Kentucky Medical Cannabis Industry Guide to Worker Safety and Health

TEAM KENTUCKY®

OFFICE OF MEDICAL CANNABIS

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About this Guide

This guide is intended to help assist employers in the medical cannabis industry build occupational safety and health programs. While the foundation of this guide includes existing Kentucky state and federal regulations, it is not a comprehensive guide to all of the regulations pertaining to occupational safety and health. It should be noted that this guide does not present any new occupational safety and health regulations for the medical cannabis industry.

Medical cannabis cultivators, processors, producers, safety compliance facilities (or laboratories), and dispensaries are required to adhere to all regulations established by the Kentucky Medical Cannabis Program. See 915 KAR Chapter 1.

The medical cannabis industry in Kentucky falls under Kentucky Occupational Safety and Health Program jurisdiction and businesses must comply with U.S. Occupational Safety and Health Administration (OSHA) regulations and recordkeeping requirements. In addition to OSHA regulations, medical cannabis businesses are required to comply with other state regulations including Kentucky labor laws, Kentucky workers' compensation laws, Kentucky hazardous waste laws, Kentucky Pesticide Applicator's Act, local fire codes, and other regulations that are specific to employment and labor as well as the production of medical cannabis.

The Division Occupational Safety and Health Education and Training, also known as **KYSAFE**, offers Kentucky businesses cost-free, confidential, on-site OSH consultative surveys. Occupational safety and health professionals (i.e., consultants) work with employers to identify safety and health hazards in workplaces. Consultants also advise employers how to comply with Kentucky OSH standards, train and educate workers, and assist with establishing and improving safety and health programs.

Please note that the Kentucky legalization of medical cannabis does not require employers to allow the use of medical cannabis by employees while on duty. See KRS 218B.040. Please develop your own company policy on the use of medical cannabis. Information and guidance on writing a policy on using medical cannabis at the workplace is available at:

- Marijuana at Work - National Safety Council: Link
- Marijuana, leave laws and workplace violence top 2019 HR hurdles: Link
- Clearing the air on marijuana | April 2019 | Safety + Health: Link

About the Team Kentucky Medical Cannabis Workgroup

The Team Kentucky Medical Cannabis Workgroup was established on October 5, 2023 by Governor Andy Beshear through Executive Order 2023-600.

The workgroup is comprised of members who have relevant experience in health care, education and workforce, law enforcement, agriculture, economic development, and local government.

The workgroup's purpose is to study evolving medical cannabis industry policy and the state of medical cannabis policy in the Commonwealth in order to make recommendations to the Kentucky Medical Cannabis Program and other state agencies on emerging best practices.

The workgroup will deliver ongoing recommendations on legislative, regulatory, or policy changes necessary to ensure Kentucky patient cardholders, visiting qualified patients, and designated caregivers have safe access to affordable medical cannabis products.

This guide will continue to be updated as laws and information are developed to address safety and health issues. We would like to thank the following people and their respective organizations for their participation in the Team Kentucky Medical Cannabis Work Group:

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Executive Summary

At the time of this writing, 38 states and the District of Columbia currently have laws legalizing marijuana or medical cannabis in some form. While many studies have focused on health outcomes and public safety issues, little attention has been focused on occupational safety and health associated with this industry. Prior to its legalization, occupational safety and health hazards associated with producing illegal marijuana or medical cannabis were documented in published literature and law enforcement reports. Washington was the first state to develop formal guidance for the industry, such as the Regulatory Guidance for Licensed I-502 Cannabis Operations. The Program and the Department for Workplace Standards sought to identify various types of occupational hazards encountered in this industry and build a document to assist the industry and its workforce in building effective safety and health programs for their businesses.

The Kentucky Medical Cannabis Program has specific regulations written for the medical cannabis industry in Kentucky. See 915 KAR Chapter 1. This document is informational only and is not intended to replace or supplement regulations promulgated by the Kentucky Medical Cannabis Program or from OSHA. The best practices in this document are suggestions and do not establish any new enforceable regulations by the Commonwealth of Kentucky. Furthermore, this guide is not intended to provide a comprehensive list of existing federal, state, and local regulations that may apply to the medical cannabis industry.

Purpose, scope, and users of the guide

The complicated nature of the hazards present in the medical cannabis industry highlights the need for careful attention to safety and health at all types of medical cannabis businesses. The purpose of this guide is to provide an overview of the safety and health hazards that may be present in the cultivation, processing, and sale of medical cannabis. Not all hazards listed in this guide may be present at a given facility.

Conversely, there may be additional hazards not listed within the scope of this guide that may be present at a given facility. This guide is intended to provide a starting point for the assessment and evaluation of occupational health hazards. This guide also provides abbreviated guidance and a list of resources to help employers in the medical cannabis industry develop an occupational health and safety program.

Guide objectives

The objectives of this guide are to:

- Assist in the recognition of occupational health hazards that might be present within the medical cannabis industry.
- Identify existing federal, state, and local safety and health related regulations that may apply to the medical cannabis industry.

- Provide initial recommendations for engineering, administrative, and personal protective equipment controls that can be used to help eliminate or reduce hazards in the medical cannabis industry.
- Provide information and resources to assist employers in developing written workplace safety and health programs.
- Provide information to help develop medical cannabis worker safety training programs.

Guide Roadmap

Part 1 of the guide begins with the initial steps that can be performed to establish a safety and health program within a facility. Given this initial background in Part 1, Part 2 provides more detail in two separate sections.

Section I

- Outlines the hazards for the industry by category (biological, chemical, and physical).
- For each hazard a general description is given followed by:
    - Information on the job role that might be specifically affected by the hazard
    - Considerations for a hazard assessment
    - Best practices for eliminating or managing the hazard
    - Federal, state, or local regulations that may apply to that hazard
    - Additional resources to assist in hazard recognition and management.

Section II

- Outlines broader safety and health programs that should be implemented within the industry and provides examples and tools to help develop these programs.
- The programs in Section II are broader programs (e.g., hazard communication and hearing conservation) in which, if needed, have a written plan component that is required for compliance.
- The final appendix that is included in this guide includes a table of OSHA regulations that may be applicable to the medical cannabis industry.

Contents

Part I: Background and Establishing a Safety and Health Program

1.0 Terms and Definitions

ACGIH ®: American Conference of Governmental Industrial Hygienists. The ACGIH ® is a professional association of industrial hygienists and practitioners of related professions dedicated to promoting safety and health within the workplace. The organization is a professional society, not a government agency.

AIHA: American Industrial Hygiene Association. AIHA is one of the largest international associations serving occupational and environmental safety and health professionals practicing industrial hygiene and is a resource for those in large corporations, small businesses and who work independently as consultants.

Administrative controls: Policies, operating procedures, training programs, safe work practices, maintenance campaigns and other actions taken to prevent or mitigate workplace hazards.

Cannabis: Cannabis and marijuana are commonly used interchangeably. This document will use the term "medical cannabis" as this is the term used in KRS Chapter 218B governing medical cannabis.

CDC: Centers for Disease Control and Prevention. The CDC is one of the major operating components of the Department of Health and Human Services. The CDC houses the National Institute for Occupational Safety and Health (NIOSH) whose mission is to develop new knowledge in the field of occupational safety and health and to transfer that knowledge into practice.

Cleaners: Products that remove dirt through wiping, scrubbing or mopping including soaps, detergents, and solvents.

CO: Carbon monoxide, which is a colorless, odorless, and highly toxic gas most commonly produced indoors by incomplete combustion of natural gas or propane appliances or equipment.

CO_2: Carbon dioxide, which is a colorless, odorless gas that can displace oxygen at high concentrations and is used as a growth supplement in the medical cannabis industry.

Confined space: A space that is large enough for an employee to enter fully and perform assigned works; is not designed for continuous occupancy by the employee; and has limited or restricted means of entry or exit.

Disinfectants: Products that contain chemicals that destroy or inactivate microorganisms that cause infections. Commercial disinfectants must be registered with the EPA.

EAP: Emergency Action Plan which is a workplace plan to make sure employees know what to do in case of emergency.

Ergonomics: The application of human biological sciences with engineering sciences to achieve optimum mutual adjustment of people and their work, the benefits measured in terms of human efficiency and well-being.

Engineering controls: Permanent features built into facilities or production processes to automatically eliminate or mitigate hazards. Primary engineering controls prevent hazards from ever occurring, and secondary engineering controls minimize damage after events occur.

EPA: Environmental Protection Agency. The EPA is responsible for the protection of public health and the environment by assuring compliance with federal environmental statutes and regulations.

FIFRA: Federal Insecticide, Fungicide, and Rodenticide Act. The FIFRA provides for federal regulation of pesticide distribution, sale, and use. All pesticides distributed or sold in the United States must be registered (licensed) by the Environmental Protection Agency.

Flammable liquid: Any liquid having a flashpoint at or below 199.4°F (93°C). Flammable liquids are divided into four categories:

- **Category 1**: Liquids having flashpoints below 73.4°F (23°C) and having a boiling point at or below 95°F (35°C).
- **Category 2**: Liquids having flashpoints below 73.4°F (23 °C) and having a boiling point above 95 °F (35 °C).
- **Category 3**: Liquids having flashpoints at or above 73.4°F (23°C) and at or below 140°F (60°C). When a Category 3 liquid with a flashpoint at or above 100°F (37.8°C) is heated for use to within 30°F (16.7°C) of its flashpoint, it shall be handled in accordance with the requirements for a Category 3 liquid with a flashpoint below 100°F (37.8°C).
- **Category 4:** Liquids having flashpoints above 140°F (60°C) and at or below 199.4°F (93°C). When a Category 4 flammable liquid is heated for use to within 3 °F (16.7°C) of its flashpoint, it shall be handled in accordance with the requirements for a Category 3 liquid with a flashpoint at or above 100°F (37.8°C).

Hypersensitivity diseases: Diseases characterized by allergic responses to chemicals or other substances, such as asthma, rhinitis, and hypersensitivity pneumonitis.

HVAC: Heating ventilation and air-conditioning system.

IAQ: Indoor air quality.

Industrial Hemp: Amendment 64 to the Kentucky Constitution defines industrial hemp as a plant of the genus cannabis and any part of that plant, whether growing or not, containing a Delta-9 tetrahydrocannabinol (THC) concentration of no more than 0.3 percent on a dry weight basis.

Job hazard analysis (JHA): A technique that focuses on job tasks as a way to identify hazards before they occur. It focuses on the relationship between the worker, the task, the tools and the work environment. After uncontrolled hazards are identified, this tool assists in outlining the steps to eliminate or reduce the hazards to an acceptable risk level.

NIOSH: National Institute for Occupational Safety and Health. NIOSH is a branch of the Centers for Disease Control and Prevention whose mission is to develop new knowledge in the field of occupational safety and health and to transfer that knowledge into practice.

Occupational Health: Refers to the identification and control of the risks arising from physical, chemical, and other workplace hazards in order to establish and maintain a safe and healthy working environment.

OSHA: Occupational Safety and Health Administration. With the Occupational Safety and Health Act of 1970, Congress created the OSHA to assure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education, and assistance.

PEL: Permissible exposure limit. The PEL is the maximum amount or concentration of a chemical that a worker may be exposed to under OSHA regulations. This is usually expressed as an eight-hour, time-weighted average (TWA).

Permit-required confined space: A confined space that has one or more of the following: contains or has the potential to contain a hazardous atmosphere; contains a material with the potential to engulf someone who enters the space; has an internal configuration that might cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section; and/or contains any other recognized serious safety or health hazards.

PIT: Powered industrial truck. Any mobile power-propelled truck used to carry, push, pull lift, stack or tier materials. Powered industrial trucks can be ridden or controlled by a walking operator.

PPE: Personal protective equipment. PPE refers to protective clothing, helmets, goggles, or other garments or equipment designed to protect the wearer's body from injury or infection.

REL: Recommended exposure limits. This is an occupational limit that has been recommended by the United States National Institute for Occupational Safety and Health as being protective of worker safety and health over a working lifetime. It is frequently expressed as a time weighted average (TWA) exposure for up to 10 hours/ day during a 40-hour work week.

Sanitizer: A product that contains chemicals that reduce, but do not necessarily eliminate, microorganisms such as bacteria, viruses, and mold from surfaces. Public health codes may require cleaning with the use of sanitizers in certain areas, like toilets and food preparation areas. As with disinfectants, some sanitizers will be registered with the EPA.

SDS: Safety data sheet, formerly known as Material Safety Data Sheets (MSDS).

Sensitizer: A chemical or substance that causes a substantial proportion of exposed people or animals to develop an allergic reaction after repeated exposure to the chemical.

Terpene: Any large group of volatile unsaturated hydrocarbons found in the essential oils of plants. Terpenes are fragrant oils that can give medical cannabis its aromatic diversity.

Tetrahydrocannabinol (THC): The chemical that is the main mind-altering ingredient of cannabis.

TLV: Threshold limit value.

Veg Room: Location of plants that have grown beyond the germination and/or clone stage but have not entered the flowering stage.

Volatile Organic Compounds (VOCs): Are emitted as gases from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short- and long-term health effects. Concentrations of many VOCs are consistently higher indoors than outdoors. VOCs may be emitted while using solvents for extraction operations.

WHO: World Health Organization. The WHO is a global organization that is similar to the Centers for Disease Control and Prevention. The organization publishes occupational health guidelines that can be supplemented in safety programs. Guidelines from WHO are not enforceable.

2.0 Illness and injury notification and reporting

2.1 Notification of worker's rights

Employers are obligated to provide employees with current information about workers' rights and labor laws as they relate to safety and health issues. All entities covered by OSHA are required to display the "OSHA Job Safety and Health: It's the Law" poster in the workplace. This poster must be displayed in a conspicuous place where workers can see it. Copies of the poster can be accessed at this link.

In addition, Kentucky employers may be required to post certain labor law posters. These posters can be accessed at: Safety & Health Protection On The Job (ky.gov).

2.2 Workers' compensation in Kentucky

As a part of a safety program, employers with one or more full-time or part-time employees are required by Kentucky law to provide workers' compensation insurance coverage for their employees, except for some specific exclusions. Coverage may be purchased from any authorized insurance company. If an employer fails, neglects, or refuses to obtain workers' compensation insurance as required by law, the Commissioner of the Department of Workers' Claims is authorized to impose fines, and/or issue a cease-and-desist order against the business to stop operations until insurance is obtained. A contractor who contracts out any work to a subcontractor is liable for coverage for all workers of the subcontractor unless the subcontractor has obtained workers' compensation insurance coverage.

2.3 OSHA injury and illness recordkeeping and reporting

Employers with more than 10 employees are required to keep a record of serious work-related injuries and illnesses. Minor injuries requiring first aid only do not need to be recorded. These records must be maintained at the worksite for at least five years. Each February through April, employers must post a summary of the injuries and illnesses recorded for the previous year.

Per OSHA standard 29 CFR 1904.39, all employers are required to notify OSHA when an employee is killed on the job or suffers a work-related hospitalization, amputation, or loss of an eye. A fatality must be reported within 8 hours. An in-patient hospitalization, amputation, or eye loss must be reported to OSHA within 24 hours. For more detailed information on recordkeeping and reporting requirements: link and link.

