An Employer's Guide to Developing an Employee Right-To-Know Program

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DEPARTMENT OF LABOR AND INDUSTRY

July 2009
Minnesota Department of Labor and Industry
Occupational Safety and Health Division

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Purpose of this Manual

This manual is designed to assist employers in the process of developing and successfully implementing an Employee Right-to-Know (ERTK) program.

SECTION 1:
INTRODUCTION AND OVERVIEW

The Employee Right-to-Know Act was passed by the Minnesota Legislature in 1983 and is intended to ensure that employees are aware of the dangers associated with hazardous substances, harmful physical agents, or infectious agents they may be exposed to in their workplaces.

The Employee Right-to-Know Act applies to all employers in Minnesota with the exception of Federal agencies.

To comply with the Employee Right-to-Know (ERTK) standard, employers must identify the hazardous substances, harmful physical agents, and infectious agents that are present in the workplace and provide information and training to employees who are "routinely exposed" to those substances or agents. A written ERTK program is required.

"Routinely exposed" means that a reasonable potential exists for exposure to hazardous substances, harmful physical agents, or infectious agents during the normal course of the employees' work assignments. Exposure above the Minnesota OSHA Permissible Exposure Limits (PELs) is not necessary before implementing ERTK provisions. Routinely exposed includes working in areas where hazardous substances have been spilled and assignment to cleaning up leaks and spills. It does not include a simple walk-through of an area where a substance or agent is present and no significant exposure occurs.

In brief, the Employee Right-to-Know program must include:

- An inventory of hazardous substances and/or agents that exist in the workplace;
- Identification of employees who are routinely exposed to those substances or agents;
- A system for obtaining and maintaining written information on the substances and agents employees may be exposed to in the workplace;
- Methods for making ERTK information readily accessible to employees in their work areas;
- A plan for providing initial, pre-assignment and annual training of employees; and
- Implementation and maintenance of a labeling system or other warning methods.

The following sections of this manual provide more information on each of these elements.

SECTION 2:
DEVELOPING A WRITTEN
EMPLOYEE RIGHT-TO-KNOW PROGRAM

Employers must develop and implement a written Employee Right-to-Know program for hazardous substances, harmful physical agents, and infectious agents that are present in the workplace.

THE WRITTEN ERTK PROGRAM MUST INCLUDE:

1. An outline of training that will be provided to employees for hazardous substances, harmful physical agents and infectious agents. *[More information about the training requirements of ERTK is provided in Sections 3 through 6.]*

2. A list of the hazardous substances known to be present using an identity (e.g., chemical name, common name, etc.) that is referenced on the appropriate material safety data sheet (MSDS). *[More information about material safety data sheets is provided in Section 4 and Appendix A.]* This list may be compiled for the workplace as a whole or for individual work areas.

3. A description of the labeling system or other forms of warning used in the workplace. *[Details about the labeling requirements for hazardous substances, harmful physical agents, and infectious agents are provided in Sections 4, 5, and 6, respectively.]*

4. The methods the employer will use:

   - to inform employees of the hazards of infrequent or non-routine tasks that involve exposure to hazardous substances, harmful physical agents, or infectious agents.

   - to inform employees of the hazards associated with substances contained in unlabeled pipes in their work areas.

5. In addition, multi-employer workplace employers must describe the methods the employer will use to:

   - inform other employers with employees working at the workplace of the hazardous substances, harmful physical agents, or infectious agents employees may be exposed to while performing their work;

   - provide other employers with MSDSs or other written information, or where it will be located in the workplace;

   - inform other employees of required precautionary measures that must be taken during normal operating conditions and in foreseeable emergencies;

   - inform the other employers of the labeling system used in the workplace.

AVAILABILITY OF WRITTEN PROGRAM:

- The ERTK program must be maintained at the worksite.
- The written ERTK program must be available to employees or their designated representatives and Minnesota OSHA.

PERIODIC REVIEW:

- Because of the changing nature of the workplace, the ERTK program will be an ever-changing program. New substances will be introduced, currently used substances will be replaced or totally eliminated from use, etc. The written ERTK program should, therefore, be periodically reviewed (Recommendation: annually when the annual ERTK update training is conducted) to remove outdated information, insert new information, update training records, etc. When outdated MSDS information is removed from the active file to records retention, the dates of active use should be noted on the individual MSDS. *(See Section 4 regarding retention of MSDSs.)*

NOTE: If employees are exposed to blood as part of their job duties, the Occupational Exposure to Bloodborne Pathogens standard, 29 CFR 1910.1030, requires employers to develop and implement an Exposure Control Plan. If all infectious agents to which employees may be exposed are covered as part of the Exposure Control Plan, that Plan will be considered as meeting the ERTK requirement for a written program for infectious agents.

SECTION 3:
TRAINING

Every employee who works with or is routinely exposed to hazardous substances, harmful physical agents, or infectious agents as part of their job responsibilities **must** receive Employee Right-to-Know training.

The training must be made available by, and at the cost of, the employer. If employees are required to attend training at times other than their normal work schedule, they must be compensated for that time (e.g., overtime, equivalent time off, etc.).

NOTE:	Details of the training required for hazardous substances, harmful physical agents, and infectious agents is provided in Sections 4, 5, and 6 of this manual.

ERTK TRAINING MUST BE PROVIDED:

- In English or a language understood by employees;
- For the hazardous substances, harmful physical agents, and/or infectious agents to which employees may be exposed in the workplace;
- For temporary and seasonal employees who are assigned to tasks which may expose them to hazardous substances, harmful physical agents, or infectious agents.

FREQUENCY OF ERTK TRAINING:

- Before an employee's initial assignment to a workplace where they may be routinely exposed to a hazardous substance, harmful physical agent, or infectious agent;
- Before any new or additional hazardous substance or agent is introduced into the workplace to which the employee may be routinely exposed;
- Training must be updated **annually**. [Annual update training may be brief summaries of information included in initial and/or previous training sessions.]

