

Preamble:

This document intends to provide insight and a basic understanding of the cannabis manufacturing industry. While its focus is on the specifics of odor mitigation and to provide an overview of the general design features of the Community Gardens cannabis manufacturing site located in Mansfield Township; We feel that it is important that any community, town, region, and most importantly its citizens are properly equipped with thorough information. This document should be viewed as supplemental to the technical plans and designs that Community Gardens has provided to the committee.

In this document, we will attempt to discuss and clarify, through analogies and parallel industries, the challenges and most current solutions to prevent and mitigate concerns. This discussion is drawing from diverse background and technical expertise in biosecurity, technology, building design, agriculture, microbiology, engineering, economics, chemistry, rules and regulation from cities, states, and federal entities like the EPA, FDA, CDC, USDA, and standards like that of FOCUS, ASTM and ISO.

As of writing this, we have had the opportunity to engage with hundreds of cannabis manufacturing sites located “East of the Mississippi”. These sites have been in large city centers, suburban landscapes, small towns, and far off rural areas. With this experience, it is notable that each has a common theme; significant economic growth and opportunity. As a son of a plumber, I have been delighted to see a resurgence of trade-related skills being put to use daily at these sites. High schools, colleges, and universities engaging with new science and curriculum to prepare students for new and higher-paying jobs. This has led to a renewed interest in agriculture, trades, engineering, science, entrepreneurs finding new ways to solve problems, new businesses created, and new tax revenue. Simply put, American innovation is hard at work, and its best with this new and emerging industry.

The chief concern of any manufacturer should be one of Consumer Health and Safety & Employee Wellbeing. Secondary to those are operational efficiency and profitability. It is our opinion after speaking and engaging with the Community Gardens founders and their team that they exemplify these ideals and intend to act upon them both in design and organizational philosophy.

Odor and Its Source

Humans can recognize 10,000 different odors. However, no two people sense anything the same. Because of this, the odor is subjective. Much like the “Pain Scale” in healthcare, the odor is experienced by individuals differently. For some, the smell of freshly roasted and brewed coffee is pleasant and for some it’s offensive.

Our sense of smell, like our sense of taste, is a part of our chemosensory system; what we smell and taste, or interpret as such, are molecules. These molecules that we smell are volatile and evaporate. These are called Volatile Organic Compounds(VOCs) and can be found in everything from bread, onions, ice cream, and yes, even cannabis.

When most people think of cannabis smell, they think of an intense aroma... but, like wine, cigars, and cheese- the smell and tastes of cannabis can be quite diverse. Cannabis can produce aromatics like that of blueberry, citrus, muffins, and even whipped creme. Commonly, these aromatics are broadly described as Fruity, earthy, and floral with at least 48 variations. These odors from the cannabis plant are from terpenes which are VOCs and are produced by the cannabis plant in abundance by the trichome during the flowering stage. It is at this stage(the flower stage and it’s harvest) that cannabis odor may be at its height. These stages occur later in the life cycle of cannabis cultivation.

Example:

For anyone that has ever grown a tomato plant, you likely have a vivid memory of picking tomatoes or brushing against them and the unique and unforgettable smell that proceeds. The smell that we fondly remember, is also a VOC and like the cannabis plant, derived from a trichome.

This is the *source* of odor in cannabis manufacturing.

Odor mitigation

Principle 1) Containment

“In any odor mitigation plan, one of the primary forms of control is to *contain* the *source* of the odor.”

Example:

At home, if we were to cut an onion and have leftovers, we might choose to put it in a plastic bag or wrap it in cellophane. We do this because the odor of the onion tends to be strong and the bag acts as a barrier to contain it and so that it doesn’t “smell-up” the fridge.

In a similar fashion, the building design of a cannabis manufacturer exercises the same concept to contain odors. This often comes in the form of spray foam insulation. In addition to significantly increasing energy efficiency, it also “air-seals” or creates a conditioned space that reduces the air exchanges between the outside and inside air. We call this the envelope and its efficiency is measured in Cubic feet per minute (CFM). The spray foam is applied to the interior of the external walls and roof, making a monolithic and impermeable structure that significantly limits the air exchanges between the outside and inside environments and much like our bag, acts as a barrier to contain the source of the odor. We can also think of our fridge as an additional barrier... both insulating and containing our food. Community Gardens is exercising this concept through its building design and also in the pod-style growing units, they will be using.

Principle 2) Elimination

“An odor mitigation plan should have redundancies that further mitigate instances of smell by eliminating the cause.”

Example:

Because we know the source of cannabis odor, being VOC's, we know that we can remove them. Just like our onion example, the cutting board and knife that we likely used may have remnants of onion odor still on it. We remove that odor and possible contaminants by washing and cleaning those things. From a molecular standpoint what is occurring, is that the cleaning/disinfection agent we use (being a cleaner, disinfectant, or soap), is changing or acting upon the onion's chemistry and removing the source.

In odor and biosecurity mitigation, we apply these same concepts.

At Community Gardens, They will be using three methods of *elimination* to mitigate odor. These methods are in regular use in food-agriculture and commercial processing sites to ensure food is safe to eat from disease and controls odor.

One of the main methods of elimination of odor is through disinfection. Community Gardens will be using Chlorine Dioxide which is a very effective disinfectant for mold, bacteria, and viruses, but also very effective at breaking down the odor. It works by breaking down or oxidizing the molecular structure of the target pathogens or VOCs.

Because Community Gardens is installing a system that manages the application of the disinfectant at the *source* of the odor, where cannabis is grown, the odor is being actively broken down. Additional methods of *elimination* use systems that force air through units that “scrub” the air of VOC's and pathogens in a similar oxidative fashion with ozone. These systems use UV-C or ultraviolet light to breakdown molecules through what's called photo-catalytic oxidation and create similar conditions found outside Earth's atmosphere.

Principle 3) Filtration

“An odor mitigation plan should use *filtration* to mitigate *exhaust* related odors.”

Just like our HVAC systems at home, cannabis manufacturers have them too...except they're huge and sometimes referred to as an Environmental Control Systems (ECS). Like our HVAC systems, there are internal components of that system like filters and intercoolers that manage particulates and condition the air to our liking. These systems in general draw fresh air in and push old air out(exhaust). Cannabis HVAC systems generally have a centralized exhaust point, where the air is collected to a central point and exhausted to the outside of the building. In the design of cannabis HVAC systems, like that of Community Gardens, carbon *filtration* is used to force the *exhaust* air across the filter to Adsorb odor-causing molecules. This is analogous to our onion.

There are Adsorption and Absorption, both describe mechanisms of trapping molecules, like VOCs.

Example:

When we put our bagged onion in the fridge, we still may smell some odor. This is because the same molecules are on the bag itself. We combat this issue by putting a box of baking soda in our fridge. The baking soda “grabs” or Absorbs the odor-causing molecules to neutralize them.

In a similar fashion, carbon *filtration acts* to Adsorb odor-causing molecules and “trap” them before they exit. This is because there are millions of pores and cavities on the charcoal particles and traps particulates of a certain size...like molecules that cause odor. It's for this reason that we see charcoal filtration in use in commercial settings, in drinking water, gas masks, and in our fish tanks at home. It is an effective means to *filter* unwanted chemicals, smells, and tastes from air and water.

Principle 4) Avoidance

“An odor mitigation plan should *avoid* detection”

It should seem logical that the best way to solve a problem is to avoid it and prevent it from occurring. As with any industry that deals with odor challenges (be it food processing, paper mills, or cannabis manufacturers) getting the problem as far away as possible is paramount to avoid detection. No matter the location of manufacturing, be it a city, suburb, or farm, one control mechanism is where and how to *exhaust*.

Example:

Just like our chimneys at home, the goal is to get the exhaust (smoke) up and away. The ideal location of roof exhaust is at the highest point of a structure and determined by building code.

Community Gardens is exercising this principle in the design of the building and its environmental control systems. They will be using what's referred to as a high-plume fan. It acts in a similar fashion to our fireplaces at home. The high plume will heat the air-exhaust to a temperature higher than the surrounding environment and create what is called the *chimney effect*. This effect, coupled with the height of the building, theoretically propels the exhaust high and away from detection... perhaps up to 90 feet.

Principle 4) Transfer

“An odor mitigation plan should track, communicate, and resolve instances of noncompliance and odor complaints”

When problems arise, as they do, it's important to be able to communicate those concerns to fix them. As such, the most important part of an odor mitigation plan is to provide a way for residents and officials to communicate concern or discontent to the manufacturer who can change and fix it. In a way, we *transfer* those problems to someone that can resolve it.

The odor mitigation plan outlines the chain-of-custody and who to contact in the event of a concern. These plans are generally available to the public through the local city government.

Community Gardens and other like-minded cannabis companies strive to be a positive member of the community and look to add to the community's success. Manufacturers that are providing direct information to interact, learn, and engage about their companies have a high chance for success and their ability to resolve problems when they occur.

Concluding

Community Gardens has gone to great length and expense to create a thorough odor mitigation plan. One that has the best interests of the consumer, employee, and community at heart and addresses the problem completely.

The systems and design of Community Gardens bring together a series of redundancies that mitigate problems of odor and contamination from occurring. From the building design meant to contain the odor, the disinfectants and deodorizers that destroy, trap, and filter odor, and the mechanical systems employed to avoid and dispel odors- these measures act to significantly

decrease the probability of a complaint or concern. If ever a problem, the plan offers a direct and easy way to address it.

Organizations, like that of Community Gardens, that commit to these concepts and put them into action have a high probability of being a great new asset to the community. By identifying the problems before they start, creating solutions to alleviate them, and committing to being a responsible neighbor cannabis manufacturing can be an economic boon to any community.

Signed,

Kyle R.L Baker
CSO and Co-founder
EcoBuds

Community Gardens

Biosecurity and Odor Mitigation Plan for:
500 School St., Manfield, MA

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1. Overview- Odor Mitigation Plan

Cannabis, a word derived from the Hebrew *kneh-bosm*, which means “aromatic reed,” releases organic vapors originating from the plant’s numerous terpenes. The release of these terpene-derived organic vapors may be further increased at various stages of manufacturing, such as during flowering, trimming, harvest, and processing. While different strains of cannabis produce different forms and amounts of terpenes, the more potent strains, which are generally more sought after as medicines and adult-use adjuncts, typically have higher concentrations of odor. Growing these strains will, without an effective odor reduction plan, increase the opportunity and likelihood of complaints from neighbors, both residential and commercial, who may be exposed to cannabis odors.

To avoid such conflicts and to maintain “good neighbor” status, while creating a work environment comfortable for employees and not running afoul of OSHA or other workplace standards, cultivators may turn to a variety of technologies used for odor mitigation. A first-line strategy employed for odor control of the facility is the design of the building itself. By operating a closed and sealed facility, in addition to sealed and self-contained pod-style cultivation units, there is very little exchange of air from inside the facility to the exterior, mitigating the vast majority of odors escaping.

After building construction, additional odor reducing strategies are used to suppress and mitigate odors. These include carbon adsorption, masking-agents, and neutralizers (including oxidants). Since the effectiveness of an odor reduction strategy is measured by the elimination of odor, the operator’s goal is to eliminate the offending odor’s molecules which are responsible for the problem in the first place. As such, Community Gardens has invested in specific technologies from Agrify and EcoBuds. These combined technologies, which include the “Digital Immune System and “Bluezone”. These technologies work together to provide comprehensive solutions to biosecurity and odor related risks.

Also, the facility will employ a rooftop mounted high plume fan for heat and air exchange. EcoBuds and its alliance partner bioWALL, a global leader in deodorization and disinfection, will install a facility-wide, patented dual-phase Chlorine Dioxide (ClO₂) system for successful deodorization of cannabis’ terpene-generated Volatile Organic Compounds (VOC's).

The DiKlor® ClO₂ is both EPA-registered and FDA-compliant. By deploying a sophisticated ClO₂ system in both liquid and gas application phases, the Mansfield, MA facility can be both effectively and safely treated for both odor and pathogens using a plan built on science and dedication to best practices. The automated nature of the system supplies consistent, predictable suppression of both odors and pathogens while removing the time and expense of manual cleaning and reduces risks such as unnecessary employee exposure and human error.

ClO₂ is always an optimal choice because it provides the dual benefit of being both an odor control agent as well as a disinfectant. This reduces costs and increases efficiencies within the operation. Chlorine dioxide also reacts more rapidly and completely than other available oxidizers, such as ozone. Unlike most oxidants, chlorine dioxide's efficacy remains consistent within a broad range of pH. This allows it to oxidize (reduce) odor-causing compounds, such as organic vapors, in virtually all environmental conditions.

ClO₂ is also unique in its operation. Due to its extremely small molecular size and its course of action, ClO₂ neutralizes certain organic molecules on contact. Since it is also most effective in the absence of light, treatment applications may be optimized during "dark" cycles. Upon the reintroduction of light, ClO₂ breaks down, taking the remnants of the destroyed odor molecule with it, while leaving no toxic residues to negatively impact regulatory testing.

The EcoBuds system has taken chlorine dioxide disinfection within the cannabis industry to a new level by helping to introduce the use of bioWall's Replenish® system- the cannabis industry's only patented dual liquid/gas automated disinfecting and odor reduction system. BioWall is a global authority on mitigating biological and chemical threats. BioWall, through its parent company Sabre, was instrumental in helping the Federal Government mitigate the Anthrax attacks in the early 2000s. They have industry expertise and on-the-ground experience for effective decontamination and odor reduction in industries such as biohazard remediation, food agriculture, oil & gas, and water treatment.

ClO₂ is a safe and effective broad-spectrum biocide used across numerous industries for decades. As a selective oxidant, ClO₂ is a broad spectrum sterilant, highly

effective in remediating a vast array of biological and chemical contaminants, neutralizing odor, destroying mold and mold spores, purifying drinking water, and sterilizing large spaces – including indoor agriculture, large scale barns, food processing plants, sensitive equipment, and commercial kitchens. These properties make ClO₂ an ideal cannabis cultivation facility management tool as it fights and suppresses mold and mildew while simultaneously reducing the odor associated with production.

2. Disclosures and supporting information

In compliance with the Massachusetts Department of Environmental Protection (MassDEP) & the MassDEP Air Compliance & Enforcement codes; Guidance for Adopting Municipal Regulations to Control Air Pollution under M.G.L. chapter 111, section 31C (hereinafter, “Guidelines”). Massachusetts General Laws Chapter 111, Section 31C (Section 31C). Additionally, the Code provided by the Town of Mansfield, MA / Part II: General Legislation / Zoning, Article III Principal Use Regulations will be observed.

See Attached Documents’ A1, A2.

Environmental conditions data have been considered and are referenced herein from the attached document, See Exhibit B1: Environmental Other environmental data, such as Wind Direction, is sourced from weather stations and extension programs such as; Weather Network, Weather Underground, The National Weather Service.

Attached is Exhibit C1, the facility blueprint or likeness for reference B. All plans are dependent and subject to state, local, and/or municipal regulations and laws on building code and other established rules related to the plan.

Attached is Exhibit D1, HVAC technical description

Attached is Exhibit E1, Agrify and EcoBuds “Consumer Information” Sheets

3. FACILITY ODOR EMISSIONS INFORMATION

a. Facility Information

The proposed cannabis cultivation site, located at 500 School St., in Mansfield, Massachusetts is owned and operated by Community Gardens.

b. Specific odor-emitting activity(ies)

The specific odor related activities at this site may be categorized as cannabis cultivation and drying.

The location of the odor related activities is isolated to the designated flowering rooms, processing areas, and the “drying” rooms located within the facility. The growth stage when cannabis is the most fragrant is during the flowering, harvest, processing, and trimming of the plant materials.

The main strategy employed for odor control of the facility is the design of the building and cultivation units itself. By operating a closed and sealed facility with fully contained units, there is very little exchange of air from inside the facility, mitigating the vast majority of odors from escaping the facility.

The facility is heavily modernized, conforming to higher than average standards, and utilizes the best of class methods to increase energy efficiencies, increase noise reduction, and enhance odor containment.

The superstructure of the facility, as developed as a part of the architectural and engineering design, exercises the well-known and proven feature of closed-cell spray foam insulation. The closed-cell foam feature is applied floor-to-ceiling and the roof of the interior superstructure, forming an envelope to the outside. The spray foam feature is multifaceted in benefit-enhancing aspects of structural integrity, thermal loss, noise reduction.

For biosecurity and odor mitigation; 1) spray foam is inert and not subject to decay, molding, and bacterial build-up present in most commonly used insulation materials. 2) spray foam creates a "true-conditioned space" and "air-seals" the envelope of the superstructure, thereby preventing air exchanges and odors from permeating to the outside.

Also, Community Gardens has elected to cultivate with Agrify's Vertical Farming Unit (VFU) system technology. In contrast to traditional open benchtop growing racks, Agrify's VFU provides a completely compartmentalized micro-climate growing environment with two motorized curtains that are kept sealed throughout the entire vegetative and flowering cycles. The curtains are only raised during a scheduled plant-touching activity. As such, the VFU's pod-like technology design creates an additional layer of odor mitigation around the source of emission.

c. Phases (timing, length, etc.) of odor---emitting activities

Odor related activities may occur on an ongoing basis, for example, every two weeks on Tuesday, during normal business hours.

4. ODOR MITIGATION

Odor emitting activities shall be contained within the superstructure and infrastructure of this site. Odor reducing/mitigating technologies using a combination of filtration and deodorizers throughout the sealed facility. These systems recirculate and neutralize odor-causing compounds. Additional technologies and systems that use proven methods from food-animal production and processing will be executed to eliminate the odor at the source. The main strategy employed for odor control of the facility is the design of the building itself. By operating a closed and sealed facility there is very little exchange of air from inside the facility mitigating the vast majority of odors from escaping the facility.

In addition to a closed and sealed facility, the facility will deploy a state-of-the-art odor mitigation system. An automated odor reduction, disinfection, and humidity offset system developed by our partner Ecobuds, Inc, bioWall, and Agrify

All technologies used shall be within the guidelines for safe manufacturing and are environmentally friendly.

a. Administrative Controls

i. Procedural activities

The ventilation of this site is exercised through a rooftop mounted high plume fan located on the roof for temperature regulation. Based on the construction of this site, the exhaust vent is approximately forty(40') feet above ground level. Additional redundancies take the form of odor scrubbing technology and devices deployed in animal rendering facilities. These devices manage and eliminate the odor at the vent level.

The EcoBuds system and the Agrify Bluezone will work in conjunction with each other to provide 24/7/365 suppression of pathogens and odor.

i. Staff training procedures

The Director of Cultivation, Agent-in-Charge, and/or General Manager shall be responsible for day-to-day activities and management of activities. The Odor Plan is under the responsibilities and management of these person(s).

The Staff shall be trained on the use of facilities engineering controls. The controls are but are not limited to, the ventilation of the facility, temperature controls, and disinfection/deodorization systems.

Staff shall be trained within 15 days of employment on the safety, recognition, and handling of procedures, processes, and technologies involved with the systems. Additional training shall be conducted to attest

and record the employee's knowledge and understanding of the respective technologies, methodologies, and systems of the plan, no less than bi-annually. Training may be conducted in person or via digital learning platforms or a combination thereof.

ii. Recordkeeping systems and forms

The automated systems keep detailed records of environmental activities and the use of ClO₂ and Ozone. These records are available at any time or can be reviewed on the monitoring screen of the Bluezone technology.

b. Engineering Controls

i. ClO₂, an oxidant, has been able to cause the rapid and complete chemical destruction of many volatile organic chemicals and pathogens. In general, the oxidants have been capable of achieving high treatment efficiencies (e.g., > 90 percent) for unsaturated aliphatic (e.g., trichloroethylene [TCE]) and aromatic compounds (e.g., benzene), with very fast reaction rates (90 percent destruction in minutes). Field applications have affirmed that matching the oxidant and in situ delivery system to the contaminants of concern (COCs) and the site conditions is the key to successful implementation and achieving performance goals for odor mitigation. Since the automated odor and disinfection system is designed and implemented within the sealed facility, odor mitigation is occurring at the source of the odor at all times.

5. Components of engineering control

a. System design

The Replenish system is based on the existing logistics of the Food Ag industry. A Semi-truck with specialized equipment fills and recharges a special "smart" tank. The refilling process, "Replenish" is a lossless system and has zero waste, restoring the concentration to full capacity. The smart tank uses a variety of inline and in-tank sensors to measure the PPM of the Clo₂ and ultimately diverts the concentrations to the plumbed systems (inline sprayers, Gas-Phase emitters). The pumps that deliver the CLo₂ are operated by "if this, then that" and timed programming methods, sometimes called AI.)

The Bluezone unit is a military-developed, award-winning technology that provides localized air purification and odor mitigation. The technology utilizes a combination of germicidal UV, vacuum uvc, and ozone generation to deactivate airborne pathogens and oxidize VOCs inside of a completely self-contained device. Before emitting purified air back into the space, a catalyst removes and strips the ozone, resulting in only O₂ and CO₂ being emitted into the air. This technology is Electrical Testing Labs(ETL) safety certified, California Air Resources Certified for ozone emissions, and National Sanitation Foundation(NSF) certified. Today, the system is installed in every US aircraft carrier.

b. Operational processes

Operational processes of the Biosecurity and Odor Mitigation Plan are automated and monitored in real-time to ensure 100% uptime and efficacy.

c. Maintenance plan

Maintenance of the systems shall be routine and scheduled in accordance with manufacturer control recommendations and regulations. All maintenance rendered shall be documented in detail and retained in a centralized repository.

6. System design

System 1: Automated Disinfection

Through a series of proportioning pumps, the stock solution of ClO₂ is diluted to the appropriate concentrations to installed inline spray systems. These systems are custom to each room and have spray nozzles that are specific to spray width, distance, and gallons per minute. These nozzles are directed to floor levels to address "hard-non-porous surfaces" and disinfect to a LOG 6 reduction using 100 ppm ClO₂.

System 2: Gas-Phase

Like the Automated Disinfection system, The Gas-Phase Emitter operates from proportioning pumps and the smart tank. The difference is that the

device (Gas-Phase Emitter) is specialized to execute the gas phase of the Clo₂.

System 3: Air Purification

Each Bluezone unit purifies 15,000 cubic ft. of air volume every 4 hours.

The system can be installed as a fixed device that continuously circulates air in a given space or moved to be placed in areas on demand to facilitate any environmental or odor challenge.

7. Maintenance plan

a. Timeline for implementation of odor mitigation practices

The timeline should begin upon receipt of approval from the Town of Mansfield; of the “Biosecurity and Odor Mitigation Plan” or “BOMP”

- i. Approval of BOMP by the Department
- ii. Approval of BOMP by other City agencies
- iii. Purchase and installation of engineering controls
- iv. Inspections and approval by City agencies

d. Complaint tracking system

An odor caused by the release of an air contaminant is considered air pollution and a violation of the local ordinance if the MassDEP or local regulatory authority determines that the odor has unreasonably interfered

with the enjoyment of life or property. Many citizen complaints of air pollution involve the presence of objectionable odors. Community Gardens is committed to being a good neighbor and has made considerable efforts to avoid any instance of nuisances to the community.

All complaints received, whether, by telephone, letter, or through the MassDEP of Environmental Protect or local authorities will be immediately forwarded to the General Manager or his designee for review.

A complaint of Odor related instances may be reported by telephone and email to:

Steve Chorney

Phone: (508)207-0938

Email: Stevecommunitygardens@gmail.com

Additional Contacts:

Doug Rhodes

Phone: (508)472-6515

Email: Mmjnursedoug@gmail.com

8. Additional Notes:

Basics

ClO₂ is water-soluble true-gas. Essentially, what that means is that it always remains a gas, but can be put in water at a wide variety of concentrations without actually mixing with the H₂O molecule. They stay separate.

Being a gas, ClO₂ always wants to leave the solution and enter what we call the "gas-phase". The solution of ClO₂ stays in the water until agitated or not contained. The molecule(ClO₂) remains in the physical state of matter, gas. As such, the gas can only be held together if contained (or by gravitational force), in our instance this represents the greenhouse or indoor facility. There is a great deal of space between molecules, which have a lot of kinetic energy (also, oxidation potential). The particles move very fast and collide into one another, causing them to diffuse, or spread out until they are evenly distributed throughout the volume of the facility (or container).

Gases have measurable properties: temperature (T), volume (V), and the number of particles, which is expressed in a mole number (n or mol). This measurement allows us to very precisely and mathematically "dose" a given space; in-fact exactly. If it's a liquid, we measure in Parts Per Million(PPM). In our use, generally at 100PPM (These are the sprayers).

