fit Testing Solution.

## C. Taste Sensitivity Screening

This test is done to ensure that a person being fit tested can detect the taste of Bitrex™ at sufficiently low levels to make the fit test valid. The threshold screening solution is a 100 to 1 dilution of the fit test solution

1. Ensure the test subject does not eat, drink, smoke or chew gum for at least 15 prior to the test.

2. Explain the screening and fit testing procedures to the subject.

3. Instruct subject to put the hood on without a respirator.

4. Position the hood forward so there is about 6 inches between the subjects face and the window. This is especially important for the fit test. It allows free movement of the head when the subject is wearing a respirator and helps ensure even dispersion of the aerosol around the face seal area.

5. Instruct the test subject to breath through their mouth.

6. Using the nebulizer labeled Threshold Screening; inject the aerosol into the hood through the hole in the front of the enclosure. Inject ten (10) squeezes of the bulb, fully collapsing and fully expanding the bulb on each squeeze.

7. Ask the subject if they can detect the bitter taste of the Bitrex™ threshold screening solution.

8. If the subject does not detect the bitter taste, inject an additional ten (10) squeezes into the hood.

9. If the subject still does not detect the bitter taste, inject an additional ten (10) squeezes into the hood for a total of thirty (30) squeezes.

10. If thirty (30) squeezes were inadequate to elicit a response from the subject, this subject cannot be fit tested with Bitrex™. Another fit test method must be used or you may try a saccharin solution.

11. If the subject could detect the bitter taste, the number of squeezes to produce the taste response should be noted I.e. 10, 20, 30 squeezes.

12. Remove the hood. Wait a few minutes to give the subject time to clear the taste from their mouth, before proceeding to the fit test. A drink of water during this time will aid in removing the bitter taste. Have the subject use a paper towel to wipe any residue from around the mouth.

## D. Fit Test

1. Use a respirator with N, R or P series filters. Have the test subject put on and adjust the respirator per the instruction provided with the respirator. Have the subject select the size respirator that provides the best fit. The subject may find a mirror useful in the adjustment process. The subject should wear the respirator at least five (5) minutes before starting the test.

2. Instruct the subject to put on and position the hood as before and breathe through their mouth.

3. Using the nebulizer labeled Fit Test Solution; inject the fit test aerosol into the hood. The same number of squeezes is required as was necessary to elicit a response in the threshold sensitivity-screening test. (i.e. 10, 20, 30 squeezes)

4. To maintain an adequate concentration of aerosol during the test, one half the initial number of squeezes should be injected again every 30 seconds.

5. After injecting the aerosol initially, ask the test subject to perform the following exercises for 60 seconds each:

    - Normal breathing
    - Deep breathing
    - Turning head from side to side, stopping at each end of travel for one breath
    - Moving head up and down, stopping at the up position for one breath
    - Talking or reading the Rainbow Passage (found on page 4)
    - Normal breathing

6. Instruct the subject to indicate if they detect the bitter taste at any time during the test.

7. If the entire test is completed without the subject detecting the bitter taste of the aerosol, the test is passed and the respirator's fit on the individual is judged adequate.

8. At any time during the test, if the subject detects the bitter taste of the aerosol the test is stopped at that point. When this occurs, the fit of the respirator on the subject is judges inadequate.

9. If the test is failed, before retesting the subject, a 15-minute waiting period must be observed and the threshold sensitivity-screening test must be performed again. This repeat test must be conducted with the same model respirator.

10. If the second test fails, repeat test with another size or model respirator.

11. Document results of the fit test for each employee.

## E. Cleaning of Nebulizers and Hood

Immediately after completing the test, pour the unused solutions back into their respective bottles. Rinse the nebulizers with warm water to prevent clogging. Wipe
Inside of hood with a damp cloth or paper towel to remove any deposited test solution.

**Rainbow Passage found on following page**

# The Rainbow Passage

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

# RESPIRATOR FIT TEST RESULTS
## BITREX™
## (Qualitative)

Employee Name _____

Department/Job _____

Date of Test _____

Make of respirator used _____

Model of respirator used _____

Size of respirator used _____

Type of cartridge used _____

Type of particulate filter used _____

Number of nebulizer squeezes needed to elicit response during taste sensitivity screening _____

Taste Sensitivity Screening **Pass**_____ **Fail** _____

Number of nebulizer squeezes used during fit test (should be same as above) _____

Fit Test **Pass** _____ **Fail** _____

Testing Conducted By _____

**Fit test results records need only be retained until next fit test is administered**

# Respirator Use
# Quiz

1. A filtering facepiece (dust mask) is classified as a respirator, and therefore employees using them must be fit tested and trained in their use?

   True False

2. A respirator fitted with a multi-function cartridge can protect against all known chemical hazards?

   True False

3. Respirators must be cleaned and inspected?

a. Monthly
b. Weekly
c. Before you use it the first time
d. Before each use

4. Which of the following must be done annually?

a. Medical evaluations
b. Replacing respirator cartridges
c. Fit testing
d. Cleaning of respirator

5. To ensure your respirator is adjusted properly each time you wear it you must conduct a seal-check?

   True False

6. Your employers Respiratory Protection Program must be available for review by?

a. MIOSHA
b. Sate Police
c. MDOT
d. All employees

7. If your medical evaluation indicates that you can not perform your job function safely while wearing a negative pressure respirator, your employer must?

a. Provide you a job that does not require the wearing of a respirator
b. Provide you with air supplied positive pressure respiratory protection
c. Allow you to perform your job without respiratory protection
d. None of the above

8. An acceptable respirator must be certified by?

a. UAW
b. NAACP
c. DEQ
d. OSHA
e. NIOSH

9. In an emergency situation (i.e. respirator malfunction) you would simply remove the respirator and exit the area of exposure?

   True False

10. To clean an organic vapor cartridge for reuses it?

a. Must be scrubbed with paint thinner
b. Must be rinsed with clean water
c. Must never be cleaned or reused
d. Must be vacuumed thoroughly

Employee Name _____ Date _____

# Respirator Use Quiz
## Answers

1. False
2. False
3. d
4. c
5. True
6. a & d
7. b
8. e
9. True
10. c

# NIOSH Guide to the Selection And Use Of Particulate Respirators Certified Under 42 CFR 84

## ***Summary For Respirator Users***

NIOSH has developed a new set of regulations in 42 CFR 84 (also referred to as Part 84) for testing and certifying non-powered air-purifying, particulate-filter respirators.
The new Part 84 respirators have passed a more demanding certification test than the old respirators (e.g., dust and mist [DM], dust, fume and mist [DFM], spray paint, pesticide, etc.) certified under 30 CFR 11 (also referred to as Part 11).

The new Part 84 regulation provides for nine classes of filters (three levels of filter efficiency, each with three categories of resistance to filter efficiency degradation). The three levels of filter efficiency are 95%, 99% and 99.97%. The three categories of resistance to filter efficiency degradation are labeled N (for Not resistant to oil) R (for Resistant to oil) and P (for oil Proof). The class of filter will be clearly marked on the filter, filter package or the respirator box. For example, a filter marked N95 would mean an
N-series filter that is at least 95% efficient.

The new class of non-power particulate respirators requires new decision logic for selection of the proper respirator. The selection process for using the new particulate classification is outlined as follows:

1. The selection of N, R or P series filters depends on the presence or absence of oil particles as follows

    - If no oil particles are present in the work environment, use a filter of any series.

    - If oil particles (e.g. lubricant, cutting fluids, glycerine, etc.) are present, use an R or P series filter. NOTE N-series filters cannot be used if oil particles are present.

    - If oil particles are present and filter is to be used for more than one work shift use only a P-series filter.

2. Selection of filter efficiency (95%, 99% or 99.97%) depends on how much filter leakage can be accepted.

3. The choice of facepiece depends on the level of protection needed, that is the assigned protection factor (APF) needed.

Following the requirements of Part 84 for the spraying of lacquer or enamel paints the following guide for respirator selection is recommended:

- <u>In a work setting free of oil aerosols</u>, a combination respirator consisting of an organic vapor cartridge and an N95 particulate filter with an optional prefilter (to prevent rapid clogging by paint aerosols) would be minimally protective.

- <u>In a work setting that may contain or does contain oil aerosols</u>, a combination respirator consisting of an organic vapor cartridge and an R95 or P95 particulate filter with a prefilter (to prevent rapid clogging by aerosol paint would be minimally protective.

# Appendix -D
# (Mandatory)

## A copy of this appendix must be give to each voluntary use respirator user

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator
Itself can become a hazard to the worker. Sometimes workers may wear respirators to avoid exposures to hazards, even if the amount of the hazardous substance does not exceed the limits set by MIOSHA or OSHA standards. If your employer provides respirators for your voluntary use, or you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

## You Should Do The Following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and warnings regarding the respirators limitations.

2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or the packaging. It will tell you what the respirator is designed for and how much it will protect you.

3. Do not wear your respirator in atmospheres containing contaminants against which your respirator is not designed to protect. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small particles of fumes or smoke.

4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

# LIVONIA CHRYSLER-JEEP

## WRITTEN HAZARD COMMUNICATION PROGRAM

## GENERAL INFORMATION:

In order to comply with the Occupational Health & Safety Hazard Communication Standard the following program has been established for the employees of **LIVONIA CHRYSLER-JEEP.**

The program will be available for review by all employees in the **CONFERENCE ROOM.**

## HAZARD DETERMINATION

**LIVONIA CHRYSLER-JEEP** will be relying on Material Safety Data sheets from suppliers to meet the hazard determination requirements of the act.

## CONTAINER LABELING

**EACH DEPARTMENT MANAGER** will be responsible for seeing that all incoming containers are properly labeled.

All incoming container labels shall be checked for:

a. Identity of the hazardous chemical.
b. Appropriate hazard warnings.
c. Name and address of the chemical manufacturer, importer or other responsible party.

**EACH DEPARTMENT MANAGER** shall be responsible for ensuring all portable containers are labeled with the following information.

a. Identity of the hazardous chemical.
b. Appropriate hazard warnings.

The label will be either an extra copy of the original manufacturer's label or a generic label, which has a block for the identity and blocks for the hazard warning.

Piping systems shall be identified at access points and every 10 feet where piping is 10 feet or closer to employee contact. The method of identification will be: **STICKERS.**

## MATERIAL SAFETY DATA SHEETS (MSDS)

**THE SAFETY COORDINATOR** will be responsible for compiling the master MSDS file. These files will be kept in the **CONFERENCE ROOM.**

MSDS's received from suppliers will be checked for completeness by the **SERVICE/BODY SHOP MANAGERS**.

Copies of MSDS's applicable to each department in detached building will be kept in that department and access by employees can be gained by contacting their manager.

Notification of new or revised MSDS's will be accomplished by means of posting within 5 days of receipt. The posting will indicate:

a. New or revised title
b. Date of receipt
c. Posting date
d. Location of the new or revised MSDS

## EMPLOYEE INFORMATION AND TRAINING

**JOHN BELANGER** shall coordinate and maintain records of all Right to Know training.

All employees will receive training regarding Hazardous Materials used in their department. All new employees will be likewise trained before starting work.

The training will have information regarding:

a. An overview of the requirements contained in the Hazard Communication Standard.
b. Chemicals present in their workplace operations.
c. Location and availability of our written program.
d. Physical and health effects of the hazardous chemicals.
e. Methods of observation techniques used to determine the presents or release of hazardous chemicals in the work area.
f. How to lessen or prevent exposure to these hazardous chemicals through the usage of control/work practices and personal protective equipment.
g. Steps the company has taken to lessen or prevent exposure to these chemicals.
h. Emergency procedures to follow if they are exposed to these chemicals.
i. How to read labels and review MSDS's to obtain appropriate hazard information.

After attending training class, each employee will sign a form to verify that he/she has attended the training, has received written materials and understands this company's policies on Hazard Communication.

Prior to a new hazardous chemical being introduced, each employee will be given information as outlined above. **THE SERVICE/BODY SHOP MANAGER** is responsible to ensure that the MSDS's on the new chemical(s) list are available.

## HAZARDOUS NON-ROUTINE TASKS

Periodically, employees are required to perform hazardous non-routine tasks. Prior to starting work on such projects, each affected employee will be given information by their manager about hazardous chemicals to which they may be exposed to during such activity.

This information will include:

a. Specific chemical hazards.
b. Protective/safety measures the employee can take.
c. Measures the company has taken to lessen the hazards including ventilation, respirators, presence of another employee and emergency procedures.

Periodic safety meetings will be held to ensure all employees retain prior training and information provided by management.

Notices will be posted on the employee bulletin boards that provide the location of the written hazard communication program and MSDS's.

It is policy that no employee will begin work in a confined space or on any non-routine task without first receiving safety training from his or her manager.

## INFORMING CONTRACTORS

It is the responsibility of the **LIVONIA CHRYSLER-JEEP** to provide contractors and their employees with the following information:

a. Hazardous chemicals, which they may be exposed to while on the job, site.
b. Measures the employee may take to lessen their risk.
c. MSDS's for all hazardous chemicals are on file in the technicians' library.
d. Procedures to follow if they are exposed.

**LIVONIA CHRYSLER-JEEP** will coordinate with the supervisor to ensure that contractor's employees are given this information prior to entering the work site.

## LIST OF HAZARDOUS CHEMICALS

A copy of all **MISCELLANEOUS HAZARDOUS CHEMICALS** used can be found on the **MADSIF CD-ROM LOCATED IN THE CONFERENCE ROOM.**

Using and reviewing **CHRYSLER MSDS'S** can be found **ON THE PARTS DEPARTMENT COMPUTER.**

Using and reviewing **PAINT AND PAINT RELATED** can be found **IN THE PAINT ROOM ON THE PAINT MIX COMPUTER.**

***AN EMPLOYEE WHO NEEDS ASSISTANCE IN ACCESSING A MSDS CAN CONTACT THEIR MANAGER.***

# LIVONIA CHRYSLER-JEEP

## Control of Hazardous Energy
## (LOCKOUT/TAGOUT)

It is the policy of this **LIVONIA CHRYSLER-JEEP** that all equipment be locked out during servicing and/or maintenance work to protect against accidental or inadvertent activation that could result in personnel injury or equipment damage. In addition to disconnecting the power source, it is also required that all residual pressures be relieved and energizing lines closed (secured) prior to and during such work.

### A. PURPOSE

This policy establishes the minimum requirements for the lockout of energy sources whenever maintenance or servicing work is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources, and locked out before employees perform any service or maintenance work where the unexpected/unintended energization or start-up of the machine or equipment, or release of stored energy could cause injury.

### B. RESPONSIBILITY

All employees (authorized, affected, or other) are required to comply with requirements of lockout.

The authorized employee (person performing the work) is required to perform the lockout following this procedure.

All employees, upon observing a machine or piece of equipment is lockout for servicing or maintenance work, shall not attempt to start, energize or use that machine or equipment.

Employees shall consult with their manager whenever there are any questions regarding energy control procedures or methods.

Managers shall enforce the energy control procedure including the use of corrective disciplinary action when necessary.

## C. APPLICATION

1. Obtaining a Lock and Identification Label

Power Lockout safety locks will be kept by the manager and issued to authorized employees as needed. Power Lockout safety locks will be clearly identified as such and are to be used exclusively for power lockout operations. Power Lockout safety locks will be clearly identified, individual numbered, keyed padlocks. During the lockout operation one key will be in the possession of the employee using the safety lockout lock. The other key or master key will be maintained by the manager for emergency lock removal as established in the energy control procedure. Lock/locks shall be return to the manager upon completion of work requiring power lockout.

Power lockout safety locks are for the personal protection of employees and are to be used solely for the control of hazardous energy sources (power lockout)

2. What to Lockout

During servicing or maintenance, a machine utilizing any mechanical power source such as electrical, pneumatic, steam, hydraulic, and/or air must be lockout when the unexpected energization or startup of the machine or equipment or release of stored energy could cause injury to employees. The lockout must render the machine or equipment inoperative and immovable.

3. When Lockout Methods are Required

Equipment Cleaning or Jam-clearing Task; When a normally moving piece of equipment is stopped for cleaning, clearing, or adjustment during which startup could cause injury, lockout is used.

Equipment Repair; Whenever a repair is being performed on or near equipment where there is a possibility of injury as a result of starting of the equipment, lockout shall be used. This includes any and all equipment from which a guard or other safety device has been removed.

Installation Tasks; Frequently during installation, either part or all of the components making up the installation can be operated before the installation is compete. If needed for testing, precautions must be taken to prevent injury to personnel during the test periods and the equipment again locked out when the test is completed or interrupted.

Electrical Repair Task; Whenever any work other than testing is to be performed on an electrical circuit, the wiring involved must be deactivated and locked out so that it cannot be reactivated during work. On machines or equipment this is accomplished by locking out the breaker box or disconnect box.

4. When Lockout Methods are not Required

Minor tool changes (for example changing a drill bit) are not covered when a stop button is used to control unexpected motion during the toll change or minor adjustment and when the start button is both visible and under the employees immediate control.

Other minor servicing activities that take place during normal production operations are not covered by this standard if they are routine, repetitive, and integral to the use of the equipment for production and if work is performed using alternative protective measures that provide effective employee protection.

Cord and plug connected equipment must unplugged and under the exclusive control of the employee performing the service or maintenance work. The plug must physically be in the possession of the employee, or in arm's reach and in line of sight of the employee. Lockout devices are available to lockout the plug when disconnected.

Repair, trouble shooting and set-up adjustments must be performed on energized equipment ONLY when absolutely necessary to leave the machine energized.

## D. Procedures

The essential part of lockout of any equipment or lines is to ensure that the equipment can not be started or source lines be opened by unauthorized personnel during service and maintenance work. If you have questions relating to the appropriate procedures to be followed, ask your manager prior to commencing work.

1. Application of Lockout Control

Preparing for Shutdown; Personal Power Lockout safety locks and keys will be obtained from the manager by the authorized employee. Authorized employees shall review the written lockout procedures to have complete understanding of the method or means to control the machine or equipment energy.

Notification of Employees; Affected employees shall be notified by the authorized employee that the machine or equipment is going to be locked out.

Machine or Equipment Shutdown; The machine or equipment shall be turned off or shut down using the energy control procedures established for the machine or equipment.

Machine or Equipment Isolation; All energy isolation controls that are needed to control the energy of the machine or equipment shall be physically located and secured in such a manner as to isolate the machine or equipment from the energy source. A Zero Energy State Must Be Achieved.

Lockout Device Application; A power lockout safety lock shall be affixed in such a manner as to hold the energy isolation device in a safe or off position.

Notification of Affected Employees; Affected employees shall be notified by the authorized employee that the machine or equipment is being locked out. This shall be done verbally and by placing a tag at the lockout device.

Verification of Isolation; Prior to starting work on a machine or equipment that has been locked out the authorized employee shall verify that the isolation and de-energization as been accomplished. This is done by attempting to cycle or start the machine or equipment the have been locked out.

Begin Work Activity; Work activity shall begin once the authorized employee has verified that the current control of hazardous energy has been effective.

2. Lock Removal

Each lockout safety lock shall be removed only by the authorized employee who was performing the work and had installed the lockout lock in first place. (For emergency removal see section 3 below)

3. Emergency Lock Removal

The manager is the only other person authorized to removal a safety lock. This can only be done following attempts to contact the authorized employee to whom the lock was issued and after ensuring all conditions to re-energy the machine or equipment are safe and all affected employees have been notified.

4. Lockout Devices

Electrical Lockout Devices or Breaker Lockout Devices ~ The switch lever must be padlocked in the off position using a shackle and/or padlock.

Valve Lockout Devices; Can be locked out be using a padlock, a cable and lock, or a valve handle lockout device.

Line Blinds or Pancakes; to isolate the flow of liquids or gases in piping systems.

Multiple Locks (gang hasp); When more than one employee will be performing service or maintenance on a machine or equipment at the same time.

5. Employee Training

All employees shall be informed of this Lockout Policy. Authorized employees (employee performing the service or repair) shall be informed of procedures for issuance and proper use of Safety Locks/Tags and other needed devices

6. Enforcement

Due to the seriousness of this policy and the degree of injury that may be caused by not following this policy, failure by any employee to comply may result in immediate discharge.

# LIVONIA CHRYSLER-JEEP

## Waste Management/Control Policy

**A. OBJECTIVE**

Safe guard employees and the environment from the adverse effects of improper handing, storage and disposal of used or spent products or chemicals. Dealerships use many products that when they are spent or are no longer usable becomes Regulated Waste. These various Regulated Waste products will be classified by the Michigan Department of Environmental Quality (DEQ) as Hazardous Waste, Liquid Industrial Waste or as Universal Waste. For the safety and health of dealership employees and the protection of the environment, each of this Regulated Waste must be handled, stored and disposed of in accordance with DEQ requirements.

**B. SCOPE**

All applicable employees

**C. REFERENCES**

Environmental Protection Agency (EPA) and Department of Environmental Quality Regulations (MIDEQ).

**D. RESPONSIBILITIES**

1. The Hazardous Waste Emergency Coordinator shall have the responsibility to see that all applicable employees are trained.
2. The Hazardous Waste Emergency Coordinator shall ensure that all waste Manifesting requirements are met.
3. The Hazardous Waste Emergency Coordinator shall ensure that all Hazardous Waste storage areas are inspected weekly and appropriate records maintained.
4. Applicable department managers shall ensure that Hazardous Waste containers are properly stored, closed and labeled.
5. All employee are encouraged to reduce waste and recycle when ever practical and possible
6. All employees are directed to close liquid waste containers when not in use and not to commingle (mix) liquid waste.

***Note:***
***The guidelines list on the following pages are to be adhered to by all employees when handling, storing or disposing of any regulated waste generated by this dealership***

The following products/chemicals are commonly used in dealerships, and when spent or no longer usable are considered regulated waste. These products/chemicals when disposed of will be classified as one of the following:

**Hazardous Waste**
**Liquid Industrial waste**
**Universal Waste**

Therefore, for your safety, the safety of fellow employees and the protection of the environment it is important to understand the safe/proper handling, storage disposal or recycling of each

**Unusable Paint & Used Paint Thinner (can be commingled-mixed)**

- Store in metal drums, no larger than 55 gallons
- Accumulate no more than two 55-gallons drums
- Drums must be stored on an impervious surface away from floor drains
- Drum being filled should be on a spill pallet or in a drip pan
- Ensure drums are properly labeled
- Drums must be closed when not in use
- Drum must be stored away from heat or open flames (flammable liquid) (Storage area should have signage warning of flammability)
- Drums being filled must be grounded (flammable liquid)

*NOTE: these products are a strictly regulated HAZARDOUS WASTE, can only be disposed of by a licensed disposal contractor, and must be MANIFESTED*

**Used Parts Washer Solvents**

- Generally dealerships lease their parts washers and have service contracts that handle transport and disposal of hazardous waste generated by this equipment
- Ensure no other liquid waste are disposed of in the parts washers

**Used Paint Filters**

- Should not be stored, dispose of at the time of removal (must be dry)
- Dispose of in a licensed type II solid waste landfill (can not contain free flowing liquids)

**Used Crankcase or Hydraulic Oils**

- Considered an liquid industrial waste if recycled or burned as heating fuel on site
- Must be stored on an impervious surface, away from floor drains
- Can be stored indoors in tanks of not more than 660-gallons without secondary containment
- Any outdoor storage of tanks or drums must be protected from the elements and have secondary containment
- Tanks or drums must be kept closed when not in use
- Tanks or drums must be labeled USED OIL or RECYCLABLE WASTE OIL
- Must be manifested if shipped off site for recycling

*NOTE: Must never be commingled (mixed) with other liquid waste*

**Used Oil Filters**

- May be classified as hazardous waste if TERNE plated (coated with lead-tin alloy)
- If filter is hazardous waste, or you are unsure, it must be hot-drained and recycled as scrap metal (check with your scrap metal recycler if acceptable)
- Filters that are tested and found to be non-hazardous and are certified non-terne plated, must be hot-drained and can be disposed of in a licensed type II solid waste landfill
- Drain and/or crush and recycle if at all possible

**Used Oily Rags/Paper Wipes**

- Generally these products are cleaned/recycled by a laundry company
- If they contain no free flowing liquids, they can be disposed of in a licensed type II solid waste landfill

**Used/Spent Solvent Degreasers**

- Generally these products are contained in aerosol cans
- Aerosol cans are not classified as hazardous waste if empty at time of disposal (empty, meaning pressure in the can approaches atmospheric pressure)
- Dispose of in a licensed type II solid waste landfill, recycle if possible

**Used Radiator Cleaning Solvents**

- Generally, amounts of these solutions are small and can be recycled with your antifreeze
- Larger quantities must be recycled or disposed of as hazardous waste

**Used Antifreeze**

- Classified as an liquid industrial waste if properly recycled
- Must never be commingled (mixed) with other liquid waste
- Store in either metal or plastic containers
- Store on an impervious surface, away from floor drains
- Storage containers must be closed when not in use
- Storage containers must labeled/marked USED or SPENT ANTIFREEZE
- May be recycled on site or transported/recycled by a licensed liquid industrial waste contractor (manifested)

**Used Batteries**

- Lead acid batteries must be recycled
- Store on an impervious surface away from floor drains
- Protect from the elements (freezing or direct sun light)
- Store in a well ventilated area, away from sparks or open flames
- Must not be stacked
- Damaged or leaking batteries must be stored in a suitable container

**Used Fuel Filters**

- Generally not classified as hazardous waste
- Must be properly and completely drained of free flowing liquids
- Dispose of in a licensed type II solid waste landfill

**Used Floor Cleaning Sorbents or Pads**

- Generally not classified as hazardous waste
- Must contain no free flowing liquids
- Dispose of in a licensed type II solid waste landfill

**Used Electronic Equipment (computers, monitor, ballasts, fluorescent/mercury bulbs)**

- Classified as Universal Waste
- Must be recycled, if not recycled are considered hazardous waste
- Must be stored properly to protect from breakage
- Storage container must be marked UNIVERSAL WASTE or USED/WASTE whatever
- Must be manifested by disposal/recycle contractor
- Can be stored for not more than one year

**Used/Scrap Tires**

- Considered a regulated waste
- Accumulation of scrap tire must be kept to a minimum
- Must be transported to a collection site by a REGISTERED scrap tire hauler
- Scrap tire removal/disposal must manifested

# Recap

- ✓ **Reduce quantity of all waste generated/recycle when ever possible**
- ✓ **Do not commingle (mix) waste**
- ✓ **Place all waste in compatible containers**
- ✓ **Store all waste containers in approved area**
- ✓ **Keep all waste containers closed when not in use**
- ✓ **Ensure all waste containers are properly labeled/marked**
- ✓ **Inspect waste storage areas on a weekly bases (record)**

# HAZARDOUS WASTE

# EMERGENCY

| | |
|---|---|
| JOHN BELANGER, SAFETY COORDINATOR<br>EMERGENCY COORDINATOR | EXTENSION: 1263<br>(313) 418-2946 |
| JACK HOLDEN<br>ALTERNATE COORDINATOR | EXTENSION: 1244<br>(313) 218-7118 |
| TONY SALIBA, BODY SHOP MANAGER<br>ALTERNATE COORDINATOR | EXTENSION: 1280<br>(734) 525-4989 |

## FIRE EXTINGUISHER LOCATIONS

*REFER TO EMERGENCY EQUIPMENT DIAGRAM*

## SPILL CONTROL EQUIPMENT LOCATION

*REFER TO EMERGENCY EQUIPMENT DIAGRAM*

**POLICE ~ FIRE ~ EMERGENCY MEDICAL SERVICES: ..... 911**

**NATIONAL RESPONSE CENTER: ..... 1-800-424-8802**

**CEMTREC: ..... 1-800-424-9300**

# LIVONIA CHRYSLER-JEEP

## ASBESTOS CONTROL WORK PRACTICES POLICY

**A) OBJECTIVE**

Eliminate asbestos overexposure during brake or clutch inspection or repair.

**B) SCOPE**

All applicable dealership employees

**C) REFERENCES**

Federal, State and Local Standards

**D) RESPONSIBILITY**

Department Managers shall ensure all applicable employees are informed of and comply with the asbestos control work practice contained in this policy.

**E) PROCEDURE**

The standard for MIOSHA's Asbestos Standard allows for several acceptable methods of controlling asbestos during brake or clutch servicing. The two most commonly used methods and their acceptable work practice controls are:

### Low Pressure Wet Cleaning Method

1. A catch basin shall be placed under the brake assembly, positioned to avoid splashes and spills.
2. The reservoir shall contain water containing an organic solvent or wetting agent. The flow of liquid shall be controlled such that the brake assembly is gently flooded to prevent the asbestos containing dust from becoming airborne.
3. The aqueous solution shall be allowed to flow freely between the brake drum and brake support before the drum is removed.
4. After removing the brake drum, the wheel hub and back of the brake assembly shall be thoroughly wetted to suppress dust.
5. The brake support plate, brake shoes and brake components used to attach the shoes shall be thoroughly washed before removing the old shoes.

**ASBESTOS CONTROL POLICY CONTINUED:**

6. In systems using filters, the filters, when full shall first be wetted with a fine mist of water, then removed and placed in an impervious plastic bag.
7. Impermeable container labeled "Danger Contains Asbestos Fibers Avoid Creating Dust Cancer and Lung Disease Hazard"; this sealed container can then be disposed of as solid waste materials.
8. Any spills of asbestos-containing aqueous solution or any asbestos containing waste materials shall be cleaned up immediately and disposed of in sealed/closed impermeable bags or containers.

**THE USE OF DRY BRUSHING OR COMPRESSED AIR DURING LOW-PRESSURE WET CLEANING OPERATIONS IS PROHIBITED.**

## Equivalent Method ~ Aerosol Spray Brake Cleaning

This work practice control method has been accepted, provided all applicable procedures listed for the Low Pressure Wet Cleaning Method is followed.

# LIVONIA CHRYSLER-JEEP

## CARBON MONOXIDE CONTROL WORK PRACTICES POLICY

### A) OBJECTIVE

To eliminate or control Carbon Monoxide (CO) exposure during motor vehicle service operations.

### B) SCOPE

All applicable dealership employees

### C) REFERENCES

Federal, State and Local Standards

### D) RESPONSIBILITY

Department Managers shall ensure all applicable employees are informed of and comply with the Carbon Monoxide control work contained in this policy.

### E) PROCEDURE

Carbon Monoxide is generated due to incomplete oxidation of carbon and carbonaceous fuels. Common sources of CO at dealerships may be fuel-power vehicle, poorly ventilated or malfunctioning heating furnaces and welding. To control overexposure to CO, the work practices list below should be followed.

1. Vehicle engines should be run the minimal amount possible while in any enclosed area.
2. Exhaust hoses shall be used whenever vehicle engines must be run in an enclosed area.
3. Exhaust ventilation systems should be cleaned, inspected and tested annually. Copies of the testing can be found in this manual.
4. All fuel fired furnace and water heater flues and heat exchangers should be inspected periodically.
5. All welding should be done in a well - ventilated area or mechanical ventilation should be used.

**CO POLICY CONTINUED:**

## F) Permissible Exposure Limits

35 parts of CO per million parts of air (PPM). Ceiling limit is 200 PPM, which can cause headaches and nausea after several hours and can become dangerous. Air concentrations above 1200ppm can cause rapid collapse and possibly death.

## G) Toxic Effects

CO poisoning occurs by inhalation of Carbon Monoxide which binds tightly to hemoglobin in blood to form carboxyhemoglobin, (COHb) thereby reducing the oxygen-carrying capacity of the blood. Exposures can be determined by measuring concentrations of CO in air or COHb in blood. CO does not accumulate in the body. Once an exposure ends, the lungs exhale CO and COHb reverts back to oxyhemoglobin, the form of hemoglobin that can carry oxygen. COHb can occur in normal humans. A COHb level in blood of 1% to 3% would be normal in a non-smoker. Heavy smokers may have levels of 5% to 10%.

The symptoms resulting from CO exposure depend on concentrations in air and the duration of exposure. Early symptoms of CO exposure are nonspecific: headache, dizziness, weakness, nausea, visual disturbances and confusion. The poor warning properties of CO may allow exposure to continue. Improvement of symptoms upon exposure to fresh air and the absence of a sore throat or fever can distinguish CO poisoning from the flu. COHb levels in the blood of 10-20% result in tightness around the forehead, possible slight headache and an increase in size of blood vessels at the skin. COHb levels of 20-30% can result in headache and throbbing in the temples. COHb levels of 30-40% can result in severe headaches, weakness, dizziness, and dimness of vision, nausea, vomiting and collapse. COHb levels of 50-60% result in fainting increased respiration and pulse, coma with intermittent convulsions and irregular heart action and respiration. COHb levels of 60-70% can result in coma and possible death.

# LIVONIA CHRYSLER-JEEP

## CONFINED SPACE ENTRY
## Determination & Policy

We have surveyed the premises of our dealership for confined spaces and have determined that we have **10** at this dealership location**.** The confined spaces are manholes/sewers **7 (permit entry) and 3 (non permit entry)** small entrances in paint booth exhaust stacks, located in our building and parking lot areas. There will be no entrance to permitted areas. **Livonia Chrysler-Jeep** employees have never and will never enter any confined spaces and are been trained not to enter permit required confined spaces. **Livonia Chrysler-Jeep** will fulfill its responsibility as a host employer, which is as follows:

- Inform the contractor that the workplace contains permit spaces and that permit space entry is allowed only through compliance with a permit space program meeting the following requirements.
    - Apprise the contractor of the elements, including the hazards identified and the hose employer's experience with the space, that make the space in question a permit space;
    - Apprise the contractor of any precautions or procedures that the host employer has implemented for the protection of employees in or near permit spaces where contractor personnel will be working;
    - Coordinate entry operations with the contractor, when both hose employer personnel and contractor personnel will be working in or near permit spaces as required by paragraph (d)(11) of this section; and
    - Debrief the contractor at the conclusion of the entry operations regarding the permit space program followed and regarding any hazards confronted or created in permit spaces during entry operations.

**Livonia Chrysler-Jeep** shall delegate responsibility to an outside representative who is aware and educated in the proper rules and regulations concerning confined spaces.

# CONFINED SPACES
## INFORMATION & AWARENESS

Many people think that a confined space is just a small, enclosed area, but it's actually a lot more than that. A confined space is a space that:

1. Is large enough and so configured that an employee can bodily enter and perform assigned work; and
2. Has limited or restricted means of entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults and pits are spaces that may have limited means of entry.); and
3. Is not designed for continuous employee occupancy

We are required to perform an evaluation of our dealership to determine if there are any confined spaces and we have done so. It was determined that we have **10** throughout our dealership.

- **7** of these are in the form of manholes/sewers and are permit entry spaces.
  *DO NOT ENTER THESE or TRY TO ENTER THESE*

- **3** of these are small entryways (that an employee can enter) in our exhaust stacks on our paint booths. These are non-permit spaces.
  *DO NOT ENTER THESE*

**PERMIT SPACE:** means a confined space that has one or more of the following characteristics:

1. Contains or has the potential to contain a hazardous atmosphere;
2. Contains a material that has the potential for engulfing an employee
3. Has an internal configuration such that an employee could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or (hopper)
4. Contains any other recognized serious safety or health hazards

**NON-PERMIT SPACE:** Means a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

**RECAP:** Confined spaces are extremely hazardous; therefore, precautions MUST be taken in order to work safely in these areas. The law requires that certain steps be taken to protect employees who enter these spaces. That is why we are informing you about these spaces and ask you to NEVER enter any confined space unless you have proper authorization and are fully trained to do so.

# LIVONIA CHRYSLER-JEEP

## EMPLOYEE SAFETY TRAINING RECORD

**SUBJECT**

_____

| *DATE* | *NAME* | *DEPARTMENT* | *SIGNATURE* | *TRAINER* |
|---|---|---|---|---|

# DEPARTMENT OF CONSUMER & INDUSTRY SERVICES
# DIRECTOR'S OFFICE
# GENERAL INDUSTRY SAFETY STANDARDS

Filed with the Secretary of State on December 12, 1974 (as amended September 30, 1977) (as amended May 31, 1990) (**as amended, August 2, 1993**)

These rules take affect 15 days after filing with the Secretary of State

(By authority conferred on the director of the department of consumer and industry services by sections 16 and 21 of Act No. 154 of the Public Acts of 1974, as amended, and Executive Reorganization Order No. 1996-2, being §§408.1016, 408.1021, and 445.2001 of the Michigan Compiled Laws)

R 408.17235 of the Michigan Administrative Code, appearing on pages 826 and 827 of the 1990 Annual Supplement to the 1979 Michigan Administrative Code, is amended to read as follows:

Visit our website at: www.michigan.gov/mioshastandards

# PART 72. AUTOMOTIVE SERVICE OPERATIONS

## TABLE OF CONTENTS



## GENERAL PROVISIONS

**R 408.17201. Scope.**

**Rule 7201.**This part sets forth rules for the safe maintenance and operation of equipment in, around, and about places of employment where vehicles or tire and wheel assemblies are serviced, repaired, and salvaged. Manufacturing, research, and development facilities are excluded.

**R 408.17204. Definitions; A to E.**

**Rule 7204.**(1) "Automotive lift" means a vehicle lifting device, the purpose of which is to raise an entire vehicle to provide accessibility for convenient under-chassis service.

(2) "Class I flammable liquid" means those having a flash point below 100 degrees Fahrenheit. Representative examples of a Class I liquid are ether, gasoline, lacquer thinner, acetone and methyl acetate.

(3) "Combustible" means to be readily ignitable and easily burnable.

(4) "Extractor" means a machine, except a vacuum cleaner, used to remove moisture from fabrics.

**R 408.17205. Definitions; F to L.**

**Rule 7205.**(1) "Flammable liquid" means a liquid having a flash point of less than 100 degrees Fahrenheit and having a vapor pressure of not more than 40 pounds per square inch (absolute) at 100 degrees Fahrenheit.

(2) "Jack" means a portable mechanical or hydraulic device for lifting or lowering a load by application of a force.

(3) "Lockout" means to lock by key or padlock.

**R 408.17206. Definitions; P to S.**

**Rule 7206.**(1) "Pinch point" means a point at which it is possible to be caught between the moving parts of a machine, between moving and stationary parts of a machine, or between a moving object and a stationary object.

(2) "Restraining device" means a mechanical apparatus, such as a safety cage, rack, or safety bar arrangement or other machinery or equipment, that will constrain all rim wheel components following their release during an explosive separation of the wheel components.

(3) "Rim manual" means a publication containing instructions from the manufacturer or other qualified organization for the correct mounting and demounting, maintenance, and safety precautions peculiar to the type of wheel being serviced.

(4) "Safeguard" means a device or part of a product designed for the protection of equipment or an employee.

(5) "Safety factor" means the ratio of the breaking strength of a piece of material or object to the maximum designed load or stress applied when in use.

(6) "Service" means to adjust, install, repair, replace, wash, wax, change or exchange, polish, sand, grind, refinish, paint, or coat.

(7) "Single-piece rim wheel," for purposes of this part, means a vehicle wheel or rim which consists of 1 part, which is designed to hold the tire on the rim when the tire is inflated, and which is intended for use with tires designed for an inflation pressure of more than 44 psig.

**R 408.17207. Definitions; V to Y.**

**Rule 7207.**(1) "Vehicle" means a powered conveyance operating on 2 or more wheels, including, but not limited to, an automobile, truck or trailer.

(2) "Wet operations" means those operations which involve the drainage, splash or running of liquids such as, but not limited to, those found in car washing or dipping of radiators in solutions.

(3) "Yield point" means the point where material begins to take a permanent deformation.

**R 408.17211. Employer responsibility.**

**Rule 7211.**An employer shall:

(a) Provide training to an employee as to the hazards, safe operations of the assigned job and applicable rules of this part.

(b) Assure that job required tools, equipment and the work area are maintained in a manner free of recognized hazards which would cause an injury.

(c) Prohibit smoking, flames and sparks within 15 feet of where Class I flammable liquids are dispensed or used, unless separated by an approved wall. "No Smoking" signs shall be posted in these restricted areas.

(d) Maintain a copy of this part for employees' review.

(e) Not circumvent, bypass or make inoperative any safeguard unless required during servicing. The safeguard shall be replaced before resuming operation of the equipment.

**R 408.17212. Employee responsibility.**

**Rule 7212.**An employee shall:

(a) Use personal protective equipment required by this part.

(b) Use tools and equipment only when authorized and trained in their use.

(c) Report employers' defective tools and equipment and hazardous conditions, when detected, to the supervisor.

(d) Maintain all personal tools, equipment and work area in a manner to prevent a hazardous condition.

(e) Not smoke, create a spark or flame within 15 feet of an exposed flammable liquid or articles which have been wetted by a flammable liquid.

(f) Not circumvent, bypass or make inoperative any safeguard or tie down any control unless required during servicing. The safeguard shall be replaced before resuming operation of the equipment.

(g) Not use any device emitting air or other material in a manner which may inject a foreign material into a human body part.

(h) Use tools and equipment within their rated capacity.

**R 408.17213. Personal protective equipment.**

**Rule 7213.**(1) An employer shall provide and an employee shall wear eye protection in accordance with and as prescribed in the general industry safety standards commission standard, Part 33. Personal Protective Equipment, being R 408.13301 to R 408.13398 of the Michigan Administrative Code.

(2) Other personal protective equipment such as, but not limited to, rubber gloves, aprons, boots, welding helmets and respirators shall be provided by the employer and worn by the employee to protect against the hazards of wet operations, welding and cutting, radiator cleaning, battery charging, and spray painting.

(3) When respiratory and hearing protection is required by a division of occupational health rule, the protection shall be provided by the employer and used by the employee.

(4) Where corrosive liquids or other liquid materials that would be harmful to an employee are normally used and where an employee is exposed to splash of the materials, a readily accessible means of flushing with water shall be provided.

(5) Cloth shoes, open sandals and exposed rings and necklaces shall not be worn in the work area. A ring may be worn if covered by gloves or tape.

**R 408.17221. Illumination.**

**Rule 7221.**When hazardous work is performed where a hazard could be lessened by adequate lighting, a minimum of 25 foot candles intensity shall be provided.

**R 408.17222. Machinery and equipment installation.**

**Rule 7222.**(1) Electrically powered machinery or equipment, other than double insulated equipment, shall be grounded.

(2) Nonportable machinery or equipment shall be secured to the floor, platform, table or bench to prevent displacement or tipping.

(3) Machinery or equipment shall be equipped with a disconnect switch which shall be locked in the off position, unless the machinery or equipment is equipped with a plug-in cord which shall be disconnected and tagged, when the machinery or equipment is repaired or serviced if unexpected motion would cause injury.

(4) When electrical equipment is used within a spray booth and flammable materials are applied, the equipment shall be suitable for Class I, Division I hazards.

(5) Machinery and equipment equipped with a foot control shall be provided with a cover or guard to prevent unintentional operation of the machinery or equipment where such operation would cause injury. The cover or guard shall be capable of withstanding a static load of 200 pounds without permanent deformation. The edges of the cover of the guard shall be rolled, broad or covered to prevent injury or discomfort due to contact by the operator's foot or leg.

**R 408.17223. Housekeeping.**

**Rule 7223.**(1) Until disposal is made, wiping cloths, when soiled from oil, grease, paints or solvents, shall be placed in their own covered metal container, which shall be labeled or identified as combustible material.

(2) Rubbish shall be placed in containers. The container for combustible rubbish shall be of metal.

(3) Floors shall be maintained free of water, oil, grease and paint or other accumulations which would cause a slipping, tripping or falling hazard.

(4) After a vehicle is serviced, tools, loose parts, materials and general debris shall be cleaned up and placed in their designated areas.

**R 408.17224. Ventilation and air receivers.**

**Rule 7224.**(1) Ventilation shall be provided and used to exhaust toxic vapors or fumes if such vapors or fumes exceed the maximum allowable limits prescribed.

(2) The blades of a fan less than 7 feet from the floor, platform or ground shall be guarded on all sides. Openings in a guard shall not be more than 1 inch and the distance shall not be less than the values in table 1.

(3) A fan shall not be located where the fumes of flammable liquids can be induced into an area where sparks or flame may be present.

(4) An air receiver shall be equipped with an operable relief valve set at not more than the working load limit of the receiver.

Table 1

| *Smallest dimension in guard (in):* | *Minimum distance from guard to blade* |
|---|---|
| Greater than 0 up to 1/4 inclusive. | 1/2 in. |
| Greater than 1/4 up to 3/8 inclusive. | 1 1/2 in. |
| Greater than 3/8 up to 1/2 inclusive | 2 1/2 in. |
| Greater than 1/2 up to 3/4 inclusive. | 4 in. |
| Greater than 3/4 up to 1 inclusive | 6 times the smallest dimension |

**R 408.17225. Flammables, painting and coating.**

**Rule 7225.** (1) A Class I flammable solvent stored inside a building shall be in an approved safety can with an automatic closing cap and flame arrestor or original unopened container having a capacity of not more than 5 gallons. Quantities in excess of 5 gallons shall be stored as prescribed by flammable liquid regulations of the fire marshal promulgated under Act 207 of the Public Acts of 1941, as amended.

(2) When pouring a flammable solvent from 1 container to another, continuous contact between the containers shall be maintained or a bonding or grounding strap shall connect the containers.

(3) A Class I flammable solvent shall not be used for cleaning tools, parts, floors or booths.

(4) Application by spraying of paint or coatings with a flammable ingredient to an area of more than 9 square feet shall be made within a booth or room constructed of noncombustible materials. The booth or room shall be ventilated as prescribed by a division of occupational health rule. Sparks, flame and spark producing equipment and smoking shall be prohibited in the booth or room and the area shall be posted "No Smoking."

(5) When a flammable liquid is removed from a vehicle tank, an approved pumping device equipped with a ground strap shall be used.

**R 408.17226. Belt servicing.**

**Rule 7226.** An employee adjusting or testing the tension of a belt, installing or removing a belt on a vehicle, shall do so when the motor is off and without turning the engine over.

**R 408.17227. Air conditioning and refrigeration servicing.**

**Rule 7227.** A check valve shall be used to prevent refrigerant system pressures from flowing back to the refrigerant charging container unless such containers are equipped with a pressure relief valve.

## SPECIFICS

**R 408.17232. Cranes and winches, hoists and chain falls.**

**Rule 7232.** (1) A crane, hoist and chain fall or winch, fixed or portable, shall have affixed to it a permanent tag showing the rated capacity and name of manufacturer and, if available, the model and serial numbers.

(2) A crane, hoist and chain fall or winch shall not be used to lift more than its rated capacity.

(3) Wire rope or cable used on a crane, hoist or winch shall be inspected monthly, and shall be replaced if:

(a) In any length of 8 diameters, the total number visible broken wires exceeds 10% of the total number of wires.

(b) The wire rope or cable has been kinked, crushed or bird caged or sustained other damage which distorts the wire rope structure.

(c) The wire rope or cable shows heat or corrosive damage.

**R 408.17233. Wreckers.**

**Rule 7233.**(1) A wrecker cable and boom shall have a designed safety factor of not less than 5.

(2) Wire rope or cable used on a wrecker shall be inspected as prescribed in subrule (3) of rule 7232.

(3) A wrecker pulling or lifting a vehicle shall be used within its rated capacity.

(4) When pulling a vehicle with a wrecker cable, the employee shall stand aside from the line of pull.

(5) When towing a boom supported vehicle, safety chains shall be connected between the wrecker and the towed vehicle.

(6) A wrecker boom shall be equipped with a permanent tag showing rated capacity and name of manufacturer and, if available, the model and serial numbers. Where this information is not available, an outside source, knowledgeable in wrecker booms, shall be used to determine the rated capacity which shall be permanently labeled on the wrecker boom. The boom shall be installed on the vehicle in a manner capable of sustaining the imposed load.

(7) The winch controls shall be located in a manner to prevent accidental contact with cable and winch pinch points or the pinch point shall be guarded.

**R 408.17234. Jacking and blocking.**

**Rule 7234.**(1) A vehicle being serviced, adjusted or repaired while the motor is running shall have 2 wheels chocked from front and rear or parking brake set or other vehicle restraint controls provided.

(2) An employee shall not place his body under a vehicle supported only by a jack, overhead hoist or chain fall. Safety stands having a yield point of not less than 1 1/2 times its rated capacity shall be used to support the vehicle.

(3) A jack shall not be used to lift more than its rated capacity.

**R 408.17235. Rim wheel servicing.**

**Rule 7235.**(1) An employer shall ensure that each employee who is engaged in servicing multi-piece and single-piece rim wheels demonstrates and maintains his or her ability to service the rims safely and in accordance with these rules.

(2) All wheel components shall be inspected before assembly. Rims, rim bases, side rings, or lock rings that are bent out of shape, pitted from corrosion, broken, or cracked shall not be used or welded, brazed, or otherwise heated in an attempt to repair them. The defective components shall be rendered unusable for tire mounting.

(3) Tires shall be completely deflated by removal of the valve core before demounting and disassembly of the components.

(4) A restraining device, as defined in R 408.17206(3), shall be provided by the employer and maintained in a safe condition and shall be in compliance with all of the following requirements:

(a) Each restraining device or barrier shall have the capacity to withstand the maximum force that would be transferred to it during a rim wheel separation that occurs at 150% of the maximum tire specification pressure for the type of rim wheel being serviced.

(b) Restraining devices and barriers shall be capable of preventing the rim wheel components from being thrown outside or beyond the device or barrier for any rim wheel that is positioned within or behind the device.

(c) Restraining devices and barriers shall be visually inspected before each day's use and after any separation of the rim wheel components or sudden release of contained air. A restraining device or barrier that exhibits evidence of damage, such as any of the following defects, shall be immediately removed from service:

(i) Cracks at welds.

(ii) Cracked or broken components.
(iii) Bent or sprung components caused by mishandling, abuse, tire explosion, or rim wheel separations.
(iv) Pitting of components due to corrosion.
(v) Other structural damage that would decrease the effectiveness of the restraining device or barrier.

(d) A restraining device or barrier that is removed from service shall not be returned to service until it is repaired and reinspected. A restraining device or barrier that requires structural repair, such as component replacement or rewelding, shall not be returned to service until it is certified by either the manufacturer or a registered professional engineer that the device or barrier meets the strength requirements specified in subdivision (a) of this subrule.

(5) A clip-on chuck with a sufficient length of hose to permit the employee to stand clear of the potential trajectory (see figure 1) of the wheel components and an in-line valve with a gauge or a pressure regulator preset to the desired pressure shall be furnished by the employer and used to inflate tires.

(6) Industry-accepted tire lubricant shall be applied to the bead and the rim mating surfaces during assembly of the tire and wheel.

(7) When a tire is in a restraining device, an employee shall not rest or lean any part of his or her body or equipment on or against the device.

(8) An attempt shall not be made to correct the seating of the wheel components, rim, rim base, or side and lock rings by hammering, striking, or forcing the components while the tire is pressurized.

(9) Heat shall not be applied to an inflated wheel tire assembly.

(10) Figure 1 reads as follows:

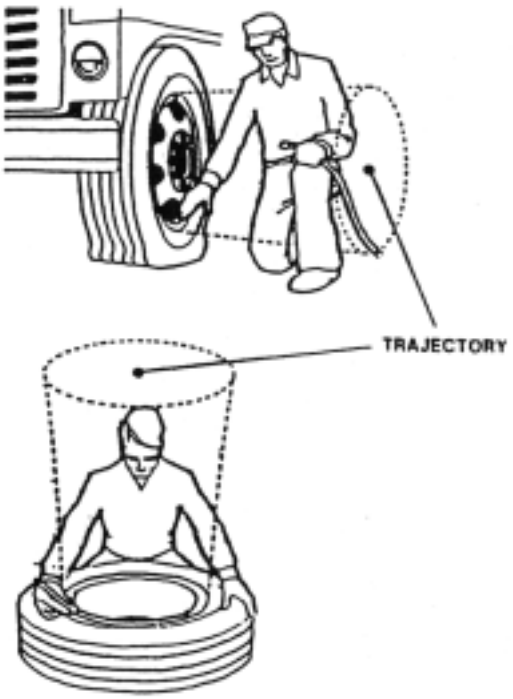


FIGURE 1

TRAJECTORY WARNING. Stay out of the trajectory as indicated by shaded area.