TRAINING RECORDS:

- Training records must be maintained by the employer and retained for three years.
- Training records must include:
  - The dates training was conducted;

- The name, title, and qualifications of the person who conducted the training;

- The names and job titles of employees who completed the training; and

- A brief summary or outline of the information that was included in the training session.

UPON COMPLETION OF ERTK TRAINING, EMPLOYEES SHOULD:

- be aware of the hazards they are exposed to;
- know the short and long term effects of exposure to substances or agents and how to protect themselves from over-exposure (e.g., appropriate personal protective equipment and/or clothing, etc.);
- know how to obtain, read and use information on labels, material safety data sheets, or other reference materials; and
- know and follow appropriate work practices.

AUDIOVISUALS AND WRITTEN MATERIALS AS ERTK TRAINING:

- Giving an employee a data sheet, package insert, reference manual, or other printed material to read does not meet the ERTK training requirements.
- It is not acceptable to have employees watch a video that does not include specific information about the substances and agents the employee is exposed to in the workplace as the only method of training.
- Audiovisuals, interactive videos, printed materials, etc., may be used as "part" of the ERTK program if they are supplemented by specific information related to the employees' job duties and related exposures.
    - Training must include an opportunity for employees to ask questions to ensure they understand the information presented to them.

EXCEPTIONS:

- *Technically Qualified Individuals (TQIs)*. TQIs are individuals who, because of their training, education, and experience, are deemed to be knowledgeable in the hazards associated with hazardous substances, harmful physical agents, or infectious agents.

  The only individuals who may claim TQI status are: physicians, dentists, pharmacists, and lead research individuals.

  Employers are not required to provide ERTK training to TQIs. However, they must be

notified when the training is going to be given to other employees and allowed to attend if they wish.

NOTE:	The TQI exemption applies only to ERTK training and has no affect on any other OSHA standard that requires training of employees. For example, employees who are exposed to bloodborne pathogens (which are infectious agents) must be trained in accordance with the Occupational Exposure to Bloodborne Pathogens standard. If bloodborne pathogens are included in the ERTK training session on infectious agents, TQIs must attend.

- *Farms*. Farming operations that employ ten or fewer employees are exempt from all provisions of ERTK with the exception that label information must be provided to employees or their representatives. Farming operations employing more than ten employees or operating a temporary labor camp and employing any of its residents, must comply with the Farming Operations Training Plan Standard, Minnesota Rules 5206.1300 to 5206.1900.

- *Waste Service Employers.* Employers who collect, process, or dispose of waste regulated under the federal Resource Conservation and Recovery Act are exempt from the hazardous substances and harmful physical agents training and information requirements of ERTK. Waste service employers include garbage and rubbish collectors, landfill operators, hazardous waste transporters, and independent testing laboratories or government agencies who visit hazardous waste sites. To qualify for exemption under ERTK, waste service employers must develop and implement a training program for employees and submit that program to MNOSHA for approval.

NOTE:	The exemption from ERTK requirements for waste service employers does not extend to any other OSHA standard. For example, waste service employers must comply with the Occupational Exposure to Bloodborne Pathogens Standard, 29 CFR 1910.1030, if employees have the potential for exposure to blood as a result of their job responsibilities.

SECTION 4:
TRAINING AND INFORMATION REQUIREMENTS FOR HAZARDOUS SUBSTANCES

Step 1. INVENTORY FOR HAZARDOUS SUBSTANCES:

- ✓ Conduct an inventory, or survey, to identify and list all hazardous substances that your employees may use or come in contact with in your facility. Include hazardous substances that are generated in the work operation but are not in containers (e.g. welding fume, wood dust, carbon monoxide generated by propane or gas powered vehicles, or nitrogen dioxide from diesel powered vehicles).

- ✓ Develop procedures to keep your list current. When new substances are used, add them to your list. Conversely, when substances are no longer used they should be removed from the list. *[See note below.]*

Step 2. MATERIAL SAFETY DATA SHEETS:

- ✓ Request Material Safety Data Sheets (MSDS) from the chemical manufacturer or distributor of all the hazardous substances identified in the inventory. [Manufacturers and distributors are required to provide a MSDS at the time of the first shipment and whenever the information on the MSDS changes.]

- ✓ Develop a routine procedure for requesting MSDSs each time a new substance is ordered. Remove MSDSs for substances that are no longer used or available in the workplace.

NOTE: MSDSs are considered to be "exposure records" under 29 CFR 1910.1020(c)(5)(iii), "Access to Employee Exposure and Medical Records," and, as such, must be retained for 30 years. However, in lieu of keeping all MSDSs for 30 years, the intent of 29 CFR 1910.1020 can be met by keeping three key pieces of information: (1) the identity (chemical name, etc.) of the substance or agent, (2) where it was used, and (3) when it was used. Employers may wish to consider including this information as part of the hazardous substance list, retain the list for 30 years, and discard the MSDS.

- ✓ MSDSs must be current, accurate, and all required sections on the MSDS must be completed. *[Review the completeness of MSDSs using the checklist in Appendix B.]*

- ✓ MSDSs must be readily accessible to employees in their work areas. If desired, MSDS information may be made available on computer, display terminals, etc., as long as employees know how to access the information.

- ✓ In those workplaces where employees are required to handle or mix drugs in powder or liquid form in the course of assigned job duties, the package insert that generally is included in the drug package may be substituted for the MSDS if that package insert includes all information needed for training as outlined in Step 4.

- ✓ It is not necessary to obtain MSDSs for:

    - products employees bring into the workplace for their personal use;

    - consumer products or products sold or used in retail establishments if they are used in a manner that is comparable to typical consumer use (e.g., same frequency, concentration, etc.);

    - articles which contain a hazardous substance in solid form that is not released (e.g., hardware, equipment, etc.);

    - substances bound and not released under normal conditions of use (e.g., adhesive tape, vinyl upholstery, tires, etc.);

    - waste material regulated under the Resource Conservation and Recovery Act (RCRA);

    - substances in sealed packages that are not opened; and

    - substances present in a physical state, volume, or concentration that does not present a hazard (e.g., very small quantity, solids, diluted substances that present no adverse health affects, etc.).