OXIDATION

ClO₂ oxidizes volatile organic compounds, size-specific mold, bacteria, and viruses (sans your skin, or plant cells and trichomes). Oxidation is the process in which an electron is taken away from a molecule. Taking away electrons disrupts important cellular structures of microbes (like a cell wall). Oxidation can disrupt the cell wall of bacteria and/or mold: the membrane stops functioning, no transport of molecules is possible (like sugars). Also, the barrier can break or burst open and important constituents can leak out of the cell (denatures the protein structures) Oxidation can also affect all structures inside the cell such as important enzymes and DNA. Damage caused by oxidation can sometimes be repaired by cells, but when there is too much oxidation damage, the cell/microbial will die.

The System

The system operates on three basic principles; 1)Detection of specific biological activity (mold/bacteria), 2)Termination of biological activity (mold/bacteria), and 3)verification of termination of biological activity.

Specialized devices monitor airborne environmental conditions and identify mold and bacteria.

System Operations

The Replenish system is based on the existing logistics of the Food Ag industry. A Semi-truck with specialized equipment fills and recharges a special "smart" tank. The refilling process, "Replenish" is a lossless system and has zero waste, restoring the concentration to full capacity. The smart tank uses a variety of inline and in-tank sensors to measure the PPM of the Clo2 and ultimately diverts the concentrations to the plumbed systems (inline sprayers, BioBud-e). The pumps that deliver the CLo2 are operated by "if this, then that" and timed programming methods, sometimes called AI.

System 1: Automated Disinfection

Through a series of proportioning pumps, the stock solution of ClO2 is diluted to the appropriate concentrations to installed inline spray systems. These systems are custom to each room and have spray nozzles that are specific to spray width, distance, and gallons per minute. These nozzles are directed to floor levels to address "hard-non-porous surfaces" and disinfect to a LOG 6 reduction using 100 ppm Clo2. The amount of Clo2 in gallons is determined by the square footage of the space and based on the centipoise (in this case, 0-1=1,000 Sqft of coverage, per 1 gallon).

System 2: Gas-Phase

Like the Automated Disinfection system, The Gas-Phase Emitters operate off of proportioning pumps and the smart tank. The difference is that the device (Gas-Phase Emitter) is specialized to execute the gas phase of the Clo2. This is essentially accomplished by using a media that look like marbles, where the Clo2 cascades across the media and excites/agitates the Clo2 out of solution and into the room (or any given space) to its gas-phase....delivering precise mols of Clo2 that are OSHA safe.

Supporting documentation: ATTACHED

Exhibit: A1 And A2



COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION

ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

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Governor

TIMOTHY P. MURRAY
Lieutenant Governor

IAN A. BOWLES
Secretary

LAURIE BURT
Commissioner

**Guidance for Adopting Municipal Regulations to Control
Air Pollution under M.G.L. chapter 111, section 31C**

A city or town, through its Board of Health or other legal authority (referred to in this fact sheet as “Board of Health”), has the authority to enact “reasonable” rules and regulations to control air pollution, pursuant to Massachusetts General Laws Chapter 111, Section 31C (Section 31C). These regulations are enforceable only after they are approved by the Massachusetts Department of Environmental Protection (MassDEP) and printed in a newspaper published in the city or town (if there is no newspaper published in the city or town, the regulation must be posted in a public place).

Boards of Health may enact regulations to control air pollution if the regulation serves to prevent:

1. Nuisance to members of the town;
2. Danger to the public health of the town; or
3. Detriment to public comfort and convenience in the town.

According to Section 31C “air pollution” includes (but is not limited to) the emission of smoke, particulate matter, soot, cinders, ashes, toxic and radioactive substances, fumes, vapors, gases, industrial odors, and dusts that may arise within the town’s boundaries and are a nuisance, danger, or detriment.

Procedural Requirements of Section 31C

Before sending a regulation or an amendment of a previously approved regulation to MassDEP for approval, the Board of Health must hold a public hearing to give the public an opportunity to comment on the regulation. The date, time, place and subject of the hearing must be printed in a newspaper published in the city or town, or if there is no newspaper published in the city or town, the notice of the hearing must be posted in a public place within the city or town. The text of the regulation or amended regulation does not have to be published in the newspaper before the hearing, but it should be made available to the public at or before the hearing.

The notice must be published in the newspaper twice, in two successive weeks before the hearing, as follows:

- The first notice must be published at least two weeks (14 days) before the hearing; and
- The second notice must be published sometime during the week immediately following the week of the first publication. For example, if a hearing is scheduled to be held on June 15, the first notice should be published by June 1, and the second notice must be published during the week of June 8, 2009.

After the hearing, if the Board of Health approves the regulation or amended regulation, the regulation must then be approved by MassDEP. To obtain MassDEP's approval, the Board of Health must submit the following information:

1. A letter requesting approval of the regulations;
2. One copy of the regulation; and
3. Copies of the two public hearing notices that were published or posted (please make sure the copies show the date on which the notices were published).

This information must be submitted to Assistant Commissioner, Bureau of Waste Prevention, MassDEP, One Winter Street, Boston, MA 02108

MassDEP will inform the Board of Health in writing whether the agency approves or disapproves the regulation.

If MassDEP approves the regulation, the Board of Health must print a copy of it in a newspaper published in the city or town to give the regulation the force of law¹.

Substantive Requirements of Section 31C

Regulations adopted by cities and towns pursuant to Section 31C must be "reasonable." Although there is no specific definition of "reasonable" in the statute, these regulations should be clear, concise and not conflict with existing laws and regulations.

Section 31C contains a penalty provision that should be included in the regulation either in its entirety or by reference:

Whoever violates any order, rule or regulation promulgated or adopted under the provisions of this section shall be punished, for the first offense, by a fine of not less than one thousand nor more than five thousand dollars and for a subsequent offense, by a fine of not less than five thousand nor more than ten thousand dollars. For the purpose of this paragraph each day or part thereof of violation of such an order, rule or regulation whether such violation be continuous or intermittent, shall be construed as a separate and succeeding offense.

Regulations adopted by the Board of Health can include limits, bans and/or moratoriums on certain activities that produce air pollution (e.g. outdoor wood fired boilers). The regulation must be at least as stringent as any applicable state or federal law or regulation.

Local Regulations Adopted Pursuant to M.G.L. Chapter 111, Section 31

Boards of Health also have the authority to "make reasonable health regulations" pursuant to M.G.L. Chapter 111, Section 31. Regulations adopted under Section 31 do not have to be approved by MassDEP, but this section of the statute requires that "attested copies of sanitary codes, and all rules, regulations and standards, and any amendments and additions thereto" must be filed with MassDEP (Please send them to: Assistant Commissioner, Bureau of Waste Prevention, MassDEP, One Winter Street, Boston, MA 02108).

¹ If no newspaper is published in the city or town, a copy of the regulation must be posted in a public place in the city or town.

An air pollution regulation may be adopted pursuant to both Section 31 and Section 31C, but the procedural and substantive requirements of Section 31C must be followed in order to give the air pollution regulation the force of law.

For More Information

- MassDEP encourages Boards of Health to consult with their Town Counsel on the procedural and substantive requirements for adopting air regulations under Section 31C, and to consult with other cities/towns to develop a consistent approach for regulating air pollution.
- Contact Marc Cohen in MassDEP's Bureau of Waste Prevention (email: marc.cohen@state.ma.us or telephone: 617/292-5873), with questions about the requirements of Section 31C.

COMMONWEALTH OF MASSACHUSETTS

DEPARTMENT OF ENVIRONMENTAL PROTECTION

310 CMR 7.00 AIR POLLUTION CONTROL REGULATIONS

310 CMR 7.25 U BEST AVAILABLE CONTROLS FOR CONSUMER AND COMMERCIAL PRODUCTS

7.25: U Best Available Controls for Consumer and Commercial Products

(1) Purpose. 310 CMR 7.25 applies to and sets forth requirements for the control of volatile organic compound emissions from the use of consumer and commercial products as defined in Title I Part D Subpart 2 Section 183(e)(1)(B) of the federal Clean Air Act.

[(2) through (10): Reserved]

(11) Architectural and Industrial Maintenance (AIM) Coatings.

(a) Applicability.

1. Except as provided in 310 CMR 7.25(11)(a)2., the requirements of 310 CMR 7.25(11) apply to any person who, on or after January 1, 2009, supplies, sells, offers for sale, blends for sale, or manufactures any architectural coating listed in 310 CMR 7.25(11)(b) for use within Massachusetts, as well as any person who applies or solicits the application of any architectural coating within Massachusetts.
2. The provisions of 310 CMR 7.25(11) do not apply to any person who supplies, sells, offers for sale, blends for sale, or manufactures any architectural coating that is for exclusive use outside of Massachusetts.

(b) Definitions. Terms used in 310 CMR 7.25 are defined at 310 CMR 7.00: *Definitions* or in 310 CMR 7.25. Where a term is defined in both 310 CMR 7.00: *Definitions* and in 310 CMR 7.25, the definition in 310 CMR 7.25 shall apply.

AEROSOL COATING PRODUCT means an aerosol coating product containing pigments or resins that is packaged in a disposable can for hand-held application, or for use in specialized equipment for ground traffic/marketing applications.

ANTENNA COATING means a coating labeled and formulated exclusively for application to equipment and associated structural appurtenances that are used to receive or transmit electromagnetic signals.

ANTIFOULING COATING means a coating labeled and formulated for application to submerged stationary structures and their appurtenances to prevent or reduce the attachment of marine or freshwater biological organisms. To qualify as an antifouling coating, the coating must be registered with both the U.S. EPA under the Federal Insecticide, Fungicide and Rodenticide Act (7 U.S.C. § 136 *et seq.*) and with the under the Massachusetts Pesticide Control Act.

APPURTENANCE means any accessory to a stationary structure coated at the site of installation, whether installed or detached, including but not limited to: bathroom and kitchen fixtures; cabinets; concrete forms; doors; elevators; fences; hand railings; heating equipment, air conditioning equipment, and other fixed mechanical equipment or stationary tools; lampposts; partitions, pipes and piping systems; rain gutters and downspouts; stairways; fixed ladders; catwalks and fire escapes; and window screens.

ARCHITECTURAL COATING means a coating to be applied to stationary structures or the appurtenances at the site of installation, to portable buildings at the site of installation, to pavements, or to curbs. Coatings applied in shop applications or to nonstationary structures such as airplanes, ships, boats, railcars, and automobiles, and adhesives are not considered architectural coatings for the purposes of 310 CMR 7.25.

ASTM means the American Society for Testing and Materials.

BAAQMD means Bay Area Air Quality Management District of the State of California.

BITUMENS means black or brown materials including, but not limited to, asphalt, tar, pitch, and asphaltite that are soluble in carbon disulfide, consist mainly of hydrocarbons, and are obtained from natural deposits or as residues from the distillation of crude petroleum or coal.

BITUMINOUS ROOF COATING means a coating that incorporates bitumens that is labeled and formulated exclusively for roofing.

BITUMINOUS ROOF PRIMER means a primer that incorporates bitumens that is labeled and formulated exclusively for roofing.

BOND BREAKER means a coating labeled and formulated for application between layers of concrete to prevent a freshly poured top layer of concrete from bonding to the layer over which it is poured.

CALCIMINE RECOATER means a flat solvent-borne coating formulated and recommended specifically for recoating calcimine-painted ceilings and other calcimine-painted substrates.

CARB means the California Air Resources Board.

CLEAR BRUSHING LACQUERS means clear wood finishes, excluding clear lacquer sanding sealers, formulated with nitrocellulose or synthetic resins to dry by solvent evaporation without

chemical reaction and to provide a solid, protective film, which are intended exclusively for application by brush and which are labeled as specified in 310 CMR 7.25(11)(d)3.

CLEAR WOOD COATINGS means clear and semi-transparent coatings, including lacquers and varnishes, applied to wood substrates to provide a transparent or translucent solid film.

COATING means a material applied onto or impregnated into a substrate for protective, decorative, or functional purposes. Such materials include, but are not limited to, paints, varnishes, sealers, and stains.

COLORANT means a concentrated pigment dispersion in water, solvent, and/or binder that is added to an architectural coating after packaging in sale units to produce the desired color.

CONCRETE CURING COMPOUND means a coating labeled and formulated for application to freshly poured concrete to retard the evaporation of water.

CONCRETE SURFACE RETARDER means a mixture of retarding ingredients such as extender pigments, primary pigments, resin, and solvent that interact chemically with the cement to prevent hardening on the surface where the retarder is applied, allowing the retarded mix of cement and sand at the surface to be washed away to create an exposed aggregate finish.

CONSUMER means any person who purchases or acquires any product for personal, family, household, or institutional use. Persons acquiring a product for resale are not consumers for that product.

CONVERSION VARNISH means a clear acid curing coating with an alkyd or other resin blended with amino resins and supplied as a single component or two-component product. Conversion varnishes produce a hard, durable, clear finish designed for professional application to wood flooring. The film formation is the result of an acid-catalyzed condensation reaction, affecting a transesterification at the reactive ethers of the amino resins.

DATE-CODE means the day, month and year on which the product was manufactured, filled, or packaged, or a code indicating such a date.

DRY FOG COATING means a coating labeled and formulated only for spray application such that overspray droplets dry before subsequent contact with incidental surfaces in the vicinity of the surface coating activity.

EXEMPT COMPOUND a compound identified as exempt under the definition of Volatile Organic Compound (VOC), under 310 CMR 7.25(11)(b). Exempt compounds content of a coating shall be determined by U.S. EPA Method 24 or South Coast Air Quality Management District (SCAQMD) Method 303-91 (Revised August 1996).

FAUX FINISHING COATING means a coating labeled and formulated as a stain or a glaze to create artistic effects including, but not limited to, dirt, old age, smoke damage, and simulated marble and wood grain.

FIRE-RESISTIVE COATING means an opaque coating labeled and formulated to protect structural integrity by increasing the fire endurance of interior or exterior steel and other structural materials, that has been fire tested and rated by a testing agency and approved by building code officials for use in bringing assemblies of structural materials into compliance with federal, state, and local building code requirements. The fire-resistive coating and the testing agency shall have been approved by building code officials. The fire-resistive coating shall be tested in accordance with ASTM Designation E 119-98.

FIRE-RETARDANT COATING means a coating labeled and formulated to retard ignition and flame spread, that has been fire tested and rated by a testing agency approved by building code officials for use in bringing building and construction materials into compliance with federal, state, and local building code requirements. Building code officials shall have been approved the fire-retardant coating and the testing agency. The fire-retardant coating shall be tested in accordance with ASTM Designation E 84-99.

FLAT COATING means a coating that is not defined under any other definition in 310 CMR 7.25 and that registers gloss less than 15 on an 85° meter or less than five on a 60° meter according to ASTM Designation D 523-89 (1999).

FLOOR COATING means an opaque coating that is labeled and formulated for application to flooring, including, but not limited to, decks, porches, steps, and other horizontal surfaces that may be subjected to foot traffic.

FLOW COATING means a coating labeled and formulated exclusively for use by electric power companies or their subcontractors to maintain the protective coating systems present on utility transformer units.

HIGH-TEMPERATURE COATING means a high performance coating labeled and formulated for application to substrates exposed continuously or intermittently to temperatures above 204/C.

IMPACTED IMMERSION COATING means a high performance maintenance coating formulated and recommended for application to steel structures subject to immersion in turbulent, debris-laden water. These coatings are specifically resistant to high-energy impact damage caused by floating ice or debris.

INDUSTRIAL MAINTENANCE COATING means high performance architectural coating, including primers, sealers, undercoaters, intermediate coats, and topcoats, formulated for application to substrates exposed to one or more of the following extreme environmental conditions listed in a. through e., and labeled as specified in 310 CMR 7.25(11)(d)2.:

- (a) Immersion in water, wastewater, or chemical solutions (aqueous and non-aqueous solutions), or chronic exposures of interior surfaces to moisture condensation;

- (b) Acute or chronic exposure to corrosive, caustic, or acidic agents, or to chemicals, chemical fumes, or chemical mixtures or solutions;
- (c) Repeated exposure to temperatures above 121/C (250/F);
- (d) Repeated heavy abrasion, including mechanical wear and frequently repeated scrubbing with industrial solvents, cleansers, or scouring agents; or
- (e) Exterior exposure of metal structures and structural components.

LABEL means any written, printed, or graphic matter affixed to, applied to, attached to, blown into, formed, molded into, embossed on, or appearing upon any product or product package, for purposes of branding, identifying, or giving information with respect to the product or to the contents of the package.

LACQUER means a clear or opaque wood coating, including clear lacquer sanding sealers, formulated with cellulosic or synthetic resins to dry by evaporation without chemical reaction and to provide a solid, protective film.

LOW-SOLIDS COATING means a coating containing 0.12 kilogram or less of solids per liter (one pound or less of solids per gallon) of coating material.

LUBRICANT means a product designed to reduce friction, heat, noise, or wear between moving parts, or to loosen rusted or immovable parts or mechanisms. Lubricant does not include automotive power steering fluids; products for use inside power generating motors, engines, and turbines, and their associated power-transfer gearboxes; two-cycle oils or other products designed to be added to fuels; products for use on the human body or animals or products that are sold exclusively to establishments that manufacture or construct goods or commodities, and labeled not for retail sale.

MAGNESITE CEMENT COATING means a coating labeled and formulated for application to magnesite cement decking to protect the magnesite cement substrate from erosion by water.

MANUFACTURER means any person who manufactures, processes, imports, assembles, produces, packages, repackages, or re-labels a product.

MANUFACTURERS MAXIMUM RECOMMENDATION means the maximum recommendation for thinning that is indicated on the label or lid of the coating container.

MASTIC TEXTURE COATING means a coating labeled and formulated to cover holes and minor cracks and to conceal surface irregularities, and is applied in a single coat of at least ten mils (0.010 inch) dry film thickness.

METALLIC PIGMENTED COATING means a coating containing at least 48 grams of elemental metallic pigment per liter of coating as applied (0.4 pounds per gallon) when tested in accordance with SCAQMD Method 318-95.

MULTI-COLOR COATING means a coating that is packaged in a single container and that exhibits more than one color when applied in a single coat.

NON-FLAT HIGH GLOSS COATING means a non-flat coating that registers a gloss of 70 or above on a 60° meter according to ASTM Designation D 523-89 (1999).

NON-FLAT COATING means a coating that is not defined under any other definition in 310 CMR 7.25(11)(b) and that registers a gloss of 15 or greater on an 85° meter and five or greater on a 60° meter according to ASTM Designation D 523-89 (1999).

NON-INDUSTRIAL USE means any use of architectural coatings except in the construction or maintenance of any of the following: facilities used in the manufacturing of goods and commodities; transportation infrastructure, including highways, bridges, airports and railroads; facilities used in mining activities, including petroleum extraction; and utilities infrastructure, including power generation and distribution, and water treatment and distribution systems.

NUCLEAR COATING means a protective coating formulated and recommended to seal porous surfaces such as steel or concrete that otherwise would be subject to intrusion by radioactive materials. These coatings must be resistant to long-term, *e.g.*, service life, cumulative radiation exposure (tested according to ASTM Method D 4082-89, *Standard Test Method for Effects of Gamma Radiation on Coatings for Use in Light-Water Nuclear Power Plants*), relatively easy to decontaminate, and resistant to various chemicals to which the coatings are likely to be exposed (Tested according to ASTM Method D 3912-80, Reapproved 1989, *Standard Test Method for Chemical Resistance of Coatings Used in Light-Water Nuclear Power Plants*).

PESTICIDE means and includes any substance or mixture of substances labeled, designed, or intended for use in preventing, destroying, repelling or mitigating any pest, or any substance or mixture of substances labeled, designed, or intended for use as a defoliant, desiccant, or plant regulator, provided that the term “pesticide” does not include any substance, mixture of substances, or device that the U.S. EPA does not consider to be a pesticide.

POST-CONSUMER COATING means a finished coating that would have been disposed of as waste, having completed its usefulness to a consumer, and does not include manufacturing wastes.

PRE-TREATMENT WASH PRIMER means a primer that contains a minimum of 0.5% acid, by weight, when tested in accordance with ASTM Designation D 1613-96, and that is labeled and formulated for application directly to bare metal surfaces to provide corrosion resistance and to promote adhesion of subsequent topcoats.

PRIMER means a coating labeled and formulated for application to a substrate to provide a firm bond between the substrate and subsequent coats.

QUICK-DRY ENAMEL means non-flat coating that is labeled as specified in 310 CMR 7.25(11)(d)6. and that is formulated to have the following characteristics:

- (a) Is capable of being applied directly from the container under normal conditions with ambient temperatures between 16/C and 27/C;
- (b) When tested in accordance with ASTM Designation D 1640-95, sets to touch in two hours or less, is tack free in four hours or less, and dries hard in eight hours or less by the mechanical test method; and
- (c) Has a dried film gloss of 70 or above on a 60° meter.

QUICK-DRY PRIMER SEALER AND UNDERCOATER mean a primer, sealer, or undercoater that is dry to the touch in 30 minutes and can be re-coated in two hours when tested in accordance with ASTM Designation D 1640-95.

RECYCLED COATING means an architectural coating formulated such that 50% or more of the total weight consists of secondary and post-consumer coating, with 10% or more of the total weight consisting of post-consumer coating.

RESIDENCE means areas where people reside or lodge, including, but not limited to, single and multiple family dwellings, condominiums, mobile homes, apartment complexes, motels, and hotels.

ROOF COATING means a non-bituminous coating labeled and formulated exclusively for application to roofs for the primary purpose of preventing penetration of the substrate by water or reflecting heat and ultraviolet radiation. Metallic pigmented roof coatings, which qualify as metallic pigmented coatings, shall not be considered in this category, but shall be considered to be in the Metallic Pigmented Coatings category.

RUST PREVENTIVE COATING means a coating formulated exclusively for non-industrial use to prevent the corrosion of metal surfaces and labeled as specified in 310 CMR 7.25(11)(d)4.

SANDING SEALER means a clear or semi-transparent wood coating labeled and formulated for application to bare wood to seal the wood and to provide a coat that can be abraded to create a smooth surface for subsequent applications of coatings. A Sanding Sealer that also meets the definition of a Lacquer is not included in this category, but it is included in the Lacquer category.

SCAQMD means South Coast Air Quality Management District of the State of California.

SEALER means a coating labeled and formulated for application to a substrate for one or more of the following purposes: to prevent subsequent coatings from being absorbed by the substrate, or to prevent harm to subsequent coatings by materials in the substrate.

SECONDARY COATING (REWORK) means a fragment of a finished coating or a finished coating from a manufacturing process that has converted resources into a commodity of real economic value, but does not include excess virgin resources of the manufacturing process.

SHELLAC means a clear or opaque coating formulated solely with the resinous secretions of the lac beetle (*Lacifer lacca*), thinned with alcohol, and formulated to dry by evaporation without a chemical reaction.

SHOP APPLICATION means application of a coating to a product or a component of a product in or on the premises of a factory or a shop as part of a manufacturing, production, or repairing process (e.g., original equipment manufacturing coatings).

SOLICIT means to require for use or to specify, by written or oral contract.

SPECIALTY PRIMER, SEALER, AND UNDERCOATER means a coating that is formulated for application to a substrate to seal fire, smoke or water damage; to condition excessively chalky surfaces; or to block stains. An excessively chalky surface is one that is defined as having a chalk rating of four or less as determined by ASTM Designation D 4214-98.

STAIN means a clear, semi-transparent, or opaque coating labeled and formulated to change the color of a surface, but not conceal the grain pattern or texture.

SWIMMING POOL COATING means a coating labeled and formulated to coat the interior of swimming pools and to resist the adverse effects of chemicals in swimming pool water.

SWIMMING POOL REPAIR AND MAINTENANCE COATING means a rubber-based coating labeled and formulated to be used over existing rubber-based coatings for the repair and maintenance of swimming pools.

TEMPERATURE-INDICATOR SAFETY COATING means a coating labeled and formulated as a color-changing indicator coating for the purpose of monitoring the temperature and safety of the substrate, underlying piping, or underlying equipment, and for application to substrates exposed continuously or intermittently to temperatures above 204/C (400/F).

THERMOPLASTIC RUBBER COATING AND MASTIC means a coating or mastic formulated and recommended for application to roofing or other structural surfaces and that incorporates no less than 40% by weight of thermoplastic rubbers in the total resin solids and may also contain other ingredients including, but not limited to, fillers, pigments, and modifying resins.

TINT BASE means an architectural coating to which colorant is added after packaging in sale units to produce a desired color.