NOTE: Under some circumstances, the trajectory may deviate from its expected path.

**R 408.17236. Multi-piece rim wheels.**

**Rule 7236.** (1) Wheel components shall not be interchanged except as permitted pursuant to the publication entitled "Multi-piece Rim/Wheel Matching Chart" or any other publication containing, at a minimum, the same instructions, safety precautions, and information as the charts identified in subrule (2) of this rule.

(2) The publications entitled "Multi-piece Rim/Wheel Matching Chart" and "Safety Precautions for Mounting and Demounting Tube/Type Truck Tires," as revised January, 1978, which are hereby incorporated in these rules by reference, shall be accessible and available in the service area. These publications may be purchased from the Superintendent of Documents, Government Printing Office, Washington DC 20402, or from the Safety Standards Division, Michigan Department of Consumer and Industry Services, 7150 Harris Drive, Box 30643, Lansing, MI 48909, at a cost of $2.00 and $2.25 respectively.

(3) Mating surfaces of the rim gutter ring shall be free of any dirt, surface rust, scale, or rubber buildup before mounting and inflation.

(4) A tire shall be completely deflated by removal of the valve core before a wheel is removed from the axle in either of the following situations:

(a) When the tire has been driven underinflated at 80% or less of its recommended pressure.
(b) When there is obvious or suspected damage to the tire or wheel components.

(5) Tires shall be inflated only when constrained by a restraining device, except when the wheel assembly is on a vehicle. Tires may be inflated without being constrained by a restraining device if remote control inflation equipment is used and no employees remain in the trajectory path during inflation in either of the following situations:

(a) Tires are underinflated, but have more than 80% of the recommended pressure.
(b) Tires are known not to have been run underinflated.

(6) When a tire is being partially inflated without a restraining device for the purpose of seating the lock ring or to round out the tube, such inflation shall not exceed 3 psig (0.21 Kg/cm).

(7) After tire inflation, the tire rim and rings shall be inspected while still constrained in the restraining device to assure they are properly seated and locked.

**R 408.17237. Single-piece rim wheels.**

**Rule 7237.** (1) Subrules (2) to (8) of this rule apply to the servicing of single-piece wheel rims used on vehicles such as trucks, trailers, buses, and off-road machines which have a tire-inflation pressure that is 45 psig or greater. Subrules (2) to (8) of this rule do not apply to single-piece rim wheels used on automobiles and light-duty trucks or vans utilizing automobile tires.

(2) A rim manual, as prescribed in R 408.17206(3), which contains instructions for the types of wheels serviced shall be available in the service area.

(3) The size and type of both the tire and the wheel shall be checked for compatibility before assembly of the rim and wheel.

(4) Mounting and demounting of the tire shall be done only from the narrow ledge side of the wheel. Care shall be taken to avoid damaging the tire beads while mounting tires on wheels.

(5) If a bead expander is used to seat the beads, it shall be removed before a tire is inflated to more than 10 psig (.7031 Kg/cm).

(6) To seat the bead while the rim wheel is restrained on a tire changing machine, the tire shall not be inflated to more than the operating pressure indicated on the tire or the posted capacity on the machine, whichever is the lesser. If, during inflation, the tire beads do not progress toward the flanges in a normal manner or are not fully seated by the time the tire is inflated to its designated operating pressure, the tire shall be deflated and the rim wheel disassembled. The wheel and tire shall be rechecked for compatibility, relubricated, repositioned, and then reinflated in accordance with this rule.

(7) A tire inflated in accordance with subrule (6) of this rule which reaches the tire changing machine's posted capacity before becoming inflated to its designated operating pressure or which has to be inflated in excess of its operating pressure to fully seat shall be placed in a restraining device positioned behind a barrier or shall be bolted on the vehicle, with lug nuts fully tightened.

(8) Employees shall stay out of the potential trajectory of the wheel when inflating a tire and shall not lean or place a rim wheel on or against any flat solid surface.

**R 408.17241. Radiators and gas tanks.**

**Rule 7241.** (1) A radiator cap shall not be removed until the pressure has been relieved.

(2) Where radiators are repaired and cleaned by use of caustic solutions, the employee shall be protected by boots, gloves, rubber apron, safety glasses and face shield. A deluge water supply at a fixed location shall be available within 25 feet of the hazard source. This equipment shall be posted: "Emergency Shower."

(3) When the top of an open tank or vat containing a hazardous substance is less than 36 inches from the floor, platform, or ground level, a barrier shall be erected to a height of not less than 36 inches on a exposed sides.

(4) Gasoline tanks shall be thoroughly evacuated and maintained free of all explosive vapors or gasoline before commencing welding or soldering repairs.

**R 408.17243. Transmission.**

**Rule 7243.** When removing or replacing a transmission from below a vehicle, a cradle type device shall be used to hold and carry the transmission.

**R 408.17245. Extractors and wringers.**

**Rule 7245.** (1) An extractor shall be equipped with a metal cover interlocked in a manner to prevent opening when the basket is in motion and power operation of the basket when the cover is open.

(2) A extractor shall be equipped with a motor brake.

(3) A power wringer used to remove moisture from fabrics shall be equipped with a safety release bar which shall remove the tension of the wringer rolls when struck.

**R 408.17246. Car wash conveyors.**

**Rule 7246.** (1) A conveyance used to move a vehicle along a line of working equipment or moving such equipment along a vehicle, shall have the conveyor, track or chain outlined by a 4 inch strip of yellow zone paint or other warning means located within 8 inches of the hazardous area.

(2) Pinch points exposed to contact shall be guarded as prescribed by the general industry safety standards commission standard, Part 14, Conveyors, being R 408.11403 to R 408.11461 of the Michigan Administrative Code.

**R 408.17251 Automotive lift; adoption by reference; auxiliary support device; permanent tag; lifting more than rated capacity prohibited.**

**Rule 7251.** (1) An automotive lift installed, or the modification made, after the effective date in this subrule, shall be as prescribed in sections 2, 3, and 5, except paragraph 5.7, of the ANSI Standard, B153.1-1974, Safety Requirements for the Construction, Care and Use of Automotive Lifts, which is incorporated herein by reference and may be inspected at the Lansing office of the department of consumer and industry services. This standard may be purchased at a cost of $3.50 from the American National Standards Institute, 11 West 42nd Street, New York, New York 10036, or from the Michigan Department of Consumer and Industry Services, 7150 Harris Drive, Box 30643, Lansing, Michigan 48909.

(2) When an employee is required to work underneath a vehicle supported by a hydraulic lift, installed before the effective date of this part, the lift shall be used only when an auxiliary support device is engaged and capable of supporting the rated capacity of the lift.

(3) An automotive lift purchased after December 28, 1974, shall have affixed to it a permanent tag showing the name of the manufacturer, model number, serial number, and rated capacity.

(4) An automotive lift purchased before December 28, 1974, shall be equipped with a permanent tag showing the name of the manufacturer and its rated capacity. Where this information is not available, an outside source knowledgeable in automotive lifts shall be used to determine the rated capacity. The capacity shall be permanently labeled on the lift.

(5) An automotive lift shall not be used to lift more than its rated capacity.

**R 408.17252. Automotive lift; inspections.**

**Rule 7252.** (1) Wire rope used on a mechanical-type lift shall be inspected as prescribed in rule 7232(3).

(2) Effective December 31, 1976, the following items shall be inspected and the inspections shall be repeated not less than annually thereafter. The bolster, bolster connections, lifting arms and pads, lift control devices, oil reservoir level, cylinder packing, and all other critical components. Defects shall be repaired before the hoist is returned to service.

**R 408.17253. Automotive lift; color coding obstructions or hazards in work area; vehicle positioning means; corrosive protective methods.**

**Rule 7253.** (1) Fixed obstructions, protrusions, and other tripping or stumbling-type hazards located in the work area of a lift shall be color coded as prescribed in rule 18 of general industry safety standard, Part 1. General Rules, being R 408.10018 of the Michigan Administrative Code.

(2) Vehicle positioning means, such as locating ribs, positioning devices or floor markings, shall be used with frame or axle engaging lifts.

(3) A hydraulic automotive lift cylinder installed underground in a fixed position after the effective date of this amendment shall be protected from possible catastrophic failure by electrolytic corrosion at the bottom of the cylinder. At least 1 effective means, such as 1 of the following corrosive protective methods, shall be used to protect the cylinder:

(a) The cylinder bottom shall be imbedded in concrete to the depth of not less than 3 inches and with not less than a 1-inch wall thickness.

(b) A square plate which is not less than 1/2 inch greater in diameter than the cylinder bottom and which is thicker than the cylinder wall shall be continuously welded to the cylinder bottom.

(c) The cylinder shall be encased in a watertight electrical insulating housing, wrap, or coating.

(d) The cylinder shall be equipped with a sacrificial anode system sufficient to protect the cylinder.

(4) An electromechanical power lift shall have all of the following devices:

(a) A separate deadman-type raise-lower switch mounted on the power column.

(b) A separate power disconnect switch that is readily accessible to the operator in the lift area.

(c) A device to automatically de-energize the lift when it has reached the limits of its travel.

(5) A screw-driven lift shall be provided with a safety nut to follow the main drive nut, which shall be capable of sustaining the imposed load in case of failure of the main drive nut.

(6) The lift control mechanism shall automatically return to neutral or "off" position when released by the operator.

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# DEPARTMENT OF LABOR & ECONOMIC GROWTH
# DIRECTOR'S OFFICE
# GENERAL INDUSTRY SAFETY STANDARDS

Filed with the Secretary of State on March 2, 1983 (as amended November 15, 1989)
(as amended May 31, 1995) **(as amended May 14, 1997)**

These rules take effect 15 days after filing with the Secretary of State.

(By authority conferred on the director of the department of consumer and industry services by sections 16 and 21 of Act No. 154 of the Public Acts of 1974, as amended, and Executive Reorganization Order No. 1996-2, being §§408.1016, 408.1021, and 445.2001 of the Michigan Compiled Laws)

R 408.13311, R 408.13312, R 408.13350, R 408.13370, R 408.13372, R 408.13383, R 408.13385, R 408.13387, R 408.13390 and R 408.13394, of the Michigan Administrative Code, appearing on pages 359 and 360 of the 1983 Annual Supplement to the 1979 Michigan Administrative Code and pages 839 to 853 of the 1995 Annual Supplement to the Code, are amended to read as follows:

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# PART 33. PERSONAL PROTECTIVE EQUIPMENT

TABLE OF CONTENTS



## GENERAL PROVISIONS

### R 408.13301. Scope.

**Rule 3301.** This standard shall apply to all places of employment in this state and includes requirements by the employer and use by the employee of personal protective equipment and provides reasonable and adequate means, ways, and methods for the proper selection and safe use of this equipment.

### R 408.13302. Definitions; A to E.

**Rule 3302.** (1) "Absorptive lens" means a filter lens whose physical properties are designed to attenuate the effect of glare, reflective, and stray light.

(2) “Apparatus” means electrical equipment.

(3) “Bare hand technique” means a method of working on energized conductors by isolating the employee from any ground potential and by placing the employee in continuous firm contact with the energized electric field.

(4) “Bump hat or cap” means a device worn on the head to protect the wearer from bumps or blows but which does not meet the requirements of class A, B, C, and D protective helmets.

(5) “Conductor” means a material, such as a bus bar, wire, or cable, suitable for carrying an electric current.

(6) “Corrective lens” means a lens ground to the wearer’s individual prescription.

(7) “Cover lens” means a removable disc or colorless glass, plastic-coated glass, or plastic that covers a filter lens and protects it from weld spatter, pitting, or scratching when used in a goggle.

(8) “Cover plate” means a removable pane of colorless glass, plastic-coated glass, or plastic that covers a filter plate and protects it from weld spatter, pitting, or scratching when used in a helmet, hood, or goggle.

(9) “Electrical worker” means an operational or maintenance employee working on electrical conductors or equipment, except mining and construction operations.

(10) “Energized,” sometimes known as “live,” means to be electrically charged, or that to which voltage is being applied.

(11) “Eye size” means a measurement expressed in millimeters and denoting the size of the lens-holding section of an eye frame.

**R 408.13303. Definitions; F, G.**

**Rule 3303.** (1) “Face shield” means a device worn in front of the eyes and a portion or all of the face, whose predominant function is protection of the eyes and face.

(2) “Filter lens” means removable disc in the eyecup of a goggle that absorbs varying proportions of the ultraviolet, visible, and infrared rays according to the composition and density of the lens.

(3) “Filter plate” means a removable pane in the window of a helmet, hood, or goggle that absorbs varying proportions of the ultraviolet, visible, and infrared rays according to the composition and density of the plate.

(4) “Foot or toe protection” means a device or equipment, such as, but not limited to, safety toe footwear, toe protectors, or foot guards, that protects an employee’s foot or toes against injury.

(5) “Goggle” means a device with contour-shaped eyecups or facial contact with glass or plastic lenses, worn over the eyes and held in place by a headband or other suitable means for the protection of the eyes and eye sockets.

**R 408.13304. Definitions; H, I.**

**Rule 3304.** (1) “Hair enclosure” means a hat, cap, or hair net specifically designed to protect the wearer from hair entanglement in moving machinery.

(2) “Headband” means that part of a goggle, helmet, or hood suspension consisting of a supporting band that encircles the head.

(3) “Headgear” means that part of a protective helmet, hood, or face shield that supports the device on the wearer’s head, usually consisting of a headband and crown strap.

(4) “Hood” means a device that is worn to provide protection against acids, chemicals, abrasives, and temperature extremes and entirely encloses the whole head including face, neck, and shoulders. Air line hoods and hoods used to protect wearers from inhalation or harmful atmospheres are not included in this part.

(5) “Interpupillary distance” means the distance in millimeters between the centers of the pupils of the eyes.

(6) “Inservice load” means an imposed physical load on a safety belt or harness from a free fall of more than 3 feet.

(7) “Insulated barrier” means a separation from another conducting surface by a dielectric substance or air space.

(8) “Isolated” means that all energized conductors or the exposed energized parts of equipment are isolated from the work area by an insulated barrier. Conductors may be isolated by moving them out of reaching distance by use of hot line tools.

**R 408.13305. Definitions; L to R.**

**Rule 3305.** (1) “Lanyard” means a tether attached to a safety belt or harness at one end and to a lifeline or a fixed object at the other.

(2) “Lens” means the transparent glass or plastic device through which a wearer of protective goggles or spectacles sees.

(3) “Lifeline” means a rope line, except where used in tree trimming, attached at one end to a fixed object or attended by a person and to which a safety belt or lanyard is secured.

(4) “Lift front” means a type of mounting frame for a welding helmet, hood, or goggles which is made of 2 connected parts: the front part, which may be removed from the line of vision, contains the high density filter plate with its cover plate, and the back part, which is fixed to the helmet, contains a low density or clear impact resistant plate.

(5) “Plano lens” means a lens which does not incorporate correction.

(6) “Protective helmet” “protective hat or cap”, or “safety hat or cap” means a rigid device, often referred to as a safety cap or hat, that is worn to provide protection for the head or portions thereof against impact, flying particles, or electric shock, or any combination thereof, and which is held in place by a suitable suspension.

(7) “Protector” means a device that provides eye or face protection against the hazards of processes encountered in employment.

(8) “Radiant energy or radiation” means the 3 kinds of radiant energy which are pertinent to this standard:

(a) Ultraviolet.

(b) Visible light.

(c) Infrared.

(9) “Reaching distance” means the employee’s reach as extended by a conductive material or equipment.

**R 408.13306. Definitions; S to W.**

**Rule 3306.** (1) “Safety belt” means a belt worn around the waist and capable of restraining a pull or fall of an employee.

(2) “Safety harness” means a belt with a shoulder strap worn around the waist and shoulder and capable of restraining a pull or fall of an employee.

(3) “Safety strap” means a restraining line secured at both ends to a safety belt or harness to hold an employee to a fixed object.

(4) “Safety toe footwear” means footwear containing a safety toe box of steel or equivalent material capable of meeting the requirements of this part.

(5) “Sanitizing” means an act or process of destroying organisms that may cause disease.

(6) “Shield” means a device to be held in the hand, or supported without the aid of the operator, whose predominant function is protection of the eyes and face.

(7) “Side shield” means a device of metal, plastic, or other material fixed to a spectacle lens frame to protect an eye from side exposure.

(8) “Snood” means a flexible attachment to the back of a hood or helmet for protection against injury to the back of the head and neck.

(9) “Spectacle” means a device patterned after conventional-type spectacle eyewear, but of more substantial construction, with or without side shields, and with plano or corrective impact resistant lenses of clear or absorptive filter glass or plastic.

(10) “Supplier” means a manufacturer or an authorized dealer representative.

(11) “Temple” means that part of a spectacle or other protector extending to and dropping behind the ear of the wearer and intended to position the device before the eyes.

(12) “Temple length” means the measured length of a temple designated in inches.

(13) “Working gloves” means gloves used as personal protective equipment to protect an employee from injuries on the job.

**R 408.13308. Hazard assessment and equipment selection.**

**Rule 3308.** (1) An employer shall assess the workplace to determine if hazards that necessitate the use of personal protective equipment are present, or are likely to be present. If the hazards are present or are likely to be present then the employer shall do all of the following:

(a) Select, and have each affected employee use, the types of personal protective equipment that will protect the affected employee from the hazards identified in the hazard assessment.
(b) Communicate selection decisions to each affected employee.
(c) Select the personal protective equipment that properly fits each affected employee.

(2) An employer shall verify that the required workplace hazard assessment has been performed through a written certification which identifies the document as a certification of hazard assessment and which specifies all of the following information:

(a) The workplace evaluated.
(b) The person who certifies that the evaluation has been performed.
(c) The date of the hazard assessment.

(3) Defective or damaged personal protective equipment shall not be used.

**R 408.13309. Training.**

**Rule 3309.** (1) An employer shall provide training to each employee who is required by this part to use personal protective equipment. Each employee who is required by this part to use personal protective equipment shall be trained in all of the following areas:

(a) When personal protective equipment is necessary.
(b) What personal protective equipment is necessary.
(c) How to properly don, doff, adjust, and wear the personal protective equipment.
(d) The limitations of the equipment.
(e) The useful life of the equipment and the proper care, maintenance, and disposal of the equipment.

(2) Each affected employee shall demonstrate an understanding of the training specified in subrule (1) of this rule and the ability to use the equipment properly before being allowed to perform work requiring the use of personal protective equipment.

(3) When an employer has reason to believe that any affected employee who has already been trained does not have the understanding and skill required by subrule (2) of this rule, the employer shall retrain the employee. The existence of any of the following circumstances requires retraining:

(a) Changes in the workplace that render previous training obsolete.
(b) Changes in the types of personal protective equipment to be used that render previous training obsolete.
(c) Inadequacies in an affected employee’s knowledge or use of assigned personal protective equipment which indicate that the employee has not retained the requisite understanding or skill.

(4) An employer shall verify that each affected employee has received and understood the required training through a written certification that contains the name of each employee trained and the date of training and that identifies the subject of the certification.

**R 408.13310. Employer’s and employee’s responsibilities.**

**Rule 3310.** (1) An employer shall provide to an employee, at no expense to the employee, the initial issue of the type of personal protective equipment which is suitable for the work to be performed as required by this standard or any other general industry safety standard, unless specifically indicated otherwise in this standard or any other general industry safety standard. The employer shall also provide replacement equipment if necessary due to wear and tear on the previous equipment or if the equipment is lost due to the work environment, unless covered by a collective bargaining agreement.

(2) An employee shall use all of the personal protective equipment provided by the employer.

## FACE AND EYE PROTECTION

**R 408.13311. Certification.**

**Rule 3311.** (1) All eye and face protection devices purchased after July 5, 1994, shall be in compliance with occupational and educational eye and face protection of the American national standards institute standard Z87.1-1989 or the devices shall be demonstrated by the employer to be equally effective. The standard is adopted by reference in these rules and may be purchased from the American National Standards Institute, 11 West 42 Street, New York, New York 10036, or from the Safety Standards Division, Michigan Department of Consumer and Industry Services, 7150 Harris Drive, Box 30643, Lansing, Michigan 48909, at a cost at the time of adoption of these rules of $18.00.

(2) If it is impractical for eye and face protection devices to be marked in compliance with ANSI standard Z87.1-1989, then the containers for eye and face protection shall be in compliance with the standard.

(3) Eye and face protection devices purchased before July 5, 1994, shall be in compliance with the ANSI standard entitled “Occupational and Educational Eye and Face Protection,” Z87.1-1968, or the devices shall be demonstrated by the employer to be equally effective. The standard is adopted by reference in these rules and may be purchased from the American National Standards Institute, 11 West 42nd Street, New York, New York 10036, or from the Safety Standards Division, Michigan Department of Consumer and Industry Services, Box 30643, Lansing, Michigan 48909, at a cost at the time of adoption of these rules of $18.00.

**R 408.13312. Face and eye protection generally.**

**Rule 3312.** (1) An employer shall ensure that each affected employee shall use appropriate eye or face protection as prescribed in R 408.13311 if a hazard exists due to any of the following:

(a) Flying objects or particles.
(b) Harmful contacts.

(c) Exposures.
(d) Molten metal.
(e) Liquid chemicals.
(f) Acids or caustic liquids.
(g) Chemical gases or vapors.
(h) Glare.
(i) Injurious radiation.
(j) Electrical flash.
(k) A combination of the hazards specified in this subrule.

(2) Table 1 shall be used as a guide to select the proper eye and face protection. Each affected employee shall use eye protection that provides side protection when there is a hazard from flying objects. Detachable side protectors, such as clip-on or slide-on side shields, that are in compliance with the pertinent requirements of this rule are acceptable.

(3) Contact lenses or federal drug administration (FDA) standard hardened or plastic lenses are not eye protection as required by these rules.

(4) A face or eye protector shall be in compliance with all of the following minimum requirements:
(a) It shall protect against the particular hazards for which it is designed.
(b) It shall fit snugly and shall not unduly interfere with movements of the wearer.
(c) It shall be capable of withstanding sanitizing.

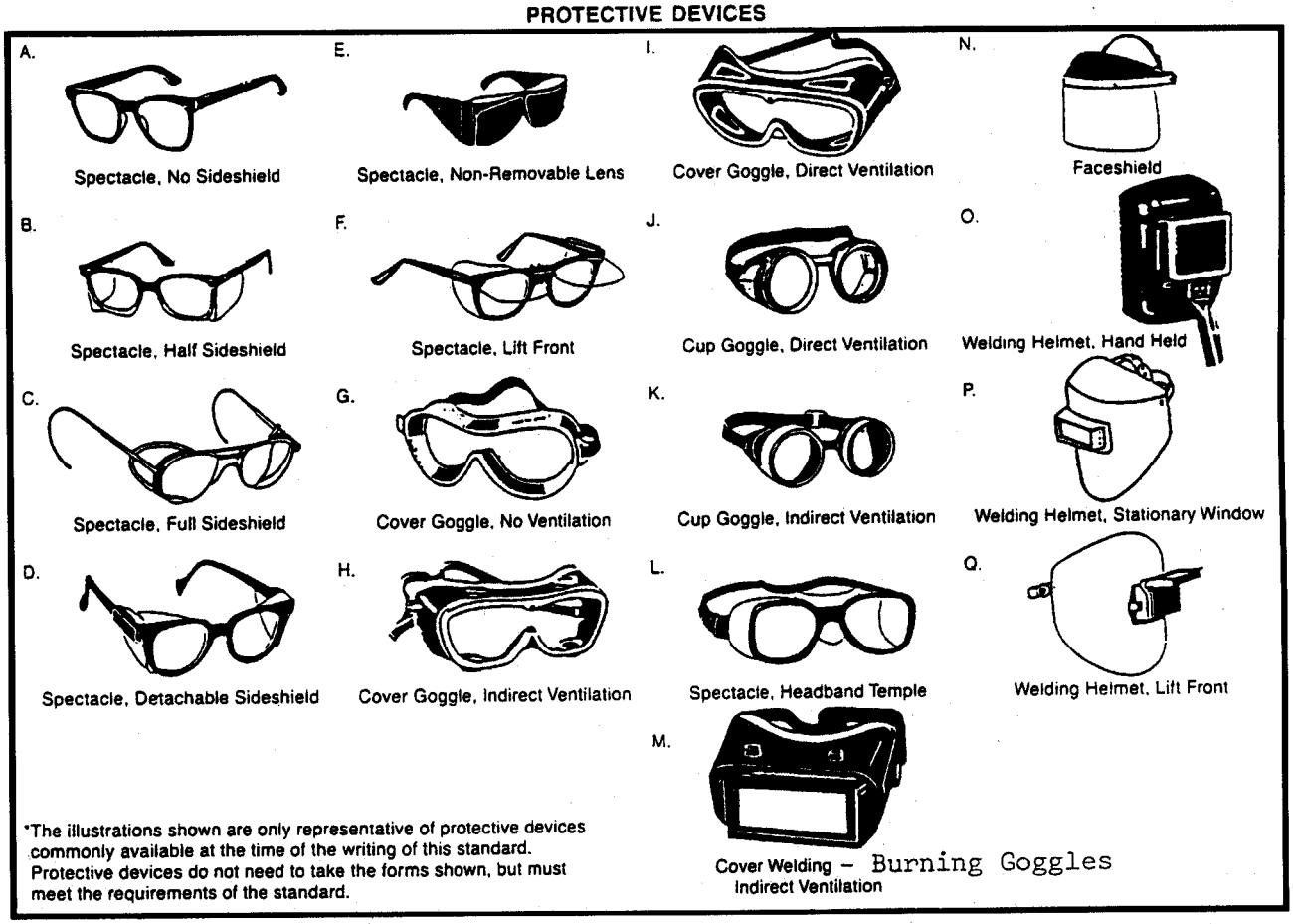
(5) A protector shall be distinctly marked to identify the manufacturer.

(6) Limitations or precautions indicated by the manufacturer shall be transmitted to the user and care taken to see that the limitations or precautions are observed.

(7) Table 1 reads as follows:

**TABLE 1**
FACE AND EYE PROTECTOR SELECTION CHART

**PROTECTIVE DEVICES**




**NOTES:**

(1) Care shall be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of each of the hazards must be provided.

(2) Operations involving heat may also involve optical radiation. Protection from both hazards shall be provided.

(3) Faceshields shall only be worn over primary eye protection.

(4) Filter lenses shall meet the requirements for shade designations in Table 2.

(5) Persons whose vision requires the use of prescription (Rx) lenses shall wear either protective devices fitted with prescription (Rx) lenses or protective devices designed to be worn over regular prescription (Rx) eyewear.

(6) Wearers of contact lenses shall also be required to wear appropriate covering eye and face protection devices in a hazardous environment. It should be recognized that dusty and/or chemical environments may represent an additional hazard to contact lens wearers.

(7) Caution should be exercised in the use of metal frame protection devices in electrical hazard areas.

(8) Refer to Section 6.5, Special Purpose Lenses. (ANSI Z87.1-1989)

(9) Welding helmets or handshields shall be used only over primary eye protection.

(10) Non-sideshield spectacles are available for frontal protection only.

| | | ASSESSMENT SEE NOTE (1) | PROTECTOR TYPE | PROTECTORS | LIMITATIONS | NOT RECOMMENDED |
|---|---|---|---|---|---|---|
| **IMPACT** | Chipping, grinding, machining, masonry, work, riveting, and sanding. | Flying fragments, objects, large chips, particles, sand, dirt, etc. | B, C, D, E, F, G, H, I, J, K, L, N | Spectacles, goggles, face shields.<br><br>SEE NOTES (1) (3) (5) (6) (10)<br>For severe exposure add N | Protective devices do not provide unlimited protection.<br><br>SEE NOTE (7) | Protectors that do not provide protection from side exposure.<br>SEE NOTE (10)<br><br>Filter or tinted lenses that restrict light transmittance, unless it is determined that a glare hazard exists. Refer to OPTICAL RADIATION. |
| **HEAT** | Furnace operations, pouring, casting, hot dipping, gas cutting, and welding. | Hot sparks | B, C, D, E, F, G, H, I, J, K, L, N, | Face shields, goggles, spectacles<br>*For severe exposure Add N<br>SEE NOTE (2) (3) | Spectacles, cup and cover type goggles not provide unlimited protection.<br><br>SEE NOTE (2) | Protectors that do not provide protection from side exposure. |
| | | Splash from molten metals | *N | *Face shields worn over goggles H, K | | |
| | | High temperature exposure | N | Screen face shields, Reflective face shields.<br>SEE NOTE (2) (3) | SEE NOTE (3) | |
| **CHEMICAL** | Acid and chemicals handling, degreasing, plating. | Splash | G, H, K,<br><br>*N | Goggles, eyecup, and cover types.<br><br>*For severe exposure Add N. | Ventilation should be adequate but well protected from splash entry. | |
| | | Irritating mists | G | Special purpose goggles. | SEE NOTE (3) | |
| **DUST** | Woodworking, buffing, general dusty conditions. | Nuisance dust | G, H, K | Goggles, eyecup and cover types | Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent cleaning may be required. | |
| **OPTICAL RADIATION** | WELDING:<br><br>Electric Arc | | O, P, Q | **TYPICAL FILTER LENS SHADE** / **PRO-TECTORS** **SEE NOTE (9)**<br><br>10-14 Welding Helmets Or Welding Shields | Protection from optical radiation is directly related to filter lens density. SEE NOTE (4). Select the darkest shade that allows adequate task performance. | Protectors that do not provide protection from optical radiation.<br><br>SEE NOTE (4) |
| | WELDING:<br><br>Gas<br><br>CUTTING<br><br>TORCH BRAZING | | J, K, L, M, N, O, P, Q | SEE NOTE (9)<br>4-8 Welding Goggles Or Welding Faceshields<br><br>3-6<br><br>3-4 | SEE NOTE (3) | |
| | TORCH SOLDERING | | B, C, D, E, F, N | 1.5-3 Spectacles Or Welding Faceshield | | |
| | GLARE | | A, B | Spectacle<br>SEE NOTE (9) (10) | Shaded or special Purpose lenses as suitable<br>SEE NOTE (8) | |

(8) Each affected employee shall use equipment that has filter lenses which have shade numbers appropriate for the work being performed for protection from injurious light radiation. Table 2 is a listing of appropriate shade numbers for various operations.

(9) Table 2 reads as follows:

**TABLE 2**

FILTER LENSES FOR PROTECTION AGAINST RADIANT ENERGY

| **OPERATIONS** | **ELECTRODE SIZE 1/32 INCH** | **ARC CURRENT** | **MINUMUM* PROTECTIVE SHADE** |
|---|---|---|---|
| Shield metal arc welding | Less than 3 | Less than 60 | 7 |
| | 3-5 | 60-160 | 8 |
| | More than 5-8 | 161-250 | 10 |
| | More than 8 | 251-550 | 11 |
| Gas metal arc welding and flux cored arc welding | | Less than 60 | 7 |
| | | 60-160 | 10 |
| | | 161-250 | 10 |
| | | 251-500 | 10 |
| Gas tungsten arc welding | | Less than 50 | 8 |
| | | 50-150 | 8 |
| | | 150-500 | 10 |
| Air carbon | (Light) | Less than 500 | 10 |
| Air cutting | (Heavy) | 500-1,000 | 11 |
| Plasma arc welding | | Less than 20 | 6 |
| | | 20-100 | 8 |
| | | 101-400 | 10 |
| | | 401-800 | 11 |
| Plasma arc cutting | (Light)** | Less than 300 | 8 |
| | (Medium)** | 300-400 | 9 |
| | (Heavy)** | 401-800 | 10 |
| Torch brazing | | | 3 |
| Torch soldering | | | 2 |
| Carbon arc welding | | | 14 |
| **OPERATIONS** | **PLATE THICKNESS (INCHES)** | **(MM)** | **MINIMUM*PROTECTIVE SHADE** |
| Gas welding: | | | |
| Light | Under 1/8 | Under 3.2 | 4 |
| Medium | 1/8 to 1/2 | 3.2 to 12.7 | 5 |
| Heavy | Over 1/2 | Over 12.7 | 6 |
| Oxygen cutting: | | | |
| Light | Under 1 | Under 25 | 3 |
| Medium | 1 to 6 | 25 to 150 | 4 |
| Heavy | Over 6 | Over 151 | 5 |

* As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to a lighter shade that gives a sufficient view of the weld zone without going below the minimum. In oxyfuel gas welding or cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line in the visible light of the (spectrum) operation.

** These values apply where the actual arc is clearly seen. Experience has shown that lighter filters may be used when the arc is hidden by the workpiece.

**R 408.13313. Maintenance and cleanliness of protectors.**

**Rule 3313.** (1) A face or eye protector shall be kept clean and in good repair.

(2) Cleaning facilities for protectors shall be provided away from the hazard, but readily accessible to the wearer.

(3) A slack, worn out, sweat-soaked, knotted, or twisted headband shall be replaced.

(4) A face or eye protector is a personal item and shall be for the individual and exclusive use of the person to whom it is issued. If circumstances require reissue, the protector shall be thoroughly cleaned, sanitized, and in good condition.

## WELDING HELMETS AND HAND SHIELDS

**R 408.13320. Purposes, types, styles, and marking.**

**Rule 3320.** (1) The devices described in R 408.13320 to R 408.13330 are designed to provide protection for the face, eyes, ears, and neck against intense radiant energy and spatter resulting from arc welding.

(2) A helmet and a hand shield are the only permissible types.

(3) A helmet and a hand shield shall be made with the same basic design and of the same basic materials: an opaque, bowl-shaped or modified bowl-shaped device containing a window with filter plate which allows the wearer to see the radiant object, yet prevents harmful intensities or radiation from reaching his eyes. A helmet shall be supported on the head by an adjustable headgear. A hand shield shall have a handle attached to the bottom by which it is held in the hand. The basic designs may be modified to provide protection against special hazards, but modified equipment shall meet the same requirements as the basic design.

(4) A helmet and a hand shield shall bear a permanent and legible marking by which the manufacturer may be readily identified.

**R 408.13321. Rigid helmet bodies.**

**Rule 3321.** A helmet body of a rigid helmet shall be of such size and shape as to protect the face, forehead, ears, and neck to a vertical line back of the ears. It shall have 1 or more openings in the front for filter plates or filter lenses. The helmet body shall be attached to the headgear so that it will

not come in contact with any part of the head and so that it can be lifted up from in front of the face and hold its position in front of the head. The helmet body shall be made of vulcanized fiber, reinforced plastic, or other suitable material which shall be thermally insulating, noncombustible or slow burning, opaque to visible, ultraviolet, and infrared radiations, and capable of withstanding sanitizing. The inside of the helmet body shall have a low light reflecting finish. Rivets or other metal parts, if terminating on the inside surface, shall be adequately separated from the wearer's head.

**R 408.13322. Rigid helmet headgear or cradles.**

**Rule 3322.** A rigid helmet shall have a headgear or cradle that shall hold the helmet body comfortably and firmly on the wearer's head, but shall permit the helmet body to be tilted back over the head. The headgear shall be readily adjustable for all head sizes from 6 1/2 to 7 5/8, without the use of tools. The headgear shall be made of materials which are thermally insulating, noncombustible or slow burning, resistant to heat, and capable of withstanding sanitizing. Where required, the headgear shall be fitted with a removable and replaceable sweatband covering at least the forehead portion of the headband. The sweatband shall be made of leather or other suitable material which is slow-burning and nonirritating.

**R 408.13323. Rigid helmet headgear substitutes.**

**Rule 3323.** A headgear for a rigid helmet may be replaced by an impact resistant hat or cap that meets the requirements of R 408.13370 to R 408.13378 of this part, or other suitable device to which the helmet body is connected, if the helmet body may be lifted and adjusted to permit unobstructed vision or lowered to furnish complete protection, as required. The alternative device shall meet the requirements for sanitizing and resistance to heat and, in addition, shall meet the applicable requirements of any additional functions, such as protection against falling objects.

**R 408.13324. Rigid helmet filter plates.**

**Rule 3324.** (1) A filter plate on a rigid helmet shall fit into the frame and cover the window.

(2) Both surfaces of a filter plate shall be well polished and shall be free from striae, waves, or other defects that would impair the optical quality of the surfaces. Filter plate surfaces shall be flat and substantially parallel.

(3) Table 2 of R 408.13312 shall be used to select the proper shade number of filter lenses or plates during welding operations.

(4) When specified, a filter plate shall be impactresistant, unless impact-resistant eye protection is worn in conjunction with a welding helmet.

(5) A filter plate shall be marked with the shade designation and a permanent and legible marking by which the manufacturer may be readily identified. In addition, a glass filter plate, when treated for impact resistance, shall be marked with the letter "H."

(6) A cover plate made of plain glass, of glass coated on 1 or on both sides with plastic, or of a slow-burning solid plastic sheet shall be used to protect a filter plate from damage. A cover plate shall be the same peripheral size and shape as the filter plate, and the thickness of a cover plate shall not be less than 0.050 inches. A cover plate shall transmit not less than 75% of the luminous radiation and shall be substantially free from optical imperfections.

**R 408.13325. Nonrigid helmets.**

**Rule 3325.** A helmet may be made of nonrigid materials where it is to be used in confined spaces, or may be collapsible for convenience in carrying or storing. The helmet may be of the same general shape as a rigid helmet, except that a more complete covering of the top of the head is necessary in order to maintain the face, side, and windows in proper position. The requirements for the filter plates, cover plates, and lens mounting frame are the same as for a rigid helmet. A headgear may be used. The material shall be nonconducting and opaque to ultraviolet, visible, and infrared radiations. Stitched seams shall be welded. No stitching shall be exposed.

**R 408.13327. Hand shield.**

**Rule 3327.** A hand shield shall be constructed of materials similar to those used for a helmet and in like manner. The materials, lens mounting arrangement, and filter and cover plates shall conform to the requirements for the corresponding parts of the helmet body with headgear. The handle shall be made of a material that is a nonconductor of electricity and is noncombustible or slow burning. It shall be of such size and shape as to be held easily by 1 hand and shall be firmly attached to the lower portion of the shield. A hand shield intended for use by other than a welding operator shall have filter and cover plates suitable for the intended use.

**R 408.13329. Helmet and hand shield lift fronts and chin rests.**

**Rule 3329.** (1) The lift front of the helmet shall be fabricated from metal, plastic, or other suitable material. A snap hinge shall be provided so that the front part will stay up or down but will not remain in a partially opened position. The lift front seal against the helmet shall be light tight. The lift front shall be designed to accommodate 3 plates: a clear impact-resisting plate in the back or fixed part; a filter plate, impact-resisting, when specified; and a cover plate in the front part. The back or fixed part plate shall be clear heat treated glass or plastic not more than 3/16 inch thick or less than 1/8 inch and capable of withstanding the impact test.

(2) To avoid contact of a helmet or hand shield with the face of the wearer, a chin rest or adjustable position stop shall be provided. They shall be constructed of suitable rigid material and shall be detachable from the body of the hand shield.

**R 408.13330. Helmet snoods, neck protectors, and aprons.**

**Rule 3330.** (1) A snood or back-of-head-and-neck protector where required shall be of material that is flame resistant, that is a good insulator of heat and electricity, and that is capable of withstanding sanitizing. They shall be designed for easy attachment to the helmet, helmet headgear, or cradle.

(2) An apron or bib, where required for a helmet, shall be of nonflammable, nonconducting material that is flexible and capable of withstanding sanitizing.

**R 408.13332. Effect of head protection standards.**

**Rule 3332.** The characteristics and performance requirements of these rules for welding helmets shall in no way be altered through their attachment to protective hats and caps, as required by R 408.13370 to R 408.13378 of this part.

## FACE SHIELDS

**R 408.13340. Purposes and uses.**

**Rule 3340.** (1) The devices described in R 408.13340 to R 408.13347 of this part are designed to provide protection to the front part of the head, including forehead, cheeks, nose, mouth, and chin, and to the neck, where required, from flying particles and sprays of hazardous liquids, and to provide filter

protection where required. Such devices shall be worn over suitable basic eye protection devices.

(2) Typical uses for face shields include, but are not limited to, the following situations:

(a) Woodworking operations where chips and particles fly.
(b) Metal machining causing flying particles.
(c) Buffing, polishing, wire brushing, and grinding operations causing flying particles or objects.
(d) Spot welding.
(e) Handling of hot or corrosive materials.

**R 408.13342. Types and materials.**

**Rule 3342.** (1) Face shields are of 3 basic styles: headgear without crown protector; headgear with crown protector; and headgear with crown protector and chin protector. Each of these styles shall accommodate any of the following styles of windows:

(a) Clear transparent.
(b) Colored transparent.
(c) Wire screen.
(d) Combination of plastic and wire screen.
(e) Fiber window with filter plate mounting.

(2) Materials used in the manufacture of a face shield shall be nonirritating to the skin when subjected to perspiration and shall be capable of withstanding frequent sanitizing. Metals, when used, shall be resistant to corrosion. Plastic materials shall be slow burning. Clear or colored plastic materials used in windows shall be of an optical grade. Plastic windows shall not be used in connection with welding operations unless they meet the requirements of table 1 of this part.

**R 408.13343. Components.**

**Rule 3343.** A face shield shall consist of a detachable transparent plastic window, wire screen window, or opaque frame with window; a tilting support, an adjustable headgear; and, as required, a crown protector and chin protector.

**R 408.13344. Windows.**

**Rule 3344.** (1) A window shall be designed to fit the contour of the window support.

(2) A window supporting or window holding member, which shall be a band or crown protector, shall be attached to the headgear. The window support shall position the window in front of the face to provide clearance for the nose and eyeglasses of the wearer.

(3) The attachment of the window to the window support shall be secure and shall permit easy removal and replacement. The several sizes and types of windows for a face shield shall be interchangeable for attachment to the window support.

(4) A plastic or wire screen window without frame shall be not less than 9 1/2 inches wide at the top and 8 ½ inches wide at the bottom, measured over its curved surfaces when attached and in position on the window support, and not less than 6 inches high. A window, when used in a frame, shall not be less than 4 inches wide and 2 inches high, and the frame shall conform to the dimensions specified for a window without a frame. A plastic window shall be not less than 0.040 inch nominal thickness.

(5) The exposed borders of a wire screen window shall be suitably bound or otherwise finished to eliminate sharp, rough, or unfinished edges. A wire screen window shall not be less than 20-mesh screen.

(6) A window support shall be pivotally attached to the sides of the headgear to permit easy tilting, either upward or downward, of the supporting member and of the window attached thereto. The window shall be capable of being tilted sufficiently upward so that the center of its bottom edge shall be out of the line of horizontal vision. The tension of the tilting mechanism shall be sufficient to hold the window without slippage in either the up or down position.

**R 408.13345. Headgear.**

**Rule 3345.** (1) A headgear shall consist of at least a headband and a crown strap. The headgear shall be made from materials having a low heat conductivity. The design shall hold the window and window support comfortably and firmly in place on the wearer's head and shall provide for tilting the window away from the face.

(2) A headgear shall be readily adjustable to head sizes from 6 1/2 to 7 5/8 without the use of tools. The crown strap or band shall be attached to and extend between the front and rear centers or from the middle sides of the headband. It shall form an arc over the head to assist in positioning and holding the headgear in place. An adjusting device shall be positive and hold firmly in place after being adjusted. Its mechanisms and movements shall be protected so that the wearer's hair cannot catch in the device.

(3) For greater protection, headgear may be replaced by an impact resistant hat or cap to which the window support is connected. The attachment may be either rigid or swiveled. If swiveled, the design shall permit lifting and adjusting of the window to permit unobstructed vision or lowering to furnish protection.

**R 408.13346. Crown and chin protectors.**

**Rule 3346.** (1) A crown protector and chin protector shall be made of material having an impact resistance not less than that of the plastic window. When the crown protector is used in conjunction with the chin protector for protection against sprays of hazardous liquids, the assembly of the crown protector and window support and the assembly of the chin protector and window shall not allow liquids to pass through any opening in the assembly and reach the face, forehead, or chin of the wearer.

(2) A crown protector shall be shaped to cover at least the frontal portion of the head and shall extend around each side at least to a vertical line at the front of the ears. It may be an integral part of the window support or a separate assembly. The design shall provide a comfortable clearance over the forehead and the head of the wearer.

(3) A chin protector shall be shaped to cover at least the chin and upper part of the neck. The design shall provide a comfortable clearance under the chin of the wearer.

**R 408.13347. Marking; special operating conditions.**

**Rule 3347.** (1) When a face shield is used in atmospheres or working areas requiring special conditions of nonconductivity or nonsparking, materials used shall meet these requirements. A face shield shall be plainly and permanently labeled, identifying it as a "nonconductive face shield" or "nonsparking face shield."

(2) A headgear and a plastic window shall bear a permanent and legible marking by which the manufacturer may be readily identified. A window offered for protection against glare shall also bear its shade designation.

## EYE PROTECTORS

**R 408.13350. Prescription lenses.**

**Rule 3350.** An employer shall assure that each affected employee who wears prescription lenses while engaged in operations that involve eye hazards shall wear eye protection which incorporates that prescription in its design or shall wear eye protection which can be worn over the prescription lenses without disturbing the proper position for the prescription lenses or protective lenses.

**R 408.13352. Materials.**

**Rule 3352.** Materials used in the manufacturing of eye protectors shall combine mechanical strength and lightness of weight to a high degree, shall be nonirritating to the skin when subjected to perspiration, and shall withstand frequent sanitizing. Metals, where used, shall be corrosion resistant. Plastic materials, when used, shall be noncombustible or slow burning. Cellulose nitrate, or materials having flammability characteristics approximately those of cellulose nitrate, shall not be used.

**R 408.13353. Lenses.**

**Rule 3353.** (1) Lenses intended for use in eye protectors are of 4 basic types, as follows:

(a) Clear lenses which are impact-resisting and provide protection against flying objects.

(b) Absorptive lenses of shades 1.7 through 3.0 which are impact-resisting and provide protection against flying objects and glare or which are impact-resisting and provide protection against flying objects, and narrowband spectral transmittance of injurious radiation.

(c) Protective-corrective lenses which are impact-resisting and either clear or absorptive, as specified for persons requiring visual correction.

(d) Filter lenses which are impact-resisting and provide protection against flying objects and narrow-band spectral transmittance of injurious radiation.

(2) Glass filter lenses intended for use in eyecup goggles shall be heat treated.

(3) The height of the safety lens shall not be less than 30 millimeters.

**R 408.13355. Eyecup goggles; components.**

**Rule 3355.** Eyecup goggles shall consist of 2 eyecups with lenses and lens retainers, connected by an adjustable bridge, and a replaceable and adjustable headband or other means for retaining the eyecups comfortably in front of the eyes. Recommended applications for the use of eyecup goggles are shown in table 1 of R 408.13312(7).

**R 408.13356. Eyecup goggles; types and models.**

**Rule 3356.** (1) Eyecup goggles shall be of 2 types as follows:

(a) Cup-type goggles designed to be worn by individuals who do not wear corrective spectacles.

(b) Cover cup-type goggles designed to fit over corrective spectacles.

(2) The 2 types of eyecup goggles are subdivided into the following classes:

(a) Chipper's models providing impact protection against flying objects.

(b) Dust and splash models providing protection against fine dust particles or liquid splashes and impact.

(c) Welder's and cutter's models providing protection against glare, injurious radiations, and impact.

(3) The basic designs may be modified to provide more protection against special hazards, but the modified equipment shall meet the same requirements as the basic design.

**R 408.13357. Eyecup goggles; fit.**

**Rule 3357.** (1) The edge of the eyecup of eyecup goggles which bears against the face shall have a smooth surface free from roughness or irregularities which might exert undue pressure or cause discomfort to the wearer. The eyecups shall be of such shape and size as to protect the entire eye sockets.

(2) Cover cup-type goggles shall provide ample clearance and not interfere with the spectacles of the wearer. The edge of the goggles which bears against the face shall have a smooth surface free from roughness or irregularities which might exert undue pressure or cause discomfort to the wearer.

**R 408.13359. Eyecup ventilation.**

**Rule 3359.** (1) Eyecups of chipper's models shall be ventilated in a manner to permit circulation of air.

(2) Eyecups of dust and splash models shall be ventilated in a manner to permit circulation of air. The ventilation openings shall be baffled or screened to prevent direct passage of dust or liquids into the interior of the eyecups.

(3) Eyecups of welder's and cutter's models shall be ventilated in a manner to permit circulation of air and shall be opaque. The ventilation openings shall be baffled to prevent passage of light rays into the interior of the eyecup.

**R 408.13360. Eyecup lenses and retaining rings.**

**Rule 3360.** (1) An eyecup shall be provided with a rigidly constructed lens retaining ring of metal or of plastic designed to accommodate lenses and to permit their ready removal and replacement without damage to the eyecup or to the lenses and without the use of tools. The ring shall provide a complete clamping action against the lens. Lens retainers for welder's and cutter's models shall accommodate a filter lens, fiber gasket, and cover lens.

(2) A filter lens shall be marked with the shade designation and a permanent and legible marking by which the manufacturer may be readily identified. A glass filter lens, when treated for impact resistance, shall also be marked with the letter "H".

**R 408.13362. Flexible and cushioned fitting goggles; construction.**

**Rule 3362.** Flexible and cushioned fitting goggles shall consist of a wholly flexible frame, forming a lens holder or with a separable lens holder or a rigid frame with integral lens or lenses, having a separate cushioned fitting surface on the full periphery of the facial contact area. Materials used shall be chemical-resistant, nontoxic, nonirritating, and slow burning. There shall be a positive means of support on the face, such as an adjustable headband of suitable material or other suitable means of support to retain the frame comfortable and snugly in place in front of the eyes. A frame which is a lens holder or has a separable lens holder shall hold the lenses firmly and tightly and be removable or replaceable without the use of tools. The goggles may be ventilated or not, as required by their intended use. Where chemical goggles are ventilated, the openings shall be such as to render the goggles splashproof.

**R 408.13363. Flexible and cushioned fitting goggles; protection.**

**Rule 3363.** (1) Chipper's models of flexible and cushioned fitting goggles shall provide protection against impact.

(2) Dust and splash models shall provide protection from fine dusts, fumes, liquids, splashes, mists, and spray, alone or with reflected light or glare, wind, and impact.

(3) Gas welder's and cutter's models shall provide protection against glare, injurious radiations, and impact.

**R 408.13364. Flexible and cushioned fitting goggles; marking.**

**Rule 3364.** (1) The frame of flexible and cushioned fitting goggles shall bear a trademark or name identifying the manufacturer.

(2) Each separate lens shall be distinctly marked in a manner by which the manufacturer may be identified.

(3) A heat-treated glass filter plate or lens shall also be marked with the shade designation and the letter "H".

(4) The marking shall be clear cut and permanent and so placed as not to interfere with the vision of the wearer.

**R 408.13366. Foundrymen's goggles; construction.**

**Rule 3366.** (1) A foundryman's goggles shall consist of a mask made of a flexible, nonirritating, and noncombustible or slow-burning material, such as a leather or flexible plastic, suitable ends holders attached thereto, lenses, and a positive means of support on the face, such as an adjustable headband, to retain the mask comfortably and snugly in place in front of the eyes. The edge of the mask on contact with the face shall be provided with a binding of corduroy or other suitable material. The lens holders shall hold the lenses firmly and tightly and may be readily removable or replaceable. The lens holders shall be ventilated to permit circulation of air.