Also, KY OSH 803 KAR 2:181 further defines some of these terms: Link

3.0 Establishing a Safety and Health Program

The framework for establishing a safety and health program has been adapted below from the OSHA framework described fully here: Link.

The OSHA safety and health program framework is intended to provide employers, workers, and worker representatives with a sound, flexible method for addressing safety and health issues in diverse workplaces. It is intended for use in any workplace but will be particularly helpful in small and medium-sized workplaces. Many of the safety and health topics covered in other sections of this guide fit within the context of this safety and health program. A successful safety and health program should include the following elements within the framework: management leadership, worker participation, hazard identification and assessment, hazard prevention and control, education and training, and program evaluation and improvement. A sample program following the principles below can be found here: Link

3.1 Management Leadership

Management provides the leadership, vision, and resources needed to implement an effective safety and health program. This includes a written policy signed by top management describing the organization's commitment to safety and health and pledging to establish and maintain a safety and health program. Management can also establish goals to measure progress toward improved safety and health and allocate resources for pursuing these goals. An example management policy statement is located here: Link

3.2 Worker participation

A safety and health program is dependent on worker participation in order to succeed. Workplaces should establish a process for workers to report injuries, illnesses, close calls/near misses, and other safety and health concerns, and respond to reports promptly. Reporting processes may have an anonymous component to reduce any fear of reprisal. Employees should also be given the opportunity to participate in every step of program design and implementation. The following document provides guidance in establishing management commitment and employee involvement in safety and health programs: Link

3.3 Hazard identification and assessment

A proactive, ongoing process to identify, assess, and mitigate hazards is a core element of any effective safety and health program. Failure to identify or recognize hazards is one of the root causes of workplace injuries, illnesses, and incidents. This assessment process involves collecting information about workplace hazards and conducting workplace inspections in order to characterize hazards and determine effective controls. Using tools such as a job hazard analysis (JHA) is one practical approach to identifying hazards and solutions to reduce or eliminate hazards.

3.4 Hazard Prevention and Control

Effective controls protect workers from workplace hazards; prevent injuries, illnesses, and incidents; minimize or eliminate safety and health risks; and help employers provide workers with safe and healthy working conditions. Controls are selected based on feasibility, effectiveness, and permanence. Once controls are implemented, they should be evaluated to measure their efficacy and updated accordingly. This step might include a Hazard Communication Program, Hearing Conservation Program, Lockout/Tagout, or a PPE Assessment, all described in this guide in Section II.

3.5 Education and Training

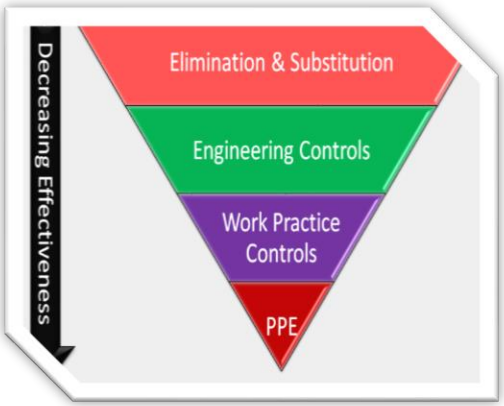
Workers who know about workplace hazards, and the measures in place to control them, can work safer and more productively. Workers need to be trained on the safety and health program and their role as it relates to that program. They should also know how to identify workplace hazards and be involved in the process of controlling those hazards. KYSAFE provides cost free, confidential consultative surveys and training. The Kentucky Medical Cannabis Program strongly encourages all licensed cannabis businesses to participate in the consultative surveys and training offered by KYSAFE. Please visit https://kysafe.ky.gov for more information.

3.6 Program Evaluation and Improvement

This step in the process helps establish a system of evaluating control measures for their continued effectiveness. Processes should be established to monitor program performance, verify program implementation, identify program deficiencies and opportunities for improvement, and take actions necessary to improve the program and overall safety and health performance.

3.7 Hierarchy of Controls

A number of control options exist when exposures or safety hazards are identified in the various occupational environments present in the medical cannabis industry. A well-known structure, the hierarchy of controls, has been successfully used to prevent worker injuries and illnesses in multiple industries.



3.8 Elimination and substitution

Recognized as the most effective controls at reducing hazards, these include eliminating a hazard altogether from a specific process or substituting a less hazardous activity or chemical for a more hazardous one. These are most successfully implemented at the process design or development stage.

3.9 Engineering controls

An engineering control is any change in facilities, equipment, tools, or process that eliminates or reduces a hazard. Engineering controls are designed to remove a hazard at its source before it comes into contact with the worker. Examples of engineering controls include process controls, isolation, and ventilation. Process controls involve changing the way a job or process is performed to make the work less dangerous (for example, using an electric motor instead of a diesel motor to eliminate exhaust emissions). Isolation controls keep employees isolated or physically removed from the hazard (for example, restricting employees from areas where intensive UV is being used).

3.10 Administrative controls

Administrative controls are measures an employer can implement to reduce employee exposure to hazards by changing the way they work. Examples include employee breaks and worker rotation.

3.11 PPE

One might assume the use of personal protective equipment (PPE) to control identified hazards is a first step in protecting workers in the medical cannabis industry. However, within the hierarchy, PPE is actually the least effective method compared to elimination, substitution, or engineering controls and administrative controls. One reason PPE is the least effective control method is because it requires reliance on the worker to ensure it is used consistently and correctly. However, when hazards cannot be controlled through other means, PPE plays an important part in protecting workers.

3.12 Medical screening and surveillance

Medical surveillance may be another strategy to optimize employee health. Medical screening is only one component of a comprehensive medical surveillance program. The purpose of screening is early diagnosis and treatment of the individual and has a clinical focus. Surveillance’s purpose is to detect and eliminate the underlying causes such as hazards or exposures of any discovered trends and thus has a prevention focus. Using both medical screening and surveillance techniques can assist with the early identification of potential health hazards.

4.0 Overview of Medical Cannabis Industry Workforce and Potential Hazards

Upon multiple worksite observations and discussions with industry representatives, Table 4.1 summarizes job titles and associated types of potential hazards observed in the medical cannabis industry. Given the rapid evolution of this industry, the nature of businesses may continue to expand and consequently job titles, tasks, and hazards will also change. These roles should be considered throughout the program to ensure potential hazards are adequately recognized and reduced.

Table 4.1: Common occupations and potential hazards in the medical cannabis industry

Job	Duties	Potential Hazards
Cultivator	Planting, transplanting, physically relocating plants, watering, nutrient mixing and feeding, mixing, and applying pesticides, cleaning, harvesting plants, drying plants, wasting material	Mold, sensitizers/allergens CO_2, CO, pesticides/fungicides, ergonomics, walking/ working surfaces, lighting hazards, chemical exposures, workplace violence machinery for waste
Trimmer/ Packager/ Shipping	Trimming, packaging, shipping, data entry, cleaning wasting material	Mold, asthma, sensitizers/allergens, pesticides, ergonomics, occupational injuries (cuts), chemical exposures, machinery, workplace violence
Grind room technician	Grinding material, handling material, wasting material	Mold, asthma, sensitizers/allergens, pesticides, ergonomics, occupational injuries, chemical exposures, machinery, workplace violence.
Extraction technician	Extracting medical cannabis concentrates, grinding material, wasting material	Machinery, IAQ, asthma, allergens, noise, ergonomics, chemical exposures, CO_2, use of explosive/ flammable chemicals such as butane, workplace violence
Edible producer, infused product confectioner/ artisan	Cooking, baking, packaging, bottling, and labeling medical cannabis infused products, wasting material	Occupational injuries (burns), noise, chemicals, workplace violence machinery
Budtender	Sales representative who sells medical cannabis and medical cannabis products to customers	Sensitizers/allergens, ergonomics, workplace violence
Laboratory technician	Operates laboratory equipment to determine cannabinoid and contaminant concentrations	Solvents, ergonomics, workplace violence machinery

Cultivation owner/ operator	In addition to running the business, may oversee and be involved in the functions of the grow operation	Sensitizers/allergens, mold, CO2, CO, pesticides/fungicides, high pressure machinery, IAQ, noise, chemicals, workplace violence
Administrative	Responsible for day-to-day operations of the business. May include marketing roles, financial roles, HR roles, retail store management	Ergonomics, workplace violence
Transportation	May transport product or money between growing and retail facilities	Occupational injuries, workplace violence
Maintenance (non-contracted)	Facilities maintenance, equipment maintenance, HVAC	Elevated heights, electrical hazards, workplace violence, mold, sensitizers, allergens, CO2, CO, pesticides, machinery, chemical exposure, flammable chemicals. possible exposure to all potential hazards identified in this table due to nature of this position working throughout a facility

Part II: Guide to Worker Safety and Health in the medical cannabis Industry

Section I: Hazards

1. Biological hazards

Biological hazards can arise from directly working with plants. Biological agents can include bacteria and fungi, mildew, and viruses that have the ability to adversely affect human health in a variety of ways, such as causing nasal congestion, throat irritation, and other physical health effects. A summary of the potential biological hazards that may be encountered in the medical cannabis industry is presented in Table I.1.

Table I.1 Summary of Potential Biological Hazards

Hazard Type	Hazard	Exposure level and/or applicable standards or guidelines	Health effects/ hazard	Controls
Biological	Mold, fungi and bacteria	WHO Guidelines for Indoor Air Quality: Dampness and Mold	Nasal congestion, throat irritation, coughing, wheezing, eye irritation, skin irritation, asthma	Good housekeeping (moisture and dampness control), engineering controls (local and general exhaust ventilation), PPE
	Sensitizers/ allergens (dermal)	Varies	Irritant contact dermatitis, allergic contact dermatitis,	Medical surveillance, good housekeeping, proper PPE
	Sensitizers/ allergens (respiratory)	Varies	Itchy, runny, or congested nose, sneezing, coughing, wheezing, asthma	Engineering controls, proper PPE

I.1.1 Mold

Medical cannabis production requires increased levels of humidity, which have been found to be as high as 70 percent. This increased humidity in the presence of organic material promotes the growth of mold.

Although high humidity and moist soil or other growth material may be optimal for growth of the medical cannabis plants, these conditions also promote mold and bacteria in the soil or other growth material. Moist soil is the natural breeding material for mold whether the soil is outdoors or indoors. As a part of good greenhouse management, consider the feasibility of either replacing or using high heat sterilization, including autoclave methods, of the soil each time new crop cycles are planted. This process will help to remove the mold spores and bacteria from the soil if it is reused from one crop growth cycle to the next.

Another method of sterilization of soil and other items at a cultivation facility is the use of irradiation. By using irradiation, it causes the potential for radiation poisoning to employees that work in a cultivation facility. To remediate raw plant material that has failed mold/microbials testing, some cultivators will use an irradiator, which often requires the cultivator to have a radiation officer and monitoring program. Sensors for those working directly with the machine and in surrounding rooms are necessary to confirm there is no leakage. 902 KAR 100:200 (Licenses and radiation safety requirements for irradiators) governs the process for registering and licensing "the possession or use of sources of ionizing or electronic product radiation and the handling and disposal of radioactive waste." The Department of Public Health (DPH) within CHFS is tasked with the registering and licensing process.

Previous studies of illegal indoor growing operations have reported elevated levels of airborne mold spores, especially during activities such as plant removal by law enforcement personnel. In this study, law enforcement personnel were exposed to levels of mold equivalent to a small to medium-sized mold remediation project. To date, there have not been similar studies of legal growing operations to determine the risk for mold exposure in the more controlled cultivation facility environments.

Scientific reviews by the Institute of Medicine (IOM) and WHO have indicated strong associations of exposure to indoor dampness related agents such as mold with health issues including wheezing, coughing, increased asthma symptoms, shortness of breath, and respiratory infections. A trained industrial hygienist can perform air monitoring to determine spore levels within the work environment. Special considerations may be needed for susceptible or immunosuppressed individuals. More research is needed to characterize and reduce potential exposures to mold and powdery mildew, including adverse effects on workers' respiratory and lung functions.

Job roles affected: Employees within the cultivation facility, drying, curing, bucking, and trimming rooms.

Hazard assessment: The facility should determine if the hazard is present and what controls or PPE might be needed for employee protection. Hazard assessments are contained within the Personal Protection Equipment Standard (**See Section II).**

Best practices:

- Implement water intrusion and mold mitigation practices in areas within the facility that might be prone to floods or have conditions that include standing water. Moisture control is the key to mold control on surfaces and within building structures.
- Implement engineering controls and work practices to control or eliminate exposure to mold (for example, vacuuming rather than sweeping and ventilation).
- Consider the feasibility of either replacing or using high heat sterilization of the soil each time new crop cycles are planted. This process will help to remove the mold spores and bacteria from the soil if it is reused from one crop growth cycle to the next.
- Conduct a PPE assessment to determine the need for respiratory protection, skin and eye protection, or protective clothing.
- In the absence of mold sampling data, consider respiratory protection for any dusty operations and for employees reporting even mild respiratory symptoms.
- Consider gloves for employees whose jobs require direct handling of plants.
- Ensure employees are trained in the proper use of PPE.
- If an employee develops moderate to severe respiratory symptoms, they should be medically evaluated and removed from the agent that caused the reaction.

State/ federal standards:

- There are no specific standards for mold. Refer to Kentucky OSH General Duty Clause Kentucky Revised Statutes KRS Chapter 338, Section 338.031 Obligations of employers and employees. (1) Each employer: (a) Shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees; (b) Shall comply with occupational safety and health standards promulgated under this chapter. (2) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this chapter which are applicable to his own actions and conduct. Link
- Also see OSHA General Duty Clause - Section 5 (a)(1) of the Occupational Safety and Health Act (OSHA) 1970 - Employers are required to provide their employees with a place of employment free from recognizable hazards that are causing or likely to cause death or serious harm to employees. Link

Resources for program development:

- WHO-Guidelines for Indoor Air Quality: Dampness and Mold: Link

- EPA-Mold Remediation in Schools and Commercial Buildings Guide: Link
- OSHA-A Brief Guide to Mold in the Workplace: Link
- KEEC-Kentucky Energy and Environmental Cabinet: Link
- OSHA-PPE Booklet: Link

I.1.2 Sensitizers/Allergens

Case reports in the medical literature have described episodes of allergic reactions, hypersensitivity, and anaphylaxis to medical cannabis. Skin contact through personal handling of plant material or occupational exposure has been associated with hives, itchy skin, and swollen or puffy eyes. As with most sensitizers, initial exposure results in a normal response, but over time, repeated exposures can lead to progressively strong and abnormal responses. All of the hierarchy of controls can be used to help eliminate or reduce the effects of sensitizers or allergens.

Job roles affected: Employees who have direct contact with the medical cannabis plants.

