Project Number: IQP MVM-0002 -47

DEVELOPING A SAFETY PROGRAM FOR A SMALL MACHINE SHOP

An Interactive Qualifying Project Report
submitted to the Faculty
of the
WORCESTER POLYTECHNIC INSTITUTE
in partial fulfillment of the requirements for the
Degree of Bachelor of Science
by

Richard B. Foulkes

Date: April 29, 2002

Approved:

Professor Makhlouf M. Makhlouf, Advisor

Abstract

The purpose of this project is to develop a safety program satisfying all state and federal laws involving employee safety that require the maintenance of written programs and records. The laws within CFR 29 1900-1910 and related Rhode Island state laws are considered. An example of how to implement such a safety program is provided. This example provides the framework for developing similar programs at other plants.

Table of Contents

Chapter 1: Introduction

The purpose of this project is to develop a safety program satisfying all state and federal laws involving employee safety that require the maintenance of written programs and records. It is also the aim of this project to arrive at a safety program that can be implemented reasonably in small machine shops of less than 20 employees. The safety program is intended to act as a source of information on the methods of employee training, hazard communication, and safe operation of a small machine shop.

At machine shops, there are a number of things that pose a health and safety risk to workers. The most immediate hazard comes from the nature of the work performed at machine shops. Machining is the process of removing material from a work piece in order to obtain a desired geometry [1]. This involves high-powered machinery that may or may not have guarding around it to protect the machinist from flying metal chips and moving equipment. Other hazards typically present are welding operations that emit intense light radiation, heat, and fumes. Also commonly found is grinding equipment that can release breathable particles into the air. Support equipment such as fork trucks, cranes, and slings may pose a risk if they are not maintained correctly or improperly used. The laws within CFR 29 Parts 1900 – 1910 that deal with these issues are the focus of this project.

Because of the vast breadth of laws to which employers are subject, it is beyond the capability of this report to cover every law. Even within the subject of labor safety and health, the depth is considerable. For this reason, this project is limiting itself to setting up a basic written safety program that will satisfy laws dealing with labor health and safety. The specific laws examined pertain to those requiring written records, communication to employees, and training of employees.

Many of the laws covered fall under the jurisdiction of the federal agency OSHA, the Occupational Health & Safety Administration. OSHA was formed in 1970 with the main purpose of protecting the health and safety of American workers [2]. OSHA has federal authority to inspect all worksites and to issue fines and citations for violations of labor laws under their jurisdiction. OSHA has a strong presence and extensive information located on the World Wide Web, making information relating to OSHA easily accessible. Their web site is www.osha.gov.

The specific Federal laws considered are Code of Federal Regulations (CFR) 29 Parts 1900 through 1910. Those State regulations that overlap Federal laws are also considered. The safety program includes the following components: (1) Company Policy, (2) Employee Training Program, (3) Occupational Safety and Health Administration (OSHA) Injury and Illness Reporting, (4) Workplace Hazard Assessment and (5) Manual for Annual Updating. A sample program developed for Mark Precision, a machine shop located in Providence, RI which employees 8 workers is presented.

This project is being conducted in response to the need for an organized approach to worker safety that meets the requirements of federal regulations. Since employers at small machine shops tend to lack the resources needed for a dedicated staff for safety issues, record keeping and awareness of these laws tends to be inadequate. This does not mean necessarily that these shops are unsafe; rather, they simply may not comply completely with the law. In targeting the development of a safety program for small shops, a main goal must be that the program can be executed and updated in a reasonable amount of time by an employee whose main job is not safety.

In Chapter 2, a review of CFR 1900 – 1910, and related State laws, is provided to outline required written records and actions that need to be performed on a routine basis. Laws pertaining to bringing the infrastructure of a plant up to code, such as electrical, lighting, and surfaces, are not considered unless periodical checks of that equipment is required. Chapters 3-6 illustrate how to carry out the safety program by providing an example of its implementation. These chapters include all that is required by law for a safety program and can act as a model for developing programs at other plants.

Chapter 2: The Law

This chapter describes a Safety Program that satisfies all federal and state laws involving employee safety that require the maintenance of written programs and records. This program must be made available to employees of the plant. Chapter 3 describes in depth a sample safety program developed for Mark Precision.

2.1 Company Policy

The program includes a description of company policy, including the laws with which the company complies and the workers who are responsible for maintaining the safety program and ensuring safe practices in the plant. (Chapter 3, Section I.)

2.2 Employee Training Program

The Safety Program also describes the Employee Training Program. (Chapter 3, Section II) This has three components: (1) The Employee Safety Plan, (2) The Employee Safety Training Session, and (3) The Fork Truck Training Program. The Employee Training Session (2) is intended to provide all employees with guidance as to the exact nature of hazards present at Mark Precision and the methods available to them to counteract these hazards. The law requires several topics be discussed during this training session. A detailed description of these is provided.

The Fork Truck Training Program (3) is designed to educate, certify, and monitor drivers for the safe operation of fork trucks. The training program involves formal instruction, practical training, and performance evaluation in order to certify a driver for operation. The safety program describes what is required for training and evaluation purposes. Finally, the Employee Safety Plan (ESP) (1) is described in the Safety Program.

2.3 OSHA Injury & Illness Reporting

In addition to describing company policy and describing and implementing the Employee Training Program, an employer is required to record, maintain, and post a log and summary of all recordable occupational injuries & illnesses. CFR 29 Part 1904 mandates employers collect, store, and send to OSHA information on occupational injuries and illnesses annually [3]. OSHA provides two forms that outline what information is required, form OSHA No. 200 which is used

as an annual summary of incidents, and form OSHA No. 101 which covers individual incidents in greater depth. Only from No. 200 is required to be sent annually to OSHA. Both of these forms are available for download at www.osha.gov. If there is a fatality or three (3) injuries from one incident, OSHA must be notified within eight (8) hours. This notification is to be done orally to the local or nearest OSHA branch office.

Small companies with fewer than ten (10) employees are exempt from record keeping and are only required to provide this information if it is requested for the next calendar year either by OSHA or by the Bureau of Labor Statitics [4]. This exemption does not apply to cases where there are fatalities or multiple injuries. There are three basic types of work related injuries or illness that need to be recorded: (1) Fatalities, (2) Injuries or illnesses that cause lost workdays, (3) Injuries or illnesses that require treatment from a physician. Injuries that can be treated with minor first aid should not be recorded [5]. A complete description of what injuries must be reported and how to report them is also provided in the Safety Program (Chapter 2, Section III.)