TRAFFIC MARKING COATING means a coating labeled and formulated for marking and striping streets, highways, or other traffic surfaces including, but not limited to, curbs, driveways, parking lots, sidewalks, and airport runways.

UNDERCOATER means a coating labeled and formulated to provide a smooth surface for subsequent coatings.

VARNISH means a clear or semi-transparent wood coating, excluding lacquers and shellacs, formulated to dry by chemical reaction on exposure to air. Varnishes may contain small amounts of pigment to color a surface, or to control the final sheen or gloss of the finish.

VOC CONTENT means the weight of VOC per volume of coating, calculated according to the procedures specified in 310 CMR 7.25(11)(f)1.

WATERPROOFING CONCRETE/MASONRY SEALER means a clear or pigmented film-forming coating that is labeled and formulated for sealing concrete and masonry to provide resistance against water, alkalis, acids, ultraviolet light, and staining.

WATERPROOFING SEALER means a coating labeled and formulated for application to a porous substrate for the primary purpose of preventing the penetration of water.

WOOD PRESERVATIVE means a coating labeled and formulated to protect exposed wood from decay or insect attack that is registered with both the U.S. EPA under the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. § 136, *et seq.*) and with the Massachusetts Pesticide Control Act.

(c) Standards.

1. VOC Content Limits. Except as provided in 310 CMR 7.25(11)(c)2. Through 310 CMR 7.25(11)(c)4., 310 CMR 7.25(11)(c)6., and 310 CMR 7.25(11)(c)7., no person subject to 310 CMR 7.25 shall:
 - a. manufacture or blend for sale within Massachusetts;
 - b. supply, sell, or offer for sale within Massachusetts; or
 - c. solicit for application or apply within Massachusetts any architectural coating with a VOC content in excess of the corresponding limit specified in 310 CMR 7.25(11)(c)1.: *Table 1*.

Table 1. VOC Content Limits for Architectural And Industrial Maintenance Coatings Effective January 1, 2009

Coating Category	VOC Content Limit (grams/liter)
Flat Coatings	100
Non-flat Coatings	150
Non-flat High Gloss Coatings	250
SPECIALTY COATINGS	
Antenna Coatings	530
Antifouling Coatings	400

Bituminous Roof Coatings	300
Bituminous Roof Primers	350
Bond Breakers	350
Calcimine Recoater	475
Clear Wood Coatings;	
Clear Brushing Lacquers	680
Lacquers (including lacquer sanding sealers)	550
Sanding Sealers (other than lacquer sanding sealers)	350
Varnishes	350
Conversion Varnishes	725
Concrete Curing Compounds	350
Concrete Surface Retarders	780
Dry Fog Coatings	400
Faux Finishing Coatings	350
Fire Resistive Coatings	350
Fire Retardant Coatings	
Clear	650
Opaque	350
Floor Coatings	250
Flow Coatings	420
Form release Compounds	250
Graphic Arts Coatings (Sign Paints)	500
High Temperature Coatings	420
Impacted Immersion Coatings	780
Industrial Maintenance Coatings	340
Low solids Coatings	120
Magnesite Cement Coatings	450
Mastic Texture Coatings	300
Metallic Pigmented Coatings	500
Multi-color Coatings	250
Nuclear Coatings	450
Pre Treatment Wash Primers	420
Primers, Sealers, and Undercoaters	200
Quick Dry Enamels	250
Quick Dry Primers, Sealers and Undercoaters	200
Recycled Coatings	250
Roof Coatings	250
Rust Preventative Coatings	400
Shellacs	
Clear	730
Opaque	550
Specialty Primers, Sealers, and Undercoaters	350
Stains	250
Swimming Pool Coatings	340

Swimming Pool Repair and Maintenance Coatings	340
Temperature indicator Safety Coatings	550
Thermoplastic Rubber Coatings and Mastics	550
Traffic Marking Coatings	150
Waterproofing Sealers	250
Waterproofing Concrete/Masonry Sealers	400
Wood Preservatives	350

Limits are expressed in grams of VOC per liter of coating thinned to the manufacturer's maximum recommendation, excluding the volume of any water, exempt compounds, or colorant added to tint bases.

2. Most Restrictive VOC Limit. If anywhere on the container of any architectural coating, or any label or sticker affixed to the container, or in any sales, advertising, or technical literature supplied by a manufacturer or anyone acting on its behalf, any representation is made that indicates that the coating meets the definition of, or is recommended for use, for more than one of the coating categories specified in 310 CMR 7.25(11)(c)1., then the lowest VOC content limit shall apply. 310 CMR 7.25(11)(c)2. does not apply to the following coating categories:
 - a. Lacquer coatings (including lacquer sanding sealers).
 - b. Metallic pigmented coatings.
 - c. Shellacs.
 - d. Fire-retardant coatings.
 - e. Pretreatment wash primers.
 - f. Industrial maintenance coatings.
 - g. Low-solids coatings.
 - h. Wood preservatives.
 - i. High-temperature coatings.
 - j. Temperature-indicator safety coatings.
 - k. Antenna coatings.
 - l. Antifouling coatings.
 - m. Flow coatings.
 - n. Bituminous roof primers.
 - o. Specialty primers, sealers, and undercoaters.
 - p. Calcimine recoaters.
 - q. Concrete surface retarders.
 - r. Conversion varnishes.
 - s. Impacted Immersion Coatings.
 - t. Nuclear coatings.
 - u. Thermoplastic rubber coating and mastic.

3. Sell-through of Coatings. A coating manufactured prior to January 1, 2009, may be sold, supplied, offered for sale, or applied after January 1, 2009, until January 1, 2012,

so long as the coating complied with the VOC content standards and other applicable requirements in effect at the time the coating was manufactured. 310 CMR 7.25(11)(c)3. shall not apply if:

- a. A coating does not display the date on which the product was manufactured or a code indicating such date as required by 310 CMR 7.25(11)(d)1.a.i.; or
 - b. The manufacturer has not filed an explanation of the code with the Department by the deadlines specified in 310 CMR 7.25(11)(d)1.a.ii.(i) for a coating on which the manufacturer has used a code indicating the date of manufacture that is different than the code specified in 310 CMR 7.25(11)(d)1.a.ii.(ii).
4. Exclusions. The VOC content standards specified in 310 CMR 7.25(11)(c)1. Shall not apply to:
- a. Any aerosol coating product.
 - b. Any architectural coating that is sold in a container with a volume of one liter (1.057 quart) or less.
5. Coatings Not Listed in 310 CMR 7.25(11)(c)1.: Table 1. For any coating that does not meet any of the definitions for the specialty coatings categories listed in 310 CMR 7.25(11)(c)1.: *Table 1*, the VOC content limit shall be determined by classifying the coating as a flat coating, non-flat coating, or non-flat high gloss coating based on its gloss, as defined in 310 CMR 7.25(11)(b), and the corresponding flat, non-flat, or nonflat high gloss coating limit shall apply.
6. Lacquers. Notwithstanding the provisions of 7.25(11)(c)1., a person or facility may add up to 10% by volume of VOC to a lacquer to avoid blushing of the finish during days with relative humidity greater than 70% and temperature below 65/F, at the time of application, provided that the coating contains acetone and no more than 550 grams of VOC per liter of coating, less water and exempt compounds, prior to the addition of VOC.
7. Products Registered Under FIFRA.
- a. AIM coatings registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA; 7 U.S.C. § 136-136y) must comply with the VOC standards specified in 310 CMR 7.25(11)(c)1.: *Table 1*, by 12 months after the VOC limit compliance date specified in 310 CMR 7.25(11)(c)1. Such products must also be registered under the Massachusetts Pesticide Control Act.

- b. The labeling requirements of 310 CMR 7.25(11)(d) do not apply to products that are registered as pesticides under FIFRA and the Massachusetts Pesticide Control Act.
 - c. For coatings that are registered under FIFRA, the three-year sell-through period provided in 310 CMR 7.25(11)(c)3. shall begin one year after the date specified in 310 CMR 7.25(11)(c)1.
8. Thinning. No person who applies or solicits the application of any architectural coating shall apply a coating that is thinned to exceed the applicable VOC limit specified in Table 1.
9. Painting Practices. All architectural coating containers used to apply the contents therein to a surface directly from the container by pouring, siphoning, brushing, rolling, padding, ragging, or other means, shall be closed when not in use. These architectural coatings containers include, but are not limited to, drums, buckets, cans, pails, trays, or other application containers. Containers of any VOC-containing materials used for thinning and cleanup shall also be closed when not in use.

(d) Labeling Requirements.

1. Each manufacturer of any architectural coating subject to this rule shall display the information required in 310 CMR 7.25(11)(d)1.a. through 7.25(11)(d)1.c. on the coating container (or label) in which the coating is sold or distributed.
- a. Product Dating.
 - i. The date the coating was manufactured, or a code representing the date, shall be indicated on the label, lid, or bottom of the container.
 - ii. Explanation of the Code.
 - (i) If the manufacturer uses a code indicating the date of manufacture for any coating, an explanation of the code shall be filed with the Department no later than:
 - the effective date of the applicable standard specified in 310 CMR 7.25(11)(c)1.; or, the date on which the product first becomes available for sale, distribution, or use within Massachusetts, whichever is later; and
 - 12 months prior to any date on which the product first becomes available for sale, distribution, or use within Massachusetts after any modification to an existing product's date-code format.

- (ii) A manufacturer who uses the following code to indicate the date of manufacture shall not be subject to the requirements of 310 CMR 7.25(11)(d)1.a.ii.(i), if the code is represented separately from other codes on the product container so that it is easily recognizable:

YY DDD

where:

YY = two digits representing the year in which the product was manufactured.

DDD = three digits representing the day of the year on which the product was manufactured, with “001” representing the first day of the year, “002” representing the second day of the year, and so forth (*i.e.*, the “Julian date”).

- iii. No person shall erase, alter, deface or otherwise remove or make illegible any date or code indicating the date of manufacture from any regulated product container without the express authorization of the manufacturer.
 - iv. Codes indicating the date of manufacture are public information and may not be claimed as confidential.
- b. Thinning Recommendations. A statement of the manufacturer's recommendation regarding thinning of the coating shall be indicated on the label or lid of the container. 310 CMR 7.25(11)(d)1.b. does not apply to the thinning of architectural coatings with water. If thinning of the coating prior to use is not necessary, the recommendation must specify that the coating must be applied without thinning.
- c. VOC Content. Each container of any coating subject to this rule shall display either the maximum or the actual VOC content of the coating, as supplied, including the maximum thinning as recommended by the manufacturer. VOC content shall be displayed in grams of VOC per liter of coating. VOC content displayed shall be calculated using product formulation data, or shall be determined using the test methods in 310 CMR 7.25(11)(f)2. The equations in 310 CMR 7.25(11)(f)1. Shall be used to calculate VOC content.
2. Industrial Maintenance Coatings. In addition to the information specified in 310 CMR 7.25(11)(d)1.a. through 310 CMR 7.25(11)(d)1.c., each manufacturer of any industrial maintenance coating subject to this rule shall display on the label or the lid of the container in which the coating is sold or distributed one or more of the following descriptions:

- a. "For industrial use only."
 - b. "For professional use only."
 - c. "Not for residential use." or "Not intended for residential use."
3. Clear Brushing Lacquers. The labels of all clear brushing lacquers shall prominently display the statements "For Brush Application Only" and "This product must not be thinned or sprayed."
 4. Rust Preventive Coatings. The labels of all rust preventive coatings shall prominently display the statement "For Metal Substrates Only."
 5. Specialty Primers, Sealers, and Undercoaters. The labels of all specialty primers, sealers, and undercoaters shall prominently display one or more of the following descriptions:
 - a. For blocking stains.
 - b. For fire-damaged substrates.
 - c. For smoke-damaged substrates.
 - d. For water-damaged substrates.
 - e. For excessively chalky substrates.
 6. Quick Dry Enamels. The labels of all quick dry enamels shall prominently display the words "Quick Dry" and the dry hard time.
 7. Non-flat High Gloss Coatings. The labels of all non-flat high gloss coatings shall prominently display the words "High Gloss."

(e) Recordkeeping and Reporting Requirements.

1. Each manufacturer of a product subject to a VOC content limit in 310 CMR 7.25(11)(c) of this regulation shall keep records demonstrating compliance with the VOC content limits in accordance with 310 CMR 7.25(11)(f). Such records shall clearly list each product by name (and identifying number, if applicable) as shown on the product label and in applicable sales and technical literature, the VOC content as determined in 310 CMR 7.25(11)(f), the names and chemical abstract service (CAS) numbers of the VOC constituents in the product, the dates of the VOC content determinations, the coating category and the applicable VOC content limit. These records shall be kept on site for a period not less than three years and shall be made available to the Department within 90 days of a written request.
2. A responsible official from each manufacturer shall, upon request of the Department, provide data concerning the distribution and sales of coatings subject to a VOC content limit in 310 CMR 7.25(11)(c). The responsible official shall within 90 days provide information including, but not limited to:

- a. the name and mailing address of the manufacturer;
- b. the name, address and telephone number of a contact person;
- c. the name of the product as it appears on the label and the coating category in 310 CMR 7.25(11)(c) under which it is regulated;
- d. whether it is marketed for interior or exterior use or both;
- e. the number of gallons sold in Massachusetts in containers greater than one liter and less than one liter;
- f. the actual VOC content and VOC content limit in grams per liter. If thinning is recommended, list the actual VOC content and VOC content after recommended thinning. If containers less than one liter have a different VOC content than containers greater than one liter, list separately;
- g. the names and CAS numbers of the VOC constituents in the product; and
- h. the names and CAS numbers of any compounds in the products specifically exempted under 310 CMR 7.25(11)(c).

(f) Compliance Provisions and Test Methods.

1. Calculation of VOC Content. For the purpose of determining compliance with the VOC content limits in 310 CMR 7.25(11)(c)1.: *Table 1*, the VOC content of a coating shall be determined according to 310 CMR 7.25(11)(f)1.a. or 310 CMR 7.25(11)(f)1.b., as appropriate. The VOC content of a tint base shall be determined without colorant that is added after the tint base is manufactured.

- a. For all coatings other than low-solids coatings, the VOC content of the coating in units of grams of VOC per liter of coating thinned to the manufacturer's maximum recommendation, excluding the volume of any water and exempt compounds, shall be determined using Equation (1) as follows:

$$\text{VOC Content} = (W_v - W_w - W_{ec}) / (V_c - V_w - V_{ec}) \text{ Equation (1)}$$

Where,

VOC Content = grams of VOC per liter of coating

W_v = weight of volatiles, in grams

W_w = weight of water, in grams

W_{ec} = weight of exempt compounds, in grams

V_c = volume of coating, in liters

V_w = volume of water, in liters

V_{ec} = volume of exempt compounds, in liters

- b. For low-solids coatings, the VOC content in units of grams of VOC per liter of coating thinned to the manufacturer's maximum recommendation, including the volume of any water and exempt compounds, shall be determined using Equation (2) as follows:

$$\text{VOC Content (ls)} = (W_v - W_w - W_{ec}) / (V_c) \text{ Equation (2)}$$

where,

VOC Content (ls) = the VOC content of a low solids coating in grams per liter of coating

W = weight of volatile, in grams

W_w = weight of water, in grams

W_{ec} = weight of exempt compounds, in grams

V_c = volume of coating, in liters

2. VOC Content of Coatings. Except as provided in 310 CMR 7.25(11)(f)3. and (f)4., U.S. EPA Method 24 shall be used to determine the physical properties of a coating in order to perform the calculations in 310 CMR 7.25(11)(f)1. An alternative method to determine the VOC content of coatings is SCAQMD Method 304-91 (Revised February 1996). The exempt compounds content shall be determined by SCAQMD Method 303-91 (Revised August 1996). The manufacturer may use U.S. EPA Method 24, an alternative test method as provided in 310 CMR 7.25(11)(f)3., formulation data, or any other reasonable means (*e.g.*, quality assurance records, recordkeeping) to determine the VOC content of the coating. However, if there are any inconsistencies between the results of a Method 24 test and any other means for determining VOC content, the Method 24 results shall govern, except when an alternative method is approved by EPA. The Department may require the manufacturer to conduct a Method 24 analysis.
3. Alternative Test Methods. Other test methods demonstrated to provide results that are acceptable for purposes of determining compliance with 310 CMR 7.25(11)(c)1. May be used provided that the manufacturer has received an approval from CARB for the alternative testing method to be used in architectural and maintenance coatings VOC content determination. A copy of CARB's approval, including all conditions established by CARB applicable to the testing procedure, shall be submitted to the Department within 30 days upon the Department's written request.
4. Methacrylate Traffic Coating Markings. Analysis of methacrylate multi-component coatings used as traffic marking coatings shall be conducted according to a modification of U.S. EPA Method 24 (40 CFR 59, subpart D, Appendix A). This

method has not been approved for methacrylate multicomponent coatings used for purposes other than traffic marking coatings or for other classes of multicomponent coatings.

5. Test Methods. The following test methods are incorporated by reference herein, and shall be used to test coatings subject to the provisions of this rule:
- a. Flame Spread Index. The flame-spread index of a fire-retardant coating shall be determined by the ASTM Designation E 84-99, *Standard Test Method for Surface Burning Characteristics of Building Materials*.
 - b. Fire-resistance Rating. The fire-resistance rating of a fire-resistive coating shall be determined by ASTM designation E 119-98, *Standard Test Methods for Fire Tests of Building Construction Materials*
 - c. Gloss Determination. The gloss of a coating shall be determined by ASTM Designation D 523-89 (1999), *Standard Test Method for Specular Gloss*.
 - d. Metal Content of Coatings. The metallic content of a coating shall be determined by SCAQMD Method 318-95, *Determination of Weight Percent Elemental Metal in Coatings by X-Ray Diffraction, SCAQMD Laboratory Methods of Analysis for Enforcement Samples*.
 - e. Acid Content of Coatings. The acid content of a coating shall be determined by ASTM Designation D 1613-96, *Standard Test Method for Acidity in Volatile Solvents and Chemical Intermediates Used in Paint, Varnish, Lacquer and Related Products*.
 - f. Drying Times. The set-to-touch, dry-hard, dry-to-touch and dry-to-recoat times of a coating shall be determined by ASTM Designation D 1640-95, *Standard Methods for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature*. The tack free time of a quick-dry enamel coating shall be determined by the Mechanical Test Method of ASTM Designation D 1640-95.
 - g. Surface Chalkiness. The chalkiness of a surface shall be determined using ASTM Designation D 4214-98, *Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films*.
 - h. Exempt Compounds – Siloxanes. To determine the cyclic, branched, or linear completely methylated siloxanes content of a coating, the coating shall be analyzed according to BAAQMD Method 43, *Determination of Volatile Methylsiloxanes in Solvent-Based Coatings, Inks, and Related Materials*, BAAQMD Manual of Procedures, Volume III, adopted November 6, 1996.
 - i. Exempt Compounds - Parachlorobenzotrifluoride (PCBTF). To determine parachlorobenzotrifluoride content of a coating, the coating shall be analyzed according to BAAQMD Method 41, *Determination of Volatile Organic Compounds in Solvent-Based Coatings and Related Materials Containing Parachlorobenzotrifluoride*, BAAQMD Manual of Procedures, Volume III, adopted December 20, 1995.

- j. Exempt Compounds – Volatile Organic Compounds Exempted Under U.S. EPA Method 24. To determine the composition of a coating with respect to volatile organic compounds that are exempt under U.S. EPA Method 24, the coating shall be analyzed according to SCAQMD Method 303-91 (Revised August 1996), *Determination of Exempt Compounds*, SCAQMD "Laboratory Methods of Analysis for Enforcement Samples."
- k. VOC Content of Coatings. The VOC content of a coating shall be determined by U.S. EPA Method 24 as it exists in appendix A of 40 Code of Federal Regulations (CFR) Part 60, *Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings*.
- l. Alternative Methods for Determining VOC Content of Coatings. The VOC content of coatings may be determined by either U.S. EPA Method 24 or by SCAQMD Method 304-91 (Revised 1996), *Determination of Volatile Organic Compounds (VOC) in Various Materials*, SCAQMD *Laboratory Methods of Analysis for Enforcement Samples*.
- m. Methacrylate Traffic Marking Coatings. The VOC content of methacrylate multi-component coatings used as traffic marking coatings shall be determined by the procedures in 40 CFR part 59, subpart D, appendix A, *Determination of Volatile Matter Content of Methacrylate Multi-component Coatings Used as Traffic Marking Coatings*, (September 11, 1998).

(12) Consumer Products.

(a) Applicability.

1. Except as provided in 310 CMR 7.25(12)(a)2., the requirements of 310 CMR 7.25(12) apply to any person who, on or after January 1, 2009, sells, supplies, offers for sale, or manufactures any consumer product listed in 310 CMR 7.25(12)(c)1. for use in Massachusetts.
2. a. The provisions of 310 CMR 7.25(12) do not apply to any person who, sells, supplies, offers for sale, or manufactures in Massachusetts any consumer product specified in 310 CMR 7.25(12)(b) that is for exclusive use outside of Massachusetts as long as the manufacturer or distributor can demonstrate both that the consumer product is intended for shipment and use outside of Massachusetts and that the manufacturer or distributor has taken reasonable prudent precautions to assure that the consumer product is not distributed to Massachusetts.

b. The provision in 310 CMR 7.25(12)(a)2.a. does not apply to consumer products that are sold, supplied, or offered for sale by any person to retail outlets in Massachusetts.

(b) Definitions. Terms used in 310 CMR 7.25 are defined at 310 CMR 7.00: *Definitions* or in 310 CMR 7.25. Where a term is defined in both 310 CMR 7.00: *Definitions* and in 310 CMR 7.25, the definition in 310 CMR 7.25 shall apply.

ACP EXECUTIVE ORDER means the document approved and signed by CARB that includes the conditions and requirements of the ACP, and which allows a manufacturer to sell products in the state of California under the ACP.

ADHESIVE means any product that is used to bond one surface to another by attachment. Adhesive does not include products used on humans and animals, adhesive tape, contact paper, wallpaper, shelf liners, or any other product with an adhesive incorporated onto or in an inert substrate. For Contact Adhesive, “adhesive” does not include units of product, less packaging, which consist of more than one gallon. For Construction, Panel, and Floor Covering Adhesive, and General Purpose Adhesive, “adhesive” does not include units of product, less packaging, which weigh more than one pound and consist of more than 16 fluid ounces. This limitation does not apply to aerosol adhesives.

ADHESIVE REMOVER means a product designed to remove adhesive from either a specific type of substrate or a variety of types of substrates. Adhesive removers do not include products that remove adhesives intended for use on humans or animals. For the purpose of 310 CMR 7.25(11)(b): ADHESIVE REMOVER and 310 CMR 7.25(11)(b): ADHESIVE REMOVER 1. through 4. , the term “adhesive” shall mean a substance used to bind one or more materials. Adhesive includes, but is not limited to: caulks; sealants; glues; or similar substances used for the purpose of forming a bond.

1. FLOOR AND WALL COVERING ADHESIVE REMOVER means a product designed or labeled to remove floor or wall coverings and associated adhesive from the underlying substrate;

2. GASKET OR THREAD LOCKING ADHESIVE REMOVER means a product designed or labeled to remove gaskets or thread locking adhesives. Products labeled for dual use as a paint stripper and gasket remover and/or thread locking adhesive remover are considered Gasket or Thread Locking Adhesive Remover.

3. GENERAL PURPOSE ADHESIVE REMOVER means a product designed or labeled to remove cyanoacrylate adhesives as well as non-reactive adhesives or residue from a variety of types of substrates. General Purpose Adhesive Remover includes, but is not limited to, products that remove thermoplastic adhesives; pressure sensitive adhesives; dextrin or starch-based adhesives; casein glues; rubber or latex-based adhesives; as well as products that remove stickers; decals; stencils; or similar materials. General Purpose Adhesive Remover does not include Floor or Wall Covering Adhesive Remover.

4. SPECIALTY ADHESIVE REMOVER means a product designed to remove reactive adhesives from a variety of substrates. Reactive adhesives include adhesives that require a hardener or catalyst in order for the bond to occur. Examples of reactive adhesives include, but are not limited to: epoxies, urethanes, and silicones. Specialty Adhesive Remover does not include Gasket or Thread Locking Adhesive Remover.

AEROSOL ADHESIVE means an aerosol adhesive product in which the spray mechanism is permanently housed in a non-refillable can designed for hand-held application without the need for

ancillary hoses or spray equipment. Aerosol Adhesives include Special Purpose Spray Adhesives, Mist Spray Adhesives, and Web Spray Adhesives.