Hazard assessment: Jobs roles that include coming in direct contact with plants should be evaluated and a PPE assessment completed. Hazard assessments are contained within the Personal Protection Equipment Standard (**See Section II).**

Best practices:

- The most effective exposure control is to eliminate the exposure, but this approach may not work in all situations.
- Engineering controls such as local ventilation can assist in controlling airborne exposures to dusts or chemical mists or vapors.
- Exposure controls at the worker level include work scheduling, job rotation, and worker training. Determine if direct contact with plants can be controlled first by the above mentioned elimination, engineering, or administrative control. Conduct a PPE assessment to determine the need for respiratory protection, skin and eye protection or protective clothing.
- Consider gloves for employees whose jobs require direct handling of plants.
- If an employee develops a rash they should be medically evaluated and removed from the agent that caused the reaction.

State/ federal standards:

- No specific standards to sensitizers/ allergens. Refer to Kentucky OSH General Duty Clause Kentucky Revised Statutes KRS Chapter 338, Section 338.031 Obligations of employers and employees. (1) Each employer: (a) Shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees; (b) Shall comply with occupational safety and health standards promulgated under this chapter. (2) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this chapter which are applicable to his own actions and conduct. Link
- Also see OSHA General Duty Clause-Section 5 (a)(1) of the Occupational Safety and Health Act

(OSHA) 1970 - Employers are required to provide their employees with a place of employment free from recognizable hazards that are causing or likely to cause death or serious harm to employees. Link

- OSHA-PPE General Requirements: Link

Resources for program development:

- OSHA-PPE Booklet**:** Link

2. Chemical Hazards

Chemical hazards pose a wide range of safety and health hazards. As discussed below, in order to ensure chemical safety in any workplace, information about the identities and hazards of the chemicals must be available and understandable to workers. A summary of some of the potential chemical hazards that may be encountered in the medical cannabis industry is presented in **Table I.2**.

Table I.2: Summary of Potential Chemical Hazards

Hazard	Exposure level and/or applicable standards or guidelines	Health effects/ hazards	Controls
Carbon dioxide (CO_2)	OSHA PEL 5,000 ppm TWA	Asphyxiation, burns	Engineering controls, administrative controls (alarms/sensors), PPE
Carbon monoxide (CO)	OSHA PEL 50 ppm TWA	CO poisoning	Engineering controls, administrative controls (alarms/sensors)
IAQ (Volatile organic compounds)	Varies depending on the VOC	Eye, nose and throat irritation, headaches, vomiting, dizziness, worsening asthma symptoms	Engineering controls (e.g., proper ventilation), administrative controls (e.g., proper handling and use), PPE
Pesticide	EPA Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) EPA Worker Protection Standard 40 CFR Part 170 OSHA Hazard Communication 29 CFR 1910.1200 Kentucky Pesticide Applicators' Act of 1996 (KRS 217b) and its Associated Rules	Pesticide poisoning - effect varies depending on the nature of the pesticide; nervous system effects, skin or eye irritation, endocrine disruption, cancer	Engineering controls, administrative controls [e.g., standard operating procedures (SOPs)], PPE, Worker Protection Standards
Disinfectants / cleaning chemicals	OSHA Hazard Communication 29 CFR 1910.1200. Disposal may be regulated under Resource Conservation and Recovery Act (RCRA)	Respiratory or skin irritation, burns, irritation of eyes, asthma, improper mixing of chemicals can cause severe lung damage or asphyxiation.	Engineering controls (ventilation), administrative controls (substitution), PPE
Nutrients-Corrosives	OSHA Hazard Communization 29 CFR 1910.1200 Disposal may be regulated under Resource Conservation and Recovery Act (RCRA)	Respiratory, skin or eye irritation, burns to the skin and/or eyes, asthma, improper mixing of chemicals can cause severe lung damage or asphyxiation.	Administrative controls (substitution), Engineering controls (ventilation), PPE

I.2.2 Carbon Monoxide (CO) and Cardon Dioxide (CO2)

Carbon monoxide (CO) is a colorless, odorless, toxic gas which interferes with the oxygen-carrying capacity of blood. At elevated concentrations, CO can overcome persons without warning. Many people die from CO poisoning, usually while using gasoline powered tools and generators in buildings or semi-enclosed spaces without adequate ventilation. Severe carbon monoxide poisoning can cause neurological damage, illness, coma and death. Sources of carbon monoxide exposure include furnaces, hot water heaters, portable generators/ generators in buildings; concrete cutting saws, compressors; forklifts, power trowels, floor buffers, space heaters, welding, and gasoline powered pumps. Additionally, it is beneficial to train employees on the health effects associated with carbon monoxide, so they are able to recognize symptoms in themselves or co-workers. Symptoms include headache, fatigue, confusion, palpitations, shortness of breath, drowsiness that can lead to unconsciousness, and death.

Jobs affected: Employees within the cultivation facility, employees in areas where generators may be running or indoor equipment is being used.

Hazard assessment: The facility should determine if the hazard is present and if ventilation or PPE is needed for employees. Potential sources of CO should be evaluated. Hazard assessments are contained within the Personal Protection Equipment Standard (**See Section II).**

Best practices:

- Consider using tools (including power washers) powered by electricity or compressed air, if available.
- Implement engineering controls to reduce environmental concentrations to permissible exposure levels. Install an effective ventilation system that will remove CO from work areas.
- Do not use generators or gasoline powered engines indoors.
- Make sure space heaters or stoves are in good working order to reduce CO buildup and are not used in enclosed spaces.
- Install CO monitors with audible alarms.
- Establish a preventative maintenance program for all natural gas, propane, and gasoline powered equipment.
- Educate workers about the sources and conditions that may result in CO poisoning as well as the symptoms and control of CO exposure

State/ federal standards:

- Carbon monoxide has a PEL of 50 ppm (55mg/m^3)

- Hazard Communication Standard **29 CFR 1910.1200:** Link

Resources for program development:

- CDC-Occupational Health Guideline for Carbon Monoxide: Link
- CDC-Carbon Monoxide Fact Sheet: Link
- OSHA-Quick Card-Carbon Monoxide Poisoning: Link
- OSHA-Fact Sheet-Carbon Monoxide Poisoning: Link
- OSHA-Portable Generators: Link

Carbon dioxide (CO_2) is used in the medical cannabis industry to increase plant growth and to produce concentrates. In addition to the liquid gas form, solid carbon dioxide or dry ice can be used for extraction processes. Dry ice converts directly to carbon dioxide gas and can be hazardous to workers if not handled properly. In addition, CO_2 might be used in compressed gas form for enrichment. Compressed gases can present a physical hazard that is described in this guideline under "Compressed gas" and has additional safety regulations that must be adhered to.

In normal concentrations, CO_2 does not pose a health hazard. However, at high concentrations, CO_2 acts as a simple asphyxiant. A simple asphyxiant is a gas or vapor that displaces oxygen. Most commercial CO_2 systems are equipped with monitoring devices that will sound an alarm if an unsafe level of CO_2 is detected in an area. These systems must be properly maintained and calibrated.

Additionally, it is beneficial to train employees on the health effects associated with carbon dioxide, so they are able to recognize symptoms in themselves or co-workers. Symptoms include headache, dizziness, rapid breathing, increased heart rate that can lead to unconsciousness, and death.

Job affected: Employees within the cultivation facility.

Hazard assessment: The facility should determine if the hazard is present and if controls or PPE are needed for employee protection. Hazard assessments contained within the Personal Protection Equipment Standard (**See Section II).** Carbon dioxide has an OSHA permissible exposure limit (PEL) of 5,000 ppm TWA.

Best practices:

- Install CO_2 monitoring devices in areas where concentrations of CO_2 might be elevated.
- Implement engineering controls to maintain environmental concentrations below permissible exposure levels.
- Ensure CO_2 safety data sheet (SDS) is accessible to employees and part of a hazard communication plan.

- Use gloves (and safety glasses) when handling dry ice to avoid contact with skin or eyes.
- Do not use or store dry ice in confined areas, walk-in refrigerators, environmental chambers or rooms without ventilation. A leak in such an area could cause an oxygen-deficient atmosphere.
- Educate workers about the sources and conditions that may result in CO_2 overexposure as well as the symptoms and control of CO_2 exposure.

State/ federal standards:

- Carbon dioxide has an OSHA PEL of 5,000 ppm (9,000 mg/m^3) TWA.
- Hazard Communication Standard **29 CFR 1910.1200**: Link

Resources for program development:

- OSHA-Hazard Communication Information: Link
- OSHA-Hazard Information Bulletin- Potential Carbon Dioxide (CO_2) Asphyxiation Hazard when Filling Stationary Low Pressure CO_2 Supply Systems: Link
- OSHA-Quick Facts-Cryogens and Dry Ice: Link

I.2.3 Indoor Air Quality (IAQ)

Workers may encounter ozone as a product of the chemical reaction of nitrogen oxides and volatile organic compounds (e.g., terpenes emitted from the medical cannabis plant) present inside a cultivation facility. Nitrogen oxides may enter the facility, depending on the location of air intake and proximity to major highways. Terpenes and nitric oxides are associated with eye, skin and mucous irritation.

Ozone generators may also be found in facilities for odor control. Ozone can cause decreased lung function and/or exacerbate pre-existing health effects, especially in workers with asthma or other respiratory complications. More research is needed to characterize potential exposures to ozone, nitrogen oxides, and volatile organic compounds in medical cannabis cultivation operations.

Conditions within a grind room include dangers of small particulates in the air. Very small particles can be inhaled into the deeper regions of the lungs and therefore become lodged there to increase breathing difficulty and complications and cause lung damage. Increased supply of outside air, timely exchanges of air filtration devices and increased air exchanges within the grind room are good engineering controls. Employee use of respirators will also reduce the employee exposure to these very small particles.

Job roles affected: Employees working in indoor environments may be subject to IAQ issues at any time.

Hazard assessment: Ensure HVAC systems are adequate for the facility where they are located. Many IAQ problems result from poor ventilation (lack of outside air), problems controlling temperature, high or low humidity, recent remodeling, and other activities in or near a building that can affect the fresh air coming into the building. Sometimes, specific contaminants like dust from construction or renovation, mold, cleaning supplies, pesticides, or other chemicals may cause poor IAQ.

Best Practices:

- Ensure HVAC systems are appropriately sized and working effectively.
- Provide appropriate ventilation where chemicals are used indoors.
- Respiratory protection should be used as appropriate (**See Section II**).
- Establish a process for IAQ complaints and how they will be addressed.

State/ federal standards

- There are no OSHA standards for IAQ. Specific chemicals used may have OSHA PELs that need to be monitored: Link
- NIOSH has Recommended Exposure Levels (RELs): NIOSH Pocket Guide to Chemical Hazards: Link

- Consensus Standards: American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE): ANSI/ ASHRAE Standard 62.1-2004: Ventilation for Acceptable Indoor Air Quality: Link

- Consensus Standards**:** ACGIH TLVs

Resources for program development:

- OSHA-IAQ Investigation methods: Link

- EPA-An Office Building Occupants Guide to Indoor Air Quality: Link

- EPA-IAQ building Education and Assessment Model (IBEAM)-Diagnosing and Solving Problems: Link

I.2.4 Pesticides

Medical cannabis cultivation facilities may have insecticides and fungicides used within the facility in accordance with 915 KAR 1:030. Some pesticides have been associated with dermal and respiratory toxicity for the workers who apply them. Workers applying pesticides without proper personal protective equipment may be placing themselves at risk. Applicators need to know the product, **use the product according to the label**, and understand the product's toxicity. Unlabeled or unknown products should never be used and would be a violation of Kentucky State Law, under the Pesticide Applicators' Act, to do so. Depending on the pesticide used, requirements from 40 CFR Part 170 (also known as the EPA's Agricultural Worker Protection Standard or WPS) may need to be implemented. When a pesticide product has labeling that refers to the WPS, WPS codes will be enforced. The WPS requires that owners and employers on agricultural establishments:

- Provide protections to workers and handlers from potential pesticide exposure;
- Provide training on the safe use of pesticides;
- Provide training on how to avoid exposures to pesticides; and
- Are able to identify pesticides exposure symptoms and how to respond and manage exposures to pesticides if they occur.

The WPS is an extensive rule that all agricultural establishments must comply with. The Kentucky Department of Agriculture can provide information specific to the WPS at (502) 573-0282 or link.

The Kentucky Medical Cannabis Program has adopted rules setting criteria for allowable pesticide use in the cultivation of medical cannabis in Kentucky. See 915 KAR 1:030, Section 8. The Kentucky Medical Cannabis Program's "Notice re Pesticides and Other Chemical Applications for Use in the Growing and Cultivating of Medicinal Cannabis in Kentucky" is also available on the program's website, kymedcan.ky.gov. This notice will be reviewed and updated by the program on a regular basis.

In addition to reading and following labels for correct pesticide use, labels should also be followed for the proper disposal of pesticide containers.

Job roles affected: Employees within the cultivation facilities. If WPS is referenced on the pesticide label, the WPS standard covers pesticide handlers, meaning those who mix, load, or apply agricultural pesticides; clean or repair pesticide application equipment; or assist with the application of pesticides. The WPS standard also covers agricultural workers, meaning those who perform tasks related to growing and harvesting plants in greenhouses or nurseries.

Hazard assessment: Hazard assessment for pesticide use should involve the following:

- Reading the product label and determining the hazard class of the pesticide from the human hazard signal word that is found on the label (caution, warning, or danger);

- Confirming what precautions must be considered when using the products to protect workers, the public, and the environment. This includes a PPE assessment for workers and handlers;
- Determining whether the WPS provisions apply and any associated re-entry intervals, storage and disposal requirements.

Best practices:

- Service containers should be labeled with the name of the product, active ingredient, EPA registration number, and each and every human hazard signal word.
- Pesticides must be used pesticides in a manner consistent with their label.
- All pesticide containers should be dedicated to a single product type or intended pest use if the products are compatible (e.g., insecticides, fungicides, herbicides).
- Maintain safety data sheets (SDS) for each product in a hazard communication plan (**Section II**).
- Ensure on a routine basis that only pesticides permitted by the Kentucky Department of Agriculture are used.
- Ensure waste management procedures are consistent with the pesticide label requirements, EPA requirements for pesticide disposal and Kentucky's Agricultural Chemicals and Groundwater Protection Program.
- Ensure programs are in compliance with EPA's Agricultural Worker Protection Standard guidelines.
- Evaluate the use of administrative or engineering controls. If administrative or engineering controls cannot be effectively implemented, PPE needs should be assessed.