2.3 The Hazard Communication Law

The Federal Hazard Communication Law (CFR 29 Part 1910.1200) is designed to ensure that information on the hazards from chemicals present in a work place is transmitted to both employers and employees [6]. In order to perform this, employers are required to develop, implement, and maintain a written hazard communication program. To aid in the development of these programs, producers of a product that contain hazardous chemicals must make available a Material Safety Data Sheet (MSDS) for that product. The MSDS contains information relative to the health and safety of the people how will ultimately use or come into contact with that product.

An employers hazard communication program does not need to be independent from other safety related programs. In this project, the hazard communication program is encompassed within the safety program. MSDSs were collected and included as part of the Safety Program for Mark Precision. These are excluded from the sample report given in Chapter 4. The written program must include, at a minimum, the following items to satisfy the law [7].

1. Verification method of appropriate labels on all hazardous chemical containers.
2. Collection of an MSDS for any hazardous chemical present.
3. A list of all hazardous chemicals present at a workplace.

4. Method for informing employees and training.
5. Method for informing employees of the hazards during non-routine tasks.

Other items that should also be included are the procedures for the maintenance of the program and the assignment of responsibility for the execution of the program. Though the method for informing and training of employees has to be written, the actual training itself can be conducted verbally. The items that must be included in the employee training are as follows [8].

1. What the law requires employees be informed and trained about.
2. Where hazardous chemicals are located.
3. Where the hazard communication program, MSDSs, and chemical list are found.
4. Method used to detect the presence or release of present hazardous chemicals.
5. The health hazards from present chemicals.
6. How employees can protect themselves from present chemicals.
7. An explanation of MSDSs and how to read them.

In Rhode Island, There is also the Hazardous Substance Right-To-Know Act. This Rhode Island law closely follows the Federal Hazard Communication Law but also includes some additions. One requirement is that a list of work areas within a building, and the hazardous chemicals found in each work area, be given to the local fire department. Also, $35 must be paid annually to the Rhode Island Department of Labor to provide funding for the enforcement of this law.

OSHA and the State of Rhode Island define the amount of a hazardous chemical that must be present in order to be recorded differently. In Rhode Island the amount of a hazardous chemical must be greater than 1% of at least two (2) gallons or ten (10) lbs of total quantity, or any amount containing carcinogens. OSHA requires reporting on hazardous chemicals that are greater than 1%, .01% for carcinogens, but they do not specify a quantity limit. OSHA does however address the issue of household items used in the workplace. In situations where an employee receives no more exposure than seen by a typical consumer of the household item, then OSHA does not require the maintenance of an MSDS.

2.4 Workplace Hazard Assessment & Personal Protective Equipment

The employer is also required to determine if hazards are present, or are likely to be present, which require the use of personal protective equipment. A hazard assessment is to be

carried upon initial completion of this program and when changes in the work environment occur, or as necessary. A complete discussion of the steps to be taken when assessing hazardous conditions is given in Chapter 3, Section IV.

Federal regulations specify that personal protective equipment (PPE) is equipment that protects an individual from harm [9]. This equipment protects an individual from hazards such as chemicals, heat, radiation, and mechanical irritants. Some forms of PPE are eyeglasses, face shields, helmets, respirators, earplugs, and protective clothing.

To establish what PPE is required in a workplace, a hazard assessment needs to be performed. An employer has to keep a certificate of hazard assessment in order to verify that one has been performed [10]. The law does not require that the hazard assessment certification be performed by anyone with special training or certification. Guidelines on how the certification should be performed are located in CFR 29 Part 1910 Subpart I Appendix B or Part 1915 Subpart I Appendix A, found at OSHA's web site. The final hazard assessment details what protective equipment is required for employees working in a given area.

Employee Training on how to use the required PPE has to be conducted and a written document certifying that this training has been performed has to be kept by the employer [11]. This certification must include the employee's name and date of training. Once this training has been performed, retraining is only required if there are changes to the specified PPE, or the employee shows a lack of understanding on the correct use of the PPE. There are several things that must be included in the PPE training: (1) What and when PPE is necessary, (2) how to properly wear and adjust the PPE, (3) PPEs limitations, and (4) Care and maintenance of PPE. Once the training as been conducted, the employees must demonstrate that they understand this training [12].

In conditions that require the use of a respirator by employees to protect themselves from airborne hazards, the employer must set up a written respiratory protection program [13]. This program is extensive in its requirements for the selection of proper equipment, training of employees, verification of proper fit and operation, and medical evaluation of employees. The use of dust masks for protection against nuisance particle does not require the implementation of a respiratory protection program. Before a program like this is to be set up, environmental controls, such as a ventilation system, should be used to eliminate the hazard.

2.5 Environmental Controls

Before PPE is required to be used by employees, an employer must take reasonable engineering measures to reduce the cause of a hazard. These engineering measures may be in the form of ventilation systems, sound reduction techniques, and machine guarding. Only if these measures are impractical to implement or fail to reduce the hazard to an acceptable level is the use of PPE acceptable to eliminate a hazard. In situations where airborne contaminants pose a health risk to employees, a local exhaust and ventilation system should be implemented. The requirements of a local exhaust system are outlined in ANSI Z9.2 [14] and ANSI Z33.1 [15].

2.6 Manual for Annual Updating

As mention in Chapter 1, it is vital that a safety program be easy to implement and update. For this reason the safety program should include point-by-point description of what needs to be followed and performed annually. This is given in Chapter 3, Section V.

2.7 Employee Safety Plan

Chapter 4 is devoted to outlining the key elements of an ESP. While federal law does not mandate the distribution of an ESP, it does strongly encourage it. The plan is tailored to the specific interests of employees. It includes descriptions of the Hazard Communication Law and an employee's legal rights under these laws, a definition of hazard substances, an explanation of labels, lists and MSDSs, a description of personal protective equipment available and proper fire extinguisher use and finally, a list of acronyms.

2.8 Fire Safety Report

Rhode Island state law also requires the compilation of a Fire Safety Report. This report is to be provided to the local fire department. An example is given in Chapter 5.

2.9 Certification Forms

Finally, the law requires that several certification forms be filed annually, or upon occurrence of relevant events. Sample Certification forms are provided in Chapter 6.

Mark Precision Inc.

Safety Program

This program complies with

Rhode Island Hazardous Substance Right-to-Know Act
Chapter 28-21

and

Federal OSHA Laws
Title 29 CFR 1900 through 1910.

I. Company Policy

I.1 Introduction

The goal of this program is to assemble, organize, and fulfill all State and Federal Laws involving employee safety that require the maintenance of written programs and records. It is also the goal of this program to act as a source for information on the methods for employee training, hazard communication, and safe operation of Mark Precision.