- ✓ A master file should be maintained if individual MSDS's are placed in particular departments or areas.

Step 3. LABELING:

- ✓ Check all incoming shipments of hazardous substances to be sure they are labeled. Labels on containers received from manufacturers or importers must include:

    - the identity (name) of the hazardous substance

    - the appropriate hazard warnings (e.g. flammable, causes lung damage, irritates skin, etc.)

    - the name and address of the chemical manufacturer, importer, or other responsible party

- ✓ Stationary process containers within a work area that have similar contents and hazards may be labeled by use of signs, placards, or other alternative identification

means as long as the method used identifies the substance in the container and provides the appropriate hazard warning.

- ✓ Immediate use containers (test tubes, beakers, graduates, vials, pitchers, pails, or similar containers which are routinely used and reused) do not have to be labeled if:
  - they are used only to transfer a hazardous substance from a labeled container;
  - they remain under the control of the person who transferred the substance; and
  - they are only used during the work shift in which the transfer takes place.
- ✓ Pipes or piping systems need not be labeled but their contents must be included in employee training.
- ✓ Where labeling is not practical or feasible, such as for carbon monoxide from lift trucks or welding operations, warning signs or equivalent warning methods must be used.

Step 4. EMPLOYEE TRAINING:

- ✓ Information that must be included in the training program for all employees routinely exposed to hazardous substances includes:
  - A summary of the ERTK standard and the employer's written ERTK program;
  - Specific information from the MSDSs of the hazardous substances employees may be exposed to, including:
    - the name or names of substances, including any generic or chemical name, trade name, and commonly used name;
    - the level, if known, at which exposure to the substance has been restricted or, if no standard has been adopted, according to guidelines established by competent professional groups;
    - known acute (extremely severe, reaching crisis rapidly) and chronic (prolonged, lingering) effects of exposure at hazardous levels, including routes of entry;
    - known symptoms;
    - any potential for flammability, explosion, or reactivity of the substance;

- appropriate emergency treatment;
- known proper conditions of use and exposure to the substance;
- procedures for cleanup of leaks and spills; and
- the name, phone number, and address of a manufacturer of the hazardous substance.

▪ Where a written copy of all of the above information (e.g., the MSDS) is located in the work area or facility and how employees can access that information.

✓ Training must also cover the hazards associated with substances in unlabeled pipes in the work areas.

✓ Training can be conducted on each specific substance found in the workplace or it may be conducted by categories of hazards (e.g., carcinogens, sensitizers, acutely toxic agents). [This approach to training may be especially useful when training employees about the types of hazards they may encounter at another employer's worksite.]

✓ Employees who work in operations where they handle only sealed containers (such as warehousing) are exempt from the requirements of ERTK. However, if a spill or leak of hazardous substances occurs, any employee involved in its cleanup must be trained.

SECTION 5:
TRAINING AND INFORMATION REQUIREMENTS FOR HARMFUL PHYSICAL AGENTS

Step 1. IDENTIFY ALL PHYSICAL AGENTS

✓ ERTK restricts coverage of harmful physical agents to only four because the Employee Right-to-Know Act restricts harmful physical agent coverage to those physical agents for which a separate standard has been adopted and exposures are expected to approximate either the action level or permissible exposure limit at some time during the work year.

✓ The four harmful physical agents subject to ERTK coverage are:

- **NOISE:** Conduct initial evaluations to identify employees who are exposed to noise at or above 85db averaged over eight working hours. (If noise levels exceed 85db, compliance with the Occupational Exposure to Noise Standard, 29 CFR 1910.95, is required.)

- **HEAT:** List areas of potential excessive heat exposure, considering:

  - temperature of the work environment
  - season of the year
  - work activity

  (See Appendix D for more information and exposure limits.)

- **IONIZING RADIATION:** List all potential sources of X-rays, and radioactive materials. The most common uses of ionizing radiation occur in hospitals and dental offices with X-ray equipment and radioactive sources for non-destructive testing of welded seams, such as in pipes. *(See OSHA Standard 29 CFR 1910.1096)*

- **NON-IONIZING RADIATION:** List all sources of nonionizing radiation. *(See OSHA Standard 29 CFR 1910.97 and Appendix C, "Industrial Sources of Non-ionizing Radiation.")*

Step 2. LABELING

✓ Ensure that all equipment or work areas that generate harmful physical agents at a level which may be expected to approximate or exceed the permissible exposure limit or applicable action level are labeled.

✓ The label shall include:

- The name of the physical agent; and

- Appropriate hazard warning

✓ Examples of labels or signs for a physical agent:

- for equipment or a work area where there is a reasonable potential for exposure to heat at a level which may be expected to approximate or exceed the heat stress standard:

  "POTENTIAL HEAT STRESS AREA – TRAINING REQUIRED"

- for equipment or work areas where there is a reasonable potential for exposure to noise at a level which may be expected to approximate or exceed the permissible exposure limit or action level:

  "HIGH NOISE AREA – TRAINING REQUIRED" or

  "HIGH NOISE AREA – HEARING PROTECTION REQUIRED" or

  "HIGH NOISE AREA – HEARING PROTECTION RECOMMENDED"

Step 3. TRAINING

✓ Manufacturers of equipment that generate a harmful physical agent must provide the purchasing employer with information necessary to comply with the training requirements. This information must be provided at the time of purchase.

✓ Employers must conduct initial and on-going evaluations to determine if employees are routinely exposed to harmful physical agents at levels which approximate or exceed the permissible exposure limit or applicable action level and provide training to those employees.

✓ ERTK requires the following information to be included in training on harmful physical agents:

- the name or names of the physical agent including any commonly used synonym;
- the level at which exposure to the physical agent has been restricted;
- the known acute (extremely severe, reaching crisis rapidly) and chronic (prolonged, lingering) effects of exposure at hazardous levels;
- known symptoms;
- appropriate emergency treatment;

- known proper conditions for exposure to the physical agent; and

- the name, phone number, and address, if appropriate, of a manufacturer of the equipment which generates the harmful physical agent.