**R 408.13367 Foundrymen's goggles; protection.**

**Rule 3367.** (1) A foundryman's goggles shall provide protection against impact and hot-metal splash hazards encountered in foundry operations such as melting, pouring, chipping, babbitting, grinding, and riveting. Where required, they shall also provide protection against dusts.

(2) Applications for use of foundryman's goggles are shown in Table 1 or R 408.13312(7).

(3) Materials shall resist flame, corrosion, water, and sanitizing.

**R 408.13369. Metal, plastic, and combination metal and plastic spectacles.**

**Rule 3369.** (1) Spectacles of metal, plastic, or a combination thereof, shall consist of 2 lenses in a frame which supports the lenses around their entire periphery of suitable size and shape for the purpose intended connected by a nose bridge, and retained on the face by temples or other suitable means. The spectacles shall be furnished with or without sideshields depending upon their intended use. The frames, temples, and sideshields may be metal or plastic and when made of plastic shall be of the slow-burning type.

(2) Spectacles shall provide protection to the eye from flying objects, and, when required, from glare and injurious radiations. Spectacles without sideshields are intended to provide frontal protection. Where side as well as frontal protection is required, the spectacles shall be provided with sideshields. See Table 1 of R 408.13312(7).

(3) Frames shall be designed for industrial exposure and shall bear a trademark identifying the manufacturer on both fronts and temples. The frame front shall carry a designation of the eye size and bridge size, where applicable. Temples shall be marked as to the overall length or fitting value.

(4) Temples may be of the cable or spatula type, as specified, and shall be of such design as to permit adjustment and fit comfortably and securely on the wearer. The size of the temples shall be clearly marked.

(5) Safety lens in frames which do not comply with this part shall not be worn.

## HEAD PROTECTION EQUIPMENT

**R 408.13370. Head protection generally.**

**Rule 3370.** (1) An employer shall ensure that each affected employee shall be provided with, and shall wear, head protection equipment and accessories when the employee is required to be present in areas where a hazard exists from falling or flying objects or from other harmful contacts or exposures or where there is a risk of injury from electric shock, hair entanglement, chemicals, or temperature extremes.

(2) Service facilities shall be provided for the sanitizing and replacement of needed parts when necessary and before head protection equipment is reissued.

(3) Head protection equipment that has been physically altered or damaged shall not be worn or reissued to an employee.

(4) An employee shall not physically alter, and shall guard against damage to, the head protection equipment provided.

(5) An employee shall use the provided head protection equipment in accordance with the instructions and training received.

**R 408.13372. Head protection; adoption of standards by reference.**

**Rule 3372.** (1) Protective helmets purchased after July 5, 1994, shall be in compliance with American national standards institute standard Z89.1-1986, entitled "Requirements for Protective Headwear for Industrial Workers," or shall be demonstrated to be equally effective. The standard is adopted by reference in these rules and may be purchased from the American National Standards Institute, 11 West 42nd Street, New York, New York 10036, or from the Safety Standards Division, Michigan Department of Consumer and Industry Services, Box 30643, Lansing, Michigan 48909, at a cost at the time of adoption of these rules of $12.00.

(2) Protective helmets purchased before July 5, 1994, shall be in compliance with American national standards institute standard Z89.1-1969, entitled "Requirements for Industrial Head Protection," or shall be demonstrated by the employer to be equally effective. The standard is adopted by reference in these rules and may be purchased from the American National Standards Institute, 11 West 42nd Street, New York, New York 10036, or from the Safety Standards Division, Michigan Department of Consumer and Industry Services, Box 30643, Lansing, Michigan 48909, at a cost at the time of adoption of these rules of $12.00.

**R 408.13375. Protective helmets.**

**Rule 3375.** (1) Protective helmets or safety hats and caps shall be of the following types:

(a) Class - A - Limited voltage protection.
(b) Class - B - High voltage protection.
(c) Class - C - No voltage protection.
(d) Class - D - Limited voltage protection – fire fighters service helmets with full brim.

(2) A class C helmet or any metallic head device shall not be furnished by an employer or used by an employee for head protection, except where it has been determined that the use of other types of protective helmets or safety hats or caps is impractical, such as where chemical reaction will cause the deterioration of other types of head protection.

(3) A protective helmet furnished by an employer shall be identified on the inside of the shell with the name of the manufacturer.

(4) When used in conjunction with protective helmets, face shields, welding helmets, and goggles shall be in compliance with the requirements set forth in R 408.13311 to R 408.13369 and Michigan department of consumer and industry services, division of occupational health standards for hearing protection being R 325.60101.

(5) Winter liners and chin straps used in conjunction with class B helmets for high-voltage protection shall not contain any metallic parts or other conductive materials. Winter liners and chin straps used in areas where there is a danger of ignition from heat, flame, or chemical reaction shall be made of materials that are nonburning or flame retardant.

(6) Bump hats or caps or other limited-protection devices shall not be used as a substitute for protective helmets for the hazards described in R 408.13370.

(7) Protective helmets designed to reduce electrical shock hazard shall be worn by an employee who is near exposed electrical conductors that could come in contact with the employee's head.

**R 408.13376. Hoods.**

**Rule 3376.** (1) A hood shall be made of materials that combine mechanical strength and lightness of weight to a high degree, shall be nonirritating to the skin when subjected to perspiration and shall be capable of withstanding frequent cleaning and disinfection. Materials used in the manufacture of hoods shall also be suitable to withstand the hazards to which the user may be exposed.

(2) A hood shall bear a permanent and legible marking by which the manufacturer may be readily identified.

(3) A hood shall be designed to provide adequate ventilation for the wearer. Where air lines are used they shall be installed and used in accordance with Michigan department of consumer and industry services, division of occupational health standards.

(4) A protective helmet shall be used in conjunction with a hood where there is a head injury hazard and the hood shall be designed to accommodate such helmet.

**R 408.13378. Hair enclosures.**

**Rule 3378.** A hat, cap, or net shall be used by a person where there is a danger of hair entanglement in moving machinery or equipment, or where there is exposure to means of ignition. It shall be designed to be reasonably comfortable to the wearer, completely enclose all loose hair, and be adjustable to accommodate all head sizes. Material used for a hair enclosure shall be fast dyed, nonirritating to the skin when subjected to perspiration, and capable of withstanding frequent cleaning. It shall not be reissued from one employee to another unless it has been thoroughly sanitized.

## FOOT PROTECTION

**R 408.13383. Certification.**

**Rule 3383.** (1) All protective footwear purchased after July 5, 1994, shall bear a permanent mark to show the manufacturer's name or trademark and certification of compliance with the provisions of ANSI standard Z41-1991, entitled "Personal Protective Footwear," which is adopted by reference in these rules and which may be inspected at the Lansing office of the Michigan department of consumer and industry services. The standard may be purchased from the American National Standards Institute, 11 West 42nd Street, New York, New York 10036, or from the Michigan Department of Consumer and Industry Services, Safety Standards Division, Box 30643, Lansing, Michigan 48909, at a cost at the time of adoption of these rules of $7.00.

(2) Protective footwear purchased before July 5, 1994, shall bear a permanent mark to show the manufacturer's name or trademark and certification of compliance with American national standards institute standard Z41.1-1967, entitled "Men's Safety-Toe Footwear," which is adopted by reference in these rules and which may be inspected at the Lansing office of the Michigan department of consumer and industry services. The standard may be purchased from the American National Standards Institute, 11 West 42nd Street, New York, New York 10036, or from the Michigan Department of Consumer and Industry Services, Safety Standards Division, Box 30643, Lansing, Michigan 48909, at a cost at the time of adoption of these rules of $32.00.

**R 408.13384. Toe protection.**

**Rule 3384.** Where toe protection other than safety toe footwear is worn, the toe protection shall have an impact value of not less than that required for the safety toe footwear.

**R 408.13385. Foot protection generally.**

**Rule 3385.** (1) An employer shall ensure that each affected employee shall wear protective footwear when working in areas where an emloyee's feet are exposed to electrical hazards or where there is a danger of foot injuries due to falling or rolling objects or a danger of objects piercing the sole of the shoe. The payment for protective footwear shall be determined between the employer and the employee or shall be as determined by a collective bargaining agreement.

(2) Safety shoes and boots which are not worn over shoes and which are worn by more than 1 employee shall be maintained, cleaned, and sanitized inside and out before being issued to another employee.

**R 408.13386. Foot protection; specific requirements.**

**Rule 3386.** Where a hazard is created from a process, environment, chemical, or mechanical irritant which would cause an injury or impairment to the feet by absorption or physical contact, other than from impact, footwear, such as boots, overshoes, rubbers, wooden-soled shoes, or their equivalent, shall be used.

## ELECTRICAL PROTECTIVE EQUIPMENT

**R 408.13387. Electrical protective equipment; design; certification; use; storage.**

**Rule 3387.** (1) Insulating blankets, matting, covers, line hose, gloves, and sleeves made of rubber shall be in compliance with all of the following requirements as applicable:

(a) Blankets, gloves, and sleeves shall be produced by a seamless process.

(b) Each item shall be clearly marked as follows:

(i) Class 0 equipment shall be marked class 0.

(ii) Class 1 equipment shall be marked class 1.

(iii) Class 2 equipment shall be marked class 2.

(iv) Class 3 equipment shall be marked class 3.

(v) Class 4 equipment shall be marked class 4.

(vi) Non-ozone-resistant equipment other than matting shall be marked type 1.

(vii) Ozone-resistant equipment other than matting shall be marked type II.

(viii) Other relevant markings, such as the manufacturer's identification and the size of the equipment, may also be provided.

(c) Markings shall be nonconducting and shall be applied in a manner that does not impair the insulating qualities of the equipment.

(d) Markings on gloves shall be confined to the cuff portion of the glove.

(2) Equipment shall be capable of withstanding the alternating current proof test voltage specified in table 4 or the direct current proof test voltage specified in table 5. The proof test shall reliably indicate that the equipment can withstand the voltage involved. The test voltage shall be applied continuously for 3 minutes for equipment other than matting and shall be applied continuously for 1 minute for matting.

(3) Gloves shall also be capable of withstanding the alternating current proof test voltage specified in table 4 after a 16-hour water soak. When the alternating current proof test is used on gloves, the 60-hertz proof test current may not be more than the values specified in table 4 at any time during the test period. If the alternating current test is made at a frequency other than 60 hertz, the permissible proof test current shall be computed from the direct ratio of the

frequencies. For the test, gloves (right side out) shall be filled with tap water and immersed in water to a depth that is in accordance with table 6. Water shall be added to or removed from the glove, as necessary, so that the water level is the same inside and outside the glove. After the 16-hour water soak specified in this rule, the 60-hertz proof test current may exceed the values specified in table 4 by not more than 2 milliamperes.

(4) Equipment that has been subjected to a minimum breakdown voltage test may not be used for electrical protection. See subrule (3) of this rule.

(5) Material used for type II insulating equipment shall be capable of withstanding an ozone test without visible effects. The ozone test shall reliably indicate that the material will resist ozone exposure in actual use. Any visible signs of ozone deterioration of the material, such as checking, cracking, breaks, or pitting, is evidence of failure to meet the requirements for ozone-resistant material. See subrule (3) of this rule.

(6) Equipment shall be free of harmful physical irregularities that can be detected by the tests or inspections required under this rule. Surface irregularities that may be present on all rubber goods because of imperfections on forms or molds or because of inherent difficulties in the manufacturing process and that may appear as indentations, protuberances, or imbedded foreign material are acceptable if both of the following conditions are satisfied:

(a) The indentation or protuberance blends into a smooth slope when the material is stretched.

(b) Foreign material remains in place when the insulating material is folded and stretches with the insulating material surrounding it.

(7) The standards listed in table 3 are adopted by reference in these rules and may be inspected at the Lansing office of the department of consumer and industry services. The ANSI standards may be purchased from the American National Standards Institute, 11 West 42nd Street, New York, New York 10018, and the ASTM standards may be purchased from the American Society of Test and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428, or any of the standards may be purchased from the Michigan Department of Consumer and Industry Services, Safety Standards Division, Box 30643, Lansing, Michigan 48909, at a cost at the time of adoption of these rules as listed in Table 3.

**TABLE 3**
**ITEM ANSI-ASTM COST**

| ITEM | ANSI-ASTM | COST |
|---|---|---|
| Rubber insulating gloves | D 120-87el | $16.50 |
| Rubber matting for use around electrical apparatus | D 178-88 | $16.50 |
| Rubber insulating blankets | D 1048-88Ael | $16.50 |
| Rubber insulating covers | D 1049-88 | $16.50 |
| Rubber insulating line hose | D 1050-90 | $16.50 |
| Rubber insulating sleeves | D 1051-87 | $16.50 |
| In-service care – line hose and covers | F 478-92 | $15.00 |
| In-service care insulating blankets | F 479-88a | $15.00 |
| In-service care of insulating gloves and sleeves | F 496-91 | $12.00 |
| These standards contain specifications for conducting the various tests required in subrules (1) to (6) of this rule. | | |

(8) Electrical protective equipment shall be maintained in a safe, reliable condition.

(9) All of the following specific requirements apply to insulating blankets, covers, line hose, gloves, and sleeves made of rubber as applicable:

(a) Maximum use voltages shall conform to the voltages listed in table 7.

(b) Insulating equipment shall be inspected for damage before each days use and immediately following any incident that can reasonably be suspected of having caused damage. Insulating gloves shall be given an air test in addition to being inspected.

(c) Insulating equipment that has any of the following defects shall not be used:
  (i) A hole, tear, puncture, or cut.
  (ii) Ozone cutting or ozone checking, the cutting action produced by ozone on rubber under mechanical stress into a series of interlacing cracks.
  (iii) An embedded foreign object.
  (iv) Any of the following texture changes:
    (a) Swelling.
    (b) Softening.
    (c) Hardening.
    (d) Becoming sticky or inelastic.
  (v) Any other defect that damages the insulating properties.

(d) Insulating equipment found to have other defects that might affect its insulating properties shall be removed from service and returned for testing under subdivisions (h) and (j) of this subrule.

(e) Insulating equipment shall be cleaned as needed to remove foreign substances.

(f) Insulating equipment shall be stored in a location and in a manner to protect it from all of the following:
  (i) Light.
  (ii) Temperature extremes.
  (iii) Excessive humidity.
  (iv) Ozone.
  (v) Other injurious substances and conditions.

(g) Protector gloves shall be worn over insulating gloves, except that protector gloves need not be used with class 0 gloves under limited-use conditions or where small equipment and parts manipulation necessitate unusually high finger dexterity. Any other class of glove may be used for similar work without protector gloves if the employer can demonstrate that the possibility of physical damage to the gloves is small and if the class of glove is 1 class higher than that required for the voltage involved. Insulating gloves that have been used without protector gloves shall not be used at a higher voltage until they have been tested under the provisions of subdivisions (h) and (i) of this subrule.

Extra care shall be taken when visually examining gloves and to avoid handling sharp objects.

(h) Electrical protective equipment shall be subjected to periodic electrical tests. Test voltages and the maximum intervals between tests shall be in accordance with table 7 and table 8.

(i) The test method used in this rule shall reliably indicate whether the insulating equipment can withstand the voltages involved. The standard electrical test methods considered as meeting this requirement are listed in table 3.

(j) Only insulating equipment that passes inspection or electrical tests may be used by employees, except that rubber insulating line hose may be used in shorter lengths if the defective portion is cut off. Rubber insulating blankets may be repaired using a compatible patch that results in physical and electrical properties equal to those of the blanket. Rubber insulating blankets may be salvaged by severing the defective area from the undamaged portion of the blanket. The resulting undamaged area may not be less than 22 inches by 22 inches (560mm by 560mm) for class 1, 2, 3, and 4 blankets. Rubber insulating gloves and sleeves that have minor physical defects, such as small cuts, tears, or punctures, may be repaired by applying a compatible patch. Also, rubber insulating gloves and sleeves that have minor surface blemishes may be repaired with a compatible liquid compound. The patched area shall have electrical and physical properties equal to those of the surrounding material. Repairs to gloves are permitted only in the area between the wrist and the reinforced edge of the opening.

(k) Repaired insulating equipment shall be retested before it may be used by employees.

(l) An employer shall certify that equipment has been tested in accordance with the requirements of R 408.13387(9)(h), (l), and (k) of this subrule. The certification shall identify the equipment that passed the test and the date it was tested. The marking of equipment and entering the results of the tests and the dates of testing onto logs are acceptable means of equipment identification.

(10) Material other than rubber that offers protection equivalent to or greater than rubber may be used if the material is certified to meet the appropriate ANSI-ASTM standard tests.

(11) An insulated blanket, glove, or sleeve shall be capable of withstanding the voltage to which it may be subjected.

(12) Exposed conductors or equipment, or both, except for conductors or equipment being directly worked on, which is energized from 750 volts to 28,000 volts phase to ground and which an employee may reach into or touch shall be isolated or covered with at least 1 of the following:

(a) An insulating blanket.

(b) An insulating hood.

(c) An insulating line hose.

(d) An insulating barrier.

(13) An employee shall use insulating gloves and sleeves capable of withstanding the imposed voltage when performing any of the following activities:

(a) Working directly on, or within reaching distance of, a conductor or equipment at a nominal 750 volts or more phase to ground, except when using barehanded techniques or a hot stick. Sleeves are not required for an employee who performs routine switching operations in a substation or powerhouse. An employee who uses gloves and sleeves and works directly on or within reaching distance of a conductor or equipment energized at more than 5,000 volts phase to ground shall do so from an insulated platform or board or an aerial device that has an insulated basket.

(b) Connecting or disconnecting primary neutrals, pole ground wires, or other conductors normally connected to static wires or energized equipment, except that gloves and sleeves need not be worn while connecting and disconnecting a service neutral or secondary neutral.

(c) Working on a de-energized conductor that extends into an area in which contact may be made with an energized conductor or exposed parts of energized equipment, unless the conductor is grounded or isolated. Insulating sleeves are optional at voltages of less than 750 volts phase to ground.

(14) An employee shall use insulating gloves capable of withstanding the imposed voltage when performing either of the following activities:

(a) When working with a powered or manual hole digger while using booms or using winch lines to install or remove poles or equipment where the hole digger may contact conductors or equipment energized at a voltage of 300 volts or more phase to ground. An employee need not use the gloves while in the enclosed cab of the equipment.

(b) When working directly on a conductor or equipment energized at a voltage of more than 240 volts phase to ground. This does not include the use of test equipment.

**TABLE 4**

ALTERNATING CURRENT PROOF-TEST REQUIREMENTS

| | | MAXIMUM PROFF-TEST CURRENT, Ma (Globes Only) | | | |
|---|---|---|---|---|---|
| **CLASS OF EQUIPMENT** | **PROOF-TEST VOLTAGE RMS V** | **267MM (10.5 in.) glove** | **356MM (14 in.) glove** | **406MM (16 in.) glove** | **457MM (18 in.) glove** |
| 0 | 5,000 | 8 | 12 | 14 | 16 |
| 1 | 10,000 | | 14 | 16 | 18 |
| 2 | 20,000 | | 16 | 18 | 20 |
| 3 | 30,000 | | 18 | 20 | 22 |
| 4 | 40,000 | | | 22 | 24 |

**TABLE 5**
DIRECT CURRENT PROOF-TEST REQUIREMENTS

| CLASS OF EQUIPMENT | PROFF-TEST VOLTAGE |
|---|---|
| 0 | 20,000 |
| 1 | 40,000 |
| 2 | 50,000 |
| 3 | 60,000 |
| 4 | 70,000 |

NOTE: The direct current voltages listed in this table are not appropriate for proof-testing rubber insulating line hose or covers. For this equipment, direct current proof tests shall use a voltage high enough to indicate that the equipment can be safely used to the voltages listed in table 6. See ASTM D1050-90 and ASTM D1049-88 for further information on proof tests for rubber insulating line hose and covers.

**TABLE 6**
GLOVE TESTS – WATER LEVEL 1, 2

| CLASS OF GLOVE | ALTERNATING CURRETN PROOF TEST | | DIRECT CURRENT PROOF TEST | |
|---|---|---|---|---|
| | mm. | Inches | mm. | Inches |
| 0 | 38 | 1.5 | 38 | 1.5 |
| 1 | 38 | 1.5 | 51 | 2.0 |
| 2 | 64 | 2.5 | 76 | 3.0 |
| 3 | 89 | 3.5 | 102 | 4.0 |
| 4 | 127 | 5.0 | 153 | 6.0 |

1. The water level is given as the clearance from the cuff of the glove to the waterline, with a tolerance of ± 13mm. (± 0.5 inches).
2. If atmospheric conditions make the specified clearances impractical, the clearances may be increased by a maximum of 25mm. (1 inch).

**TABLE 7**
RUBBER INSULATING EQUIPMENT VOLTAGE REQUIREMENTS

| CLASS OF EQUIPMENT | MAXIMUM USE VOLTAGE | RETEST VOLTAGE ALTERNATING CURRENT ROOT MEAN SQUARE | RETEST VOLTAGE DIRECT CURRENT AVERAGE |
|---|---|---|---|
| 0 | 1,000 | 5,000 | 20,000 |
| 1 | 7,500 | 10,000 | 40,000 |
| 2 | 17,000 | 20,000 | 50,000 |
| 3 | 26,500 | 30,000 | 60,000 |
| 4 | 36,000 | 40,000 | 70,000 |

1 The maximum use voltage is the alternating current voltage (root mean square) classification of the protective equipment that designates the maximum nominal design voltage of the energized system that may be safely worked. The nominal voltage is equal to the phase-to-phase voltage on multiphase circuits. However, the phase-to-ground potential is considered to be the nominal design voltage in either of the following situations:
(a) If there is no multiphase exposure in a system area and if the voltage exposure is limited to the phase-to-ground potention.
(b) If the electrical equipment and devices are insulated or isolated, or both, so that the multiphase exposure on a grounded wye circuit is removed.
2 The proof-test voltage shall be applied continuously for not less than 1 minute, but not more than 3 minutes.

**TABLE 8**
RUBBER INSULATING EQUIPMENT TEST INTERVALS

| TYPE OF EQUIPMENT | WHEN TO TEST |
|---|---|
| RUBBER INSULATING LINE HOSE | UPON INDICATION THAT INSULATING VALUE IS SUSPECT. |
| RUBBER INSULATING COVERS | UPON INDICATION THAT INSULATING VALUE IS SUSPECT. |
| RUBBER INSULATING BLANKETS | BEFORE FIRST ISSUE AND EVERY 12 MONTHS THEREAFTER. |
| RUBBER INSULATING GLOVES | BEFORE FIRST ISSUE AND EVERY 6 MONTHS THEREAFTER. |
| RUBBER INSULATING SLEEVES | BEFORE FIRST ISSUE AND EVERY 12 MONTHS THEREAFTER. |

If the insulating equipment has been electrically tested, but not issued for service, the equipment may not be placed into service unless it has been electrically tested within the previous 12 months.

## SAFETY BELTS, HARNESSES, LIFELINES, AND LANYARDS

**R 408.13390. General requirements; safety belts, safety harnesses, lifelines, and lanyards generally.**

**Rule 3390.** (1) Unless a safety net is used as prescribed in construction safety standard, Part 45. Fall Protection, being R 408.44501 et seq. of the Michigan Administrative Code, or an employee is protected by a perimeter guardrail or is working on a portable ladder, the employee shall be safeguarded by a safety belt or safety harness secured to a lifeline or structure capable of sustaining the imposed load, if the employee's work station is more than 25 feet above the ground, floor, water, or other surface. The safety belt and harness and any lifeline or lanyard shall be used only for

safeguarding the employee. A safety belt, safety harness, lifeline, or lanyard subjected to in-service loading, rather than static loading, shall be removed from service and shall not be used again for employee safeguarding.

(2) Safety belt, safety harness, and lanyard hardware shall be made of cadmium-plated, drop forged or pressed steel or metal of equivalent strength with edges free of sharp edges. The safety belt and lanyard hardware shall withstand a tensile load of 4,000 pounds without cracking, breaking, or permanent deformation. A lineman's body belt "D" ring and snaps shall withstand 5,000 pounds tensile test and the buckle 2,000 pounds tensile test.

(3) A lifeline shall be secured above the employee's workplace to an anchorage or structural member capable of supporting a dead weight of not less than 5,400 pounds.

(4) A lifeline shall not be less than 3/4-inch manila rope or a material of equivalent strength, having a breaking strength of not less than 5,400 foot pounds except where the lifeline is used on rock-scaling operation or in areas where the lifeline may be subject to cutting or abrasion, the line shall be not less than 7/8-inch manila rope with a wire core.

(5) A lanyard or safety strap shall be not less than 1/2-inch nylon rope or its equivalent with a maximum length to provide a free fall of not more than 6 feet. The breaking strength of the lanyard shall be not less than 5,400 pounds.

(6) A safety belt, safety strap, safety harness, lanyard, or lifeline, including the hardware, shall be inspected before using each day.

(7) A safety belt, safety harness, lifeline, or lanyard shall be stored in a clean dry area away from excessive heat or other deteriorating conditions.

(8) A lifeline or lanyard made of synthetic fibers shall not be kinked, run over sharp corners, used when frozen, left in freezing temperatures when wet, or exposed to sources of ignition or flame.

## HAND PROTECTION

**R 408.13392. Hand protection generally.**

**Rule 3392.** (1) An employer shall select and require employees to use appropriate hand protection when employee's hands are exposed to hazards that may cause any of the following:

(a) Skin absorption of harmful substances.
(b) Severe cuts or lacerations.
(c) Severe abrasions.
(d) Punctures.
(e) Chemical burns.
(f) Thermal burns.
(g) Harmful temperature extremes.

(2) An employer shall base the selection of the appropriate hand protection on an evaluation of the performance characteristics of the hand protection relative to all of the following:

(a) The task to be performed.
(b) Conditions present.
(c) Duration of use.
(d) The hazards and potential hazards identified.

(3) Hand protection interiors shall be kept free of corrosive or irritating contaminants. If more than 1 employee wears a pair of gloves, the gloves shall be sanitized before reissuance.

**R 408.13394. Body protection.**

**Rule 3394.** (1) An employer shall assure that an employee who is required to work so that his or her clothing becomes wet due to a condition other than the weather or perspiration shall use such aprons, coats, jackets, sleeves, or other garments that will keep his or her clothing dry. The material shall be unaffected by the wetting agent. The provision of dry, clean, acid-resistant clothing, in addition to rubber shoes or short boots and an apron, shall be considered a satisfactory substitute where small parts are cleaned, plated, or acid-dipped in an open tank.

(2) When abrasive blasting is not protected by an enclosure, the operator shall use heavy canvas or leather gloves and aprons or equivalent protection to provide protection from the impact of abrasives.

**R 408.13398. Rescission.**

**Rule 3398.** The following general industry safety standards promulgated by the general industry safety standards commission pursuant to Act No. 154 of the Public Acts of 1974, as amended, being §408.1001 et seq. of the Michigan Compiled Laws, are rescinded:

(a) R 408.13101 to R 408.13135 of the Michigan Administrative Code, appearing on pages 3,717 to 3,721 of the 1979 Michigan Administrative Code and pages 136 and 137 of Quarterly Supplement No. 6 to the 1979 Code.
(b) R 408.13201 to R 408.13241 of the Michigan Administrative Code, appearing on pages 3,724 to 3,738 of the 1979 Michigan Administrative Code.
(c) R 408.13501 to R 408.13569 of the Michigan Administrative Code, appearing on pages 3,724 to 3,738 of the 1979 Michigan Administrative Code.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# DEPARTMENT OF LABOR & ECONOMIC GROWTH

## DIRECTOR'S OFFICE

## OCCUPATIONAL HEALTH STANDARDS

Filed with the Secretary of State on **April 5, 1999**

These rules take effect 15 days after filing with the Secretary of State

(By authority conferred on the director of the department of consumer and industry services by section 24 of Act No. 154 of the Public Acts of 1974, as amended, and Executive Reorganization Order Nos. 1996-1 and 1996-2, being §§408.1024, 330.3101, and 445.2001 of the Michigan Compiled Laws)

Visit our web site at: www.michigan.gov/mioshastandards

# PART 451. RESPIRATORY PROTECTION

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**R 325.60051 Scope and application.**

**Rule 1.** (1) In the control of occupational diseases caused by breathing air contaminated with harmful dusts, fog, fumes, mists, gases, smokes, spray, or vapors, the primary objective shall be to prevent atmospheric contamination. The prevention of atmospheric contamination shall be accomplished, as far as feasible, by accepted engineering control measures. When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used pursuant to these rules.

(2) These rules replace occupational health rule 3502(1) to (7).

**R 325.60052 Adoption by reference of federal standard.**

**Rule 2.** (1) The federal occupational safety and health administration's regulations on respiratory protection promulgated by the United States department of labor and codified at 29 C.F.R. §1910.134, respiratory protection, January 8, 1998, and corrections appearing in the Federal Register on pp. 20098 to 20099, April 23, 1998, are adopted by reference in these rules as of the effective date of these rules.

(2) The adopted federal regulations shall have the same force and effect as a rule promulgated under Act No. 154 of the Public Acts of 1974, as amended, being §408.1001 et seq. of the Michigan Compiled Laws.

(3) The adopted federal regulations are available without cost as of the time of adoption of these rules from the United States Department of Labor, OSHA, 801 South Waverly, Room 306, Lansing, Michigan 48917, or from the Michigan Department of Consumer and Industry Services, Standards Division, P.O. Box 30643, Lansing, Michigan 48909.

**§1910.134 Respiratory Protection.**

This section applies to General Industry (part 1910), Shipyards (part 1915), Marine Terminals (part 1917), Longshoring (part 1918), and Construction (part 1926).

**(a) Permissible practice.**

(a)(1)In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective shall be to prevent atmospheric contamination. This shall be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used pursuant to this section.

(a)(2) Respirators shall be provided by the employer when such equipment is necessary to protect the health of the employee. The employer shall provide the respirators which are applicable and suitable for the purpose intended. The employer shall be responsible for the establishment and maintenance of a respiratory protection program which shall include the requirements outlined in paragraph (c) of this section.

**(b) Definitions.**

The following definitions are important terms used in the respiratory protection standard in this section.

**Air-purifying respirator** means a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

**Assigned protection factor (APF)** [Reserved]

**Atmosphere-supplying respirator** means a respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

**Canister or cartridge** means a container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

**Demand respirator** means an atmosphere-supplying respirator that admits breathing air to the facepiece only when a negative pressure is created inside the facepiece by inhalation.

**Emergency situation** means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

**Employee exposure** means exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection.

**End-of-service-life indicator (ESLI)** means a system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

**Escape-only respirator** means a respirator intended to be used only for emergency exit.

**Filter or air purifying element** means a component used in respirators to remove solid or liquid aerosols from the inspired air.

**Filtering facepiece (dust mask)** means a negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.

**Fit factor** means a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

**Fit test** means the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual. (See also Qualitative fit test QLFT and Quantitative fit test QNFT.)

**Helmet** means a rigid respiratory inlet covering that also provides head protection against impact and penetration.

**High efficiency particulate air (HEPA)** filter means a filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

**Hood** means a respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

**Immediately dangerous to life or health (IDLH)** means an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

**Interior structural firefighting** means the physical activity of fire suppression, rescue or both, inside of buildings or enclosed structures which are involved in a fire situation beyond the incipient stage. (See 29 CFR 1910.155)

**Loose-fitting facepiece** means a respiratory inlet covering that is designed to form a partial seal with the face.

**Maximum use concentration (MUC)** [Reserved].

**Negative pressure respirator (tight fitting)** means a respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

**Oxygen deficient atmosphere** means an atmosphere with an oxygen content below 19.5% by volume.

**Physician or other licensed health care professional (PLHCP)** means an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required by paragraph (e) of this section.

**Positive pressure respirator** means a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

**Powered air-purifying respirator (PAPR)** means an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

**Pressure demand respirator** means a positive pressure atmosphere-supplying respirator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation.

**Qualitative fit test (QLFT)** means a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

**Quantitative fit test (QNFT)** means an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

**Respiratory inlet covering** means that portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both. It may be a facepiece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

**Self-contained breathing apparatus (SCBA)** means an atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

**Service life** means the period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer.

**Supplied-air respirator (SAR) or airline respirator** means an atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

**This section** means this respiratory protection standard.

**Tight-fitting facepiece** means a respiratory inlet covering that forms a complete seal with the face.

**User seal check** means an action conducted by the respirator user to determine if the respirator is properly seated to the face.

**(c) Respiratory protection program.**

This paragraph requires the employer to develop and implement a written respiratory protection program with required worksite-specific procedures and elements for required respirator use. The program must be administered by a suitably trained program administrator. In addition, certain program elements may be required for voluntary use to prevent potential hazards associated with the use of the respirator. The Small Entity Compliance Guide contains criteria for the selection of a program administrator and a sample program that meets the requirements of this paragraph. Copies of the Small Entity Compliance Guide will be available on or about April 8, 1998 from the Occupational Safety and Health Administration's Office of Publications, Room N 3101, 200 Constitution Avenue, NW, Washington, DC, 20210 (202-219-4667).

(c)(1) In any workplace where respirators are necessary to protect the health of the employee or whenever respirators are required by the employer, the employer shall establish and implement a written respiratory protection program with worksite-specific procedures. The program shall be updated as necessary to reflect those changes in workplace conditions that affect respirator use. The employer shall include in the program the following provisions of this section, as applicable:

(c)(1)(i) Procedures for selecting respirators for use in the workplace;

(c)(1)(ii) Medical evaluations of employees required to use respirators;

(c)(1)(iii) Fit testing procedures for tight-fitting respirators;

(c)(1)(iv) Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations;

(c)(1)(v) Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators;

(c)(1)(vi) Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators;

(c)(1)(vii) Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations;

(c)(1)(viii) Training of employees in the proper use of respirators, including putting on and removing them, any limitations on their use, and their maintenance; and

(c)(1)(ix) Procedures for regularly evaluating the effectiveness of the program.

(c)(2) . Where respirator use is not required:

(c)(2)(i) An employer may provide respirators at the request of employees or permit employees to use their own respirators, if the employer determines that such respirator use will not in itself create a hazard. If the employer determines that any voluntary respirator use is permissible, the employer shall provide the respirator users with the information contained in Appendix D to this section ("Information for Employees Using Respirators When Not Required Under the Standard"); and

(c)(2)(ii) In addition, the employer must establish and implement those elements of a written respiratory protection program necessary to ensure that any employee using a respirator voluntarily is medically able to use that respirator, and that the respirator is cleaned, stored, and maintained so that its use does not present a health hazard to the user. Exception: Employers are not required to include in a written respiratory protection program those employees whose only use of respirators involves the voluntary use of filtering facepieces (dust masks).

(c)(3) The employer shall designate a program administrator who is qualified by appropriate training or experience that is commensurate with the complexity of the program to administer or oversee the respiratory protection program and conduct the required evaluations of program effectiveness.

(c)(4) The employer shall provide respirators, training, and medical evaluations at no cost to the employee.

**(d) Selection of respirators.**

This paragraph requires the employer to evaluate respiratory hazard(s) in the workplace, identify relevant workplace and user factors, and base respirator selection on these factors. The paragraph also specifies appropriately protective respirators for use in IDLH atmospheres, and limits the selection and use of air-purifying respirators.

(d)(1) General requirements.

(d)(1)(i) The employer shall select and provide an appropriate respirator based on the respiratory hazard(s) to which the worker is exposed and workplace and user factors that affect respirator performance and reliability.

(d)(1)(ii) The employer shall select a NIOSH-certified respirator. The respirator shall be used in compliance with the conditions of its certification.

(d)(1)(iii) The employer shall identify and evaluate the respiratory hazard(s) in the workplace; this evaluation shall include a reasonable estimate of employee exposures to respiratory hazard(s) and an identification of the contaminant's chemical state and physical form. Where the employer cannot identify or reasonably estimate the employee exposure, the employer shall consider the atmosphere to be IDLH.

(d)(1)(iv) The employer shall select respirators from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.

(d)(2) Respirators for IDLH atmospheres.

(d)(2)(i) The employer shall provide the following respirators for employee use in IDLH atmospheres:

(d)(2)(i)(A) A full facepiece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes, or

(d)(2)(i)(B) A combination full facepiece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply.

(d)(2)(ii) Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

(d)(2)(iii) All oxygen-deficient atmospheres shall be considered IDLH. Exception: If the employer demonstrates that, under all foreseeable conditions, the oxygen concentration can be maintained within the ranges specified in Table II of this section (i.e., for the altitudes set out in the table), then any atmosphere-supplying respirator may be used.

(d)(3) Respirators for atmospheres that are not IDLH.

(d)(3)(i) The employer shall provide a respirator that is adequate to protect the health of the employee and ensure compliance with all other OSHA statutory and regulatory requirements, under routine and reasonably foreseeable emergency situations.

(d)(3)(i)(A) Assigned Protection Factors (APFs) [Reserved]

(d)(3)(i)(B) Maximum Use Concentration (MUC) [Reserved]

(d)(3)(ii) The respirator selected shall be appropriate for the chemical state and physical form of the contaminant.

(d)(3)(iii) For protection against gases and vapors, the employer shall provide:

(d)(3)(iii)(A) An atmosphere-supplying respirator, or

(d)(3)(iii)(B) An air-purifying respirator, provided that:

(d)(3)(iii)(B)(1) The respirator is equipped with an end-of-service-life indicator (ESLI) certified by NIOSH for the contaminant; or

(d)(3)(iii)(B)(2) If there is no ESLI appropriate for conditions in the employer's workplace, the employer implements a change schedule for canisters and cartridges that is based on objective information or data that will ensure that canisters and cartridges are changed before the end of their service life. The employer shall describe in the respirator program the information and data relied upon and the basis for the canister and cartridge change schedule and the basis for reliance on the data.

(d)(3)(iv) For protection against particulates, the employer shall provide:

(d)(3)(iv)(A) An atmosphere-supplying respirator; or

(d)(3)(iv)(B) An air-purifying respirator equipped with a filter certified by NIOSH under 30 CFR part 11 as a high efficiency particulate air (HEPA) filter, or an air-purifying respirator equipped with a filter certified for particulates by NIOSH under 42 CFR part 84; or

(d)(3)(iv)(C) For contaminants consisting primarily of particles with mass median aerodynamic diameters (MMAD) of at least 2 micrometers, an air- purifying respirator equipped with any filter certified for particulates by NIOSH.

TABLE I. -- Assigned Protection Factors [Reserved]

TABLE II.

| Altitude (ft.) | Oxygen deficient Atmospheres ($\%O_2$) for which the employer may rely on atmosphere-supplying respirators. |
|---|---|
| Less than 3,001 | 16.0-19.5 |
| 3,001-4,000 | 16.4-19.5 |
| 4,001-5,000 | 17.1-19.5 |
| 5,001-6,000 | 17.8-19.5 |
| 6,001-7,000 | 18.5-19.5 |
| 7,001-8,000* | 19.3-19.5 |

** Above 8,000 feet the exception does not apply. Oxygen-enriched breathing air must be supplied above 14,000 feet.*

**(e) Medical evaluation.**

Using a respirator may place a physiological burden on employees that varies with the type of respirator worn, the job and workplace conditions in which the respirator is used, and the medical status of the employee. Accordingly, this paragraph specifies the minimum requirements for medical evaluation that employers must implement to determine the employee's ability to use a respirator.

(e)(1) General. The employer shall provide a medical evaluation to determine the employee's ability to use a respirator, before the employee is fit tested or required to use the respirator in the workplace. The employer may discontinue an employee's medical evaluations when the employee is no longer required to use a respirator.

(e)(2) Medical evaluation procedures.

(e)(2)(i) The employer shall identify a physician or other licensed health care professional (PLHCP) to perform medical evaluations using a medical questionnaire or an initial medical examination that obtains the same information as the medical questionnaire.

(e)(2)(ii) The medical evaluation shall obtain the information requested by the questionnaire in Sections 1 and 2, Part A of Appendix C of this section.

(e)(3) Follow-up medical examination.

(e)(3)(i) The employer shall ensure that a follow-up medical examination is provided for an employee who gives a positive response to any question among questions 1 through 8 in Section 2, Part A of Appendix C or whose initial medical examination demonstrates the need for a follow-up medical examination.

(e)(3)(ii) The follow-up medical examination shall include any medical tests, consultations, or diagnostic procedures that the PLHCP deems necessary to make a final determination.

(e)(4) Administration of the medical questionnaire and examinations.

(e)(4)(i) The medical questionnaire and examinations shall be administered confidentially during the employee's normal working hours or at a time and place convenient to the employee. The medical questionnaire shall be administered in a manner that ensures that the employee understands its content.

(e)(4)(ii) The employer shall provide the employee with an opportunity to discuss the questionnaire and examination results with the PLHCP.

(e)(5) Supplemental information for the PLHCP.

(e)(5)(i) The following information must be provided to the PLHCP before the PLHCP makes a recommendation concerning an employee's ability to use a respirator:

(e)(5)(i)(A) The type and weight of the respirator to be used by the employee;

(e)(5)(i)(B) The duration and frequency of respirator use (including use for rescue and escape);

(e)(5)(i)(C) The expected physical work effort;

(e)(5)(i)(D) Additional protective clothing and equipment to be worn; and

(e)(5)(i)(E) Temperature and humidity extremes that may be encountered.

(e)(5)(ii) Any supplemental information provided previously to the PLHCP regarding an employee need not be provided for a subsequent medical evaluation if the information and the PLHCP remain the same.

(e)(5)(iii) The employer shall provide the PLHCP with a copy of the written respiratory protection program and a copy of this section.

Note to Paragraph (e)(5)(iii): When the employer replaces a PLHCP, the employer must ensure that the new PLHCP obtains this information, either by providing the documents directly to the PLHCP or having the documents transferred from the former PLHCP to the new PLHCP. However, OSHA does not expect employers to have employees medically reevaluated solely because a new PLHCP has been selected.

(e)(6) Medical determination. In determining the employee's ability to use a respirator, the employer shall:

(e)(6)(i) Obtain a written recommendation regarding the employee's ability to use the respirator from the PLHCP. The recommendation shall provide only the following information:

(e)(6)(i)(A) Any limitations on respirator use related to the medical condition of the employee, or relating to the workplace conditions in which the respirator will be used, including whether or not the employee is medically able to use the respirator;

(e)(6)(i)(B) The need, if any, for follow-up medical evaluations; and

(e)(6)(i)(C) A statement that the PLHCP has provided the employee with a copy of the PLHCP's written recommendation.

(e)(6)(ii) If the respirator is a negative pressure respirator and the PLHCP finds a medical condition that may place the employee's health at increased risk if the respirator is used, the employer shall provide a PAPR if the PLHCP's medical evaluation finds that the employee can use such a respirator; if a subsequent medical evaluation finds that the employee is medically able to use a negative pressure respirator, then the employer is no longer required to provide a PAPR.

(e)(7) Additional medical evaluations. At a minimum, the employer shall provide additional medical evaluations that comply with the requirements of this section if:

(e)(7)(i) An employee reports medical signs or symptoms that are related to ability to use a respirator;

(e)(7)(ii) A PLHCP, supervisor, or the respirator program administrator informs the employer that an employee needs to be reevaluated;

(e)(7)(iii) Information from the respiratory protection program, including observations made during fit testing and program evaluation, indicates a need for employee reevaluation; or

(e)(7)(iv) A change occurs in workplace conditions (e.g., physical work effort, protective clothing, temperature) that may result in a substantial increase in the physiological burden placed on an employee.

**(f) Fit testing.**

This paragraph requires that, before an employee may be required to use any respirator with a negative or positive pressure tight-fitting facepiece, the employee must be fit tested with the same make, model, style, and size of respirator that will be used. This paragraph specifies the kinds of fit tests allowed, the procedures for conducting them, and how the results of the fit tests must be used.

(f)(1) The employer shall ensure that employees using a tight-fitting facepiece respirator pass an appropriate qualitative fit test (QLFT) or quantitative fit test (QNFT) as stated in this paragraph.

(f)(2) The employer shall ensure that an employee using a tight- fitting facepiece respirator is fit tested prior to initial use of the respirator, whenever a different respirator facepiece (size, style, model or make) is used, and at least annually thereafter.

(f)(3) The employer shall conduct an additional fit test whenever the employee reports, or the employer, PLHCP, supervisor, or program administrator makes visual observations of, changes in the employee's physical condition that could affect respirator fit. Such conditions include, but are not limited to, facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight.

(f)(4) If after passing a QLFT or QNFT, the employee subsequently notifies the employer, program administrator, supervisor, or PLHCP that the fit of the respirator is unacceptable, the employee shall be given a reasonable opportunity to select a different respirator facepiece and to be retested.

(f)(5) The fit test shall be administered using an OSHA-accepted QLFT or QNFT protocol. The OSHA-accepted QLFT and QNFT protocols and procedures are contained in Appendix A of this section.

(f)(6) QLFT may only be used to fit test negative pressure air- purifying respirators that must achieve a fit factor of 100 or less.

(f)(7) If the fit factor, as determined through an OSHA-accepted QNFT protocol, is equal to or greater than 100 for tight-fitting half facepieces, or equal to or greater than 500 for tight-fitting full facepieces, the QNFT has been passed with that respirator.

(f)(8) Fit testing of tight-fitting atmosphere-supplying respirators and tight-fitting powered air-purifying respirators shall be accomplished by performing quantitative or qualitative fit testing in the negative pressure mode, regardless of the mode of operation (negative or positive pressure) that is used for respiratory protection.

(f)(8)(i) Qualitative fit testing of these respirators shall be accomplished by temporarily converting the respirator user's actual facepiece into a negative pressure respirator with appropriate filters, or by using an identical negative pressure air-purifying respirator facepiece with the same sealing surfaces as a surrogate for the atmosphere-supplying or powered air-purifying respirator facepiece.

(f)(8)(ii) Quantitative fit testing of these respirators shall be accomplished by modifying the facepiece to allow sampling inside the facepiece in the breathing zone of the user, midway between the nose and mouth. This requirement shall be accomplished by installing a permanent sampling probe onto a surrogate facepiece, or by using a sampling adapter designed to temporarily provide a means of sampling air from inside the facepiece.

(f)(8)(iii) Any modifications to the respirator facepiece for fit testing shall be completely removed, and the facepiece restored to NIOSH-approved configuration, before that facepiece can be used in the workplace.

**(g) Use of respirators.**

This paragraph requires employers to establish and implement procedures for the proper use of respirators. These requirements include prohibiting conditions that may result in facepiece seal leakage, preventing employees from removing respirators in hazardous environments, taking actions to ensure continued effective respirator operation throughout the work shift, and establishing procedures for the use of respirators in IDLH atmospheres or in interior structural firefighting situations.

(g)(1) Facepiece seal protection.

(g)(1)(i) The employer shall not permit respirators with tight-fitting facepieces to be worn by employees who have:

(g)(1)(i)(A) Facial hair that comes between the sealing surface of the facepiece and the face or that interferes with valve function; or

(g)(1)(i)(B) Any condition that interferes with the face-to-facepiece seal or valve function.

(g)(1)(ii) If an employee wears corrective glasses or goggles or other personal protective equipment, the employer shall ensure that such equipment is worn in a manner that does not interfere with the seal of the facepiece to the face of the user.

(g)(1)(iii) For all tight-fitting respirators, the employer shall ensure that employees perform a user seal check each time they put on the respirator using the procedures in Appendix B-1 or procedures recommended by the respirator manufacturer that the employer demonstrates are as effective as those in Appendix B-1 of this section.

(g)(2) Continuing respirator effectiveness.

(g)(2)(i) Appropriate surveillance shall be maintained of work area conditions and degree of employee exposure or stress. When there is a change in work area conditions or degree of employee exposure or stress that may affect respirator effectiveness, the employer shall reevaluate the continued effectiveness of the respirator.

(g)(2)(ii) The employer shall ensure that employees leave the respirator use area:

(g)(2)(ii)(A) To wash their faces and respirator facepieces as necessary to prevent eye or skin irritation associated with respirator use; or

(g)(2)(ii)(B) If they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece; or

(g)(2)(ii)(C) To replace the respirator or the filter, cartridge, or canister elements.

(g)(2)(iii) If the employee detects vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece, the employer must replace or repair the respirator before allowing the employee to return to the work area.

(g)(3) Procedures for IDLH atmospheres. For all IDLH atmospheres, the employer shall ensure that:

(g)(3)(i) One employee or, when needed, more than one employee is located outside the IDLH atmosphere;

(g)(3)(ii) Visual, voice, or signal line communication is maintained between the employee(s) in the IDLH atmosphere and the employee(s) located outside the IDLH atmosphere;

(g)(3)(iii) The employee(s) located outside the IDLH atmosphere are trained and equipped to provide effective emergency rescue;

(g)(3)(iv) The employer or designee is notified before the employee(s) located outside the IDLH atmosphere enter the IDLH atmosphere to provide emergency rescue;

(g)(3)(v) The employer or designee authorized to do so by the employer, once notified, provides necessary assistance appropriate to the situation;

(g)(3)(vi) Employee(s) located outside the IDLH atmospheres are equipped with:

(g)(3)(vi)(A) Pressure demand or other positive pressure SCBAs, or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA; and either

(g)(3)(vi)(B) Appropriate retrieval equipment for removing the employee(s) who enter(s) these hazardous atmospheres where retrieval equipment would contribute to the rescue of the employee(s) and would not increase the overall risk resulting from entry; or (g)(3)(vi)(C) Equivalent means for rescue where retrieval equipment is not required under paragraph (g)(3)(vi)(B).

(g)(4) Procedures for interior structural firefighting. In addition to the requirements set forth under paragraph (g)(3), in interior structural fires, the employer shall ensure that:

(g)(4)(i) At least two employees enter the IDLH atmosphere and remain in visual or voice contact with one another at all times;

(g)(4)(ii) At least two employees are located outside the IDLH atmosphere; and

(g)(4)(iii) All employees engaged in interior structural firefighting use SCBAs.

Note 1 to paragraph (g): One of the two individuals located outside the IDLH atmosphere may be assigned to an additional role, such as incident commander in charge of the emergency or safety officer, so long as this individual is able to perform assistance or rescue activities without jeopardizing the safety or health of any firefighter working at the incident.

Note 2 to paragraph (g): Nothing in this section is meant to preclude firefighters from performing emergency rescue activities before an entire team has assembled.

**(h) Maintenance and care of respirators.**

This paragraph requires the employer to provide for the cleaning and disinfecting, storage, inspection, and repair of respirators used by employees.

(h)(1) Cleaning and disinfecting. The employer shall provide each respirator user with a respirator that is clean, sanitary, and in good working order. The employer shall ensure that respirators are cleaned and disinfected using the procedures in Appendix B-2 of this section, or procedures recommended by the respirator manufacturer, provided that such procedures are of equivalent effectiveness. The respirators shall be cleaned and disinfected at the following intervals:

(h)(1)(i) Respirators issued for the exclusive use of an employee shall be cleaned and disinfected as often as necessary to be maintained in a sanitary condition;

(h)(1)(ii) Respirators issued to more than one employee shall be cleaned and disinfected before being worn by different individuals;

(h)(1)(iii) Respirators maintained for emergency use shall be cleaned and disinfected after each use; and

(h)(1)(iv) Respirators used in fit testing and training shall be cleaned and disinfected after each use.

(h)(2) Storage. The employer shall ensure that respirators are stored as follows:

(h)(2)(i) All respirators shall be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals, and they shall be packed or stored to prevent deformation of the facepiece and exhalation valve.