I.2 Laws Addressed

This program is designed to comply with the following specific laws:

Federal CFR 29 Part:

1904	Recording & Reporting Occupational Injuries & Illnesses
1910.38	Employee Emergency & Fire Prevention Plans
1910.95	Occupational Noise Exposure
1910.101	Compressed Gases
1910.132	Workplace Hazard Assessment and PPE Training Verification
1910.133	Respiratory Protection
1910.151	Medical Services and First Aid
1910.157	Portable Fire Extinguishers
1910.158	Automatic Sprinkler Systems
1910.178	Powered Industrial Trucks
1910.184	Slings
1910.1200	Hazard Communication

Rhode Island Law:

Chapter 28-21 Hazardous Substance Right-To-Know Act

I.3 Responsibilities

The Safety Manager is responsible for developing, updating, and carrying out this program. This program will be updated annually at the beginning of the new year, no later than February 1st of the following year, by following the Manual for Annual Updating. The Safety Manager can be contacted at 401-455-0558. Copies of this program can be obtained from the

Safety Manager, or directly from the program binder located in the Manufacturing Manager's office, labeled as **Safety Program**. Also, it is the responsibility of the Safety Manager to record and report all occupational injuries and illnesses as outlined in the OSHA Accident Reporting section of this program. All accident reports are to be conducted no later than 6 working days after the incident, or within 8 hours of a fatality or hospitalization of 3 or more employees.

It is the responsibility of the Production manager or shop Forman, with the aid of the machine's instruction booklet, to conduct training on the proper and safe operation of any production equipment. An employee will be trained on the proper use of a machine before the employee uses that piece of equipment. Also, in the case of a fire, it is the responsibility of the shop Forman to visually confirm that all employees have exited the building and to inform fire officials of any missing persons.

Any purchaser of materials for Mark Precision is responsible for reviewing the Hazardous Substance List when a new item is purchased. If there is no Material Safety Data Sheets (MSDS) for a newly purchased item, then the purchaser is responsible for obtaining the appropriate MSDS for the purchased chemical. Upon arrival of a new MSDS, the purchaser will place the MSDS in the front of the Safety Program binder and update the Hazardous Substance List manually in the area marked Addendum. Upon arrival of the purchased item, the purchaser is responsible for making sure that the item is properly labeled with identity, hazard warnings, and name of manufacturer before the use of that product can begin.

II. Employee Training Program

II.1 Introduction

The Employee Training Program is to be used at Mark Precision Inc. for the purpose of training employees about the safe operation of the plant. The Employee Training Program consists of the Employee Safety Plan, Employee Safety Training Session, and Fork Truck Training Program.

The Employee Training Session is intended to provide all employees with guidance as to the exact nature of hazards present at Mark Precision and the methods available to them to counteract these hazards. The Employee Safety Report summarizes important safety information and will be given to employees for their personal review and records. This report is so employees

can quickly find general information and serve as a guide to what other resources are available. The Employee Safety Report is located in Chapter 4. The Employee Fork Truck Training Program is to train employees for use of the fork truck.

II.2 Employee Training Session

After the Safety Manager has conducted the annual program update a health and safety session will be held with all employees, as well as with any new employee before starting work. The Safety Manager will inform employees about specific information involving the outlined material below. The safety session will be conducted verbally with any necessary demonstration materials. The safety session will include a review of all hazardous chemicals, physical hazards, person protective equipment, the emergency action plan, the fire prevention plan, and fire extinguisher use & principles. At the conclusion of this training session, all attendees will sign a Certification of Employee Safety Training. The Certification of Employee Safety Training form is located in Appendix E.

11.2.1 Chemical Hazards

The review of chemical hazards is to be conducted in terms of general categories using a few specific chemicals present at Mark Precision as examples. A specific review of each chemical present is not required. The review of each chemical will address:

- What hazardous chemicals are present at Mark Precision
- Health problems associated with the chemicals
- Symptoms of overexposure to the chemicals
- How to use and handle the chemicals safely
- How to handle a spill or an emergency involving the chemicals

11.2.2 Physical Hazards

The review of physical hazards will include:

- What specific physical hazards are present at mark precision
- How to identify physical hazards other than the ones covered in this session
- What protective measures to take for specific types of hazards

II.2.3 PPE Training Method

Personal protective equipment (PPE) training will include:

- Use of acceptable shop clothing
- Use of dust masks

  Note: While use of dust masks is allowed at Mark Precision, the use of respirators is not, because of the inability to educate, maintain, and verify medical requirements for respirator use as specified by CFR 29 1910.134
- Use of local exhaust system for respiratory protection.
- Limitations of PPE
- Proper care of PPE
- Employee demonstration of understanding about PPE

II.2.4 Emergency Action

In accordance with 29 CFR 1910.38 for employers with 10 or fewer employees:
The review emergency action will include:

- Emergency escape procedures and route assignments
- How to account for all employees
- Rescue and medical duties of employees
- The preferred method of reporting fires and other emergencies

II.2.5 Fire Prevention

The review for fire prevention will include:

- A list of all workplace fire hazards and there handling
- Names of personnel who are responsible for maintenance of fire equipment
- Names of personnel who are responsible for control of fuel source hazards

Fire extinguisher use & principles training will include:

- How fire extinguishers are rated
- What fire extinguishers are applicable to different types of fire
- How to use fire extinguishers
- What hazards are present when trying to fight a fire

II.3 Fork Truck Training Program

II.3.1 Outline

The fork truck training program is designed to educate, certify, and monitor drivers for the safe operation of fork trucks at Mark Precision. The training program involves formal instruction, practical training, and performance evaluation in order to certify a driver for operation. Refresher training for a certified driver will be provided:

- When they have been observed driving in an unsafe manner
- When they have been involved in an accident
- When they have received a bad evaluation
- When conditions in the workplace change

An evaluation of a certified driver must be performed at least once every three years.

The Safety Manager, Production Manager, or anyone who has knowledge, training, and experience with fork trucks will carry out the training program.

II.3.2 Formal Instruction

The formal instruction will be conducted verbally, with the aid of the Fork Truck Manual supplied by the manufacturer, and will contain the following information:

- Operating instructions, warnings, and precautions
- Differences between the truck and the automobile
- Truck controls
- Engine & motor operation
- Steering & maneuvering
- Possible visibility problems
- Fork & attachment adaptation
- Vehicle capacity
- Vehicle stability
- Refueling
- Operation limitations
- Workplace surface conditions

- Review of typical loads

II.3.2 Practical Training

The practical training is designed to give trainees experience while under the guidance of a trainer. Practical training will be conducted after the formal instruction session. A trainer will perform a demonstration of typical fork truck maneuvers at Mark Precision. Trainees will duplicate this demonstration. After operating the fork truck in the presence of the trainer for a period of time suitable to demonstrate acceptable skill and knowledge, the trainee will be considered for certification.

