

WORKER HEALTH AND SAFETY IN THE CANNABIS INDUSTRY

Technical Bulletin



Marijuana legalization is spreading across the Americas. In 2013, Uruguay became the first country to legalize its production, sale and consumption. More recently, the Canadian government legalized the recreational use of marijuana. In the United States, as of January 2018, nine states and the District of Columbia allowed the recreational use of marijuana, and 30 states had legalized it for medical use. At the same time, as many as 12 additional states had marijuana-related initiatives on the ballot.

The impact of the legalization of marijuana, also referred to by its plant genus name, *Cannabis*, has primarily focused on medical versus recreational use, federal versus states' rights, and the health and societal consequences of broader recreational use by the general population. Garnering much less attention are the consequences for the workers the industry employs. Cannabis cultivation, processing and retail facilities currently employ an estimated 120,000 workers and, according to a 2017 report by New Frontier Data, if growth projections for the industry bear out, employment will reach nearly 300,000 by 2020.¹

CANNABIS WORKER HEALTH AND SAFETY RISKS

On the supply end of the industry, cannabis cultivation and processing facilities present applications that potentially expose workers to a wide variety of physical, biological, and chemical hazards.

The list of physical hazards is similar to those found in other agricultural and processing industries, including ergonomics, electricity, noise, ultraviolet (UV) light, extraction and other pressurized equipment, walking/working surfaces, and confined spaces.

Biological hazards are primarily associated with exposure to mold and sensitizers. Cannabis cultivation requires increased levels of humidity, which can promote mold growth. Molds are associated

with a variety of respiratory health effects. Moreover, dermal and inhalation exposures to cannabis resin and plant materials have been reported to cause hypersensitivity and allergic reactions² in some workers, including rashes, itchy skin and swollen eyes.

The presence of chemical hazards is widespread in both cultivation and processing operations. Examples include carbon dioxide, fertilizers and other nutrients used to enhance plant growth, pesticides used to control insects, fungicides used to limit the formation of molds, and disinfectants and other cleaning chemicals used to maintain sanitary conditions. These hazards pose both dermal contact and inhalation exposures that range in impact from oxygen depletion to nervous system effects, rashes and chemical burns.

Processing operations involve the extraction of cannabis concentrates, as well as the production of marijuana-infused (edible) products. The extraction of oils and resins typically involves handling flammable materials, such as butane, heptane, ethanol and isopropyl alcohol, at elevated pressures and temperatures. Liquefied carbon dioxide also can be used for extraction processing.

Workers in both cannabis extraction and edible marijuana production jobs can be exposed to cleaning chemicals, especially in the latter industry since edible products are generally produced in sanitary environments. Related health effects range from skin rashes and burns to frostbite as well as danger from potential fires or explosions.

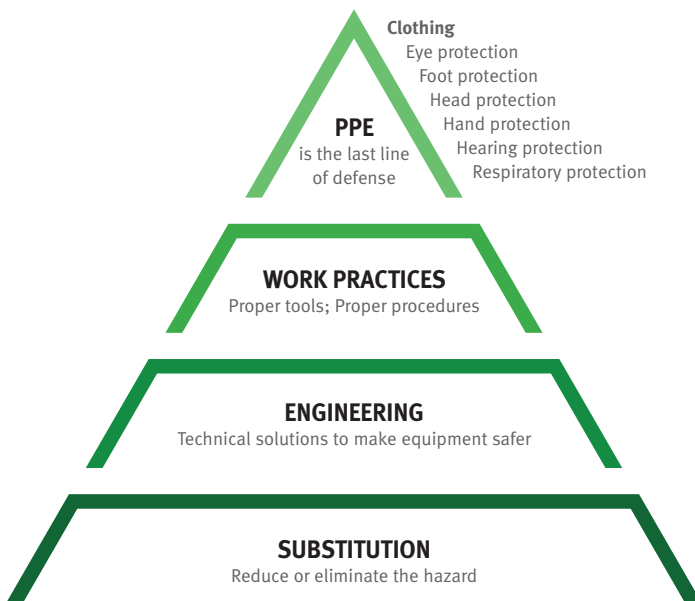
PROTECTING WORKERS

With all workplace hazards, OSHA expects employers to apply the hierarchy of exposure controls to protect workers. Employers should eliminate hazards or substitute lower-hazard alternatives first. Next, engineering solutions should be implemented, followed by administrative controls. If these controls have been applied and residual risk remains, then the use of personal protective equipment (PPE) is warranted.