- where a written copy of all of the above information is kept in the work area. [Written information must be available to employees in the area or areas in which the harmful physical agent is present and where the employees may be exposed to the agent through use, handling, or otherwise.]

✓ The following are examples of information that should be included for each of the harmful physical agents covered under ERTK:

NOISE:

- When noise levels exceed 85db over an 8 hour period
- Identity of areas of potential over-exposure
- The effects of noise on hearing
- The purpose of hearing protection, advantages and disadvantages of various types
- Instructions on selection, fitting, use and care of hearing protection
- Purpose of audiometric testing and test procedures

HEAT STRESS:

- Identification of heat disorders and how to avoid them
- Symptoms of over-exposure
- Cause of heat stress
- Prevention measures the employer has implemented (including engineering controls and work/rest patterns)

IONIZING/NON-IONIZING RADIATION:

- Identity of sources
- Exposure limits
- Health effects of exposure
- Emergency procedures
- Safety procedures and control measures
- Personal protective equipment

SECTION 6:
TRAINING AND INFORMATION REQUIREMENTS FOR INFECTIOUS AGENTS

Step 1. IDENTIFY ALL INFECTIOUS AGENTS:

- ✓ Employers must evaluate the workplace for the presence of infectious agents employees may be exposed to at work.
  - Infectious agents include bacterial, viral, fungal, parasitic, and rickettsial agents.
  - A list of infectious agents is included in the ERTK standard (Minnesota Rules 5206.0600, subpart 4) and includes the most common infectious agents that may be encountered in Minnesota.
- ✓ Infectious agents requirements of ERTK apply to all employers who have employees potentially exposed to infectious agents. This means that infectious agents training must be provided to employees of correctional facilities and group homes, to firefighters and law enforcement personnel, and to employees who are assigned to a first aid or first responder team.

Step 2. LABELING:

- ✓ Labeling of infectious waste (e.g., labeled with the biohazard symbol) must comply with the requirements of the Occupational Exposure to Bloodborne Pathogens Standard, 29 CFR 1910.1030, and the Minnesota Infectious Waste Control Act.

Step 3. TRAINING:

- ✓ Information required as part of the ERTK infectious agents training program is identical to training for employees exposed to blood required by the Occupational Exposure to Bloodborne Pathogens standard, 29 CFR 1910.1030.
  - An employer may conduct one training program that covers all infectious agents to satisfy both standards.
- ✓ Information that must be included in the training for infectious agents includes an explanation of:
  - the employer's ERTK program for infectious agents;
  - the epidemiology and symptoms of infectious diseases including hazards to special at-risk employee groups;
  - appropriate methods of recognition of tasks and other activities that may involve exposure to infectious agents, including blood and other infectious

materials;

- the chain of infection, or infectious disease process, including:
  - agents
  - reservoirs
  - modes of escape from reservoirs
  - modes of transmission
  - modes of entry into the host and host susceptibility

- the use and limitations of control methods that prevent or reduce exposure including:
  - universal precautions
  - engineering controls
  - appropriate work practices
  - personal protective equipment
  - housekeeping

- the basis for selection of personal protective equipment:
  - its use
  - types of equipment available
  - location of equipment
  - decontamination and disposal

- the proper procedures for clean-up of blood or body fluids;

- recommended immunization practices;

- procedures to follow if an exposure incident occurs, including:
  - when, how, and to whom the incident should be reported
  - post-exposure evaluation and medical followup that will be available

- the appropriate actions to take and persons to contact in an emergency involving potentially infectious materials;

- signs, labels, tags, or color coding used to denote biohazards;

- where employees can find a written copy of the above information (e.g., reference documents such as "The Control of Communicable Diseases in Man"), the employer's written ERTK program, the ERTK standard, and the person to contact with questions.

✓ Training sessions must allow employees an opportunity for interactive questions and answers with the person conducting the training session.

MATERIAL SAFETY DATA SHEETS

The Material Safety Data Sheet (MSDS) is a detailed information bulletin prepared by the manufacturer or importer of a chemical that describes the physical and chemical properties, health hazards, routes of entry, precautions for safe handling and use, emergency and first-aid procedures, and control measures. This information is not only helpful in selecting appropriate products but provides employers and employees with the facts they need to use, store or dispose of the substance safely and to respond to an emergency.

- Employers must maintain a complete and accurate MSDS for each hazardous substance used in their facility and are entitled to obtain this information automatically upon purchase of the material.

- Manufacturers (anyone who produces, synthesizes, extracts, or otherwise makes, processes, blends, packages, or repackages) of hazardous substances or equipment which generates a harmful physical agent are required to provide employers who use their products with complete, up-to-date MSDSs.

- When an employer is unable to obtain a MSDS from a supplier or manufacturer, he/she should submit a written complaint, with complete background information, to the nearest Minnesota OSHA office. *[Addresses and phone numbers are included in Appendix E.]*

- When new and significant information becomes available concerning a product's hazards, chemical manufacturers, importers, or distributors must add it to their MSDS within three months and provide it to their customers with the next shipment of the product.

NOTE: If the name or identity of a hazardous substance is considered proprietary (trade secret) by the manufacturer, that information can be registered as a trade secret with the Department of Labor and Industry. Formulations and procedures are automatically considered trade secret and need not be registered. Information on registering trade secrets may be obtained from any Minnesota OSHA Office.

To meet the intent of the Employee Right-to-Know Standard, the MSDS must meet all requirements of the Federal OSHA "Hazard Communication" Standard, 29 CFR 1910.1200. This standard does not prescribe the precise format for the MSDS but does prescribe the information that must be provided. *[A checklist to aid in determining whether all required information is provided can be found in Appendix B. A "sample" MSDS form that includes blanks for all required information can be found on page 5 of this Appendix.]*

To meet the requirements of ERTK and 29 CFR 1910.1200, the MSDS must be in English or a language understood by employees; must be current, accurate, and all sections of the MSDS

completed; and must include the following information:

Section I **Manufacturer's Identity**

- ✓ Manufacturer's name, address, information telephone number, and an emergency telephone number.
- ✓ Date the MSDS was prepared.