(h)(2)(ii) In addition to the requirements of paragraph (h)(2)(i) of this section, emergency respirators shall be:

(h)(2)(ii)(A) Kept accessible to the work area;

(h)(2)(ii)(B) Stored in compartments or in covers that are clearly marked as containing emergency respirators; and

(h)(2)(ii)(C) Stored in accordance with any applicable manufacturer instructions.

(h)(3) Inspection.

(h)(3)(i) The employer shall ensure that respirators are inspected as follows:

(h)(3)(i)(A) All respirators used in routine situations shall be inspected before each use and during cleaning;

(h)(3)(i)(B) All respirators maintained for use in emergency situations shall be inspected at least monthly and in accordance with the manufacturer's recommendations, and shall be checked for proper function before and after each use; and

(h)(3)(i)(C) Emergency escape-only respirators shall be inspected before being carried into the workplace for use.

(h)(3)(ii) The employer shall ensure that respirator inspections include the following:

(h)(3)(ii)(A) A check of respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the facepiece, head straps, valves, connecting tube, and cartridges, canisters or filters; and

(h)(3)(ii)(B) A check of elastomeric parts for pliability and signs of deterioration.

(h)(3)(iii) In addition to the requirements of paragraphs (h)(3)(i) and (ii) of this section, self-contained breathing apparatus shall be inspected monthly. Air and oxygen cylinders shall be maintained in a fully charged state and shall be recharged when the pressure falls to 90% of the manufacturer's recommended pressure level. The employer shall determine that the regulator and warning devices function properly.

(h)(3)(iv) For respirators maintained for emergency use, the employer shall:

(h)(3)(iv)(A) Certify the respirator by documenting the date the inspection was performed, the name (or signature) of the person who made the inspection, the findings, required remedial

action, and a serial number or other means of identifying the inspected respirator; and (B) Provide this information on a tag or label that is attached to the storage compartment for the respirator, is kept with the respirator, or is included in inspection reports stored as paper or electronic files. This information shall be maintained until replaced following a subsequent certification.

(h)(4) Repairs. The employer shall ensure that respirators that fail an inspection or are otherwise found to be defective are removed from service, and are discarded or repaired or adjusted in accordance with the following procedures:

(h)(4)(i) Repairs or adjustments to respirators are to be made only by persons appropriately trained to perform such operations and shall use only the respirator manufacturer's NIOSH-approved parts designed for the respirator;

(h)(4)(ii) Repairs shall be made according to the manufacturer's recommendations and specifications for the type and extent of repairs to be performed; and

(h)(4)(iii) Reducing and admission valves, regulators, and alarms shall be adjusted or repaired only by the manufacturer or a technician trained by the manufacturer.

**(i) Breathing air quality and use.**

This paragraph requires the employer to provide employees using atmosphere-supplying respirators (supplied-air and SCBA) with breathing gases of high purity.

(i)(1) The employer shall ensure that compressed air, compressed oxygen, liquid air, and liquid oxygen used for respiration accords with the following specifications:

(i)(1)(i) Compressed and liquid oxygen shall meet the United States Pharmacopoeia requirements for medical or breathing oxygen; and

(i)(1)(ii) Compressed breathing air shall meet at least the requirements for Grade D breathing air described in ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1-1989, to include:

(i)(1)(ii)(A) Oxygen content (v/v) of 19.5-23.5%;

(i)(1)(ii)(B) Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less;

(i)(1)(ii)(C) Carbon monoxide (CO) content of 10 ppm or less;

(i)(1)(ii)(D) Carbon dioxide content of 1,000 ppm or less; and

(i)(1)(ii)(E) Lack of noticeable odor.

(i)(2) The employer shall ensure that compressed oxygen is not used in atmosphere-supplying respirators that have previously used compressed air.

(i)(3) The employer shall ensure that oxygen concentrations greater than 23.5% are used only in equipment designed for oxygen service or distribution.

(i)(4) The employer shall ensure that cylinders used to supply breathing air to respirators meet the following requirements:

(i)(4)(i) Cylinders are tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR part 173 and part 178);

(i)(4)(ii) Cylinders of purchased breathing air have a certificate of analysis from the supplier that the breathing air meets the requirements for Grade D breathing air; and

(i)(4)(iii) The moisture content in the cylinder does not exceed a dew point of -50°F (-45.6°C) at 1 atmosphere pressure.

(i)(5) The employer shall ensure that compressors used to supply breathing air to respirators are constructed and situated so as to:

(i)(5)(i) Prevent entry of contaminated air into the air-supply system;

(i)(5)(ii) Minimize moisture content so that the dew point at 1 atmosphere pressure is 10 degrees F (5.56°C) below the ambient temperature;

(i)(5)(iii) Have suitable in-line air-purifying sorbent beds and filters to further ensure breathing air quality. Sorbent beds and filters shall be maintained and replaced or refurbished periodically following the manufacturer's instructions.

(i)(5)(iv) Have a tag containing the most recent change date and the signature of the person authorized by the employer to perform the change. The tag shall be maintained at the compressor.

(i)(6) For compressors that are not oil-lubricated, the employer shall ensure that carbon monoxide levels in the breathing air do not exceed 10 ppm.

(i)(7) For oil-lubricated compressors, the employer shall use a high- temperature or carbon monoxide alarm, or both, to monitor carbon monoxide levels. If only high-temperature alarms are used, the air supply shall be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10 ppm.

(i)(8) The employer shall ensure that breathing air couplings are incompatible with outlets for nonrespirable worksite air or other gas systems. No asphyxiating substance shall be introduced into breathing air lines.

(i)(9) The employer shall use breathing gas containers marked in accordance with the NIOSH respirator certification standard, 42 CFR part 84.

**(j) Identification of filters, cartridges, and canisters.**

The employer shall ensure that all filters, cartridges and canisters used in the workplace are labeled and color coded with the NIOSH approval label and that the label is not removed and remains legible.

**(k) Training and information.**

This paragraph requires the employer to provide effective training to employees who are required to use respirators. The training must be comprehensive, understandable, and recur annually, and more often if necessary. This paragraph also requires the employer to provide the basic information on respirators in Appendix D of this section to employees who wear respirators when not required by this section or by the employer to do so.

(k)(1) The employer shall ensure that each employee can demonstrate knowledge of at least the following:

(k)(1)(i) Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator;

(k)(1)(ii) What the limitations and capabilities of the respirator are;

(k)(1)(iii) How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions;

(k)(1)(iv) How to inspect, put on and remove, use, and check the seals of the respirator;

(k)(1)(v) What the procedures are for maintenance and storage of the respirator;

(k)(1)(vi) How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators; and

(k)(1)(vii) The general requirements of this section.

(k)(2) The training shall be conducted in a manner that is understandable to the employee.

(k)(3) The employer shall provide the training prior to requiring the employee to use a respirator in the workplace.

(k)(4) An employer who is able to demonstrate that a new employee has received training within the last 12 months that addresses the elements specified in paragraph (k)(1)(i) through (vii) is not required to repeat such training provided that, as required by paragraph (k)(1), the employee can demonstrate knowledge of those element(s). Previous training not repeated initially by the employer must be provided no later than 12 months from the date of the previous training.

(k)(5) Retraining shall be administered annually, and when the following situations occur:

(k)(5)(i) Changes in the workplace or the type of respirator render previous training obsolete;

(k)(5)(ii) Inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill; or

(k)(5)(iii) Any other situation arises in which retraining appears necessary to ensure safe respirator use.

(k)(6) The basic advisory information on respirators, as presented in Appendix D of this section, shall be provided by the employer in any written or oral format, to employees who wear respirators when such use is not required by this section or by the employer.

**(l) Program evaluation.**

This section requires the employer to conduct evaluations of the workplace to ensure that the written respiratory protection program is being properly implemented, and to consult employees to ensure that they are using the respirators properly.

(l)(1) The employer shall conduct evaluations of the workplace as necessary to ensure that the provisions of the current written program are being effectively implemented and that it continues to be effective.

(l)(2) The employer shall regularly consult employees required to use respirators to assess the employees' views on program effectiveness and to identify any problems. Any problems that are identified during this assessment shall be corrected. Factors to be assessed include, but are not limited to:

(l)(2)(i) Respirator fit (including the ability to use the respirator without interfering with effective workplace performance);

(l)(2)(ii) Appropriate respirator selection for the hazards to which the employee is exposed;

(l)(2)(iii) Proper respirator use under the workplace conditions the employee encounters; and (l)(2)(iv) Proper respirator maintenance.

**(m) Recordkeeping.**

This section requires the employer to establish and retain written information regarding medical evaluations, fit testing, and the respirator program. This information will facilitate employee involvement in the respirator program, assist the employer in auditing the adequacy of the program, and provide a record for compliance determinations by OSHA.

(m)(1) Medical evaluation. Records of medical evaluations required by this section must be retained and made available in accordance with 29 CFR 1910.1020.

(m)(2) Fit testing.

(m)(2)(i) The employer shall establish a record of the qualitative and quantitative fit tests administered to an employee including:

(m)(2)(i)(A) The name or identification of the employee tested;

(m)(2)(i)(B) Type of fit test performed;

(m)(2)(i)(C) Specific make, model, style, and size of respirator tested;

(m)(2)(i)(D) Date of test; and

(m)(2)(i)(E) The pass/fail results for QLFTs or the fit factor and strip chart recording or other recording of the test results for QNFTs.

(m)(2)(ii) Fit test records shall be retained for respirator users until the next fit test is administered.

(m)(3) A written copy of the current respirator program shall be retained by the employer.

(m)(4) Written materials required to be retained under this paragraph shall be made available upon request to affected employees and to the Assistant Secretary or designee for examination and copying.

**(n) Dates.**

(n)(1) Effective date. This section is effective April 8, 1998. The obligations imposed by this section commence on the effective date unless otherwise noted in this paragraph. Compliance with obligations that do not commence on the effective date shall occur no later than the applicable start-up date.

(n)(2) Compliance dates. All obligations of this section commence on the effective date except as follows:

(n)(2)(i) The determination that respirator use is required (paragraph (a)) shall be completed no later than September 8, 1998.

(n)(2)(ii) Compliance with provisions of this section for all other provisions shall be completed no later than October 5, 1998.

(n)(3) The provisions of 29 CFR 1910.134 and 29 CFR 1926.103, contained in the 29 CFR parts 1900 to 1910.99 and the 29 CFR part 1926 editions, revised as of July 1, 1997, are in effect and enforceable until October 5, 1998, or during any administrative or judicial stay of the provisions of this section.

(n)(4) Existing Respiratory Protection Programs. If, in the 12 month period preceding April 8, 1998, the employer has conducted annual respirator training, fit testing, respirator program evaluation, or medical evaluations, the employer may use the results of those activities to comply with the corresponding provisions of this section, providing that these activities were conducted in a manner that meets the requirements of this section.

**(o) Appendices.**

(o)(1) Compliance with Appendix A, Appendix B-1, Appendix B-2, and Appendix C of this section is mandatory.

(o)(2) Appendix D of this section is non-mandatory and is not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

[63 FR 1152, Jan. 8, 1998; 63 FR 20098, April 23, 1998]

**Appendix A to § 1910.134: Fit Testing Procedures (Mandatory)**

**Part I. OSHA-Accepted Fit Test Protocols**

**A. Fit Testing Procedures--General Requirements**

The employer shall conduct fit testing using the following procedures. The requirements in this appendix apply to all OSHA- accepted fit test methods, both QLFT and QNFT.

1. The test subject shall be allowed to pick the most acceptable respirator from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.
2. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension

and how to determine an acceptable fit. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This instruction may not constitute the subject's formal training on respirator use, because it is only a review.

3. The test subject shall be informed that he/she is being asked to select the respirator that provides the most acceptable fit. Each respirator represents a different size and shape, and if fitted and used properly, will provide adequate protection.
4. The test subject shall be instructed to hold each chosen facepiece up to the face and eliminate those that obviously do not give an acceptable fit.
5. The more acceptable facepieces are noted in case the one selected proves unacceptable; the most comfortable mask is donned and worn at least five minutes to assess comfort. Assistance in assessing comfort can be given by discussing the points in the following item A.6. If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.
6. Assessment of comfort shall include a review of the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator:
   (a) Position of the mask on the nose
   (b) Room for eye protection
   (c) Room to talk
   (d) Position of mask on face and cheeks
7. The following criteria shall be used to help determine the adequacy of the respirator fit:
   (a) Chin properly placed;
   (b) Adequate strap tension, not overly tightened;
   (c) Fit across nose bridge;
   (d) Respirator of proper size to span distance from nose to chin;
   (e) Tendency of respirator to slip;
   (f) Self-observation in mirror to evaluate fit and respirator position.
8. The test subject shall conduct a user seal check, either the negative and positive pressure seal checks described in Appendix B-1 of this section or those recommended by the respirator manufacturer which provide equivalent protection to the procedures in Appendix B-1. Before conducting the negative and positive pressure checks, the subject shall be told to seat the mask on the face by moving the head from side-to-side and up and down slowly while taking in a few slow deep breaths. Another facepiece shall be selected and retested if the test subject fails the user seal check tests.
9. The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface, such as stubble beard growth, beard, mustache or sideburns which cross the respirator sealing surface. Any type of apparel which interferes with a satisfactory fit shall be altered or removed.
10. If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician or other licensed health care professional, as appropriate, to determine whether the test subject can wear a respirator while performing her or his duties.
11. If the employee finds the fit of the respirator unacceptable, the test subject shall be given the opportunity to select a different respirator and to be retested.
12. Exercise regimen. Prior to the commencement of the fit test, the test subject shall be given a description of the fit test and the test subject's responsibilities during the test procedure. The description of the process shall include a description of the test exercises that the subject will be performing. The respirator to be tested shall be worn for at least 5 minutes before the start of the fit test.
13. The fit test shall be performed while the test subject is wearing any applicable safety equipment that may be worn during actual respirator use which could interfere with respirator fit.
14. Test Exercises. (a) The following test exercises are to be performed for all fit testing methods prescribed in this appendix, except for the CNP method. A separate fit testing exercise regimen is contained in the CNP protocol. The test subject shall perform exercises, in the test environment, in the following manner:
    (1) Normal breathing. In a normal standing position, without talking, the subject shall breathe normally.
    (2) Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply, taking caution so as not to hyperventilate.
    (3) Turning head side to side. Standing in place, the subject shall slowly turn his/her head from side to side between the extreme positions on each side. 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/her head up and down. 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.
    Rainbow Passage
    When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.
    (6) Grimace. The test subject shall grimace by smiling or frowning. (This applies only to QNFT testing; it is not performed for QLFT)
    (7) Bending over. The test subject shall bend at the waist as if he/she were to touch his/her toes. Jogging in place shall be substituted for this exercise in those test environments such as shroud type QNFT or QLFT units that do not permit bending over at the waist.
    (8) Normal breathing. Same as exercise (1).
    (b) Each test exercise shall be performed for one minute except for the grimace exercise which shall be performed for 15 seconds. 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 unacceptable, another model of respirator shall be tried. The respirator shall not be adjusted once the fit test exercises begin. Any adjustment voids the test, and the fit test must be repeated.

**B. Qualitative Fit Test (QLFT) Protocols**

**1. General**

(a) The employer shall ensure that persons administering QLFT are able to prepare test solutions, calibrate equipment and perform tests properly, recognize invalid tests, and ensure that test equipment is in proper working order.

(b) The employer shall ensure that QLFT equipment is kept clean and well maintained so as to operate within the parameters for which it was designed.

**2. Isoamyl Acetate Protocol**

Note: This protocol is not appropriate to use for the fit testing of particulate respirators. If used to fit test particulate respirators, the respirator must be equipped with an organic vapor filter.

(a) Odor Threshold Screening

Odor threshold screening, performed without wearing a respirator, is intended to determine if the individual tested can detect the odor of isoamyl acetate at low levels.

(1) Three 1 liter glass jars with metal lids are required.

(2) Odor-free water (e.g., distilled or spring water) at approximately 25°C (77°F) shall be used for the solutions.

(3) The isoamyl acetate (IAA) (also known at isopentyl acetate) stock solution is prepared by adding 1 ml of pure IAA to 800 ml of odor-free water in a 1 liter jar, closing the lid and shaking for 30 seconds. A new solution shall be prepared at least weekly.

(4) The screening test shall be conducted in a room separate from the room used for actual fit testing. The two rooms shall be well-ventilated to prevent the odor of IAA from becoming evident in the general room air where testing takes place.

(5) The odor test solution is prepared in a second jar by placing 0.4 ml of the stock solution into 500 ml of odor-free water using a clean dropper or pipette. The solution shall be shaken for 30 seconds and allowed to stand for two to three minutes so that the IAA concentration above the liquid may reach equilibrium. This solution shall be used for only one day.

(6) A test blank shall be prepared in a third jar by adding 500 cc of odor-free water.

(7) The odor test and test blank jar lids shall be labeled (e.g., 1 and 2) for jar identification. Labels shall be placed on the lids so that they can be peeled off periodically and switched to maintain the integrity of the test.

(8) The following instruction shall be typed on a card and placed on the table in front of the two test jars (i.e., 1 and 2): "The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the covers are on tight, then shake each bottle for two seconds. Unscrew the lid of each bottle, one at a time, and sniff at the mouth of the bottle. Indicate to the test conductor which bottle contains banana oil."

(9) The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.

(10) If the test subject is unable to correctly identify the jar containing the odor test solution, the IAA qualitative fit test shall not be performed.

(11) If the test subject correctly identifies the jar containing the odor test solution, the test subject may proceed to respirator selection and fit testing.

(b) Isoamyl Acetate Fit Test

(1) The fit test chamber shall be a clear 55-gallon drum liner suspended inverted over a 2-foot diameter frame so that the top of the chamber is about 6 inches above the test subject's head. If no drum liner is available, a similar chamber shall be constructed using plastic sheeting. The inside top center of the chamber shall have a small hook attached.

(2) Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors.

(3) After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well-ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.

(4) A copy of the test exercises and any prepared text from which the subject is to read shall be taped to the inside of the test chamber.

(5) Upon entering the test chamber, the test subject shall be given a 6-inch by 5-inch piece of paper towel, or other porous, absorbent, single-ply material, folded in half and wetted with 0.75 ml of pure IAA. The test subject shall hang the wet towel on the hook at the top of the chamber. An IAA test swab or ampule may be substituted for the IAA wetted paper towel provided it has been demonstrated that the alternative IAA source will generate an IAA test atmosphere with a concentration equivalent to that generated by the paper towel method.

(6) Allow two minutes for the IAA test concentration to stabilize before starting the fit test exercises. This would be an appropriate time to talk with the test subject; to explain the fit test, the importance of his/her cooperation, and the purpose for the test exercises; or to demonstrate some of the exercises.

(7) If at any time during the test, the subject detects the banana-like odor of IAA, the test is failed. The subject shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.

(8) If the test is failed, the subject shall return to the selection room and remove the respirator. The test subject shall repeat the odor sensitivity test, select and put on another respirator, return to the test area and again begin the fit test procedure described in (b) (1) through (7) above. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject shall wait at least 5 minutes before retesting. Odor sensitivity will usually have returned by this time.

(9) If the subject passes the test, the efficiency of the test procedure shall be demonstrated by having the subject break the respirator face seal and take a breath before exiting the chamber.

(10) When the test subject leaves the chamber, the subject shall remove the saturated towel and return it to the person conducting the test, so that there is no significant IAA concentration buildup in the chamber during subsequent tests. The used towels

shall be kept in a self-sealing plastic bag to keep the test area from being contaminated.

**3. Saccharin Solution Aerosol Protocol**

The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) Taste threshold screening. The saccharin taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of saccharin.

(1) During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches in diameter by 14 inches tall with at least the front portion clear and that allows free movements of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly, parts # FT 14 and # FT 15 combined, is adequate.

(2) The test enclosure shall have a 3/4-inch (1.9 cm) hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

(3) The test subject shall don the test enclosure. Throughout the threshold screening test, the test subject shall breathe through his/her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a sweet taste.

(4) Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the threshold check solution into the enclosure. The nozzle is directed away from the nose and mouth of the person. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

(5) The threshold check solution is prepared by dissolving 0.83 gram of sodium saccharin USP in 100 ml of warm water. It can be prepared by putting 1 ml of the fit test solution (see (b)(5) below) in 100 ml of distilled water.

(6) To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely, then released and allowed to fully expand.

(7) Ten squeezes are repeated rapidly and then the test subject is asked whether the saccharin can be tasted. If the test subject reports tasting the sweet taste during the ten squeezes, the screening test is completed. The taste threshold is noted as ten regardless of the number of squeezes actually completed.

(8) If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the second ten squeezes, the screening test is completed. The taste threshold is noted as twenty regardless of the number of squeezes actually completed.

(9) If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the third set of ten squeezes, the screening test is completed. The taste threshold is noted as thirty regardless of the number of squeezes actually completed.

(10) The test conductor will take note of the number of squeezes required to solicit a taste response.

(11) If the saccharin is not tasted after 30 squeezes (step 10), the test subject is unable to taste saccharin and may not perform the saccharin fit test.

Note to paragraph 3. (a): If the test subject eats or drinks something sweet before the screening test, he/she may be unable to taste the weak saccharin solution.

(12) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

(13) Correct use of the nebulizer means that approximately 1 ml of liquid is used at a time in the nebulizer body.

(14) The nebulizer shall be thoroughly rinsed in water, shaken dry, and refilled at least each morning and afternoon or at least every four hours.

(b) Saccharin solution aerosol fit test procedure.

(1) The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.

(2) The fit test uses the same enclosure described in 3.(a) above.

(3) The test subject shall don the enclosure while wearing the respirator selected in section I. A. of this appendix. The respirator shall be properly adjusted and equipped with a particulate filter(s).

(4) A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

(5) The fit test solution is prepared by adding 83 grams of sodium saccharin to 100 ml of warm water.

(6) As before, the test subject shall breathe through the slightly open mouth with tongue extended, and report if he/she tastes the sweet taste of saccharin.

(7) The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of saccharin fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20 or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test. A minimum of 10 squeezes is required.

(8) After generating the aerosol, the test subject shall be instructed to perform the exercises in section I.A.14. of this appendix.

(9) Every 30 seconds the aerosol concentration shall be replenished using one half the original number of squeezes used initially (e.g., 5, 10 or 15).

(10) The test subject shall indicate to the test conductor if at any time during the fit test the taste of saccharin is detected. If the test subject does not report tasting the saccharin, the test is passed.

(11) If the taste of saccharin is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).

(12) Since the nebulizer has a tendency to clog during use, the test operator must make periodic checks of the nebulizer to ensure that it is not clogged. If clogging is found at the end of the test session, the test is invalid.

**4. BitrexTM (Denatonium Benzoate) Solution Aerosol Qualitative Fit Test Protocol**

The BitrexTM (Denatonium benzoate) solution aerosol QLFT protocol uses the published saccharin test protocol because that protocol is widely accepted. Bitrex is routinely used as a taste aversion agent in household liquids which children should not be drinking and is

endorsed by the American Medical Association, the National Safety Council, and the American Association of Poison Control Centers. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) Taste Threshold Screening.
The Bitrex taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of Bitrex.

(1) During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches (30.5 cm) in diameter by 14 inches (35.6 cm) tall. The front portion of the enclosure shall be clear from the respirator and allow free movement of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly, parts # FT 14 and # FT 15 combined, is adequate.

(2) The test enclosure shall have a 3/4 inch (1.9 cm) hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

(3) The test subject shall don the test enclosure. Throughout the threshold screening test, the test subject shall breathe through his or her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a bitter taste

(4) Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the Threshold Check Solution into the enclosure. This Nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

(5) The Threshold Check Solution is prepared by adding 13.5 milligrams of Bitrex to 100 ml of 5% salt (NaCl) solution in distilled water.

(6) To produce the aerosol, the nebulizer bulb is firmly squeezed so that the bulb collapses completely, and is then released and allowed to fully expand.

(7) An initial ten squeezes are repeated rapidly and then the test subject is asked whether the Bitrex can be tasted. If the test subject reports tasting the bitter taste during the ten squeezes, the screening test is completed. The taste threshold is noted as ten regardless of the number of squeezes actually completed.

(8) If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the second ten squeezes, the screening test is completed. The taste threshold is noted as twenty regardless of the number of squeezes actually completed.

(9) If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the third set of ten squeezes, the screening test is completed. The taste threshold is noted as thirty regardless of the number of squeezes actually completed.

(10) The test conductor will take note of the number of squeezes required to solicit a taste response.

(11) If the Bitrex is not tasted after 30 squeezes (step 10), the test subject is unable to taste Bitrex and may not perform the Bitrex fit test.

(12) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

(13) Correct use of the nebulizer means that approximately 1 ml of liquid is used at a time in the nebulizer body.

(14) The nebulizer shall be thoroughly rinsed in water, shaken to dry, and refilled at least each morning and afternoon or at least every four hours.

(b) Bitrex Solution Aerosol Fit Test Procedure.

(1) The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.

(2) The fit test uses the same enclosure as that described in 4.(a) above.

(3) The test subject shall don the enclosure while wearing the respirator selected according to section I. A. of this appendix. The respirator shall be properly adjusted and equipped with any type particulate filter(s).

(4) A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

(5) The fit test solution is prepared by adding 337.5 mg of Bitrex to 200 ml of a 5% salt (NaCl) solution in warm water.

(6) As before, the test subject shall breathe through his or her slightly open mouth with tongue extended, and be instructed to report if he/she tastes the bitter taste of Bitrex.

(7) The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of the fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20 or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test.

(8) After generating the aerosol, the test subject shall be instructed to perform the exercises in section I.A.14. of this appendix.

(9) Every 30 seconds the aerosol concentration shall be replenished using one half the number of squeezes used initially (e.g., 5, 10 or 15).

(10) The test subject shall indicate to the test conductor if at any time during the fit test the taste of Bitrex is detected. If the test subject does not report tasting the Bitrex, the test is passed.

(11) If the taste of Bitrex is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).

**5. Irritant Smoke (Stannic Chloride) Protocol**

This qualitative fit test uses a person's response to the irritating chemicals released in the "smoke" produced by a stannic chloride ventilation smoke tube to detect leakage into the respirator.

(a) General Requirements and Precautions

(1) The respirator to be tested shall be equipped with high efficiency particulate air (HEPA) or P100 series filter(s).

(2) Only stannic chloride smoke tubes shall be used for this protocol.

(3) No form of test enclosure or hood for the test subject shall be used.

(4) The smoke can be irritating to the eyes, lungs, and nasal passages. The test conductor shall take precautions to minimize the test subject's exposure to irritant smoke. Sensitivity varies, and certain individuals may respond to a greater degree to irritant smoke. Care shall be taken when performing the sensitivity screening checks that determine whether the test subject can detect irritant smoke to use only the minimum amount of smoke necessary to elicit a response from the test subject.

(5) The fit test shall be performed in an area with adequate ventilation to prevent exposure of the person

conducting the fit test or the build-up of irritant smoke in the general atmosphere.

(b) Sensitivity Screening Check

The person to be tested must demonstrate his or her ability to detect a weak concentration of the irritant smoke.

(1) The test operator shall break both ends of a ventilation smoke tube containing stannic chloride, and attach one end of the smoke tube to a low flow air pump set to deliver 200 milliliters per minute, or an aspirator squeeze bulb. The test operator shall cover the other end of the smoke tube with a short piece of tubing to prevent potential injury from the jagged end of the smoke tube.

(2) The test operator shall advise the test subject that the smoke can be irritating to the eyes, lungs, and nasal passages and instruct the subject to keep his/her eyes closed while the test is performed.

(3) The test subject shall be allowed to smell a weak concentration of the irritant smoke before the respirator is donned to become familiar with its irritating properties and to determine if he/she can detect the irritating properties of the smoke. The test operator shall carefully direct a small amount of the irritant smoke in the test subject's direction to determine that he/she can detect it.

(c) Irritant Smoke Fit Test Procedure

(1) The person being fit tested shall don the respirator without assistance, and perform the required user seal check(s).

(2) The test subject shall be instructed to keep his/ her eyes closed.

(3) The test operator shall direct the stream of irritant smoke from the smoke tube toward the faceseal area of the test subject, using the low flow pump or the squeeze bulb. The test operator shall begin at least 12 inches from the facepiece and move the smoke stream around the whole perimeter of the mask. The operator shall gradually make two more passes around the perimeter of the mask, moving to within six inches of the respirator.

(4) If the person being tested has not had an involuntary response and/or detected the irritant smoke, proceed with the test exercises.

(5) The exercises identified in section I.A. 14. of this appendix shall be performed by the test subject while the respirator seal is being continually challenged by the smoke, directed around the perimeter of the respirator at a distance of six inches.

(6) If the person being fit tested reports detecting the irritant smoke at any time, the test is failed. The person being retested must repeat the entire sensitivity check and fit test procedure.

(7) Each test subject passing the irritant smoke test without evidence of a response (involuntary cough, irritation) shall be given a second sensitivity screening check, with the smoke from the same smoke tube used during the fit test, once the respirator has been removed, to determine whether he/she still reacts to the smoke. Failure to evoke a response shall void the fit test.

(8) If a response is produced during this second sensitivity check, then the fit test is passed.

C. Quantitative Fit Test (QNFT) Protocols

The following quantitative fit testing procedures have been demonstrated to be acceptable: Quantitative fit testing using a non- hazardous test aerosol (such as corn oil, polyethylene glycol 400 [PEG 400], di-2-ethyl hexyl sebacate [DEHS], or sodium chloride) generated in a test chamber, and employing instrumentation to quantify the fit of the respirator; Quantitative fit testing using ambient aerosol as the test agent and appropriate instrumentation (condensation nuclei counter) to quantify the respirator fit; Quantitative fit testing using controlled negative pressure and appropriate instrumentation to measure the volumetric leak rate of a facepiece to quantify the respirator fit.

**1. General**

(a) The employer shall ensure that persons administering QNFT are able to calibrate equipment and perform tests properly, recognize invalid tests, calculate fit factors properly and ensure that test equipment is in proper working order.

(b) The employer shall ensure that QNFT equipment is kept clean, and is maintained and calibrated according to the manufacturer's instructions so as to operate at the parameters for which it was designed.

**2. Generated Aerosol Quantitative Fit Testing Protocol**

(a) Apparatus.

(1) Instrumentation. Aerosol generation, dilution, and measurement systems using particulates (corn oil, polyethylene glycol 400 [PEG 400], di-2-ethyl hexyl sebacate [DEHS] or sodium chloride) as test aerosols shall be used for quantitative fit testing.

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

(3) When testing air-purifying respirators, the normal filter or cartridge element shall be replaced with a high efficiency particulate air (HEPA) or P100 series filter supplied by the same manufacturer.

(4) 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 test agent concentration with each inspiration and expiration at fit factors of at least 2,000. Integrators or computers that 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.

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

(6) 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 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.

(7) The test setup shall permit the person administering the test to observe the test subject inside the chamber during the test.

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

(9) 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.

(10) 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.

(11) The exhaust flow from the test chamber shall pass through an appropriate filter (i.e., high efficiency particulate filter) before release.

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

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

(14) Test respirators shall be maintained in proper working order and be inspected regularly for deficiencies such as cracks or missing valves and gaskets.

(b) Procedural Requirements.

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

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

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

(4) Immediately after the subject enters the test chamber, the test 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.

(5) A stable test agent concentration shall be obtained prior to the actual start of testing.

(6) 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. The respirator shall not be adjusted once the fit test exercises begin.

(7) 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.

(8) Calculation of fit factors.

(i) 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.

(ii) The average test chamber concentration shall be calculated as the arithmetic average of the concentration measured before and after each test (i.e., 7 exercises) or the arithmetic average of the concentration measured before and after each exercise or the true average measured continuously during the respirator sample.

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

(A) 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 that 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.

(B) 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.

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

(D) 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 exercises 1, 2, 3, etc.

(9) 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.

(10) 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.

**3. 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, style, model, and size that the employer uses and can be obtained from the respirator manufacturer or distributor. The CNC instrument manufacturer, TSI Inc., also provides probe attachments (TSI sampling adapters) that permit fit testing in an employee's own respirator. A minimum fit factor pass level of at least 100 is necessary for a half-mask respirator and a minimum fit factor pass level of at least 500 is required for a full facepiece negative pressure respirator. 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 sampling probe and line are properly attached to the facepiece and that the respirator is fitted with a particulate filter capable of preventing significant penetration by the ambient particles used for the fit test (e.g., NIOSH 42 CFR 84 series 100, series 99, or series 95 particulate filter) per manufacturer's instruction.

(2) Instruct the person to be tested to don the respirator for five minutes before the fit test starts. This purges

the ambient particles trapped inside the respirator and permits the wearer to make certain the respirator is comfortable. This individual shall already have 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; Tendency of the respirator to slip; Self-observation in a mirror to evaluate fit and respirator position.

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

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

(6) The test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.

(7) 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 unacceptable, another model of respirator shall be tried.

(b) 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) Since the pass or fail criterion of the Portacount is user programmable, the test operator shall ensure that the pass or fail criterion meet the requirements for minimum respirator performance in this Appendix.

(3) 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, style, and size of respirator used; and date tested.

**4. Controlled negative pressure (CNP) quantitative fit testing protocol.**

The CNP protocol provides an alternative to aerosol fit test methods. The CNP fit test method technology is based on exhausting air from a temporarily sealed respirator facepiece to generate and then maintain a constant negative pressure inside the facepiece. The rate of air exhaust is controlled so that a constant negative pressure is maintained in the respirator during the fit test. The level of pressure is selected to replicate the mean inspiratory pressure that causes leakage into the respirator under normal use conditions. With pressure held constant, air flow out of the respirator is equal to air flow into the respirator. Therefore, measurement of the exhaust stream that is required to hold the pressure in the temporarily sealed respirator constant yields a direct measure of leakage air flow into the respirator. The CNP fit test method measures leak rates through the facepiece as a method for determining the facepiece fit for negative pressure respirators. The CNP instrument manufacturer Dynatech Nevada also provides attachments (sampling manifolds) that replace the filter cartridges to permit fit testing in an employee's own respirator. To perform the test, the test subject closes his or her mouth and holds his/her breath, after which an air pump removes air from the respirator facepiece at a pre-selected constant pressure. The facepiece fit is expressed as the leak rate through the facepiece, expressed as milliliters per minute. The quality and validity of the CNP fit tests are determined by the degree to which the in-mask pressure tracks the test pressure during the system measurement time of approximately five seconds. Instantaneous feedback in the form of a real-time pressure trace of the in-mask pressure is provided and used to determine test validity and quality. A minimum fit factor pass level of 100 is necessary for a half-mask respirator and a minimum fit factor of at least 500 is required for a full facepiece respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) CNP Fit Test Requirements.

(1) The instrument shall have a non-adjustable test pressure of 15.0 mm water pressure.

(2) The CNP system defaults selected for test pressure shall be set at -- 15 mm of water (-0.58 inches of water) and the modeled inspiratory flow rate shall be 53.8 liters per minute for performing fit tests. (Note: CNP systems have built-in capability to conduct fit testing that is specific to unique work rate, mask, and gender situations that might apply in a specific workplace. Use of system default values, which were selected to represent respirator wear with medium cartridge resistance at a low-moderate work rate, will allow intertest comparison of the respirator fit.)

(3) The individual who conducts the CNP fit testing shall be thoroughly trained to perform the test.

(4) The respirator filter or cartridge needs to be replaced with the CNP test manifold. The inhalation valve downstream from the manifold either needs to be temporarily removed or propped open.

(5) The test subject shall be trained to hold his or her breath for at least 20 seconds.

(6) The test subject shall don the test respirator without any assistance from the individual who conducts the CNP fit test.

(7) The QNFT protocol shall be followed according to section I. C. 1. of this appendix with an exception for the CNP test exercises.

(b) CNP Test Exercises.

(1) Normal breathing. In a normal standing position, without talking, the subject shall breathe normally for 1 minute. After the normal breathing exercise, the subject needs to hold head straight ahead and hold his or her breath for 10 seconds during the test measurement.

(2) Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply for 1 minute, being careful not to hyperventilate. After the deep breathing exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during test measurement.

(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. After the turning head side to side exercise, the subject needs to hold head full left and hold his or her breath for 10 seconds during test measurement. Next, the subject needs to hold head full right and hold his or her breath for 10 seconds during test measurement.

(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). After the moving head up and down exercise, the subject shall hold his or her head full up and hold his or her breath for 10 seconds during test measurement. Next, the subject shall hold his or her head full down and hold his or her breath for 10 seconds during test measurement.

(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. After the talking exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement.

(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 that prohibit bending at the waist. After the bending over exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement.

(8) Normal Breathing. The test subject shall 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 normal breathing exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement. 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 unacceptable, another model of a respirator shall be tried.

(c) CNP Test Instrument.

(1) The test instrument shall have an effective audio warning device when the test subject fails to hold his or her breath during the test. The test shall be terminated whenever the test subject failed to hold his or her breath. The test subject may be refitted and retested.

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

**Part II. New Fit Test Protocols**

A.Any person may submit to OSHA an application for approval of a new fit test protocol. If the application meets the following criteria, OSHA will initiate a rulemaking proceeding under section 6(b)(7) of the OSH Act to determine whether to list the new protocol as an approved protocol in this Appendix A.

B. The application must include a detailed description of the proposed new fit test protocol. This application must be supported by either:

1. A test report prepared by an independent government research laboratory (e.g., Lawrence Livermore National Laboratory, Los Alamos National Laboratory, the National Institute for Standards and Technology) stating that the laboratory has tested the protocol and had found it to be accurate and reliable; or
2. An article that has been published in a peer-reviewed industrial hygiene journal describing the protocol and explaining how test data support the protocol's accuracy and reliability.

C. If OSHA determines that additional information is required before the Agency commences a rulemaking proceeding under this section, OSHA will so notify the applicant and afford the applicant the opportunity to submit the supplemental information. Initiation of a rulemaking proceeding will be deferred until OSHA has received and evaluated the supplemental information.

[63 FR 20098, April 23, 1998]

**Appendix B-1 to § 1910.134: User Seal Check Procedures (Mandatory)**

The individual who uses a tight-fitting respirator is to perform a user seal check to ensure that an adequate seal is achieved each time the respirator is put on. Either the positive and negative pressure checks listed in this appendix, or the respirator manufacturer's recommended user seal check method shall be used. User seal checks are not substitutes for qualitative or quantitative fit tests.

I. Facepiece Positive and/or Negative Pressure Checks

A. Positive pressure check. Close off the exhalation valve and exhale gently into the facepiece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece without any evidence of outward leakage of air at the seal. For most respirators this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.

B. Negative pressure check. Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently so that the facepiece collapses slightly, and hold the breath for ten seconds. The design of the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. The test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

II. Manufacturer's Recommended User Seal Check Procedures

The respirator manufacturer's recommended procedures for performing a user seal check may be used instead of the positive and/or negative pressure check procedures provided that the employer demonstrates that the manufacturer's procedures are equally effective.

[63 FR 1152, Jan. 8, 1998]

**Appendix B-2 to § 1910.134: Respirator Cleaning Procedures (Mandatory)**

These procedures are provided for employer use when cleaning respirators. They are general in nature, and the employer as an alternative may use the cleaning recommendations provided by the manufacturer of the respirators used by their employees, provided such procedures are as effective as those listed here in Appendix B-2. Equivalent effectiveness simply means that the procedures used must accomplish the objectives set forth in Appendix B-2, i.e., must ensure that the respirator is properly cleaned and disinfected in a manner that prevents damage to the respirator and does not cause harm to the user.

I. Procedures for Cleaning Respirators

A. Remove filters, cartridges, or canisters. Disassemble facepieces by removing speaking diaphragms, demand and pressure- demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.

B. Wash components in warm (43°C [110°F] maximum) water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.

C. Rinse components thoroughly in clean, warm (43 °C [110°F] maximum), preferably running water. Drain.

D. When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in one of the following:

1. Hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at 43°C (110°F); or,
2. Aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliters of tincture of iodine (6-8 grams ammonium and/or potassium iodide/100 cc of 45% alcohol) to one liter of water at 43°C (110°F); or,
3. Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.

E. Rinse components thoroughly in clean, warm (43 °C [110°F] maximum), preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on facepieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.

F. Components should be hand-dried with a clean lint-free cloth or air-dried.

G. Reassemble facepiece, replacing filters, cartridges, and canisters where necessary.

H. Test the respirator to ensure that all components work properly.

[63 FR 1152, Jan. 8, 1998]

**Appendix C to Sec. 1910.134: OSHA Respirator Medical Evaluation Questionnaire (Mandatory)**

To the employer: Answers to questions in Section 1, and to question 9 in Section 2 of Part A, do not require a medical examination.

To the employee:

Can you read (circle one): Yes/No

Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Part A. Section 1. (Mandatory) The following information must be provided by every employee who has been selected to use any type of respirator (please print).

1. Today's date: _____
2. Your name: _____
3. Your age (to nearest year): _____
4. Sex (circle one): Male/Female
5. Your height: ft. _____in._____
6. Your weight: _____ lbs.
7. Your job title: _____
8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code): _____
9. The best time to phone you at this number: _____
10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes/No
11. Check the type of respirator you will use (you can check more than one category):

a. _____ N, R, or P disposable respirator (filter-mask, non- cartridge type only).
b. _____ Other type (for example, half- or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus).

12. Have you worn a respirator (circle one): Yes/No

If "yes," what type(s): _____
_____

Part A. Section 2. (Mandatory) Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle "yes" or "no").

1. Do you currently smoke tobacco, or have you smoked tobacco in the last month: Yes/No

2. Have you ever had any of the following conditions?
   a. Seizures (fits): Yes/No
   b. Diabetes (sugar disease): Yes/No
   c. Allergic reactions that interfere with your breathing: Yes/No
   d. Claustrophobia (fear of closed-in places): Yes/No
   e. Trouble smelling odors: Yes/No

3. Have you ever had any of the following pulmonary or lung problems?
   a. Asbestosis: Yes/No
   b. Asthma: Yes/No
   c. Chronic bronchitis: Yes/No
   d. Emphysema: Yes/No
   e. Pneumonia: Yes/No
   f. Tuberculosis: Yes/No
   g. Silicosis: Yes/No
   h. Pneumothorax (collapsed lung): Yes/No
   i. Lung cancer: Yes/No
   j. Broken ribs: Yes/No
   k. Any chest injuries or surgeries: Yes/No
   l. Any other lung problem that you've been told about: Yes/No

4. Do you currently have any of the following symptoms of pulmonary or lung illness?
   a. Shortness of breath: Yes/No
   b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes/No
   c. Shortness of breath when walking with other people at an ordinary pace on level ground: Yes/No
   d. Have to stop for breath when walking at your own pace on level ground: Yes/No
   e. Shortness of breath when washing or dressing yourself: Yes/No
   f. Shortness of breath that interferes with your job: Yes/No
   g. Coughing that produces phlegm (thick sputum): Yes/No
   h. Coughing that wakes you early in the morning: Yes/No
   i. Coughing that occurs mostly when you are lying down: Yes/No
   j. Coughing up blood in the last month: Yes/No
   k. Wheezing: Yes/No
   l. Wheezing that interferes with your job: Yes/No
   m. Chest pain when you breathe deeply: Yes/No
   n. Any other symptoms that you think may be related to lung problems: Yes/No

5. Have you ever had any of the following cardiovascular or heart problems?
   a. Heart attack: Yes/No
   b. Stroke: Yes/No
   c. Angina: Yes/No
   d. Heart failure: Yes/No
   e. Swelling in your legs or feet (not caused by walking): Yes/No
   f. Heart arrhythmia (heart beating irregularly): Yes/No

g. High blood pressure: Yes/No
h. Any other heart problem that you've been told about: Yes/No

6. Have you ever had any of the following cardiovascular or heart symptoms?
a. Frequent pain or tightness in your chest: Yes/No
b. Pain or tightness in your chest during physical activity: Yes/No
c. Pain or tightness in your chest that interferes with your job: Yes/No
d. In the past two years, have you noticed your heart skipping or missing a beat: Yes/No
e. Heartburn or indigestion that is not related to eating: Yes/ No
f. Any other symptoms that you think may be related to heart or circulation problems: Yes/No

7. Do you currently take medication for any of the following problems?
a. Breathing or lung problems: Yes/No
b. Heart trouble: Yes/No
c. Blood pressure: Yes/No
d. Seizures (fits): Yes/No

8. If you've used a respirator, have you ever had any of the following problems? (If you've never used a respirator, check the following space and go to question 9 )
a. Eye irritation: Yes/No
b. Skin allergies or rashes: Yes/No
c. Anxiety: Yes/No
d. General weakness or fatigue: Yes/No
e. Any other problem that interferes with your use of a respirator: Yes/No

9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire: Yes/No

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-facepiece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

10. Have you ever lost vision in either eye (temporarily or permanently): Yes/No

11. Do you currently have any of the following vision problems?
a. Wear contact lenses: Yes/No
b. Wear glasses: Yes/No
c. Color blind: Yes/No
d. Any other eye or vision problem: Yes/No

12. Have you ever had an injury to your ears, including a broken ear drum: Yes/No

13. Do you currently have any of the following hearing problems?
a. Difficulty hearing: Yes/No
b. Wear a hearing aid: Yes/No
c. Any other hearing or ear problem: Yes/No

14. Have you ever had a back injury: Yes/No

15. Do you currently have any of the following musculoskeletal problems?
a. Weakness in any of your arms, hands, legs, or feet: Yes/No
b. Back pain: Yes/No
c. Difficulty fully moving your arms and legs: Yes/No
d. Pain or stiffness when you lean forward or backward at the waist: Yes/No
e. Difficulty fully moving your head up or down: Yes/No
f. Difficulty fully moving your head side to side: Yes/No
g. Difficulty bending at your knees: Yes/No
h. Difficulty squatting to the ground: Yes/No
i. Climbing a flight of stairs or a ladder carrying more than 25 lbs: Yes/No
j. Any other muscle or skeletal problem that interferes with using a respirator: Yes/No

Part B Any of the following questions, and other questions not listed, may be added to the questionnaire at the discretion of the health care professional who will review the questionnaire.

1. In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen: Yes/No
If "yes," do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions: Yes/No

2. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (e.g., gases, fumes, or dust), or have you come into skin contact with hazardous chemicals: Yes/No
If "yes," name the chemicals if you know them: _____
_____

3. Have you ever worked with any of the materials, or under any of the conditions, listed below:
a. Asbestos: Yes/No
b. Silica (e.g., in sandblasting): Yes/No
c. Tungsten/cobalt (e.g., grinding or welding this material): Yes/No
d. Beryllium: Yes/No
e. Aluminum: Yes/No
f. Coal (for example, mining): Yes/No
g. Iron: Yes/No
h. Tin: Yes/No
i. Dusty environments: Yes/No
j. Any other hazardous exposures: Yes/No
If "yes," describe these exposures: _____

4. List any second jobs or side businesses you have: _____
_____

5. List your previous occupations: _____
_____

6. List your current and previous hobbies: _____
_____

7. Have you been in the military services? Yes/No
If "yes," were you exposed to biological or chemical agents (either in training or combat): Yes/No

8. Have you ever worked on a HAZMAT team? Yes/No

9. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications): Yes/No
If "yes," name the medications if you know them: _____

10. Will you be using any of the following items with your respirator(s)?
a. HEPA Filters: Yes/No
b. Canisters (for example, gas masks): Yes/No
c. Cartridges: Yes/No

11. How often are you expected to use the respirator(s) (circle "yes" or "no" for all answers that apply to you)?:
a. Escape only (no rescue): Yes/No
b. Emergency rescue only: Yes/No
c. Less than 5 hours per week: Yes/No
d. Less than 2 hours per day: Yes/No
e. 2 to 4 hours per day: Yes/No
f. Over 4 hours per day: Yes/No

12. During the period you are using the respirator(s), is your work effort:
a. Light (less than 200 kcal per hour): Yes/No
If "yes," how long does this period last during the average shift: _____ hrs _____ mins.
Examples of a light work effort are sitting while writing, typing, drafting, or performing light assembly work; or standing while operating a drill press (1-3 lbs.) or controlling machines.
b. Moderate (200 to 350 kcal per hour): Yes/No
If "yes," how long does this period last during the average shift: _____ hrs. _____ mins.
Examples of moderate work effort are sitting while nailing or filing; driving a truck or bus in urban traffic; standing while drilling, nailing, performing assembly work, or transferring a moderate load (about 35 lbs.) at trunk level; walking on a level surface about 2 mph or down a 5-degree grade about 3 mph; or pushing a wheelbarrow with a heavy load (about 100 lbs.) on a level surface.
c. Heavy (above 350 kcal per hour): Yes/No
If "yes," how long does this period last during the average shift: _____ hrs. _____ mins.
Examples of heavy work are lifting a heavy load (about 50 lbs.) from the floor to your waist or shoulder; working on a loading dock; shoveling; standing while bricklaying or chipping castings; walking up an 8-degree grade about 2 mph; climbing stairs with a heavy load (about 50 lbs.).

13. Will you be wearing protective clothing and/or equipment (other than the respirator) when you're using your respirator: Yes/No
If "yes," describe this protective clothing and/or equipment: _____
_____

14. Will you be working under hot conditions (temperature exceeding 77 deg. F): Yes/No

15. Will you be working under humid conditions: Yes/No

16. Describe the work you'll be doing while you're using your respirator(s): _____
_____
_____

17. Describe any special or hazardous conditions you might encounter when you're using your respirator(s) (for example, confined spaces, life-threatening gases): _____
_____

18. Provide the following information, if you know it, for each toxic substance that you'll be exposed to when you're using your respirator(s):
Name of the first toxic substance: _____
Estimated maximum exposure level per shift: _____
Duration of exposure per shift _____
Name of the second toxic substance: _____
Estimated maximum exposure level per shift: _____
Duration of exposure per shift: _____
Name of the third toxic substance: _____
Estimated maximum exposure level per shift: _____
Duration of exposure per shift: _____
The name of any other toxic substances that you'll be exposed to while using your respirator: _____
_____
_____
_____

19. Describe any special responsibilities you'll have while using your respirator(s) that may affect the safety and well-being of others (for example, rescue, security):
_____

[63 FR 1152, Jan. 8, 1998; 63 FR 20098, April 23, 1998]

**Appendix D to Sec. 1910.134 (Mandatory) Information for Employees Using Respirators When Not Required Under the Standard**

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, of if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

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# DEPARTMENT OF LABOR & ECONOMIC GROWTH
# DIRECTOR'S OFFICE
# GENERAL INDUSTRY SAFETY STANDARDS

Filed with the Secretary of State on December 28, 1970 (as amended October 25, 1972) (as amended November 1, 1974) (as amended October 28, 1976) (as amended April 2, 1979) (as amended November 7, 1980) (as amended March 2, 1983), **(as amended April 11, 2000)**

These rules take effect 15 days after filing with the Secretary of State

(By authority conferred on the director of consumer and industry services by sections 16 and 21 of Act No. 154 of the Public Acts of 1974, as amended, and Executive Reorganization Order No. 1996-2, being §§408.1016, 408.1021, and 445.2001 of the Michigan Compiled Laws)

R 408.12103, R 408.12105, R 408.12106, R 408.12109, R 408.12110, R 408.12111, R 408.12132, R 408.12134, R 408.12136, R 408.12137, R 408.12138, R 408.12151, R 408.12152, R 408.12154, R 408.12155, R 408.12163, R 408.12164, R 408.12171, R 408.12172, R 408.12173 and R 408.12176 of the Michigan Administrative Code are amended and R 408.12104, R 408.12121, R 408.12130 and R 408.12135 of the Michigan Administrative Code are rescinded as follows:

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# PART 21. POWERED INDUSTRIAL TRUCKS

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## GENERAL PROVISIONS

**R 408.12101. Scope.**

**Rule 2101.** The purpose of this part is to provide, in or about places of employment, minimum safety rules for the care and use of powered industrial trucks and to provide for operator safety and specifications of equipment.