State/federal standards:

- 915 KAR 1:030, Section 8: Link
- The Kentucky Medical Cannabis Program's *Notice re Pesticides and Other Chemical Applications for Use in the Growing and Cultivating of Medicinal Cannabis in Kentucky*: Link
- KRS Chapter 217B: Link
- Kentucky Department of Agriculture, Division of Environmental Services: Link
- EPA-Requirements for Pesticide Disposal: Link
- Summary of the Federal insecticide, Fungicide, and Rodenticide Act (FIFRA): Link

- Hazard Communication Standard 29 CFR 1910.1200: Link
- ECFR-Worker Protection Standard: Link
- EPA-Quick Reference Guide and manual on How to comply with the Worker Protection Standard: Link
- Link

Resources for program development:

- EPA-Occupational Pesticide Safety and Health: Link
- EPA-Agricultural Worker Protection Standard (WPS): Link

I.2.5 Disinfectants / Cleaning Chemicals

Employers must provide safe working conditions for employees using cleaning chemicals. Even if store bought household disinfectants and cleaners are used employees should be warned of their potential hazards. EPA-registered antimicrobials fall under pesticide registration and must be used in a manner consistent with the product labeling. These chemicals should be a part of the facility hazard communication plan (**Section II**). When chemicals such as bleach are used routinely, they can be corrosive to surfaces and could affect employees using the products by causing respiratory and skin irritation. In addition, injuries with spills and splashes can occur when cleaning. There are a variety of cleaning and disinfectant chemicals on the market. The least hazardous cleaning chemical that best suits the purpose for which it will be used should be chosen. If sanitizing or disinfecting is necessary, the product purchased should be effective against the microorganisms being targeted. These products are primarily intended for use as hard surface disinfectants, they are not intended to be applied directly to crops to control pest problems. Use in a manner inconsistent with the labeling would be a violation of the Kentucky Pesticide Applicators' Act.

Job roles affected: Employees who are responsible for housekeeping and anyone using disinfectants or cleaning chemicals.

Hazard assessment: Hazard assessment for disinfectants and cleaners should involve selection of the least hazardous chemical, ensuring safe working conditions exist, such as adequate ventilation, for employees using cleaning chemicals, and PPE compatibility and accessibility is assessed. Hazard assessments are contained within the Personal Protection Equipment Standard (**See Section II).**

Best practices:

- Choose safer cleaning chemicals that meet the cleaning/disinfecting needs.
- Ensure Safety Data Sheets (SDS) are provided, and cleaning chemicals are labeled to identify their contents and hazards per hazard communication standards.
- Warn employees not to mix cleaning products that contain bleach and ammonia.
- Ensure workers know which chemicals must be diluted and how to correctly dilute the cleaners they are using.
- Provide training on the use, storage, and emergency spill procedures for cleaning chemicals.
- Operate ventilation systems as needed during cleaning tasks to allow sufficient airflow and prevent buildup to hazardous vapors.
- Review PPE needed such as gloves and goggles.
- Provide areas where employees can wash up after using cleaning chemicals.

- Provide eyewash stations if corrosive cleaning chemicals are being handled.

State / Federal Standards

- Hazard Communication Standard 29 CFR 1910.1200: Link
- Resource Conservation and Recovery Act (RCRA): Link

Resources for program development:

- OSHA-NIOSH Info Sheet: Protecting Workers Who Use Cleaning Chemicals: Link
- OSHA-Cleaning Chemicals and Your Health: Link
- OSHA-Health and Safety Topics-Cleaning Industry: Link

I.2.6 Nutrients and Corrosive Chemicals

Cultivation facilities may encounter corrosive chemicals in the mixing of nutrients used for plant growth. Corrosives are materials that can attack and chemically destroy exposed body tissues. Corrosives can also damage or even destroy metal. The stronger or more concentrated, the corrosive material is and the longer it touches the body, the worse injuries can be. Corrosive materials can severely irritate, or in some cases, burn the eyes. Skin can become badly burned or even blister on contact with corrosive chemicals. Respiratory hazards can also occur from breathing in corrosive vapors or particles that irritate or burn the inner lining of the nose, throat and lungs.

Most corrosives are either acids or bases. Common acids include hydrochloric acid, phosphoric acid, sulfuric acid, nitric acid, chromic acid, acetic acid and hydrofluoric acid. Common bases are ammonium hydroxide, potassium hydroxide, and sodium hydroxide. Chemicals used in both liquid and solid forms should be a part of a hazard communication plan (**Section II**) and should be stored away from incompatible materials.

Job roles affected: Employees in cultivation areas. Employees who mix plant nutrients.

Hazard Assessment: Hazard assessment for nutrients and chemicals used should involve selection of the least hazardous chemical. Ensure safe working conditions, such as adequate ventilation, for employees using corrosive chemicals, and assess PPE compatibility and accessibility. Hazard assessments are contained within the Personal Protection Equipment Standard (**See Section II).**

Best practices:

- Substitute with a less hazardous material where possible.
- Ensure safety data sheets (SDS) are provided, and nutrients and corrosive chemicals are labeled to identify their contents and hazards per hazard communication standards.
- Provide training on the use, storage, and emergency spill procedures for corrosives.
- Operate ventilation systems to assist in the removal of corrosive vapors, fumes, mists, or airborne dusts from the workplace. Use corrosion-resistant construction in ventilation systems for corrosive materials.
- Inspect all incoming containers of corrosives to ensure they are undamaged and properly labeled before storing them.
- Store corrosives in the type of containers recommended by the manufacturer or supplier. Corrosives can destroy containers made of improper materials.
- Segregate acids from bases when storing corrosives. Segregate inorganic oxidizing acids (e.g., nitric acid) from organic acids (e.g., acetic acid), flammables, and combustibles.

- Segregate acids from water reactive metals such as sodium, potassium, and magnesium.
- Store corrosives on lower shelves at least below eye level and in compatible secondary containers.
- Do not store corrosives on metal shelves.
- Review PPE needed such as gloves and goggles. Ensure PPE is compatible with the chemical(s) being handled.
- Ensure employees are trained on how to appropriately use PPE.
- Provide areas where employees can wash up after using chemicals.
- Provide eyewash stations in areas where corrosive chemicals are being handled.

State/federal Standards:

- Hazard Communication Standard 29 CFR 1910.1200: Link
- Medical Services and first aid-1910.151
- Also see 803 KAR 2:310 for employers with 8 or more employees.
- Resource Conservation and Recovery Act (RCRA): Link

Resources for program development:

- NIOSH-Occupational Health Guidelines for Chemical Hazards: Link
- OSHA-Solutions-Acid and Caustic Solutions: Link
- KYSAFE-Emergency Eyewash and Shower: Link
- KYSAFE-SWS Eyewash Update Webinar: Link

3. Physical Hazards

Physical hazards include hazards that might exist within the workplace that can cause physical harm or injury. Many of the hazards listed below have different regulations and work practices that should be followed to ensure a safe work environment. A summary of the potential physical hazards that may be encountered in the medical cannabis industry is presented in **Table I.3**.

Table I.3: Summary of potential physical hazards

Hazard	Exposure level and/or applicable standards or guidelines	Health effect	Controls
Compressed gases	Compressed gases -29 CFR 1910. 101 Also see 803 KAR 2:312	Explosion hazards, fire	Administrative controls (proper use and handling)
Occupational Injuries (sharp objects, hot/cold surfaces)	OSHA General Duty Clause 5(a)(1) Also see KRS Section 338.031 KY OSH General Duty Clause	Cuts, burns, infection	Engineering controls, administrative controls, PPE
Ergonomics, body Mechanics	OSHA General Duty Clause 5(a)(1) Also see KRS Section 338.031 KY OSH General Duty Clause	Muscle, nerve, and tendon injury	Engineering controls, administrative Controls
Workplace violence	OSHA General Duty Clause 5(a)(1) Also see KRS Section 338.031 KY OSH General Duty Clause	Injury, mental health effects	Engineering controls, administrative Controls
Walking working Surfaces	OSHA Standard 1910 Subpart D Also, KY OSH Standard 803 KAR 2:303	Slips, trips, and/or falls	Engineering controls, administrative controls
Working at heights	OSHA Standard 1910.24- 1910.29 1910 Subpart F	Fall from heights	Engineering controls, administrative controls, PPE (fall protection)
Electrical	OSHA Standard 1910 Subpart S Also see 803 KAR 2:318 if lock cannot be attached, use tagging procedures	Burns, shock, electrocution	Engineering controls, administrative controls, PPE

Noise	85 dBA (action level for 8 hr TWA/ OSHA Standard 1910.95 / 90 dBA TWA	Temporary or permanent hearing loss	Engineering controls, administrative controls, PPE
Environment	OSHA Standard 29 CFR 1910 Subpart E; 29 CFR 1910.39; 29 CFR 1910.38	Fire, natural disasters, extreme weather	Engineering controls, administrative controls
Powered industrial trucks (PITs)(forklifts)	OSHA standard 1910.178 Also see 803 KAR 2:313 Also see 803 KAR 2:325	Driving accidents, accidents involving heavy/ awkward loads	Engineering controls, administrative controls
Lighting hazards	OSHA General Duty Clause 5(a)(1) Also see KRS Section 338.031 KY OSH General Duty Clause	Eye and skin Damage, UV light	Engineering controls, Administrative controls, PPE
Machines	OSHA Standard 1910.212 Also see 803 KAR 2:314	Burns, explosions, hand injury, entrapment	Engineering controls, administrative controls, PPE
Extraction equipment	Local building codes	Burns, explosions, fire, injury	Engineering controls, administrative controls, PPE
Confined spaces	OSHA Standard 1910.146	Entrapment, asphyxiation, engulfment, injury	Engineering controls, administrative controls

I.3.1 Flammable / Combustible Liquids

Flammable and combustible liquids are liquids that can burn. Flammable and combustible liquids are present in almost every workplace, including the medical cannabis industry. Fuels and products such as solvents, thinners, cleaners, adhesives, paints, waxes, and polishes may be flammable or combustible liquids. They are classified, or grouped, as either flammable or combustible based on their flashpoints. In general, flammable liquids will ignite and burn easily at normal working temperatures (below 37.8℃ (100°F)). Combustible liquids have the ability to burn at temperatures that are usually above working temperatures (above 37.8 ℃ (100 °F) and below 93.3℃ (200°F). Containers of Category 1 or 2 flammable liquids or Category 3 flammable liquids with a flashpoint below 100°F (37.8°C) are required to be bonded and grounded. Bonding and grounding should always be used when dispensing flammable liquids as well.

Job roles affected: Processors and anyone who might handle or be around flammable or combustible liquids within a facility.

Hazard assessment: Hazard assessment for work involving flammable liquids should thoroughly address the issues of proper use and handling, fire safety, chemical toxicity, storage, and spill response. This can be completed by conducting a chemical inventory and reviewing the SDS for each chemical that can help to determine the proper handling, use of the chemical and procedures to follow in the event of a spill or chemical release.

Best practices:

- Eliminate, substitute with less flammable chemicals or reduce the quantities of flammable liquids being used if possible.
- Ensure safety data sheets (SDS) for flammable liquids are included in a hazard communication plan (**Section II**).
- Conduct a PPE assessment and ensure PPE is worn as indicated on the SDS (**Section II**).
- Understand that storage requirements for flammable liquids have quantity and compatibility requirements.
- Understand bonding and grounding requirements for transfer of flammable liquids.
- Work with flammable liquids in a chemical fume hood.
- Keep flammable liquid containers closed when not in use.
- Use only closed-loop type LPG extraction equipment.
- Limit quantities of flammable liquids to the amount necessary for the work in progress.

- Implement flammable gas monitoring through the use of a hand-held combustible gas meter/ leak detector (for facilities engaged in extraction processes).

- Develop an emergency action plan (**Section II**) and fire protection plan (**Section II**) and know the locations of fire alarms, pull stations, fire extinguishers, safety showers, and other emergency equipment.

State/ federal standards:

- Flammable liquids-29 CFR 1910.106: Link

- Also see 803 KAR 2:307 hazardous materials-Portion of property where motor fuel stored and service of tires, batteries, etc.

- Flammable liquids-29 CFR 1926.152: Link

Resources for program development:

- NFPA-30 FAQ**s:** Link

- CDC-Safety Guidelines for n-Butane: Link

- OSHA-Transitioning to Safer Chemicals: Link

- OSHA-Fire Safety for employers: Link

- OSHA-Flammable liquid training slides: Link

I.3.2 Compressed Gas

Compressed gas in the medical cannabis industry can consist of gases used such as CO_2 for enrichment purposes or gasses used for extraction processes. Large quantities of compressed gas in facilities with improper training and inadequate procedures can pose a serious threat to employee safety. All compressed gases are hazardous because of the high pressures inside the cylinders. Most cylinders have safety-relief devices. These devices can prevent rupture of the cylinder if internal pressure builds up to levels exceeding design limits. However, gas can be released deliberately by opening the cylinder valve, or accidentally from a broken or leaking valve or from a safety device. There have been many cases in which cylinders have become uncontrolled rockets or pinwheels and have caused severe injury and damage. In addition, pressure can become dangerously high if a cylinder is exposed to fire or heat, including high storage temperatures.

Job roles affected: Extraction technicians and anyone using or handling compressed gases.

Hazard assessment: A hazard assessment for work involving compressed gasses should thoroughly address the issues of proper use and handling, fire safety, chemical toxicity, storage, and spill response.

Best practices:

- Substitute or find a less hazardous substitute if possible.
- Know and understand the properties, uses, and safety precautions of the gases or gas mixtures being used.
- Ensure safety data sheets (SDS) are available for the gases at the facility.
- Ensure cylinders have one or more safety-relief devices.
- Ensure compressed gases are stored upright and immobilized by chains or other means to prevent them from being knocked over. When not in use, ensure cylinder caps are in place.

State/ federal standards:

- Compressed gases -29 CFR 1910. 101: Link

Resources for program development:

- NIOSH-Compressed Gases-Self inspection checklist: Link

I.3.3 Occupational Injuries

Employees in any industry are susceptible to potential injury (work-related or not), which could be anything from slips, trips, or falls, to an auto accident or heart attack. Many minor injuries or health-related incidents that occur in the workplace can be treated immediately using first aid. In more severe cases, first aid, CPR, or the use of an Automated External Defibrillator (AED) can help reduce the long-term severity of an injury or incident by providing temporary treatment until professional help can be obtained. Some locations may be too far from immediate emergency services and need to have employees with first aid training.

To handle potential workplace injuries, employers must ensure medical personnel and adequate first aid supplies are available to workers. Procedures should be developed to ensure medical personnel are ready and available for advice and consultation on the overall employee safety and health condition in the workplace. In addition, suitable facilities for immediate emergency use should be provided if exposure to injurious or corrosive materials is possible. Facilities should also use a “universal precautions” approach to infection control to treat all human blood and certain body fluids as if they were known to be infectious for HIV, HBV and other bloodborne pathogens. This involves avoiding contact with bodily fluids by wearing non-porous articles such as gloves, goggles, and face shields.

Job roles affected: Common exposures for cuts include job roles that involve the use of trimmers and scissors, opening packages, and using knives for cutting tape and labels as well as other tasks. Burns can occur in operations involving food production, kitchens or when using cleaning chemicals. There is also the possibility of burns while changing tubing on compressed gases or from improper use of canned air.

Hazard assessment: Employers should make an effort to obtain estimates of emergency medical system (EMS) response times for all permanent and temporary locations and for all times of the day and night at which they have workers on duty, and they should use that information when planning their first-aid program. When developing a workplace first-aid program, it may help to consult the local fire and rescue service or emergency medical professionals for response-time information and other program issues.

Best practices:

- Develop a written first-aid plan.
- Ensure the ready availability of medical personnel for advice and consultation on matters of occupational health.
- Ensure employees have been provided with clear instructions on how to report their injuries and how and where to seek emergency medical attention.
- Have a person or persons within the facility who are adequately trained to render first aid as needed.
- Employees should be aware of universal precautions should an event occur where they may be

exposed to blood or bodily fluids in the workplace.