Once a trainee is to be certified the Fork Truck Driver Certification form located in Appendix E is to be filled out. A completed certification form for each driver at Mark Precision will be kept in Appendix F of this program. Future evaluations will be recorded on driver's certification form.

III. OSHA Injury & Illness Reporting

Mark precision is required to record, maintain, and post a log and summary of all recordable occupational injuries & illnesses in accordance with CFR 29 Part 1904. If Mark Precision has no more than ten (10) employees at any time during a calendar year then this record keeping is not required unless there is a fatality or a multiple hospitalization accident. Fatalities or multiple hospitalizations require an oral report, either by phone or in person, of the incident within eight (8) hours to the local area office of OSHA located at:

Federal Office Building
380 Westminster Mall, Room 243
Providence, RI 02903
(401)-528-4669

Recording of accidents will consist of completing OSHA form 200 no later than 6 working days after receiving information about the accident or illness. There is one OSHA form 200 for each calendar year where all incidents are recorded. Also a supplementary record for each incident will be recorded. This supplementary record can be a completed OSHA form 101,

a Workmen's compensation report, or an insurance report. The supplementary record must contain all the information requested in OSHA form 101.

Recordable occupational injuries are incidents that result in: fatalities, lost workdays, transfer to another job, termination of employment, requirement of medical treatment other than first aid, loss of consciousness or restriction of work or motion, diagnosis of occupational illness by a doctor.

IV. Workplace Hazard Assessment

Hazard assessment for Mark Precision is to determine if hazards are present, or are likely to be present, which requires the use of personal protective equipment. A hazard assessment is to be carried upon initial completion of this program and when changes in the work environment occur, or as necessary. The following steps are to be taken when assessing hazardous conditions. For clarification see CFR 29 Part 1910 Subpart I Appendix B or CFR 29 Part 1915 Subpart I Appendix A.

IV.1 Survey

A walk-through survey will be conducted to identify sources of hazards to employees. The basic categories of hazards to look for are:

- Impact
- Penetration
- Compression (roll-over)
- Chemical
- Heat
- Harmful Dust
- Light Radiation

Common sources at Mark Precision are machinery and welding.

IV.2 Organize & Analyze Data

Organize the information collected from the survey as well as information gathered from previous Mark Precision's accident reports. Analyze the information to estimate the potential for

injury. Each hazard is to be identified by its type, level of risk, and seriousness of potential injury.

IV.3 Selection of Personal Protective Equipment (PPE)

When protection from a hazard cannot be provided by engineering measures such as machine guarding or local exhaust system, personal protective equipment must be selected and supplied to the affected employees. Training on the proper use of the required PPE must be included in Mark Precision's Employee Safety Training Program. In order to select PPE for a hazard, research is to be conducted on available equipment. Once possible equipment has been identified, select equipment that ensures a level of protection greater than the minimum required for the hazard. Selection of PPE must also consider the fit to an employee. Before the initial use of a PPE by an employee, verify that the PPE fits correctly and is comfortable and that the employee understands how to use and care for the PPE.

IV.4 Certification

Once a hazard has been assessed, fill out the form **Mark Precision Certification of Hazard Assessment** found in Appendix E and place it in Appendix F. The hazard assessment certification must include: identification of the workplace, the person certifying that the evaluation has been performed, the date, and identification that it is a certification of hazard assessment.

V. Manual for Annual Updating

This manual is to be followed and performed annually between Jan 1 and Feb 1.

Annual Equipment Check

An annual equipment check will be performed and recorded using form **Mark Precision Annual Equipment Checklist** found in Appendix E. Upon completion, this form will be placed in Appendix F and kept for at least one year.

OSHA Occupational Injury & Illness Reporting

An annual summary of OSHA form 200 must be completed by Feb 1 that includes the signature of the employer, or officer of the employer, at the bottom of the page certifying that the stated information is true and complete. If no accidents have been reported then the form is to be filled out with zeros. This summary is to be stored in the appropriate appendix for five years. Also this summary is to be posted at Mark Precision from Feb1 to March 1.

MSDS and Hazard Chemical List Update

Take the previous year's hazardous chemical list and perform a walk-through survey to locate all reported chemicals. Also look for any chemicals not listed that may potentially be hazardous. Note quantity of materials found. Obtain MSDSs for chemicals found those that do not already have one. Update Hazardous Chemical List by adding items found in the survey and those included in the previous years list in the area marked addendum. Remove any items that are no longer present. Final list must be alphabetized. Place previous year's copy of Hazardous Chemical List in appropriate appendix (note: lists must be kept for 30 years). Place new MSDSs in the appropriate appendix as alphabetized in list. Place new list in appropriate appendix.

Confirm that $35 has been paid to Rhode Island Department of Labor & Training for the annual Right-to-Know act assessment.

Fire Safety Report

Review previous year's floor plan to find any changes that have occurred and update floor plan if necessary. Update fire report chemical list using the new Hazardous Chemical List. Fire report chemical list must show chemicals by location. Confirm all other information in report is correct. Send a copy of this report to the local fire department at:

Workplace Hazard Assessments

Obtain the Mark Precision Hazard Assessment Certifications and review them for correctness. Assess if any changes need to be made by examining outlined areas. If necessary, take corrective action in accordance with Mark Precision's Workplace Hazard Assessment plan as outlined in this program.

Fork Truck Driver Evaluations

Obtain the Mark Precision Fork Truck Driver Certification for each driver. Meet with drivers and evaluate their performance. Record evaluation results on their certification form.

Posters and Employee Notifications

Confirm that following posters and notifications are in a conspicuous place:

- The Rhode Island Hazardous Substance Right-to-Know poster.
- The OSHA form 200 Summary (displayed between Feb 1 to March 1)

Mark Precision Inc.

June 2000

Employee Safety Plan

This report is to be given to all employees during the annual Safety Training Session

This report complies with the requirements of
Federal OSHA Hazards Communication Law
Title 29 CFR 1910.1200
And
Rhode Island Hazardous Substance Right-To-Know Act Chapter 28-21

I. What is The Hazard Communication Law

The Federal Hazard Communication Law and the Rhode Island Right-To-Know Act are laws that have the same fundamental concept – that employees have both a need and a right to know the hazards and identities of the chemicals they are exposed to in the workplace. They are also used to help clarify the degree, and/or nature of a hazard a chemical presents by mandating the publication of a Material Safety Data Sheet (MSDS) for any chemical product sold or used in the U.S. By properly implementing these laws it is the goal to inform both employees and employers of chemical hazards so that personal risk to everyone can be reduced and hopefully eliminated.