Section II **Hazardous Ingredients/Identity Information**

- ✓ The identity used on the label;
- ✓ Chemical and common names of the hazardous ingredients;
  - For mixtures tested as a whole:
    - Chemical and common names of the ingredients which contribute to the known hazards;
    - Common names of the mixture itself.
  - For mixtures not tested as a whole:
    - Chemical and common names of all ingredients which are health hazards [1 percent concentration or greater], including carcinogens [0.1 percent concentration or greater];
    - Chemical and common names of all ingredients which are health hazards and pose a risk to employees, even though they are present in the mixture in concentrations of less than 1 percent or 0.1 percent for carcinogens.
- ✓ PEL (OSHA Permissible Exposure Limit); TLV (American Conference of Governmental Industrial Hygienists [ACGIH] Threshold Limit Value); or other exposure limits [including ceiling and other short-term limits]

NOTE:	For mixtures, if the employer assumes the mixture has the same hazards as its hazardous components (i.e., no test data exists on the mixture as a whole), the MSDS for each component will satisfy the requirements for a data sheet for the mixture. The MSDSs must be attached to one another and identified so they can be cross-referenced with the label. In addition, the MSDSs must include the PEL, TLV, and other exposure limits for each ingredient that is determined to be a health hazard.

Section III **Physical and Chemical Characteristics**

- ✓ Physical and chemical characteristics of the hazardous substance must be listed, including:

- boiling and freezing points
- vapor density
- vapor pressure
- specific gravity
- melting point
- evaporation rate
- solubility in water
- appearance and odor
- pH

Section IV **Fire and Explosion Hazard Data**

- ✓ The flash point and flammable limits--Lower explosive limit (LEL); Upper explosive limit (UEL)
- ✓ Extinguishing media and special firefighting procedures
- ✓ Unusual fire and explosion hazards.

Section V **Reactivity Data**

- ✓ Stability (Stable/Unstable) and conditions to avoid
- ✓ Incompatibility (materials to avoid)
- ✓ Hazardous decomposition or byproducts
- ✓ Hazardous polymerization (may occur/will not occur) and conditions to avoid.

Section VI **Health Hazard Data**

- ✓ Primary routes of entry
  - inhalation
  - skin
  - ingestion
- ✓ Health hazards (acute and chronic)
- ✓ Whether the chemical is listed with the National Toxicology Program (NTP) Annual Report on Carcinogens (latest edition) or has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest editions), or by OSHA;
- ✓ Signs and symptoms of exposure

- ✓ Medical conditions generally aggravated by exposure
- ✓ Emergency and first aid procedures.

Section VI **Precautions for Safe Handling and Use**

- ✓ Steps to be taken in case material is released or spilled
- ✓ Methods of waste disposal
- ✓ Precautions to be taken in handling and storing; and other precautions

Section VII **Control Measures**

- ✓ Respiratory protection (including the specified type)
- ✓ Ventilation (local exhaust; general mechanical; special)
- ✓ Personal protective equipment
  - protective gloves
  - eye protection
  - other protective clothing or equipment (e.g., body suits, face shields, etc.)
- ✓ Work and hygienic practices

SAMPLE MSDS FORM

Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard,29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY *(As Used on Label and List)*	Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name	Emergency Telephone Number
Address *(Number, Street, City, State, and ZIP Code)*	Telephone Number for Information
	Date Prepared
	Signature of Preparer *(optional)*

Section II - Hazard Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	%*(optional)*

Section III - Physical/Chemical Characteristics

Boiling Point		Specific Gravity (H_2O = 1)	
Vapor Pressure (mm Hg.)		Melting Point	
Vapor Density (AIR = 1)		Evaporation Rate (Butyl Acetate = 1)	
Solubility in Water			
Appearance and Odor			

Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
Extinguishing Media			
Special Fire Fighting Procedures			
Unusual Fire and Explosion Hazards			

(Reproduce locally) OSHA 174, Sept. 1985

Section V - Reactivity Data

Stability	Unstable		Conditions to Avoid
	Stable		

Incompatibility *(Materials to Avoid)*

Hazardous Decomposition or Byproducts

Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur		

Section VI - Health Hazard Data

Route(s) of Entry:	Inhalation?	Skin?	Ingestion?

Health Hazards *(Acute and Chronic)*

Carcinogenicity:	NTP?	IARC Monographs?	OSHA Regulated?

Signs and Symptoms of Exposure

Medical ConditionsGenerally Aggravated by Exposure

Emergency and First Aid Procedures

Section VII - Precautions for Safe Handling and Use

Steps to Be Taken in Case Material is Released or Spilled

Waste Disposal Method

Precautions to Be taken in Handling and Storing

Other Precautions

Section VIII - Control Measures

Respiratory Proctection *(Specify Type)*

Ventilation	Local Exhaust	Special
	Mechanical *(General)*	Other

Protective Gloves	Eye Protection

Other Protective Clothing or Equipment

Work/Hygienic Practices

* U.S.G.P.O.: 1986 - 491 - 529/45775

APPENDIX B

MATERIAL SAFETY DATA SHEET CHECKLIST

Each MSDS must contain the following information:

✓	Product or chemical identity used on the label.	□
✓	Manufacturer's name and address	□
✓	Chemical and common names of each hazardous ingredient	□
✓	Name, address, and phone number for emergency information	□
✓	Preparation or revision date	□
✓	The hazardous chemical's physical and chemical characteristics (such as vapor pressure and flashpoint)	□
✓	Physical hazards, including the potential for fire, explosion, and reactivity	□
✓	Known health hazards	□
✓	OSHA permissible exposure limit (PEL), ACGIH Threshold Limit Value (TLV) or other exposure limits	□
✓	Emergency and first-aid procedures	□
✓	Whether OSHA, NTP or IARC lists the ingredients as a carcinogen	□
✓	Precautions for safe handling and use	□
✓	Control measures such as engineering controls, work practices, or personal protective equipment	□
✓	Primary routes of entry	□
✓	Procedures for spills, leaks, and clean-up	□