- Provide workplace first-aid kits that meet ANSI/ISEA Z308.1-2015 standards.
- Supply an automated external defibrillator (AED) at the workplace and provide training to employees on how to properly use the AED.
- If any workers are designated to perform first aid as a part of their job, they should be aware of the bloodborne pathogen risks and a bloodborne pathogen program should be developed.

State/federal standards:

- Medical Services and first aid–1910.151
- Also see 803 KAR 2:310 for employers with 8 or more employees.
- Bloodborne Pathogen Standard-1910.1030: Link

Resources for program development:

- First Aid-Best Practices Guide (OSHA): Link
- First Aid-Medical and First Aid Safety and Health Topic Page (OSHA): Link
- First Aid-First Aid Kit Minimum Requirements Checklist: Link
- OSHA-Fact Sheet-Bloodborne Pathogens Standard: Link

I.3.4 Ergonomics

Ergonomics is the study of how humans interact with manmade objects. The goal of ergonomics is to create an environment that is well-suited to a user's physical needs. It is an applied science concerned with designing and arranging things people use so the people and things interact most efficiently and safely. Employers are responsible for providing a safe and healthful workplace for their workers. In the workplace, the number and severity of musculoskeletal disorders resulting from physical overexertion and their associated costs can be substantially reduced by applying ergonomic principles.

Job roles affected: Job roles such as trimming medical cannabis leaves or manual cultivation activities have tasks that might present awkward postures, high hand forces, highly repetitive motions, repeated impacts, heavy, frequent or awkward lifting; or moderate-to-high hand-arm vibration may be at risk for cumulative trauma disorders (CTDs), repetitive stress injuries (RSIs) or musculoskeletal disorders (MSDs).

Hazard assessment: Employers are encouraged to conduct a worksite analysis to identify ergonomic hazards and conditions by tracking injury and illness records to identify patterns of trauma or strains associated with particular job tasks that may indicate the development of MSDs or CTDs. Once these job tasks are identified, a risk assessment can be performed to evaluate the risk for an MSD. Major risk factors that may lead to cumulative trauma disorders of the upper extremities (hands and arms) include:

- Forceful exertions
- Repetitive and/or prolonged activities
- Prolonged static postures
- Awkward postures of the body, including twisting the wrists and other joints to perform
- Continued physical contact with hard work surfaces, for example, table surfaces or edges; and inappropriate or inadequate hand tools

Best practices:

- Continued physical contact with hard work surfaces, for example, table surfaces or edges; and inappropriate or inadequate hand tools.
- Define clear goals and objectives for the ergonomic process, discuss them with their workers, assign responsibilities to designated staff members, and communicate clearly with the workforce.
- Involve workers to encourage a participatory ergonomic approach, where workers are directly involved in worksite assessments, solution development and implementation.

- Rotate employees to other jobs that use different muscle-tendon groups.
- Hire adequate numbers of employees to compensate for staff absences.
- Encourage by example and schedule stretch, rest, and movement breaks throughout the workday.
- Train line staff, supervisors and managers in proper ergonomic postures and techniques to ensure employees are aware of potential ergonomic problems.
- Provide workstations that encourage proper ergonomic postures.
- Provide tools designed for the task, in a variety of sizes to fit the various sizes of employees.
- Encourage early reporting of musculoskeletal disorders (MSDs).
- Ensure anti-fatigue mats are in a place where employees stand for extended periods of time.
- Ensure adjustable tables and chairs to accommodate a variety of body types.

State/ federal standards:

- No specific standards for ergonomics. Refer to Kentucky OSH General Duty Clause Kentucky Revised Statutes KRS Chapter 338, Section 338.031 Obligations of employers and employees. (1) Each employer: (a) Shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees; (b) Shall comply with occupational safety and health standards promulgated under this chapter. (2) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this chapter which are applicable to his own actions and conduct. Link
- Also see OSHA General Duty Clause - Section 5 (a)(1) of the Occupational Safety and Health Act (OSHA) 1970 - Employers are required to provide their employees with a place of employment free from recognizable hazards that are causing or likely to cause death or serious harm to employees. Link

Resources for program development:

- OSHA-Prevention of Musculoskeletal Disorders in the Workplace: Link
- NIOSH-Guide to Selecting Non-Powered Hand Tools: Link
- NIOSH-A Primer Based on Workplace Evaluations of Musculoskeletal Disorders: Link

I.3.5 Workplace Violence

There may be a false sense of security or general lack of awareness regarding workplace violence in the medical cannabis industry. The most obvious opportunity for violence is in growing operations and retail stores, due to the presence of large quantities of cash and product, the possibility of disgruntled employees, angry terminated employees, and a high-stress environment. Other routine activities such as moving large quantities of product between stores, transporting product in personal vehicles, and making trackable movements (times and routes) create opportunities for a violent offender to attempt robbery. Workplace violence can take many forms including verbal threats, threatening behaviors, or physical assaults. Violence can be committed by strangers, customers or clients, co-workers, or by personal relations.

Security in the medical cannabis industry is highly regulated by the Kentucky Medical Cannabis Program due to the potential for crime against businesses with large amounts of product and/or money on the premises. Specific regulations can be accessed at: Link

These regulations include the placement of alarms and video surveillance as well as specific requirements to maintain visitor logs in limited access areas and signage to indicate ingress and egress to limited access areas. However, that security should not interfere with employees' ability to exit the building in the event of an emergency, or with responders' ability to enter.

Job roles affected: According to OSHA, research has identified factors that may increase the risk of violence for some workers at certain worksites. Such job roles in the medical cannabis industry at increased risk of violence include retail roles, employees working alone or in isolated areas, employees transporting medical cannabis products and cash to retail facilities, and employees working late at night or in areas with high crime rates. However, security should be assessed for all roles within the industry.

Hazard assessment: Employers are encouraged to conduct an assessment of the workplace to find existing or potential hazard for workplace violence. By assessing worksites, employers can identify methods for reducing the likelihood of incidents occurring. This assessment can include analyzing and tracking records of violence at work, examining specific violence incidents carefully, surveying employees to gather their ideas and input, and periodic inspections of the worksite to identify risk factors that could contribute to injuries related to violence.

Best practices:

- Establish security requirements as outlined in 915 KAR Chapter 1.
- Implement a sign-in procedure for visitors as required by 915 KAR Chapter 1.
- Post applicable laws, such as those prohibiting assaults and stalking, in visible locations.
- Establish a zero-tolerance policy toward workplace violence. This policy should cover all workers, patients, clients, visitors, contractors, and anyone else who may come into contact with company personnel.

- Establish a clear policy for workplace violence, verbal and nonverbal threats and related actions. All personnel employed in the retail establishment should know the policy.
- Ensure no worker who reports or experiences workplace violence faces reprisals.
- Encourage workers to promptly report incidents and suggest ways to reduce or eliminate risks.

State/ federal standards:

- No specific standards for workplace violence. Refer to KRS 338.031 ("Obligations of employers and employees"): (1) Each employer: (a) Shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees; (b) Shall comply with occupational safety and health standards promulgated under this chapter. (2) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this chapter which are applicable to his own actions and conduct. Link
- Also see OSHA General Duty Clause - Section 5 (a)(1) of the Occupational Safety and Health Act (OSHA) 1970 - Employers are required to provide their employees with a place of employment free from recognizable hazards that are causing or likely to cause death or serious harm to employees. Link
- 915 KAR Chapter 1: Link

Resources for program development:

- ***OSHA-Safety and Health Topics: Workplace Violence***
- Example Workplace Security Plan: Link
- Workplace Violence Prevention Programs in Late-Night Retail Establishments: Link

I.3.6 Walking and Work Surfaces

Regardless of the industry someone works in, workers and visitors to facilities can all be prone to slip, trip, and fall hazards both indoors and outdoors. Some of the causes of slip, trip, and fall injuries include:

- Distracted walking (listening, playing, or talking on devices)
- Uneven floors
- Poor housekeeping (spills, slippery floors)
- Wet floors due to watering practices, nutrient mixing, and cold-water hash production
- Weather (wet/icy conditions)
- Clutter or loose cords
- Unsecured rugs and mats

Job roles affected: All employees are prone to slip, trip and fall hazards. A facility hazard assessment should be conducted to identify potential slip, trip, and fall hazards in the workplace, and these should be eliminated or modified to reduce the fall potential.

Hazard assessment: Both slips and trips result from some kind of unintended or unexpected change in the contact between the feet and the ground or walking surface. Good housekeeping, quality of walking surfaces (flooring), selection of proper footwear, and appropriate pace of walking are critical for preventing fall accidents.

Best practices:

- Ensure passageways, storerooms, and service rooms are kept clean and orderly in a sanitary condition.
- Maintain clean, dry floors as much as possible. Where wet processes are used, maintain drainage, and provide false floors, platforms, mats or other dry standing places.
- Keep floors and passageways free from protruding nails, splinters, holes, or loose boards.
- Clearly mark permanent aisles and passageways.
- Mark floor elevation change, noticeably to indicate the possible trip hazard.
- Develop a snow and ice removal program to reduce falls outdoors in winter weather.

- If electrical cords are used on a regular basis, install outlets so cords do not cross walkways.
- Provide proper lighting in all areas indoors and outdoors to reduce shadows, dark areas, and glare so trip hazards or surface irregularities are clearly visible. Replace non-working light bulbs promptly.
- Encourage employees to wear slip-resistant footwear.
- Guard floor openings with a cover, a guardrail, or equivalent on all sides.
- Make sure skylight screens can withstand a load of at least 200 pounds.
- All elevated working platforms over 4 feet from the ground must be protected on all sides with a guardrail.

State/ federal standards:

- 29 CFR 1910 Subpart D- Walking Working Surfaces: Link
    - 1910.23, Guarding floor and wall openings and holes: Link
    - 1910.24, Fixed industrial stairs: Link
    - 1910.30, Other working surfaces: Link
- 803 KAR 2:303 Walking Working Surfaces: Link

Resources for program development:

- OSHA-Safety and Health Topics-Walking/Working Surfaces: Link
- OSHA-eTool-Falls: Link
- NIOSH-Workplace Solutions: Link

I.3.7 Working at Heights

Falls from portable ladders (step, straight, combination and extension) are one of the leading causes of occupational fatalities and injuries. There are a number of ways employers can protect workers from falls, including using conventional means such as guardrail systems, safety net systems and personal fall protection systems, adopting safe work practices and providing appropriate training. Whether conducting a hazard assessment or developing a comprehensive fall protection plan, thinking about fall hazards before the work begins will help the employer manage fall hazards and focus attention on prevention efforts. If personal fall protection systems are used, particular attention should be paid to identifying attachment points and ensuring employees know how to properly use and inspect the equipment.

Job roles affected: Employees who use ladders and scaffolds, including step stools/ step ladders.

Hazard assessment: Determine which specific jobs, activities or areas expose employees to fall hazards. Determine if employees will be exposed to any of the following: unprotected sides and edges, leading edges, floor holes, portable ladders and stairways, working above dangerous equipment, working overhead, roof work, aerial lifts, and scaffolds.

Best practices:

- A standard railing or guard must be placed on every open-sided floor or platform that is four feet or more above adjacent floors or ground level. All open sides except where there is an entrance to a ramp, stairway, or fixed ladder must be guarded.
- When there is a break in elevation of 19 inches or more, and no ramp, runway, embankment, or personnel hoist is available, provide a stairway or ladder at all worker points of access.
- When there is only one point of access between levels, keep it clear of obstacles to permit free passage by workers.
- Develop a ladder safety, maintenance, and inspection program to ensure ladders are inspected prior to use and employees are trained on proper ladder safety.
- Ensure employee read and follow all labels/markings on the ladder and only use them for their designed purpose.
- Keep ladders free of oil, grease, or other slipping hazards.
- Avoid electrical hazards. Make sure employees know to look for overhead power lines before handling a ladder. Avoid using metal ladders near power lines or exposed energized electrical equipment.

- Make sure employees using ladders always maintain a three-point (two hands and a foot, or two feet and a hand) contact on the ladder when climbing.
- Use ladders only on stable and level surfaces unless they are secured to prevent accidental movement.
- Make sure aerial lifts and manlifts have inspection and maintenance programs that ensure their safe operation.
- Provide fall protection for accessing or working on rooftops and some overhead storage areas. Include fall protection for work conditions six feet or more above lower level This includes unprotected side edges, leading edges, and walking/working surfaces.

State/ federal standards:

- 29 CFR 1910 Subpart D-Walking Working Surfaces: Link
  - 1910.25, Portable wood ladders: Link
  - 1910.26, Portable metal ladders: Link
  - 1910.27, Fixed ladders: Link
  - 1910.28, Safety requirements for scaffolding: Link
  - 1910.29, Manually propelled mobile ladder stands and scaffolds (towers): Link
  - 1910 Subpart F, Powered platforms, manlifts, and vehicle-mounted work platforms: Link
  - 1910.66, Powered platforms for building maintenance: Link
- Also see 803 KAR 2:305 Powered Platforms, manlifts and vehicle mounted work platforms: Link

Resources for program development:

- OSHA-Fact Sheet-OSHA's Final Rule to Update, Align, and Provide Greater Flexibility in its General Industry Walking-Working Surfaces and Fall Protection Standards: Link
- OSHA-Stairways and Ladders-A Guide to OSHA Rules: Link
- OSHA-Quick Card-Portable Ladder Safety: Link
- OSHA-Scaffolding eTool: Link
- OSHA-Fact Sheet-Aerial Lifts: Link

I.3.8 Electrical

The cultivation of medical cannabis is a very energy intensive process. Common electrical hazards include the use of temporary wiring (e.g., extension cords), missing breakers, blocked electrical panels, improperly wired units, electricity use in high humidity and watering areas, improper repairs, unguarded fans, overloaded circuits, inadequate wiring, lack of training and general electrical safety. National electric codes as well as local building and fire codes should be applied to assist to eliminate the need for temporary wiring in a cultivation facility. Ensuring that electrical equipment and their power cords are in good working condition will reduce the potential of electrical shock and injury.

The OSHA lockout/tagout standard establishes the employer's responsibility to protect employees from hazardous energy sources on machines and equipment during service and maintenance. Information on developing a lockout/ tagout program is located in **Section II** of this document.

Job roles affected: Employees who may be working with or around electrical sources.

Hazard assessment: A hazard assessment of the workplace should be completed to develop a current listing of potential hazard areas, activities, or processes associated with electrical systems. This analysis will provide a basis for defining work-specific hazards associated with electricity and create a plan for hazard mitigation and employee training.

Best practices:

- Develop an electrical safety program based on the needs of the facility. Consider the following elements:
    - Bonding and grounding.
    - Overcurrent protection.
    - Installation in wet locations.
    - Flexible cords and cables.
    - Distribution panels and rooms.
    - Electrical guarding.
    - Working on or near live parts.
- Use only equipment that is approved by a nationally recognized testing laboratory.
- Do not modify extension cords or use them incorrectly.