Under these laws it is the responsibility of an employer to:

- Maintain a list of all chemical hazards present in a workplace.
- Maintain an MSDS for each hazardous chemical present.
- Assure that all chemicals entering the workplace are properly labeled.
- Provide the chemical hazard list to the local fire department.
- Implement an employee training program that is intended to:
- Inform about the nature and intent of these laws.
- Inform about designated substances.
- Inform about protective measures for chemical hazards.
- Outline emergency procedures for chemical accidents.
- Inform how labels, lists, and MSDSs work.
- Make all written records available to employees.
- Revise chemical hazard list annually with previous lists kept for 30 years.
- Repeat training program annually with updated information.

These laws apply to hazardous chemicals present in quantities exceeding two gallons or ten pounds, or carcinogens, mutagens, and teratogens present in concentrations equal to or greater than one part per ten thousand by volume.

II. What Are Your Legal Rights Under These Laws

You have the right to review and have copies of Mark Precision's Right-To-Know Training Program.

You have the right to refuse to work with, or be exposed to a chemical if you have requested an MSDS for a particular chemical and have not received it within three (3) days (not including weekend or holidays).

An employer may not discriminate against or discipline any employee because they have exercised any of these stated rights.

An employer may not request or require any employees to waive any of these stated rights.

Any employee who has been discharged, disciplined, or otherwise discriminated against by an employer in violation with these stated rights, may within one hundred and eighty (180) days after the violation occurs or ninety (90) days after the employee first obtained knowledge that a violation has occurred, commence an action in any appropriate court of law alleging wrongful dismissal in violation with Rhode Island Law Chapter 28-21-8.

III. What is a Hazardous Substance

Types of Hazardous Substances:

Flammables

Reactants

Toxins

Carcinogens

Mutagens

Teratogens

Flammables substances can range from the explosive type, such as hydrogen, to metals, such as aluminum and magnesium, which will burn under very special conditions. Uncontrolled burning of any material is potentially very harmful and should be guarded against at all times.

Reactants are substances that can react spontaneously and unpredictably when mixed with other chemicals. For example, pouring an acid into water can cause an explosion. These chemicals may be perfectly safe on there own but special precautions must be taken when preparing to mix them with other chemicals.

Toxic substances are ones that produce unwanted side effects upon entry into the human body. These effects can range from a mild sneeze to death. In all cases we should be aware when toxins are present and take appropriate action.

Carcinogens are substances that can cause cancer. Cancer is a potentially life-threatening disease tat may not appear for many years. All these substances should be treated with extreme caution.

Mutagens are substances that bring about changes in a person's DNA, or genes. These changes may produce birth defects that may be passed onto future generations. All these substances should be treated with extreme caution.

Teratogens are substances that can cause abnormalities in unborn children, because of their mothers' exposure to the substance. These substances should be treated with extreme care, especially by pregnant women.

Substances can enter the human body through several different routes.

- Inhaled through breathing.
- Enter through cuts or sores on the skin.
- Absorbed directly through the skin.

- By swallowing or coming into contact with the eyes or ears.

Because different substances have different ways of entering the body, the personal protection we use will vary accordingly. All employees have eyeglasses, dust masks, and gloves available to them at all times.

IV. Explanation of Labels, Lists, and MSDSs

At Mark Precision there are three primary ways you can determine the hazard a chemical presents to you. First, by reading the label on the container of the product. Second, by reviewing a master list of all hazardous chemicals at Mark Precision that is available to everyone. And last, by reading the Material Safety Data Sheet (MSDS) for the product.

On all hazardous chemicals entering and present at Mark Precision will be a label indicating what this substance is, who manufactured it, and basic warnings about the dangers of this product. The purchaser of that product, to assure that proper labeling is present, will inspect all products entering Mark Precision. If at any time you find a product that is not labeled, contact the Safety Manager (Richard Foulkes).

On many labels there will be a hazard rating from either the National Fire Protection Agency (NFPA) or the (HMIS). These hazard ratings are intended to be a quick reference to determine the dangers of a chemical. They rate the Health Risk, the Flammability, and the Reactivity in a scale from 0 to 4. The rating system is as follows:

0 = No Hazard

1 = Slight Hazard

2 = Moderate Hazard

3 = Serious Hazard

4 = Severe Hazard

These ratings sometimes specify the protective equipment to wear while using the product. These rating are only intended to be a quick reference with more information available through the product's MSDS.

There is a complete list of all hazardous chemicals present at Mark Precision located in this report with a continuously updated list located in the Safety Program binder in Ray Foulkes' office. This list shows what chemicals are present, how the MSDSs are alphabetized in the

MSDS file, what there approximate hazards are, and where they are located. This list is updated annually, with temporary additions written in by hand. An archive of the previous 30 years worth of lists will be kept in the appendix of the Mark Precision Safety Program.

Material Data Safety Sheets (MSDS) are reports on a product that indicate the health and working hazards of a product due to the chemicals that they contain. It is federally mandated that an MSDS be developed or maintained by anyone producing, importing, or using in a work place a given hazardous chemical. All MSDSs will vary slightly because of the many different natures of the chemicals they are describing. In this report we will try to describe the basic features they will all contain and how you can interpret them. In general they contain 12 sections that each describe specific areas of a hazard. In some cases, information is not in the section as indicated below, you should look in several related areas to find what you are looking for. Also, not all sections are included in every MSDS, some products do not to have all of these sections.

Section 1: Chemical Product and Company Information

This section gives what the product is, who made it, how to get emergency medical information and when the MSDS was prepared.

Section 2: Ingredient Information

This section lists all of the individual hazardous chemicals that are in this product as well as their amounts in the mixture. Each individual chemical will be described in terms of its scientific name and its Chemical Abstract Identity (CAS) number. Also given in this section are the allowable limits of exposure, or TLV (Threshold Limit Value), for each of the hazardous chemical components. The limits are given as mg/M^3 (milligram per cubic meter) for amounts in air, or as ppm (parts per million) for amounts in liquids. There are several different organizations that determine these limits with the OSHA limits being enforced by law. Another organization defining exposure limits is the American Conference of Governmental Industrial Hygienists (ACGIH). The ACGIH continuously evaluates limits and makes recommendations to OSHA, so the ACGIH limits will generally be tighter and more up to date.