AEROSOL COOKING SPRAY means any aerosol product designed either to reduce sticking on cooking and baking surfaces or to be applied on food, or both.

AEROSOL PRODUCT means a pressurized spray system that dispenses product ingredients by means of a propellant contained in a product's container or a mechanically induced force. Aerosol Product does not include Pump Spray.

AGRICULTURAL USE means the use of any pesticide or method or device for the control of pests in connection with the commercial production, storage or processing of any animal or plant crop. Agricultural Use does not include the sale or use of pesticides in properly labeled packages or containers that are intended for home use; use in structural pest control; industrial use; or institutional use. For the purposes of this definition only:

1. HOME USE means use in a household or its immediate environment.
2. STRUCTURAL PEST CONTROL USE means a use requiring a license under the Massachusetts Pesticide Control Act.
3. INDUSTRIAL USE means use for or in a manufacturing, mining, or chemical process or use in the operation of factories, processing plants, and similar sites.
4. INSTITUTIONAL USE means use within the lines of or on property necessary for the operation of buildings such as hospitals, schools, libraries, and auditoriums.

AIR FRESHENER means any consumer product including, but not limited to, sprays, wicks, powders, and crystals, designed for the purpose of masking odors, or freshening, cleaning, scenting, or deodorizing the air. Air Freshener includes dual-purpose air freshener/ disinfectant products. Air Freshener does not include products that are used on the human body, products that function primarily as cleaning products as indicated on a product label, or Toilet/Urinary Care Products, disinfectant products claiming to deodorize by killing germs on surfaces, or institutional/industrial disinfectants when offered for sale solely through institutional and industrial channels of distribution. Air Freshener does include spray disinfectants and other products that are expressly represented for use as air fresheners, except institutional and industrial disinfectants when offered for sale through institutional and industrial channels of distribution. To determine whether a product is an air freshener, all verbal and visual representations regarding product use on the label or packaging and in the product's literature and advertising may be considered. The presence of, and representations about, a product's fragrance and ability to deodorize (resulting from surface application) shall not constitute a claim of air freshening.

ALL OTHER CARBON CONTAINING COMPOUNDS means any other compound that contains at least one carbon atom and is not an Exempt Compound or an LVP-VOC.

ALL OTHER FORMS means all consumer product forms for which no form-specific VOC standard is specified. Unless specified otherwise by the applicable VOC standard, All Other Forms include, but are not limited to, solids, liquids, wicks, powders, crystals, and cloth or paper wipes (towelettes).

ALTERNATIVE CONTROL PLAN or ACP means an emissions-averaging program approved by CARB pursuant to California Code of Regulations, Title 17, Subchapter 8.5, Article 4, Sections 94540-94555.

ANTIMICROBIAL HAND OR BODY CLEANER OR SOAP means a cleaner, or soap, that is designed to reduce the level of microorganisms on the skin through germicidal activity. Antimicrobial Hand or Body Cleaner or Soap includes, but is not limited to antimicrobial hand or body washes/cleaners, food-handler hand washes, healthcare personnel hand washes, pre-operative skin preparations and surgical scrubs. Antimicrobial Hand or Body Cleaner or Soap does not include prescription drug products, Antiperspirants, Astringent/Toner, Deodorant, Facial Cleaner or Soap, General-use Hand or Body Cleaner or Soap, Hand Dishwashing Detergent (including antimicrobial), Heavy-duty Hand Cleaner or Soap, Medicated Astringent/Medicated Toner, and Rubbing Alcohol.

ANTIPERSPIRANT means any product including, but not limited to, aerosols, roll-ons, sticks, pumps, pads, creams, and squeeze bottles, that is intended by the manufacturer to be used to reduce perspiration in the human axilla by at least 20% in at least 50% of a target population.

ANTI-STATIC PRODUCT means a product that is labeled to eliminate, prevent, or inhibit the accumulation of static electricity. Anti-Static Product does not include Electronic Cleaner, Floor Polish or Wax, Floor Coating, and products that meet the definition of Aerosol Coating Product or Architectural Coating.

ARCHITECTURAL COATING means a coating to be applied to stationary structures or the appurtenances at the site of installation, to portable buildings at the site of installation, to pavements, or to curbs.

ASTM means the American Society for Testing and Materials.

ASTRINGENT/TONER means any product not regulated as a drug by the United States Food and Drug Administration (FDA) that is applied to the skin for the purpose of cleaning or tightening pores. This category also includes clarifiers and substrate-impregnated products. This category does not include any hand, face, or body cleaner or soap product, Medicated Astringent/Medicated Toner, cold cream, lotion, or antiperspirant.

AUTOMOTIVE BRAKE CLEANER means a cleaning product designed to remove oil, grease, brake fluid, brake pad material or dirt from motor vehicle brake mechanisms.

AUTOMOTIVE HARD PASTE WAX means an automotive wax or polish that is:

1. designed to protect and improve the appearance of automotive paint surfaces; and
2. a solid at room temperature; and
3. contains 0% water by formulation.

AUTOMOTIVE INSTANT DETAILER means a product designed for use in a pump spray that is applied to the painted surface of automobiles and wiped off prior to the product being allowed to dry.

AUTOMOTIVE RUBBING OR POLISHING COMPOUND means a product designed primarily to remove oxidation, old paint, scratches or swirl marks, and other defects from the painted surfaces of motor vehicles without leaving a protective barrier.

AUTOMOTIVE WAX, POLISH, SEALANT OR GLAZE means a product designed to seal out moisture, increase gloss, or otherwise enhance a motor vehicle's painted surfaces. Automotive Wax, Polish, Sealant or Glaze includes, but is not limited to, products designed for use in autobody repair shops and drive-through car washes, as well as products designed for the general public. Automotive Wax, Polish, Sealant or Glaze does not include Automotive Rubbing or Polishing Compounds, automotive wash and wax products, surfactant-containing car wash products, and products designed for use on unpainted surfaces such as bare metal, chrome, glass, or plastic.

AUTOMOTIVE WINDSHIELD WASHER FLUID means any liquid designed for use in a motor vehicle windshield washer system either as antifreeze or for the purpose of cleaning, washing, or wetting the windshield. Automotive windshield washer fluid does not include fluids placed by the manufacturer in a new vehicle.

BATHROOM AND TILE CLEANER means a product designed to clean tile or surfaces in bathrooms. Bathroom and Tile Cleaner does not include products designed primarily to clean toilet bowls, toilet tanks, or urinals.

BUG AND TAR REMOVER means a product labeled to remove either or both of the following from painted motor vehicle surfaces without causing damage to the finish:

1. biological-type residues such as insect carcasses and tree sap; and
2. road grime, such as road tar, roadway paint markings, and asphalt.

CARB means the California Air Resources Board.

CARBURETOR OR FUEL-INJECTION AIR INTAKE CLEANERS means a product designed to remove fuel deposits, dirt, or other contaminants from a carburetor, choke, throttle body of a fuel-injection system, or associated linkages. Carburetor or fuel-injection air intake cleaners does not include products designed exclusively for direct introduction into the fuel lines or fuel storage tank prior to introduction into the carburetor or fuel injectors.

CARPET AND UPHOLSTERY CLEANER means a cleaning product designed for the purpose of eliminating dirt and stains on rugs, carpeting, and the interior of motor vehicles and/or on household furniture or objects upholstered or covered with fabrics such as wool, cotton, nylon or other synthetic fabrics. Carpet and Upholstery Cleaner includes, but is not limited to, products that make fabric protectant claims. Carpet and Upholstery Cleaner does not include General Purpose Cleaners, Spot Removers, vinyl or leather cleaners, dry cleaning fluids, or products designed exclusively for use at industrial facilities engaged in furniture or carpet manufacturing.

CHARCOAL LIGHTER MATERIAL means any combustible material designed to be applied on, incorporated in, added to, or used with charcoal to enhance ignition. Charcoal Lighter Material does not include any of the following:

1. electrical starters and probes;

2. metallic cylinders using paper tinder;
3. natural gas;
4. propane; and
5. fat wood.

COLORANT means any pigment or coloring material used in a consumer product for an aesthetic effect, or to dramatize an ingredient.

CONSTRUCTION, PANEL, AND FLOOR COVERING ADHESIVE means any one component adhesive that is designed exclusively for the installation, remodeling, maintenance, or repair of:

1. structural and building components that include, but are not limited to, beams, trusses, studs, paneling (such as drywall or drywall laminates, fiberglass reinforced plastic (FRP), plywood, particle board, insulation board, pre-decorated hardboard or tileboard, *etc.*), ceiling and acoustical tile, molding, fixtures, countertops or countertop laminates, cover or wall bases, and flooring or subflooring; or
2. floor or wall coverings that include, but are not limited to, wood or simulated wood covering, carpet, carpet pad or cushion, vinyl backed carpet, flexible flooring material, non-resilient flooring material, mirror tiles and other types of tiles, and artificial grass. Construction, Panel, and Floor Covering Adhesive does not include Floor Seam Sealer.

CONSUMER means any person who purchases or acquires any product for personal, family, household, or institutional use. Persons acquiring a product for resale are not Consumers for that product.

CONSUMER PRODUCT means a chemically formulated product used by household and institutional consumers including, but not limited to, detergents; cleaning compounds; polishes; floor finishes; cosmetics; personal care products; home, lawn, and garden products; disinfectants; sanitizers; aerosol paints; and automotive specialty products; but does not include other paint products, furniture coatings, or architectural coatings. Consumer Product, as defined in 310 CMR 7.25, includes Aerosol Adhesives used for consumer, industrial, or commercial uses.

CONTACT ADHESIVE means an adhesive that:

1. is designed for application to both surfaces to be bonded together; and
2. is allowed to dry before the two surfaces are placed in contact with each other; and
3. forms an immediate bond that is impossible, or difficult, to reposition after both adhesive-coated surfaces are placed in contact with each other; and
4. does not need sustained pressure or clamping of surfaces after the adhesive-coated surfaces have been brought together using sufficient momentary pressure to establish full contact between both surfaces. Contact Adhesive does not include rubber cements that are primarily intended for use on paper substrates. Contact Adhesive also does not include vulcanizing fluids that are designed and labeled for tire repair only.

CONTACT ADHESIVE - GENERAL PURPOSE means any contact adhesive that is not a Contact Adhesive - Special Purpose.

CONTACT ADHESIVE - SPECIAL PURPOSE means a contact adhesive that:

1. is used to bond melamine-covered board, unprimed metal, unsupported vinyl, Teflon, ultra-high molecular weight polyethylene, rubber, high pressure laminate or wood veneer 1/16 inch or less in thickness to any porous or nonporous surface, and is sold in units of product, less packaging, that contain more than eight fluid ounces; or
2. is used in automotive applications that are:
 - a. automotive under-the-hood applications requiring heat, oil or gasoline resistance; or
 - b. body-side molding, automotive weather-strip or decorative trim.

CONTAINER/PACKAGING means the part or parts of the consumer or institutional product that serve only to contain, enclose, incorporate, deliver, dispense, wrap or store the chemically formulated substance or mixture of substances which is solely responsible for accomplishing the purposes for which the product was designed or intended. Container/ Packaging includes any article onto or into which the principal display panel and other accompanying literature or graphics are incorporated, etched, printed or attached.

CRAWLING BUG INSECTICIDE means any insecticide product that is designed for use against ants, cockroaches, or other household crawling arthropods, including, but not limited to, mites, silverfish or spiders. Crawling Bug Insecticide does not include products designed to be used exclusively on humans or animals, or any house dust mite product. For the purposes of 310 CMR 7.25(11)(b): CRAWLING BUG INSECTICIDE only:

1. HOUSE DUST MITE PRODUCT means a product whose label, packaging, or accompanying literature states that the product is suitable for use against house dust mites, but does not indicate that the product is suitable for use against ants, cockroaches, or other household crawling arthropods.
2. HOUSE DUST MITE means mites that feed primarily on skin cells shed in the home by humans and pets and which belong to the phylum Arthropoda, the subphylum Chelicerata, the class Arachnida, the subclass Acari, the order Astigmata, and the family Pyroglyphidae.

DATE-CODE means the day, month and year on which the product was manufactured, filled, or packaged, or a code indicating such a date.

DEODORANT means any product including, but not limited to, aerosols, roll-ons, sticks, pumps, pads, creams, and squeeze bottles, that indicates or depicts on the container or packaging, or any sticker or label affixed thereto, that the product can be used on or applied to the human axilla to provide a scent and or minimize odor. A Deodorant Body Spray product that indicates or depicts on the container or packaging, or any sticker or label affixed thereto, that it can be used on or applied to the human axilla is a Deodorant as defined in 310 CMR 7.25(12)(b).

DEODORANT BODY SPRAY is a Personal Fragrance Product, as defined in 310 CMR 7.25(12)(b), with 20% or less fragrance that is designed for application all over the human body to provide a scent. A Deodorant Body Spray product that indicates or depicts on the container or packaging, or any sticker or label affixed thereto, that it can be used on or applied to the human axilla is a Deodorant as defined in 310 CMR 7.25(12)(b).

DEVICE means any instrument or contrivance other than a firearm that is designed for trapping, destroying, repelling, or mitigating any pest or any other form of plant or animal life (other than

human and other than bacterium, virus, or another microorganism on or in living human or other living animals); but not including equipment used for the application of pesticides when sold separately therefrom.

DISINFECTANT means any product intended to destroy or irreversibly inactivate infectious or other undesirable bacteria, pathogenic fungi, or viruses on surfaces or inanimate objects and whose label is registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA, 7 U.S.C. 136, *et seq.*). Disinfectant does not include any of the following:

1. products designed solely for use on humans or animals;
2. products designed for agricultural use;
3. products designed solely for use in swimming pools, therapeutic tubs, or hot tubs;
4. products which, as indicated on the principal display panel or label, are designed primarily for use as bathroom and tile cleaners, glass cleaners, general purpose cleaners, toilet bowl cleaners, or metal polishes.

DISTRIBUTOR means any person to whom a consumer product is sold or supplied for the purposes of resale or distribution in commerce, except that manufacturers, retailers, and consumers are not distributors.

DOUBLE PHASE AEROSOL AIR FRESHENER means an aerosol air freshener with the liquid contents in two or more distinct phases that requires the product container be shaken before use to mix the phases, producing an emulsion.

DRY CLEANING FLUID means any non-aqueous liquid product designed and labeled exclusively for use on:

1. fabrics that are labeled “for dry clean only,” such as clothing or drapery; or
2. S-coded fabrics. Dry Cleaning Fluid includes, but is not limited to, those products used by commercial dry cleaners and commercial businesses that clean fabrics such as draperies at the customer’s residence or work place. Dry Cleaning Fluid does not include Spot Remover or Carpet and Upholstery Cleaner. For the purposes of 310 CMR 7.25(11)(b): DRY CLEANING FLUID, S-coded fabric means an upholstery fabric that is designed to be cleaned only with water-free spot cleaning products as specified by the Joint Industry Fabric Standards Committee.

DUSTING AID means a product designed to assist in removing dust and other soils from floors and other surfaces without leaving a wax or silicone based coating. Dusting Aid does not include Pressurized Gas Duster.

ELECTRICAL CLEANER means a product labeled to remove heavy soils such as grease, grime, or oil from electrical equipment, including, but not limited to, electric motors, armatures, relays, electric panels, or generators. Electrical Cleaner does not include General Purpose Cleaner, General Purpose Degreaser, Dusting Aid, Electronic Cleaner, Energized Electrical Cleaner, Pressurized Gas Duster, Engine Degreaser, Anti-static Product, or products designed to clean the casings or housings of electrical equipment.

ELECTRONIC CLEANER means a product labeled for the removal of dirt, moisture, dust, flux, or oxides from the internal components of electronic or precision equipment such as circuit boards, and the internal components of electronic devices, including but not limited to, radios, compact disc (CD) players, digital video disc (DVD) players, and computers. Electronic Cleaner does not include General Purpose Cleaner, General Purpose Degreaser, Dusting Aid, Pressurized Gas Duster, Engine Degreaser, Electrical Cleaner, Energized Electrical Cleaner, Anti-static Product, or products designed to clean the casings or housings of electronic equipment.

ENERGIZED ELECTRICAL CLEANER means a product that meets both of the following criteria:

1. the product is labeled to clean and/or degrease electrical equipment, where cleaning and/or degreasing is accomplished when electrical current exists, or when there is a residual electrical potential from a component such as a capacitor; and
2. the product label clearly displays the statements: "For Energized Equipment use only. Not to be used for motorized vehicle maintenance, or their parts." Energized Electrical Cleaner does not include Electronic Cleaner.

ENGINE DEGREASER means a cleaning product designed to remove grease, grime, oil and other contaminants from the external surfaces of engines and other mechanical parts.

EXISTING PRODUCT means any formulation of the same product category and form sold, supplied, manufactured, or offered for sale in Massachusetts prior to January 1, 2009, or any subsequently introduced identical formulation.

FABRIC PROTECTANT means a product designed to be applied to fabric substrates to protect the surface from soiling from dirt and other impurities or to reduce absorption of liquid into the fabric's fibers. Fabric Protectant does not include waterproofers, products designed for use solely on leather, or products designed for use solely on fabrics that are labeled for dry clean only and sold in containers of ten fluid ounces or less.

FABRIC REFRESHER means a product labeled to neutralize or eliminate odors on nonlaundered fabric including, but not limited to, soft household surfaces, rugs, carpeting, draperies, bedding, automotive interiors, footwear, athletic equipment, clothing and/or on household furniture or objects upholstered or covered with fabrics such as, but not limited to, wool, cotton, or nylon. Fabric Refresher does not include Anti-static Product, Carpet and Upholstery Cleaner, soft household surface sanitizers, Footwear or Leather Care Product, Spot Remover, or Disinfectant, or products labeled for application to both fabric and human skin. For the purposes of 310 CMR 7.25(11)(b): FABRIC REFRESHER only, soft household surface sanitizer means a product labeled to neutralize or eliminate odors on surfaces whose label is registered as a sanitizer under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA, 7 U.S.C. 136 *et seq.*).

FACIAL CLEANER OR SOAP means a cleaner or soap designed primarily to clean the face. Facial Cleaner or Soap includes, but is not limited to, facial cleansing creams, semisolids, liquids, lotions, and substrate-impregnated forms. Facial Cleaner or Soap does not include prescription drug products, Antimicrobial Hand or Body Cleaner or Soap, Astringent/Toner, General-use Hand or Body Cleaner or Soap, Medicated Astringent/Medicated Toner, or Rubbing Alcohol.

FAT WOOD means pieces of wood kindling with high naturally occurring levels of sap or resin that enhance ignition of the kindling. Fat wood does not include any kindling with substances added to enhance flammability, such as wax-covered or wax-impregnated wood-based products.

FLEA AND TICK INSECTICIDE means any insecticide product that is designed for use against fleas, ticks, their larvae, or their eggs. Flea and Tick Insecticide does not include products that are designed to be used exclusively on humans or animals and their bedding.

FLEXIBLE FLOORING MATERIAL means asphalt, cork, linoleum, no-wax, rubber, seamless vinyl, and vinyl composite flooring.

FLOOR COATING means an opaque coating that is labeled and formulated for application to flooring, including, but not limited to, decks, porches, steps, and other horizontal surfaces that may be subjected to foot traffic.

FLOOR POLISH OR WAX means a wax, polish, or any other product designed to polish, protect, or enhance floor surfaces by leaving a protective coating that is designed to be periodically replenished. Floor Polish or Wax does not include spray buff products, products designed solely for the purpose of cleaning floors, floor finish strippers, products designed for unfinished wood floors, and coatings subject to architectural coatings regulations.

FLOOR SEAM SEALER means any product designed and labeled exclusively for bonding, fusing, or sealing (coating) seams between adjoining rolls of installed flexible sheet flooring.

FLOOR WAX STRIPPER means a product designed to remove natural or synthetic floor polishes or waxes through breakdown of the polish or wax polymers, or by dissolving or emulsifying the polish or wax. Floor Wax Stripper does not include aerosol floor wax strippers or products designed to remove floor wax solely through abrasion.

FLYING BUG INSECTICIDE means any insecticide product that is designed for use against flying insects or other flying arthropods, including but not limited to flies, mosquitoes, moths, or gnats. Flying Bug Insecticide does not include wasp and hornet insecticide, products that are designed to be used exclusively on humans or animals, or any mothproofing product. For the purposes of 310 CMR 7.25(11)(b): FLYING BUG INSECTICIDE only, moth-proofing product means a product whose label, packaging, or accompanying literature indicates that the product is designed to protect fabrics from damage by moths, but does not indicate that the product is suitable for use against flying insects or other flying arthropods.

FOOTWEAR OR LEATHER CARE PRODUCT means any product designed or labeled to be applied to footwear or to other leather articles/components, to maintain, enhance, clean, protect, or modify the appearance, durability, fit, or flexibility of the footwear or leather article/component. Footwear includes both leather and non-leather foot apparel. Footwear or Leather Care Product does not include Fabric Protectant, General Purpose Adhesive, Contact Adhesive, Vinyl/Fabric/Leather/Polycarbonate Coating, Rubber and Vinyl Protectant, Fabric Refresher,

products solely for deodorizing, or sealant products with adhesive properties used to create external protective layers greater than two millimeters thick.

FORM-RELEASE COMPOUND means a coating labeled and formulated for application to a concrete form to prevent the freshly poured concrete from bonding to the form. The form may consist of wood, metal, or some material other than concrete.

FRAGRANCE means a substance or complex mixture of aroma chemicals, natural essential oils, and other functional components with a combined vapor pressure not in excess of two millimeters of mercury at 20°C, the sole purpose of which is to impart an odor or scent, or to counteract a malodor.

FURNITURE COATING means any paint designed for application to room furnishings including, but not limited to, cabinets (such as kitchen, bath and vanity cabinets), tables, chairs, beds, and sofas.

FURNITURE MAINTENANCE PRODUCT means a wax, polish, conditioner, or any other product designed for the purpose of polishing, protecting or enhancing finished wood surfaces other than floors. Furniture Maintenance Product does not include Dusting Aids, Wood Cleaners and products designed solely for the purpose of cleaning, and products designed to leave a permanent finish such as stains, sanding sealers and lacquers.

GEL means a colloid in which the disperse phase has combined with the continuous phase to produce a semisolid material, such as jelly.

GENERAL PURPOSE ADHESIVE means any non-aerosol adhesive designed for use on a variety of types of substrates. General Purpose Adhesive does not include:

1. contact adhesives;
2. construction, panel, and floor covering adhesives;
3. adhesives designed exclusively for application on one specific category of substrates (*i.e.*, substrates that are composed of similar materials, such as different types of metals, paper products, ceramics, plastics, rubbers, or vinyls); or
4. adhesives designed exclusively for use on one specific category of articles (*i.e.*, articles that may be composed of different materials but perform a specific function, such as gaskets, automotive trim, weather-stripping, or carpets).

GENERAL PURPOSE CLEANER means a product designed for general all-purpose cleaning, in contrast to cleaning products designed to clean specific substrates in certain situations. General Purpose Cleaner includes products designed for general floor cleaning, kitchen or countertop cleaning, and cleaners designed to be used on a variety of hard surfaces and does not include general purpose degreasers and electronic cleaners.

GENERAL PURPOSE DEGREASER means any product labeled to remove or dissolve grease, grime, oil and other oil-based contaminants from a variety of types of substrates, including automotive or miscellaneous metallic parts. General Purpose Degreaser does not include Engine Degreaser, General Purpose Cleaner, Adhesive Remover, Electronic Cleaner, Electrical Cleaner, Energized Electrical Cleaner, Metal Polish/Cleanser, products used exclusively in solvent cleaning tanks or related equipment, or products that are:

1. sold exclusively to establishments that manufacture or construct goods or commodities; and
2. labeled “not for retail sale”. Solvent cleaning tanks or related equipment includes, but is not limited to, cold cleaners, vapor degreasers, conveyORIZED degreasers, film cleaning machines, or products designed to clean miscellaneous metallic parts by immersion in a container.

GENERAL-USE HAND OR BODY CLEANER OR SOAP means a cleaner or soap designed to be used routinely on the skin to clean or remove typical or common dirt and soils. General-use Hand or Body Cleaner or Soap includes, but is not limited to, hand or body washes, dual-purpose shampoo-body cleaners, shower or bath gels, and moisturizing cleaners or soaps. General-use Hand or Body Cleaner or Soap does not include prescription drug products, Antimicrobial Hand or Body Cleaner or Soap, Astringent/Toner, Facial Cleaner or Soap, Hand Dishwashing Detergent, Heavy-duty Hand Cleaner or Soap, Medicated Astringent/Medicated Toner, or Rubbing Alcohol.