- Use factory-assembled extension cord sets and only extension cords that are the three-wire type.
- Use only extension cords, connection devices, and fittings equipped with strain relief.
- Do not use extension cords as a substitute for permanent wiring.
- Use ground-fault circuit interrupters (GFCIs) on all 120-volt, single-phase, 15- and 20- ampere receptacles, or have an assured equipment grounding conductor program (AEGCP) where electrical outlets are located in damp or potentially wet.
- Use double insulated tools and equipment, distinctively marked.
- Visually inspect all electrical equipment before use.
- Remove from service any defective equipment.
- Remove from service any equipment with frayed cords, missing ground prongs, cracked tool casings and other deficiencies.
- Avoid standing in wet areas when using portable electrical power tools.
- Develop a written lockout/tagout program and ensure training is provided and an annual review is completed.

State/ federal standards:

- Electrical Protective Devices-29 CFR 1910.137: Link
- Control of Hazardous Energy-29 CFR 1910.147: Link
- Also see 803 KAR 2:309, provides additional requirements for Lock Out Tag Out energy isolation and control: Link
- Also see 803 KAR 2:318, provides additional requirements for 1910.333(b)(2)(iii)(c) if a lock cannot be attached, tagging procedures may be used: Link

Resources for program development:

- OSHA-Fact Sheet-Working Safely with Electricity: Link
- OSHA-Subpart S eTool: Link

- OSHA-Nationally Recognized Testing Laboratory Program-Acceptable Test Standards: Link
- NIOSH-Electrical Safety: Link
- LOTO- Tutorial: Link
- LOTO-Interactive Training Program: Link
- See **Section II** for lockout/tagout resources for program development.

I.3.9 Noise

OSHA estimates nearly 30 million workers every year are exposed to hazardous levels of noise. Exposure to hazardous levels of occupational noise can cause noise-induced hearing loss. Noise-induced hearing loss (NIHL) is a reduction in a person's ability to hear sound due to exposure to hazardous levels of noise. This damage can be irreversible. Noise levels can be variable within the different areas of cultivation facilities. Specific tools or machines that are being used can contribute to high noise levels in the facility.

To protect workers from NIHL OSHA has set an action level of 85 decibels (dbA). OSHA requires employers to institute a hearing conservation program when workers are exposed to noise levels at or above the action level of 85 dBA. An industrial hygienist or safety specialist can perform noise monitoring to determine noise levels within the work environment. Generally, if a job process or operation is occurring in an area where voices need to be raised from a normal conversations sound level, these areas may be above the action level of 85 dBA and warrant further investigation.

Job roles affected: Employees working with or around loud machinery such as around power tools, compressors, or woodchippers.

Hazard assessment: Monitor and document sound levels in areas where noises cause a worker to raise his or her voice above normal conversation levels to be heard. Personal monitoring with dosimeters can also assess noise levels encountered by employees.

Best practices:

- Eliminate the noise source if possible. Substitution of the loud equipment for quieter equipment if elimination cannot be achieved. Noise controls should minimize or eliminate sources of noise; prevent the propagation, amplification, and reverberation of noise.
- Maintain tools and equipment routinely (such as lubricate gears).
- Reduce vibration where possible.
- Isolate the noise source in an insulated room or enclosure.
- Place a barrier between the noise source and the employee.
- Control exposure by changing work schedules to reduce the amount of time any one worker spends in the high noise area.
- Use hearing protectors such as earplugs or earmuffs.
- Implement a hearing conservation program as required by OSHA if levels are at or above the

action level of 85 dBA. (See **Section II)**

State/ federal standards:

- Occupational Noise Exposure-29 CFR 1910.95: Link

Resources for program development:

- OSHA-OSHA's Program Guide: Link
- See **Section II** for additional resources for program development.

I.3.10 Emergencies

Emergencies such as fires and natural disasters can be a hazard in any industry. The most important aspect of preparation is ensuring prevention programs are put in place. Facilities need to have an Emergency Action Plan (EAP) as required by OSHA. Emergency Action Plans (EAPs) should clearly establish employee roles and responsibilities, evacuation routes, and meeting locations during an emergency. Routine fire department inspections will help ensure compliance with fire extinguishing and sprinkling facility code requirements. It is essential to know where fire suppression systems are located and how to use fire extinguishers. Natural disasters such as tornados and potential workplace violence situations such as active shooter situations should also be covered in an emergency action plan.

Job roles affected: All workers should participate and be aware of emergency action plans.

Hazard assessment: In most circumstances for fires, immediate evacuation is the best policy, especially if professional firefighting services are available to respond quickly. There may be situations in which employee firefighting is warranted to give other workers time to escape or to prevent danger to others by the spread of a fire. Shelter-in-place might be warranted in the case of a tornado.

Consider including active shooter scenarios in the EAP. See **Section II** for additional fire protection policy and Emergency Action Plan guidance.

Best practices:

- Determine the facility's emergency hazards, including the building, geographic area, population, and potential natural or manmade emergency situations.
- Determine which emergency conditions may require shelter-in-place.
- Establish a clear chain of command and designate a person who is authorized to order an evacuation or shutdown.
- Establish specific evacuation procedures, including routes and exits. Maps of evacuation routes should include locations of exits, assembly points, and equipment (such as fire extinguishers, first aid kits, spill kits, eyewash stations) that may be needed in an emergency.
- Emergency exit signs must be lit and clearly visible.
- Establish procedures for assisting visitors and employees to evacuate, consider those with disabilities or who do not speak English.
- Ensure emergency alarms are in place and are tested on a routine basis.

- Determine which, if any employees will remain after the evacuation alarm to shut down critical operations or perform other duties before evacuating.
- Establish a means to account for employees.
- Inspect and maintain fire suppression systems such as portable extinguishers and sprinklers per fire code regulations.
- Exit routes should be:
    - Clearly marked and well lit.
    - Wide enough to accommodate the number of evacuating personnel.
    - Unobstructed and clear of debris at all times.
    - Unlikely to expose evacuating personnel to additional hazards.

State/ federal standards:

- Means of Egress 29 CFR 1910 Subpart E: Link
- Also see 803 KAR 2:304: Link
- Fire Prevention Plans 29 CFR 1910.39: Link
- Emergency Action Plans 29 CFR 1910.38: Link
- Various National Fire Protection Association (NFPA)-Refer to local fire department: Link

Resources for program development:

- OSHA-eTool-Evacuation Plans and Procedures: Link
- OSHA-Emergency Action Plan Checklist: Link
- OSHA-Exits FAQ sheet: Link

I.3.11 Forklifts

There are many types of powered industrial trucks (PITs). Each type presents different operating hazards. Workers can be injured:

- When lift trucks are inadvertently driven off loading docks.
- When lifts fall between docks and an unsecured trailer.
- When workers are struck by a lift truck.

Forklifts are primarily used to transport and move materials and come in many sizes and capacities. They can be powered by batteries, propane, gasoline or diesel fuel. Whenever forklifts are in use, operation programs must be established that outline the operation of the forklift as well as the training of the operator. In addition, the workplace where the forklift will be operated must be considered. In warehouse areas, such as might be found in medical cannabis cultivation facilities, pedestrian traffic must be considered when forklifts are in use. Forklift traffic and pedestrian traffic should be separated when possible. Forklift operation programs should also include inspection programs and additional safety measures that should be employed when powered industrial trucks are used in the workplace.

Job roles affected: Employees who are responsible for the operation of PITs (forklifts). Employees who might be working in areas where PITs (forklifts) are operated.

Hazard assessment: Determining the best way to protect workers from injury largely depends on the type of truck and the worksite where it is being used. Employers must ensure each powered industrial truck operator is competent to operate a powered industrial truck safely, as demonstrated by the successful completion of the training and evaluation specified in 29 CFR 1910.178(l)(1). Also see 803 KAR 2:313: Link

Best practices:

- Understand the type of powered industrial trucks present at the facility.
- Identify the major parts and accessories associated with the PITs and the potential hazard and solution associated with each part.
- Develop a program that includes a system for inspecting and maintaining PITs prior to their use.
- Develop good operating practices for traveling and maneuvering equipment, including protected travel paths so as to not interfere with foot traffic.
- Identify the hazards and recommended practices for each step in the load handling process.
- Ensure only trained and competent operators are permitted to operate a powered industrial truck.

All powered industrial truck operators must be trained and certified by their organizations.

- Never use a forklift to elevate a person on the forks to create an elevated work level.

State/ federal standards:

- Powered Industrial Trucks 29 CFR 1910.178: Link
- 803 KAR 2:313: Link
- 803 KAR 2:325: Link

Resources for program development:

- OSHA-Safety and Health Topics: Powered Industrial Trucks-Forklifts: Link
- NIOSH-Preventing Injuries and Deaths of Workers who Operate or Work Near Forklifts: Link
- OSHA-eTool-Powered Industrial Trucks (Forklift): Link
- OSHA-Scissor Lift Hazard Alert Letter: Link

I.3.12 Lighting Hazards

Metal halide lights, which are often used in veg rooms, contain an inner arc tube that is similar to a welder's arc. This arc emits intense UV radiation along with visible light. Normally the outer glass bulb reduces the ultraviolet (UV) radiation to nominal levels, but, if the outer bulb is broken, UV levels can be significant enough to cause photokeratitis. Photokeratitis is a painful eye condition that occurs when your eye is exposed to invisible rays of energy called ultraviolet (UV) rays, either from the sun or from a man-made source. Symptoms, which include tearing, blurry vision, and the feeling of a foreign body in the eye, normally peak six to 12 hours after exposure. To prevent photokeratitis, broken metal halide bulbs should be immediately removed from service.

UV lamps can be useful germicidal tools. As with metal halide lights, exposure to UV radiation from these lamps can cause extreme discomfort and serious injury. The effect of UV radiation overexposure depends on UV intensity, wavelength, portion of the body exposed, and the sensitivity of the individual. Overexposure of the eyes may produce painful inflammation, a gritty sensation, and/or tears within three to 12 hours. Overexposure of the skin may produce reddening (sunburn) within one to eight hours. Certain medications can cause an individual to be more sensitive to UV light.

Fluorescent lamps may also be used in medical cannabis cultivation facilities. Health hazards with fluorescent bulbs are present when a fluorescent bulb breaks. The hazard is from metals such as lead, cadmium and, most importantly, mercury. Broken bulbs can release mercury vapors causing exposure to employees in the area of the broken lamp and potentially be a fire hazard.

In addition to considering the health effects of lighting, there also must be a hazardous waste plan for disposing of spent or broken bulbs. Mercury containing lighting wastes such as fluorescent, high-pressure sodium, mercury vapor and mercury halide lamps are classified as "Universal Waste" and is covered under the Kentucky Hazardous Waste Regulations and under the federal Resource Conservation and Recovery Act (RCRA).

Job roles affected: Employees who are working in areas where metal halide and/or other high- intensity lights are being used.

Hazard assessment: Operators of UV-generating equipment for which the radiation is not totally enclosed and exposure is possible should wear PPE to protect them from the long-term effects of UV radiation. These areas should be isolated from the general public entrance.

Best practices:

- Consider substituting metal halide lights with safer alternative lighting.
- Always operate metal halide and high-pressure sodium discharge lamps with the compatible ballast, rated fixture (open/closed, wattage), and socket.
- Provide and require the use of the appropriate PPE (glasses or goggles)for employees who work in intense lighting areas. Ensure that eye protection is rated for the UV wavelength that is being used.

- Ensure that safe electrical practices are used when changing out light bulbs. Electrical system work should only be performed by a qualified or certified person. Proper lockout-tagout procedures should be used when work is done on any system that may contain electrical energy.
- Appropriate fall protection measures should be taken when bulbs are changed while working at heights.
- Immediately remove broken lamps from service; develop a program to ensure used and broken bulbs are disposed of as hazardous waste.
- A protocol should be followed for the proper cleanup of broken bulbs. If a bulb is broken the room should be ventilated (using exhaust ventilation if possible) and central forced air heating/ air conditioning should be shut off.
- Do not vacuum broken bulbs. Broken glass should be swept on to stiff paper or cardboard. Sticky tape, such as duct tape, can be used to pick up any remaining small glass fragments and powder. Used tape should be placed in a glass jar or plastic bag. All clean-up materials should be placed in a sealable container.
- Used and broken bulbs must be labeled as either "Waste Lamp", "Used Lamp" or "Universal Waste Lamp". If the waste is placed into an accumulation container, only the accumulation container needs to be labeled, not the individual lamps within it. The date when accumulation started should also be placed on the container. Broken lamps must be individually packed in a closed packing container that is properly labeled and capable of preventing any releases of mercury vapor. Accumulated wastes on site should not be accumulated for more than one year. Universal wastes must be sent to a facility that is permitted to accepted it.
- Depending on the amounts of universal waste that is generated, this will determine how the facility disposes of the waste. Please refer to the Kentucky Universal Waste Rule for more information.

State/ federal standards:

- No specific standards for lighting hazards. Refer to KRS 338.031 ("Obligations of employers and employees"): (1) Each employer: (a) Shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees; (b) Shall comply with occupational safety and health standards promulgated under this chapter. (2) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this chapter which are applicable to his own actions and conduct. Link
- Also see OSHA General Duty Clause - Section 5 (a)(1) of the Occupational Safety and Health Act (OSHA) 1970 - Employers are required to provide their employees with a place of employment free from recognizable hazards that are causing or likely to cause death or serious harm to employees. Link

- Kentucky Hazardous Waste Regulations (401 KAR Chapter 39)
- Kentucky Universal Waste rule Part 273: Link
- EPA Universal Waste Program Overview: Link

Resources for program development:

- OSHA-Technical Information Bulletin: Link
- OSHA-Quick Card for avoiding mercury exposure from fluorescent bulbs: Link
- EPA-CFL Clean-up Guide: Link

I.3.13 Machines and Hand Tools

In addition to high-pressure machinery for extractions, grinders, trimming machines, conveyor belts, packaging equipment, or woodchippers might be used at medical cannabis cultivation facilities. For all machinery, it is key that preventative maintenance programs are put into place to ensure safe operation. In addition, a lockout/tagout program may be needed to ensure hazardous energy is isolated prior to machine maintenance (**Section II**). Employees who use hand and power tools and are exposed to the hazards of falling, flying, abrasive and splashing objects, or to harmful dusts, fumes, mists, vapors, or gases must be provided with the appropriate PPE.

Job roles affected: Employees who operate machines.

Hazard assessment: Assess machines for motion hazards such as pinch points or exposed rotating parts and actions such as cutting, punching, shearing or bending. Assess machine safeguards to ensure they meet the minimum OSHA requirements. Safeguards should prevent workers' hands, arms and other body parts from making contact with dangerous moving parts or areas of high heat. A machine-guarding checklist can be used to assist with assessment.

Best practices:

- Assess machine hazards and ensure engineering controls are in place to protect against employee injuries.
- Consider a lockout/ tagout procedure if a machine needs additional de-energization steps.
- Machines such as grinders or others designed for a fixed location should be securely anchored to prevent the machine from "walking" or moving.
- Ensure employees using any type of machine are trained in their use.
- Ensure employees are trained in the proper use of all tools. Workers should be able to recognize the hazards associated with the different types of tools and the safety precautions necessary.