Section 3: Hazard Identification

This section describes the exact hazards that this product exposes you to. It tells how the chemicals can enter you body, what are the acute – or immediate health effects, and what are the chronic health effects. Generally in this section you will find out if something is carcinogenic, mutagenic, or toxic.

Section 4: First Aid Measures

This section lists what actions to take if you or someone else is exposed to a chemical. Also there will be information about how to detect overexposure and what symptoms to look out for.

Section 5: Fire and Explosion Data

Any potential fire dangers will be listed here. This section not only covers how flammable a substance is but how to extinguish a fire burning this product. This section is important to review because many hazardous chemicals have unusual methods of extinguishing their fire.

Section 6: Accidental Release Measures

This section describes how to contain an accidental spill or release of a chemical.

Section 7: Handling and Storage

Special precautions and instructions on storage and handling will be included in this section.

Section 8: Exposure Controls and Personal Protection

This section contains what personal protective gear someone is to use with a chemical and environmental conditions that should be met, such as ventilation requirements.

Section 9: Physical and Chemical Properties

This section outlines what the chemical properties are. Here you find if a product is a liquid, what temperatures it melts – boils at and what the product looks like.

Section 10: Stability and Reactivity

This section outlines how stable or reactive a chemical is. It lists what other chemicals will react with this product and how they will behave. Also, it should state what decomposition byproducts would be generated if a product breaks down, such as in a fire or by oxidizing.

Section 11: Toxicological Information

This section covers how toxic a substance is believed to be towards humans. Often the results of lab tests on the exposure of a product to lab animals are reviewed here. If you want to know what this product did to a rat or a bunny, this is where to look.

Section 12: Ecological Information

Section 13: Disposal Information

Section 14: Transportation Information

Section 15: Regulatory Information

These sections are self-explanatory and their titles describe what they are for.

Section 16: Other

This section is a catchall for all of the information that the producer didn't include in other sections but felt was important enough to inform you about.

V. Personal Protective Equipment

Personal Protective Equipment is anything that protects you from either physical or chemical hazards. Protective equipment includes the clothes you are wearing, eyeglasses, gloves, aprons, facemasks, machinery guarding, and local exhaust systems.

Personal Clothing

Required personal clothing for anyone present on the shop floor includes:

Shoes: Steel toed shoes complying with ANSI Z41-91 standard.

Socks: Covering the exposed area between the shoes and the pants.

Pants: Long pants, no shorts allowed.

Shirt: A minimum of a short sleeved tee shirt, with long sleeved shirts preferred.

Eyeglasses: Safety eyeglasses that have side protection and comply with ANSI Z87.1

Eye & Face Protection

Safety eyeglasses are required to be worn at all times on the shop floor. Safety glasses protect your eyes form flying debris, liquids, chemical vapors, and high levels of radiant energy. All safety glasses should have side protection and be resistant to shattering. Eyeglasses should be kept clean by washing to prevent impaired vision.

During welding, filtering lenses are required to protect your eyes form high levels of light radiation. The minimum required shade level for a specific application is listed below:

TIG Welding: **Shade 8 with 1/8" thick plate**

MIG Welding: **Shade 8 with 1/8" thick plate**

Oxy-Acetylene Welding: **Shade 5 with 1/8" thick plate**

Also during arc welding, a face shield will be used to protect your face from form high levels of light radiation. Face shields with built in light filters of level 8 are located in the welding area for your use.

Respiratory Protection

Respiratory protection is required to protect your respiratory system from harmful chemicals. Atmospheric contamination comes in the form of dust, mist, smoke, spray, vapor, and gases. Mark Precision's primary method for removing atmospheric contamination is to remove those contaminants at their point of generation by the use of a local exhaust system. In some circumstances the use of alternative methods of respiratory protection may be required.

The local exhaust system removes atmospheric contaminants at their point of origin by vacuuming away air immediately surrounding the creation point. This air is then ducted up into the ceiling where it is filtered and blown outside. When opening gates in the local exhaust system remember that other employees might also be using this system. If there are other people on the system please do not open the gate all of the way if it is not necessary. Placement of the

inlet and shielding is already set up on grinding equipment and sand blasters. For welding and some polishing, the local exhaust inlet will need to be placed in the correct position by the operator.

In order for the local exhaust system to work correctly, the exhaust inlet must be in the correct position and any gathering hoods must be in place. The placement of the inlet should be in a position where contaminated air is drawn away from you and into the exhaust inlet. Hoods or shielding around the source help direct air in a way to focus airflow over the contamination source. Smoke sticks can be used to see airflow patterns in order to find the best inlet placement. Smoke sticks can be found in the welding area.

In some cases the local exhaust system cannot be placed in a way to remove air contaminants from a certain operation. In such cases, dust masks will be provided for your protection. An example of this is the machining of cast iron where dust is generated. Mark Precision will take steps to minimize dust in theses situation.

The use of a respirator is not permitted at Mark Precision do to the extremely stringent OSHA laws that cover training, inspection, maintenance, and personal medical evaluations for respirator use. Mark Precision does not have the resources or the need to set up this type of program. During normal circumstances, your work will not require the use of a respirator. If such a situation develops it will be handled with suitable environmental controls.

VI. Fire Extinguisher Use & Principles

Fire extinguishers are classified by the type of fire they are designed to suppress. The class of fire is rated by the letters A, B, C, & D with the appropriate letter indicated on the fire extinguisher. Some fire extinguishers are designed for multiple fire types and may have several letters marking them. The types of fire are indicated below:

A **General fires consisting of wood, paper, and trash.**

B **Fires involving liquids and greases such as gasoline, oil, and fat.**

C **Fires that occur in electrical environments such as fuss boxes and transformers.**

D **Fires involving metals such as aluminum and magnesium.**

When putting out a fire with an extinguisher always hold the extinguisher firmly and aim at the base of the fire. A momentary flare-up is normal when beginning to douse the fire. Avoid breathing the smoke form the fire and evacuate the area if smoke becomes intense. Use extreme caution when attempting to put out a fire.