APPENDIX C

INDUSTRIAL SOURCES OF NON-IONIZING RADIATION*

Sources	Uses	Comments
Broadcast	AM radio FM radio VHF TV UHF TV	535-1605 kHz. 88-108 MHZ 54-72, 76-88, 174-216 MHZ 470-890 MHZ
Cathode-ray tubes	Information processing systems such as CRT-based video display terminals; CRT-TV monitors	10-50 kHz
Communications	Fixed systems; tropospheric scatter; satellite communication; microwave point-to-point (relay); high-frequency radio Mobile systems; CB radios; walkie-talkies	0.8-15 GHz; generally well controlled 27-800 MHZ; may produce high field strengths near antennae
Diathermy	Shortwave microwave	13.56 and 27.12 MHZ; 915 and 2450 MHZ; may be continuous wave (CW) or pulsed wave (PW); consider duty cycle and leakage fields
Dielectric heaters	Seal/emboss plastics; cure glues, resins, particle boards, and panels; bake sand cores; mold appliance covers and auto parts; heat paper products	1-100 MHZ; mainly 27.12 MHZ; may produce high E and/or H fields
Electronic equipment	Switching regulator in copying machines, microcomputers, etc.	Usually shielded.
Electronic security systems	Intrusion alarms; theft detection; speed sensors; distance monitor; motion detection	Usually microwave frequencies
Electro-surgical devices	Cauterizing or coagulating tissues	May be CW or PW; solid state or spark-gap design
Hyperthermia	Same frequencies as diathermy	Applicators may be implantable
Induction heaters	Deep hardening; forging; welding; soft soldering; brazing; annealing; tempering metals and semiconductors; heat and draw optical fibers; epitaxial growth; plasma torching.	250-500 kHz and ELF; may product high E and/or H fields.
Lasers	Etching/engraving, welding, optical and other medical surgery, communications, research	Gas, crystalline liquid and semi-conductor lasers
Microwave heaters (including microwave ovens)	Drying wood, paper, film, inks; thawing, cooking, baking, dehydrating, pasteurizing, and sterilizing foodstuffs; curing plastics; solvent desorption	915 and 2450 MHZ
Plasma processors	Chemical milling; nitriding steel; polymerization; modifying polymer surfaces; depositing and hardening coatings and films; etching, cleaning, or stripping photoresist.	0.1-27.12 MHZ; consider potential for exposure to plasma gases
Radar	Acquisition and tracking; air and auto traffic control; marine uses; surveillance	1-15 GHz; usually PW
Spectroscopic instruments	Excite emissions from lamps/phototubes used in quantitative analysis	2.45 GHz
Welding	Production of pipe, tube, and beam; spot welding.	RF-stabilized; 0.4-100 MHZ with harmonics

* NOT ALL SOURCES SHOWN IN THIS TABLE ARE IN THE ELECTROMAGNETIC FREQUENCIES COVERED BY ERTK.

APPENDIX D

STRESS EVALUATION - HEAT

Heat stress may occur year round in areas with heat producing equipment such as in foundries, kitchens, or laundries. In Minnesota, high temperature and humidity are common during the summer with daily temperatures routinely varying up to 30 degrees. This variation does not always allow people to become acclimatized and stay acclimatized, thereby increasing the risk of heat stress.

Heat stress results from a combination of internal heat production from doing work and external heat exposure from the environment. Both aspects need to be addressed properly to control heat stress.

Two commonly used instruments to obtain heat stress measurements are the heat stress monitor and a sling psychrometer. The heat stress monitor measures several temperatures simultaneously and accounts for radiant heat and air movement. The sling psychrometer is a much cheaper and simpler device, but does not take into account radiant heat, and air movement must be determined separately.

The measurements obtained from either of these instruments are converted to one value, the wet bulb globe temperature (WBGT), for determining compliance with Minnesota Rules. WBGT is an index of heat stress indicating relative comfort. It considers temperature, humidity and air movement. The calculated value can then be compared to those found in Minnesota Rules § 5205.0110, subpart 2a (see page 2 of this Appendix).

Minnesota Rules § 5205.0110, subpart 2a, is the Minnesota OSHA standard for heat exposure. The standard is based on wet bulb globe temperature (WBGT) and level of work activity. Typically, one will determine the WBGT by using a heat stress monitor, or by using a sling psychrometer to obtain effective temperature, then converting effective temperature to WBGT. (More information on measuring and calculating heat stress can be found in the MNOSHA *Heat Stress* booklet available on the MNOSHA Web site.) If the heat stress limit is approached or exceeded, Employee Right-to-Know requirements specified in Minnesota Rules § 5206.0700, subparts 1 and 3, "Training Program for Harmful Physical Agents," and Minnesota Rules § 5206.1100, "Labeling Harmful Physical Agents; Label Content," also apply.

5205.0110 INDOOR WORKROOM VENTILATION AND TEMPERATURE

Subp. 2a. **Heat stress.** The requirements of this subpart cover employee exposure to environmental heat conditions indoors.

A. The following definitions apply when assessing and controlling health hazards associated with extremes in temperature and humidity indoors.

(1) "Wet bulb globe temperature index" or "WBGT" means a measure of the combined effect of air temperature, air speed, humidity, and radiation. WBGT = 0.7 T_{nwb} + 0.3 T_g.

(2) "Natural wet-bulb temperature" or "T_{nwb}" means temperature measured by a thermometer which has its sensor covered by a wetted cotton wick, exposed to natural air movement.

(3) "Globe temperature" or "T_g" means temperature measured by a thermometer with its sensor inside a matte black globe, exposed to radiant heat, Vernon Globe or equivalent.