**R 408.12103. Definitions; A to C.**

**Rule 2103.** (1)"Attachment" means a device, other than conventional forks or load backrest extension, mounted permanently or removed on the elevating mechanism of a truck for handling the load. Popular attachments are fork extensions, clamps, rotating devices, side shifters, load stabilizers, rams and booms.

(2) “Cantilever truck” means a self-loading counterbalanced or noncounterbalanced truck equipped with cantilever load engaging means. (Appendix, Fig. 1).

(3) “Capacity” when referring to trucks, means:

(a) The capacity of a truck equipped with a load carriage and forks, or with attachments, is the maximum weight in pounds, at a specified load center which the truck, based on the strength of its various components and applicable stability, can lift to the maximum elevation of the load engaging means. Alternate capacities may be established at the same specified load center and at less than maximum elevation of the load engaging means.

(b) The capacity of a truck equipped with a platform is the maximum weight in pounds, at a specified load center which the truck, based on the strength of its various components, can lift to the maximum elevation of the load engaging means.

(4) “Carriage” means a support structure for forks or attachment, generally roller mounted, traveling vertically within the mast of a cantilever truck.

(5) “Center-control truck” means a truck in which the operator’s control position is located near the longitudinal center of the truck.

(6) “Counterbalanced truck” means a truck equipped with load engaging means wherein all the load during normal transporting is external to the polygon formed by the wheel contacts. (Appendix, Fig. 1).

**R 408.12104. Rescinded.**

**R 408.12105. Definitions; D to F.**

**Rule 2105.** (1)“Drift” means to move without control.

(2) “Electric truck” means a truck in which the principal energy is transmitted to motors in the form of electricity from a power source such as, but not limited to, a battery or motor generator.

(3) “End-control truck” means a truck in which the operator’s position is located at the end opposite the load.

(4) “Fixed platform truck” means a truck equipped with a load platform which is non-elevating.

(5) “Forks” means horizontal tine-like projections, normally suspended from the carriage, for engaging and supporting loads.

(6) “Fork height” means the vertical distance from the floor to the load carrying surface adjacent to the heel of the forks with mast vertical, and in the case of a reach truck, with the forks extended.

(7) “Fork-lift truck” means a light-lift self-loading truck equipped with load carriage and forks for transporting and tiering loads.

(8) “Free play” means an uncontrolled movement.

**R 408.12106. Definitions; H to I.**

**Rule 2106.** (1) “High-lift truck” means a self-loading truck equipped with an elevating mechanism designed to permit tiering. Popular types are high-lift fork trucks, high-lift ram trucks, high-lift boom trucks, high-lift clamp trucks and highlift platform trucks. (Appendix, Fig. 1).

(2) “High-lift platform truck” means a self-loading truck equipped with a load platform, intended primarily for transporting and tiering loaded skid platforms. (Appendix, Fig. 2).

(3) “Industrial crane truck” means a truck intended primarily for pick and carry use in warehousing, yarding, or industrial plant operation over improved or hard surfaced roads and yards, including maintenance within these areas.

(4) “Industrial tractor” means a truck designed primarily to draw 1 or more nonpowered trucks, trailers or other mobile loads. (Appendix, Fig. 5).

(5) “Internal combustion engine truck” means a truck in which the power source is a gas, LP gas, gasoline or diesel type engine.

(6) “Issuing authority” means an employer or his designated representative who instructed and trained the operator.

**R 408.12107. Definitions; L.**

**Rule 2107.** (1)“Liquefied petroleum gas (LP gas)” means a fuel which is composed predominantly of any of the following hydrocarbons, or mixtures of them: propane, propylene, butanes (normal butane or iso-butane) and butylenes.

(2) “Load-axle” means the truck axle nearest the load.

(3) “Load backrest extension” means a device extending vertically from the fork carriage frame.

(4) “Load center” means the horizontal longitudinal distance from the intersection of the horizontal load-carrying surfaces and vertical load-engaging faces of the forks, or equivalent load positioning structure, to the center of gravity of the load.

(5) “Load engaging means” means a load handling device attached to a powered industrial truck for the purpose of handling a load.

(6) “Low-lift truck” means a self-loading truck equipped with an elevating mechanism designed to raise the load sufficiently to permit horizontal movement. Popular types are low-lift platform trucks and pallet trucks. (Appendix, Fig. 3).

(7) “Low-lift platform truck” means a self-loading truck equipped with a load platform intended primarily for transporting loaded skid platforms. (Appendix, Fig. 3).

**R 408.12108. Definitions; M and N.**

**Rule 2108.** (1) “Mast” means a support member providing the guideways permitting vertical movement of the carriage. It is usually constructed in the form of channels or similar sections providing the supporting pathway for the carriage rollers.

(2) “Motorized hand truck” means a truck designed to be controlled by a walking operator and used to lift, tow, carry, stock and tier materials. (Appendix, Fig. 4).

(3) “Motorized hand or rider truck” means a dual purpose truck designed to be controlled by a walking operator or by a riding operator. (Appendix, Fig. 6).

(4) “Narrow aisle truck” means a self-loading truck primarily intended for right angle stacking in aisles narrower than those normally required by counterbalanced trucks of the same capacity. (Appendix, Fig. 10).

(5) “Non-elevating truck” means a noncounterbalanced truck designed primarily for burden-carrying and not capable of self-loading.

**R 408.12109. Definitions; O, P.**

**Rule 2109.** (1) “Operator” means an employee who has been trained, tested, and authorized by the present employer to operate a powered industrial truck.

(2) “Order picker truck, high-lift” means a high-lift truck controlled by the operator stationed on a platform movable with the load engaging means and intended for manual stock selection. The truck may be capable of self-loading or tiering or both. (Appendix, Fig. 9).

(3) “Overhead guard” means a framework fitted to a truck over the head of a riding operator.

(4) “Overall lowered mast height” means the maximum vertical dimension from the ground or floor to the extreme top

point of the mast with the fork carriage in the fully lowered position and unloaded.

(5) “Pallet truck” means a self-loading low-lift truck equipped with wheeled forks of dimensions to go under a single faced pallet or between the top and bottom boards of a double faced pallet and having wheels capable of lowering into spaces between the bottom boards so as to raise the pallet off the floor for transportation. (Appendix, Fig. 4).

(6) “Parking brake” means a device to prevent the movement of a stationary truck.

(7) “Powered industrial truck” or “truck” means a mobile, power driven vehicle used to carry, push, pull, lift, stack, or tier material.

**R 408.12110. Definitions; R to U.**

**Rule 2110.** (1) “Reach truck” means a self-loading truck, generally high-lift, having load engaging means mounted so the means can be extended forwardly under control to permit a load to be picked up and deposited in the extended position and transported in the retracted position. (Appendix, Fig. 7).

(2) “Rough terrain forklift truck” means a wheeled-type truck which is designed primarily as a fork truck that has a vertical mast or pivoted boom, or both, which has variable fixed length reach and which may be equipped with attachments and that is intended for operation on unimproved natural terrain as well as the disturbed terrain of construction sites. A machine that is designed primarily for earth-moving, such as a loader or dozer, even though its buckets and blades are replaced with forks or a machine that is designed primarily as an over-the-road truck that has a lifting device, is not a rough terrain forklift truck.

(3) “Self-loading” means the capability of a truck to pick up, carry, set down and, in the case of high-lift types to stack or tier its load without the aid of external means.

(4) “Service brake” means a device designed to bring a moving truck to a halt.

(5) “Side loader” means a self-loading truck, generally high-lift, having load engaging means mounted in such a manner that the means can be extended laterally under control to permit a load to be picked up and deposited in the extended position and transported in the retracted position. (Appendix, Fig. 8).

(6) “Straddle truck” means a general class of cantilever truck with horizontal structural wheel supported members extending forward from the main body of the truck, generally high-lift, for picking up and hauling loads between its outrigger arms. (Appendix, Fig. 10).

(7) “Tire” means a tire which may be standard solid, cushion solid, pneumatic or solid pneumatic style.

(8) “Tiering” means a process of placing a load on or above another load.

(9) “Unattended truck” means one which is beyond the vision or more than 25 feet from the operator, whichever is less.

**R 408.12111. Adoption of standards.**

**Rule 2111.** (1) A powered industrial truck manufactured after January 15, 1971, but before 1993, shall be certified by the manufacturer that the truck covered by this part has been produced according to the mandatory requirements of section 3 and 4, except subsection 421 of section 4, of the ANSI standard B56.1-1969 “Safety Standards For Powered Industrial Trucks.”

(2) A low lift or high lift truck manufactured after the effective date of this part shall be in compliance with the requirements of the ANSI standard B56.1-1993 “Safety Standard For Low Lift And High Lift Trucks”, except as noted in subrule (1) of this rule.

(3) A rough terrain fork lift truck manufactured after the effective date of this part shall be in compliance with the requirements of ANSI standard B56.6-1992 “Rough Terrain Fork Lift Trucks.”

(4) A industrial crane truck manufactured after the effective date of this part shall be in compliance with ANSI standard B56.7-1987 “Safety Standard For Industrial Crane Trucks.”

(5) A tow tractor manufactured after the effective date of this part shall be in compliance with ANSI standard B56.9-1992 “Operator Controlled Industrial Tow Tractors.”

(6) A manually propelled high lift industrial truck manufactured after the effective date of this part shall be in compliance with ANSI standard B56.10-1992 “Manually Propelled High Lift Industrial Trucks.”

(7) The standards specified in this rule are adopted by reference. These standards may be purchased from Global Engineering Documents, 15 Inverness Way East, Englewood, Colorado, 80112, USA, telephone number: 1-800-854-7179 and web-site global@ihs.com. at a cost of respectively, $97.00, $77.00, $56.00, $56.00, and $70.00, as of the time of the adoption of these rules, or from the Michigan Department of Consumer and Industry Services, Standards Division, 7150 Harris Drive, Box 30643, Lansing, Michigan, 48909.

**R 408.12121. Rescinded.**

## NAMEPLATES AND MARKINGS

**R 408.12122. Approved labels.**

**Rule 2122.** (1) A powered industrial truck which has been accepted by an approved testing laboratory shall bear a label or marking indicating such acceptance.

(2) A nameplate, label or tag provided on such a truck shall be maintained in place and in legible condition.

**R 408.12130. Rescinded.**

## EQUIPMENT

**R 408.12131. Warning devices and lights.**

**Rule 2131.** (1) A truck, except a motorized hand truck, shall be equipped with an audible device to warn of approach.

(2) A truck used in areas where general lighting is less than 2 foot-candles shall be equipped with auxiliary lights that illuminate work in process.

**R 408.12132. Modifications.**

**Rule 2132.** (1) The employer shall not install an additional counterweight without written assurance from the manufacturer of the truck that the truck will meet the stability requirements of ANSI standard B56.1-1993 “Safety Standard For Low Lift And High Lift Trucks.”

(2) An employer shall not make other modifications affecting capacity or safety without written approval of the manufacturer or an engineer knowledgeable on the subject. Capacity, operation, and maintenance instruction plates, tags, or decals shall be changed accordingly.

(3) If the truck is equipped with front end attachments, the name plate shall be marked to show all of the following:

(a) Identification of the attachments.

(b) The approximate weight of the truck and attachment.

(c) The load capacity of the truck and attachment combination at maximum elevation of the load engaging means with load laterally centered.

**R 408.12134. Parking brakes, tires.**

**Rule 2134.** (1) The parking brake on a sitdown rider truck shall be capable of holding the truck on the maximum grade which the truck can negotiate with rated load, or on a 15% grade, whichever is lesser. The parking brake shall be manually or automatically applied and shall remain applied until released by the operator.

(2) Tires shall be used as recommended by the truck manufacturer.

**R 408.12135. Rescinded.**

**R 408.12136. Operator platforms.**

**Rule 2136.** (1) An end control, reach, narrow aisle, order picker high-lift, order picking and stacking, and motorized hand rider truck shall be equipped with a platform extended beyond the operator's position, and shall withstand a compression load equal to the weight of the loaded vehicle applied along the longitudinal axis of the truck with the outermost projection of the platform against a flat vertical surface. The back protective guard where provided shall permit rapid and unobstructed ingress or egress from the platform.

(2) On a double end control baggage type truck or a truck which may be transported on short elevators, means shall be provided to prevent accidental folding of the operator's folding platform.

(3) All the following apply to an order picker truck, high-lift:

(a) A removable operator platform shall be provided with a device that attaches the platform to the lifting means.

(b) The operator platform shall be equipped with side guard rails.

(c) When the platform is elevated, the horizontal travel speed of the truck shall be automatically reduced to a degree necessary to maintain stability under maximum braking load and turning.

(d) Subdivisions (a) and (c) of this subrule pertain only to a truck manufactured after the effective date of this part. (Note: The effective date was January 15, 1971.)

**R 408.12137. Steering control.**

**Rule 2137.** (1) An employer shall assure that, except on a motorized hand and motorized hand or rider truck, the steering control of a powered industrial truck is contained within the outlines of the planes of the truck, or guarded to prevent injury to the operator during movement of the controls when passing an obstacle such as a wall, post, equipment, box, or other truck.

(2) An employer shall assure that on a motorized hand and motorized hand or rider truck, the steering handle is provided with a guard or device to protect the operator's hands from injury when passing an obstacle such as a wall, post, equipment, box, or another truck.

**R 408.12138. Load handling controls, general.**

**Rule 2138.** (1) All of the following apply to a load handling control on a truck:

(a) Is preferably located for right hand operation.

(b) Is a single lever used to perform more than one function. Push button or pre-selected controls shall be properly identified.

(c) Is clearly and durably identified to indicate function and direction of motion of load or equipment.

(d) Is self-centering.

**R 408.12139. Load handling controls; direction of motion and guards.**

**Rule 2139.** (1) A lever or handle type control, including a toggle switch, shall be in accordance with the following table:

**TABLE 1**

DIRECTION OF MOTION

| Function | Of Load Or Equipment | Of the Operator's Hand When Actuating the Control Handle While Facing the Load |
|---|---|---|
| Hoist | up | rearward or up |
| | down | forward or down |
| Tilt | rearward | *rearward or up |
| | forward | forward or down |
| Reach | retract | *rearward |
| | extend | forward |
| Clamp | clamp | rearward or up |
| | release | forward or down |
| Side Shift | right | rearward or up |
| | left | forward or down |
| Rotate Laterally | clockwise | rearward or up |
| | counterclockwise | forward or down |
| Rotate Longitudinally | rearward | *rearward or up |
| | forward | forward or down |

*The Sense of rotation of the control handle is intended to be in the same direction as the desired motion of the mast or load.

(2) Moving parts that represent a hazard from the operator's position shall be protected by suitable guards.

**R 408.12143. Overhead guard on high-lift truck.**

**Rule 2143.** (1) Except as provided in subrule (3), a highlift truck shall be fitted with an overhead guard. The overhead guard shall be capable of supporting a uniformly distributed static load in accordance with the following table. The overhead guard is not intended to withstand the impact of a falling capacity load.

(2) Table 2 reads as follows:

**TABLE 2**

OVERHEAD GUARD TEST

| Truck Capacity Rating (in pounds) | Static Test Load as a % of Truck Capacity |
|---|---|
| Through 5,000 | 200% of truck rating |
| Over 5,000 through 10,000 | 10,000 pounds plus 100% of increment rating over 5,000 pounds |
| Over 10,000 through 20,000 | 15,000 pounds plus 50% increment rating over 10,000 pounds |

(3) An overhead guard may be omitted from a high-lift truck if the truck is never used to lift or raise material or objects more than 72 inches measured from the floor to the forks and if all of the following are complied with:

(a) The load is limited to a single rack or pallet.

(b) The truck is not operated in an area where material or objects are stacked above the operator's head.

(c) A sign with lettering not less than 1/2-inch high is securely attached and the area of the operator's controls stating, "This truck shall not be used to lift materials above the operator's head or in an area where materials are stacked above the operator's head."

(4) A low-lift rider truck which is used to lift material stacked higher than the head of the operator, and which would likely vibrate and fall back onto the operator, shall be provided with an overhead guard.

(5) The overhead guard shall be capable of withstanding the impact of a 100-pound solid hardwood cube, or equivalent, dropped a distance of 5 feet 10 times, without failure or without permanent deflection exceeding 3/4 inch.

(6) The overhead guard shall be constructed in a manner that does not interfere with visibility. Openings in the top shall

not exceed 6 inches in 1 of the 2 dimensions, width or length. The guard shall be large enough to extend over the operator under all normal circumstances of truck operation, including forward tilt.

(7) A fork truck equipped with a single-tilt cylinder shall be made to avoid injury to the operator by the overhead guard resulting from failure of this cylinder or associated parts.

(8) On a truck where the operator is seated, a vertical clearance of not less than 39 inches should be maintained from the point of maximum depression of the seat under the operator to the underside of the section of the overhead guard under which the operator's head moves during normal operation.

(9) On a powered industrial truck where the operator stands on a platform, a vertical clearance of not less than 74 inches should be maintained from the platform to the underside of the section of the overhead guard under which the operators's head moves during normal operation.

(10) Where head room conditions limit the overall lowered height of the truck, a normal overhead guard height may be reduced.

(11) An overhead guard is intended to offer protection from the impact of small packages, boxes, and bagged material representative of the job application, but not to withstand the impact of a falling capacity load.

## EMPLOYER RESPONSIBILITIES

**R 408.12151. Operator selection.**

**Rule 2151.** (1) An employer shall assure that an employee assigned to operate a powered industrial truck shall meet the following minimum requirements, except as noted in subrule (3) of this rule:

(a) Have corrected vision that meets the same requirements as those for a valid Michigan driver's license. Evidence of meeting this requirement shall be a Michigan driver's license or a doctor's certificate.

(b) Have effective use of all 4 limbs, unless the powered industrial truck has been modified, as prescribed in R 408.12132, to permit operation with fewer than 4 limbs. A prosthetic device is considered a limb when capable of being used to effectively operate the controls.

(c) Be of a height sufficient to operate the controls and have an unobstructed view over the controls and dashboard.

(d) Have coordination between eyes, hands, and feet.

(e) Have freedom from known convulsive disorders and episodes of unconsciousness for a period of 1 year before obtaining a powered industrial truck operator's permit or a lesser time with the assurance from a neurologist that the disorders or episodes are under control.

(f) Have the ability to understand signs, labels, and instructions.

(2) An employer shall assure that an employee assigned to operate a powered industrial truck shall meet the minimum requirements stated in this rule and shall be retested not less than every 3 years.

(3) Requirements listed in subdivisions (b) and (c) of subrule (1) of this rule and of subrule (2) of this rule are optional for operators of a motorized hand low lift truck.

(4) An employee who was operating a powered industrial truck before November 9, 1972, but does not meet the requirements of subdivisions (a), (b), (c), and (d) of subrule (1) of this rule and of subrule (2) of this rule, may be continued as an operator if the handicap or inability does not prove detrimental to the assigned task.

**R 408.12152. Training.**

**Rule 2152.** (1) An employer shall provide training to the employee before the employee's assignment as an operator of a powered industrial truck. Instruction shall include all of the following:

(a) Capacities of the equipment and attachments.

(b) Purpose, use, and limitations of controls.

(c) How to make daily checks.

(d) Practice and operating assigned vehicles through the mechanical functions necessary to perform the required job.

(e) State safety standard rules 2171 to 2193 of Part 21 "Powered Industrial Trucks," being R 408.12171 to R 408.12193 of the Michigan Administrative Code.

(f) Hazards associated with exhaust gases produced by fossil fuel powered industrial trucks (e.g. carbon monoxide, components of diesel exhaust), and hazards associated with the handling of electrolyte chemicals used for battery operated trucks (e.g. sulphuric acid), shall be provided in accordance with the Michigan Right To Know Law, "Hazards Communications" standards 29 C.F.R. §1910.1200 as adopted by R 408.19202 and R 325.77002.

(2) Training shall consist of a combination of formal instruction (e.g. lecture, discussion, interactive computer learning, videotape, written material), practical training, and testing of the operator's performance in the workplace as required in R 408.12153.

(3) Refresher training in relevant topics shall be provided to an operator under any of the following conditions:

(a) An operator has been observed to operate the vehicle in an unsafe manner.

(b) An operator has been involved in an accident or a near-miss incident.

(c) An operator has received an evaluation that reveals that the operator is not operating the truck safely.

(d) An operator is assigned to a different type of truck.

(e) A condition in the workplace changes that could affect safe operation of the truck.

(4) An evaluation of each operator's performance shall be conducted before renewal of a truck operator permit. An individual who is authorized by the employer and who has the knowledge, training, and experience to train and evaluate the competence of the operator shall provide training and evaluation.

**R 408.12153. Testing.**

**Rule 2153.** (1) An employer shall test an employee before authorizing the employee to operate a powered industrial truck, except a motorized hand truck. The test shall check the employees:

(a) Operating ability.

(b) Knowledge of the equipment.

(c) Knowledge of state safety standard rules 2171 to 2193 of Part 21. "Powered Industrial Trucks," being R 408.12171 to R 408.12193 of the Michigan Administrative Code.

(d) Knowledge of daily checks.

(2) A performance test shall be given to determine whether the employee can operate the assigned powered industrial truck through the functions necessary to perform the required work.

(3) An employee who has a valid permit to operate a powered industrial truck issued by another employer may be tested as prescribed in this rule without meeting the training requirements of R 408.12152.

**R 408.12154. Permits.**

**Rule 2154.** (1) An employer shall provide the employee with a permit to operate a powered industrial truck only after meeting the requirements prescribed in R 408.12151, R 408.12152, and R 408.12153. A permit is optional for operators of motorized hand low lift trucks.

(2) An employee being trained is exempt from the permit requirement for a period of not more than 30 days, provided the employee is under the supervision of an individual who is authorized by the employer and who has the knowledge, training, and experience to train operators and to evaluate their competence, and that the training period does not endanger the trainee or other employees.

(3) A permit shall be carried by the operator or be available upon request by a department representative at all times during working hours.

(4) A permit shall indicate the type of truck an operator has been trained on and is qualified to operate.

(5) A permit to operate a powered industrial truck shall be valid only with the employer who issued the permit, and the permit shall be issued for a period of not more than 3 years and shall be consistent with subrule (2) of R 408.12151. An employee who is exempt under subrule (4) of R 408.12151 may continue to operate a powered industrial truck if the employee's handicaps or inabilities do not prove detrimental to his or her task.

(6) A permit shall contain the following information (see sample permit):

(a) Firm name.
(b) Operator's name.
(c) Operator I.D. number, if any.
(d) Name of issuing authority.
(e) Type of truck authorized to operate.
(f) Operator restrictions, if any. The permit shall state the nature of the restriction.
(g) Date issued.
(h) Date expiring.

(7) A sample permit is set forth as follows:

**SAMPLE PERMIT**

INDUSTRIAL TRUCK OPERATOR PERMIT
*(firm name)*
OPERATOR'S NAME
OPERATOR'S NUMBER
IS AUTHORIZED TO OPERATE: (insert type of truck(s) authorized)
RESTRICTIONS: (explanation of restrictions)
DATE ISSUED: (month - day- year)
DATE EXPIRING: (month - day- year)

BY ISSUING AUTHORITY: _____
TITLE

**R 408.12155. Restriction of use.**

**Rule 2155.** (1) A powered industrial truck used in an environment containing the following substances shall be equipped as prescribed in the National Fire Protection Association standard, 505-1996, "Type Designations, Areas Of Use, Conversions, Maintenance, And Operation Of Powered Industrial Trucks," incorporated herein by reference:

(a) Gases or vapors, such as but not limited to acetylene, hydrogen, oxygen, ether, gasoline, naphtha, or acetone, which may be present in quantities sufficient to produce an explosive or ignitable mixture.
(b) Combustible mixtures of dusts such as, but not limited to, metal dust, coal dust, coke dust, grain dust, flour dust, or organic dust.
(c) Ignitable fibres such as, but not limited to, baled waste, cocoa fibre, cotton, excelsior, kapok, or oakum.

The standard is available for inspection at the Lansing office of the department of consumer and industry services. This standard may be purchased from the National Fire Protection Association, 11 Tracy Drive, Avon, Massachusetts, 02322, telephone number: 1-800-344-3555 and web-site www.nfpa.org, at a cost as of the time of adoption of this rule of $19.50, or from the Michigan Department of Consumer and Industry Services, Standards Division, 7150 Harris Drive, Box 30643, Lansing, Michigan 48909.

**R 408.12161. Mechanical condition and maintenance.**

**Rule 2161.** (1) An employer shall not permit a powered industrial truck to be used if:

(a) The service and parking brakes do not perform their intended function.
(b) The fuel system leaks.
(c) A lift cylinder of a load engaging means allows a downward drift of the load engaging means loaded or unloaded in excess of 5 inches in 5 minutes.
(d) A tilt cylinder of a mast allows a forward drift of the mast in excess of 2 degrees in 5 minutes with the mast in a vertical position and a capacity load on the fork or load engaging means.
(e) The steering mechanism allows free play of the steering wheel of more than 1/4 turn on trucks capable of speeds up to 8 miles per hour and more than 1/ 8 turn on trucks capable of speeds over 8 miles per hour.
(f) A hydraulic system leaks and creates a hazard for an employee and equipment in the area.

(2) Repairs to a fuel and ignition system which involve a fire hazard shall be made only in a designated location. Repairs shall not be made in a location made hazardous by:

(a) Flammable gases or vapors.
(b) Combustible dusts.
(c) Ignitable fibers.

(3) Repairs to the truck electrical system shall be made only after the battery has been disconnected.

(4) A replacement part shall have not less than the equivalent safety of the original part.

(5) A water muffler shall have the water maintained at not less than 75% of capacity. A water muffler equipped with a screen shall have the screen maintained to accomplish its intended purpose. When an exhaust system of this type emits sparks or flames, the truck shall be removed from service and repaired.

(6) A truck running in excess of normal operating temperature which creates a hazardous condition shall be removed from service and repaired.

(7) A truck shall be maintained in a condition, reasonably free of lint, excess oil and grease. Solvent with a flash point of less than 100 degrees Fahrenheit shall not be used to clean the truck. Precautions regarding ventilation, fire and toxicity shall be observed when using a cleaning agent.

(8) A truck approved for use of 1 type of fuel may be converted to another type of fuel if the conversion qualifies the truck to its new designation, such as GS, LP or LPS. Only approved parts shall be used. The conversion shall be as prescribed in subrule (2) of rule 2132.

(9) All repairs shall be made by authorized personnel.

**R 408.12162. Blocks and safety stands for maintenance.**

**Rule 2162.** (1) An employer shall provide the following:

(a) Chock blocks, support blocks, or jack stands for the maintenance department's use when repairing powered industrial trucks or their components.

(b) Blocks or safety stands as a means of support for powered industrial trucks elevated from the floor by a hoist or chain fall.

(2) When repairing a powered industrial truck, an employee shall use chock blocks, support blocks, or jack stands if there is a hazard from movement.

(3) An employee shall not place his or her body under a powered industrial truck unless the powered industrial truck is supported by properly arranged blocks or jack stands capable, in total, of supporting a minimum of 1 1/2 times the weight of the component of the truck to be repaired.

**R 408.12163. Fuel.**

**Rule 2163.** (1) An employer shall provide safety fuel cans where trucks are refueled with gasoline at other than a gas pump area.

(2) An employer shall provide a special area for refueling that is not less than 25 feet from a source of open flame or spark and the area shall be posted to this effect.

(3) Use and storage of LP gas shall be as specified by 29 C.F.R. §1910.110, "Storage And Handling Of Liquefied Petroleum Gases," which was adopted by reference in general industry safety standard part 56 "Storage And Handling Of Liquefied Petroleum Gases," being R 408.15601 et seq. This standard is available from the Michigan Department of Consumer and Industry Services, Standards Division, 7150 Harris Drive, Box 30643, Lansing, Michigan 48909.

(4) Handling and storage of fuel, such as gasoline and diesel fuel, shall be as prescribed by 29 C.F.R. §1910.106, "Flammable And Combustible Liquids," which was adopted by reference in general industry safety standard part 75 "Flammable And Combustible Liquids," being R 408.17501 et seq. This standard is available from the Michigan Department of Consumer and Industry Services, Standards Division, 7150 Harris Drive, Box 30643, Lansing, Michigan 48909.

(5) Smoking while refueling is prohibited.

(6) Fuel level shall not be checked by use of an open flame.

(7) An employer shall ensure that an employee is protected from exposure to airborne contaminants created in exhaust gases (e.g. carbon monoxide) of fossil fuel powered industrial trucks, as required by R 325.51101 et seq., "Air Contaminants".

**R 408.12164. Electric trucks.**

**Rule 2164.** (1) Where electric trucks are used, an employer shall provide a designated area for battery changing, charging or both which shall be performed by a trained and authorized employee.

(2) Provisions shall be made in a battery charging area where batteries are removed from the truck for flushing and neutralization of spillage, for fire protection and for air movement sufficient to disperse fumes from gassing batteries.

(3) Smoking and other sources of ignition shall be prohibited in these areas.

(4) An employer shall assure that an employee shall be trained to position the truck and apply the brake before changing or charging a battery and to position and secure a reinstalled battery before releasing the truck for use.

(5) Material handling equipment, such as, but not limited to, a conveyor or overhead hoist, shall be used for removing and replacing a battery. A spreader bar or an equivalent device shall be used with any overhead battery hoist so that the lifting stresses are vertical. A chain type powered battery hoist shall have a container to accumulate the excess lifting chain. When a hand hoist is used, an uncovered battery shall be covered to prevent the hand chain from shorting on cell connectors or terminals. Tools and other metallic objects shall be kept away from the terminals.

(6) When mixing electrolyte for a battery, an employer shall ensure the use of a carboy tilter or siphon for handling electrolyte. Acid concentrate shall be poured into water; water shall not be poured into acid concentrate.

(7) The following apply to charging a battery:

(a) The vent cap shall be kept in place and functioning.

(b) The battery or compartment covers where provided shall be kept open to dissipate heat and gases.

(8) The electrolyte level shall not be checked with an open flame.

(9) Where there is a potential for employee exposure to injurious corrosive electrolyte solutions (e.g. sulfuric acid) associated with battery powered industrial trucks, the employer shall provide both of the following:

(a) Personal protective equipment in accordance with occupational health part 433, R 325.60001 et seq., "Personal Protective Equipment" or general industry part 33, R 408.13301 et seq., "Personal Protective Equipment".

(b) Suitable facilities for quick drenching or flushing of eyes and body within the work area for immediate emergency use in accordance with occupational health part 472, "Medical Services And First Aid".

**R 408.12165. Dockboards and plates.**

**Rule 2165.** (1) An employer shall provide dockboards and plates designed to carry the load imposed on them. The carrying capacity shall be marked on a dockboard or plate purchased after the effective date of this part.

(2) The dockboard or plate shall be secured in position, either by being anchored or equipped with a device which will prevent its slipping out of position.

(3) Hand holds, or other effective means, shall be provided to permit safe handling. Where a fork truck is used, fork loops, pockets or lugs shall be provided for safe handling.

(4) A dockboard or plate shall have a slip-resistant surface, such as but not limited to tread plate, designed to reduce the possibility of slipping by an employee or truck.

(5) A dockboard or plate shall be designed and maintained so the end edges will have a sufficient contact with the dock or loading platform and the carrier to prevent the dockboard or plate from rocking or sliding out of position.

(6) A portable dockboard or plate used by a powered industrial truck to bridge an opening in excess of 18 inches shall have curbs. The height of the curb on the dockboard or plate used by a powered industrial truck with solid or cushion tires shall be not less than 15% of the diameter of the largest tire of the truck, however, the maximum curb height need not exceed 3 inches.

**R 408.12166. Order picker trucks, high-lift-platforms.**

**Rule 2166.** Whenever an order picker truck, high-lift is equipped with vertical only or vertical and horizontal controls traveling with the lifting carriage or forks for lifting an employee, an employer shall assure that the following is provided:

(a) A platform equipped with railing or other limiting device, including but not limited to a chain, strap or tether.

(b) A control device whereby the employee on the platform can shut off the power to the truck.
(c) Protection from falling objects as indicated necessary by the operating conditions.

**R 408.12167. Fork lift truck platforms.**

**Rule 2167.** (1) An employee shall not be lifted or transported except when a platform is attached to the forks by enclosed sleeves, a safety chain or a mechanical device in such a manner that the platform cannot tip or slip.

(2) A platform shall be equipped with a railing not less than 36 inches or more than 42 inches high and a toeboard. The railing shall consist of 1 of the following materials:

(a) Wood posts of at least 2 x 4 inch nominal stock; the top rail shall be made of 2 right angle pieces of not less than 1 x 4 inch nominal stock and an intermediate rail of 1 x 4 inch nominal stock.
(b) Steel or aluminum pipe posts and rails of not less than 1 inch inside diameter and an intermediate rail of 3/4 inch inside diameter pipe.
(c) Structural steel or aluminum posts, rails and intermediate rail of angle iron of not less than 1 x 1 x 3/16 inch size or other shapes of equal strength.

(3) The intermediate rail may be omitted from 1 side.

(4) A toeboard shall be made of not less than 1 inch x 4 inches nominal wood stock or a material of equal strength.

**R 408.12168. Load backrest extensions.**

**Rule 2168.** A load backrest extension, manufactured in accordance with rule 2121, shall be used whenever necessary to minimize the possibility of a load, or part of it, falling rearward.

**R 408.12169. Spinner knobs.**

**Rule 2169.** A spinner knob shall not be attached to a steering handwheel of a truck unless originally equipped with such; the truck is equipped with power steering; or the truck is equipped with an anti-kickback device on the steering mechanism. The knob shall be installed within the periphery of the handwheel.

## EMPLOYEE RESPONSIBILITIES

**R 408.12171. Daily checks.**

**Rule 2171.** (1) At the start of each shift, the operator of a powered industrial truck or a qualified employee shall perform daily checks of the equipment as required by the employer. See appendix B for suggested inspection checklist.

(2) An employer shall ensure that any defects that would affect the safe operation of the equipment shall be repaired before use.

(3) An operator shall promptly report any defect on the powered industrial truck to the employer.

**R 408.12172. General operating rules.**

**Rule 2172.** (1) An operator shall safeguard other employees at all times.

(2) An operator shall not drive a truck up to anyone who is standing in front of a fixed object.

(3) An operator shall not allow anyone to stand or pass under the elevated portion of any powered industrial truck, whether loaded or empty.

(4) No employee except the operator, shall ride on a powered industrial truck unless the truck is provided with a passenger seat. Passenger seats on a fork lift truck shall be under the overhead guard.

**R 408.12173. Position of arms and legs.**

**Rule 2173.** An employee shall not place his or her arms or legs in either of the following positions:

(a) Between the uprights of the mast.
(b) Outside the running lines of a moving truck.

**R 408.12174. Parking.**

**Rule 2174.** (1) When leaving a powered industrial truck unattended, an operator shall fully lower the forks flat to the floor, neutralize the controls, set the brakes and shut the power off.

(2) Whenever it is necessary to leave a truck on an incline, the truck wheels shall be blocked and the steering wheels turned toward the curbing, wall or railing.

**R 408.12175. Towing and pushing.**

**Rule 2175.** A truck shall not be used to tow or push railroad cars, unless it is specifically designed for that purpose. Freight car doors shall not be opened or closed by using a powered industrial truck unless it is equipped with attachments designed for that purpose.

**R 408.12176. Loading trucks, trailers, and railcars.**

**Rule 2176.** (1) An employer shall ensure that a highway truck and trailer shall not be boarded by a powered industrial truck before the highway truck and trailer has its brakes set and not less than 2 wheels blocked or be restrained by other mechanical means installed in a manner that will hold the trailer from movement.

(2) An employer shall ensure that wheel stops, hand brakes, or other approved positive protection to prevent railroad cars from moving during loading or unloading operations are provided, and before and while dockboards or bridge plates are in position.

(3) Provisions shall be made to isolate rail cars during switching operations as required by R 408.10026, “General Provisions.”

(4) An employer shall ensure that the landing gear of all semi-trailers are visually inspected immediately before the trailer is uncoupled from the tractor to assure ability of the landing gear to support the imposed load.

(5) A semitrailer less than 30 feet in length, when not coupled to a tractor and being loaded or unloaded with a powered industrial truck, shall be provided a support capable of sustaining the load at the front.

(6) An employer shall ensure that the flooring of trucks, trailers, and railroad cars are checked for breaks and weakness before they are driven onto.

**R 408.12177. Surveying path of travel.**

**Rule 2177.** Before moving or stacking, an operator shall survey the path of travel in order to avoid obstacles, such as, but not limited to, pipes, light fixtures, and sprinkler systems. A safe distance shall be maintained from the edge of ramps or platforms while on an elevated dock.

**R 408.12178. Operations in hazardous areas.**

**Rule 2178.** When operating a powered industrial truck in a hazardous area, only a truck specifically equipped for such operation shall be used. See rule 2155.

**R 408.12179. Reporting accidents.**

**Rule 2179.** A powered industrial truck operator shall report all accidents involving injury to an employee, or damage to buildings and equipment to the employer.

**R 408.12180. Clear access.**

**Rule 2180.** An operator shall maintain clear access of fire aisles, to stairways and fire equipment when depositing loads.

**R 408.12181. Making repairs.**

**Rule 2181.** Operators shall not make any repairs or adjustments unless specifically authorized to do so.

**R 408.12182. Flammables.**

**Rule 2182.** A fuel tank shall not be filled while the engine is running. Spilled fuel shall be carefully washed away or completely evaporated, and the fuel tank cap replaced before restarting the engine.

## MOVING TRUCKS

**R 408.12183. Operation.**

**Rule 2183.** (1) An operator shall operate a powered industrial truck according to the rules of this part and in accordance with local traffic rules when on a public road.

(2) When following another truck, a safe distance shall be maintained approximately 3 truck lengths from the vehicle ahead and the vehicle shall be kept under control at all times.

(3) An operator shall give the right of way to ambulances, fire trucks, or other emergency vehicles.

(4) An operator of a rider-type powered industrial truck shall not pass another truck traveling in the same direction at intersections, blind spots, or other dangerous locations.

(5) An operator shall cross railroad tracks diagonally whenever possible and shall not park closer than 8 1/2 feet from the center of a railroad track.

**R 408.12184. Slow down at crossings and obstructions.**

**Rule 2184.** An operator shall slow down and sound the warning device at cross aisles and other locations where the operator's vision is obstructed by fixed objects.

**R 408.12185. Clear view.**

**Rule 2185.** An operator shall look in the direction of and keep a clear view of the direction of travel. When moving loads blocking the forward visibility, for safe handling an operator shall drive the truck with the load trailing.

**R 408.12186. Ascending and descending grades.**

**Rule 2186.** (1) An operator shall ascend and descend grades of 10% or more at a speed of not more than 2 miles per hour.

(2) When ascending or descending a grade that exceeds the back-tilt of the mast, the load shall be facing upgrade.

(3) On all grades, unloaded trucks shall be driven with the load engaging means downgrade, tilted back and raised only as far as necessary to clear the floor or road surface.

**R 408.12187. Traveling.**

**Rule 2187.** In level areas an operator shall travel with the load engaging means elevated only sufficiently to clear obstacles on floor or roadway.

**R 408.12188. Starts, stops and turns.**

**Rule 2188.** Starts, stops and turns shall be made in a manner which will prevent a load from shifting or overturning the truck.

**R 408.12189. Horseplay.**

**Rule 2189.** Stunt driving and horseplay shall not be permitted.

**R 408.12190. Wet floors, dockboards, and bridgplates.**

**Rule 2190.** (1) An operator shall drive at a slow speed over wet or slippery floors.

(2) Before driving over a dockbord or bridgeplate, an operator shall observe that the dockboard or bridgeplate is secured.

**R 408.12191. Entering elevators.**

**Rule 2191.** (1) An operator shall drive onto elevators only when authorized to do so.

(2) An elevator shall be entered squarely after it is leveled to the floor. Once on the elevator an operator shall neutralize the controls, set the brakes and shut off the power.

(3) Motorized hand trucks shall enter an elevator and other confined areas with the load end forward.

(4) A truck shall not enter an elevator if the combined weight of the load and truck exceeds the capacity of the elevator.

**R 408.12192. Running over loose objects.**

**Rule 2192.** An operator of the truck shall avoid running over loose objects.

## LOADING SAFETY

**R 408.12193. Operators' loading rules.**

**Rule 2193.** An operator shall:

(a) Operate a truck equipped with attachments as a partially loaded truck when not transporting a load.

(b) When loading a fork lift truck, place the load engaging means under the load as far as possible and tilt the mast backwards to cradle the load.

(c) Exercise caution when tilting loads especially when they are segmented.

(d) Lift or transport only a load that is within the rated capacity of the truck.

(e) Lift or transport only a load that cannot fall out of a basket or container, or off the load engaging means during the normal movements of the truck.

(f) Tilt an elevated load forward only when in a deposit position over a rack or stack.

**APPENDIX "A"**

**TYPES OF TRUCKS**

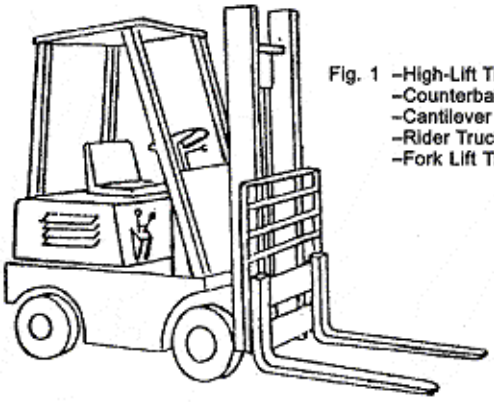

Fig. 1 –High-Lift Truck
–Counterbalanced Truck
–Cantilever Truck
–Rider Truck
–Fork Lift Truck

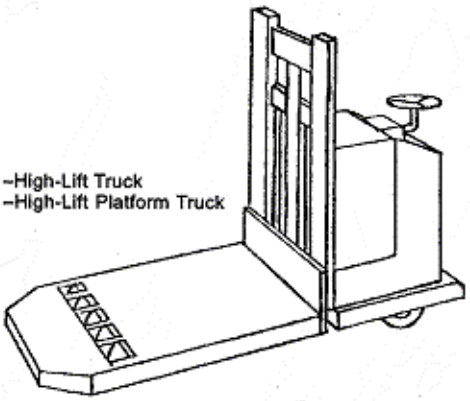

Fig. 2 –High-Lift Truck
–High-Lift Platform Truck

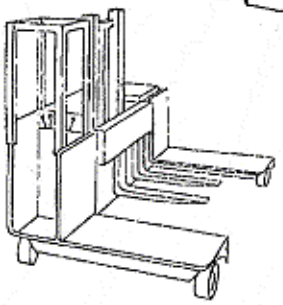

Fig. 8 –Side-Loader Truck

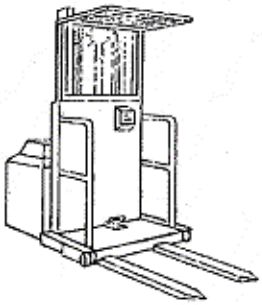

Fig. 9 –Order Picker Truck High Lift

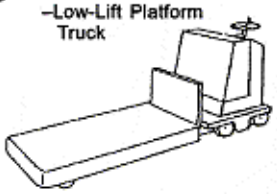

Fig. 3 –Low-Lift Truck
–Low-Lift Platform Truck

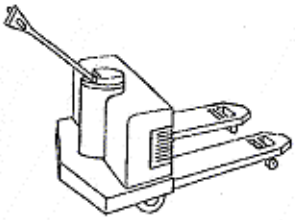

Fig. 4 –Motorized Hand Truck
–Pallet Truck

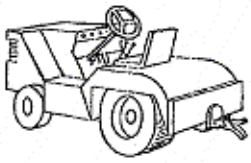

Fig. 5 –Industrial Tractor

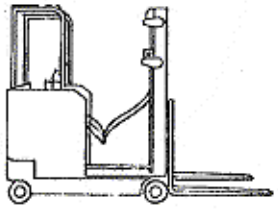

Fig. 7 –Reach Truck

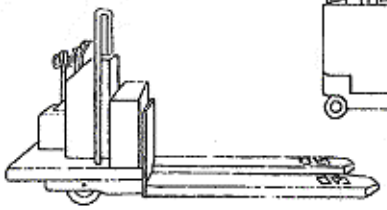

Fig. 6 –Motorized Hand/Rider Truck

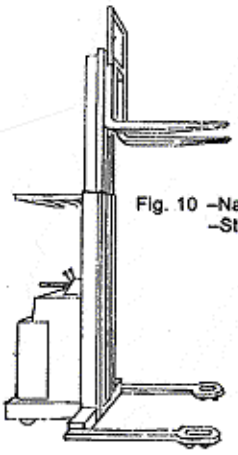

Fig. 10 –Narrow-Aisle Truck
–Straddle Truck

| |
|---|
| Total Units Printed:<br>Total Printing Cost:<br>Cost Per Unit: |

**APPENDIX "B"**

# FORK TRUCK
# PRE-OPERATION INSPECTION CHECKLIST

**Complete the pre-operation checklist with one of the following responses after each item.**

- **If working properly, enter an X in the "O.K." column.**
- **If not working properly, enter an X in the "Needs Repair" column and explain the condition.**

**Turn the checklist in to the appropriate person.**

**Truck No.** _____ **Operator** _____

**Date** ____ **/** ____ **/** ____ **Type of Truck** _____

**Shift** **1** **2** **3** **Department** _____

| Checklist | O.K. | Needs Repair |
|---|---|---|
| **Accessory Control** | | |
| **Battery Indicator** | | |
| **Brakes** | | |
| **Fluid Levels** | | |
| **Forks, Mast, Chains, Stops, Backrest** | | |
| **Horn** | | |
| **Hydraulic Cylinders** | | |
| **Hydraulic Hoses and Fittings** | | |
| **Lift Control** | | |
| **Lights** | | |
| **Limit Switches** | | |
| **LP Leaks** | | |
| **Overhead Guard** | | |
| **Steering** | | |
| **Tilt Control** | | |
| **Tires and Wheels** | | |

BSR-STD-1152 (01/04)
26 Pages

# DEPARTMENT OF LABOR & ECONOMIC GROWTH
# DIRECTOR'S OFFICE
# GENERAL INDUSTRY SAFETY STANDARDS

Filed with the Secretary of State on January 1, 1975 (**as amended April 30, 1982**)
This rule takes effect 15 days after filing with the Secretary of State

(By authority conferred on the director of the department of consumer and industry services by sections 16 and 21 of Act No. 154 of the Public Acts of 1974, as amended, and Executive Reorganization Order No. 1996-2, being §§408.1016, 408.1021, and 445.2001 of the Michigan Compiled Laws)

Visit our web site at: www.michigan.gov/mioshastandards

# PART 75. FLAMMABLE & COMBUSTIBLE LIQUIDS (1910.106)

TABLE OF CONTENTS



**R 408.17501 Rescission of federal standards.**

Rule 7501. The following provisions of 29 C.F.R. 1910.106, incorporated by reference in section 14 of Act No. 154 of the Public Acts of 1974, being §408.1014 of the Michigan Compiled Laws, are rescinded:

(a) 1910.106 (b)(1)(i)(E)
(b) 1910.106(b)(1)(ii)(A)
(c) 1910.106(b)(2)(i)
(d) 1910.106(b)(2)(i)(A)
(e) 1910.106(b)(2)(i)(B)
(f) 1910.106(b)(2)(i)(C)
(g) 1910.106(b)(2)(i)(D)
(h) 1910.106(b)(2)(i)(E)
(i) 1910.106(B)(2)(i)(F)
(j) TABLE H-5
(k) TABLE H-6
(l) TABLE H-7
(m) TABLE H-8
(n) 1910.106(b)(2)(iii)
(o) TABLE H-9
(p) 1910.106(b)(2)(vii)(B)(I)
(q) 1910.106(b)(2)(vii)(B)(III)
(r) 1910.106(b)(2)(vii)(C)(5)
(s) 1910.106(b)(2)(vii)(C)(7)
(t) 1910.106(b)(2)(vii)(C)(7)(I)
(u) 1910.106(b)(2)(vii)(C)(7)(II)
(v) 1910.106(b)(2)(vii)(C)(7)(III)
(w) 1910.106(b)(2)(vii)(V)(7)(IV)
(x) 1910.106(b)(2)(viii)(A)
(y) 1910.106(b)(2)(viii)(B)
(z) 1910.106(b)(2)(viii)(C)
(aa) 1910.106(b)(5)(vi)(E)
(bb) 1910.106(d)(5)(iv)(A)
(cc) 1910.106(d)(5)(iv)(B)
(dd) 1910.106(d)(5)(iv)(C)
(ee) 1910.106(d)(5)(iv)(D)
(ff) 1910.106(d)(6)(ii)(A)
(gg) 1910.106(e)(3)(iv)(C)
(hh) 1910.106(f)(4)(ii)
(ii) 1910.106(f)(4)(iii)
(jj) 1910.106(f)(4)(v)
(kk) 1910.106(g)(1)(ii)(C)
(ll) 1910.106(g)(1)(iv)
(mm) 1910.106(h)(2)(ii)
(nn) TABLE H-20
(oo) 1910.106(h)(3)(ii)(C)
(pp) The columns entitled "Height" from TABLE H-14
(qq) The columns entitled "Height" from TABLE H-15
(rr) The second sentence of 1910.106(h)(2)(i)
(ss) The second sentence of 1910.106(i)(4)

NOTE 1: The above listed revocations have been deleted from the standard.
NOTE 2: The remaining provisions of C.F.R. 1910.106, Flammable and Combustible Liquids incorporated by reference by Section 14(1) of Act No. 154 of the Public Acts are still in effect.

**(a) Definitions. As used in this section:**

(1) Aerosol shall mean a material which is dispensed from its container as a mist, spray, or foam by a propellant under pressure.

(2) Atmospheric tank shall mean a storage tank which has been designed to operate at pressures from atmospheric through 0.5 p.s.i.g.

(3) Automotive service station shall mean that portion of property where flammable or combustible liquids used as motor fuels are stored and dispensed from fixed equipment into the fuel tanks of motor vehicles and shall include any facilities available for the sale and service of tires, batteries, and accessories, and for minor automotive maintenance work. Major automotive repairs, painting, body and fender work are excluded.

(4) Basement shall mean a story of a building or structure having one-half or more of its height below ground level and to which access for fire fighting purposes is unduly restricted.

(5) Boiling point shall mean the boiling point of a liquid at a pressure of 14.7 pounds per square inch absolute (p.s.i.a.) (760mm.). Where an accurate boiling point is unavailable for the material in question, or for mixtures which do not have a constant boiling point, for purposes of this section the 10 percent point of a distillation performed in accordance with the Standard Method of Test for Distillation of Petroleum Products, ASTM D–86–62, may be used as the boiling point of the liquid.

(6) Boilover shall mean the expulsion of crude oil (or certain other liquids) from a burning tank. The light fractions of the crude oil burnoff producing a heat wave in the residue, which on reaching a water strata may result in the expulsion of a portion of the contents of the tank in the form of froth.

(7) Bulk plant shall mean that portion of a property where flammable or combustible liquids are received by tank vessel, pipelines, tank car, or tank vehicle, and are stored or blended in bulk for the purpose of distributing such liquids by tank vessel, pipeline, tank car, tank vehicle, or container.

(8) Chemical plant shall mean a large integrated plant or that portion of such a plant other than a refinery or distillery where flammable or combustible liquids are produced by chemical reactions or used in chemical reactions.