State/federal standards:

- Machinery and Machine Guarding-General requirements for all machines 29 CFR 1910.212: Link
- 803 KAR 2:314: Link

Resources for program development:

- OSHA-Machine Guarding Checklist: Link
- OSHA-eTool-Machine Guarding: Link
- OSHA-Hand and Power Tools: Link
- OSHA-Checklist for Abrasive Wheel Equipment Grinders: Link

I.3.14 Extraction Equipment

Performing extractions is probably one of the most well-known physical hazards in the medical cannabis industry. With the processes that are commonly used there is a large explosion and fire hazard when extracting oils from the medical cannabis plant. Local municipalities fire codes must be consulted.

High heat and pressure may be combined to make products like rosin. High-pressure machinery poses a hazard both from the pressing and high-pressure build-up to extract oils and from explosion hazards and burns. CO_2 is commonly used for extractions and is covered under its own section in this document. Extraction using butane is the most cost effective, yet the most dangerous method of extraction used.

Job roles affected: Employees involved in extraction processes.

Hazard assessment: If extraction processes are going to be utilized, local fire codes must be consulted. Hazard assessments similar to what has been done for chemicals, gasses, flammable/ combustible liquids should be followed. PPE assessments for employees should be performed. (**Section II**).

Best Practices:

- Ensure extraction equipment meets the relevant regulations.
- Establish a fire protection policy plan (**Section II**).
- Ensure that only trained employees are performing extraction processes and that they are trained on electrical safety, compressed gas, and fire protection standards.
- Assess the need for PPE that might be needed during the extraction process (**Section II**).

State/federal standards:

- Electrical Protective Devices-29 CFR 1910.137: Link
- Control of Hazardous Energy-29 CFR 1910.147: Link
- 915 KAR 1:040: Link

I.3.15 Confined Spaces

Confined spaces are work areas that are large enough for an employee to enter, have limited means of entry or exit, and are not designed for continuous occupancy. These spaces can present physical and atmospheric hazards that can be prevented if addressed prior to entering the space to perform work. By this definition, water storage tanks used in many grow operations are confined spaces. People working in confined spaces can face life-threatening hazards including toxic substances, electrocutions, explosions, and asphyxiation. In the medical cannabis industry, examples of confined spaces are water tanks, cold storage areas, and manholes.

OSHA uses the term "permit-required confined space" (permit space) to describe a confined space that has one or more of the following characteristics:

- Contains or has the potential to contain a hazardous atmosphere.
- Contains material that has the potential to engulf an entrant.
- Has walls that converge inward or floors that slope downward and taper into a smaller area which could trap or asphyxiate an entrant.
- Contains any other recognized safety or health hazard, such as unguarded machinery, exposed live wires, or heat stress.

One example of a permit-required confined space is a water storage tank that is entered in order to perform cleaning tasks using chemical cleaners.

Job roles affected: All employees must be aware of confined and permit required spaces. Special training is required for employees who are entering permit-required confined spaces.

Hazard assessment: Employers should inspect the workplace to determine if any confined spaces exist. If confined spaces exist within the facility, employees must be notified of the existence and location of and the danger posed by the permit spaces.

Best practices:

- Inspect the workplace to determine if any confined spaces exist.
- Post signs in accordance with the OSHA Confined Space Standard on all confined spaces within the workplace.
- Consider altering cleaning procedures to eliminate the need for employees to enter confined spaces, such as water storage tanks.
- Develop and implement a comprehensive confined permit spaces program if employees will be required to enter confined spaces.

State/federal standards:

- 29 CFR 1910.146-Confined Space Standard: Link

Resources for program development:

- OSHA-Safety and Health Topics-Confined Spaces: Link
- OSHA-Confined Spaces Advisor: Link
- OSHA-QuickCard™ 321, (2006): Link
- OSHA-Fact Sheet for Atmospheric Testing in Confined Spaces: Link
- OSHA-Publication 3138: Link

Section II: Safety and Health Program Plans

II.1 Hazard Communication Plans

The Hazard Communication Standard requires employers to inform employees of hazards and identities of chemicals they are exposed to in the workplace, as well as protective measures that are available. All workplaces where employees are exposed to hazardous chemicals must have a written plan that describes how the hazard communication standard will be implemented in that facility.

The steps for implementing an effective hazard communication program are:

1. ***Learn the standard and identify responsible staff***

   Obtain a copy of the standard from OSHA and designate an individual responsible for implementing this standard.

2. ***Prepare and implement a written hazard communication program***

   Address how you will meet the requirements of the standard, and include a list of all hazardous chemicals in the workplace.

3. ***Ensure containers are labeled***

   Manufacturers of hazardous chemicals are required to label, tag, or mark the chemical with the identity of the material and appropriate hazard warnings. If materials are transferred into other containers, employers may create their own workplace labels. They either can include all the required information on the label from the chemical manufacturer, or the product identifier and words, pictures and symbols, or a combination thereof, which in combination with other information immediately available to employees, provides specific information regarding the hazards of the chemicals.

4. ***Maintain safety data sheets (SDS)***

   Safety data sheets include information about hazardous chemicals, including identification, hazards, first-aid measures, and handling and storage precautions. Manufacturers are required to provide SDS. These sheets must be maintained by employers for all hazardous chemicals in the workplace and be readily available to employees.

5. ***Inform and train employees***

   Employees must be trained on hazardous chemicals in their work areas before their initial assignment, and whenever new hazards are introduced. They must also be aware that labeling and SDS provide information about chemicals hazards.

6. Evaluate and reassess your program

Hazard communication programs must remain current. The best way to do this is to periodically reassess the program to make sure it is meeting its objectives and includes all hazardous chemicals in the workplace.

References: OSHA-Hazard Communication Program Fact Sheet: Link

Resources and examples for program development:

- Link
- Link
- Link
- Link
- OSHA-Label Requirements and Sample: Link
- OSHA-Hazard Communication Program: Link

II.2 Hearing Conservation Plan

To protect workers from noise induced hearing loss OSHA has set an action level of 85 decibels (dBA) as a time-weighted average (TWA). OSHA requires employers to institute a hearing conservation program when workers are exposed to noise levels at or above the action level of 85 dBA or, equivalently, a dose of 50 percent. TWA exposures exceeding the OSHA permissible exposure limit of 90 dBA require feasible engineering or administrative controls to be implemented. An industrial hygienist can perform noise monitoring to determine noise levels in a facility. If there are job processes or areas of an operation where employees must raise their voices for the person next to them to hear, these areas may be above the action level of 85 dBA and warrant further investigation. In the cultivation of medical cannabis, loud noises could be generated by hand tools, wood chippers, if any landscaping equipment is being used by employees, or compressors to name a few.

An effective hearing conservation program can prevent hearing loss, improve employee morale, promote a general feeling of well-being, increase the quality of production and reduce the incidence of stress-related disease.

A hearing conservation program includes the following elements:

1. Monitoring program

A hearing conservation program requires employers to monitor noise exposure levels in a way that accurately identifies employees exposed to noise at or above 85 decibels (dB) averaged over eight working hours, or an eight-hour, time-weighted average (TWA). Employers must repeat monitoring whenever changes in production, process, or controls increase noise exposure. These changes may mean more employees need to be included in the program or their hearing protectors may no longer provide adequate protection.

2. Hearing protection devices

Employers must provide hearing protection devices to all employees at or above the action level. Employers must provide hearing protectors to all workers exposed to eight-hour TWA noise levels of 85 dBA or above. This requirement ensures employees have access to protectors before they experience any hearing loss.

Employees must wear hearing protectors:

- For any period exceeding six months from the time they are first exposed to eight-hour TWA noise levels of 85 dB or above, until they receive their baseline audiograms if these tests are delayed due to mobile test van scheduling.
- If they have incurred standard threshold shifts that show they are susceptible to noise.
- If they are exposed to noise over the permissible exposure limit of 90 dB over an eight-hour TWA.

Employers must provide employees with a selection of at least one variety of hearing plug and one variety of hearing muff. Employees should decide, with the help of a person trained to fit hearing protectors, which size and type protector is most suitable for the working environment. The protector selected should be comfortable to wear and offer sufficient protection to prevent hearing loss.

3. Employee training and education

All employees at or above the action level must be given training on the effects of noise on hearing and how and why to use various types of hearing protection devices. Employers must train employees exposed to TWAs of 85 dB and above at least annually in the effects of noise, the purpose, advantages, and disadvantages of various types of hearing protectors, the selection, fit, and care of protectors, and the purpose and procedures of audiometric testing. The training program may be structured in any format, with different portions conducted by different individuals and at different times, as long as the required topics are covered.

4. Audiometric evaluations

Employees that are a part of a hearing conservation program should be tested both at their hire and annually to determine if they have experienced any hearing loss. Audiometric tests must be performed by a licensed professional. Within six months of an employee's first exposure at or above the action level, the employer shall establish a valid baseline audiogram against which subsequent audiograms can be compared. Audiograms should continue at least annually after obtaining the baseline audiogram for each employee exposed at or above an eight-hour, time- weighted average of 85 decibels.

5. Recordkeeping

Employers must retain data on exposure measurements and audiometric test results. Employers must keep noise exposure measurement records for two years and maintain records of audiometric test results for the duration of the affected employee's employment. Audiometric test records must include the employee's name and job classification, date, examiner's name, date of the last acoustic or exhaustive calibration, measurements of the background sound pressure levels in audiometric test rooms, and the employee's most recent noise exposure measurement.

Reference: OSHA-Hearing Conservation Booklet: Link

Resources for additional program development:

- OSHA-eTool-Noise and Hearing Conservation: Link
- OSHA-Occupational Noise Exposure: Link
- CDC-Preventing Occupational Hearing Loss-A Practical Guide: Link
- NIOSH-Noise and Hearing Loss Prevention: Link

II.3 Personal Protective Equipment Assessment

The hazard assessment prescribed in the PPE standard is critical in identifying the potential physical hazards (e.g., noise, ultraviolet light), chemical hazards (e.g., pesticides, extraction chemicals), biological hazards (e.g., mold), and safety hazards (e.g., electrical/energized equipment, sharp objects such as trim scissors) that may be present in medical cannabis cultivation, processing, or dispensary facilities. If a process or work practice changes, the employer should re-evaluate PPE needs to determine if the existing PPE program remains suitable and protective for the employees.

The PPE assessment involves the following steps:

1. ***Assess the workplace for hazards.***

   Determine if hazards are present that necessitate the use of PPE. When the hazard assessment is complete, a written certification is required that documents information such as the workplace evaluated, individual who conducted the assessment, and date of assessment.

2. ***Implement engineering controls and administrative controls (work practices) to control or eliminate these hazards to the extent feasible.***

   Engineering controls involve changing the machine or work environment to prevent employee exposure to a hazard. Administrative controls remove employees from the exposure by changing how they do their jobs.

3. ***Select appropriate PPE to protect employees from hazards that cannot be eliminated or controlled through engineering controls and work practices.***

   Employers should use the information gained from the assessment to determine the appropriate PPE that may reduce or eliminate the potential for injury or illness.

4. ***Inform your employees why the PPE is necessary and when it must be worn.***

   - Train your employees how to use and care for the selected PPE and how to recognize PPE deterioration and failure.

   - Require your employees to wear the selected PPE in the workplace.

II.3.1 Personal Protective Equipment Standard

According to the PPE standard, employers are required to train each employee whom they provide PPE to conduct their work activities. The following information must be included in this training:

- What PPE is required.
- When to use PPE.
- How to properly use the assigned PPE, including how to put on, take off, and adjust it.
- The PPE's limitations.
- How to properly care for, maintain, clean, and dispose of the PPE.

All employees must demonstrate an understanding of the above factors. If an employee appears unsure of one or more of these aspects, the employee should be re-trained. Documentation of the training provided to the workers is required.

II.3.2 Eye Protection

Activities related to growing and processing medical cannabis may present a number of hazards that require the use of eye protection. Safety glasses or goggles should be used as PPE to protect against the possibility of eye injuries due to liquid chemical splashes, aerosolized nuisance dust or flying debris, or ultraviolet light exposures. Specific work processes and practices that should be evaluated in the industry and may necessitate the use of safety glasses or goggles for eye protection include:

- Pesticide mixing and application.
- Solvent use for extraction processes.
- Automated bud and leaf trimming that may generate aerosolized organic dust.
- Use of ultraviolet lamps in indoor cultivation operations.
- Trim machinery may throw items out at extreme speed.

Eye protection selected must meet the requirements of ANSI Z87.1-1989 if purchased after July 5, 1994. If an individual wears prescription glasses, side shields and protective lenses must meet these requirements as well. Goggles can be worn over glasses if they fit comfortably and do not disturb the alignment of the glasses.

II.3.3 Hand and Skin Protection

Because of the manual nature of many of the activities associated with growing and processing medical cannabis, protection of the hands is a requirement. A variety of gloves exist that can protect against dermal contact from compounds that could irritate, sensitize, puncture or cut the skin. Specific work processes and practices that may necessitate the use of gloves include:

- Pesticide mixing and application
- Solvent use for extraction processes
- Manual trimming of medical cannabis leaves and buds for protection against nicks or cuts from the hand shears
- Automated trimming of medical cannabis leaves and buds for protection against nicks or cuts from rotating metal equipment blades
- Cleaning processes

The material of choice for the glove depends on the nature of the hazard. Nitrile gloves can be a good selection for preventing irritation and dermatitis caused by contact with chemicals, solvents, and oils typically found and used in medical cannabis cultivation and processing facilities. The material also resists puncturing, abrasion, and snagging. Natural latex rubber gloves are not recommended because they can cause allergies. In larger-scale industrial facilities, long-sleeved laboratory-style coats, coveralls, or aprons may be warranted. Cut-resistant gloves can prevent injuries to the hands and fingers.

II.3.4 Hearing Protection

Workers in the industry may be exposed to high levels of noise for periods of time that could damage their hearing. Noise exposures may be particularly pertinent for larger scale medical cannabis processing operations in which industrial machinery is running. Automated equipment running conveyor belts, fans for freezers and ventilation exhaust systems, and machinery motors are all sources of noise that may necessitate hearing protection and require evaluation. Common types of hearing protection include earplugs and earmuffs. It is very important these properly fit the worker. Training is required to ensure workers know the effects of noise and how to properly select, fit and use the hearing protection device (**see Section II.2)**.

Reference: OSHA-Office of Training and Education-PPE Assessment: Link

Resources for additional program development

- OSHA-PPE Standard: Link
- OSHA-PPE Assessment tool: Link
- PPE Assessment Certification Form: Link
- OSHA-Employer Obligations and Payment for PPE: Link

II.4 Respiratory Protection Plan

Workers in the medical cannabis industry have been observed to wear single-strap dust masks during certain dust-generating activities such as automated processing of medical cannabis and grinding of cannabis material. These may be useful in providing comfort from non-toxic nuisance dust, pollen, etc. However, they do not provide a level of respiratory protection compared to disposable filtering facepiece respirators approved by the National Institute for Occupational Safety and Health (NIOSH). If an exposure assessment determines a hazard exists for which respiratory protection is needed against airborne particles, a NIOSH-certified respirator (e.g., N- 95) used in the context of a written respiratory protection program is recommended.