(4) "Heavy work" means 350 to 500 kcal/hr (kilocalories per hour), for example: heavy lifting and pushing, shovel work.

(5) "Moderate work" means 200 to 350 kcal/hr., for example: walking about with moderate lifting and pushing.

(6) "Light work" means up to 200 kcal/hr., for example: sitting or standing performing light hand or arm work.

B. Employees shall not be exposed to indoor environmental heat conditions in excess of the values listed in Table 1. The values in Table 1 apply to fully clothed acclimatized workers.

TABLE 1. Two-hour time-weighted average permissible heat exposure limits.

Work Activity	WBGT, EF.
Heavy work	77
Moderate work	80
Light work	86

C. Employees with exposure to heat shall be provided training according to part 5206.0700, subparts 1 and 3.

APPENDIX E

SOURCES OF INFORMATION

Minnesota OSHA Offices

Questions concerning the Employee Right-to-Know Standard may be directed to the following Minnesota OSHA Offices:

Minnesota OSHA
443 Lafayette Road N.
St. Paul, MN 55155-4307
Phone: (651) 284-5050
Fax: (651) 284-5741
Toll-free: 1-877-470-OSHA
1-877-470-6742

Minnesota OSHA
525 Lake Ave. S., Suite 330
Duluth, MN 55802-2368
Phone: (218) 733-7830
Fax: (218) 725-7722

Minnesota OSHA
Mankato Place
12 Civic Center Plaza, Suite 1620
Mankato, MN 56001-7781
Phone: (507) 389-6507
Fax: (507) 389-2746

Minnesota OSHA Rules and Standards

The most recent copy of the Minnesota Department of Labor and Industry "Occupational Safety and Health Rules" – which includes the "Employee Right-to-Know Standard" – is available from:

Minnesota's Bookstore
Department of Administration
660 Olive Street
St. Paul, MN 55155
(651) 297-3000 or 1-800-657-3757

Federal OSHA Standards

The Federal OSHA Standards – which include 1910.1200 "Hazard Communication" and 1910.95 "Occupational Exposure to Noise" – may be accessed on the federal OSHA Web site at www.osha.gov, ordered from Minnesota's Bookstore (address above) or attained through the U.S. Government Printing Office online at http://bookstore.gpo.gov or by phone at 1-866-512-1800.

Resources for Hazardous Substance and Harmful Physical Agent Information

The Employee Right-to-Know standard requires the manufacturer of a hazardous substance or mixture of hazardous substances, or of equipment which generates a harmful physical agent to provide information to the employer so that employer can comply with the standard. If additional information on hazardous substances and harmful physical agents is needed, the following documents may be useful:

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices (latest edition), available from:

American Conference of Governmental Industrial Hygienists (ACGIH)
1330 Kemper Meadow Drive
Cincinnati, OH 45240-1634
Phone: (513) 742-2020
Web: www.acgih.org

Workplace Environmental Exposure Level Guides (latest edition), available from:

American Industrial Hygiene Association (AIHA)
Attn.: Customer Service
P.O. Box 79673
Baltimore, MD 21279-0673
Phone: (301) 843-3064
Web: www.aiha.org

Recommendations for Occupational Safety and Health Standards available on the National Institute for Occupational Safety and Health (NIOSH) Web site at www.cdc.gov/niosh or from:

Publications Dissemination Office
Mail Stop C-13
4676 Columbia Pkwy.
Cincinnati, OH 45226-1998
Phone: 1-800-CDC-INFO (1-800-232-4636

Monographs on the Evaluation of the Carcinogenic Risks to Humans and their Supplements, prepared by the International Agency for Research on Cancer (IARC), available online at www.iarc.fr.

Report on Carcinogens (latest edition) by the National Toxicology Program (NTP), available at http://ntp.niehs.nih.gov/ntp/roc/toc11.html.

Additional Resources for Heat Stress Information

Heat Stress available on the Minnesota OSHA Web site – www.dli.mn.gov/OSHA/Information.asp

Federal OSHA Safety and Health Topics: Heat Stress page – www.osha.gov/SLTC/heatstress

NIOSH Safety and Health Topic: Heat Stress page – www.cdc.gov/niosh/topics/heatstress

Additional Resources for Noise Information

Federal OSHA Safety and Health Topics: Noise and Hearing Conservation page – www.osha.gov/SLTC/noisehearingconservation

NIOSH Safety and Health Topic Noise and Hearing Loss Prevention page – www.cdc.gov/niosh/topics/noise

Additional Resources for Radiation Information

Minnesota Department of Health
Environmental Health Division
Radiation Control (ionizing)
625 Robert Street N.
P.O. Box 64975
St. Paul, MN 55164-0975
Phone: (651) 201-4545
Web: www.health.state.mn.us/divs/eh/radiation

Federal OSHA Safety and Health Topics: Non-Ionizing Radiation page – www.osha.gov/SLTC/radiation_nonionizing

Federal OSHA Safety and Health Topics: Radiofrequency and Microwave Radiation page – www.osha.gov/SLTC/radiofrequencyradiation

Federal OSHA Safety and Health Topics: Ionizing Radiation page – www.osha.gov/SLTC/radiationionizing

Federal OSHA Safety and Health Topics: Laser Hazards page – www.osha.gov/SLTC/laserhazards

Resources for Infectious Agents Information

Available on the Centers for Disease Control and Prevention (CDC) Web site at www.cdc.gov:

Biosafety in Microbiological and Biomedical Laboratories, 5th edition
Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Settings, 2005
Guideline for Infection Control in Health Care Personnel, 1998
Guidelines for Infection Control in Dental Health-Care Settings, 2003
Prevention and Control of Tuberculosis in Correctional and Detention Facilities: Recommendations from CDC, 2006

GLOSSARY OF TERMS AND ABBREVIATIONS

Acidosis. A condition of decreased alkalinity of the blood.
ACGIH. American Conference of Governmental Industrial Hygienists, Inc.
Action Level. The exposure level which triggers some but not all requirements in certain OSHA standards.
Acute Toxicity. The adverse effects resulting from a single dose of or exposure to a substance.
Alkali. Any compound having highly basic properties.
Anesthesia. Loss of sensation or feeling.
Asphyxia. Lack of oxygen and thus interference with the oxygenation of the blood.
Asphyxiant. A vapor or gas that can cause unconsciousness or death by suffocation.