GLASS CLEANER means a cleaning product designed primarily for cleaning surfaces made of glass. Glass cleaner does not include products designed solely for the purpose of cleaning optical materials used in eyeglasses, photographic equipment, scientific equipment and photocopying machines.

GRAFFITI REMOVER means a product labeled to remove spray paint, ink, marker, crayon, lipstick, nail polish, or shoe polish, from a variety of non-cloth or non-fabric substrates. Graffiti Remover does not include Paint Remover or Stripper, Nail Polish Remover, or Spot Remover. Products labeled for dual use as both a paint stripper and graffiti remover are considered Graffiti Removers.

GRAPHIC ARTS COATING OR SIGN PAINT means a coating labeled and formulated for hand-application by artists using brush or roller techniques to indoor and outdoor signs (excluding structural components) and murals including letter enamels, poster colors, copy blockers, and bulletin enamels.

HAIR MOUSSE means a hair-styling foam designed to facilitate styling of a coiffure and provide limited holding power.

HAIR SHINE means any product designed for the primary purpose of creating a shine when applied to the hair. Hair Shine includes, but is not limited to, dual-use products designed primarily to impart sheen to the hair. Hair Shine does not include Hair Spray, Hair Mousse, Hair Styling Product, or products whose primary purpose is to condition or hold the hair.

HAIR SPRAY means a product that is applied to styled hair, and is designed or labeled to provide sufficient rigidity to hold, retain and/or (finish) the style of the hair for a period of time. Hair Spray includes aerosol hair sprays, pump hair sprays, spray waxes; color, glitter, or sparkle hairsprays that make finishing claims; and products that are both a styling and finishing product. Hair Spray does not include spray products that are intended to aid in styling but do not provide finishing of a hairstyle.

For the purposes of 310 CMR 7.25(11)(b): HAIR SPRAY, “finish” or “finishing” means the maintaining and/or holding of previously styled hair for a period of time. For the purposes of 310

CMR 7.25(11)(b): HAIR SPRAY, “styling” means the forming, sculpting, or manipulating of the hair to temporarily alter the hair's shape.

HAIR STYLING PRODUCT means a product manufactured on or after January 1, 2009, that is designed or labeled for the application to wet, damp, or dry hair to aid in defining, shaping, lifting, styling and/or sculpting the hair. Hair Styling Product includes, but is not limited to, hair balm, clay, cream, creme, curl straightener, gel, liquid, lotion, paste, pomade, putty, root lifter, serum, spray gel, stick, temporary hair straightener, wax, spray products that aid in styling but do not provide finishing of a hairstyle, and leave-in volumizers, detanglers and/or conditioners that make styling claims. Hair Styling Product does not include Hair Mousse, Hair Shine, Hair Spray, or shampoos and/or conditioners that are rinsed from the hair prior to styling.

For the purposes of 310 CMR 7.25(11)(b): HAIR STYLING PRODUCT, “finish” or “finishing” means the maintaining and/or holding of previously styled hair for a period of time, and “styling” means the forming, sculpting, or manipulating of the hair to temporarily alter the hair's shape.

HEAVY-DUTY HAND CLEANER OR SOAP means a product designed to clean or remove difficult dirt and soils such as oil, grease, grime, tar, shellac, putty, printer’s ink, paint, graphite, cement, carbon, asphalt, or adhesives from the body with or without the use of water. Heavy-duty Hand Cleaner or Soap does not include prescription drug products, Antimicrobial Hand or Body Cleaner or Soap, Astringent/Toner, Facial Cleaner or Soap, General-use Hand or Body Cleaner or Soap, Medicated Astringent/Medicated Toner or Rubbing Alcohol.

HERBICIDE means a pesticide product designed to kill or retard a plant’s growth, but excludes products that are:

1. for agricultural use; or
2. restricted materials that require a permit for use and possession.

HIGH VOLATILITY ORGANIC COMPOUND (HVOC) means any volatile organic compound that exerts a vapor pressure greater than 80 millimeters of mercury when measured at 20°C.

HOUSEHOLD PRODUCT means any consumer product that is primarily designed to be used inside or outside of living quarters or residences that are occupied or intended for occupation by individuals, including the immediate surroundings.

INSECTICIDE means a pesticide product that is designed for use against insects or other arthropods, but excluding products that are:

1. for agricultural use; or
2. for a use that requires a structural pest control license under the Massachusetts Pesticide Control Act; or
3. restricted materials that require a permit for use and possession.

INSECTICIDE FOGGER means any insecticide product designed to release all or most of its content, as a fog or mist, into indoor areas during a single application.

INSTITUTIONAL PRODUCT OR INDUSTRIAL AND INSTITUTIONAL (I&I)

PRODUCT means a consumer product that is designed for use in the maintenance or operation of an establishment that:

1. manufactures, transports, or sells goods or commodities, or provides services for profit; or
2. is engaged in the nonprofit promotion of a particular public, educational, or charitable cause. Establishments include, but are not limited to, government agencies, factories, schools, hospitals, sanitariums, prisons, restaurants, hotels, stores, automobile service and parts centers, health clubs, theaters, or transportation companies. Institutional Product does not include household products and products that are incorporated into or used exclusively in the manufacture or construction of the goods or commodities at the site of the establishment.

LABEL means any written, printed, or graphic matter affixed to, applied to, attached to, blown into, formed, molded into, embossed on, or appearing upon any product or product package, for purposes of branding, identifying, or giving information with respect to the product or to the contents of the package.

LAUNDRY PREWASH means a product that is designed for application to a fabric prior to laundering and that supplements and contributes to the effectiveness of laundry detergents and/or provides specialized performance.

LAUNDRY STARCH PRODUCT means a product that is designed for application to a fabric, either during or after laundering, to impart and prolong a crisp, fresh look and may also act to help ease ironing of the fabric. Laundry Starch Product includes, but is not limited to, fabric finish, sizing, and starch.

LAWN AND GARDEN INSECTICIDE means an insecticide product labeled primarily to be used in household lawn and garden areas to protect plants from insects or other arthropods.

LIQUID means a substance or mixture of substances that is capable of a visually detectable flow as determined under ASTM D4359-90(2000)e1, D 4359 90 *Standard Test Method For Determining Whether A Material Is A Liquid Or A Solid*, ASTM International. Liquid does not include powders or other materials that are composed entirely of solid particles.

LVP-VOC or Low-Vapor-Pressure VOC means a chemical compound or mixture that contains at least one carbon atom and meets one of the following:

1. has a vapor pressure less than 0.1 millimeters of mercury at 20°C, as determined by CARB Method 310; or
2. is a chemical compound with more than 12 carbon atoms, or a chemical mixture comprised solely of compounds with more than 12 carbon atoms as verified by formulation data, and the vapor pressure and boiling point are unknown; or
3. is a chemical compound with a boiling point greater than 216°C, as determined by CARB Method 310; or
4. is the weight percent of a chemical mixture that boils above 216°C, as determined by CARB Method 310.

For the purposes of 310 CMR 7.25(11)(b): LVP-VOC, chemical compound means a molecule of definite chemical formula and isomeric structure, and chemical “mixture” means a substrate comprised of two or more chemical compounds.

MANUFACTURER means any person who manufactures, processes, imports, assembles, produces, packages, repackages, or re-labels a product.

MEDICATED ASTRINGENT/MEDICATED TONER means any product regulated as a drug by the FDA that is applied to the skin for the purpose of cleaning or tightening pores. Medicated Astringent/Medicated Toner includes, but is not limited to, clarifiers and substrate-impregnated products. Medicated Astringent/Medicated Toner does not include hand, face, or body cleaner or soap products, Astringent/Toner, cold cream, lotion, antiperspirants, or products that must be purchased with a doctor's prescription.

MEDIUM VOLATILITY ORGANIC COMPOUND (MVOC) means any volatile organic compound that exerts a vapor pressure greater than two millimeters of mercury and less than or equal to 80 millimeters of mercury when measured at 20°C.

METAL POLISH/CLEANSER means any product designed primarily to improve the appearance of finished metal, metallic, or metallized surfaces by physical or chemical action. To improve the appearance means to remove or reduce stains, impurities, or oxidation from surfaces or to make surfaces smooth and shiny. Metal Polish/Cleanser includes, but is not limited to, metal polishes used on brass, silver, chrome, copper, stainless steel and other ornamental metals. Metal Polish/Cleanser does not include Automotive Wax, Polish, Sealant or Glaze, wheel cleaner, Paint Remover or Stripper, products designed and labeled exclusively for automotive and marine detailing, or products designed for use in degreasing tanks.

MIST SPRAY ADHESIVE means any aerosol that is not a special purpose spray adhesive and which delivers a particle or mist spray, resulting in the formation of fine, discrete particles that yield a generally uniform and smooth application of adhesive to the substrate.

MULTI-PURPOSE DRY LUBRICANT means any lubricant that is:

1. designed and labeled to provide lubricity by depositing a thin film of graphite, molybdenum disulfide (moly), or polytetrafluoroethylene or closely related fluoropolymer (teflon) on surfaces; and
2. designed for general purpose lubrication, or for use in a wide variety of applications.

MULTI-PURPOSE LUBRICANT means any lubricant designed for general purpose lubrication, or for use in a wide variety of applications. Multi-purpose Lubricant does not include Multi-purpose Dry Lubricants, Penetrants, or Silicone-based Multi-purpose Lubricants.

MULTI-PURPOSE SOLVENT means any organic liquid designed to be used for a variety of purposes, including cleaning or degreasing of a variety of types of substrates, or thinning, dispersing or dissolving other organic materials. Multi-purpose Solvent includes solvents used in institutional facilities, except for laboratory reagents used in analytical, educational, research, scientific or other laboratories. Multi-purpose Solvent does not include solvents used in cold cleaners, vapor degreasers, conveyorized degreasers or film cleaning machines, or solvents that are incorporated into, or used exclusively in the manufacture or construction of, the goods or commodities at the site of the establishment.

NAIL POLISH means any clear or colored coating designed for application to the fingernails or toenails and including but not limited to, lacquers, enamels, acrylics, base coats, and top coats.

NAIL POLISH REMOVER means a product designed to remove nail polish and coatings from fingernails or toenails.

NON-AEROSOL PRODUCT means any consumer product that is not dispensed by a pressurized spray system.

NON-CARBON CONTAINING COMPOUND means any compound that does not contain any carbon atoms.

NON-RESILIENT FLOORING means flooring of a mineral content that is not flexible. Non-Resilient Flooring includes terrazzo, marble, slate, granite, brick, stone, ceramic tile and concrete.

NON-SELECTIVE TERRESTRIAL HERBICIDE means a terrestrial herbicide product that is toxic to plants without regard to species.

OVEN CLEANER means any cleaning product designed to clean and to remove dried food deposits from oven walls.

PAINT means any pigmented liquid, liquefiable, or mastic composition designed for application to a substrate in a thin layer that is converted to an opaque solid film after application and is used for protection, decoration or identification, or to serve some functional purpose such as the filling or concealing of surface irregularities or the modification of light and heat radiation characteristics.

PAINT REMOVER OR STRIPPER means any product designed to strip or remove paints or other related coatings, by chemical action, from a substrate without markedly affecting the substrate. Paint Remover or Stripper does not include Multi-purpose Solvents, paintbrush cleaners, products designed and labeled exclusively as Graffiti Removers, and hand cleaner products that claim to remove paints and other related coatings from skin.

PENETRANT means a lubricant designed and labeled primarily to loosen metal parts that have bonded together due to rusting, oxidation, or other causes. Penetrant does not include Multi-purpose Lubricants that claim to have penetrating qualities, but are not labeled primarily to loosen bonded parts.

PERSONAL FRAGRANCE PRODUCT means any product which is applied to the human body or clothing for primary purpose of adding a scent, or masking a malodor, including cologne, perfume, aftershave, and toilet water. Personal Fragrance Product does not include:

1. Deodorant;
2. medicated products designed primarily to alleviate fungal or bacterial growth on feet or other areas of the body;
3. mouthwashes, breath fresheners and deodorizers;

4. lotions, moisturizers, powders or other skin care products used primarily to alleviate skin conditions such as dryness and irritations;
5. products designed exclusively for use on human genitalia;
6. soaps, shampoos, and products primarily used to clean the human body; and
7. fragrance products designed to be used exclusively on non-human animals.

PESTICIDE means and includes any substance or mixture of substances labeled, designed, or intended for use in preventing, destroying, repelling or mitigating any pest, or any substance or mixture of substances labeled, designed, or intended for use as a defoliant, desiccant, or plant regulator, provided that the term “pesticide” does not include any substance, mixture of substances, or device that the United States Environmental Protection Agency does not consider to be a pesticide.

PRESSURIZED GAS DUSTER means a pressurized product labeled to remove dust from a surface solely by means of mass air or gas flow, including surfaces such as photographs, photographic film negatives, computer keyboards, and other types of surfaces that cannot be cleaned with solvents. Pressurized Gas Duster does not include Dusting Aid.

PRINCIPAL DISPLAY PANEL OR PANELS means that part or those parts of a label that are so designed as to most likely be displayed, presented, shown or examined under normal and customary conditions of display or purchase. Whenever a principal display panel appears more than once, all requirements pertaining to the principal display panel shall pertain to all such principal display panels.

PRODUCT BRAND NAME means the name of the product exactly as it appears on the principal display panel of the product.

PRODUCT CATEGORY means the applicable category that best describes the product as listed in Definitions.

PRODUCT LINE means a group of products of identical form and function belonging to the same product category or categories.

PROPELLANT means a liquefied or compressed gas that is used in whole or in part, such as a co-solvent, to expel a liquid or any other material from the same self-pressurized container or from a separate container.

PUMP SPRAY means a packaging system in which the product ingredients within the container are not under pressure and in which the product is expelled only while a pumping action is applied to a button, trigger or other actuator.

RESPONSIBLE PARTY means the company, firm or establishment that is listed on the product label. If the label lists two companies, firms or establishments, the responsible party is the party that the product was manufactured for or distributed by, as noted on the label.

RESTRICTED MATERIALS means pesticides established as restricted materials under applicable Massachusetts laws or regulations.

RETAIL OUTLET means any establishment at which consumer products are sold, supplied, or offered for sale directly to consumers.

RETAILER means any person who sells, supplies, or offers consumer products for sale directly to consumers.

ROLLON PRODUCT means any antiperspirant or deodorant that dispenses active ingredients by rolling a wetted ball or wetted cylinder on the affected area.

RUBBER AND VINYL PROTECTANT means any product designed to protect, preserve or renew vinyl, rubber, and plastic on vehicles, tires, luggage, furniture, and household products such as vinyl covers, clothing, and accessories. Rubber and Vinyl Protectant does not include products primarily designed to clean the wheel rim, such as aluminum or magnesium wheel cleaners, and tire cleaners that do not leave an appearance-enhancing or protective substance on the tire.

RUBBING ALCOHOL means any product containing isopropyl alcohol (also called isopropanol) or denatured ethanol and labeled for topical use, usually to decrease germs in minor cuts and scrapes, to relieve minor muscle aches, as a rubefacient, and for massage.

SEALANT AND CAULKING COMPOUND means any product with adhesive properties that is designed to fill, seal, waterproof, or weatherproof gaps or joints between two surfaces. Sealant and Caulking Compound does not include roof cements and roof sealants; insulating foams; removable caulking compounds; clear, paintable, or water resistant caulking compounds; floor seam sealers; products designed exclusively for automotive uses; or sealers that are applied as continuous coatings. Sealant and Caulking Compound also does not include units of product, less packaging, which weigh more than one pound and consist of more than 16 fluid ounces. For the purposes of 310 CMR 7.25(11)(b): SEALANT AND CAULKING COMPOUND only, removable caulking compound means a compound that temporarily seals windows or doors for three to six month time intervals. For the purposes of 310 CMR 7.25(11)(b): SEALANT AND CAULKING COMPOUND only, clear/paintable/water resistant caulking compound means a compound that:

1. contains no appreciable level of opaque fillers or pigments;
2. transmits most or all visible light through the caulk when cured;
3. is paintable; and
4. is immediately resistant to precipitation upon application.

SEMISOLID means a product that, at room temperature, will not pour, but will spread or deform easily, including but not limited to gels, pastes, and greases.

SHAVING CREAM means an aerosol product that dispenses a foam lather intended to be used with a blade or cartridge razor, or other wet shaving system, in the removal of facial or other bodily hair. Shaving Cream does not include Shaving Gel.

SHAVING GEL means an aerosol product that dispenses a post-foaming semisolid designed to be used with a blade, cartridge razor, or other shaving system in the removal of facial or other bodily hair. Shaving Gel does not include Shaving Cream.

SILICONE-BASED MULTI-PURPOSE LUBRICANT means any lubricant that is:

1. signed and labeled to provide lubricity primarily through the use of silicone compounds including, but not limited to, polydimethylsiloxane; and
2. designed and labeled for general purpose lubrication, or for use in a wide variety of applications. Silicone-based Multi-purpose Lubricant does not include products designed and labeled exclusively to release manufactured products from molds.

SINGLE-PHASE AEROSOL AIR FRESHENER means an aerosol air freshener with the liquid contents in a single homogeneous phase and that does not require that the product container be shaken before use.

SOLID means a substance or mixture of substances that, either whole or subdivided (such as the particles comprising a powder), is not capable of visually detectable flow as determined under ASTM D4359-90(2000)e1, *Standard Test Method For Determining Whether A Material Is A Liquid Or A Solid*, ASTM International.

SPECIAL PURPOSE SPRAY ADHESIVE Means an aerosol adhesive that meets any of the following definitions:

1. MOUNTING ADHESIVE means an aerosol adhesive designed to permanently mount photographs, artwork, and any other drawn or printed media to a backing (such as paper, board, cloth, etc.) without causing discoloration to the artwork.
2. FLEXIBLE VINYL ADHESIVE means an aerosol adhesive designed to bond flexible vinyl to substrates. Flexible vinyl means a non-rigid polyvinyl chloride plastic with at least 5%, by weight, of plasticizer content. A plasticizer is a material, such as a high boiling point organic solvent, that is incorporated into a plastic to increase its flexibility, workability, or distensibility, and may be determined using ASTM D1045- 95(2001), "*Standard Test Methods for Sampling and Testing Plasticizers Used in Plastics*," ASTM International, or from product formulation data.
3. POLYSTYRENE FOAM ADHESIVE means an aerosol adhesive designed to bond polystyrene foam to substrates.
4. AUTOMOBILE HEADLINER ADHESIVE means an aerosol adhesive designed to bond together layers in motor vehicle headliners.
5. POLYOLEFIN ADHESIVE means an aerosol adhesive designed to bond polyolefins to substrates.
6. LAMINATE REPAIR/EDGE BANDING ADHESIVE means an aerosol adhesive designed for:
 - a. The touch-up or repair of items laminated with high-pressure laminates (*e.g.*, lifted edges, delaminates, *etc.*); or
 - b. The touch-up, repair, or attachment of edge-bonding materials, including but not limited to, other laminates, synthetic marble, veneers, wood molding, and decorative metals.

For the purposes of this definition, high pressure laminate means sheet materials that consist of paper, fabric, or other core material that have been laminated at temperatures exceeding 265° F, and at pressures between 1,000 and 1,400 psi.

7. AUTOMOTIVE ENGINE COMPARTMENT ADHESIVE means an aerosol adhesive designed for use in motor vehicle under-the-hood applications that require oil and plasticizer resistance, as well as high shear strength, at temperatures of 93°C through 135°C.

SPOT REMOVER means any product labeled to clean localized areas, or remove localized spots or stains on cloth or fabric such as drapes, carpets, upholstery, and clothing, that does not require subsequent laundering to achieve stain removal. Spot Remover does not include Dry Cleaning Fluid, Laundry Prewash, or Multi-purpose Solvent.

SPRAY BUFF PRODUCT means a product designed to restore a worn floor finish in conjunction with a floor buffing machine and special pad.

STICK PRODUCT means any antiperspirant or deodorant that contains active ingredients in a solid matrix form, and that dispenses the active ingredients by frictional action on the affected area.

STRUCTURAL WATERPROOF ADHESIVE means an adhesive whose bond lines are resistant to conditions of continuous immersion in fresh or salt water, and that conforms with Federal Specification MMM-A-181D (Type 1, Grade A).

TERRESTRIAL means to live on or grow from land.

TIRE SEALANT AND INFLATION means any pressurized product that is designed to temporarily inflate and seal a leaking tire.

TOILET/URINAL CARE PRODUCT means any product designed or labeled to clean and/or to deodorize toilet bowls, toilet tanks, or urinals. Toilet bowls, toilet tanks, or urinals include, but are not limited to, toilets or urinals connected to permanent plumbing in buildings and other structures, portable toilets or urinals placed at temporary or remote locations, and toilet or urinals in vehicles such as buses, recreational motor homes, boats, ships, and aircraft. Toilet/Urinal Care Product does not include Bathroom and Tile Cleaner or General Purpose Cleaner.

TYPE A PROPELLANT means a compressed gas such as CO₂, N₂, N₂O, or compressed air that is used as a propellant, and is either incorporated with the product or contained in a separate chamber within the product's packaging.

TYPE B PROPELLANT means any halocarbon that is used as a propellant, including chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), and hydrofluorocarbons (HFCs).

TYPE C PROPELLANT means any propellant that is not a Type A or Type B propellant, including propane, isobutane, n-butane, and dimethyl ether (also known as dimethyl oxide).

UNDERCOATING means any aerosol product designed to impart a protective, non-paint layer to the undercarriage, trunk interior, and/or firewall of motor vehicles to prevent the formation of rust or to deaden sound. Undercoating includes, but is not limited to, rubberized, mastic, or asphaltic products.

USAGE DIRECTIONS means the text or graphics on the product's principal display panel, label, or accompanying literature that describes to the end user how and in what quantity the product is to be used.

VINYL/FABRIC/LEATHER/POLYCARBONATE COATING means a coating designed and labeled exclusively to coat vinyl, fabric, leather, or polycarbonate substrates.

VOC CONTENT means except for charcoal lighter products, the total weight of VOC in a consumer product expressed as a percentage of the product weight (exclusive of the container or packaging), as determined pursuant to 310 CMR 7.25(12)(h)1.

For charcoal lighter material products only,

VOC CONTENT = Certified Emissions * 100 / Certified Use Rate.

Where:

Certified Emissions = the emissions level for products approved by the CARB and as determined pursuant to South Coast Air Quality Management District Rule 1174 Ignition Method Compliance Certification Protocol (February 27, 1991), expressed to the nearest 0.001 pound CH₂ per start.

Certified Use Rate = the usage level for products approved by CARB and as determined pursuant to South Coast Air Quality Management District Rule 1174 Ignition Method Compliance Certification Protocol (February 27, 1991), expressed to the nearest 0.001 pound certified product used per start.

WASP AND HORNET INSECTICIDE means any insecticide product that is designed for use against wasps, hornets, yellow jackets or bees by allowing the user to spray from a distance a directed stream or burst at the intended insects, or their nest.

WATERPROOFER means a product designed and labeled exclusively to repel water from fabric or leather substrates. Waterproofer does not include Fabric Protectants.

WAX means a material or synthetic thermoplastic substance generally of high molecular weight hydrocarbons or high molecular weight esters of fatty acids or alcohols, except glycerol and high polymers (plastics). Wax includes, but is not limited to, substances derived from the secretions of plants and animals such as carnuba wax and beeswax, substances of a mineral origin such as ozocerite and paraffin, and synthetic polymers such as polyethylene.

WEB SPRAY ADHESIVE means any aerosol adhesive that is not a mist spray or special purpose spray adhesive.

WOOD CLEANER means a product labeled to clean wooden materials including, but not limited to, decking, fences, flooring, logs, cabinetry, and furniture. Wood Cleaner does not include Dusting Aid, General Purpose Cleaner, Furniture Maintenance Product, Floor Wax Stripper, Floor Polish or Wax, or products designed and labeled exclusively to preserve or color wood.

WOOD FLOOR WAX means wax based products for use solely on wood floors.

(c) Standards.