(9) Closed container shall mean a container as herein defined, so sealed by means of a lid or other device that neither liquid nor vapor will escape from it at ordinary temperatures.

(10) Crude petroleum shall mean hydrocarbon mixtures that have a flash point below 150°F. and which have not been processed in a refinery.

(11) Distillery shall mean a plant or that portion of a plant where flammable or combustible liquids produced by fermentation are concentrated, and where the concentrated products may also be mixed, stored, or packaged.

(12) Fire area shall mean an area of a building separated from the remainder of the building by construction having a fire resistance of a least 1 hour and having all communicating openings properly protected by an assembly having a fire resistance rating of at least 1 hour.

(13) Flammable aerosol shall mean an aerosol which is required to be labeled “Flammable” under the Federal Hazardous Substances Labeling Act (15 U.S.C. 1261). For the purposes of paragraph (d) of this section, such aerosols are considered Class IA liquids.

(14) “Flashpoint” means the minimum temperature at which a liquid gives off vapor within a test vessel in sufficient concentration to form an ignitable mixture with air near the surface of the liquid, and shall be determined as follows:

(i) For a liquid which has a viscosity of less than 45 SUS at 100°F. (37.8°C.), does not contain suspended solids, and does not have a tendency to form a surface film while under test, the procedure specified in the Standard Method of Test for Flashpoint by Tag Closed Tester (ASTM D-56-70) shall be used.

(ii) For a liquid which has a viscosity of 45 SUS or more at 100°F. (37.8°C.), or contains suspended solids, or has a tendency to form a surface film while under test, the Standard Method of Test for Flashpoint by Pensky-Martens Closed Tester (ASTM D-93-71) shall be used, except that the methods specified in Note 1 to section 1.1 of ASTM D-93-71 may be used for the respective materials specified in the Note.

(iii) For a liquid that is a mixture of compounds that have different volatilities and flashpoints, its flashpoint shall be determined by using the procedure specified in paragraph (a)(14)(i) or (ii) of this section on the liquid in the form it is shipped. If the flashpoint, as determined by this test, is 100°F. (37.8°C.) or higher, an additional flashpoint determination shall be run on a sample of the liquid evaporation to 90 percent of its original volume, and the lower value of the two tests shall be considered the flashpoint of the material.

[38 F.R. 28035, October 11, 1973.]

(iv) Organic peroxides, which undergo auto accelerating thermal decomposition, are excluded from any of the flashpoint determination methods specified in this subparagraph.

[38 F.R. 27047, September 28, 1973]

(15) Hotel shall mean buildings or groups of buildings under the same management in which there are sleeping accommodations for hire, primarily used by transients who are lodged with or without meals including but not limited to inns, clubs, motels, and apartment hotels.

(16) Institutional occupancy shall mean the occupancy or use of a building or structure or any portion thereof by persons harbored or detained to receive medical, charitable or other care or treatment, or by persons involuntarily detained.

(17) Liquid shall mean, for the purpose of this section, any material which has a fluidity greater than that of 300 penetration asphalt when tested in accordance with ASTM Test for Penetration for Bituminous Materials, D-5-65. When not otherwise identified, the term liquid shall include both flammable and combustible liquids.

(18) “Combustible liquid” means any liquid having a flashpoint at or above 100°F. (37.8°C.). Combustible liquids shall be divided into two classes as follows:

(i) “Class II liquids” shall include those with flashpoints at or above 100°F. (37.8°C.) and below 140°F. (60°.), except any mixture having components with flashpoints of 200°F. (93.3°C.) or higher, the volume of which make up 99 percent or more of the total volume of the mixture.

(ii) “Class III liquids” shall include those with flashpoints at or above 140°F. (60°C.). Class III liquids are subdivided into two subclasses:

(a) “Class IIIA liquids” shall include those with flashpoints at or above 140°F. (60°C.) and below 200°F. (93.3°C.), except any mixture having components with flashpoints of 200°F. (93.3°C.), or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.

(b) “Class IIIB liquids” shall include those with flashpoints at or above 200°F. (93.3°C). This section does not cover Class IIIB liquids. Where the term “Class III liquids” is used in this section, it shall mean only Class IIIA liquids.

(iii) When a combustible liquid is heated for use to within 30°F. (16.7°C.) of its flashpoint, it shall be handled in accordance with the requirements for the next lower class of liquids.

(19) "Flammable liquid" means any liquid having a flashpoint below 100°F. (37.8°C.), except any mixture having components with flashpoints of 100°F.(37.8°C.) or higher, the total of which make up 99 percent or more of the total volume of the mixture. Flammable liquids shall be known as Class I liquids. Class I liquids are divided into three classes as follows:

(i) Class IA shall include liquids having flashpoints below 73°F. (22.8°C.) and having a boiling point below 100°F. (37.8°C.).

(ii) Class IB shall include liquids having flashpoints below 73°F. (22.8°C.) and having a boiling point at or above 100°F. (37.8°C.).

(iii) Class IC shall include liquids having flashpoints at or above 73°F. (22.8°C.) and below 100°F. (37.8°C.).

[38 F.R. 27047, September 28, 1973.]

(20) Unstable (reactive) liquid shall mean a liquid which in a pure state or as commercially produced or transported will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shocks, pressure, or temperature.

(21) Low-pressure tank shall mean a storage tank which has been designed to operate at pressures above 0.5 p.s.i.g. but not more than 15 p.s.i.g.

(22) Marine service station shall mean that portion of a property where flammable or combustible liquids used as fuels are stored and dispensed from fixed equipment on shore, piers, wharves, or floating docks into the fuel tanks of self-propelled craft, and shall include all facilities used in connection therewith.

(23) Mercantile occupancy shall mean the occupancy or use of a building or structure or any portion thereof for the displaying, selling, or buying of goods, wares, or merchandise.

(24) Office occupancy shall mean the occupancy or use of a building or structure or any portion thereof for the transaction of business, or the rendering or receiving of professional services.

(25) Portable tank shall mean a closed container having a liquid capacity over 60 U.S. gallons and not intended for fixed installation.

(26) Pressure vessel shall mean a storage tank or vessel which has been designed to operate at pressures above 15 P.S.I.G.

(27) Protection for exposure shall mean fire protection for structures on property adjacent to tanks. When acceptable to the authority having jurisdiction, such structures located (i) within the jurisdiction of any public fire department or (ii) within or adjacent to plants having private fire brigades shall be considered as having adequate protection for exposures.

(28) Refinery shall mean a plant in which flammable or combustible liquids are produced on a commercial scale from crude petroleum, natural gasoline, or other hydrocarbon sources.

(29) Safety can shall mean an approved container, of not more than 5 gallons capacity, having a spring-closing lid and spout cover and so designed that it will safely relieve internal pressure when subjected to fire exposure.

(30) Vapor pressure shall mean the pressure, measured in pounds per square inch (absolute) exerted by a volatile liquid as determined by the "Standard Method of Test for Vapor Pressure of Petroleum Products (Reid Method)," American Society for Testing and Materials ASTM D323-68.

(31) Ventilation as specified in this section is for the prevention of fire and explosion. It is considered adequate if it is sufficient to prevent accumulation of significant quantities of vapor-air mixtures in concentration over one-fourth of the lower flammable limit.

(32) Storage: Flammable or combustible liquids shall be stored in a tank or in a container that complies with paragraph (d)(2) of this section.

(33) Barrel shall mean a volume of 42 U.S. gallons.

(34) Container shall mean any can, barrel, or drum.

(35) Approved unless otherwise indicated, approved, or listed by at least one of the following nationally recognized testing laboratories: Underwriters' Inc.; Factory Mutual Engineering Corp.

(36) Listed see "approved" in §1910.106(a)(35).

(37) "SUS" means Saybolt Universal Seconds as determined by the Standard Method of Test for Saybolt Viscosity (ASTM D-88-56), and may be determined by use of the SUS conversion tables specified in ASTM Method of Test for Viscosity of Transparent and Opaque Liquids (ASTM D445-65).

(38) "Viscous" means a viscosity of 45 SUS or more.

[38 F.R. 27047, September 28, 1973.]

**(b) Tank storage.**

**(1) Design and construction of tanks.**

**(i) Materials.**

(a) Tanks shall be built of steel except as provided in (b) through (e) of this subdivision.

(b) Tanks may be build of materials other than steel for installation underground or if required by the properties of the liquid stored. Tanks located above ground or inside buildings shall be of noncombustible construction.

(c) Tanks built of materials other than steel shall be designed to specifications embodying principles recognized as good engineering design for the material used.

(d) Unlined concrete tanks may be used for storing flammable or combustible liquids having a gravity of 40° API or heavier. Concrete tanks with special lining may be used for other services provided the design is in accordance with sound engineering practice.

(e) Revoked.

(f) Special engineering consideration shall be required if the specific gravity of the liquid to be stored exceeds that of water or if the tanks are designed to contain flammable or combustible liquids at a liquid temperature below 0°F.

**(ii) Fabrication**.

(a) Revoked.

(b) Metal tanks shall be welded, riveted, and caulked, brazed, or bolted, or constructed by use of a combination of these methods. Filler metal used in brazing shall be nonferrous metal or an alloy having a melting point above 1000°F. and below that of the metal joined.

**(iii) Atmospheric tanks.**

(a) Atmospheric tanks shall be built in accordance with acceptable good standards of design. Atmospheric tanks may be built in accordance with:

(1) Underwriters' Laboratories, Inc., Subjects No. 142, Standard for Steel Aboveground Tanks for Flammable and Combustible

Liquids, 1968; No. 58, Standard for Steel Underground Tanks for Flammable and Combustible Liquids, Fifth Edition, December 1961; or No. 80, Standard for Steel Inside Tanks for Oil-Burner Fuel, September 1963.

(2) American Petroleum Institute Standards No. 12A, Specification for Oil Storage Tanks with Riveted Shells, Seventh Edition, September 1951, or No. 650, Welded Steel Tanks for Oil Storage, Third Edition, 1966.

(3) American Petroleum Institute Standards No. 12B, Specification for Bolted Production Tanks, Eleventh Edition, May 1958, and Supplement 1, March 1962; No. 12D, Specification for Large Welded Production Tanks, Seventh Edition, August 1957; or No. 12F, Specification for Small Welded Production Tanks, Fifth Edition, March 1961. Tanks built in accordance with these standards shall be used only as production tanks for storage of crude petroleum in oil-producing areas.

(b) Tanks designed for underground service not exceeding 2,500 gallons capacity may be used aboveground.

(c) Low-pressure tanks and pressure vessels may be used as atmospheric tanks.

(d) Atmospheric tanks shall not be used for the storage of a flammable or combustible liquid at a temperature at or above its boiling point.

**(iv) Low pressure tanks.**

(a) The normal operating pressure of the tank shall not exceed the design pressure of the tank.

(b) Low-pressure tanks shall be built in accordance with acceptable standards of design. Low-pressure tanks may be built in accordance with:

(1) American Petroleum Institute Standards No. 620, Recommended Rules for the Design and Construction of Large, Welded, Low- Pressure Storage Tanks, Third Edition, 1966.

(2) The principles of the Code for Unfired Pressure Vessels, Section VIII of the ASME Boiler and Pressure Vessels Code, 1968.

(c) Atmospheric tanks built according to Underwriters' Laboratories, Inc., requirements in subdivision (iii)(a) of this subparagraph may be used for operating pressures not exceeding 1 p.s.i.g. and shall be limited to 2.5 p.s.i.g. under emergency venting conditions.

(d) Pressure vessels may be used as low-pressure tanks.

**(v) Pressure vessels.**

(a) The normal operating pressure of the vessel shall not exceed the design pressure of the vessel.

(b) Pressure vessels shall be built in accordance with the Code for Unfired Pressure Vessels, Section VIII of the ASME Boiler and Pressure Vessel Code, 1968.

**(vi) Provisions for internal corrosion.** When tanks are not designed in accordance with the American Petroleum Institute, American Society of Mechanical Engineers, or the Underwriters' Laboratories, Inc.'s, standards, or if corrosion is anticipated beyond that provided for in the design formulas used, additional metal thickness or suitable protective coatings or linings shall be provided to compensate for the corrosion loss expected during the design life of the tank.

(2) Installation of outside aboveground tanks.

(i) Revoked.

(a)-(f) Revoked.

(ii) Spacing (shell-to-shell) between aboveground tanks.

(a) The distance between any two flammable or combustible liquid storage tanks shall not be less than 3 feet.

(b) Except as provided in subdivision (c) of this subdivision, the distance between any two adjacent tanks shall not be less than one-sixth the sum of their diameters. When the diameter of one tank is less than one-half the diameter of the adjacent tank, the distance between the two tanks shall not be less than one-half the diameter of the smaller tank.

(c) Where crude petroleum in conjunction with production facilities are located in noncongested areas and have capacities not exceeding 126,000 gallons (3,000 barrels), the distance between such tanks shall not be less than 3 feet.

(d) Where unstable flammable or combustible liquids are stored, the distance between such tanks shall not be less than one-half the sum of their diameters.

**TABLES H-5 AND 6 REVOKED.**

**TABLES H-7 AND 8 REVOKED.**

(e) When tanks are compacted in three or more rows or in an irregular pattern, greater spacing or other means shall be provided so that inside tanks are accessible for firefighting purposes.

(f) The minimum separation between a liquefied petroleum gas container and a flammable or combustible liquid storage tank shall be 20 feet, except in the case of flammable or combustible liquid tanks operating at pressures exceeding 2.5 p.s.i.g. or equipped with emergency venting which will permit pressures to exceed 2.5 p.s.i.g. in which case the provisions of subdivisions (a) and (b) of this subdivision shall apply. Suitable means shall be taken to prevent the accumulation of flammable or combustible liquids under adjacent liquefied petroleum gas containers such as by diversion curbs or grading. When flammable or combustible liquid storage tanks are within a diked area, the liquefied petroleum gas containers shall be outside the diked area and at least 10 feet away from the centerline of the wall of the diked area. The foregoing provisions shall not apply when liquefied petroleum gas containers of 125 gallons or less capacity are installed adjacent to fuel oil supply tanks of 550 gallons or less capacity.

(iii) **Revoked.**

(iv) **Normal venting for aboveground tanks.**

(a) Atmospheric storage tanks shall be adequately vented to prevent the development of vacuum or pressure sufficient to distort the roof of a cone roof tank or exceeding the design

pressure in the case of other atmospheric tanks, as a result of filling or emptying, and atmospheric temperature changes.

(b) Normal vents shall be sized either in accordance with:
  (1) The American Petroleum Institute Standard 2000 (1968), Venting Atmospheric and Low-Pressure Storage Tanks; or
  (2) Other accepted standard; or
  (3) Shall be at least as large as the filling or withdrawal connection, whichever is larger but in no case less than 1 1/4 inch nominal inside diameter.

(c) Low-pressure tanks and pressure vessels shall be adequately vented to prevent development of pressure or vacuum, as a result of filling or emptying and atmospheric temperature changes, from exceeding the design pressure of the tank or vessel. Protection shall also be provided to prevent overpressure from any pump discharging into the tank or vessel when the pump discharge pressure can exceed the design pressure of the tank or vessel.

(d) If any tank or pressure vessel has more than one fill or withdrawal connection and simultaneous filling or withdrawal can be made, the vent size shall be based on the maximum anticipated simultaneous flow.

(e) Unless the vent is designed to limit the internal pressure 2.5 p.s.i. or less, the outlet of vents and vent drains shall be arranged to discharge in such a manner as to prevent localized overheating of any part of the tank in the event vapors from such vents are ignited.

(f) Tanks and pressure vessels storing Class IA liquids shall be equipped with venting devices which shall be normally closed except when venting to pressure or vacuum conditions. Tanks and pressure vessels storing Class IB and IC liquids shall be equipped with venting devices which shall be normally closed except when venting under pressure or vacuum conditions, or with approved flame arresters.

Exemption: Tanks of 3,000 bbls. capacity or less containing crude petroleum in crude-producing areas; and, outside aboveground atmospheric tanks under 1,000 gallons capacity containing other than Class IA flammable liquids may have open vents. (See subdivision (vi)(b) of the subparagraph.)

(g) Flame arresters or venting devices required in subdivision (f) of this subdivision may be omitted for Class IB and IC liquids where conditions are such that their use may, in case of obstruction, result in tank damage.

(v) **Emergency relief venting for fire exposure for aboveground tanks.**

(a) Every aboveground storage tank shall have some form of construction or device that will relieve excessive internal pressure caused by exposure fires.

(b) In a vertical tank the construction referred to in subdivision (a) of this subdivision may take the form of a floating roof, lifter roof, a weak roof-to-shell seam, or other approved pressure relieving construction. The weak roof-to-shell seam shall be constructed to fail preferential to any other seam.

(c) Where entire dependence for emergency relief is placed upon pressure relieving devices, the total venting capacity of both normal and emergency vents shall be enough to prevent rupture of the shell or bottom of the tank if vertical, or of the shell or heads if horizontal. If unstable liquids are stored, the effects of heat or gas resulting from polymerization, decomposition, condensation, or self-reactivity shall be taken into account. The total capacity of both normal and emergency venting devices shall be not less than that derived from Table H-10 except as provided in subdivision (e) or (f) of this subdivision. Such device may be a self-closing manhole cover, or one using long bolts that permit the cover to lift under internal pressure, or an additional or larger relief valve or valves. The wetted area of the tank shall be calculated on the basis of 55 percent of the total exposed area of a sphere or spheroid, 75 percent of the total exposed area of a horizontal tank and the first 30 feet above grade of the exposed shell area of a vertical tank.

**TABLE H-10**
**WETTED AREA VERSUS CUBIC FEET FREE AIR PER HOUR**
(14.7 p.s.i.a and 60°F.)

| Square feet | CFH | Square feet | CFH | Square Feet | CFH |
|---|---|---|---|---|---|
| 20 | 21,100 | 200 | 211,000 | 1,000 | 524,000 |
| 30 | 31,600 | 250 | 239,000 | 1,200 | 557,000 |
| 40 | 42,100 | 300 | 265,000 | 1,400 | 587,000 |
| 50 | 52,700 | 350 | 288,000 | 1,600 | 614,000 |
| 60 | 63,200 | 400 | 312,000 | 1,800 | 639,000 |
| 70 | 73,700 | 500 | 354,000 | 2,000 | 662,000 |
| 80 | 84,200 | 600 | 392,000 | 2,400 | 704,000 |
| 90 | 94,200 | 700 | 428,000 | 2,800 | 742,000 |
| 100 | 105,000 | 800 | 462,000 | and | |
| 120 | 126,000 | 900 | 493,000 | over | |
| 140 | 147,000 | 1,000 | 524,000 | | |
| 160 | 168,000 | | | | |
| 180 | 190,000 | | | | |
| 200 | 211,000 | | | | |

(d) For tanks and storage vessels designed for pressure over 1 p.s.i.g., the total rate of venting shall be determined in accordance with Table H-10, except that when the exposed wetted area of the surface is greater than 2,800 square feet, the total rate of venting shall be calculated by the following formula:

$$CFH = 1{,}107A(.82)$$

Where:

CFH = Venting requirement, in cubic feet of free air per hour.

A = Exposed wetted surface, in square feet.

NOTE: The foregoing formula is based on

Q = 21,000A(.82)

(e) The total emergency relief venting capacity for any specific stable liquid may be determined by the following formula:

$$V = \frac{1337}{L\sqrt{M}}$$

V = Cubic feet of free air per hour from Table H-10.

L = Latent heat of vaporization of specific liquid in B.t.u. per pound.

M = Molecular weight of specific liquids.

(f) The required airflow rate of subdivision (c) or (e) of this subdivision may be multiplied by the appropriate factor listed in the following schedule when protection is provided as indicated. Only one factor may be used for any one tank.

0.5 for drainage in accordance with subdivision (vii)(b) of this subparagraph for tanks over 200 square feet of wetted area.

0.3 for approved water spray.

0.3 for approved insulation.

0.15 for approved water spray with approved insulation.

(g) The outlet of all vents and vent drains on tanks equipped with emergency venting to permit pressures exceeding 2.5 p.s.i.g. shall be arranged to discharge in such a way as to prevent localized overheating of any part of the tank, in the event vapors from such vents are ignited.

(h) Each commercial tank venting device shall have stamped on it the opening pressure, the pressure at which the valve reaches the full open position, and the flow capacity at the latter pressure, expressed in cubic feet per hour of air at 60°F. and at pressure of 14.7 p.s.i.a.

(i) The flow capacity of tank venting devices 12 inches and smaller in nominal pipe size shall be determined by actual test of each type and size of vent. These flow tests may be conducted by the manufacturer if certified by a qualified impartial observer, or may be conducted by an outside agency. The flow capacity of tank venting devices larger than 12 inches nominal pipe size, including manhole covers with long bolts or equivalent, may be calculated provided that the opening pressure is actually measured, the rating pressure and corresponding free orifice area are stated, the word “calculated” appears on the nameplate, and the computation is based on a flow coefficient of 0.5 applied to the rated orifice area.

(vi) **Vent piping for aboveground tanks.**

(a) Vent piping shall be constructed in accordance with paragraph (c) of this section.

(b) Where vent pipe outlets for tanks storing Class I liquids are adjacent to buildings or public ways, they shall be located so that the vapors are released at a safe point outside of buildings and not less than 12 feet above the adjacent ground level. In order to aid their dispersion, vapors shall be discharged upward or horizontally away from closely adjacent walls. Vent outlets shall be located so that flammable vapors will not be trapped by eaves or other obstructions and shall be at least five feet from building openings.

(c) When tank vent piping is manifolded, pipe sizes shall be such as to discharge, within the pressure limitations of the system, the vapors they may be required to handle when manifolded tanks are subject to the same fire exposure.

(vii) **Drainage, dikes, and walls for aboveground tanks.**

(a) **Drainage and diked areas.** The area surrounding a tank or a group of tanks shall be provided with drainage as in subdivision (b) of this subdivision, or shall be diked as provided in subdivision (c) of this subdivision, to prevent accidental discharge of liquid from endangering adjoining property or reaching waterways.

(b) **Drainage.** Where protection of adjoining property or waterways is by means of a natural or manmade drainage system, such systems shall comply with the following:

(1) Revoked.

(2) The drainage system shall terminate in vacant land or other area or in an impounding basin having a capacity not smaller than that of the largest tank served. This termination area and the route of the drainage system shall be so located that, if the flammable or combustible liquids in the drainage system are ignited, the fire will not seriously expose tanks or adjoining property.

(3) Revoked.

(c) **Diked areas.** Where protection of adjoining property or waterways is accomplished by retraining the liquid around the tank by means of a dike, the volume of the diked area shall comply with the following requirements:

(1) Except as provided in subdivision (2) of this subdivision, the volumetric capacity of the diked area shall not be less than the greatest amount of liquid that can be released from the largest tank within the diked area, assuming a full tank. The capacity of the diked area enclosing more than one tank shall be calculated by deducting the volume of the tanks other than the largest tank below the height of the dike.

(2) For a tank or group of tanks with fixed roofs containing crude petroleum with boilover characteristics, the volumetric capacity of the diked area shall be not less than the capacity of the largest tank served by the enclosure, assuming a full tank. The capacity of the diked enclosure shall be calculated by deducting the volume below the height of the dike of all tanks within the enclosure.

(3) Walls of the diked area shall be of earth, steel, concrete or solid masonry designed to be liquid tight and to withstand a full

hydrostatic head. Earthern walls 3 feet or more in height shall have a flat section at the top not less than 2 feet wide. The slope of earthern wall shall be consistent with the angle of repose of the material of which the wall is constructed.

(4) The walls of the diked area shall be restricted to an average height of 6 feet above interior grade.

(5) Revoked.

(6) No loose combustible material, empty or full drum or barrel, shall be permitted within the diked area.

(7) (i) - (iv) Revoked.

(viii) Tank openings other than vents for aboveground tanks.

(a) - (c) Revoked.

(d) Openings for gauging shall be provided with a vaportight cap or cover.

(e) For Class IB and Class IC liquids other than crude oils, gasolines, and asphalts, the fill pipe shall be so designed and installed as to minimize the possibility of generating static electricity. A fill pipe entering the top of a tank shall terminate within 6 inches of the bottom of the tank and shall be installed to avoid excessive vibration.

(f) Filling and emptying connections which are made and broken shall be located outside of buildings at a location free from any source of ignition and not less than 5 feet away from any building opening. Such connection shall be closed and liquidtight when not in use. The connection shall be properly identified.

(3) **Installation of underground tanks.**

(i) **Location.** Excavation for underground storage tanks shall be made with due care to avoid undermining of foundations of existing structure. Underground tanks or tanks under buildings shall be so located with respect to existing building foundations and supports that the loads carried by the latter cannot be transmitted to the tank. The distance from any part of a tank storing Class I liquids to the nearest wall of any basement or pit shall be not less than 1 foot, and to any property line that may be build upon, not less than 3 feet. The distance from any part of a tank storing Class II or Class III liquids to the nearest wall of any basement, pit or property line shall be not less than 1 foot.

(ii) **Depth and cover.** Underground tanks shall be set on firm foundations and surrounded with at least 6 inches of noncorrosive, inert materials such as clean sand, earth, or gravel well tamped in place. The tanks shall be placed in the hole with care since dropping or rolling the tank into the hole can break a weld, puncture or damage the tank, or scrape off the protective coating of coated tanks. Tanks shall be covered with a minimum of 2 feet of earth, or shall be covered with not less than 1 foot of earth, on top of which shall be placed a slab of reinforced concrete not less than 4 inches thick. When underground tanks are, or are likely to be, subject to traffic, they shall be protected against damage from vehicles passing over them by at least 3 feet of earth cover, or 18 inches of well-tamped earth, plus 6 inches of reinforced concrete or 8 inches of asphaltic concrete. When asphaltic or reinforced concrete paving is used as part of the protection, it shall extend at least 1 foot horizontally beyond the outline of the tank in all directions.

(iii) **Corrosion protection.** Corrosion protection for the tank and its piping shall be provided by one or more of the following methods:

(a) Use of protective coatings or wrappings;

(b) Cathodic protection; or,

(c) Corrosion resistant materials of construction.

(iv) **Vents.**

(a) Location and arrangement of vents for Class I liquids. Vent pipes from tanks storing Class I liquids shall be so located that the discharge point is outside of buildings, higher than the fill pipe opening, and not less than 12 feet above the adjacent ground level. Vent pipes shall discharge only upward in order to disperse vapors. Vent pipes 2 inches or less in nominal inside diameter shall not be obstructed by devices that will cause excessive back pressure. Vent pipe outlets shall be so located that flammable vapors will not enter building openings, or be trapped under eaves or other obstructions. If the vent pipe is less than 10 feet in length, or greater than 2 inches in nominal inside diameter, the outlet shall be provided with a vacuum and pressure relief device or there shall be an approved flame arrester located in the vent line at the outlet or within the approved distance from the outlet.

(b) Size of vents. Each tank shall be vented through piping adequate in size to prevent blow-back of vapor or liquid at the fill opening while the tank is being filled. Vent pipes shall be not less than 1 1/4 inch nominal inside diameter.

**TABLE H-11 – VENT LINE DIAMETERS**

| Maximum flow GPM | Pipe Length* | | |
|---|---|---|---|
| | 50 feet | 100 feet | 200 feet |
| | Inches | Inches | Inches |
| 100 | 1 1/4 | 1 1/4 | 1 1/4 |
| 200 | 1 1/4 | 1 1/4 | 1 1/4 |
| 300 | 1 1/4 | 1 1/4 | 1 1/2 |
| 400 | 1 1/4 | 1 1/2 | 2 |
| 500 | 1 1/2 | 1 1/2 | 2 |
| 600 | 1 1/2 | 2 | 2 |
| 700 | 2 | 2 | 2 |
| 800 | 2 | 2 | 3 |
| 900 | 2 | 2 | 3 |
| 1,000 | 2 | 2 | 3 |

*Vent lines of 50 ft., 100 ft., and 200 ft. of pipe plus 7 ells.

(c) Location and arrangement of vents for Class II or Class III liquids. Vent pipes from tanks storing Class II or Class III flammable liquids shall terminate outside of the building and higher than the fill pipe opening. Vent outlets shall be above normal snow level. They may be fitted with return bends, coarse screens or other devices to minimize ingress of foreign material.

(d) Vent piping shall be constructed in accordance with paragraph (c) of this section. Vent pipes shall be so laid as to drain toward the tank without sags or traps in which liquid can collect. They shall be located so that they will not be subjected to physical damage. The tank end of the vent pipe shall enter the tank through the top.

(e) When tank vent piping is manifolded, pipe sizes shall be such as to discharge within the pressure limitations of the system, the vapors they may be required to handle when manifolded tanks are filled simultaneously.

(v) **Tank openings other than vents.**

(a) Connections for all tank openings shall be vapor or liquid tight.

(b) Openings for manual gaging, if independent of the fill pipe, shall be provided with a liquid-tight cap or cover. If inside a building, each such opening shall be protected against liquid overflow and possible vapor release by means of a spring loaded check valve or other approved device.

(c) Fill and discharge lines shall enter tanks only through the top. Fill lines shall be sloped toward the tank.

(d) For Class IB and Class IC liquids other than crude oils, gasolines, and asphalts, the fill pipe shall be so designed and installed as to minimize the possibility of generating static electricity by terminating within 6 inches of the bottom of the tank.

(e) Filling and emptying connections which are made and broken shall be located outside of buildings at a location free from any source of ignition and not less than 5 feet away from any building opening. Such connection shall be closed and liquidtight when not in use. The connection shall be properly identified.

(4) **Installation of tanks inside of buildings.**

(i) **Location.** Tanks shall not be permitted inside of buildings except as provided in paragraphs (e), (g), (h), or (i) of this section.

(ii) **Vents.** Vents for tanks inside of buildings shall be as provided in subparagraphs (2)(iv), (v), (vii)(b), and (3)(iv) of this paragraph, except that emergency venting by the use of weak roof seams on tanks shall not be permitted. Vents shall discharge vapors outside the buildings.

(iii) **Vent piping.** Vent piping shall be constructed in accordance with paragraph (c) of this section.

(iv) **Tank openings other than vents.**

(a) Connections for all tank openings shall be vapor or liquidtight. Vents are covered in subdivision (ii) of this subparagraph.

(b) Each connection to a tank inside of buildings through which liquid can normally flow shall be provided with an internal or an external valve located as close as practical to the shell of the tank. Such valves, when external, and their connections to the tank shall be of steel except when the chemical characteristics of the liquid stored are incompatible with steel. When materials other than steel are necessary, they shall be suitable for the pressures, structural stresses, and temperatures involved, including fire exposures.

(c) Flammable or combustible liquid tanks located inside of buildings, except in one-story buildings designed and protected for flammable or combustible liquid storage, shall be provided with an automatic-closing heat-actuated valve on each withdrawal connection below the liquid level, except for connections used for emergency disposal, to prevent continued flow in the event of fire in the vicinity of the tank. This function may be incorporated in the valve required in (b) of this subdivision, and if a separate valve, shall be located adjacent to the valve required in (b) of this subdivision.

(d) Openings for manual gaging, if independent of the fill pipe (see (f) of this subdivision), shall be provided with a vaportight cap or cover. Each such opening shall be protected against liquid overflow and possible vapor release by means of a spring loaded check valve or other approved device.

(e) For Class IB and Class IC liquids other than crude oils, gasolines, and asphalts, the fill pipe shall be so designed and installed as to minimize the possibility of generating static electricity by terminating within 6 inches of the bottom of the tank.

(f) The fill pipe inside of the tank shall be installed to avoid excessive vibration of the pipe.

(g) The inlet of the fill pipe shall be located outside of buildings at a location free from any source of ignition and not less than 5 feet away from any building opening. The inlet of the fill pipe shall be closed and liquidtight when not in use. The fill connection shall be properly identified.

(h) Tanks inside buildings shall be equipped with a device, or other means shall be provided, to prevent overflow into the building.

(5) **Supports, foundations, and anchorage for all tank locations.**

(i) **General.** Tank supports shall be installed on firm foundations. Tank supports shall be of concrete, masonry, or protected steel. Single wood timber supports (not cribbing) laid horizontally may be used for outside aboveground tanks if not more than 12 inches high at their lowest point.

(ii) **Fire resistance.** Steel supports or exposed piling shall be protected by materials having a fire resistance rating of not less than 2 hours, except that steel saddles need not be protected if less than 12 inches high at their lowest point. Water spray protection or its equivalent may be used in lieu of fire-resistive materials to protect supports.

(iii) **Spheres.** The design of the supporting structure for tanks such as spheres shall receive special engineering consideration.

(iv) **Load distribution.** Every tank shall be so supported as to prevent the excessive concentration of loads on the supporting portion of the shell.

(v) **Foundations.** Tanks shall rest on the ground or on foundations made of concrete, masonry, piling, or steel. Tank foundations shall be designed to minimize the possibility of uneven settling of the tank and to minimize corrosion in any part of the tank resting on the foundation.

(vi) **Flood areas.** Where a tank is located in an area that may be subjected to flooding, the applicable precautions outlined in this subdivision shall be so observed.

(a) No aboveground vertical storage tank containing a flammable or combustible liquid shall be located so that the allowable liquid level within the tank is below the established maximum flood stage, unless the tank is provided with a guiding structure such as described in (m), (n), and (o) of the subdivision.

(b) Independent water supply facilities shall be provided at locations where there is no ample and dependable public water supply available for loading partially empty tanks with water.

(c) In addition to the preceding requirements, each tank so located that more than 70 percent, but less than 100 percent, of its allowable liquid storage capacity will be submerged at the established maximum flood stage, shall be safeguarded by one of the following methods:

Tank shall be raised, or its height shall be increased, until its top extends above the maximum flood stage a distance equivalent to 30 percent or more of its allowable liquid storage capacity: Provided, however, That the submerged part of the tank shall not exceed two and one-half times the diameter. Or, as an alternative to the foregoing, adequate noncombustible structural guides, designed to permit the tank to float vertically without loss of product, shall be provided.

(d) Each horizontal tank so located that more than 70 percent of its storage capacity will be submerged at the established flood stage, shall be anchored, attached to a foundation of concrete or of steel and concrete, of sufficient weight to provide adequate load for the tank when filled with flammable or combustible liquid and submerged by flood waters to the established flood state, or adequately secured by other means.

(e) Revoked.

(f) At locations where there is no ample and dependable water supply, or where filling of underground tanks with liquids is impracticable because of the character of their contents, their use, or for other reasons, each tank shall be safeguarded against movement when empty and submerged by high ground water or flood waters by anchoring, weighting with concrete or other approved solid loading material, or securing by other means. Each such tank shall be so constructed and installed that it will safely resist external pressures due to high ground water or flood waters.

(g) At locations where there is an ample and dependable water supply available, underground tanks containing flammable or combustible liquids, so installed that more than 70 percent of their storage capacity will be submerged at the maximum flood stage, shall be so anchored, weighted, or secured by other means, as to prevent movement of such tanks when filled with flammable or combustible liquids, and submerged by flood waters to the established flood stage.

(h) Pipe connections below the allowable liquid level in a tank shall be provided with valves or cocks located as closely as practicable to the tank shell. Such valves and their connections to tanks shall be of steel or other material suitable for use with the liquid being stored. Cast iron shall not be permitted.

(i) At locations where an independent water supply is required, it shall be entirely independent of public power and water supply. Independent source of water shall be available when flood waters reach a level not less than 10 feet below the bottom of the lowest tank on a property.

(j) The self-contained power and pumping unit shall be so located or so designed that pumping into tanks may be carried on continuously throughout the rise in flood waters from a level 10 feet below the lowest tank to the level of the potential flood stage.

(k) Capacity of the pumping unit shall be such that the rate of rise of water in all tanks shall be equivalent to the established potential average rate of rise of flood waters at any stage.

(l) Each independent pumping unit shall be tested periodically to insure that it is in satisfactory operating condition.

(m) Structural guides for holding floating tanks above their foundations shall be so designed that there will be no resistance to the free rise of a tank, and shall be constructed of noncombustible material.

(n) The strength of the structure shall be adequate to resist lateral movement of a tank subject to a horizontal force in any direction equivalent to not less than 25 pounds per square foot acting on the projected vertical cross-sectional area of the tank.

(o) Where tanks are situated on exposed points or bends in a shoreline where swift currents in flood waters will be present, the structures shall be designed to withstand a unit force of not less than 50 pounds per square foot.

(p) The filling of a tank to be protected by water loading shall be started as soon as flood waters reach a dangerous flood stage. The rate of filling shall be at least equal to the rate of rise of the floodwaters (or the established average potential rate of rise).

(q) Sufficient fuel to operate the water pumps shall be available at all times to insure adequate power to fill all tankage with water.

(r) All valves on connecting pipelines shall be closed and locked in closed position when water loading has been completed.

(s) Where structural guides are provided for the protection of floating tanks, all rigid connections between tanks and pipelines shall be disconnected and blanked off or blinded before the floodwaters reach the bottom of the tank, unless control valves and their connections to the tank are of a type designed to prevent breakage between the valve and the tank shell.

(t) All valves attach to tanks other than those used in connection with water loading operations shall be closed and locked.

(u) If a tank is equipped with a swing line, the swing pipe shall be raised to and secured at its highest position.

(v) Inspections. The Assistant Secretary or his designated representative shall make periodic inspections of all plants where the storage of flammable or combustible liquids is such as to require compliance with the foregoing requirements, in order to assure the following:

(1) That all flammable or combustible liquid storage tanks are in compliance with these requriements and so maintained.

(2) That detailed printed instructions of what to do in flood emergencies are properly posted.

(3) That station operators and other employees depended upon to carry out such instructions are thoroughly informed as to the location and operation of such valves and other equipment necessary to effect these requirements.

(vii) **Earthquake areas.** In areas subject to earthquakes, the tank supports and connections shall be designed to resist damage as a result of such shocks.

(6) **Sources of ignition.** In locations where flammable vapors may be present, precautions shall be taken to prevent ignition by eliminating or controlling sources of ignition. Sources of ignition may include open flames, lightning, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical, and mechanical), spontaneous ignition, chemical and physical-chemical reactions, and radiant heat.

(7) **Testing.**

(i) **General.** All tanks, whether shop built or field erected, shall be strength tested before they are placed in service in accordance with the applicable paragraphs of the code under which they were built. The American Society of Mechanical Engineers (ASME) code stamp. American Petroleum Institute (API) monogram, or the label of the Underwriters' Laboratories, Inc., on a tank shall be evidence of compliance with this strength test. Tanks not marked in accordance with the above codes shall be strength tested before they are placed in service in accordance with good engineering principles and reference shall be made to the sections on testing in the codes listed in subparagraphs (1)(iii)(a), (iv)(b), or (v)(b) of this paragraph.

(ii) **Strength.** When the vertical length of the fill and vent pipes is such that when filled with liquid the static head imposed upon the bottom of the tank exceeds 10 pounds per square inch, the tank and related piping shall be tested hydrostatically to a pressure equal to the static head thus imposed.

(iii) **Tightness.** In addition to the strength test called for in subdivisions (i) and (ii) of this subparagraph, all tanks and connections shall be tested for tightness. Except for underground tanks, this tightness test shall be made at operating pressure with air, inert gas, or water prior to placing the tank in service. In the case of field-erected tanks the strength test may be considered to be the test for tank tightness. Underground tanks and piping, before being covered, enclosed, or placed in use, shall be tested for tightness hydrostatically, or with air pressure at not less than 3 pounds per square inch and not more than 5 pounds per square inch.

(iv) **Repairs.** All leaks or deformations shall be corrected in an acceptable manner before the tank is placed in service. Mechanical caulking is not permitted for correcting leaks in welded tanks except pinhole leaks in the roof.

(v) **Derated operations.** Tanks to be operated at pressures below their design pressure may be tested by the applicable provisions of subdivisions (i) or (ii) of this subparagraph, based upon the pressure developed under full emergency venting of the tank.

**(c) Piping, valves, and fittings.**

(1) **General.**

(i) **Design.** The design (including selection of materials) fabrication, assembly, test, and inspection of piping systems containing flammable or combustible liquids shall be suitable for the expected working pressures and structural stresses. Conformity with the applicable provisions of Pressure Piping, ANSI B31 series and the provisions of this paragraph, shall be considered prima facie evidence of compliance with the foregoing provisions.

(ii) **Exceptions.** This paragraph does not apply to any of the following:

(a) Tubing or casing on any oil or gas wells and any piping connected directly thereto.

(b) Motor vehicle, aircraft, boat, or portable or stationary engines.

(c) Piping within the scope of any applicable boiler and pressures vessel code.

(iii) **Definitions.** As used in this paragraph, piping systems consist of pipe, tubing, flanges, bolting, gaskets, valves, fittings, the pressure containing parts of other components such as expansion joints and strainers, and devices which serve such purposes as mixing, separating, snubbing, distributing, metering, or controlling flow.

(2) **Materials for piping, valves, and fittings.**

(i) **Required materials.** Materials for piping, valves, or fittings shall be steel or nodular iron except as provide in subdivisions (ii), (iii), and (iv) of this subparagraph.

(ii) **Exceptions.** Materials other than steel or nodular iron may be used underground or if required by the properties of the flammable or combustible liquid handled. Material other than steel or nodular iron shall be designed to specifications embodying principles recognized as good engineering design for the material used.

(iii) **Linings.** Piping, valves, and fittings may have combustible or noncombustible linings.

(iv) **Low-melting materials.** When low-melting point materials such as aluminum and brass or materials that soften on fire exposure such as plastics, or nonductile materials such as cast iron, are necessary, special consideration shall be given to their behavior on fire exposure. If such materials are used in aboveground piping systems or inside buildings, they shall be suitably protected against fire exposure or so located that any spill resulting from the failure of these materials could not unduly expose persons, important buildings or structures or can be readily controlled by remote valves.

(3) **Pipe joints.** Joints shall be made liquid tight. Welded or screwed joints or approved connectors shall be used. Threaded joints and connections shall be made up tight with a suitable lubricant or piping compound. Pipe joints dependent upon the friction characteristics of combustible materials for mechanical continuity of piping shall not be used inside buildings. They may be used outside of buildings above or below ground. If used aboveground, the piping shall either be secured to prevent disengagement at the fitting or the piping system shall be so designed that any spill resulting from such disengagement could not unduly expose persons, importing buildings or structures, and could be readily controlled by remote valves.

(4) **Supports.** Piping systems shall be substantially supported and protected against physical damage and excessive stresses arising from settlement, vibration, expansion, or contraction.

(5) **Protection against corrosion.** All piping for flammable or combustible liquids, both aboveground and underground, where subject to external corrosion, shall be painted or otherwise protected.

(6) **Valves.** Piping systems shall contain a sufficient number of valves to operate the system properly and to protect the plant. Piping systems in connection with pumps shall contain a sufficient number of valves to control properly the flow of liquid in normal operation and in the event of physical damage. Each connection to pipelines, by which equipments such as tankcars or tank vehicles discharge liquids by means of pumps into storage tanks, shall be provided with a check valve for automatic protection against backflow if the piping arrangement is such that backflow from the system is possible.

(7) **Testing.** All piping before being covered, enclosed, or placed in use shall be hydrostatically tested to 150 percent of the maximum anticipated pressure of the system, or pneumatically tested in 110 percent of the maximum anticipated pressure of the system, but not less than 5 pounds per square inch gage at the highest point of the system. This test shall be maintained for a sufficient time to complete visual inspection of all joints and connections, but for at least 10 minutes.

**(d) Container and portable tank storage.**

(1) **Scope.**

(i) This paragraph shall apply only to the storage of flammable or combustible liquids in drums or other containers (including flammable aerosols) not exceeding 60 gallons individual capacity and those portable tanks not exceeding 660 gallons individual capacity.

(ii) **Exceptions.** This paragraph shall not apply to the following:

(a) Storage of containers in bulk plants, service stations, refineries, chemical plants, and distilleries;

(b) Class I or Class II liquids in the fuel tanks of a motor vehicle, aircraft, boat, or portable or stationary engine;

(c) Flammable or combustible paints, oils, varnishes, and similar mixtures used for painting or maintenance when not kept for a period in excess of 30 days;

(d) Beverages when packaged in individual containers not exceeding 1 gallon in size.

[38 F.R. 27047, September 28, 1973.]

(2) **Design, construction, and capacity of containers.**

(i) **General.** Only approved containers and portable tanks shall be used. Metal containers and portable tanks meeting the requirements of and containing products authorized by Chapter I, Title 49 of the Code of Federal Regulations (regulations issued by the Hazardous Materials Regulations Board, Department of Transportation), shall be deemed to be acceptable.

(ii) **Emergency venting.** Each portable tank shall be provided with one or more devices installed in the top with sufficient emergency venting capacity to limit internal pressure under the fire exposure conditions to 10 p.s.i.g., or 30 percent of the bursting pressure of the tank, whichever is greater. The total venting capacity shall be not less than that specified in paragraphs (b)(2)(v)(c) or (e) of this section. At least one pressure-actuated vent having a minimum capacity of 6,000 cubic feet of free air (14.7 p.s.i.a. and 60°F.) shall be used. It shall be set to open at not less than 5 p.s.i.g. If fusible vents are used, they shall be actuated by elements that operate at a temperature not exceeding 300°F.

(iii) **Size.** Flammable and combustible liquid containers shall be in accordance with Table H-12, except that glass or plastic containers of no more than 1-gallon capacity may be used for a Class IA or IB flammable liquid if:

(a)

(1) Such liquid either would be rendered unfit for its intended use by contact with metal or would excessively corrode a metal container so as to create a leakage hazard; and

(2) The user's process either would require more than 1 pint of a Class IA liquid or more than 1 quart of a Class IB liquid of a single assay lot to be used at one time, or would require the maintenance of an analytical standard liquid of a quality which is not met by the specified standards of liquids available, and the quantity of the analytical standard liquid required to be used in any one control process exceeds one-sixteenth the capacity of the container allowed under Table H-12 for the class of liquid; or

(b) The containers are intended for direct export outside the United States.

(3) **Design, construction, and capacity of storage cabinets.**

(i) **Maximum capacity.** Not more than 60 gallons of Class I or Class II liquids, nor more than 120 gallons of Class III liquids may be stored in a storage cabinet.

(ii) **Fire resistance.** Storage cabinets shall be designed and constructed to limit the internal temperature to not more than 325°F. when subjected to a 10-minute fire test using the standard time-termpature curve as set forth in Standard Methods of Fire Tests of Building Construction and Materials, NFPA 251-1969. All joints and seams shall remain tight and the door shall remain secuely closed during the fire test. Cabinets shall be labeled in conspicuous lettering, "Flammable – Keep Fire Away."

**TABLE H-12 MAXIMUM ALLOWABLE SIZE OF CONTAINERS AND PORTABLE TANKS**

| Container type | Flammable liquids | | | Combustible liquids | |
|---|---|---|---|---|---|
| | Class IA | Class IB | Class IC | Class II | Class III |
| Glass or approved plastic | 1 pt. | 1 qt. | 1 gal. | 1 gal. | 1 gal. |
| Metal (other than DOT drums) | 1 gal. | 5 gal. | 5 gal. | 5 gal. | 5 gal. |
| Safety cans | 2 gal. | 5 gal. | 5 gal. | 5 gal. | 5 gal. |
| Metal drums (DOT spec.) | 60 gal. | 60 gal. | 60 gal. | 60 gal. | 60 gal. |
| Approved portable tanks | 660 gal. | 660 gal. | 660 gal. | 660 gal. | 660 gal. |

Container exemptions: (a) Medicines, beverages, foodstuffs, cosmetics, and other comm. consumer items, when packaged according to commonly accepted practices, shall be exempt from the requirements of §1910.106 (d)(2)(i) and (ii).
[38 F.R. 27047, September 28, 1973.]

(a) Metal cabinets constructed in the following manner shall be deemed to be in compliance. The bottom, top, door, and sides of cabinet shall be at least No. 18 gage sheet iron and double walled with 1 1/2-inch air space. Joints shall be riveted, welded or made tight by some equally effective means. The door shall be provided with a three-point lock, and the door sill shall be raised at least 2 inches above the bottom of the cabinet.

(b) Wooden cabinets constructed in the following manner shall be deemed in compliance. The bottom, sides, and top shall be constructed of an approved grade of plywood at least 1 inch in thickness, which shall not break down or delaminate under fire conditions. All joints shall be rabbeted and shall be fastened in two directions with flathead woodscrews. When more than one door is used, there shall be a rabbeted overlap of not less than 1 inch. Hinges shall be mounted in such a manner as not to lose their holding capacity due to loosening or burning out of the screws when subjected to the fire test.

(4) **Design and construction of inside storage rooms.**

(i) **Construction.** Inside storage rooms shall be constructed to meet the required fire-restrictive rating for their use. Such construction shall comply with the test specifications set forth in Standard Methods of Fire Tests of Building Construction and Materials, NFPA 251-1969. Where an automatic sprinkler system is provided, the system shall be designed and installed in an acceptable manner. Openings to other rooms or buildings shall be provided with noncombustible liquid-tight raised sills or ramps at least 4 inches in height, or the floor in the storage area shall be at least 4 inches below the surrounding floor. Openings shall be provided with approved self-closing fire doors. The room shall be liquid-tight where the walls join the floor. A permissible alternate to the sill or ramp is an open-grated trench inside of the room which drains to a safe location. Where other portions of the building or other properties are exposed, windows shall be protected as set forth in the Standard for Fire Doors and Windows, NFPA No. 80-1968, for Class E or F openings. Wood at least 1 inch nominal thickness may be used for shelving, racks, dunnage, scuffboards, for overlay, and similar installations.

(ii) **Rating and capacity.** Storage in inside storage rooms shall comply with Table H-13.

**TABLE H-13 – STORAGE IN INSIDE ROOMS**

| Fire protection* provided | Fire resistance | Maximum size | Total allowable quantities (gals./sq. ft./floor area) |
|---|---|---|---|
| Yes | 2 hours | 500 sq. ft. | 10 |
| No | 2 hours | 500 sq. ft. | 5 |
| Yes | 1 hour | 150 sq. ft. | 4 |
| No | 1 hour | 150 sq. ft. | 2 |

*Fire protection system shall be sprinkler, water spray, carbon dioxide, or other system.

(iii) **Wiring.** Electrical wiring and equipment located in inside storage rooms used for Class I liquids shall be approved under the general industry standards 1910.308 and 1910.309, Electrical, for Class I, Division 2 Hazardous Locations; for Class II and Class III liquids, shall be approved for general use.

(iv) **Ventilation.** Every inside storage room shall be provided with either a gravity or a mechanical exhaust ventilation system. Such system shall be designed to provide for a complete change of air within the room at least six times per hour. If a mechanical exhaust system is used, it shall be controlled by a switch located outside of the door. The ventilating equipment and any lighting fixtures shall be operated by the same switch. A pilot light shall be installed adjacent to the switch if Class I flammable liquids are dispensed within the room. Where gravity ventilation is provided, the fresh air intake, as well as the exhaust outlet from the room, shall be on the exterior of the building in which the room is located.

(v) **Storage in inside storage rooms.** In every inside storage room there shall be maintained one clear aisle at least 3 feet wide. Containers over 30 gallons capacity shall not be stacked one upon the other. Dispensing shall be by approved pump or self-closing faucet only.

(5) **Storage inside building.**

(i) **Egress.** Flammable or combustible liquids, including stock for sale, shall not be stored so as to limit use of exits, stairways, or areas normally used for the safe egress of people.

(ii) **Containers.** The storage of flammable or combustible liquids in containers or portable tanks shall comply with subdivisions (iii) through (v) of this subparagraph.