Boiling Point, BP. The temperature at which the vapor pressure of a liquid is equal to the surrounding atmospheric pressure.
B.Z. Breathing zone.

Carcinogen. A chemical that has been demonstrated to cause cancer in humans.
CAS Number. [Chemical Abstract Service Number] An assigned number used to identity a material. The numbers have no chemical significance.
Ceiling Value, C. The concentration that should not be exceeded during any part of the working exposure.
CFM. Volume of air flow, cubic feet per minute.
Chemical Pneumonitis. Inflammation of the lungs due to chemical irritation.
CNS. Central nervous system.
CO. Carbon monoxide. A colorless, odorless, highly poisonous gas, formed by the incomplete combustion of carbon or a carbonaceous material, including gasoline. A chemical asphyxiant, it reduces the blood's ability to carry oxygen.
CO_2 Carbon dioxide. A colorless, odorless, incombustible gas formed during respiration, combustion, and organic decomposition and used in food refrigeration, carbonated beverages, inert atmospheres, fire extinguishers, and aerosols. High concentrations can create hazardous oxygen-deficient environments that can cause asphyxiation.
Combustible. OSHA defines combustible liquid within the Hazard Communication Law as any liquid having a flash point at or above 100ºF (38ºC), but below 200ºF (93.3ºC).
Conjunctivitis. Inflammation of the conjunctiva, the delicate membrane that lines the eyelids.
Corrosive. A chemical that causes visible destruction of or irreversible alterations in living tissue.
Cutaneous. Pertaining to the skin.

Dermal. Used on or applied to the skin.
Dermatitis. Inflammation of the skin.
Dyspnea. A sense of difficulty in breathing; shortness of breath.

Edema. An abnormal accumulation of clear, watery fluid in the tissues.
Evaporation Rate. The rate at which a particular material will vaporize from the liquid or solid state to the gas state.

f/cc. Fibers per cubic centimeter of air.
Flammable. Describes any solid, liquid, or gas that will ignite easily and burn rapidly.
Flash Point. The lowest temperature at which a flammable liquid gives off sufficient vapors to form an ignitable mixture.
FPM. Velocity of air flow, feet per minute.

Grounding. A safety practice to conduct an electrical charge to the ground.

Hazardous Material. A substance or mixture of substances having properties capable of producing adverse health or safety effects.
Hematuria. The presence of blood in the urine.
HEPA. High-efficiency particulate air-purifying filter. Most efficient mechanical filter commonly available.

IARC International Agency for Research on Cancer.
IDLH. Immediately dangerous to life and health.

Jaundice. Yellowish discoloration of tissues.

LC 50. The lethal concentration of a material in air that on the basis of laboratory tests is expected to kill 50% of a group of test animals.
LD 50. The lowest published lethal dose that will kill 50 percent of a group of test animals.
LEL. Lower explosive limit. Refers to the lowest concentration of gas or vapor that will burn or explode if an ignition source is present.

LFM or lfm. Velocity of air flow, linear feet per minute.

mg/m;. Milligrams of material per cubic meter of air.
MSDS. Material Safety Data Sheet.
Mutagen. A chemical or physical agent that induces genetic mutations.

Narcosis. Stupor or unconsciousness produced by a narcotic drug or chemical.
NFPA. National Fire Protection Association.
NIOSH. National Institute for Occupational Safety and Health.
NTP. National Toxicology Program.

Odor Threshold. The lowest concentration of a materials vapor in air that can be detected by smell.

Particulate. Small, separate pieces of an airborne material.
Peak. Maximum instantaneous allowable exposure for hazardous substances.
PEL. Permissible exposure limit. An exposure limit established by OSHA.
pH. The value that represents the acidity or alkalinity of an aqueous solution. [pH 7 = neutral; pH 0 = strong acid; pH 14 = strong alkaline.]

ppb. Parts per billion. [Parts of material per billion parts of air.]
ppm. Parts per million. [Parts of material per million parts of air.]
Psychotropic. Acting on the mind.
Pulmonary Edema. Fluid in the lungs.
Pyrophoric. A material that will ignite spontaneously in air below 130ºF (54ºC).

Reactivity. A description of the tendency of a substance to undergo chemical reaction either by itself or with other materials with the release of energy.
Reproductive Health Hazard. Any agent that has a harmful effect on the adult male or female reproductive system or the developing fetus or child.

Sensitization. An immune-response reaction state in which further exposure elicits an immune or allergic response.
Silicosis. A condition of massive fibrosis of the lungs causing shortness of breath.
Skin. Notation used to indicate possible exposure to a chemical by absorption through the skin.
STEL. Short-term exposure limit.
Subcutaneous. Beneath the skin.

Target Organ Effects. Chemically caused effects upon specifically listed organs and systems.
Teratogen. An agent or substance that caused physical defects in a developing embryo.
TLV. Threshold limit value. A term established by ACGIH to express the airborne concentration of a material to which nearly all workers can be exposed day after day without adverse effects.
TWA. Time-weighted average. The expression for average exposure which accounts for fluctuating levels during a given time period.

UEL. [Upper Explosive Limit] The highest concentration of a material in air that will produce an explosion.
Unstable. Tending toward decomposition or other unwanted chemical change during normal handling or storage.

Vapor Density. The weight of a vapor or gas compared to the weight of an equal volume of air.
Vertigo. A feeling of revolving in space; dizziness, giddiness.
Viscosity. Measurement of the flow properties of a material.
Water Reactive. A chemical that releases a hazardous gas, often violently, upon contact with water.