1. VOC Content Limits. Except as provided in 310 CMR 7.25(12)(d) (Variances), CMR 7.25(12)(e) (Innovative Products), and 310 CMR 7.25(12)(i) (Alternative Control Plans), no person subject to 310 CMR 7.25 shall:
 - a. manufacture for use within Massachusetts; or
 - b. sell, supply, or offer for sale within Massachusetts any consumer product that contains volatile organic compounds in excess of the limits specified in 310 CMR 7.25(11)(c)1.: *Table 2.*

Table 2. VOC Content Limits for Consumer Products Effective January 1, 2009

Product Category	Percent VOC by Weight (% W)
Adhesive Removers	
Floor or Wall Covering	5
Gasket or Thread Locking	50
General Purpose	20
Specialty	70
Adhesives	
Aerosol:	
Mist Spray	65
Web Spray	55
Special Purpose Spray Adhesives:	
Mounting; Automotive Engine Compartment; Flexible Vinyl	70
Polystyrene Foam and Automobile Headliner	65
Polyolefin and Laminate Repair/Edgebanding	60
Construction, Panel, and Floor Covering	
Contact:	
General Purpose	55
Special Purpose	80
General Purpose	10
Structural Waterproof	15
Air Fresheners	
Single-phase Aerosols	30
Double-phase Aerosols	25
Liquids/pump Sprays	18
Solids/Semisolid	3
Antiperspirants	
Aerosol	40 HVOC
	10 MVOC

Non-aerosol	0 HVOC
	0 MVOC
Anti-static	
Non-aerosol	11
Automotive Brake Cleaners	45
Automotive Rubbing or Polishing Compound	17
Automotive Wax, Polish, Sealant or Glaze	
Hard Paste Waxes	45
I Instant Detailers	3
All Other Forms	15
Automotive Windshield Washer Fluids	35
Bathroom and Tile Cleaners	
Aerosols	7
All Other Forms	5
Bug and Tar Remover	40
Carburetor or Fuel-injection Air Intake Cleaners	45
Carpet and Upholstery Cleaners	
Aerosols	7
Non-aerosols (Dilutables)	0.1
Non-aerosols (Ready-to-Use)	3.0
Charcoal Lighter Material	See 310 CMR 7.25(12)(c)8.
Cooking Spray Aerosols	18
Deodorants	
Aerosol	0 HVOC
	10 MVOC
Non-aerosol	0 HVOC
	0 MVOC
Dusting Aids	
Aerosols	25
All Other Forms	7
Engine Degreasers	
Aerosols	35
Non-aerosols	5
Electrical Cleaner	45
Electronic Cleaner	75
Fabric Protectants	60
Fabric Refresher	
Aerosol	15
Non-aerosol	6
Floor Polishes/ Waxes	
Products for Flexible Flooring Materials	7
Products for Non-resilient Flooring	10
Wood Floor Wax	90
Floor Wax Strippers	

Non-aerosol	<i>See 310 CMR 7.25(12)(c)10.</i>
Footwear or Leather Care Products	
Aerosol	75
Solid	55
All Other Forms	15
Furniture Maintenance Products	
Aerosols	17
All other Forms Except Solid or Paste	7
Graffiti Remover	
Aerosol	50
Non-aerosols	30
General Purpose Cleaners	
Aerosols	10
Non-aerosols	4
General Purpose Degreasers	
Aerosols	50
Non-aerosols	4
Glass Cleaners	
Aerosols	12
Non-aerosols	4
Hair Mousses	6
Hair Shines	55
Hair Sprays	55
Hair Styling Products	
Aerosol and Pump Sprays	6
All Other Forms	2
Heavy-duty Hand Cleaner or Soap	8
Insecticides	
Crawling Bug (Aerosol)	15
Crawling Bug (all other forms)	20
Flea and Tick	25
Flying Bug (Aerosol)	25
Flying Bug (all other forms)	35
Foggers	45
Lawn and Garden (all other forms)	20
Lawn and Garden (Non-Aerosol)	3
Wasp and Hornet	40
Laundry Prewash	
Aerosol / Solids	22
All Other Forms	5
Laundry Starch Products	5
Metal Polishes/ Cleansers	30
Multi-purpose Lubricant (Excluding Solid or Semi-solid Products)	50
Nail Polish Remover	75

Non-selective Terrestrial Herbicide	
Non-aerosols	3
Oven Cleaners	
Aerosols/Pump Sprays	8
Liquids	5
Paint Remover or Stripper	50
Penetrants	50
Rubber and Vinyl Protectants	
Aerosols	10
Non-aerosols	3
Sealants and Caulking Compounds	4
Shaving Creams	5
Shaving Gel	7
Silicone-based Multi-Purpose Lubricants (Excluding Solid or Semi-solid Products)	60
Spot Removers	
Aerosols	25
Non-aerosols	8
Tire Sealants and Inflators	20
Toilet/Urinal Care Products	
Aerosol	10
Non-aerosols	3
Undercoatings	
Aerosols	40
Wood Cleaner	
Aerosol	17
Non-aerosols	4

2. Most Restrictive Limit. Notwithstanding the definition of product category in 310 CMR 7.25(12)(b), if anywhere on the container or packaging of any consumer product manufactured on or after January 1, 2009, or any FIFRA-registered insecticide manufactured on or after January 1, 2010, or on any sticker or label affixed thereto, any representation is made that the product may be used as, or is suitable for use as a consumer product for which a lower VOC limit is specified in 310 CMR 7.25(12)(c)1., then the lowest VOC limit shall apply. This requirement does not apply to general purpose cleaners, antiperspirant/deodorant products and insecticide foggers. This lowest VOC limit requirement shall apply to the consumer product irrespective of whether the definition of the consumer product category, as defined in 310 CMR 7.25(12)(b), explicitly excludes the other consumer product category or categories that have been represented in the product's labeling information.

3. Sell-through of Consumer Products.

- a. A consumer product listed in 310 CMR 7.25(12)(c)1.: *Table 2* and manufactured prior to the effective date specified in 310 CMR 7.25(12)(c)1., may be sold, supplied, or offered for sale after the effective date specified in 310 CMR 7.25(12)(c)1.: *Table 2*, so long as the consumer product complied with the VOC content standards and other applicable requirements in effect at the time the consumer product was manufactured. This does not apply to the following:
 - i. Any consumer product that does not display on the product container or package the date on which the product was manufactured, or a code indicating such date, in accordance with 310 CMR 7.25(12)(f)1.
 - ii. Any consumer product on which the manufacturer has used a code indicating the date of manufacture that is different than the code specified in 310 CMR 7.25(12)(f)1.e.ii., but an explanation of the code has not been filed with the Department by the deadlines specified in 310 CMR 7.25(12)(f)1.e.i.
 - iii. Solid Air Fresheners and Toilet/Urinal Care Products that contain paradichlorobenzene. These products are subject to a one-year sell-through period as provided in 310 CMR 7.25(12)(c)13.b.

4. Exclusions.

- a. The VOC content standards specified in 310 CMR 7.25(12)(c)1. shall not apply to:
 - i. Any LVP-VOC.
 - ii. Fragrances up to a combined level of 2% by weight contained in any consumer product, and colorants up to a combined level of 2% by weight contained in any antiperspirant or deodorant.
 - iii. VOCs that contain more than ten carbon atoms per molecule and for which the vapor pressure is unknown, or that have a vapor pressure of two mm Hg or less at 20°C in antiperspirants or deodorants.
 - iv. Air fresheners that are comprised entirely of fragrance, less compounds not defined as VOCs in 310 CMR 7.25(12)(b) or exempted under 310 CMR 7.25(12)(c)4.a.i.
 - v. Insecticides containing at least 98% paradichlorobenzene.

- vi. Adhesives sold in containers of one fluid ounce or less.
 - vii. Bait Station Insecticides. For the purpose of 310 CMR 7.25(11)(c)4., bait station insecticides are containers enclosing an insecticidal bait that is not more than 0.5 ounce by weight, where the bait is designed to be ingested by insects and is composed of solid material feeding stimulants with less than 5% active ingredients.
- b. The medium volatility organic compound (MVOC) content standards specified in 310 CMR 7.25(12)(c)1. for antiperspirants or deodorants shall not apply to ethanol.
5. Use of Toxic Air Contaminants in Antiperspirant or Deodorant. No person shall sell, supply, offer for sale, or manufacture any antiperspirant or deodorant for use in Massachusetts that contains any compound that has been identified by the CARB in Title 17, California Code of Regulations, Division 3, Chapter 1, Subchapter 7, Section 93000, as a toxic air contaminant.
6. Products that are Diluted Prior to Use.
- a. For consumer products for which the label, packaging, or accompanying literature specifically states that the product should be diluted with water or non-VOC solvent prior to use, the limits specified in 310 CMR 7.25(12)(c)1. shall apply to the product only after the minimum recommended dilution has taken place. For purposes of 310 CMR 7.25(11)(c)6., minimum recommended dilution shall not include recommendations for incidental use of a concentrated product to deal with limited special applications such as hard-to-remove soils or stains.
 - b. For consumer products for which the label, packaging, or accompanying literature states that the product should be diluted with any VOC solvent prior to use, the limits specified in 310 CMR 7.25(12)(c)1. shall apply to the product only after the maximum recommended dilution has taken place.
7. Products Registered Under FIFRA.
- a. For consumer products registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA; 7 U.S.C. § 136-136y), the effective date of the VOC standards is one year after the date specified in 310 CMR 7.25(12)(c)1.: *Table 2* Such products shall also be registered under the Massachusetts Pesticide Control Act.

- b. The labeling requirements of 310 CMR 7.25(12)(f) do not apply to products that are registered as pesticides under FIFRA and under the Massachusetts Pesticide Control Act.
- 8. Charcoal Lighter Materials. No person shall sell, supply, offer for sale or manufacture for use in Massachusetts any charcoal lighter materials as defined in 310 CMR 7.25(12)(b) unless the manufacturer of that product has been granted a currently effective charcoal lighter materials certification (Executive Order) for that product by CARB under the Consumer Products provisions of Title 17 California Code of Regulations, § 94509(h). A copy of the certification decision by CARB, including all conditions established by CARB applicable to the certification, shall be submitted to the Department within 30 days upon the Department's written request.
- 9. Aerosol Adhesives.
 - a. These standards apply to all uses of aerosol adhesives, including consumer, industrial, and commercial uses. Except as otherwise provided in 310 CMR 7.25(12)(c)3. (Sell-Through of Consumer Products), 310 CMR 7.25(12)(d) (Variances), 310 CMR 7.25(12)(e) (Innovative Products), and 310 CMR 7.25(12)(i) (Alternative Control Plans), no person shall sell, supply, offer for sale, or manufacture any aerosol adhesive for use in Massachusetts that, at the time of sale, use, or manufacture, contains VOCs in excess of the specified standard.
 - b. No person shall sell, supply, offer for sale, or manufacture any aerosol adhesive for use in Massachusetts that, at the time of sale, use, or manufacture, contains any of the following compounds: methylene chloride, perchloroethylene, or trichloroethylene.
 - c. If a product meets more than one of the definitions specified in 310 CMR 7.25(12)(b) for Special Purpose Spray Adhesive, then the VOC limit for the product shall be the lowest applicable VOC limit specified in 310 CMR 7.25(12)(c)1.: *Table 2*.
- 10. Floor Wax Strippers. Effective January 1, 2009, no person shall sell, supply, offer for sale or manufacture any floor wax stripper for use in Massachusetts unless the following requirements are met:
 - a. The label of each non-aerosol floor wax stripper must specify a dilution ratio for light or medium build-up of polish that results in an as-used VOC concentration of 3% by weight or less.

- b. If a non-aerosol floor wax stripper is also intended to be used for removal of heavy build-up of polish, the label of that floor wax stripper must specify a dilution ratio for its use on heavy build-up of polish that results in an as-used VOC concentration of 12% by weight or less.
- c. The term “light build-up”, “medium build-up”, or “heavy build-up” is not specifically required, as long as comparable terminology is used.

11. Contact Adhesives, Electronic Cleaners, Footwear or Leather Care Products, and General Purpose Degreasers.

- a. Except as provided in 310 CMR 7.25(12)(c)11.b., 310 CMR 7.25(12)(c)11.c., and 310 CMR 7.25(12)(c)11.d., effective January 1, 2009, no person shall sell, supply, offer for sale, or manufacture for use in Massachusetts any contact adhesive, electronic cleaner, footwear or leather care product, or general purpose degreaser that contains any of the following compounds: methylene chloride, perchloroethylene, or trichloroethylene.
- b. Impurities. The requirements of 310 CMR 7.25(12)(c)11.a. shall not apply to any contact adhesive, electronic cleaner, footwear or leather care product, or general purpose degreaser containing methylene chloride, perchloroethylene, or trichloroethylene that is present as an impurity in a combined amount equal to or less than 0.01% by weight.
- c. Sell-through of Products. Contact adhesives, electronic cleaners, footwear or leather care products, and general purpose degreasers that contain methylene chloride, perchloroethylene, or trichloroethylene and were manufactured before January 1, 2009, may be sold, supplied, or offered for sale until January 1, 2012, so long as the product container or package displays the date on which the product was manufactured, or a code indicating such date, in accordance with 310 CMR 7.25(12)(f).
- d. Notification for products sold during the sell-through period. Any person who sells or supplies a consumer product subject to standards in 310 CMR 7.25(12)(c)11.a. shall notify, in writing, the purchaser that the sell-through period for that product will end on January 1, 2012 if both of the following conditions are met:
 - (i) the product is sold or supplied to a distributor or retailer; and
 - (ii) the product is sold or supplied on or after June 30, 2012.

12. Adhesive Removers, Electrical Cleaners, and Graffiti Removers.

- a. Except as provided below in 310 CMR 7.25(12)(c)12.b., effective January 1, 2009, no person shall sell, supply, offer for sale, or manufacture for use in Massachusetts any adhesive remover, electrical cleaner, or graffiti remover that contains any of the following compounds: methylene chloride, perchloroethylene, or trichloroethylene.
- b. Impurities. The requirements of 310 CMR 7.25(12)(c)12.a. shall not apply to any adhesive remover, electrical cleaner, or graffiti remover containing methylene chloride, perchloroethylene, or trichloroethylene that is present as an impurity in a combined amount equal to or less than 0.01% by weight.
- c. Sell-through of Products. adhesive removers, electrical cleaners, and graffiti removers that contain methylene chloride, perchloroethylene, or trichloroethylene and were manufactured before January 1, 2009, may be sold, supplied, or offered for sale until January 1, 2012, so long as the product container or package displays the date on which the product was manufactured, or a code indicating such date, in accordance with 310 CMR 7.25(12)(f).
- d. Notification for Products Sold During the Sell-through Period. Any person who sells or supplies a consumer product subject to standards in 310 CMR 7.25(12)(c)12.a. shall notify, in writing, the purchaser that the sell-through period for that product will end on January 1, 2012 if both of the following conditions are met:
 - (i) the product is sold or supplied to a distributor or retailer; and
 - (ii) the product is sold or supplied on or after June 30, 2012.

13. Solid Air Fresheners and Toilet/Urinal Care Products.

- a. Effective January 1, 2009, no person shall sell, supply, offer for sale, or manufacture for use in Massachusetts any solid air freshener or toilet/urinal care products that contain para-dichlorobenzene.
- b. Solid air fresheners and toilet/urinal care products that contain paradichlorobenzene and were manufactured before January 1, 2009 may be sold, supplied, or offered for sale until January 1, 2010, so long as the product container or package displays the date on which the product was manufactured, or a code indicating such date, in accordance with 310 CMR 7.25(12)(f).

14. Products Containing Ozone-depleting Compounds.

- a. Effective January 1, 2009, no person shall sell, supply, offer for sale or manufacture for use in Massachusetts any consumer product that contains any of the following ozone-depleting compounds:

CFC-11 (trichlorofluoromethane), CFC-12 (dichlorodifluoromethane),
CFC-113 (1,1,1-trichloro-2,2,2-trifluoroethane),
CFC-114 (1-chloro-1,1-difluoro-2-chloro-2,2-difluoroethane),
CFC-115 (chloropentafluoroethane), halon 1211 (bromochlorodifluoromethane),
halon 1301 (bromotrifluoromethane), halon 2402 (dibromotetrafluoroethane),
HCFC-22 (chlorodifluoromethane),
HCFC-123 (2,2-dichloro-1,1,1-trifluoroethane),
HCFC-124 (2-chloro-1,1,1,2-tetrafluoroethane),
HCFC-141b (1,1-dichloro-1-fluoroethane),
HCFC-142b (1-chloro-1,1-difluoroethane), 1,1,1-trichloroethane, and carbon tetrachloride.

- b. The requirements of 310 CMR 7.25(12)(c)14.a. shall not apply to any ozone depleting compounds that may be present as impurities in a consumer product in an amount equal to or less than 0.01% by weight of the product.
- c. The requirements of 310 CMR 7.25(12)(c)14.a. shall not apply to any existing product formulation that complies with the requirements in 310 CMR 7.25(12)(c)1. or any existing product formulation that is reformulated to meet the requirements in 310 CMR 7.25(12)(c)1., provided that ozone depleting compound content of the reformulated product does not change.

(d) Variances.

1. Any person who cannot comply with the requirements set forth in 310 CMR 7.25(12)(c)1., because of extraordinary reasons beyond the person's reasonable control may apply in writing to the Department for a variance. The variance application shall set forth the following:
 - a. the specific grounds upon which the variance is sought;
 - b. the proposed dates by which compliance with the provisions of 310 CMR 7.25(12)(c)1. will be achieved;
 - c. a compliance report detailing the methods by which compliance will be achieved.
 - d. information to support criteria in 310 CMR 7.25(12)(d)3.
2. Upon receipt of a variance application containing the information required in 310 CMR 7.25(12)(d)1., the Department shall hold a public hearing to determine whether, under what conditions, and to what extent, a variance from the requirements in 310 CMR 7.25(12)(c)1. is necessary and will be permitted. A hearing shall be initiated no

later than 75 days after receipt of a variance application. Notice of the time and place of the hearing shall be sent to the applicant by certified mail not less than 30 days prior to the hearing. Notice of the hearing shall also be submitted for publication in the *Massachusetts Register* and sent to every person who requests such notice, not less than 30 days prior to the hearing. The notice shall state that the parties may, but need not be, represented by counsel at the hearing. At least 30 days prior to the hearing, the variance application shall be made available to the public for inspection. Information submitted to the Department by a variance applicant may be claimed as confidential, and such information shall be handled in accordance with the Department's confidentiality procedures. The Department may consider such confidential information in reaching a decision on a variance application. Interested members of the public shall be allowed a reasonable opportunity to testify at the hearing and their testimony shall be considered.

3. No variance shall be granted unless all of the following findings are made:
 - a. that because of reasons beyond the reasonable control of the applicant, requiring compliance with 310 CMR 7.25(12)(c)1. would result in extraordinary economic hardship;
 - b. that the public interest in mitigating the extraordinary hardship to the applicant by issuing the variance outweighs the public interest in avoiding any increased emissions of air contaminants which would result from issuing the variance;
 - c. that the compliance report proposed by the applicant can reasonably be implemented, and will achieve compliance as expeditiously as possible.
4. Any variance order shall specify a final compliance date by which the requirements of 310 CMR 7.25(12)(c)1. will be achieved. Any variance order shall contain a condition that specifies increments of progress necessary to assure timely compliance, and any other conditions that the Department deems necessary.
5. A variance shall cease to be effective upon failure of the party to whom the variance was granted to comply with any term or condition of the variance.
6. Upon the application of any person, the Department may review, and for good cause, modify or revoke a variance from requirements of 310 CMR 7.25(12)(c)1.
7. All variances, or modifications to variances, shall be approved by EPA.

(e) Innovative Products.

1. Any manufacturer of a consumer product which has been granted an Innovative Product exemption by CARB under the Innovative Products provisions in Subchapter 8.5, Article 2, Section 94511, or Subchapter 8.5, Article 1, Section 94503.5 of Title 17 of the California Code of Regulations, and such Innovative Products Exemption has been approved by EPA, shall be, for that product, exempt from the VOC limits in 310 CMR 7.25(12)(c)1.: *Table 2* for the period of time that the CARB Innovative Product exemption remains in effect. Any manufacturer claiming an Innovative Product exemption on this basis must submit to the Department a copy of the CARB Innovative Product exemption decision (*i.e.*, the Executive Order), including all conditions established by CARB applicable to the exemption.

2. Manufacturers of consumer products that have been granted an Innovative Products exemption under the Innovative Products provisions in Subchapter 8.5, Article 2, Section 94511, or Subchapter 8.5, Article 1, Section 94503.5 of Title 17 of the California Code of Regulations based on California specific data, or that have not been granted an exemption by CARB, may seek an Innovative Products exemption in accordance with the following criteria:
 - a. The Department shall exempt a consumer product from the VOC limits specified in 310 CMR 7.25(12)(c)1. if a manufacturer demonstrates by clear and convincing evidence that, due to some characteristic of the product formulation, design, delivery systems or other factors, the use of the product will result in less VOC emissions as compared to:
 - i. the VOC emissions from a representative consumer product which complies with the VOC limits specified in 310 CMR 7.25(12)(c)1., or
 - ii. the calculated VOC emissions from a non-complying representative product, if the product had been reformulated to comply with the VOC limits specified in 310 CMR 7.25(12)(c)1. VOC emissions shall be calculated using the following equation:

$$ER = ENC \times VOCSTD / VOCNC$$

where:

ER = the VOC emissions from the non-complying representative product, had it been reformulated

ENC = the VOC emissions from the non-complying representative product in its current formulation

VOCSTD = the VOC limit specified in the table of standards in 310 CMR 7.25(12)(c)1.

VOCNC = the VOC content of the non-complying product in its current formulation

If a manufacturer demonstrates that this equation yields inaccurate results due to some characteristic of the product formulation or other factors, an alternative method that accurately calculates emissions may be used upon approval of the Department.

- b. For the purposes 310 MR 7.25(11)(e)2.b., “representative consumer product” means a consumer product that meets all of the following criteria:
 - i. the representative product shall be subject to the same VOC limit in 310 CMR 7.25(12)(c)1. as the innovative product.
 - ii. the representative product shall be of the same product form as the innovative product, unless the innovative product uses a new form that does not exist in the product category at the time the application is made.
 - iii. the representative product shall have at least similar efficacy as other consumer products in the same product category based on tests generally accepted for that product category by the consumer products industry.
- c. A manufacturer shall apply in writing to the Department for any exemption claimed under 310 CMR 7.25(12)(e)2.a. The application shall include the supporting documentation that demonstrates the emissions from the innovative product, including the actual physical test methods used to generate the data and, if necessary, the consumer testing undertaken to document product usage. In addition, the applicant shall provide any information necessary to enable the Department to establish enforceable conditions for granting the exemption including the VOC content for the innovative product and test methods for determining the VOC content. All information submitted by a manufacturer pursuant to 310 CMR 7.25(11)(e)2.c. shall be handled in accordance with the procedures specified in applicable Massachusetts confidentiality requirements.
- d. Within 30 days of receipt of the exemption application, the Department shall determine whether an application is complete.
- e. Within 90 days after an application has been deemed complete, the Department shall determine whether, under what conditions, and to what extent, an exemption from the requirements of 310 CMR 7.25(12)(c) will be permitted. The applicant and the Department may mutually agree to a longer time period for reaching a decision, and additional supporting documentation may be submitted by the applicant before a decision has been reached. The Department shall notify the applicant of the decision in writing and specify such terms and conditions that are necessary to insure that emissions from the product will meet the emissions reductions specified in 310 CMR 7.25(e)2.a.

- f. In granting an exemption for a product, the Department shall establish conditions that are enforceable. These conditions shall include the VOC content of the innovative product, dispensing rates, application rates and any other parameters determined by the Department to be necessary. The Department shall also specify the test methods for determining conformance to the conditions established. The test methods shall include criteria for reproducibility, accuracy, sampling and laboratory procedures.
- g. For any product for which an exemption has been granted pursuant to this section, the manufacturer shall notify the Department in writing within 30 days of any change in the product formulation or recommended product usage directions, and shall also notify the Department within 30 days if the manufacturer learns of any information which would alter the emissions estimates submitted to the Department in support of the exemption application.
- h. If the VOC limits specified in 310 CMR 7.25(12)(c)1. are lowered for a product category through any subsequent rule making, all innovative product exemptions granted for products in the product category, except as provided in 310 CMR 7.25(12)(e)2.h., shall have no force and effect as of the effective date of the modified VOC standard. 310 CMR 7.25(12)(e)2.h. shall not apply to those innovative products which have VOC emissions less than the applicable lowered VOC limit and for which a written notification of the product's emissions status versus the lowered VOC limit has been submitted to and approved by the Department at least 60 days before the effective date of such limits.
- i. If the Department determines that a consumer product for which an exemption has been granted no longer meets the criteria for an innovative product specified in 310 CMR 7.25(12)(e)2.a., the Department may modify or revoke the exemption as necessary to assure that the product will meet these criteria.