(iii) **Office occupancies.** Storage shall be prohibited except that which is required for maintenance and operation of building and operation of equipment. Such storage shall be kept in closed metal containers stored in a storage cabinet or in safety cans or in an inside storage room not having a door that opens into that portion of the building used by the public.

(iv) **Mercantile occupancies and other retail stores.**
(a)-(d) Revoked.
(e) Leaking containers shall be removed to a storage room or taken to a safe location outside the building and the contents transferred to an undamaged container.

(v) **General purpose public warehouses.** Storage shall be in accordance with Table H-14 or H-15 and in buildings or in portions of such buildings cut off by standard firewalls. Material creating no fire exposure hazard to the flammable or combustible liquids may be stored in the same area.

**TABLE H-14 – INDOOR CONTAINER STORAGE**

| Class liquid | Storage level | Protected storage maximum per pile Gallons | * | Unprotected storage maximum per pile Gallons | * |
|---|---|---|---|---|---|
| IA | Ground and upper floors | 2,750 (50) | * | 660 (12) | * |
| | Basement | Not permitted | | Not permitted | |
| IB | Ground and upper floors | 5,500 (100) | * | 1,375 (25) | * |
| | Basement | Not permitted | | Not permitted | |
| IC | Ground and upper floors | 16,500 (300) | * | 4,125 (75) | * |
| | Basement | 5,500 | | Not permitted | |
| II | Ground and upper floors | 16,500 (300) | * | 4,125 (75) | * |
| | Basement | 5,500 (100) | | Not permitted | |
| III | Ground and upper floors | 55,000 (1,000) | * | 13,750 (250) | * |
| | Basement | 8,250 (450) | | Not permitted | |

NOTE 1: When 2 or more classes of materials are stored in a single pile, the maximum gallonage permitted in that pile shall be the smallest of the 2 or more separate maximum gallonages.
NOTE 2: Aisles shall be provided so that no container is more than 12 ft. from an aisle. Main aisles shall be at least 8 ft. wide and side aisles at least 4 ft. wide.
Note 3: Each pile shall be separated from each other by at least 4 ft.
(numbers in parentheses indicate corresponding number of 55-gallon drums.)
*Revoked

**TABLE H-15 – INDOOR PORTABLE TANK STORAGE**

| Class liquid | Storage level | Protected storage maximum per pile Gallons | * | Unprotected storage maximum per pile Gallons | * |
|---|---|---|---|---|---|
| IA | Ground and upper floors | Not permitted | * | Not permitted | * |
| | Basement | Not permitted | | Not permitted | |
| IB | Ground and upper floors | 20,000 | * | 2,000 | * |
| | Basement | Not permitted | | Not permitted | |
| IC | Ground and upper floors | 40,000 | * | 5,500 | * |
| | Basement | Not permitted | | Not permitted | |
| II | Ground and upper floors | 40,000 | * | 5,500 | * |
| | Basement | 20,000 | | Not permitted | |
| III | Ground and upper floors | 60,000 | * | 22,000 | * |
| | Basement | 20,000 | | Not permitted | |

NOTE 1: When 2 or more classes of materials are stored in a single pile, the maximum gallonage permitted in that pile shall be the smallest of the 2 or more separate maximum gallonages.
NOTE 2: Aisles shall be provided so that no portable tank is more than 12 ft. from an aisle. Main aisles shall be at least 8 ft. wide and side aisles at least 4 ft. wide.
Note 3: Each pile shall be separated from each other by at least 4 ft.
*Revoked

(vi) **Flammable and combustible liquid warehouses or storage buildings.**

(a) If the storage building is located 50 feet or less from a building or line of adjoining property that may be built upon, the exposing wall shall be a blank wall having a fire-resistance rating of at least 2 hours.

(b) The total quantity of liquids within a building shall not be restricted, but the arrangement of storage shall comply with Table H-14 or H-15.

(c) Containers in piles shall be separated by pallets or dunnage where necessary to provide stability and to prevent excessive stress on container walls.

(d) Portable tanks stored over one tier high shall be designed to nest securely, without dunnage, and adequate materials handling equipment shall be available to handle tanks safely at the upper tier level.

(e) No pile shall be closer than 3 feet to the nearest beam, chord, girder, or other obstruction, and shall be 3 feet below sprinkler deflectors or discharge orifices of water spray, or other overhead fire protection systems.

(f) Aisles of at least 3 feet wide shall be provided where necessary for reasons of access to doors, windows or standpipe connections.

(6) **Storage outside buildings.**

(i) **General.** Storage outside buildings shall be in accordance with Table H-16 or H-17, and subdivisions (ii) and (iv) of this subparagraph.

**TABLE H-16 – OUTDOOR CONTAINER STORAGE**

| 1<br>Class | 2<br>Maximum per pile<br>(see note 1) | 3<br>Distance between piles<br>(see note 2) | 4<br>Distance to property line that can be built upon<br>(see notes 3 and 4) | 5<br>Distance to street, alley, public way<br>(see note 4) |
|---|---|---|---|---|
| | gal. | ft. | ft. | ft. |
| IA | 1,100 | 5 | 20 | 10 |
| IB | 2,200 | 5 | 20 | 10 |
| IC | 4,400 | 5 | 20 | 10 |
| II | 8,800 | 5 | 10 | 5 |
| III | 22,000 | 5 | 10 | 5 |

NOTE 1: When 2 or more classes of materials are stored in a single pile, the maximum gallonage in that pile shall be the smallest of the 2 or more separate gallonages.
NOTE 2: Within 200 ft. of each container, there shall be a 12 ft. wide access way to permit approach of fire control apparatus.
NOTE 3: The distances listed apply to properties that have protection for exposures as defined. If there are exposures, and such protection for exposures does not exist, the distance in column 4 shall be doubled.
NOTE 4: When total quantity stored does not exceed 50 percent of maximum per pile, the distances in columns 4 and 5 may be reduced 50 percent, but not less than 3 ft.

**TABLE H-17 – OUTDOOR PORTABLE TANK STORAGE**

| 1<br>Class | 2<br>Maximum per pile | 3<br>Distance between piles | 4<br>Distance to property line that can be built upon | 5<br>Distance to street, alley, public way |
|---|---|---|---|---|
| | gal. | ft. | ft. | ft. |
| IA | 2,200 | 5 | 20 | 10 |
| IB | 4,400 | 5 | 20 | 10 |
| IC | 8,800 | 5 | 20 | 10 |
| II | 17,600 | 5 | 10 | 5 |
| III | 44,000 | 5 | 10 | 5 |

NOTE 1: When 2 or more classes of materials are stored in a single pile, the maximum gallonage in that pile shall be the smallest of the 2 or more separate gallonages.
NOTE 2: Within 200 ft. of each container, there shall be a 12 ft. wide access way to permit approach of fire control apparatus.
NOTE 3: The distances listed apply to properties that have protection for exposures as defined. If there are exposures, and such protection for exposures does not exist, the distance in column 4 shall be doubled.
NOTE 4: When total quantity stored does not exceed 50 percent of maximum per pile, the distances in columns 4 and 5 may be reduced 50 percent, but not less than 3 ft.

(ii) **Maximum storage.** A maximum of 1,100 gallons of flammable or combustible liquids may be located adjacent to buildings located on the same premises and under the same management provided the provisions of subdivisions (a) and (b) of this subdivision are compiled with.

(a) Revoked.

(b) Where quantity stored exceeds 1,100 gallons, or provisions of subdivision (a) of this subdivision cannot be met, a minimum distance of 10 feet between buildings and nearest container of flammable or combustible liquid shall be maintained.

(iii) **Spill containment.** The storage area shall be graded in a manner to divert possible spills away from buildings or other exposures or shall be surrounded by a curb at least 6 inches high. When curbs are used, provisions shall be made for draining of accumulations of ground or rain water or spills of flammable or combustible liquids. Drains shall terminate at a safe location and shall be accessible to operation under fire conditions.

(iv) Security. The storage area shall be protected against tampering or trespassers where necessary and shall be kept free of weeds, debris and other combustible material not necessary to the storage.

(7) **Fire control.**

(i) **Extinguishers.** Suitable fire control devices, such as small hose or portable fire extinguishers, shall

be available at locations where flammable or combustible liquids are stored.

(a) At least one portable fire extinguisher having a rating of not less than 12-B units shall be located outside of, but not more than 10 feet from, the door opening into any room used for storage.

(b) At least one portable fire extinguisher having a rating of not less than 12-B units must be located not less than 10 feet, or more than 25 feet, from any Class I or Class II liquid storage area located outside of a storage room but inside a building.

(ii) **Sprinklers.** When sprinklers are provided, they shall be installed in accordance with rule 921 of the general industry standard Part 9, Fixed Fire Equipment.

(iii) **Open flames and smoking.** Open flames and smoking shall not be permitted in flammable or combustible liquid storage areas.

(iv) **Water reactive materials.** Materials which will react with water shall not be stored in the same room with flammable or combustible liquids.

[38 F.R. 27047, September 28, 1973.]

**(e) Industrial plants.**

(1) **Scope.**

(i) **Application.** This paragraph shall apply to those industrial plants where:

(a) The use of flammable or combustible liquids is incidental to the principal business, or

(b) Where flammable or combustible liquids are handled or used only in unit physical operations such as mixing, drying, evaporating, filtering, distillation, and similar operations which do not involve chemical reaction. This paragraph shall not apply to chemical plants, refineries or distilleries.

(ii) **Exceptions.** Where portions of such plants involve chemical reactions such as oxidation, reduction, halogenation, hydrogenation, alkylation, polymerization, and other chemical processes, those portions of the plant shall be in accordance with paragraph (h) of this section.

(2) **Incidental storage or use of flammable and combustible liquids.**

(i) **Application.** This subparagraph shall be applicable to those portions of an industrial plant where the use and handling of flammable or combustible liquids is only incidental to the principal business, such as automobile assembly, construction of electronic equipment, furniture manufacturing, or other similar activities.

(ii) **Containers.** Flammable or combustible liquids shall be stored in tanks or closed containers.

(a) Except as provided in subdivisions (b) and (c) of this subdivision, all storage shall comply with paragraph (d)(3) or (4) of this section.

(b) The quantity of liquid that may be located outside of an inside storage room or storage cabinet in a building or in any one fire area of a building shall not exceed:

(1) 25 gallons of Class IA liquids in containers.

(2) 120 gallons of Class IB, IC, II, or III liquids containers.

(3) 660 gallons of Class IB,IC, II, or III liquids in a single portable tank.

(c) Where large quantities of flammable or combustible liquids are necessary storage may be in tanks which shall comply with the applicable requirements of paragraph (b) of this section.

(iii) **Separation and protection.** Areas in which flammable or combustible liquids are transferred from one tank or container to another container shall be separated from other operations in the building by adequate distance or by construction having adequate fire resistance. Drainage or other means shall be provided to control spills. Adequate natural or mechanical ventilation shall be provided.

(iv) **Handling liquids at point of final use.**

(a) Flammable liquids shall be kept in covered containers when not actually in use.

(b) Where flammable or combustible liquids are used or handled, except in closed containers, means shall be provided to dispose promptly and safely of leakage or spills.

(c) Class I liquids may be used only where there are no open flames or other sources of ignition within the possible path of vapor travel.

(d) Flammable or combustible liquids shall be drawn from or transferred into vessels, containers, or portable tanks within a building only through a closed piping system, from safety cans, by means of a device drawing through the top, or from a container or portable tanks by gravity through an approved self-closing valve. Transferring by means of air pressure on the container or portable tanks shall be prohibited.

(3) **Unit physical operations.**

(i) **Application.** This subparagraph shall be applicable in those portions of industrial plants where flammable or combustible liquids are handled or used in unit physical operations such as mixing, drying, evaporating, filtering, distillation, and similar operations which do not involve chemical change. Examples are plants compounding cosmetics, pharmaceuticals, solvents, cleaning fluids, insecticides, and similar types of activities.

(ii) **Location.** Industrial plants shall be located so that each building or unit of equipment is accessible from at least one side for firefighting and fire control purposes. Buildings shall be located with respect to lines of adjoining property which may be built upon as set forth in paragraph (h)(2)(i) and (ii) of this section except that the blank wall referred to in paragraph (h)(2)(ii) of this section shall have a fire resistance rating of at least 2 hours.

(iii) **Chemical processes.** Areas where unstable liquids are handled or small scale unit chemical processes are carried on shall be separated from the remainder of the plant by a fire wall of 2-hour minimum fire resistance rating.

(iv) **Drainage.**

(a) Emergency drainage systems shall be provided to direct flammable or combustible liquid leakage and fire protection water to a safe location. This may require curbs, scuppers, or several drainage systems to control the spread of fire; see paragraph (b)(2)(vii)(b) of this section.

(b) Emergency drainage systems, if connected to public sewers or discharged into public

waterways, shall be equipped with traps or separators.

(c) Revoked.

(v) **Ventilation.**

(a) Areas as defined in subdivision (i) of this subparagraph using Class I liquids shall be ventilated at a rate of not less than 1 cubic foot per minute per square foot of solid floor area. This shall be accomplished by natural or mechanical ventilation with discharge or exhaust to a safe location outside of the building. Provision shall be made for introduction of makeup air in such a manner as not to short circuit the ventilation. Ventilation shall be arranged to include all floor areas or pits where flammable vapors may collect.

(b) Equipment used in a building and the ventilation of the building shall be designed so as to limit flammable vapor air mixtures under normal operating conditions to the interior of equipment, and to not more than 5 feet from equipment which exposes Class I liquids to the air. Examples of such equipment are dispensing stations, open centrifuges, plate and frame filters, open vacuum filters, and surfaces of open equipment.

(vi) **Storage and handling.** The storage, transfer, and handling of liquid shall comply with paragraph (h)(4) of this section.

(4) **Tank vehicle and tank car loading and unloading.**

(i) Tank vehicle and tank car loading or unloading facilities shall be separated from aboveground tanks, warehouses, other plant buildings or nearest line of adjoining property which may be built upon by a distance of 25 feet for Class I liquids measured from the nearest position of any fill stem. Buildings for pumps or shelters for personnel may be a part of the facility. Operations of the facility shall comply with the appropriate portions of paragraph (f)(3) of this section.

(5) **Fire control.**

(i) **Portable and special equipment.** Portable fire extinguishment and control equipment shall be provided in such quantities and types as are needed for the special hazards of operation and storage.

(ii) **Water supply.** Water shall be available in volume and at adequate pressure to supply water hose streams, foam-producing equipment, automatic sprinklers, or water spray systems as the need is indicated by the special hazards of operation, dispensing and storage.

(iii) **Special extinguishers.** Special extinguishing equipment such as that utilizing foam, inert gas, or dry chemical shall be provided as the need is indicated by the special hazards of operation dispensing and storage.

(iv) **Special hazards.** Where the need is indicated by special hazards of operation, flammable or combustible liquid processing equipment, major piping, and supporting steel shall be protected by approved water spray systems, deluge systems, approved fire-resistant coatings, insulation, or any combination of these.

(v) **Maintenance.** All plant fire protection facilities shall be adequately maintained and periodically inspected and tested to make sure they are always in satisfactory operating condition, and they will serve their purpose in time of emergency.

(6) **Sources of ignition.**

(i) **General.** Adequate precautions shall be taken to prevent the ignition of flammable vapors. Sources of ignition include but are not limited to open flames; lightning; smoking; cutting and welding; hot surfaces; frictional heat; static, electrical, and mechanical sparks; spontaneous ignition, including heatproducing chemical reactions; and radiant heat.

(ii) **Grounding.** Class I liquids shall not be dispensed into containers unless the nozzle and container are electrically interconnected. Where the metallic floorplate on which the container stands while filling is electrically connected to the fill stem or where the fill stem is bonded to the container during filling operations by means of a bond wire, the provisions of this section shall be deemed to have been complied with.

(7) **Electrical.**

(i) **Equipment.**

(a) All electrical wiring and equipment shall be installed according to the requirements of general industry standards 1910.308 and 1910.309, Electrical.

(b) Locations where flammable vapor-air mixtures may exist under normal operations shall be classified Class I, Division 1 according to the requirements of general industry standards 1910.308 and 1910.309, Electrical. For those pieces of equipment installed in accordance with subparagraph (3)(v)(b) of this paragraph, the Division 1 area shall extend 5 feet in all directions from all points of vapor liberation. All areas within pits shall be classified Division 1 if any part of the pit is within a Division 1 or 2 classified area, unless the pit is provided with mechanical ventilation.

(c) Locations where flammable vapor-air mixtures may exist under abnormal conditions and for a distance beyond Division 1 locations shall be classified Division 2 according to the requirements of general industry standards 1910.308 and 1910.309, Electrical. These locations include an area within 20 feet horizontally, 3 feet vertically beyond a Division 1 area, and up to 3 feet above floor or grade level within 25 feet, if indoors, or 10 feet if outdoors, from any pump, bleeder, withdrawal fitting, meter, or similar device handling Class I liquids. Pits provided with adequate mechanical ventilation within a Division 1 or 2 area shall be classified Division 2. If Class II or III liquids only are handled, then ordinary electrical equipment is satisfactory though care shall be used in locating electrical apparatus to prevent hot metal from falling into open equipment.

(d) Where the provisions of subdivisions (a), (b), and (c), of this subdivision require the installation of electrical equipment suitable for Class I, Division 1 or Division 2 locations, ordinary electrical equipment including switchgear may be used if installed in a room or enclosure which is maintained under positive pressure with respect to the

hazardous area. Ventilation makeup air shall be uncontaminated by flammable vapors.

(8) **Repairs to equipment.** Hot work, such as welding or cutting operations, use of spark-producing power tools, and chipping operations shall be permitted only under supervision of an individual in responsible charge. The individual in responsible charge shall make an inspection of the area to be sure that it is safe for the work to be done and that safe procedures will be followed for the work specified.

(9) **Housekeeping.**

(i) **General.** Maintenance and operating practices shall be in accordance with established procedures which will tend to control leakage and prevent the accidental escape of flammable or combustible liquids. Spills shall be cleaned up promptly.

(ii) **Access.** Adequate aisles shall be maintained for unobstructed movement of personnel and so that fire protection equipment can be brought to bear on any part of flammable or combustible liquid storage, use, or any unit physical operation.

(iii) **Waste and residue.** Combustible waste material and residues in a building or unit operating area shall be kept to a minimum, stored in covered metal receptacles and disposed of daily.

(iv) **Clear zone.** Ground area around buildings and unit operating areas shall be kept free of weeds, trash, or other unnecessary combustible materials.

**(f) Bulk plants.**

(1) **Storage.**

(i) **Class I liquids.** Class I liquids shall be stored in closed containers, or in storage tanks above ground outside of buildings, or underground in accordance with paragraph (b) of this section.

(ii) **Class II and III liquids.** Class II and Class III liquids shall be stored in containers, or in tanks within buildings or above ground outside of buildings, or underground in accordance with paragraph (b) of this section.

(iii) **Piling containers.** Containers of flammable or combustible liquids when piled one upon the other shall be separated by dunnage sufficient to provide stability and to prevent excessive stress on container walls. The height of the pile shall be consistent with the stability and strength of containers.

(2) **Buildings.**

(i) **Exits.** Rooms in which flammable or combustible liquids are stored or handled by pumps shall have exit facilities arranged to prevent occupants from being trapped in the event of fire.

(ii) **Heating.** Rooms in which Class I liquids are stored or handled shall be heated only by means not constituting a source of ignition, such as steam or hot water. Rooms containing heating appliances involving sources of ignition shall be located and arranged to prevent entry of flammable vapors.

(iii) **Ventilation.**

(a) Ventilation shall be provided for all rooms, buildings, or enclosures in which Class I liquids are pumped or dispensed. Design of ventilation systems shall take into account the relatively high specific gravity of the vapors. Ventilation may be provided by adequate openings in outside walls at floor level unobstructed except by louvers or coarse screens. Where natural ventilation is inadequate, mechanical ventilationshall be provided.

(b) Class I liquids shall not be stored or handled within a building having a basement or pit into which flammable vapors may travel, unless such area is provided with ventilation designed to prevent the accumulation of flammable vapors therein.

(c) Containers of Class I liquids shall not be drawn from or filled within buildings unless provision is made to prevent the accumulation of flammable vapors in hazardous concentrations. Where mechanical ventilation is required, it shall be kept in operation while flammable liquids are being handled.

(3) **Loading and unloading facilities.**

(i) **Separation.** Tank vehicle and tank car loading or unloading facilities shall be separated from aboveground tanks, warehouses, other plant buildings or nearest line of adjoining property that may be built upon by a distance of 25 feet for Class I liquids and 15 feet for Class II and Class III liquids measured from the nearest position of any fill spout. Buildings for pumps or shelters for personnel may be a part of the facility.

(ii) **Class restriction.** Equipment such as piping, pumps, and meters used for the transfer of Class I liquids between storage tanks and the fill stem of the loading rack shall not be used for the transfer of Class II or Class III liquids.

(iii) **Valves.** Valves used for the final control for filling tank vehicles shall be of the self-closing type and manually held open except where automatic means are provided for shutting off the flow when the vehicle is full or after filling of a preset amount.

(iv) **Static protection.**

(a) Bonding facilities for protection against static sparks during the loading of tank vehicles through open domes shall be provided:

(1) Where Class I liquids are loaded, or

(2) Where Class II or Class III liquids are loaded into vehicles which may contain vapors from previous cargoes of Class I liquids.

(b) Protection as required in (a) of this subdivision (iv) shall consist of a metallic bond wire permanently electrically connected to the fill stem or to some part of the rack structure in electrical contact with the fill stem. The free end of such wire shall be provided with a clamp or equivalent device for convenient attachment to some metallic part in electrical contact with the cargo tank of the tank vehicle.

(c) Such bonding connection shall be made fast to the vehicle or tank before dome covers are raised and shall remain in place until filling is completed and all dome covers have been closed and secured.

(d) Bonding as specified in (a), (b), and (c) of this subdivision is not required:

(1) Where vehicles are loaded exclusively with products not having a static accumulating tendency, such as asphalt, most crude oils, residual oils, and water soluble liquids;

(2) Where no Class I liquids are handled at the loading facility the tank vehicles loaded are exclusively for Class II and Class III liquids; and

(3) Where vehicles are loaded or unloaded through closed bottom or top connections.

(e) Filling through open domes into the tanks of tank vehicles or tank cars, that contain vaporair mixtures within the flammable range or where the liquid being filled can form such a mixture, shall be by means of a downspout which extends near the bottom of the tank. This precaution is not required when loading liquids which are nonaccumulators of static charges.

(v) **Stray currents.** Tank car loading facilities where Class I liquids are loaded through open domes shall be protected against stray currents by bonding the pipe to at least one rail and to the rack structure if of metal. Multiple lines entering the rack area shall be electrically bonded together. In addition, in areas where excessive stray currents are known to exist, all pipe entering the rack area shall be provided with insulating sections to electrically isolate the rack piping from the pipelines. No bonding between the tank car and the rack or piping is required during either loading or unloading of Class II or III liquids.

(vi) **Container filling facilities.** Class I liquids shall not be dispensed into containers unless the nozzle and container are electrically connected to the fill stem or where the fill stem is bonded to the container during filling operations by means of a bond wire, the provisions of this section shall be deemed to have been complied with.

(4) **Wharves.**

(i) **Definition, application.** The term wharf shall mean any wharf, pier, bulkhead, or other structure over or contiguous to navigable water used in conjunction with a bulk plant, the primary function of which is the transfer of flammable or combustible liquid cargo in bulk between the bulk plant and any tank vessel, ship, barge, lighter boat, or other mobile floating craft; and this subparagraph shall apply to all such installations except Marine Service Stations as covered in paragraph (g) of this section.

(ii) Revoked.

(iii) Revoked.

(iv) **Design and construction.** Substructure and deck shall be substantially designed for the use intended. Deck may employ any material which will afford the desired combination of flexibility, resistance to shock, durability, strength, and fire resistance. Heavy timber construction is acceptable.

(v) Revoked.

(vi) **Pumps.** Loading pumps capable of building up pressures in excess of the safe working pressure of cargo hose or loading arms shall be provided with bypasses, relief valves, or other arrangement to protect the loading facilities against excessive pressure. Relief devices shall be tested at not more than yearly intervals to determine that they function satisfactorily at the pressure at which they are set.

(vii) **Hoses and couplings.** All pressure hoses and couplings shall be inspected at intervals appropriate to the service. The hose and couplings shall be tested with the hose extended and using the “inservice maximum operating pressures.” Any hose showing material deteriorations, signs of leakage, or weakness in its carcass or at the couplings shall be withdrawn from service and repaired or discarded.

(viii) **Piping and fittings.** Piping, valves, and fittings shall be in accordance with paragraph (c) of this section, with the following exceptions and additions:

(a) Flexibility of piping shall be assured by appropriate layout and arrangement of piping supports so that motion of the wharf structure resulting from wave action, currents, tides, or the mooring of vessels will not subject the pipe to repeated strain beyond the elastic limit.

(b) Pipe joints depending upon the friction characteristics of combustible materials or grooving of pipe ends for mechanical continuity of piping shall not be used.

(c) Swivel joints may be used in piping to which hoses are connected, and for articulated swivel-joint transfer systems, provided that the design is such that the mechanical strength of the joint will not be impaired if the packing material should fail, as by exposure to fire.

(d) Piping systems shall contain a sufficient number of valves to operate the system properly and to control the flow of liquid in normal operation and in the event of physical damage.

(e) In addition to the requirements of subdivision (d) of this subdivision, each line conveying flammable liquids leading to a wharf shall be provided with a readily accessible block valve located on shore near the approach to the wharf and outside of any diked area. Where more than one line is involved, the valves shall be grouped in one location.

(f) Means of easy access shall be provided for cargo line valves located below the wharf deck.

(g) Pipelines on flammable or combustible liquids wharves shall be adequately bonded and grounded. If excessive stray currents are encountered, insulating joints shall be installed. Bonding and grounding connections on all pipelines shall be located on wharfside of hose-riser insulating flanges, if used, and shall be accessible for inspection.

(h) Hose or articulated swivel-joint pipe connections used for cargo transfer shall be capable of accommodating the combined effects of change in draft and maximum tidal range, and mooring lines shall be kept adjusted to prevent the surge of the vessel from placing stress on the cargo transfer system.

(i) Hose shall be supported so as to avoid kinking and damage from chafing.

(ix) **Fire protection.** Suitable portable fire extinguishers with a rating of not less than 12-BC shall be located within 75 feet of those portions of the facility where fires are likely to occur, such as hose connections, pumps, and separator tanks.

(a) Where piped water is available, ready-connected fire hose in size appropriate for the water supply shall be provided so that manifolds where connections are made and broken can be reached by at least one hose stream.

(b) Material shall not be placed on wharves in such a manner as to obstruct access to firefighting equipment, or important pipeline control valves.

(c) Where the wharf is accessible to vehicle traffic, an unobstructed roadway to the shore end of the wharf shall be maintained for access of firefighting apparatus.

(x) **Operations control.** Loading or discharging shall not commence until the wharf superintendent and officer in charge of the tank vessel agree that the tank vessel is properly moored and all connections are properly made. Mechanical work shall not be performed on the wharf during cargo transfer, except under special authorization based on a review of the area involved, methods to be employed, and precautions necessary.

(5) **Electrical equipment.**

(i) **Application.** This subparagraph shall apply to areas where Class I liquids are stored or handled. For areas where Class II or Class III liquids only are stored or handled, the electrical equipment may be installed in accordance with the provisions of the general industry standards 1910.308 and 1910.309, Electrical, or ordinary locations.

(ii) **Conformance.** All electrical equipment and wiring shall be of a type specified by and shall be installed in accordance with general industry standards 1910.308 and 1910.309, Electrical.

(iii) **Classification.** So far as it applies Table H-18 shall be used to delineate and classify hazardous areas for the purpose of installation of electrical equipment under normal circumstances. In Table H-18 a classified area shall not extend beyond an unpierced wall, roof, or other solid partition. The area classifications listed shall be based on the premise that the installation meets the applicable requirements of this section in all respects.

(6) **Sources of ignition.** Class I liquids shall not be handled, drawn, or dispensed where flammable vapors may reach a source of ignition. Smoking shall be prohibited except in designated localities. “No Smoking” signs shall be conspicuously posted where hazard from flammable liquid vapors is normally present.

(7) **Drainage and waste disposal.** Provision shall be made to prevent flammable or combustible liquids which may be spilled at loading or unloading points from entering public sewers and drainage systems, or natural waterways. Connection to such sewers, drains, or waterways by which flammable or combustible liquids might enter shall be provided with separator boxes or other approved means whereby such entry is precluded. Crankcase drainings and flammable or combustible liquids shall not be dumped into sewers, but shall be stored in tanks or tight drums outside of any building until removed from the premises.

(8) **Fire control.** Suitable fire-control devices, such as small hose or portable fire extinguishers, shall be available to locations where fires are likely to occur. Additional fire-control equipment may be required where a tank of more than 50,000 gallons individual capacity contains Class I liquids and where an unusual exposure hazard exists from surrounding property. Such additional fire-control equipment shall be sufficient to extinguish a fire in the largest tank. The design and amount of such equipment shall be in accordance with approved engineering standards.

**(g) Service stations.**

(1) **Storage and handling.**

(i) **General provisions.**

(a) Liquids shall be stored in approved closed containers not exceeding 60 gallons capacity, in tanks located underground, in tanks in special enclosures as described in subdivision (ii) of this subparagraph, or in aboveground tanks as provided for in subparagraphs (4)(ii), (b), (c) and (d) of this paragraph.

(b) Aboveground tanks, located in an adjoining bulk plant, may be connected by piping to service station underground tanks if, in addition to valves at aboveground tanks, a valve is also installed within control of service station personnel.

(c) Apparatus dispensing Class I liquids into the fuel tanks of motor vehicles of the public shall not be located at a bulk plant unless separated by a fence or similar barrier from the area in which bulk operations are conducted.

(d) [Revoked]

[39 F.R. 9975, March 15, 1974.]

(e) The provisions of (a) of this subdivision shall not prohibit the dispensing of flammable liquids in the open from a tank vehicle to a motor vehicle. Such dispensing shall be permitted provided:

(1) The tank vehicle complies with the requirements covered in the Standard on Tank Vehicles for Flammable Liquids, NFPA 385-1966.

(2) The dispensing is done on premises not open to the public.

(3) [Revoked.]

[39 F.R. 9957, March 15, 1974.]

(4) The dispensing hose does not exceed 50 feet in length.

(5) The dispensing nozzle is a listed automatic-closing type without a latch-open device.

(f) Class I liquids shall not be stored or handled within a building having a basement or pit into which flammable vapors may travel, unless such area is provided with ventilation designed to prevent the accumulation of flammable vapors therein.

(g) Accurate inventory records shall be maintained and reconciled on all Class I liquid storage tanks for possible indication of leakage from tanks or piping.

(ii) **Special enclosures.**

(a) When installation of tanks in accordance with paragraph (b)(3) of this section is impractical because of property or building limitations, tanks for flammable or combustible liquids may be installed in buildings if properly enclosed.

(b) The enclosure shall be substantially liquid and vaportight without backfill. Sides, top, and bottom of the enclosure shall be of reinforced concrete at least 6 inches thick, with openings for inspection through the top only. Tank connections shall be so piped or closed that neither vapor nor liquid can escape into the enclosed space. Means shall be provided whereby portable equipment may be employed to discharge to the outside any liquid or vapors which might accumulate should leakage occur.

(c) Revoked.

**TABLE H-18 – ELECTRICAL EQUIPMENT HAZARDOUS AREAS – BULK PLANTS**

| Location | NEC Class I Group D Division | Distance between piles (see note 2) |
|---|---|---|
| Tank vehicle and tank car: | | |
| Loading through open dome | 1 | Within 3 feet of edge of dome, extending in all directions. |
| | 2 | Area between 3 feet and 5 feet from edge of dome, extending in all directions. |
| Loading through bottom connections with atmospheric venting | 1 | Within 3 feet of point of venting to atmosphere extending in all directions. |
| | 2 | Area between 3 feet and 5 feet from point of venting to atmosphere, extending in all directions. Also up to 18 inches above grade within a horizontal radius of 10 feet from point of loading connection. |
| Loading through closed dome with atmospheric venting. | 1 | Within 3 feet of open end of vent, extending in all directions. |
| | 2 | Area between 3 feet and 5 feet from open end of vent, extending in all directions. Also within 3 feet of edge of dome, extending in all directions. |
| Loading though closed dome with vapor recovery. | 2 | Within 3 feet of point of connection of both fill and vapor lines, extending in all directions. |
| Bottom loading with vapor recovery or any bottom unloading. | 2 | Within 3 feet of point of connections extending in all directions. Also up to 18 inches above grade within a horizontal radius of 10 feet from point of connection. |
| Drum and container filling: | 1 | Within 3 feet of vent and fill opening, extending in all directions. |
| Outdoors, or indoors with adequate ventilation. | 2 | Area between 3 feet and 5 feet from vent or fill open, extending in all directions. Also up to 18 inches above floor or grade level within a horizontal radius of 10 feet from vent or fill opening. |
| Tank – Above ground: | | |
| Shell, ends, or roof and dike area | 2 | Within 10 feet from shell, ends, or roof of tank. Area inside dikes to level of top of dike. |
| Vent | 1 | Within 5 feet of open end of vent, extending in all directions. |
| | 2 | Area between 5 feet and 10 feet from open end of vent, extending in all directions. |
| Floating roof | 1 | Area above the roof and within the shell. |
| Pits: | | |
| Without mechanical ventilation | 1 | Entire area within pit if any part is within a Division 1 or 2 classified area. |
| With mechanical ventilation | 2 | Entire area within pit if any part is within a Division 1 or 2 classified area. |
| Containing valves, fittings, or piping, and not within a division 1 or 2 classified area. | 1 | Entire pit. |
| Pumps, bleeders, withdrawal fittings, meters and similar devices: | | |
| Indoors | 2 | Within 5 feet of any edge of such devices, extending in all directions. Also up to 3 feet above floor grade level within 25 feet horizontally from any edge of such devices |
| Outdoors | 2 | Within 3 feet of any edge of such devices, extending in all directions. Also up to 18 inches above grade level within 10 feet horizontally from any edge of such devices. |
| Storage and repair garage for tank vehicles | 1 | All pits or spaces below floor level. |
| | 2 | Area up to 18 inches above floor or grade level for entire storage or repair garage. |
| Drainage ditches, separators, impounding basins. | 2 | Area up to 18 inches above ditch, separator or basin. Also up to 18 inches above grade within 15 feet horizontally from any edge. |
| Garages for other than tank vehicles | Ordinary | If there is any opening to these rooms within the extent of an outdoor classified area, the entire room shall be classified the same as the area classification at the point of the opening. |
| Outdoor drum storage | Ordinary | |
| Indoor warehousing where there is no flammable liquid transfer. | Ordinary | If there is any opening to these rooms within the extent of an indoor classified area, the entire room shall be classified the same as if the wall, curb or partition did not exist. |
| Office and rest rooms | Ordinary | |

(iii) **Inside buildings.**

(a) Except where stored in tanks as provided in subdivision (ii) of this subparagraph, no Class I liquids shall be stored within any service station building except in closed containers of aggregate capacity not exceeding 60 gallons. One container not exceeding 60 gallons capacity equipped with an approved pump is permitted.

(b) Class I liquids may be transferred from one container to another in lubrication or service rooms of a service station building provided the electrical installation complies with Table H-19 and provided that any heating equipment complies with subparagraph (6) of this paragraph.

(c) Class II and Class III liquids may be stored and dispensed inside service station buildings from tanks of not more than 120 gallons capacity each.

**TABLE H-19 – ELECTRICAL EQUIPMENT HAZARDOUS AREAS – BULK PLANTS**

| Location | NEC Class I Group D Division | Extent of classified area |
|---|---|---|
| Underground tank: | | |
| Fill opening | 1 | Any pit, box or pace below grade level, any part of which is within the Division 1 or 2 classified area. |
| | 2 | Up to 18 inches above grade level within a horizontal radius of 10 feet from a loose fill connection and within a horizontal radius of 5 feet from a tight fill connection. |
| Vent – Discharging upward | 1 | Within 3 feet of open end of vent, extending in all directions. |
| | 2 | Area between 3 feet and 5 feet of open end of vent, extending in all directions. |
| Dispenser: | | |
| Pits | 1 | Any pit, box or space below grade level, any part of which is within the Division 1 or 2 classified area. |
| Dispenser enclosure | 1 | The area 4 feet vertically above base within the enclosure and 18 inches horizontally in all directions. |
| Outdoor | 2 | Up to 18 inches above grade level within 20 feet horizontally of any edge of enclosure. |
| Indoor: | | |
| With mechanical ventilation | 2 | Up to 18 inches above grade or floor level within 20 feet horizontally of any edge of enclosure. |
| With gravity ventilation | 2 | Up to 18 inches above grade or floor level within 25 fet horizontally of any edge of enclosure. |
| Remote pump – Outdoor | 1 | Any pit, box or space below grade level if any part is within a horiontal distance of 10 feet from any edge of pump. |
| | 2 | Within 3 feet of any edge of pumb, extending in all directions. Also up to 3 feet above floor or grade level witin 25 feet horizontally from any edge of pump. |
| Lubrication or service room | 1 | Entire area within any pit. |
| | 2 | Area up to 18 inches above floor grade level within entire lubrication room. |
| Dispenser for Class I Liquids | 2 | Within 3 feet of any fill or dispensing point, extending in all directions. |
| Special enclosure inside building per §1910.106(f)(1)(ii) | 1 | Entire enclosure. |
| Sales, storage and rest rooms | Ordinary | If there is any opening to these rooms within the extent to a Division 1 area, there entire room shall be classified as Division 1. |

(iv) **Revoked.**

(v) **Dispensing into portable containers.** No delivery of any Class I liquids shall be made into portable containers unless the container is constructed of metal, has a tight closure with screwed or spring cover, and is fitted with a spout or so designed that the contents can be poured without spilling.

(2) **Private stations.** Service stations not accessible to or open to the public do not require an attendant or supervisor. Such stations may be used by commercial, industrial, governmental, or manufacturing establishments.

(3) **Dispensing systems.**

(i) **Location.** Dispensing devices at automotive service stations shall be so located that all parts of the vehicle being serviced will be on the premises of the service station.

(ii) **Inside location.** Approved dispensing units may be located inside of buildings. The dispensing area shall be separated from other areas in an approved manner. The dispensing unit and its piping shall be mounted either on a concrete island or protected against collision damage by suitable means and shall be located in a position where it cannot be struck by a vehicle descending a ramp or other slope out of control. The dispensing area shall be provided with an approved mechanical or gravity ventilation system. When dispensing units are located below grade, only approved mechanical ventilation shall be used and the entire dispensing area shall be protected by an approved automatic sprinkler system. Ventilating systems shall be electrically interlocked with gasoline dispensing units so that the dispensing units cannot be operated unless the ventilating fan motors are energized.

(iii) **Emergency power cutoff.** A clearly identified and easily accessible switch(es) or a circuit breaker(s) shall be provided at a location remote from dispensing devices, including remote pumping

systems, to shut off the power to all dispensing devices in the event of an emergency

(iv) **Dispensing units.**

(a) Class I liquids shall be transferred from tanks by means of fixed pumps so designed and equipped as to allow control of the flow and to prevent leakage or accidental discharge.

(b)

(1) Only listed devices may be used for dispensing Class I liquids. No such device may be used if it shows evidence of having been dismantled.

(2) Every dispensing device for Class I Liquids installed after December 31, 1978, shall contain evidence of listing so placed that any attempt to dismantle the device will result in damage to such evidence, visible without disassembly or dismounting of the nozzle.

[39 F.R. 9957, March 15, 1974.]

(c) Class I liquids shall not be dispensed by pressure from drums, barrels, and similar containers. Approved pumps taking suction through the top of the container or approved self-closing faucets shall be used.

(d) The dispensing units, except those attached to containers, shall be mounted either on a concrete island or protected against collision damage by suitable means.

(v) **Remote pumping systems.**

(a) This subdivision shall apply to systems for dispensing Class I liquids where such liquids are transferred from storage to individual or multiple dispensing units by pumps located elsewhere than at the dispensing units.

(b) Pumps shall be designed or equipped so that no part of the system will be subjected to pressures above its allowable working pressure. Pumps installed above grade, outside of buildings, shall be located not less than 10 feet from lines of adjoining property which may be built upon, and not less than 5 feet from any building opening. When an outside pump location is impractical, pumps may be installed inside of buildings, as provided for dispensers in subdivision (ii) of this subparagraph, or in pits as provided in subdivision (c) of this subdivision. Pumps shall be substantially anchored and protected against physical damage by vehicles.

(c) Pits for subsurface pumps or piping manifolds of submersible pumps shall withstand the external forces to which they may be subjected without damage to the pump, tank, or piping. The pit shall be no larger than necessary for inspection and maintenance and shall be provided with a fitted cover.

(d) A control shall be provided that will permit the pump to operate only when a dispensing nozzle is removed from its bracket on the dispensing unit and the switch on this dispensing unit is manually actuated. This control shall also stop the pump when all nozzles have been returned to their brackets.

(e) An approved impact valve, incorporating a fusible link, designed to close automatically in the event of severe impact or fire exposure shall be properly installed in the dispensing supply line at the base of each individual dispensing device.

(f) Testing. After the completion of the installation, including any paving, that section of the pressure piping system between the pump discharge and the connection for the dispensing facility shall be tested for at least 30 minutes at the maximum operating pressure of the system. Such tests shall be repeated at 5-year intervals thereafter.

(vi) **Delivery nozzles.**

(a) Hose-nozzle valves of either the manual or automatic closing type for dispensing Class I liquids into a fuel tank or into a container shall be manually held open during the dispensing operation except as provided in subdivision (b) or this subdivision.

(b) On any service station dispenser accessible to the public a listed automatic type nozzle with hold-open latch is permitted only when all dispensing of Class I liquids is to be done by the service station attendant.

(c) Of the dispensing of Class I liquids at a service station available and open to the public is to be done by a person other than the service station attendant, the nozzle shall be a listed automatic closing type without hold-open latch.

(vii) **Special type dispensers.** [Revoked.]

[39 F.R. 9957, March 15, 1974.]

(4) **Marine service stations.**

(i) **Dispensing.**

(a) The dispensing area shall be located away from other structures so as to provide room for safe ingress and egress of craft to be fueled. Dispensing units shall in all cases be at least 20 feet from any activity involving fixed sources of ignition.

(b) Dispensing shall be by approved dispensing units with or without integral pumps and may be located on open piers, wharves, or floating docks or on shore or on piers of the solid fill type.

(c) Dispensing nozzles shall be automatic-closing without a hold-open latch.

(ii) **Tanks and pumps.**

(a) Tanks, and pumps not integral with the dispensing unit shall be on shore or on a pier of the solid fill type, except as provided in subdivisions (b) and (c) of this subdivision.

(b) Where shore location would require excessively long supply lines to dispensers, tanks may be installed on a pier provided that applicable portions of paragraph (b) of this section relative to spacing, diking, and piping are complied with and the quantity so stored does not exceed 1,100 gallons aggregate capacity.

(c) Shore tanks supplying marine service stations may be located above ground, where rock ledges or high water table make underground tanks impractical.

(d) Where tanks are at an elevation which would produce gravity head on the dispensing unit, the tank outlet shall be equipped with a pressure control valve positioned adjacent to and outside the tank block valve specified in paragraph (b)(2)(ix)(b) of this section, so

adjusted that liquid cannot flow by gravity from the tank in case of piping or hose failure.

(iii) **Piping.**

(a) Piping between shore tanks and dispensing units shall be as described in paragraph (c) of this section, except that, where dispensing is from a floating structure, suitable lengths of oil resistant flexible hose may be employed between the shore piping and the piping on the floating structure as made necessary by change in water level or shoreline.

(b) A readily accessible valve to shut off the supply from shore shall be provided in each pipeline at or near the approach to the pier and at the shore end of each pipeline adjacent to the point where flexible hose is attached.

(c) Piping shall be located so as to be protected from physical damage.

(d) Piping handling Class I liquids shall be grounded to control stray currents.

(5) **Electrical equipment.**

(i) **Application.** This subparagraph shall apply to areas where Class I liquids are stored or handled. For areas where Class II or Class III liquids are stored or handled, the electrical equipment may be installed in accordance with the provisions of general industry standards 1910.308 and 1910.309, Electrical, for ordinary locations.

(ii) All electrical equipment and wiring shall be of a type specified by and shall be installed in accordance with the general industry standards 1910.308 and 1910.309 Electrical.

(iii) So far as it applies, Table H-19 shall be used to delineate and classify hazardous areas for the purpose of installation of electrical equipment under normal circumstances. A classified area shall not extend beyond an unpierced wall, roof, or other solid partition.

(iv) The area classifications listed shall be based on the assumption that the installation meets the applicable requirements of this section in all respects.

(6) **Heating equipment.**

(i) **Conformance.** Heating equipment shall be installed as provided in subdivisions (ii) through (v) of this subparagraph.

(ii) **Application.** Heating equipment may be installed in the conventional manner in an area except as provided in subdivisions (iii), (iv), or (v) of this subparagraph.

(iii) **Special room.** Heating equipment may be installed in a special room separated from an area classified by Table H-19 by walls having a fire resistance rating of at least 1 hour and without any openings in the walls within 8 feet of the floor into an area classified in Table H-19. This room shall not be used for combustible storage and all air for combustion purposes shall come from outside the building.

(iv) **Work areas.** Heating equipment using gas or oil fuel may be installed in the lubrication, sales, or service room where there is no dispensing or transferring of Class I liquids provided the bottom of the combustion chamber is at least 18 inches above the floor and the heating equipment is protected from physical damage by vehicles. Heating equipment using gas or oil fuel listed for use in garages may be installed in the lubrication or service room where Class I liquids are dispensed provided the equipment is installed at least 8 feet above the floor.

(v) **Electric heat.** Electrical heating equipment shall conform to subparagraph (5) of this paragraph.

(7) **Drainage and waste disposal.** Provision shall be made in the area where Class I liquids are dispensed to prevent spilled liquids from flowing into the interior of service station buildings. Such provision may be by grading driveways, raising door sills, or other equally effective means. Crankcase drainings and flammable or combustible liquids shall not be dumped into sewers but shall be stored in tanks or drums outside of any building until removed from the premises.

(8) **Sources of ignition.** In addition to the previous restrictions of this paragraph, the following shall apply: There shall be no smoking or open flames in the areas used for fueling, servicing fuel systems for internal combustion engines, receiving or dispensing of flammable or combustible liquids. Conspicuous and legible signs prohibiting smoking shall be posted within sight of the customer being served. The motors of all equipment being fueled shall be shut off during the fueling operation.

(9) **Fire control.** Each service station shall be provided with at least one fire extinguisher having a minimum approved classification of 6B, C located so that an extinguisher will be within 75 feet of each pump, dispenser, underground fill pipe opening, and lubrication or service room.

**(h) Processing plants.**

(1) **Scope.** This paragraph shall apply to those plants or buildings which contain chemical operations such as oxidation, reduction, halogenation, hydrogenation, alkylation, polymerization, and other chemical processes but shall not apply to chemical plants, refineries or distilleries.

(2) **Location.**

(i) **Classification.** The location of each processing vessel shall be based upon its flammable or combustible liquid capacity. *

* Revoked.

**TABLE H-20 Revoked.**

(ii) **Revoked.**

(3) **Processing building.**

(i) **Construction.**

(a) Processing buildings shall be of fire-resistance or noncombustible construction, except heavy timber construction with load-bearing walls may be permitted for plants utilizing only stable Class II or Class III liquids. Except as provided in subparagraph (2)(ii) of this paragraph or in the case of explosion resistant walls used in conjunction with explosion relieving facilities, see subparagraph (3)(iv) of this paragraph, load-bearing walls are prohibited. Buildings shall be without basements or covered pits.

(b) Areas shall have adequate exit facilities arranged to prevent occupants from being trapped in the event of fire. Exits shall not be exposed by the drainage facilities described in subdivision (ii) of this subparagraph.

(ii) **Drainage.**

(a) Emergency drainage systems shall be provided to direct flammable or combustible liquid leakage and fire protection water to a safe location. This may require curbs, scuppers, or special drainage systems to

control the spread of fire, see paragraph (b)(2)(vii)(b) of this section.

(b) Emergency drainage systems, if connected to public sewers or discharged into public waterways, shall be equipped with traps or separators.

(b) Revoked.

(iii) **Ventilation.**

(a) Enclosed processing buildings shall be ventilated at a rate of not less than 1 cubic foot per minute per square foot of solid floor area. This shall be accomplished by natural or mechanical ventilation with discharge or exhaust to a safe location outside of the building. Provisions shall be made for introduction of makeup air in such a manner as not to short circuit the ventilation. Ventilation shall be arranged to include all floor areas or pits where flammable vapors may collect.

(b) Equipment used in a building and the ventilation of the building shall be designed so as to limit flammable vapor-air mixtures under normal operating conditions to the interior of equipment, and to not more than 5 feet from equipment which exposes Class I liquids to the air. Examples of such equipment are dispensing stations, open centrifuges, plate and frame filters, open vacuum filters, and surfaces of open equipment.

(iv) **Explosion relief.** Areas where Class IA or unstable liquids are processed shall have explosion venting through one or more of the following methods:

(a) Open air construction.

(b) Lightweight walls and roof.

(c) Lightweight wall panels and roof hatches.

(d) Windows of explosion venting type.

(4) **Liquid handling.**

(i) **Storage.**

(a) The storage of flammable or combustible liquids in tanks shall be in accordance with the applicable provisions of paragraph (b) of this section.

(b) If the storage of flammable or combustible liquids in outside aboveground or underground tanks is not practical because of temperature or production considerations, tanks may be permitted inside of buildings or structures in accordance with the applicable provisions of paragraph (b) of this section.

(c) Storage tanks inside of buildings shall be permitted only in areas at or above grade which have adequate drainage and are separated from the processing area by construction having a fire resistance rating of at least 2 hours.

(d) The storage of flammable or combustible liquids in containers shall be in accordance with the applicable provisions of paragraph (d) of this section.

(ii) **Piping, valves, and fittings.**

(a) Piping, valves, and fittings shall be in accordance with paragraph (c) of this section.

(b) Approved flexible connectors may be used where vibration exists or where frequent movement is necessary. Approved hose may be used at transfer stations.

(c) Piping containing flammable or combustible liquids shall be identified.

(iii) **Transfer.**

(a) The transfer of large quantities of flammable or combustible liquids shall be through piping by means of pumps or water displacement. Except as required in process equipment, gravity flow shall not be used. The use of compressed air as a transferring medium is prohibited.

(b) Positive displacement pumps shall be provided with pressure relief discharging back to the tank or to pump suction.

(iv) **Equipment.**

(a) Equipment shall be designed and arranged to prevent the unintentional escape of liquids and vapors and to minimize the quantity escaping in the event of accidental release.

(b) Where the vapor space of equipment is usually within the flammable range, the probability of explosion damage to the equipment can be limited by inserting, by providing an explosion suppression system, or by designing the equipment to contain the peak explosion pressure which may be modified, by explosion relief. Where the special hazards of operation, sources of ignition, or exposures indicate a need, consideration shall be given to providing protection by one or more of the above means.

(5) **Tank vehicle and tank car loading and unloading.** Tank vehicle and tank car loading or unloading facilities shall be separated from aboveground tanks, warehouses, other plant buildings, or nearest line of adjoining property which may be built upon by a distance of 25 feet for Class I liquids and 15 feet for Class II and Class III liquids measured from the nearest position of any fill stem. Buildings for pumps or shelters for personnel may be a part of the facility. Operations of the facility shall comply with the appropriate portions of paragraph (f)(3) of this section.