VII. Acronyms

CAS	Chemical Abstract Identity
CFR	Code of Federal Regulations
HCS	Hazard Communication Standard
HMIS	
MSDS	Material Safety Data Sheet
NFPA	National Fire Protection Association
PPE	Personal Protective Equipment

Fire Safety Information

For

Mark Precision Inc.
70 Salmon St.
Providence, RI

In Compliance With

Rhode Island Law Chapter 28-21-5

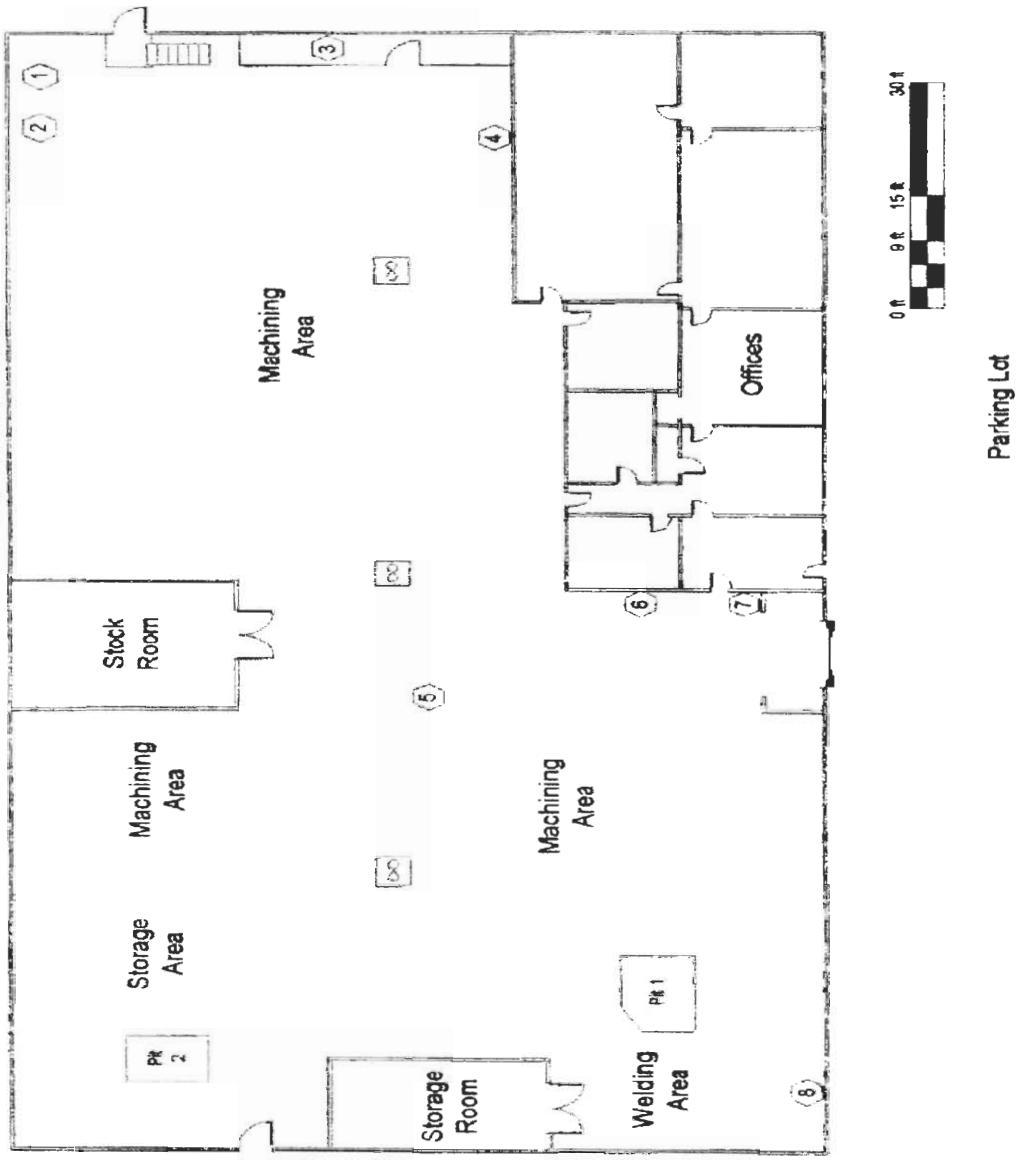
Hazardous Substance Right-To-Know Act

Current as of January 2000

I. Company Description

Mark Precision is a sub-contract machine shop that produces aluminum, brass and steel components for industry.

II. Floor Plan



III. Floor Plan Key


Fire Sprinkler Control


Incoming Natural Gas Main


Incoming Main Electrical Box


Utility Cabinet


Ceiling Fan Switches


Building Light Switches


33 lb. Liquid Propane Tank *


Paint Cabinet


Ceiling Fan

Pit 1 **Floor Pit, 4½ ft. deep, white interior with yellow border, chain link fence around perimeter.**

Pit 2 **Floor Pit, 4½ ft. deep, covered with plywood, will support approx. 600 lbs.**

*** One more 33lb. LP tank on fork truck, location – Anywhere**

IV. Fire Report Chemical List by Location

Location	N.F.P.A CODE	Quantity
Machining Area		
Acetone	H:2 F:3 R:0	1 gal.
Cemented carbide cutting inserts	C.	
Lynsol, Denatured Alcohol	H:3 F:3 R:0	1 gal.
Oil, Cutting, Hangsterfer S-1001	H:1 F:1 R:0	5 gal.
Oil, Cutting, Trim C270	H:1 F:0 R:0	5 gal.
Oil, Cutting, TrimSol		5 gal.
Oil, Hydraulic, ISO 32	H:1 F:1 R:0	5 gal.
Oil, Tapping, SafeTap Ultima	H:0 F:1 R:0	1 gal.
Oil, Tapping, Tap Magic	H:1 F:1 R:2	12 oz.
Propane	H:1 F:4 R:0	2, 33lb. Tanks
Sunnen Honing Stones	H:1 F:0 R:0	
Aluminum Alloys	F.T.	
Brass	T.	
Bronze, Naval	T.	
Copper	T.	
Steel (Carbon)	T.	
Steel (Nickel Alloy)	T.	
Titanium	T.	
Office		
Pink Luron Powder Hand Soap	H:1 F:1 R:0	150 lb.
Paint Cabinet		
MAPP Gas	H:2 F:4 R:0	2, 1lb. Tanks
Mineral Spirits, Paint Thinner	H:1 F:2 R:0	1 gal.
Propane	H:1 F:4 R:0	4, 1lb. Tanks
Storage Room		
Spartan NAD-75 Cleaner	H:3 F:0 R:0	5 gal.
Spartan OnAn'On Cleaner	H:1 F:0 R:0	5 gal.
Spartan Square One Cleaner	H:3 F:0 R:0	5 gal.

Stock Room

Aluminum Alloys	F.T.
Brass	T.
Bronze, Naval	T.
Copper	T.
Steel (Carbon)	T.
Steel (Nickel Alloy)	T.
Titanium	T.