OSHA requires that in any workplace where respirators are necessary to protect the health of the employee or whenever respirators are required by the employer, the employer shall establish and implement a written respiratory protection program with worksite-specific procedures. The program must be updated as necessary to reflect those changes in workplace conditions that affect respirator use. The written respiratory protection program should include several important details, but first and foremost it must detail worksite-specific tasks and hazards for which respirator use is required. There must also be a designated program administrator who is suitably trained to administer the respiratory protection program. Examples of qualified program administrators include safety professionals, industrial hygienists, and occupational health nurses.

OSHA notes the following components may be necessary for a written program:

- Procedures for selecting respirators.
- Medical evaluations of employees required to use a respirator.
- Fit testing procedures.
- Procedures for proper use of respirators in emergency situations.
- Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding and/or maintaining respirators.
- Special requirements for atmosphere-supplying respirators.
- Training of employees in the respiratory hazards to which they are potentially exposed.
- Procedures for evaluating the effectiveness of the respiratory protection program.

The written program should be updated as necessary to reflect changes in the workplace that affect respirator use (e.g., new chemicals, different tasks or processes, etc.).

II.4.1 Respirator Selection

1. Identify and evaluate the hazard.

The first step in determining the type of respirator to be used in a workplace is to identify and evaluate respiratory hazards present. This process should include an exposure estimate of the hazards, as well as identifying the contaminants chemical state and physical form. The exposure estimate is a critical first step in selecting a respirator because each type of respirator has an assigned protection factor (APF). The APF is a unitless number that indicates the factor by which the respirator will reduce exposure. For example, a half face respirator has an APF of 10, which means it will reduce an exposure of 1.0 mg/m^3 down to 0.1 mg/m^3, assuming the person wearing the respirator was fit to that make and model respirator and is wearing it properly. The OSHA APF document includes a table with APF for various respirators and can be used to determine what type of respirator is necessary for a given hazard.

2. Select a respirator certified by the National Institute for Occupational Safety and Health (NIOSH).

NIOSH tests respirators and determines how effective they are. Using a respirator that is not NIOSH-certified may result in respiratory protection that is not sufficient for the hazard to which the worker is exposed. Additionally, one must consider the situation the employer will be working in and if there are other hazards present in addition to respiratory hazards. For example, if employees are mixing liquid chemicals, they may also want eye protection which some respirators offer. It is also important to be aware that for half-face and full-face air- purifying-respirators the cartridges or filters an employee attaches to the mask are dependent on the exposure. The filter or cartridge that can be used with a respirator typically must be the same brand as the manufacturer of the respirator itself and can filter for particulates, gases, and other specific chemicals. As such, it is again crucial the employer and employee understand the nature of the hazard so the appropriate filter or cartridge is selected for the respirator.

II.4.2 Medical Clearance

Step One

- Provide a medical evaluation to determine the employee's ability to use a respirator.
- Before an employee wears a respirator, he or she must undergo a medical evaluation to determine his or her ability to wear a respirator. Medical clearance or evaluation is necessary because using a respirator may place a physiologic burden on employees. A medical evaluation can be completed using a medical questionnaire and/or an initial medical examination that obtains the same information as the medical questionnaire.

Step Two

- Identify a physician or other licensed healthcare professional (PLHCP) to perform a medical evaluation.

Step Three

- Obtain a written recommendation regarding the employee's ability to use the respirator from the PLHCP.

II.4.3 Fit Testing

- All employees using a negative or positive pressure tight-fitting facepiece respirator must pass an appropriate qualitative fit test (QLFT) or quantitative fit test (QNFT).
    - The fit test must be performed with the same make, model, style, and size of respirator the employee will use at work. It is important to note that fit tests should be performed for all respirators that require a seal, which includes N95 respirators that are often referred to as "dust masks." Another important factor in fit testing is that tight-fitting facepiece respirators may not be used by employees who have facial hair that comes between the sealing surface of the facepiece and the face, or that interferes with valve function.
- Fit testing is required prior to initial use, whenever a different respirator facepiece is used, and at least annually thereafter.
    - An additional fit test is required whenever the employee reports, or the employer or PLHCP makes visual observations of, changes in the employee's physical condition that could affect respirator fit (e.g. facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight).

II.4.4 Respirator Proper Use and Storage

- Employees should be aware that tight fitting respirators should not be worn by employees who have facial hair or any condition that interferes with the face-to- face seal or valve function of a respirator.

- Employees should be aware of how to properly wear a respirator and its limitations.

    - If an employer is unsure of the proper procedures for putting on or taking off a respirator, there are many resources available, including the respirator manufacturer, which will often provide training and guidance for properly wearing the respirator. Once a respirator is on, it is also important to understand respirators have limitations in terms of the environments in which they can be worn, and how long they can be worn. One such limitation of respirators is that if there is not a proper seal between the respirator and the wearer's face, the mask will not provide the protection necessary. This is why it is crucial that each time an employee wears a respirator, they perform the user seal checks for the respirator to ensure a good fit. User seal- check procedures should be part of the training and fit testing process. Another limitation is that the duration of time an employee can wear a disposable N95 respirator is different than the duration of time one can wear a half-face air filtering respirator with cartridges.

- Employees should understand the duration of respirator use.

    - For all types of filtering respirators, the duration one can wear the respirator ultimately depends on the concentration to which the employee is exposed. Although some respirator cartridges have an end of service life indicator, which lets the wearer know when the cartridge is no longer working, most respirators and cartridges do not. This is why it is crucial that an exposure estimate has been done, so the employer can identify how long a particular respirator can be worn in a given situation, per the respirator manufacturer's recommendations.

II.4.5 Voluntary Respirator Use

Voluntary respirator use falls under Appendix D of the standard (1910.134). Employees can choose to wear a respirator even when exposures are below the exposure limit, to provide additional comfort or protection if allowed by their employer. However, the respirator must be selected properly and also worn properly, or it can become a hazard to the worker. An employee who is wearing a respirator voluntarily must read and follow instructions provided by the respirator manufacturer and should wear the respirator in environments for which the respirator is designated (e.g., a particulate respirator cannot be worn to protect against vapors). The employer must establish and implement those elements of a written respiratory protection program to ensure any employee using a respirator is medically able to use the respirator, although those requirements do not apply to the voluntary use of filtering dust masks.

Reference: OSHA-Safety and Health Topics- Respiratory Protection: Link

Additional resources for program development:

- OSHA-Respiratory Protection Standard: Link
- OSHA-Respiratory Protection eTool: Link
- Sample respiratory protection program: Link
- OSHA-Appendix D: Link
- OSHA-Fit testing protocols: Link
- OSHA-Medical Clearance: Link
- OSHA-Assigned Protection Factors for the Revised Respiratory Protection Standard: Link

II.5 Lockout/Tagout

"Lockout/tagout" refers to specific practices and procedures to safeguard employees from the unexpected energization or startup of machinery and equipment or the release of hazardous energy during service or maintenance activities. This requires, in part, that a designated individual turns off and disconnects the machinery or equipment from its energy source(s) before performing service or maintenance and the authorized employee(s) either lock or tag the energy-isolating device(s) to prevent the release of hazardous energy. Authorized employee(s) also should take steps to verify the energy has been isolated effectively.

Lockout devices hold energy-isolation devices in a safe or "off" position. They provide protection by preventing machines or equipment from becoming energized they cannot be removed without a key or other unlocking mechanism. Tagout devices, by contrast, are prominent warning signs that fasten to energy-isolating devices to warn employees not to reenergize the machine while it is being serviced or repaired.

Lockout/tagout is required to be formally implemented in the workplace in the form of an energy control program.

As part of an energy-control program, employers must establish energy-control procedures for removing the energy supply from machines and for putting appropriate lockout or tagout devices on the energy-isolating devices to prevent unexpected re- energization. See below for more information.

II.5.1 Energy Control Procedures

Energy-control procedures are critical for removing the energy supply from machines and for putting appropriate lockout or tagout devices on the energy-isolating devices to prevent unexpected re-energization.

The energy-control procedures must outline the techniques employees will use to control hazardous energy sources, as well as the means that will be used to enforce compliance. These procedures must provide employees at least the following information:

- A statement on how to use the procedures.
- Specific procedural steps to shut down, isolate, block, and secure machines.
- Specific steps designating the safe placement, removal, and transfer of lockout/tagout devices and identifying who has responsibility for the lockout/tagout devices.
- Specific requirements for testing machines to determine and verify the effectiveness of lockout devices, tagout devices, and other energy-control measures.

II.5.2 Reviewing of Procedures

Inspect these procedures periodically (at least annually) to ensure they are being followed and remain effective in preventing employee exposure to hazardous energy.

The periodic inspection is intended to ensure employees are familiar with their responsibilities under the procedure and continue to implement energy-control procedures properly. The inspector, who must be an authorized person not involved in using the particular control procedure being inspected, must be able to determine the following:

- Employees are following steps in the energy-control procedure.
- Employees involved know their responsibilities under the procedure.
- The procedure is adequate to provide the necessary protection, and what changes, if any, are needed.

II.5.3 Training

Train employees on the energy-control program, including the safe application, use and removal of energy controls.

The employer must provide initial training before starting service and maintenance activities and must provide retraining as necessary. In addition, the employer must certify the training has been given to all employees covered by the standard.

References: OSHA-Control of Hazardous Energy Lockout/tagout booklet: Link

Additional resources and examples for program development:

- OSHA-Lockout-Tagout Interactive Training Program: Link
- OSHA-Control of Hazardous Energy (Lockout/Tagout): Link
- Sample written program for control of hazardous energy: Link
- NIOSH-Guidelines for Controlling Hazardous Energy During Maintenance and Servicing: Link

II.6 Fire Prevention

A fire prevention plan is intended to prevent the occurrence of fires in the workplace by targeting fuel sources and ensuring adequate building fire suppression systems. Along with local fire codes, a fire protection plan should include the operating, testing, and maintaining fixed extinguishing systems.

Fixed extinguishing systems are covered under 29 CFR 1910.160 automatic sprinkler systems are covered under 29 CFR 1910.159. In addition to fixed extinguishing systems an area may include portable extinguishers. As with other fire suppression systems, portable fire extinguishers must be approved by a nationally recognized testing laboratory to verify compliance with applicable standards.

A fire prevention plan must be in writing, be kept in the workplace and be made available to employees for review. However, an employer with 10 or fewer employees may communicate the plan orally to employees. Local municipalities may have different guidelines for medical cannabis facilities. These should be referenced and followed as appropriate. See Link.

At a minimum, a fire prevention plan must include:

- A list of all major fire hazards, proper handling and storage procedures for hazardous/ flammable materials, potential ignition sources (such as welding, sparks, hot surfaces, open flames, or smoking) and their control, and the type of fire protection equipment necessary to control each major hazard.
- Procedures to control the amount of flammable and combustible waste materials that are collected and stored at the facility.
- Procedures for regular maintenance of safeguards installed on potential ignition sources to ensure fires cannot be started (e.g. insulating hot surfaces, ensuring proper grounding and bonding, using guards and exhaust systems on grinding and cutting equipment).
- The name or job title of employees responsible for maintaining equipment to prevent or control sources of ignition or fires.
- The name or job title of employees responsible for the control of potential fire sources.

An employer must inform employees upon initial assignment to a job of the fire hazards to which they are exposed. An employer must also review with each employee those parts of the fire prevention plan necessary for self-protection.

References: OSHA-Evacuation Plans and Procedures eTool: Link

Additional resources and examples for program development:

- OSHA-Portable Fire Extinguishers eTool: Link
- OSHA-Fixed extinguishing systems regulation: Link
- OSHA-OSHAcademy Course-Fire Prevention Plans: Link

II.7 Emergency Action Plan

An Emergency Action Plan (EAP) is a written document to organize action during a workplace emergency. It is specific to a particular workplace and lists processes and procedures employees carry out.

Per OSHA (1910.38), the minimum elements of a written emergency action plan include:

- Procedures for reporting a fire or other emergency.
- Procedures and exit routes for emergency evacuation.
- Procedures to be followed by employees who remain to operate critical plant operations before they evacuate.
- Procedures to account for all employees after evacuation.
- A contact name for employees to obtain more information about the plan.
- Explanation on how the company will notify employees in case of an emergency.

Additional resources and examples for program development

- OSHA-Emergency Action Plan eTool: Link
- OSHA-Principal Emergency Response and Preparedness-Requirements and Guidance: Link
- FEMA-Incident Command Resources: Link

Appendix A

OSHA Standards Summary and Kentucky OSH Standards

References

- **Federal OSHA Standards Applicable to the medical cannabis industry. Available at https://www.osha.gov/law- regs.html**
- **Kentucky OSH Standards applicable to medical cannabis industry available at www.lrc.ky.gov**

OSHA Standard #	Standard Name
1903 Also see 803 KAR 2:060	Notification of worker's rights
1904 Also see 803 KAR 2:181	Recording and reporting occupational injuries and illnesses
1910.21 – 30 Subpart D Also see 803 KAR 2:303	Walking and Working Surfaces
1910.36 Subpart E Also see 803 KAR 2:304	Design and construction requirements for exit routes
1910.38 Subpart E Also see 803 KAR 2:304	Emergency action plans
1910.39 Subpart E Also see 803 KAR 2:304	Fire prevention plans
1910.66 -68 Subpart F Also see 803 KAR 2:305	Powered Platforms , manlifts and vehicle mounted work platforms
1910.94	Ventilation
1910.95	Occupational noise exposure
1910.101	M gases
1910.106 Subpart H Also see 803 KAR 2:307	Flammable Liquids hazardous materials - Portion of property where motor fuel stored and service of tires, batteries, etc.
1910.120	Hazardous waste operations and emergency response

1910.132 Subpart I Also see 803 KAR 2:308	Personal protective equipment: general requirements
1910.133 Subpart I Also see 803 KAR 2:308	Eye and face protection
1910.134 Subpart I Also see 803 KAR 2:308	Respiratory protection
1910.135 Subpart I Also see 803 KAR 2:308	Head protection
1910.136 Subpart I Also see 803 KAR 2:308	Foot protection
1910.137 Subpart I Also see 803 KAR 2:308	Electrical protective equipment
1910.138 Subpart I Also see 803 KAR 2:308	Hand protection
1910.141	Sanitation
1910.147 Also see 803 KAR 2:309	The control of hazardous energy (lockout/tagout)
1910.151 Also see 803 KAR 2.310	Medical services and first aid for employers with 8 or more employees
1910.157 Also see 803 KAR 2:311	Portable fire extinguishers Fire Protection
1910.159	Automatic sprinkler systems
1910.165	Employee alarm systems
1910.212 Also see 803 KAR 2:314	Machinery and machine guarding
1910.242 Also see 803 KAR 2:215	Hand and portable powered tools and equipment
1910.263	Bakery equipment
1910.303 Subpart S Also see 803 KAR 2:318	General design standards for electrical systems
1910.335 Subpart S Also see 803 KAR 2:318	Safeguards for personnel protection and electrical systems
1910.1000 Table Z-1	Table Z-1 Limits for Air Contaminants
1910.1200	Hazard communication