(6) **Fire control.**

(i) **Portable extinguishers.** Approved portable fire extinguishers of appropriate size, type, and number shall be provided.

(ii) **Other controls.** Where the special hazards of operation or exposure indicate a need the following fire control provision shall be provided.

(a) A reliable water supply shall be available in pressure and quantity adequate to meet the probable fire demands.

(b) Hydrants shall be provided in accordance with accepted good practice.

(c) Hose connected to a source of water shall be installed so that all vessels, pumps, and other equipment containing flammable or combustible liquids can be reached with at least one hose stream. Nozzles that are capable of discharging a water spray shall be provided.

(d) Processing plants shall be protected by an approved automatic sprinkler system or equivalent extinguishing system. If special extinguishing systems including but not limited to those employing foam, carbon dioxide, or dry chemical are provided, approved equipment shall be used and installed in an approved manner.

(iii) **Alarm systems.** An approved means for prompt notification of fire to those within the plant and any

public fire department available shall be provided. It may be advisable to connect the plant system with the public system where public fire alarm system is available.

(iv) **Maintenance.** All plant fire protection facilities shall be adequately maintained and periodically inspected and tested to make sure they are always in satisfactory operating condition and that they will serve their purpose in time of emergency.

(7) **Sources of ignition.**

(i) **General.**

(a) Precautions shall be taken to prevent the ignition of flammable vapors. Sources of ignition include but are not limited to open flames; lightning; smoking; cutting and welding; hot surfaces; frictional heat; static, electrical, and mechanical sparks; spontaneous ignition, including heatproducing chemical reactions; and radiant heat.

(b) Class I liquids shall not be dispensed into containers unless the nozzle and container are electrically interconnected. Where the metallic floorplate on which the container stands while filling is electrically connected to the fill stem or where the fill stem is bonded to the container during filling operations by means of a bond wire, the provisions of this section shall be deemed to have been complied with.

(ii) **Maintenance and repair.**

(a) When necessary to do maintenance work in a flammable or combustible liquid processing area, the work shall be authorized by a responsible representative of the employer.

(b) Hot work, such as welding or cutting operations, use of spark-producing power tools, and chipping operations shall be permitted only under supervision of an individual in responsible charge who shall make an inspection of the area to be sure that it is safe for the work to be done and that safe procedures will be followed for the work specified.

(iii) **Electrical.**

(a) All electrical wiring and equipment within storage or processing areas shall be installed in accordance with nationally recognized good practice.

(b) Locations where flammable vapor-air mixtures may exist under normal operations shall be classified Class I, Division 1 according to the requirements of general industry standards 1910.308 and 1910.309, Electrical. For those pieces of equipment installed in accordance with subparagraphs (3)(iii)(b) of this paragraph, the Division 1 area shall extend 5 feet in all directions from all points of vapor liberation. All areas within pits shall be classified Division 1 if any part of the pit is within a Division 1 or 2 classified area, unless the pit is provided with mechanical ventilation.

(c) Locations where flammable vapor-air mixtures may exist under abnormal conditions and for a distance beyond Division 1 locations shall be classified Division 2 according to the requirements of general industry standards 1910.308 and 1910.309, Electrical. These locations include an area within 20 feet horizontally, 3 feet vertically beyond a Division 1 area, and up to 3 feet above floor or grade level within 25 feet, if indoors, or 10 feet if outdoors, from any pump, bleeder, withdrawal fitting, meter, or similar device handling Class I liquids. Pits provided with adequate mechanical ventilation within a Division 1 or 2 area shall be classified Division 2. If Class II or Class III liquids only are handled, then ordinary electrical equipment is satisfactory though care shall be used in locating electrical apparatus to prevent hot metal from falling into open equipment.

(d) Where the provisions of (a), (b), and (c), of this subdivision (iii) require the installation of explosion-proof equipment, ordinary electrical equipment including switchgear may be used if installed in a room or enclosure which is maintained under positive pressure with respect to the hazardous area. Ventilation makeup air shall be uncontaminated by flammable vapors.

(8) **Housekeeping.**

(i) **General.** Maintenance and operating practices shall be in accordance with established procedures which will tend to control leakage and prevent the accidental escape of flammable or combustible liquids. Spills shall be cleaned up promptly.

(ii) **Access.** Adequate aisles shall be maintained for unobstructed movement of personnel and so that fire protection equipment can be brought to bear on any part of the processing equipment.

(iii) **Waste and residues.** Combustible waste material and residues in a building or operating area shall be kept to a minimum, stored in closed metal waste cans, and disposed of daily.

(iv) **Clear zone.** Ground area around buildings and operating areas shall be kept free of tall grass, weeds, trash, or other combustible materials.

**(i) Refineries, chemical plants, and distilleries.**

(1) **Storage tanks.** Flammable or combustible liquids shall be stored in tanks in containers, or in portable tanks. Tanks shall be installed in accordance with paragraph (b) of this section. Tanks for the storage of flammable or combustible liquids in tank farms and in locations other than process areas shall be located in accordance with paragraph (b)(2)(i) and (ii) of this section.

(2) **Wharves.** Wharves handling flammable or combustible liquids shall be in accordance with paragraph (f)(4) of this section.

(3) **Fired and unfired pressure vessels.**

(i) **Fired vessels.** Fired pressure vessels shall be constructed in accordance with the Code for Fired Pressure Vessels, Section I of the ASME Boiler and Pressure Vessel Code – 1968.

(ii) Unfired pressure vessels shall be constructed in accordance with the Code for Unfired Pressure Vessels, Section VIII of the ASME Boiler and Pressure Vessel Code – 1968.

(4) **Location of process units.** Process units shall be located so that they are accessible from at least one side for the purpose of fire control. *

*Revoked.

(5) **Fire control.**

(i) **Portable equipment.** Portable fire extinguishment and control equipment shall be provided in such quantities and types as are needed for the special hazards of operation and storage.

(ii) **Water supply.** Water shall be available in volume and at adequate pressure to supply water hose streams, foam producing equipment, automatic sprinklers, or water spray systems as the need is indicated by the special hazards of operation and storage.

(iii) **Special equipment.** Special extinguishing equipment such as that utilizing foam, inert gas, or dry chemical shall be provided as the need is indicated by the special hazards of operation and storage.

**(j) Scope.**

This section applies to the handling, storage, and use of flammable and combustible liquids with a flash point below 200°F. This section does not apply to:

(1) Bulk transportation of flammable and combustible liquids;

(2) Storage, handling, and use of fuel oil tanks and containers connected with oil burning equipment;

(3) Storage of flammable and combustible liquids on farms;

(4) Liquids without flashpoints that may be flammable under some conditions, such as certain halogenated hydrocarbons and mixtures containing halogenated hydrocarbons;

(5) Mists, sprays, or foams, except flammable aerosols covered in paragraph (d) of this section; or

(6) Installations made in accordance with requirements of the following standards:

(i) National Fire Protection Association Standard for Drycleaning Plants, NFPA No. 32 – 1970;

(ii) National Fire Protection 'Association Standard for the Manufacture of Organic Coatings, NFPA No. 35 – 1970;

(iii) National Fire Protection Association Standard for Solvent Extraction Plants, NFPA No. 36 – 1967; or

(iv) National Fire Protection Association Standard for Installation and Use of Stationary Combustion Engines and Gas Turbines, NFPA No. 37 – 1970.

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# DEPARTMENT OF LABOR & ECONOMIC GROWTH
# DIRECTOR'S OFFICE
# GENERAL INDUSTRY SAFETY STANDARDS

Filed with the Secretary of State on November 15, 1989 (**as amended, August 2, 1993**)

These rules take effect 15 days after filing with the Secretary of State

(By authority conferred on the director of the department of consumer and industry services by sections 16 and 21 of Act No. 154 of the Public Acts of 1974, as amended, and Executive Reorganization Order No. 1996-2, being §§408.1016, 408.1021, and 445.2001 of the Michigan Compiled Laws)

R 408.17610, R 408.17612, and R 408.17615 of the Michigan Administrative Code, appearing on pages 747 to 750 of the 1989 Annual Supplement to the 1979 Michigan Administrative Code, are amended to read as follows:

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# PART 76. SPRAY FINISHING AND DIP TANKS

## TABLE OF CONTENTS



## GENERAL PROVISIONS

**R 408.17601. Scope.**

**Rule 7601.** This part sets forth rules and specifications for spray finishing and dip tank operations in, around or about places of employment. This part also covers the application of combustible powders by powder spray guns, electrostatic powder spray guns, fluidized beds, or electrostatic fluidized beds. This part does not apply to outdoor spray application of buildings, tanks, or other similar structures or to small portable spraying apparatus which is not used repeatedly in the same location.

**R 408.17602. Definitions; A to L.**

**Rule 7602.** (1) "Aerated solid powders" means any powdered material used as a coating material which shall be fluidized within a container by passing air uniformly through the material.

(2) "Approved" means, unless otherwise indicated, approval or listing by underwriters laboratories, inc. or factory mutual engineering corporation, or both.

(3) "Combustible liquid" means any liquid having a flash point at or above 100 degrees Fahrenheit (37.8 degrees Celsius) closed cup.

(4) "Dip tank" means a tank, vat, or container of flammable or combustible liquid in which articles or materials are

immersed for the purpose of coating, finishing, treating, or similar processes.

(5) "Electrostatic fluidized bed" means a container holding powder coating material which is aerated so as to form an air-supported expanded cloud of such material which is electrically charged with a charge opposite to the charge of the object to be coated; such object is transported through the container immediately above the charged and aerated materials in order to be coated.

(6) "Flammable liquid" means any liquid having a flash point below 100 degrees Fahrenheit (37.8 degrees Celsius) closed cup and have a vapor pressure not exceeding 40 psi absolute (2068.6 mm) at 100 degrees Fahrenheit (37.8 degrees Celsius).

(7) "Fluidized bed" means a container holding powder coating material which is aerated so as to form an airsupported expanded cloud of such material and through which the preheated object to be coated is immersed and transported.

(8) "Liquids" within the scope of this standard, means combustible liquid or flammable liquid.

(9) "Listed" means "approved" as defined in subrule (2) of this rule.

(10) "Lower explosive limit (LEL)" means the lowest value expressed in percent by volume, of fuel vapor in air which will burn when ignited.

**R 408.17603. Definitions; S, V.**

**Rule 7603.** (1) "Spray area" means any area in which dangerous quantities of flammable or combustible vapors, mists, residues, dusts, or deposits are present due to the operation of spray processes. A spray area includes all of the following areas:

(a) The interior of spray booths and rooms, except as specifically provided for in R 408.17613(4).

(b) The interior of ducts exhausting from spraying processes.

(c) Any area in the direct path of spraying operations.

(2) "Spray booth" means a power-ventilated structure provided to enclose or accommodate a spraying operation to confine and limit the escape of spray, vapor, and residue, and to safely conduct or direct them to an exhaust system.

(3) "Spray finishing operations" means the employment of methods wherein organic or inorganic materials are utilized in dispersed form for deposit on surfaces to be coated, treated, or cleaned. Such methods of deposit may involve either automatic, manual, or electrostatic deposition, but do not include metal spraying or metallizing, dipping, flow coating, roller coating, tumbling, centrifuging, or spray washing and degreasing as conducted in self-contained washing and degreasing machines or systems.

(4) "Spray room" means a room in which spray finishing operations which are not conducted in a spray booth are performed separately from other areas.

(5) "Vapor area" means any area containing flammable vapor concentrations exceeding 25% of the lower explosive limit (LEL) in the vicinity of dipping and coating processes, drainboards or associated drying, conveying, or other equipment, during operation or shutdown periods.

**R 408.17605. Employer responsibilities.**

**Rule 7605.** (1) An employer shall provide training to each assigned employee regarding the operation, maintenance, hazards, and safeguards of the job covered by this part.

(2) An employer shall not knowingly authorize a process, machine, or equipment to be used which does not meet applicable state safety standards.

(3) An employer shall provide, to each employee, the personal protective equipment required by the job as prescribed in Part 33. Personal Protective Equipment, being R 408.13301 et seq. of the Michigan Administrative Code.

**R 408.17607. Employee responsibilities.**

**Rule 7607.** (1) An employee shall not operate a machine or equipment until trained in the operating procedures, hazards, and safeguards. The employee shall not operate a machine or equipment until assigned to do so by the employer.

(2) An employee shall report to his or her supervisor any recognized hazards.

(3) An employee shall use required personal protective equipment or devices as prescribed in this part or a specific standard.

(4) An employee shall not remove a guard or other safety device, except for authorized servicing purposes. If a guard or other safety device is removed, it shall be replaced or equivalent guarding shall be provided before the machine or equipment is returned to normal operation.

**R 408.17609. "No smoking" signs; posting, smoking restriction area.**

**Rule 7609.** Smoking shall be prohibited and **"No smoking"** signs in large letters on contrasting color backgrounds shall be conspicuously posted in the vicinity of all of the following areas:

(a) Dip tanks and spraying areas.

(b) Flammable and combustible liquid storage and mix rooms.

(c) Powder coating areas.

(d) Powder storage rooms.

(e) Any area where organic peroxides are stored, mixed, or applied.

The no smoking restriction shall extend 20 feet (6 m) from the area unless separated by a noncombustible, vapor-tight partition.

**R 408.17610. Spraying areas; maintenance; use of spray booths; spray rooms used for production spray finishing operations.**

**Rule 7610.** Spraying shall not be conducted outside of designated spraying areas.

(2) All spraying areas shall be maintained so that the accumulation of deposits of combustible residues does not create a hazard. Scrapers, spuds, or other tools that are used for cleaning purposes shall be made of nonsparking material.

(3) After cleaning, residue scrapings and debris contaminated with residue shall be immediately removed from the premises and properly disposed of. Approved metal waste cans shall be provided when rags or waste is impregnated with finishing material and all such rags or waste shall be deposited in the waste cans immediately after use. The contents of waste cans shall be properly disposed of at least once daily or at the end of each shift.

(4) The clothing of spray finishing employees shall not be left on the premises more than 24 hours, unless the clothing is kept in metal lockers.

(5) The use of solvents for cleaning operations shall be restricted to solvents that have flash points of not less than 100 degrees Fahrenheit; however, for cleaning spray nozzles and auxiliary equipment, solvents that have flash points which are not less than the flash points of solvents that are normally used in spray operations may be used. Such cleaning shall be conducted inside spray booths and ventilating equipment that is operated during cleaning.

(6) Spray booths shall not be alternately used for different types of coating materials if the combination of the materials might be conducive to spontaneous ignition, unless all deposits of the first material that is used are removed from the booth and exhaust ducts before spraying with the second material that is used.

(7) Spray rooms that are used for production spray finishing operations shall conform to the requirements for spray booths.

**R 408.17612. Spray booths.**

**Rule 7612.** (1) The floor surface of a spray booth and operator's working area, if combustible, shall be covered with a noncombustible material that facilitates the safe cleaning and removal of residues.

(2) In conventional dry-type spray booths, overspray dry filters or filter rolls, if installed, shall conform to all of the following provisions:

(a) All discarded filter pads and filter rolls shall be immediately removed to a safe, well-detached location or placed in a water-filled metal container and disposed of at the close of the day's operation, unless such filter pads and rolls are maintained completely in water.

(b) Space within the spray booth on the downstream and upstream sides of filters shall be protected with approved automatic sprinklers.

(c) Filters or filter rolls shall not be used when applying a spray material that is known to be highly susceptible to spontaneous heating and ignition.

(d) Clean filters or filter rolls shall be noncombustible or of a type that has a combustibility factor that is not more than the combustibility factor of class 2 filters as listed by underwriters laboratories, inc. Filters and filter rolls shall not be alternately used for different types of coating materials if the combination of materials might be conducive to spontaneous ignition. See R 408.17610.

(3) Each spray booth shall be separated from other operations by not less than 3 feet or by partitions or walls so as to reduce the danger from the juxtaposition of hazardous operations. See R 408.17650(1).

(4) Spray booths shall be installed so that all portions are readily accessible for cleaning. A clear space of not less than 3 feet on all sides shall be kept free from storage of combustible material.

(5) When spraying areas are illuminated through glass panels or other transparent materials, only fixed lighting units shall be used as a source of illumination. Panels shall effectively isolate the spraying area from the area in which the lighting unit is located. Panels shall be made of a noncombustible material which, because of the nature of the material or the manner in which the material is protected, makes breakage unlikely. Panels shall be arranged so that normal accumulations of residue on the exposed surface of the panel will not be raised to a dangerous temperature by radiation or conduction from the source of illumination.

(6) Ventilation systems to remove flammable vapors and confine overspray residue to the spray area shall be provided and used. The spraying operations shall be designed, installed, and maintained so that the average air velocity over the open face of the booth (or booth cross section during spraying operations) shall be not less than 100 linear feet (30.48 meters) per minute.

**R 408.17613. Drying, curing, or fusion apparatus.**

**Rule 7613.** (1) Drying, curing, or fusion apparatus in connection with spray application of flammable and combustible finishes shall conform to the applicable provisions of the publication entitled "Standard for Ovens and Furnaces," NFPA 86-A-1977, as adopted by reference in R 408.17699(1), and shall also conform to all of the requirements of this rule.

(2) Spray booths, rooms, or other enclosures used for spraying operations shall not alternately be used for the purpose of drying by any arrangement which will cause a material increase in the surface temperature of the spray booth, room, or enclosure.

(3) Except as specifically provided in subrule (4) of this rule, drying, curing, or fusion units utilizing a heating system having open flames or which might produce sparks shall not be installed in a spraying area, but may be installed adjacent thereto when equipped with an interlocked ventilating system arranged to do all of the following:

(a) Provide a minimum of 4 complete air changes to thoroughly purge the drying space before the heating system can be started.

(b) Maintain a safe atmosphere at any source of ignition.

(c) Automatically shut down the heating system if the ventilating system fails.

(4) Automobile refinishing spray booths or enclosures, otherwise installed and maintained in full conformity with this rule, may alternately be used for drying when all of the following provisions are complied with:

(a) Interior, especially floors, of spray enclosures shall be kept free of overspray deposits, in accordance with R 408.17610(2).

(b) During spray operations, the drying apparatus and electrical connections and wiring thereto shall not be located within the spray enclosure or in any other location where spray residues might be deposited thereon.

(c) The spraying apparatus, the drying apparatus, and the ventilating system of the spray enclosure shall be equipped with suitable interlocks arranged so that all of the following provisions are complied with:

(i) The spraying apparatus cannot be operated while the drying apparatus is inside the spray enclosure.

(ii) The spray enclosure shall be purged of spray vapors for a period of not less than 4 complete air changes before the drying apparatus can be energized.

(iii) The ventilating system will maintain a safe atmosphere within the enclosure during the drying process and the drying apparatus will automatically shut off if the ventilating system fails.

(d) All electrical wiring and equipment of the drying apparatus shall conform to the applicable sections of the general industry standards 1910.308, Application, and 1910.309, Electrical. See R 408.17699(2). Only equipment of a type approved for class I, division 2 hazardous locations shall be located within 18 inches of the floor level. All metallic parts of the drying apparatus shall be properly electrically bonded and grounded.

(e) The drying apparatus shall contain a prominently located, permanently attached warning sign indicating that ventilation shall be maintained during the drying period and that spraying shall not be conducted in the vicinity that spray will deposit on said apparatus.

**R 408.17614. Automobile undercoating.**

**Rule 7614.** Automobile undercoating spray operations conducted in areas having natural or mechanical ventilation adequate to comply with the division of occupational health requirements are exempt from the requirements pertaining to spray finishing operations when using undercoating materials which are not more hazardous than kerosene, as listed by underwriters laboratories inc. with respect to fire hazard rating 30- 40, or undercoating materials using only solvents listed as having a flash point in excess of 100 degrees Fahrenheit. Undercoating spray operations which do not conform to O.H. rule 3235(6)(p) of the division of occupational health

requirements are subject to all provisions of this rule pertaining to spray finishing operations.

**R 408.17615. Powder coating.**

**Rule 7615.** (1) Where powder coating is applied, electrical equipment and other sources of ignition shall conform to the requirements of R 408.17650(1), (8), and (9) of this part and general industry standards 1910.308, application, and 1910.309, electrical. See R 408.17699(2).

(2) The provisions of R 408.17630 and subrules (3) to (9) of this rule shall apply to fixed electrostatic equipment, except that electrical equipment that is not regulated in the provisions of R 408.17630 or subrules (3) to (9) of this rule shall conform to the provisions of subrule (1) of this rule.

(3) The provisions of R 408.17633 and this rule shall apply to electrostatic handguns when used in powder coating, except that electrical equipment that is not covered in the provisions of R 408.17633 or this rule shall conform to the provisions of subrule (1) of this rule.

(4) Electrostatic fluidized beds and associated equipment shall be approved types of beds and associated equipment. The maximum surface temperature of the beds and associated equipment in the coating area shall not be more than 150 degrees Fahrenheit. The high voltage circuits shall be designed so as to not produce a spark of sufficient intensity to ignite any powder-air mixtures or result in a shock hazard upon coming in contact with a grounded object under normal operating conditions.

(5) Transformers, high-voltage supplies, control apparatus, and all other electrical portions of the equipment, with the exception of the charging electrodes and their connections to the power supply, shall be located outside of the powder coating area or shall otherwise conform to the requirements of subrule (1) of this rule.

(6) All electrically conductive objects within the charging influence of the electrodes shall be adequately grounded. The power coating equipment shall carry a prominent, permanently installed warning regarding the necessity for grounding these objects.

(7) Objects that are being coated shall be maintained in contact with the conveyor or other support to insure proper grounding. Hangers shall be regularly cleaned to insure effective contact and areas of contact shall be sharp points of knife edges where possible.

(8) Conveyors, solenoids, powerpacks, and electrical equipment shall be interlocked with the exhaust or recirculating air ventilation system, or both, so that the equipment cannot be operated unless the ventilation fans are in operation.

(9) All of the following shall be designed to withstand an internal dust explosion or be provided with explosion relief that is vented to the outside atmosphere:

(a) Powder coating operations.

(b) Powder supply hoppers.

(c) Recirculating systems.

(d) Dust collectors.

(e) Exhaust systems.

(f) Related duct work.

(10) Electrostatic spraying operations shall be conducted with an air velocity over the open face of the booth of not less than 60 linear feet (18.2880 meters) per minute. More air velocity may be required depending upon the volume of the finishing material being applied and its flammability and explosion characteristics.

(11) Visible gauges or audible alarm or pressure activated gauges shall be installed to indicate or insure that the required air velocity is maintained.

(12) Filter rolls shall be inspected to insure the replacement of filter media.

**R 408.17616. Organic peroxides and dual component coatings.**

**Rule 7616.** All spraying operations involving the use of organic peroxides and other dual component coatings shall be conducted in approved sprinklered spray booths meeting the requirements of this part.

**R 408.17618. Maintenance of areas of operations using powder coating, organic peroxides, and dual component coatings; use of nonsparking tools.**

**Rule 7618.** (1) All areas of operation using powder coating shall be kept free of the accumulations of powder coating dusts, particularly such horizontal surfaces as ledges, beams, pipes, hoods, booths, and floors.

(2) Surfaces in areas of operations using powder coating, organic peroxides, and dual component coatings shall be cleaned in a manner which avoids scattering dust to other places or creating dust clouds.

(3) Only nonsparking tools shall be used in any area where organic peroxides, powder coating, or dual component materials are stored, mixed, or applied.

## DIP TANKS

**R 408.17620. Construction of dip tanks.**

**Rule 7620.** (1) Dip tanks, including drainboards if provided, shall be constructed of noncombustible material and their supports shall be made of heavy metal, reinforced concrete, or masonry. Where dip tanks extend through a floor to the story below or where the weakening of the tank supports by fire might result in the tank collapsing, supports shall be made of material having no less than 1-hour fire resistance rating.

(2) Dip tanks of over 150 gallons in capacity or 10 square feet in liquid surface area shall be equipped with trapped overflow pipes which prevent passage of vapors and which lead to a safe location outside buildings. Smaller dip tanks shall also be so equipped, where practical. The discharge of the overflow pipe shall be located and arranged so that if the entire combustible contents of the dip tank are overflowed through overflow pipe by the application of water during fire fighting, property will not be endangered. The size of the overflow pipe shall be sufficient to conduct the maximum rate of flow of water expected to be applied to the liquid surface of the dip tank from automatic sprinklers or from other sources in the event of fire.

(3) Overflow pipes shall be of sufficient capacity to overflow the maximum delivery of dip tank liquid fill pipes, but shall not be less than 3 inches in diameter and shall be increased in size depending upon the area of the liquid surface and the length and pitch of the pipe. Overflow connections may be omitted if the liquid has a flash point above 200 degrees Fahrenheit (93 degrees Celsius) or if the tanks are equipped with automatic closing covers or a fixed fire extinguishing system, other than water, as prescribed in Part 9. Fixed Fire Equipment, being R 408.10901 et seq. of the Michigan Administrative Code.

(4) Piping connections on drains and overflow lines shall be designed so as to permit ready access for inspection and cleaning of the interior.

(5) The bottom of the overflow connections shall be not less than 6 inches below the top of the tank. See subrule (11) of this rule and R 408.17637(4)(b).

(6) Dip tanks over 500 gallons in liquid capacity shall be equipped with combination automatic/manual bottom drains to

quickly drain the tank in the event of fire, unless the viscosity of the liquid at normal atmospheric temperature makes this impractical. Manual operation shall be from a safely accessible location. Where gravity flow is not practicable, automatic pumps shall be required.

(7) Such drain shall be trapped and discharged to a closed properly vented salvage tank or to a safe location outside which will not endanger property.

(8) According to tank capacity, the diameter of bottom drainpipe shall be not less than the following:

| Gallons | Inches |
|---|---|
| 500 to 750 | 3 |
| 751 to 1,000 | 4 |
| 1,001 to 2,500 | 5 |
| 2,501 to 4,000 | 6 |
| Over 4,000 | 8 |

(9) The capacity of the salvage tank shall be greater than the capacity of the dip tank or tanks to which they are connected.

(10) Except as noted in R 408.17622(5), all dip tanks exceeding 150 gallons of liquid capacity or having liquid surface area of more than 10 square feet shall be protected with at least 1 of the automatic extinguishing facilities conforming to R 408.17637(3), (4), (5), (6), or (7).

(11) Dip tanks utilizing a conveyor system shall be so arranged that in the event of fire, the conveyor system shall automatically cease motion and required bottom drains shall open. Conveyor systems shall automatically cease motion unless required ventilation is in full operation.

(12) Ventilation shall be provided to confine flammable vapor concentrations exceeding 25% of the lower explosive limit to within 5 feet (1.5m) of the dip tank, drainboard, and freshly coated work.

(13) When dip tank liquids are artificially heated, either by the dipping of heated articles, or by other application of heat to the liquid, provision shall be made to prevent a temperature rise of more than 50 degrees Fahrenheit below the flashpoint of the liquid. See R 408.17622(3) and (4).

**R 408.17621. Operations and maintenance.**

**Rule 7621.** (1) Areas in the vicinity of dip tanks shall be kept as clear of combustible stock as practical and shall be kept entirely free of combustible debris.

(2) When waste or rags are used in connection with dipping operations, approved metal waste cans shall be provided and all impregnated rags or waste shall be deposited therein immediately after use. The contents of waste cans shall be properly disposed of at least once daily at the end of each shift.

(3) A quarterly visual inspection or test of all dip tank facilities shall be made, including all of the following:

(a) Covers.

(b) Overflow pipe inlets and discharge.

(c) Bottom drains and valves.

(d) Electrical wiring and equipment and grounding connections.

(e) Ventilating facilities. Any defects found shall be promptly corrected.

(4) All fixed fire extinguishing systems shall be inspected and tested as prescribed in general industry safety standard, Part 9. Fixed Fire Equipment, being R 408.10901 et seq. of the Michigan Administrative Code.

(5) Floors and platforms around tanks shall be prevented from becoming slippery both by original type of construction and by frequent flushing. The floors and platforms shall be firm, sound, and of a design and construction to minimize the possibility of tripping.

(6) When a required ventilating system serves associated drying operations utilizing a heating system which might be a source of ignition, means shall be provided for preventilation of not less than 4 complete air changes before the heating system can be started, the failure of any ventilating fan shall automatically shut down the heating system, and the installation shall otherwise conform to the provisions of the publication entitled “Standard for Ovens and Furnaces,” NFPA 86A-1977, as adopted by reference in R 408.17699(1).

**R 408.17622. Hardening and tempering tanks.**

**Rule 7622.** (1) Hardening and tempering tanks shall be located as far as practicable from furnaces and shall not be located on or near combustible floors.

(2) Tanks shall be provided with a noncombustible hood and vent or other equally effective means of venting to the outside of the building to serve as a vent in case of fire. All such vent ducts shall be treated as flues and be kept well away from combustible roofs or materials.

(3) Tanks shall be designed so that the maximum work load is incapable of raising the temperature of the cooling medium to within 50 degrees below its flash point, or such tanks shall be equipped with circulating cooling systems which will accomplish the same result.

(4) Tanks shall be equipped with a high temperature limit switch arranged to sound an alarm when the temperature of the quenching medium reaches within 50 degrees Fahrenheit below the flash point. Such limit switches shall also shut down conveying equipment supplying work to the tanks, unless a greater safety hazard is created.

(5) The provisions of R 408.17620(10) shall apply to tanks having a liquid surface area of 25 square feet or more or a capacity of 500 gallons or more.

(6) Air under pressure shall not be used to fill or agitate oil tanks; however, pneumatically operated impellers are permitted.

(7) Drain facilities from the bottom of the tank may be combined with the oil circulating system or arranged independently to drain the oil to a safe location. The drain valve shall be operated automatically with approved heat-actuated devices or manually and, if operated manually, the valve shall be operated from a safe distance. An automatic drain valve shall not be provided on a internal quench tank with a controlled atmosphere where the oil provides a seal to atmosphere.

**R 408.17623. Flow coat operations; general.**

**Rule 7623.** (1) Except as provided in this rule, all of the preceding rules for dip tanks apply to flow coat operations.

(2) All piping shall be strongly erected and rigidly supported.

(3) Paint shall be supplied by direct low-pressure pumping arranged to automatically shut down by means of approved heat-actuated devices in the case of fire or paint may be supplied by a gravity tank not exceeding 10 gallons in capacity.

(4) The area of the sump and any areas on which paint flows are considered the areas of dip tank.

**R 408.17624. Roll coating.**

**Rule 7624.** (1) The process of roll coating, spreading, and impregnating in which fabrics, paper, or other materials are passed directly through a tank or trough containing flammable or combustible liquids or over the surface of a roller that revolves partially submerged in a flammable or combustible liquid with a flash point below 140 degrees Fahrenheit (60

degrees Celsius) shall conform to the applicable requirements of R 408.17637, R 408.17641, and R 408.17651.

(2) Adequate arrangements shall be made to prevent sparks from static electricity by electrically bonding and grounding all metallic rotating and other parts of machinery and equipment and by installing static collectors where the material leaves a rotating part or maintaining a conductive atmosphere such as a high relative humidity.

# ELECTROSTATIC APPARATUS

**R 408.17630. Electrostatic apparatus; installation and use.**

**Rule 7630.** (1) The installation and use of electrostatic spraying equipment and electrostatic detearing equipment shall conform to the requirements of these rules.

(2) Electrostatic apparatus and devices used in connection with coating operations or paint detearing operations shall be of the approved types.

(3) Electrostatic apparatus shall be equipped with automatic controls which will operate without time delay to disconnect the power supply to the high-voltage transformer and to signal the operator under any of the following conditions:

(a) Stoppage of the exhaust ventilating system from any cause.

(b) Stoppage of the conveyor carrying goods through the high voltage field, unless stoppage is required by the spray process.

(c) Occurrence of a ground or excessive current leakage at any point on the high-voltage system.

(d) Reduction of clearance below that specified in R 408.17631(4) and R 408.17632(4).

**R 408.17631. Fixed electrostatic apparatus used in spray finishing operations.**

**Rule 7631.** (1) Transformers, high-voltage supply, control apparatus, and all other electrical portions of the equipment used in spray finishing operations, with the exception of high-voltage grids, electrodes, and electrostatic atomizing heads and their connections shall be located outside of the spraying area or shall otherwise conform to the requirements of R 408.17650(4), (5), and (6).

(2) Electrodes and electrostatic atomizing heads shall be adequately supported in permanent locations and shall be effectively insulated from the ground. Electrodes and electrostatic atomizing heads which are permanently attached to their bases, supports, or reciprocators shall be deemed to comply with this rule. Insulators shall be nonporous and noncombustible.

(3) High-voltage leads to electrodes shall be properly insulated and protected from mechanical injury or exposure to destructive chemicals. Electrostatic atomizing heads or any exposed element at high voltage shall be effectively guarded against accidental contact or grounding. An automatic means shall be provided for grounding the electrode system when it is electrically deenergized for any reason. All insulators shall be kept clean and dry.

(4) A safe distance of not less than twice the sparking distance shall be maintained between goods being painted and electrodes or electrostatic atomizing heads or conductors. A suitable sign indicating this safe distance shall be conspicuously posted near the assembly.

(5) Goods being painted using this process are to be automatically conveyed. The conveying devices shall be arranged so as to maintain safe distance between the goods and the electrodes or electrostatic atomizing heads at all times. Any irregularly shaped or other goods subject to possible swinging or movement shall be supported to prevent swinging or movement which would reduce the clearance to less than that specified in subrule (4) of this rule.

(6) Booths, fencing, railings, or guards shall be placed about the equipment so that they, by their location or character or both, assure that a safe isolation of the process is maintained from plant storage or employees. Such railings, fencing, and guards shall be made of conducting material and shall be adequately grounded. Where automatic equipment is used, interlocked entry doors or gates shall be provided which shut down the operation. Where moving line arrangements would preclude this level of protection, such as at entrances and exits to the line access, warning signs shall be posted indicating the potential hazard of these areas.

(7) When finishing materials are applied by electrostatic hand spraying equipment which is manipulated by hand, R 408.17633 is applicable.

**R 408.17632. Electrostatic apparatus used in dip tank operations.**

**Rule 7632.** (1) Transformers, high-voltage supplies, control apparatus, and all other electrical portions of the equipment used in dip tank operations, with the exception of high-voltage grids and their connections, shall be located outside the vapor area or shall conform to the requirements of R 408.17651.

(2) Electrodes shall be of substantial construction, shall be rigidly supported in permanent locations, and shall be effectively insulated from ground. Insulators shall be nonporous and noncombustible.

(3) High-voltage leads to electrodes shall be effectively and permanently supported on suitable insulators and shall be effectively guarded against accidental contact or grounding. An automatic means shall be provided for grounding and discharging any accumulated residual charge on the electrode assembly or the secondary circuit of the high-voltage transformer when the transformer primary is disconnected from the source of supply.

(4) A space of not less than twice the sparking distance shall be maintained between goods being deteared and electrodes or conductors. A sign stating the sparking distance shall be conspicuously posted near the assembly.

(5) Goods being deteared using this electrostatic process are to be automatically conveyed. The conveying devices shall be arranged so as to maintain a safe distance between the goods and the electrodes at all times. All goods shall be supported so as to prevent any swinging or movement which would reduce the clearance to less than specified in subrule (4) of this rule.

(6) This electrostatic process shall not be performed where goods being deteared are manipulated by hand.

(7) Adequate fencing, railings, or guards shall be placed about the equipment involving electrostatic apparatus so that they, by their location or character or both, assure that a safe isolation of the process is maintained from plant storage or employees. Such railings, fencing, and guards shall be made of conducting material, shall be adequately grounded, and shall be not less than 5 feet from the processing equipment.

(8) Electrode insulators shall be kept clean and dry.

(9) The detearing area shall be ventilated by exhausting adequate air from the area as specified in R 408.17621(6).

(10) All areas for detearing shall be protected by automatic sprinklers in accordance with the applicable provisions of Part 9. Fixed Fire Equipment, being R 408.10919 to R 408.10926, where this protection is available. Where this protection is not available, other approved automatic extinguishing equipment shall be provided.

(11) Drip plates and screens subject to paint deposits shall be removable and shall be taken to a safe place for cleaning.

**R 408.17633. Electrostatic hand spraying equipment and devices used in coating operations.**

**Rule 7633.** (1) Electrostatic hand spraying apparatus and devices used in connection with coating operations in which the atomizing device is hand-held and manipulated during the spraying operation shall be of approved types.

(2) The equipment shall be designed so that the maximum surface temperature of the equipment in the spraying area shall not exceed 150 degrees Fahrenheit under any condition.

(3) The high-voltage circuits shall be designed so as to not produce a spark of sufficient intensity to ignite any vapor-air mixtures or powder-air mixtures or result in a shock hazard upon coming in contact with a grounded object under all normal operating conditions.

(4) The electrostatically charged exposed elements of the handgun shall be capable of being energized only with a switch or an actuator, or both, which also controls the coating material supply.

(5) Transformers, high-voltage supplies, control apparatus, and all other electrical portions of the equipment, with the exceptions of the handgun itself and its connections to the power supply, shall be located outside of the spraying area or shall otherwise conform to the requirements of R 408.17650(4), (5), and (6).

(6) The handle of the spraying gun shall be electrically connected to ground by metallic connection and be constructed so that the operator in the normal operating position is in intimate electrical contact with the ground handle.

(7) All electrically conductive objects in the spraying area shall be properly grounded. This requirement shall apply to paint containers, wash cans, and any other electrically conductive objects or devices in the area. The equipment shall carry a prominent, permanently installed warning regarding the necessity for this grounding feature.

(8) Objects being painted or coated shall be maintained in metallic contact with the conveyor or other grounded support. Hooks shall be regularly cleaned to insure this contact and areas of contact shall be sharp points or knife edges where possible. Points of support of the object shall be concealed from random spray where feasible. If the objects being sprayed are supported from a conveyor, the point of attachment to the conveyor shall be located so as to not collect spray material during normal operation.

(9) The electrical equipment shall be so interlocked with the ventilation of the spraying area that the equipment cannot be operated unless the ventilation fans are in operation.

# FIRE PROTECTION

**R 408.17636. Spray finishing.**

**Rule 7636.** (1) All areas used for spraying, including the interior of the booth, shall be protected by automatic sprinklers where this protection is available. Where this protection is not available, other approved automatic extinguishing equipment shall be provided as prescribed in Part 9. Fixed Fire Equipment, being R 408.10901 et seq. of the Michigan Administrative Code.

(2) In sprinklered buildings, the automatic sprinkler system in rooms containing spray finishing operations shall conform to the provisions for high hazard occupancy of Part 9. Fixed Fire Equipment, being R 408.10901 et seq., and in unsprinklered buildings where sprinklers are installed only to protect spraying areas, the sprinkler installation shall conform to the provisions of this rule.

(3) Sprinkler heads shall be located to effect water distribution throughout the entire booth.

(4) Automatic sprinklers protecting each spray booth, together with its connecting exhaust, shall be under an outside stem and yoke (OS&Y) subcontrol valve located outside of the spray booth.

(5) Sprinklers protecting spraying areas shall be kept free from coating material deposits. The use of polyethylene or cellophane bags having a thickness of .003 inches or less or thin paper bags is acceptable. Coverings shall be replaced or the heads cleaned frequently.

(6) Portable fire extinguishers shall be installed near all spraying areas.

**R 408.17637. Dip tanks.**

**Rule 7637.** (1) Except as noted in R 408.17622(5), all dip tanks exceeding 150 gallons liquid capacity or having a liquid surface area exceeding 10 square feet shall be protected with at least 1 of the automatic extinguishing facilities conforming to subrules (3), (4), (5), (6), and (7) of this rule.

(2) Areas in the vicinity of dip tanks shall be provided with fire extinguishers which are suitable for flammable and combustible liquid fires and which conform to general industry safety standard Part 8. Portable Fire Extinguishers, being R 408.10801 et seq. See R 408.17699(5).

(3) An automatic water spray extinguishing system shall conform to general industry safety standard Part 9. Fixed Fire Equipment, being R 408.10901 et seq., and shall be arranged to protect tanks, drainboards, and stock over drainboards. See R 408.17699(4).

(4) An automatic foam extinguishing system shall conform to general industry safety standard Part 9. Fixed Fire Equipment, being R 408.10901 et seq., and shall have the foam-producing material selected to be suitable for intended use, taking into account characteristics of the dip tank liquid; and shall have the overflow pipe arranged to prevent the floating away of foam and clogging the overflow pipe, which may be accomplished by either of the following:

(a) Overflow pipe may be extended through the tank wall and terminated in an ell pointing downward. The bottom of the overflow pipe at the point it pierces the tank wall shall not be more than 2 inches above the opening or face of the ell.

(b) Overflow pipe inlet may be provided with a removable screen of 1/4 inch mesh having an area which is not less than twice the crosssectional area of overflow pipe. Screens which might be clogged by dip tank ingredients shall be inspected and cleaned periodically.

(5) Automatic carbon dioxide systems shall conform to general industry safety standard Part 9. Fixed Fire Equipment, being R 408.10901 et seq., and shall be arranged to protect both dip tanks and drainboards, and, unless stock over drainboards is otherwise protected with automatic extinguishing facilities, shall also be arranged to protect such stock. See R 408.17699(4).

(6) Dry chemical extinguishing system shall conform to general industry safety standard Part 9. Fixed Fire Equipment, being R 408.10901 et seq., and shall be arranged to protect both dip tanks and drainboards, and, unless stock over drainboards is otherwise protected with automatic extinguishing facilities, shall also be arranged to protect such stock. See R 408.17699(4).

(7) A dip tank cover provided for fire protection shall comply with all of the following provisions:

(a) Be arranged to close automatically in the event of fire, be actuated by approved automatic devices, and be arranged for manual operations.

(b) Be of substantial noncombustible material or of tin-clad type material with enclosing metal applied with locked joints.

(c) Be kept closed when tanks are not in use.

(8) Chains or wire rope shall be used for the cover support or the operating mechanism where the burning of a cord would interfere with the action of a device.

(9) For areas of detearing, the requirements of R 408.17632(10) shall also apply.

# FLAMMABLE AND COMBUSTIBLE LIQUIDS

**R 408.17640. Flammable and combustible liquids.**

**Rule 7640.** (1) The storage of flammable or combustible liquids shall conform to the requirements of 1910.106, Flammable and Combustible Liquids, where applicable. See R 408.17699(3).

(2) A closed container, an approved portable tank, an approved safety can, or properly arranged system of piping shall be used for bringing flammable or combustible liquids into a spray finishing room. Open or glass containers shall not be used.

(3) Except as provided in subrule (6) of this rule, the withdrawal of flammable and combustible liquids from containers having a capacity of more than 60 gallons shall be by approved pumps. The withdrawal of flammable or combustible liquids from containers and the filling of containers, including portable mixing tanks, shall be done only in a designated mixing room or in a spraying area when the ventilating system is in operation. Adequate precautions shall be taken to protect against liquid spillage and sources of ignition.

(4) When flammable or combustible liquids are transferred from one container to another, both containers shall be effectively bonded and grounded to prevent discharge sparks of static electricity.

(5) Containers supplying spray nozzles shall be of a closed type or provided with metal covers kept closed. Containers not resting on floors shall be on metal supports or suspended by wire cables. Containers supplying spray nozzles by gravity flow shall not exceed 10 gallons capacity. Original shipping containers shall not be subject to air pressure for supplying spray nozzles. Containers under air pressure supplying spray nozzles shall be of limited capacity, not exceeding that necessary for 1 day's operations; shall be designed and approved for such use; shall be provided with a visible pressure gauge; and shall be provided with a relief valve set to operate in conformance with the requirements of section VIII, entitled "Code for Unfired Pressure Vessels," of the publication entitled "ASME Boiler and Pressure Vessel Code — 1983," as adopted by reference in R 408.17699(6). Containers under air pressure supplying spray nozzles, or stoppage tanks, and coolers shall conform to the standards of such code for construction, tests, and maintenance.

(6) If flammable or combustible liquids are supplied to spray nozzles by positive displacement pumps, the pump discharge line shall be provided with an approved relief valve discharging to a pump section or a safe location or provided with a device to stop the prime mover if the discharge pressure exceeds the safe operating pressure of the system.

(7) All containers or piping to which a hose or flexible connection is attached shall be provided with a shutoff valve at the connection. Such valves shall be kept shut when spraying operations are not being conducted, except where recirculated systems are employed and monitored.

(8) When a pump is used to deliver products, automatic means shall be provided to prevent pressure in excess of the design working pressure of accessories, piping, and hose.

(9) All pressure hose and couplings shall be inspected at regular intervals. The hose and couplings shall be tested with the hose extended and using the inservice maximum operating pressures. Any hose showing material deterioration, signs of leakage, or weakness in its carcass or at the couplings shall be withdrawn from service and repaired or discarded.

(10) Piping systems conveying flammable or combustible liquids shall be made of steel or other material having comparable properties of resistance to heat and physical damage. Piping systems shall be properly bonded and grounded.

(11) An emergency shutdown provision, to cut off the supply of liquid to an area involved in a fire shall be a part of all fixed pipe systems delivering flammable or combustible liquids to spray operations.

**R 408.17641. Dipping operations; storage of flammable and combustible liquids; grounding and bonding of portable containers.**

**Rule 7641.** (1) The storage of flammable and combustible liquids in connection with dipping operations shall conform to the requirements of section 1910.106, Flammable and Combustible Liquids, where applicable. See R 408.17699(3).

(2) Where portable containers are used for the replenishment of flammable and combustible liquids, provision shall be made so that both the container and tank shall be positively grounded and electrically bonded to prevent static electric sparks.

# ELECTRICAL AND OTHER SOURCES OF IGNITION

**R 408.17650. Electrical and other sources of ignition in spray finishing operations.**

**Rule 7650.** (1) All electrical equipment, open flames, and other sources of ignition in spray finishing operations shall conform to the requirements of this rule, except as follows:

(a) Electrostatic apparatus shall conform to the requirements of R 408.17614, R 408.17618, R 408.17630, R 408.17631, and R 408.17633.

(b) Drying, curing, and fusion apparatus shall conform to the requirements of R 408.17613.

(c) Automobile undercoating spray operations shall conform to the requirements of R 408.17614.

(d) Powder coating equipment shall conform to the requirements of R 408.17615.

(2) There shall be no open flame, spark-producing equipment, or exposed surfaces in any spraying area or within 20 feet (6m) horizontally and 10 feet (3m) vertically thereof, unless separated by a noncombustible vapor-tight partition.

(3) Space-heating appliances, steam pipes, or hot surfaces shall not be located in a spray area where deposits of combustible residues might readily accumulate.

(4) Electrical wiring and equipment shall conform to the provisions of this rule and shall otherwise be in accordance with general industry standards 1910.308, Application, and 1910.309, Electrical. See R 408.17699(2).

(5) Unless specifically approved for locations containing both deposits of readily ignitable residue and explosive vapors, there shall be no electrical equipment, in any spraying area, on which deposits of combustible residues might readily accumulate, except for wiring in rigid conduit or in boxes of fittings containing no taps, splices, or terminal connections.

(6) Classification of hazardous areas shall be in accordance with NFPA standard 33-1982, entitled "Spray

Application Using Flammable and Combustible Materials." See R 408.17699(7).

(7) Portable electric lamps shall not be used in any spraying area during spraying operations. Portable electric lamps, if used during cleaning or repairing operations, shall be of the type approved for hazardous class I locations.

(8) All metal parts of spray booths, exhaust ducts, and piping systems conveying flammable or combustible liquids or aerated solids shall be properly electrically grounded in an effective and permanent manner.

(9) Airless, high-fluid-pressure spray guns and any conductive object being sprayed shall be properly electrically grounded.

**R 408.17651. Electrical and other sources of ignition in dip tank operations.**

**Rule 7651.** (1) In dip tank operations, there shall be no open flames, spark-producing devices, or heated surfaces having a temperature sufficient to ignite vapors in any vapor area.

(2) Except as specifically permitted in R 408.17630 and R 408.17632, related to electrostatic apparatus, electrical wiring and equipment in any vapor area shall be of an explosion-proof type according to the requirements of general industry standards 1910.308, Application, and general industry standards 1910.309,
Electrical, for class I, group D locations, and shall otherwise conform to general industry standards 1910.308 and 1910.309. See R 408.17699(2).

(3) Classification of hazardous areas shall be in accordance with NFPA standard 34-1982, entitled "Dipping and Coating Processes Using Flammable or Combustible Liquids." See R 408.17699(8).

(4) In any floor space outside a vapor area, but within 20 feet there from, and not separated by noncombustible, vapor-tight partitions, there shall be no open flames or spark-producing devices, except as specifically permitted in NFPA standard 86A-1977, entitled, "Ovens and Furnaces," paragraph 200-7, as adopted by reference in R 408.17699(1), and electrical wiring and equipment shall conform to the provisions of general industry standards 1910.308, Application, and 1910.309, Electrical. See R 408.17699(2).

**R 408.17696. Rescission of federal standards.**

**Rule 7696.** On the effective date of these rules, general industry standards 1910.107 entitled "Spray Finishing Using Flammable and Combustible Materials," and 1910.108 entitled "Dip Tanks Containing Flammable or Combustible Liquids," which were incorporated by reference by section 14(1) of Act No. 154 of the Public Acts of 1974, as amended, being §408.1014(1) of the Michigan compiled Laws, are rescinded.

**R 408.17699. Referenced standards; adopted standards.**

**Rule 7699.** (1) The standard entitled "Ovens and Furnaces," NFPA 86A-1977, is adopted herein by reference. Copies of NFPA 86A-1977 may be purchased at a cost of $7.00 from the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269.

(2) General industry standards 1910.308, Application and 1910.309, Electrical, are federal standards which were incorporated by reference by section 14(1) of Act No. 154 of the Public Acts of 1974, as amended, being 408.1014(1) of the Michigan Compiled Laws.

(3) General industry standard 1910.106 Flammable and Combustible Liquids is a federal standard which was incorporated by reference by section 14(1) of Act No. 154 of the Public Acts of 1974, as amended.

(4) General industry safety standard Part 9. Fixed Fire Equipment, being R 408.10901 et seq. of the Michigan Administrative Code, was promulgated by the general industry safety standards commission in accordance with sections 16 and 21 of Act No. 154 of the Public Acts of 1974, as amended, being 408.1016 and 408.1021 of the Michigan Compiled Laws.

(5) General industry safety standard Part 8. Portable Fire Extinguishers, being R 408.10801 et seq. of the Michigan Administrative Code, was promulgated by the general industry safety standards commission in accordance with sections 16 and 21 of Act No. 154 of the Public Acts of 1974, as amended.

(6) Section VIII, entitled "Code for Unfired Pressure Vessels," of the publication entitled "ASME Boiler and Pressure Vessel Code — 1983,' is adopted herein by reference. Copies of section VIII of the ASME Boiler and Pressure Vessel Code, 1983, may be purchased at a cost of $110.00 from the American Society of Mechanical Engineers, Standards Department, United Engineering Center, 345 East 47th Street, New York, New York 19917.

(7) The standard entitled " Spray Application Using Flammable and Combustible Materials," NFPA 33-1982, is adopted herein by reference. Copies of NFPA 33- 1982 may be purchased at a cost of $7.20 from the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269.

(8) The standard entitled "Dipping and Coating Processes Using Flammable or Combustible Liquids," NFPA 34-1982, is adopted herein by reference. Copies of NFPA 34-1982 may be purchased at a cost of $8.55 from the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269.

(9) The publications and general industry safety standards listed in subrules (1) to (8) of this rule may be inspected at, or purchased at the appropriate cost from, the Safety Standards Division, Bureau of Safety and Regulation, Michigan Department of Consumer and Industry Services, 7150 Harris Drive, Box 30643, Lansing, Michigan 48909.