In many cases, PPE is used in conjunction with other exposure controls to protect workers from hazards. OSHA standards require employers to perform and document hazard risk assessments as a basis for the selection of PPE. OSHA requirements for PPE, including the requirement for documented hazard assessments, can be found in the regulations at 29 CFR 1910, Subpart I, Sections 132-138 for general industry.

Additionally, the EPA provides employers with agricultural worker protection standards and guidance in 40 CFR 170, “Worker Protection Standard,” and 40 CFR 156, “Labeling Requirements for Pesticides and Devices.” PPE requirements for safe pesticide use are found on individual product labels.

OSHA-MANDATED HIERARCHY OF EXPOSURE CONTROLS



PROTECTING PRODUCTS

Since the products from marijuana cultivation are destined for human consumption, prevention of contamination from several potential sources (e.g., bacterial and fungal microorganisms) must also be incorporated in the production process. Consequently, garments and accessories such as gloves and shoe covers must be factored into a protective clothing program, even in some instances when worker protection is not the primary concern.

PROTECTIVE APPAREL FOR CANNABIS PRODUCTION

Exposure means the potential need for PPE; hence, employers engaged in cannabis cultivation and processing operations must complete hazard risk assessments and provide workers with appropriate PPE, including protective garments. Hazardous particle exposures in the form of solid pesticides, molds and dusts, as well as liquid chemical exposures in the form of liquid pesticides, disinfectants/cleaning products and extraction solvents, would be the focus for selection of protective garments.

DuPont Personal Protection offers a range of apparel options for both hazardous particle and liquid chemical protection.

Tyvek® garments (along with other appropriate PPE such as respirators, face and eye protection, gloves and protective footwear) are an excellent option for particle exposures like solid pesticides, dust and mold, providing a superior balance of protection, durability and comfort compared to microporous film (MPF) or spunbond-meltblown-spunbond (SMS) alternatives. In addition to providing barrier protection from hazardous particles, Tyvek® garments may help to contain certain hazards and possibly mitigate their spread beyond the workplace.







DuPont™ Tyvek® 800 J can be considered for disinfectant and cleaning product use, as well as contact with oils and resins. The garment’s taped seams and higher-level liquid resistance provide advantages for these applications.







DuPont™ Tychem® 2000 and Tychem® 4000 are likely garment options available for other liquid exposure applications. Please refer to DuPont™ SafeSPEC™ for specific barrier performance information for extraction solvents and other hazardous liquid chemicals.


DuPont™ Tychem® 2000 SFR and Tychem® 6000 FR can be considered for oil and resin extraction operations where a flash fire risk has been identified.

DuPont™ ProShield® and Tyvek® garments and shoe covers can be considered for product protection applications.

See the next page for a list of DuPont apparel and accessories suitable for protecting your workers and products from the potential hazards encountered during marijuana cultivation and processing.

DuPont Option	Product Protection	Nonhazardous Particles/Dirty Work	Hazardous Particles	Extracted Oils & Resins*	Cleaning Chemicals*	Liquid Pesticides*	Extraction Solvents	Flash Fire Risk
 <p>DuPont™ ProClean® 1 Non-hazardous light liquid splash and dry particulate barrier protection in a low-linting, anti-static treated fabric</p>								
 <p>Tyvek® IsoClean® Barrier fabric technology provides an ideal balance of protection, durability and comfort</p>								
 <p>DuPont™ Sierra™ Breathability, barrier protection and particle filtration efficiency without compromising the comfort you want</p>								
 <p>ProShield® 60 Shoe Cover with PVC Skid-Resistant Sole. 5" High. Serged Seams. White.</p>								
 <p>ProShield® 70 Shoe Cover with Skid-Resistant Sole. 8.25" High. Serged Seams. Gray.</p>								
 <p>Tyvek® 400 Shoe Cover with Tyvek® Sole. 8.25" High. Serged Seams. White.</p>								