(f) Labeling Requirements.

1. Product Dating.

- a. No person shall sell, supply, offer for sale, or manufacture a consumer product subject to 310 CMR 7.25(12)(c) for use in Massachusetts unless each consumer product container or package clearly displays the day, month, and year on which the product was manufactured, or a code indicating such date.
- b. For products manufactured on or after January 1, 2009, the date-code shall be displayed on the product container or package such that it is readily observable without irreversibly disassembling any portion of the product container or

packaging. For the purposes of 310 CMR 7.25(11)(f)1.b., information may be displayed on the bottom of a container as long as it is clearly legible without removing any product packaging.

- c. No person shall erase, alter, deface or otherwise remove or make illegible any date or code indicating the date of manufacture from any regulated product container without the express authorization of the manufacturer.
- d. Explanation of the Code.
 - i. If a manufacturer uses a code indicating the date of manufacture for any consumer product subject to 310 CMR 7.25(12)(c), an explanation of the code shall be filed with the Department no later than 12 months prior to:
 - the effective date of the applicable standard specified in 310 CMR 7.25(12)(c)1.; or, the date on which the product first becomes available for sale, distribution, or use within Massachusetts, whichever is later; and
 - any date on which the product first becomes available for sale, distribution, or use within Massachusetts after any modification to an existing product's date-code format.
 - ii. A manufacturer who uses the following code to indicate the date of manufacture shall not be subject to the requirements of 310 CMR 7.25(12)(f)1.d.i., if the code is represented separately from other codes on the product container so that it is easily recognizable:

YY DDD

where:

YY = two digits representing the year in which the product was manufactured

DDD = three digits representing the day of the year on which the product was manufactured, with "001" representing the first day of the year, "002" representing the second day of the year, and so forth (*i.e.*, the "Julian date").

- e. The requirements of 310 CMR 7.25(12)(f)1. shall not apply to products containing no VOCs, as defined in 310 CMR 7.25(12)(b), or containing VOCs at 0.10 percent by weight or less.
- f. Codes indicating the date of manufacture are public information and may not be claimed as confidential.

2. Additional Labeling Requirements for Aerosol Adhesives, Adhesive Removers, Electronic Cleaners, Electrical Cleaners, Energized Electrical Cleaners, and Contact Adhesives.
 - a. In addition to the requirements specified in 310 CMR 7.25(12)(f)1., the manufacturer and responsible party for each aerosol adhesive, adhesive remover, electronic cleaner, electrical cleaner, energized electrical cleaner, and contact adhesive product subject to 310 CMR 7.25 shall ensure that all products clearly display the following information on each product container that is manufactured on or after January 1, 2009:
 - i. The product category as specified in 310 CMR 7.25(12)(c)1. or an abbreviation of the category shall be displayed;
 - ii. The applicable VOC standard for the product that is specified in 310 CMR 7.25(12)(c)1., except for energized electrical cleaner, expressed as a percentage by weight, shall be displayed;
 - iii. If the product is classified as a special purpose spray adhesive, the applicable substrate and/or application or an abbreviation of the substrate or application that qualifies the product as special purpose shall be displayed;
 - iv. If the manufacturer or responsible party uses an abbreviation as allowed under 310 CMR 7.25(12)(f)2.a.i. and 310 CMR 7.25(12)(f)2.a.iii., an explanation of the abbreviation must be filed with the Department no later than 90 days prior to:
 - the effective date of the applicable standard specified in 310 CMR 7.25(12)(c)1.; or, the date on which the product first becomes available for sale, distribution, or use within Massachusetts, whichever date is later; and
 - any date on which the product first becomes available for sale, distribution, or use within Massachusetts after any modification to an existing product's abbreviation.
 - b. The information required in 310 CMR 7.25(12)(f)3.a., shall be displayed on the product container such that it is readily observable without removing or disassembling any portion of the product container or packaging. For the purposes of this subsection, information may be displayed on the bottom of a container as long as it is clearly legible without removing any product packaging.
 - c. No person shall remove, alter, conceal, or deface the information required in 310 CMR 7.25(12)(f)2.a. prior to final sale of the product.

(g) Recordkeeping and Reporting Requirements.

1. Each responsible party for a product subject to a VOC content limit in 310 CMR 7.25(12)(c) shall keep records demonstrating compliance with the VOC content limits in accordance with 310 CMR 7.25(12)(h). If the Department requests such information and the responsible party does not have or does not provide the information requested by the Department, the Department may require the reporting of this information by the person that has the information, including, but not limited to, any formulator, manufacturer, supplier, parent company, private labeler, distributor, or repackager. All records for compliance determination, including 310 CMR 7.25(12)(g)2. and 310 CMR 7.25(12)(g)3., shall be kept on site for a period of time not less than three years and shall be made available to the Department within 90 days of request.

2. Upon a written request by the Department, a responsible official from each responsible party shall provide, to the Department within 90 days, the information for any consumer product or products that the Department may specify including, but not limited to, all or part of the following information:
 - a. the company name, telephone number, and designated contact person;

 - b. any claim of confidentiality made pursuant to applicable Massachusetts confidentiality requirements, 310 CMR 3.00;

 - c. the product brand name for each consumer product subject to recordkeeping and reporting requirements and the product label;

 - d. the product category to which the consumer product belongs;

 - e. the applicable product form(s) listed separately;

 - f. an identification of each product brand name and form as a Household Product or Industrial and Institutional Product, or both;

 - g. for reporting information submitted by multiple companies, an identification of each company that is submitting relevant data separate from that submitted by the responsible party.

 - h. for each product brand name and form, the net percent by weight of the total product, less container and packaging, comprised of the following, rounded to the nearest 0.1%:
 - i. Total Exempt Compounds
 - ii. Total LVP-VOCs that are not fragrances
 - iii. Total All Other Carbon-Containing Compounds that are not fragrances
 - iv. Total All Non-Carbon-Containing Compounds
 - v. Total Fragrance
 - vi. For products containing greater than two percent by weight fragrance:

- the percent of fragrance that are LVP-VOCs, and
- the percent of fragrance that are All Other Carbon-Containing Compounds
- vii. Total Paradichlorobenzene

i. for each product brand name and form, the identity, including the specific chemical name and associated Chemical Abstract Services (CAS) number, of the following:

- i. Each Exempt Compound
- ii. Each LVP-VOC that is not a fragrance

j. if applicable, the weight percent comprised of propellant for each product;

k. If applicable, an identification of the type of propellant (Type A, Type B, Type C, or a blend of the different types);

l. If applicable, the net percent by weight of each ozone-depleting compound that is listed in 310 CMR 7.25(12)(c)14. and is contained in a product subject to reporting under 310 CMR 7.25(12)(g) in any amount greater than 0.1% by weight.

(h) Compliance Testing Requirements.

1. The responsible party shall determine compliance with the VOC content requirements of this regulation according to one of the following:

a. CARB Method 310 Determination of Volatile Organic Compounds (VOC) in *Consumer Products and Reactive Organic Compounds in Aerosol Coating Products*, adopted September 25, 1997, and as last amended on May 5, 2005;

b. An alternative test method to CARB Method specified in 310 CMR 7.25(12)(h)1.a. that is shown to accurately determine the concentration of VOCs in a subject product, or its emissions, if the applicant has received an approval from CARB for the alternative test method for determining the VOC content of the subject product and the applicant submits to the Department a copy of the CARB Executive Order, including all applicable conditions and limitations;

c. VOC content determination using product formulation and records.

i. Testing to determine compliance with the requirements of 310 CMR 7.25 may be demonstrated through calculation of the VOC content from records of the amounts of constituents used to make the product pursuant to the following equation:

$$\text{VOC Content} = (B-C) \times 100 / A$$

where,

A = total net weight of unit (excluding container and packaging)

B = total weight of all VOCs, as defined in 310 CMR 7.25(12)(b), per unit

C = total weight of VOCs exempted under 310 CMR 7.25(12)(c)4., per unit

ii. If product records demonstrate compliance with the VOC limits, but these records are contradicted by product testing performed using CARB Method 310, the results of CARB Method 310 shall take precedence over the product records and may be used to establish a violation of the requirements of 310 CMR 7.25.

iii. Compliance determinations based on product formulation records may not be used unless the manufacturer of a consumer product keeps accurate records for each day of production of the amount and chemical composition of the individual product constituents. These records shall be kept for at least three years.

2. Testing to determine whether a product is a liquid or solid shall be performed using ASTM D4359-90(2000)e1, *Standard Test Method for Determining Whether a Material Is a Liquid or a Solid*, ASTM International.
3. Testing to determine compliance with the certification requirements for charcoal lighter material shall be performed using the procedures specified in the South Coast Air Quality Management District Rule 1174 Ignition Method Compliance Certification Protocol (Table 1, Section 200.9)(February 28, 1991).
4. Testing to determine distillation points of petroleum distillate-based charcoal lighter materials shall be performed using ASTM D86-04b, *Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure*, ASTM International.
5. Testing to determine plasticizer in flexible vinyl adhesive shall be performed using ASTM D1045-95(2001), *Standard Test Methods for Sampling and Testing Plasticizers Used in Plastics*, ASTM International.
6. Records shall accurately reflect the constituents used to manufacture a product, the chemical composition of the individual product, and any other test, processes, or records used in connection with product manufacture.

(i) Alternative Control Plans.

1. The VOC content limits specified in 310 CMR 7.25(12)(c)1.: Table 2. shall not apply to any manufacturer for any consumer product that is subject to an ACP for the period

of time that the ACP remains in effect provided that the manufacturer complies with all conditions and requirements of the ACP Executive Order.

2. Any manufacturer who claims an exemption pursuant to 310 CMR 7.25(12)(i)1. Shall submit to the Department a copy of the ACP Executive Order within 30 days of receiving the ACP Executive Order from CARB
3. Any manufacturer who claims an exemption pursuant to 310 CMR 7.25(12)(i)1. Shall notify the Department within 30 days of any violation of the ACP as determined by CARB pursuant to California Code of Regulations, Title 17, Subchapter 8.5, Article 4, Section 94546.

Exhibit: B1

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - <http://www.ncdc.noaa.gov>.

Climatological Report (Annual)

282
CXUS51 KBOX 081941
CLABOS

CLIMATE REPORT
NATIONAL WEATHER SERVICE BOSTON/NORTON MA
238 PM EST WED JAN 8 2020

.....
...THE BOSTON CLIMATE SUMMARY FOR THE YEAR OF 2019...

CLIMATE NORMAL PERIOD 1981 TO 2010
CLIMATE RECORD PERIOD 1872 TO 2020

WEATHER	OBSERVED	NORMAL	DEPART
	VALUE	DATE(S)	VALUE FROM
		NORMAL	

.....
TEMPERATURE (F)

RECORD

HIGH 104 07/04/1911

LOW -18 02/09/1934

HIGHEST 98 07/21

LOWEST 5 01/31

01/21

AVG. MAXIMUM	60.7	58.8	1.9
--------------	------	------	-----

AVG. MINIMUM	45.9	44.1	1.8
--------------	------	------	-----

MEAN	53.3	51.5	1.8
------	------	------	-----

DAYS MAX >= 90	15	10.3	4.7
----------------	----	------	-----

DAYS MAX <= 32	18	24.6	-6.6
----------------	----	------	------

DAYS MIN <= 32	93	91.9	1.1
----------------	----	------	-----

DAYS MIN <= 0	0	0.5	-0.5
---------------	---	-----	------

PRECIPITATION (INCHES)

RECORD

MAXIMUM 65.53 1878
MINIMUM 23.71 1965
TOTALS 50.38 43.77 6.61
DAILY AVG. 0.14 0.12 0.02
DAYS >= .01 155 126.0 29.0
DAYS >= .10 99 76.2 22.8
DAYS >= .50 32 28.4 3.6
DAYS >= 1.00 14 10.1 3.9
GREATEST
24 HR. TOTAL 2.43 MM

SNOWFALL (INCHES)

RECORDS

TOTAL 89.2 1978
SNOW DEPTH 31 01/11/1996
TOTALS 38.7 43.8 -5.1
SINCE 7/1 11.5 10.3 1.2
SNOWDEPTH AVG. MM
DAYS >= 1.0 13 10.9 2.1
GREATEST
SNOW DEPTH MM
24 HR TOTAL 9.9 MM

DEGREE_DAYS

HEATING TOTAL 5152 5681 -529
SINCE 7/1 1775 1994 -219
COOLING TOTAL 1013 747 266
SINCE 1/1 1013 747 266

.....

WIND (MPH)

AVERAGE WIND SPEED 11.2
RESULTANT WIND SPEED/DIRECTION 3/273
HIGHEST WIND SPEED/DIRECTION 55/090 DATE 10/17
HIGHEST GUST SPEED/DIRECTION 73/210 DATE 07/31

SKY COVER

POSSIBLE SUNSHINE (PERCENT) MM
AVERAGE SKY COVER 0.60
NUMBER OF DAYS FAIR 65
NUMBER OF DAYS PC 170
NUMBER OF DAYS CLOUDY 130

AVERAGE RH (PERCENT) 61

WEATHER CONDITIONS. NUMBER OF DAYS WITH

0
84
1
2
13
7
21
HAZE 48

- INDICATES NEGATIVE NUMBERS.
R INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T INDICATES TRACE AMOUNT.

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CXUS51 KBOX 020433 CCA
CLABOS

CLIMATE REPORT
NATIONAL WEATHER SERVICE BOSTON/NORTON MA
1055 AM EST TUE JAN 1 2019

.....

...THE BOSTON CLIMATE SUMMARY FOR THE YEAR OF 2018...

CLIMATE NORMAL PERIOD 1981 TO 2010
CLIMATE RECORD PERIOD 1872 TO 2018

WEATHER	OBSERVED	NORMAL	DEPART
	VALUE	DATE(S)	VALUE FROM
		NORMAL	

.....

TEMPERATURE (F)			
RECORD			
HIGH	104	07/04/1911	
LOW	-18	02/09/1934	
HIGHEST	98	08/29	

07/03

LOWEST	-2	01/07		
AVG. MAXIMUM	60.4		58.8	1.6
AVG. MINIMUM	45.8		44.1	1.7
MEAN	53.1		51.5	1.6
DAYS MAX >= 90	23		10.3	12.7
DAYS MAX <= 32	18		24.6	-6.6
DAYS MIN <= 32	95		91.9	3.1
DAYS MIN <= 0	2		0.5	1.5

PRECIPITATION (INCHES)

RECORD

MAXIMUM	65.53	1878		
MINIMUM	23.71	1965		
TOTALS	53.32		43.77	9.55
DAILY AVG.	0.15		0.12	0.03
DAYS >= .01	143		126.0	17.0
DAYS >= .10	90		76.2	13.8
DAYS >= .50	40		28.4	11.6
DAYS >= 1.00	16		10.1	5.9

GREATEST

24 HR. TOTAL 2.68 07/17 TO 07/17

SNOWFALL (INCHES)

RECORDS

TOTAL	89.2	1978		
SNOW DEPTH	31	01/11/1996		
TOTALS	50.9		43.8	7.1
SINCE 7/1	0.2		10.3	-10.1
SNOWDEPTH AVG.	MM			
DAYS >= 1.0	10		10.9	-0.9

GREATEST

SNOW DEPTH	MM			
24 HR TOTAL	14.8	03/13 TO 03/14		

DEGREE_DAYS

HEATING TOTAL	5391		5681	-290
SINCE 7/1	1878		1994	-116
COOLING TOTAL	1132		747	385
SINCE 1/1	1132		747	385

.....

WIND (MPH)

AVERAGE WIND SPEED 11.3
 RESULTANT WIND SPEED/DIRECTION 3/274
 HIGHEST WIND SPEED/DIRECTION 53/030 DATE 03/02
 HIGHEST GUST SPEED/DIRECTION 70/030 DATE 03/02

SKY COVER
 POSSIBLE SUNSHINE (PERCENT) MM
 AVERAGE SKY COVER 0.60
 NUMBER OF DAYS FAIR 56
 NUMBER OF DAYS PC 172
 NUMBER OF DAYS CLOUDY 135

AVERAGE RH (PERCENT) 67

WEATHER CONDITIONS. NUMBER OF DAYS WITH
 THUNDERSTORM 21 MIXED PRECIP 0
 HEAVY RAIN 48 RAIN 76
 LIGHT RAIN 150 FREEZING RAIN 0
 LT FREEZING RAIN 1 HAIL 1
 HEAVY SNOW 2 SNOW 14
 LIGHT SNOW 40 SLEET 4
 FOG 158 FOG W/VIS <= 1/4 MILE 27
 HAZE 44

- INDICATES NEGATIVE NUMBERS.
 R INDICATES RECORD WAS SET OR TIED.
 MM INDICATES DATA IS MISSING.
 T INDICATES TRACE AMOUNT.

BOSTON

...PERIOD OF RECORD: 1872 TO PRESENT...

	AVG HIGH	AVG LOW	AVG MEAN	PCPN	SNOW	REMARKS
	-----	-----	-----	----	----	-----
JAN:	35.9	21.3	28.6	4.92	17.8	
	+0.1	-0.9	-0.4	+1.56	+4.9	
FEB:	46.4	29.7	38.1	3.77	8.3	RECORD WARMEST
	+7.7	+5.0	+6.4	+0.52	-2.6	

MAR: 43.1 31.4 37.3 5.07 23.3 4TH SNOWIEST
-2.3 +0.3 -1.0 +0.75 +15.5

APR: 52.9 37.8 45.4 4.62 1.3
-2.7 -2.8 -2.7 +0.88 -0.6

MAY: 71.7 52.5 62.1 1.90 0.0 9TH WARMEST
+5.7 +2.6 +4.2 -1.59 0.0

JUN: 75.7 59.6 67.7 2.96 0.0
-0.2 +0.1 0.0 -0.72

JUL: 83.8 68.5 76.2 4.55 0.0 7TH WARMEST
+2.4 +3.1 +2.8 +1.12

AUG: 84.8 70.0 77.4 4.65 0.0 RECORD WARMEST
+5.2 +5.4 +5.3 +1.30

SEP: 75.2 62.8 69.0 5.12 0.0 4TH WARMEST
+2.8 +5.4 +4.1 +1.68

OCT: 61.7 47.2 54.5 3.78 0.0
+0.3 +0.7 +0.5 -0.16

NOV: 48.9 37.0 43.0 9.26 0.1 3RD WETTEST
-2.6 -1.0 -1.7 +5.27 -1.2

DEC: 44.0 30.5 37.3 2.72 0.1 3RD LEAST SNOWIEST
+2.8 +2.3 +2.6 +1.70 -8.9

SEASONAL SUMMARY

WINTER: 39.4 25.1 32.2 11.18 35.3
+0.8 +0.0 +0.4 +0.79 +2.5

SPRING: 55.9 40.6 48.3 11.59 24.6 6TH SNOWIEST
+0.2 +0.1 +0.2 +0.04 +14.9

SUMMER: 81.5 66.1 73.8 12.16 0.0 3RD WARMEST
+2.5 +2.9 +2.7 +1.70

AUTUMN: 61.9 49.0 55.4 18.16 0.1 4TH WETTEST
+0.1 +1.7 +0.9 +6.79 -1.2

ANNUAL SUMMARY

ANNUAL: 60.4 45.8 53.1 53.32 50.9 9TH WARMEST
+1.6 +1.8 +1.7 +9.55 +7.1 10TH WETTEST

DAILY RECORDS

01/04...RECORD MAXIMUM DAILY SNOWFALL.....13.4...PREV 7.9 IN 1994
01/07...TIED RECORD LOW TEMPERATURE.....-2...ALSO SET IN 1896
01/28...RECORD LOW MAXIMUM TEMPERATURE.....43...PREV 41 IN 1974

02/20...RECORD HIGH TEMPERATURE.....70...PREV 68 IN 1930
02/21...RECORD HIGH TEMPERATURE.....72...PREV 63 IN 1906

03/02...RECORD DAILY PRECIPITATION.....2.30...PREV 2.24 IN 1983
03/13...RECORD DAILY SNOWFALL.....14.5...PREV 12.3 IN 1993

04/15...RECORD MINIMUM HIGH TEMPERATURE.....39...PREV 40 IN 1881

07/17...RECORD DAILY PRECIPITATION.....2.68...PREV 1.12 IN 1989

08/03...RECORD MAXIMUM LOW TEMPERATURE.....77...PREV 75 IN 2007
08/07...RECORD MAXIMUM LOW TEMPERATURE.....77...PREV 76 IN 2001
08/29...RECORD HIGH TEMPERATURE.....98...PREV 96 IN 1953
08/29...RECORD MAXIMUM LOW TEMPERATURE.....81...PREV 76 IN 1948

09/04...RECORD MAXIMUM LOW TEMPERATURE.....73...PREV 70 IN 1959, 1900
09/06...RECORD HIGH TEMPERATURE.....97...PREV 94 IN 1983
09/18...TIED MAXIMUM LOW TEMPERATURE.....69...ALSO SET IN 1992

10/10...RECORD MAXIMUM LOW TEMPERATURE.....68...PREV 65 IN 2017

11/22...TIED MINIMUM HIGH TEMPERATURE.....24...ALSO SET IN 1880

12/21...RECORD HIGH TEMPERATURE.....65...PREV 62 IN 1957

MONTHLY RECORDS

FEB...NUMBER OF DAYS >= 70.....2...PREV 1 IN 2017,1985
FEB...TIED WARMEST MONTHLY AVG TEMP.....38.1...PREV 37.4 IN 1981

MAR...RECORD HIGHEST DAILY SNOWFALL.....14.5...PREV 13.2 03/19/1956

MARCH 13TH

JUL...TIED RECORD NUMBER OF DAYS LOW TEMP >= 60.....31...LAST SET 2013

AUG...RECORD WARMEST AVG MAX TEMP.....84.8...PREV 84.7 SET IN 2016
RECORD WARMEST AVG MIN TEMP.....70.0...PREV 68.1 SET IN 2016
RECORD WARMEST AVG TEMP.....77.4...PREV 76.4 SET IN 2016
RECORD NUMBER OF DAYS LOW TEMP >= 70.....16...PREV 14 LAST SET 1988
TIED RECORD NUMBER OF DAYS LOW TEMP >= 60.....31...LAST SET IN 2016

SEP...RECORD NO. OF DAYS LOW TEMP >= 60.....21...PREV 19 IN 1971, 1961
SEP...TIED RECORD NO. OF DAYS LOW TEMP >= 70.....4...LAST SET 1983

NOV...RECORD NO. OF DAYS DAILY PRECIP >= 0.10.....14...PREV 12 IN 1985, 1921
NOV...TIED RECORD NO. OF DAYS DAILY PRECIP >= 0.50...7...ALSO SET IN 1969

SEASONAL RECORDS

SUMMER...RECORD NUMBER OF DAYS LOW TEMP >= 70.....30...PREV 25 LAST SET
1955
RECORD AVG MIN TEMP.....66.1...PREV 65.3 SET IN 2016

AUTUMN...RECORD NO. OF DAYS DAILY PRECIP >= 0.10.....30...PREV 26 IN 1977
AUTUMN...TIED RECORD NO. OF DAYS DAILY PRECIP >= 0.50...14...ALSO SET IN 1958
AUTUMN...TIED RECORD NO. OF DAYS LOW TEMP >= 70.....4...LAST SET IN 1983

ALL-TIME RECORDS (SINCE RECORDS BEGAN)

ANNUAL...RECORD NUMBER OF DAYS LOW TEMP >= 70.....34...PREV 30 IN 1983

SIPPRELL

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CXUS51 KBOX 011611
CLABOS

CLIMATE REPORT
NATIONAL WEATHER SERVICE BOSTON/NORTON MA
1055 AM EST TUE JAN 1 2019

.....
...THE BOSTON CLIMATE SUMMARY FOR THE YEAR OF 2018...