Utility Cabinet

Anti-Seize Lubricant C5A	F.T.	12 oz.
Ardrox Red Dye Penetrant	H:1 F:1 R:0	1 gal.
N.D.T. fault check developer	T.	12 oz.
Naval Jelly, Rust Dissolver	H:3 F:0 R:0	12 oz.
Presto Black, Birchwood Casey	H:2 F:0 R:0	1 gal.
Soldering fluid, Duntons Nokorode.	H:1 F:0 R:0	1 lb.
Soldering fluid, Duntons Tinners	H:3 F:0 R:0	1 gal.
Sprayon S00710	H:2 F:4 R:0	2, 12 oz. Cans
TKO Rust Inhibitor	H:2 F:4 R:0	2, 12 oz. Cans
WD40, anti rust coating	H:2 F:2 R:0	1 gal.

Welding Area

Acetylene	H:1 F:4 R:3	70 lb. Tank
Argon	H:1 F:0 R:0	100 lb. Tank
Oxygen, Welding Gas	F.	70 lb. Tank
MIG Welding Gas	H:2 F:0 R:0	100 lb. Tank
Tungston, Thoriated	H:1 F:0 R:0	1 lb.

C = Carcinogen
T = Toxic
F = Flamable

V. Company Contact Information

Mark Precision Inc.

70 Salmon St.

Providence, RI 02909

401-455-0558

401-861-0710

Report and compliance person:

Richard Foulkes, Mfg. Eng.

401-455-0558

Emergency Contacts:

Tomas Egan, President

617-871-9772

Raymond Foulkes, Prd. Eng.

508-384-8047

Chapter 6: Sample Certification Forms

Certification of Employee Safety Training

I certify that I have received training in accordance with Mark Precision's Employee Safety Training Program and understand said material. I certify that I have received training in the following areas: the Hazard Communication law, the hazardous chemicals present at Mark Precision, and personal protective equipment.

Name	Signature	Date

Certification of Hazard Assessment

This document is to certify that Mark Precision was evaluated for hazards in accordance with CFR 29 Part1910 Subpart I and Mark Precision's Workplace Hazard Assessment Plan by:_____

_____

Signature:_____ on date:_____

for the stated below area.

Area:

Description:

Mark Precision Fork Truck Driver Certification

This is to certify that fork truck driver:_____ has been trained and evaluated in accordance with Mark Precision's Fork Truck Training Program by Instructor:_____ _____ on Date:_____and has satisfied the stated requirements needed to operate a fork truck at Mark Precision.

Evaluations (must include identity of evaluator and date of evaluation)

Alloy Steel Chain Sling Inspection Certification

This document is to certify that the alloy steel chain sling described below has been inspected in accordance with CFR 29 Part 1910.184 for use at Mark Precision Inc. Inspection shall include investigation for wear, defective welds, deformation, and increase in length.

Chain Description:_____

Manufacturer:_____ Chain Size:_____ Rated Capacity (Vertical):_____ Length:_____

Description of how to measure length:_____

_____

Inspection:

Condition Measured Length Date

Mark Precision Annual Equipment Checklist

Performed By:_____ Date:_____

Fire Extinguishers: Confirm that COMPANY has inspected fire extinguishers in accordance with insurance company policy. If not, confirm that the fire extinguishers are charged and that stored pressure dry chemical extinguishers have had a hydrostatic test within six (6) years.

Fire Sprinkler Tests: The sprinkler tests cannot be performed when the output from the system can freeze. If weather is too cold, delay testing until conditions permit and record date:__ _____.

Perform a main drain flow test by performing the following steps:

- Contact the local fire department at 401-###-#### and inform them that a main drain flow test on the sprinkler system at Mark Precision is going to be performed. **The fire department must be notified 24 hours before conducting this test!**
- After the notification period, note the pressure in the system from the lower supply gage: Static PSI = _____
- Open the main drain valve
- Record the flowing pressure Flowing PSI = _____
- Did the alarm come on Alarm = _____
- Close the main drain valve and confirm that the alarm goes off

First Aid Kit Supplies: Obtain or confirm the presence of the following supplies in the first aid kit.

- Band-Aids
- Disinfectant

Machine Guarding: Conduct a walk-through survey inspecting all machines and confirm that all guarding is in place and in good working order.

Local Exhaust System: Confirm that all gating is working and that ventilated areas have acceptable draw. Record the static pressure drop of the system PSI:_____

Compressed Gas Cylinders: Conduct a visual inspection of each tank to determine last testing date. Test date must be within six (6) years.

Slings: Visually inspect all slings for signs of damage. All slings must be marked with rated capacity and type of material. Because steel chain slings are used infrequently at Mark Precision they are to be inspected annually. Each alloy steel chain will have a continuous inspection certification form where inspection information will be recorded. The Alloy Steel Chain Inspection Certifications can be found in the appendix of this program. Any sling showing damage is to be removed from service.

Bibliography

[1] Groover, M.P. Fundamentals of Modern Manufacturing, Prentice-Hall Inc., New Jersey (1996)

[2] http://www.osha.gov/oshainfo/mission.html

[3] Code of Federal Regulations 29 Part 1904.1
Office of the Federal Register, Washington D.C. (1999)

[4] Code of Federal Regulations 29 Part 1904.17
Office of the Federal Register, Washington D.C. (1999)

[5] Code of Federal Regulations 29 Part 1904.12
Office of the Federal Register, Washington D.C. (1999)

[6] Code of Federal Regulations 29 Part 1910.1200
Office of the Federal Register, Washington D.C. (1999)

[7] Code of Federal Regulations 29 Part 1910.1200(e)
Office of the Federal Register, Washington D.C. (1999)

[8] Code of Federal Regulations 29 Part 1910.1200(h)
Office of the Federal Register, Washington D.C. (1999)

[9] Code of Federal Regulations 29 Part 1910.132
Office of the Federal Register, Washington D.C. (1999)

[10] Code of Federal Regulations 29 Part 1910.132(d)(2)
Office of the Federal Register, Washington D.C. (1999)

[11] Code of Federal Regulations 29 Part 1910.132(f)(4)
Office of the Federal Register, Washington D.C. (1999)

[12] Code of Federal Regulations 29 Part 1910.132(f)(3)
Office of the Federal Register, Washington D.C. (1999)

[13] Code of Federal Regulations 29 Part 1910.134
Office of the Federal Register, Washington D.C. (1999)

[14] American National Standards Institute, The Fundamentals Governing the Design and Operation of Local Exhaust Systems, Z9.2-1960, New York (1960)

[15] American National Standards Institute, Exhaust Systems for Grinding, Polishing, and Buffing, Z9.6-1961, New York (1961)