DuPont Option	Product Protection	Nonhazardous Particles/Dirty Work	Hazardous Particles	Extracted Oils & Resins*	Cleaning Chemicals*	Liquid Pesticides*	Extraction Solvents	Flash Fire Risk
 <p>ProShield® 10 SMS garment that offers comfort and quality at an affordable price</p>	✓	✓						
 <p>ProShield® 50 MPF garment provides a barrier against a variety of non-hazardous aerosols, liquids and dry particles</p>	✓	✓	✓					
 <p>ProShield® 60 Bonded MPF/HDPE for economical protection against non-hazardous particles, light liquid splash and aerosols</p>	✓	✓	✓					
 <p>Tyvek® 400 An ideal balance of comfort, durability and protection for workers against hazardous particulates and light liquid splash</p>	✓	✓	✓					
 <p>Tyvek® 800 J Combines resistance to low-concentration, water-based chemicals with the comfort, protection and durability of Tyvek®</p>			✓	✓	✓			
 <p>Tychem® 2000 Flexible, durable and lightweight protection from >40 chemical challenges</p>			✓	✓	✓			

DuPont Option	Product Protection	Nonhazardous Particles/Dirty Work	Hazardous Particles	Extracted Oils & Resins*	Cleaning Chemicals*	Liquid Pesticides*	Extraction Solvents	Flash Fire Risk
 <p>Tychem® 2000 SFR Chemical and secondary flame protection in a lightweight garment**</p>								
 <p>Tychem® 4000 Effective protection against a range of chemicals, providing at least 30 minutes of protection against >120 chemical challenges</p>								
 <p>Tychem® 6000 FR Provides triple-hazard protection from chemicals, flash fire and electric arc; TP198T and TP199T meet the requirements of NFPA 1992 and NFPA 2112***</p>								

*Liquid barrier performance varies based on the amount of liquid that may get on the garment, the length of time the liquid is on the garment, applied pressure and certain physical properties of the liquid. Tyvek® 800 J offers improved liquid barrier but may not be appropriate if spotting is observed on the skin or garments worn under the protective garment. In applications where a higher liquid barrier is needed, consider Tychem® 2000 and Tychem® 4000 garments with taped seams.

**Tychem® 2000 SFR coveralls provide only secondary flame-resistant protection. They must always be worn over an appropriate primary flame-resistant garment in an environment that needs flame protection, along with other personal protective equipment that protects your face, hands and feet.

***Most Tychem® garments should not be used around heat, flames, sparks or in potentially flammable or explosive environments. Only Tychem® 6000 FR and Tychem® 10000 FR garments are designed and tested to help reduce injury during escape from a flash fire. Tychem® 2000 SFR garments offer secondary flame resistance and are designed to be used over primary flame-resistant garments such as Nomex® IIIA. Users of Tychem® 6000 FR, Tychem® 10000 FR and Tychem® 2000 SFR garments should not knowingly enter an explosive environment. Consult the Tychem® user manual located on our website for instructions on proper use, care and maintenance of your Tychem® garments.

For Product Details, Visit SafeSPEC.DuPont.com

DuPont protective apparel must be worn with other appropriate PPE, such as, but not limited to, respirators; face and eye protection; gloves; and protective footwear, as indicated during the hazard risk assessment to minimize inhalation, prevent skin contact and avoid contamination of clothing worn under the protective garment.

References:

¹New Frontier Data, The Cannabis Industry Annual Report: 2017 Legal Marijuana Outlook, 2017.

²Colorado Department of Public Health and Environment, Guide to Worker Safety and Health in the Marijuana Industry, January 2017.

It is the user's responsibility to determine the level of toxicity and the proper personal protective equipment needed. It is intended for information use by persons having technical skill for evaluation under the specific end-use conditions, at their own discretion and risk. Anyone intending to use this information should first verify that the garment selected is suitable for the intended use. In many cases, seams and closures may provide less barrier than the fabric. If the fabric becomes torn, abraded or punctured, end user should discontinue use of garment to avoid compromising the barrier protection. SINCE CONDITIONS OF USE ARE OUTSIDE OUR CONTROL, DUPONT MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION, NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE AND ASSUME NO LIABILITY IN CONNECTION WITH ANY USE OF THIS INFORMATION. This information is not intended as a license to operate under or a recommendation to infringe any patent, trademark or right.

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