CLIMATE NORMAL PERIOD 1981 TO 2010

CLIMATE RECORD PERIOD 1872 TO 2018

WEATHER	OBSERVED	NORMAL	DEPART
	VALUE	DATE(S)	VALUE FROM
		NORMAL	

.....
TEMPERATURE (F)

RECORD

HIGH	104	07/04/1911	
LOW	-18	02/09/1934	
HIGHEST	98	08/29	
		07/03	
LOWEST	-2	01/07	
AVG. MAXIMUM	60.4	58.8	1.6
AVG. MINIMUM	45.8	44.1	1.7
MEAN	53.1	51.5	1.6
DAYS MAX >= 90	23	10.3	12.7
DAYS MAX <= 32	18	24.6	-6.6
DAYS MIN <= 32	95	91.9	3.1
DAYS MIN <= 0	2	0.5	1.5

PRECIPITATION (INCHES)

RECORD

MAXIMUM	65.53	1878	
MINIMUM	23.71	1965	
TOTALS	53.32	43.77	9.55
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DAYS >= .10	90	76.2	13.8
DAYS >= .50	40	28.4	11.6
DAYS >= 1.00	16	10.1	5.9

GREATEST

24 HR. TOTAL 2.68 07/17 TO 07/17

SNOWFALL (INCHES)

RECORDS

TOTAL	89.2	1978
SNOW DEPTH	31	01/11/1996

TOTALS 50.9 43.8 7.1
 SINCE 7/1 0.2 10.3 -10.1
 SNOWDEPTH AVG. MM
 DAYS >= 1.0 10 10.9 -0.9
 GREATEST
 SNOW DEPTH MM
 24 HR TOTAL 14.8 03/13 TO 03/14

DEGREE_DAYS
 HEATING TOTAL 5391 5681 -290
 SINCE 7/1 1878 1994 -116
 COOLING TOTAL 1132 747 385
 SINCE 1/1 1132 747 385

.....
 WIND (MPH)
 AVERAGE WIND SPEED 11.3
 RESULTANT WIND SPEED/DIRECTION 3/274
 HIGHEST WIND SPEED/DIRECTION 53/030 DATE 03/02
 HIGHEST GUST SPEED/DIRECTION 70/030 DATE 03/02

SKY COVER
 POSSIBLE SUNSHINE (PERCENT) MM
 AVERAGE SKY COVER 0.60
 NUMBER OF DAYS FAIR 56
 NUMBER OF DAYS PC 172
 NUMBER OF DAYS CLOUDY 135

AVERAGE RH (PERCENT) 67

WEATHER CONDITIONS. NUMBER OF DAYS WITH
 THUNDERSTORM 21 MIXED PRECIP 0
 HEAVY RAIN 48 RAIN 76
 LIGHT RAIN 150 FREEZING RAIN 0
 LT FREEZING RAIN 1 HAIL 1
 HEAVY SNOW 2 SNOW 14
 LIGHT SNOW 40 SLEET 4
 FOG 158 FOG W/VIS <= 1/4 MILE 27
 HAZE 44

- INDICATES NEGATIVE NUMBERS.
 R INDICATES RECORD WAS SET OR TIED.
 MM INDICATES DATA IS MISSING.

T INDICATES TRACE AMOUNT.

NATIONAL WEATHER SERVICE INSTRUCTION 10-1004

MAY 17, 2020

***Operations and Services
Climate Services, NWSPD 10-10***

CLIMATE RECORDS

NOTICE: This publication is available at: <http://www.nws.noaa.gov/directives/>

OPR: W/AFS23 (J. Zdrojewski)
Type of Issuance: Routine

Certified by: W/AFS23 (F. Horsfall)

SUMMARY OF REVISIONS: This instruction supersedes National Weather Service Instruction 10-1004, dated January 1, 2018 and contains these changes:

- Updated links
- Added comment to section 3.1 defining the use of abbreviation for PLCD/SLCD
- Updated sites in Appendix C

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05/03/2020

Andrew D. Stern
Director, Analyze,
Forecast, and Support Office

Date

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1 Introduction

This instruction describes surface station climatological data from observing stations and the principles to promote the integrity of the climatological data record. The instruction also discusses station long term normals, means, and extremes; national and state extremes; and station climatological reports.

The National Centers for Environmental Information (NCEI) (<https://www.ncei.noaa.gov>) determines station long term normals, means, and extremes from observing station sites. The Climate Prediction Center (CPC) (<https://www.cpc.ncep.noaa.gov>) provides forecast means and outlook classes as referenced in their climate outlooks.

Please note that all data are preliminary until they have been subject to all levels of NCEI quality control. Once they have passed this quality control, the data are considered “final data.” Also note, do not use the term “official data” as it is generally perceived that all data produced by the NWS is “official.” This is stated in NWSI 10-1003, Climate Data Services (<https://www.nws.noaa.gov/directives/sym/pd01010003curr.pdf>).

2 Surface Station Observation Data

Observational climate data may include the values, totals, or averages of the following (Table 1) for seconds, minute(s), hour, day, month, season, year, and/or other time period, as appropriate.

High temperature (°F)	Low temperature (°F)	Average temperature (°F)
Heating Degree days (°F)	Cooling Degree Days (°F)	Precipitation (0.01 inches or T)
Snowfall (0.1 inches or T)	Snow depth (whole inches or T)	Relative Humidity (%)
Average 2-min wind speed (mph)	Highest 2-min wind speed (mph)	Mean wind direction (degrees)
Highest 3-sec wind gust (mph)	Direction of highest gust (degrees)	Average detected cloud cover (oktas or tenths)
Visibility (statute miles)	Sunshine (minutes)	Sunshine (% of possible)

Table 1. Surface Station Observations. (T=trace, mph=miles per hour)

The National Weather Service (NWS) manages its weather/climate monitoring systems through compliance with the "Ten Principles of Climate Monitoring" (see Appendix A). To protect and enhance the integrity of climate records, Weather Forecast Offices (WFO) and Weather Service Offices (WSO) should apply these principles within their capability for surface observing stations in their area of responsibility. Further reference to WFO will mean WFO and WSO. NWS Instruction 10-1305 (Observational Quality Control – General) (<https://www.nws.noaa.gov/directives/sym/pd01013005curr.pdf>) provides additional information and procedures for WFOs to protect and enhance the integrity of climate records.

2.1 Surface Station Data Correction

At times, it may become necessary to correct certain values within the official archive at NCEI. This is done through the use of Datzilla. General information on Datzilla can be found in NWSI 10-1003, Climate Data Services (<https://www.nws.noaa.gov/directives/sym/pd01010003curr.pdf>).

To expedite the resolution of a pending ticket, it is asked that you use the spreadsheets found at <https://drive.google.com/drive/folders/0B4Vu1xdtjSiCbEJ5NHRMOWZQaHc> when providing corrected data. Instructions are found within the spreadsheet named “Datzilla_NotesFromNCEIForExcelEntries.xlsx.” Simply download the appropriate spreadsheet, fill in the pertinent data, and attach the spreadsheet to the Datzilla ticket. It is important to follow the formatting as described in the instructions.

3 Surface Station Long Term Normals, Means, and Extremes

NCEI provides these statistics for temperature, precipitation, snowfall, and heating and cooling degree days for use with NWS Automated Surface Observing System (ASOS) data sites and published NWS Cooperative Observing Program (COOP) stations.

3.1 Definitions

The definitions used for these statistics are consistent with World Meteorological Organization (WMO) (https://www.wmo.int/pages/index_en.html) terminology.

Period of Record (or Record Period): The full length of a station's records from beginning of observations to the most recent observation (the present if the station is active).

Record Mean: The computed mean for a given element for the station's period of record, without regard to changes in a station's location.

Adjusted Record Mean: The computed mean for a given element for the station's period of record, after adjusting the data for inhomogeneity introduced by changes in station location.

Period Mean: A period mean is a mean computed for any period of at least 10 years starting on January 1 of a year ending with the digit 1. One such period is 01/01/1991 through 12/31/2000.

Normal: A normal is a period mean computed by NCEI for an observing station from a period comprising of three consecutive 10--year decadal periods (for example, 1981--2010). For cases of sensor instrumentation change and/or relocation, NCEI will make appropriate adjustments to the observational record for the observing station. See Section 3.4 for details.

Extreme: An extreme is the maximum, minimum, or longevity value of an element for a specific calendar day or month, all time, or other specific reference time frame for a station's period of record.

Primary Local Climatological Data (PLCD) site. A PLCD site, formerly known simply as a Local Climatological Data (LCD) site, is an ASOS or manual observation station for which NCEI conducts manual quality control that also involves regular communication with NWS WFOs to correct/resolve data quality issues. Summary of the day and summary of the month data are provided for elements that include temperature, degree days, weather type, precipitation, pressure, and wind (as available). PLCDs also include hourly precipitation and abbreviated 3-hourly weather observations. Most PLCD sites are located at major airports.

Secondary Local Climatological Data (SLCD) site. An SLCD site is an automated station, usually an ASOS or Automatic Weather Observing Station (AWOS) station for which NCEI conducts automated quality control. The data for ASOS stations includes summary of the day and summary of the month for elements that include temperature, degree days, weather type, precipitation, pressure, and wind (as available) as well as hourly precipitation data. Hourly precipitation data and observations taken every 20 minutes are provided for AWOS stations.

Note: Unless separate distinction is required, both PLCD and SLCD will be referred to as LCD in the remainder of this document.

Climatological Data (CD) site. A CD site includes all stations within the NWS Cooperative Observer Program Network (COOP) that have an archive flag set to “Distribute,” the PLCD sites, and other ASOS stations designated for inclusion in CD publications. Designation is set through the Station Information System (SIS) of the COOP Program for an ASOS site by setting the archive flag to “Distribute.” The data include monthly summary information and a daily summary of all observed parameters at that location which may include temperature, precipitation, snowfall and snow depth, soil temperature, and pan evaporation, where available.

3.2 Final Source of Normals

NCEI no longer issues standard publications for normals. All normals can be retrieved via internet at: <https://www.ncdc.noaa.gov/data-access/land-based-station-data/land-based-datasets/climate-normals/1981-2010-normals-data> and <https://gis.ncdc.noaa.gov/maps/ncei/normals>

3.3 Effective Date of Normals

Normals become effective as soon as NCEI provides public access to the normals from the NCEI web page. For major updates that occur every decade, new normals are usually available by the middle of the following calendar year. Every attempt will be made to upload the new normals dataset to the individual field office AWIPS on or about the same date. This is coordinated by the NWS Analyze, Forecast, and Support (AFS) Climate Services Branch (CSB).

3.4 Calculation of Normals

The underlying values used to compute the 1981–2010 normals come from the Global Historical Climatology Network–Daily (GHCN-Daily) dataset (Menne et al. 2012). As its

name suggests, this dataset contains daily observations for many atmospheric variables worldwide and is the most comprehensive set of daily climate data for the United States. A complete overview of the latest normals production cycle for 1981-2010 normals can be found at Arguez et al. (2012); relevant selected edited excerpts from this paper are provided below:

The data values have undergone extensive quality assurance (QA) as described by Durre et al. (2010). A majority of the stations included in the 1981–2010 climate normals record their daily observations at or near 7 a.m. local time, with smaller percentages of stations observing in the late afternoon or around midnight. Each station is assigned the same identifier used in the GHCN-Daily dataset; corresponding metadata, such as latitude, longitude, and station name are taken directly from the GHCN-Daily station inventory. Note that the GHCN-Daily station IDs (e.g., USW00023174 for Los Angeles International Airport) are based on the National Weather Service’s (NWS’s) Cooperative Observer Program (COOP) and/or Weather Bureau–Army–Navy (WBAN) identifiers, not the airport codes (e.g., LAX) that are commonly used for airports.

The QA checks applied to GHCN-Daily may flag a portion of the daily observations as erroneous. These erroneous data values are treated as “missing values” in the computation of climate normals. All 1981–2010 climate normals values are accompanied by a completeness flag, which is an indication of how many non-missing and unflagged values (i.e., “good” values) are used in the calculation. In general, a station needs at least 10 “sufficiently complete” months for each month of the year for regular normals to be computed. Estimated normals are computed for some shorter records as described below. All reported climate normals are representative of the local observation time of day for the station and are rounded to a fixed precision based on the variable (e.g., HDD/CDD normals are rounded to whole degrees Fahrenheit).

[T]he monthly temperature data (Tmax and Tmin) used to compute the 1981–2010 normals are first calculated from GHCN-Daily values and subsequently undergo robust QA (Menne et al. 2009) and homogenization using the pairwise comparison technique described by Menne and Williams (2009). Further, by statistical design, all temperature-related normals across annual, seasonal, monthly, and daily time scales reflect the QA and homogenization applied to the monthly Tmax and Tmin data. For example, our statistical procedures ensure that the mean of the 31 daily Tmin normals in January average to the relevant monthly January Tmin normal, which in effect passes through monthly QA and adjustments down to the daily time scale. For precipitation, snowfall, and snow depth, we rely fully on the comprehensive set of QA procedures that are part of GHCN-Daily (Durre et al. 2010); no effort was made either to identify or to remove inhomogeneities in the precipitation-related variables since no technique had been developed that was suitable for a station network as large and diverse as that used here.

The 1981–2010 HDD/CDD normals were computed directly from daily temperature normals [described below] using a 15-day moving window approach that exploits both the improved daily temperature normals and the distribution of daily observations in the window about these normals....[M]onthly degree-day normals are calculated as the sums of the corresponding daily degree-day normals to ensure consistency.

For active short-record stations that fail the 10-yr completeness criterion described above but do have at least two years of sufficiently complete months for each month of the year, so-called “quasi normals,” or estimated normals, are provided. Included in the active short-record stations are not only NWS sites but also stations in the U.S. Climate Reference Network, a national network operational since 2001 that was designed explicitly to measure long-term (e.g., 50–100 years or longer) climate variability and change. Average monthly temperature and precipitation normals are estimated using linear combinations of the monthly normals from neighboring longer-record stations closely following the “pseudonormals” methodology outlined by Sun and Peterson (2005, 2006). Other statistics that are in some way dependent on these average monthly values are also available for the short-record stations. Estimated normals are computed for all temperature-related variables except standard deviations as well as for month-to-date, year-to-date, monthly, seasonal, and annual precipitation averages. Estimated normals are not provided for snowfall or snow depth parameters.

3.4.1 Daily Normals

The 1981–2010 Climate Normals make extensive use of daily observations from GHCN-Daily. This allows for a more precise representation of intraseasonal temperature signals using harmonic analysis. NCEI derives daily precipitation normals using a technique called constrained harmonic analysis (Arguez et al. 2012). The constraint is provided by the monthly homogenized temperatures for a station. Instead of allowing the harmonic curve to simply fit the 30-year daily average data, the smooth curve is adjusted to fit the daily data as closely as possible while constraining the average of each month’s daily Tmax and Tmin normals to equal the monthly Tmax and Tmin normals. This creates consistency between the daily and monthly temperatures normals, and effectively homogenizes the daily temperature normals to represent the current climate at each station.

Daily precipitation normals have been extensively revised in the 1981-2010 production run. A 30-year daily average at a station of 0.12 inches on May 1 does not correspond to the most likely precipitation amount for that day. However, daily averages may be useful for cumulative measures of precipitation over longer time periods. WFOs use these daily normals for the calculation of weekly, monthly, seasonal, yearly, month-to-date, season-to-date, and year-to-date departures from normal. For an individual day, however, daily frequencies of precipitation exceeding various thresholds, combined with information on the median and other percentile levels on days with precipitation, are more useful for understanding the normal precipitation regime on a given day (Durre et al. 2012). These statistics are also provided by NCEI.

3.4.2 Effect on Normals from Changes in Observing Conditions

If temperature sensors or precipitation gauges are relocated and/or replaced by new equipment, the NWS will collect comparative data to be used as the basis for

revising the normals. For details, see NWS Instructions 10-2101 (General Instructions for Terrestrial-Based In-Situ Instrument and Algorithm Intercomparisons for the Purpose of Climate Data Continuity) <http://www.weather.gov/directives/sym/pd01021001curr.pdf> and 10-1302 (Instrument Requirements and Standards for the NWS Surface Observing Program [Land]) <http://www.weather.gov/directives/sym/pd01013002curr.pdf>. Revised normals for a site become final as soon as they are distributed to the WFO.

3.4.3 Normals and Observations for February 29

NCEI now provides daily temperature normals for February 29, and this day is also incorporated in monthly, seasonal, and annual climate normals. WFOs will handle normals and observations related to February 29 in leap years in the following manner:

- February 29 (Daily) Normals: For February 29, WFOs will use the February 29 values for temperature, and February 29 values for precipitation, snowfall, and heating/cooling degree days.
- February Monthly Normals: No change will be made in leap years for normal temperatures, precipitation, snowfall, or heating/cooling degree days. The leap day has been incorporated in the 7 leap year monthly contributions to February normals during 1981-2010.
- Seasonal and Annual Normals: No alterations will be required for leap years.

3.5 Extremes

NCEI provides station extremes for each calendar day, month, and the period of record (i.e. “all time”). To address the challenge of having consistent climate extremes for LCD stations with numerous relocations during the period of record (especially in large metropolitan areas), NCEI developed a methodology to establish multi-location combined (or threaded) station data sets under the “ThreadEx” project (as described in detail in Appendix B).

4 Climatological Data Reports

WFOs will issue the following products for all LCD sites (see Appendix C) in their area of responsibility. These reports contain information in accordance with Sections 2 and 3.

- Climatological Report - Daily (CLI)
- Climatological Report - Monthly (CLM)
- Preliminary Local Climatological Data Report (CF6)
- Record Event Report (RER)

WFOs may optionally issue climate reports for the week, season, year, or other period of time under the AWIPS product category of MIS (Miscellaneous Local Product), PNS (Public Information Statement), OPU (Other Public Products), or another specified PIL (e.g. CLA

[annual], CLS [seasonal], and CLQ [quarterly]) on a case-by-case basis (by a request through the WFO's regional office).

The data in these products are preliminary since the products are issued before all levels of NCEI QC makes the data final. See the climate data disclaimer in NWS Instruction 10-1003 (Climate Data Services) (<https://www.nws.noaa.gov/directives/sym/pd01010003curr.pdf>). Sunrise, sunset and sunshine in these reports is not official since the U.S. Naval Observatory is the source for official astronomical records. See astronomical disclaimer also in NWS Instruction 10-1003 (Climate Data Services).

To add or remove PLCD designation from ASOS sites in its area of responsibility, a WFO will coordinate with its region and NCEI and reach a consensus, considering such factors as data quality, frequency, reliability, length of record; and historical, cultural, business, public interest, and any other factor(s) of significance. To add or remove CD designation from ASOS sites, only data quality and reliability need be taken into account. With both PLCD and CD designation changes, the proper documentation (Station Profile Request and Station Profile) will need to be filed within the Station Information System (SIS). All active PLCD and CD ASOS sites are REQUIRED to have accurate Station Profiles within SIS.

WFOs may also optionally issue any or all these products for other sites (i.e. NCEI archived non-PLCD sites), whether published or not, of major interest in their area, in concurrence with their regional climate services program manager. WFOs should consider user interest; length of climate record; and quality, frequency, and reliability of current observations when considering optional non-PLCD site products. It is preferred, however, that WFO climate products are produced primarily for published sites (either PLCD, SLCD, or CD).

WFOs should compose these products with the Advanced Weather Interactive Processing System (AWIPS) Climate Program or a text editor if the program is not available. For service backup procedures, see NWS Instruction 10-2201 (Backup Operations) <https://www.nws.noaa.gov/directives/sym/pd01022001curr.pdf>. Be advised, at this time, the AWIPS Climate Program does not have service backup functionality. Any backups done for climate products are completed with manual updates. WFOs will first report operational problems with the AWIPS Climate Program to the AWIPS Network Control Facility (NCF) (anytime – “24/7”). NCF will open a trouble ticket and attempt to solve the problem directly. If NCF cannot solve the problem, WFOs should report the problem to their regional climate services program manager for referral to CSB. This reporting process does not include requests to change output, format, or calculation methods, which are handled through the established policy coordination process for the directive system.

WFOs will only use backup observation sites when valid observation data at the primary site are not available and when all the following four conditions for backup sources are met:

- The backup site is sited near the observing location in an area of similar exposure (as determined by the WFO).
- The data from the backup site are received, accepted, and archived by NCEI.

- Sensors and methods meet NWS instrument standards (NWS Instruction 10-1302 – Instrument Requirements and Standards for the NWS Surface Observing Programs (Land), Appendix D) (<https://www.nws.noaa.gov/directives/sym/pd01013002curr.pdf>).
- There is a Completed Station Profile in SIS that includes a backup site/sensor metadata permanent remarks section in accordance with the SIS User’s Guide.

WFOs will **not** estimate values for missing elements with the exception of snow measurements. Snow measurements may be estimated during certain situations as described in the NWS Snow Measurement Guidelines

(https://www.weather.gov/media/coop/Snow_Measurement_Guidelines-2014.pdf),

paragraph 3.1.2. Follow the Snow Measurement Guidelines for reporting a snow measurement estimate.

WFOs will indicate data as missing (as described in Sections 4.1.3, 4.2.3, and 4.3.3) when the following circumstances apply:

- There are no data or inaccurate data due to a power outage, sensor malfunction, or other deficiency due to inadequate sensor performance (in the judgment of the WFO).
- There are no established backup sources available nearby.

WFOs will document the use of backup sources in the remarks Section of the Preliminary Local Climatological Data Report (CF6), as described in Section 4.3.3. Due to current limitations in the AWIPS Climate Program, it is recommended that the WFO maintain a list of remarks and enter these in the remarks section of the CF6 prior to sending the final version for the month.

4.1 Climatological Report – Daily (CLI)

4.1.1 Mission Connection

The CLI provides climatological data for each day.

4.1.2 Issuance Guidelines

Issuance Time: The CLI will be issued at least twice daily. The first mandatory issuance will be between 12:30 a.m. and 5:00 a.m. local time to capture the previous calendar day’s (midnight-to-midnight Local Standard Time [LST]) data. The second mandatory issuance will be in the late afternoon/early evening (typically between 3:00 p.m. and 5:30 p.m. local time), before local newscast times, to capture data for the current day. Other optional issuances may be made to meet local user requirements (e.g., a late morning report to capture the current day morning low temperature, an early evening report to capture the final high daily temperature, etc.)

Valid Time: The CLI is valid from the time of release until the next issuance.

Product Expiration Time: The CLI does not have a product expiration time.

4.1.3 Technical Description

MND Product Type Line: The CLI MND is “CLIMATE REPORT.”

Content: The CLI contains the standardized data shown in Section 4.1.3.c. All data shown in Section 4.1.3.c are required for both mandatory daily issuances, except as identified in Note 3 at the end of Section 4.1.3.c, for all CLIs year-round. Data to be included in the optional CLIs may be adapted to meet local needs. “MM” should be used to indicate missing data, as appropriate (as explained in Section 4). To ensure consistency with NCEI routines, one or more missing daily values will result in a “MM” for the preliminary monthly value. WFOs may append specialized data to the end of the standard fixed-fields to meet local user needs.

Format: The CLI is a tabular product. However, supplemental narrative information may be included to meet local user needs. When specialized or additional information is appended to the standard format, it will be separated from the standard fixed-fields by double ampersands (&&). Double dollar signs (\$\$) will be used to signify the end of the product.

(WMO Heading)
(AWIPS ID)

CLIMATE REPORT

NATIONAL WEATHER SERVICE <WFO> <STATE>
<HHMM> AM <LT> <DAY MMM DD YYYY>

.....
...THE <CITY NAME> CLIMATE SUMMARY FOR <MONTH DD YEAR>...

CLIMATE NORMAL PERIOD YYYY TO YYYY
CLIMATE RECORD PERIOD YYYY TO YYYY

WEATHER ITEM	OBSERVED VALUE	TIME (LST)	RECORD VALUE	YEAR	NORMAL VALUE	DEPARTURE FROM NORMAL	LAST YEAR
--------------	----------------	------------	--------------	------	--------------	-----------------------	-----------

.....
TEMPERATURE (F)

YESTERDAY							
MAXIMUM	000	0000 PM	000	YYYY	000	000	000
MINIMUM	000	0000 AM	000	YYYY	000	000	000
AVERAGE	000				000	000	000

PRECIPITATION (IN)

YESTERDAY	00.00		00.00	YYYY	00.00	00.00	00.00
MONTH TO DATE	00.00				00.00	00.00	00.00
SINCE <SEASON>	00.00				00.00	00.00	00.00
SINCE JAN 1	000.00				00.00	00.00	00.00

SNOWFALL (IN)

YESTERDAY	00.0		00.0	YYYY	00.0	00.0	00.0
MONTH TO DATE	000.0				00.0	000.0	000.0
SINCE <SEASON>	000.0				000.0	0000.0	0000.0
SINCE JUL 1	0000.0				000.0	0000.0	0000.0
SNOW DEPTH	000						

DEGREE DAYS

HEATING							
YESTERDAY	000				00	000	000
MONTH TO DATE	0000				0000	0000	0000
SINCE <SEASON>	0000				0000	00000	0000
SINCE JUL 1	00000				00000	00000	00000

COOLING

YESTERDAY	00				00	000	00
MONTH TO DATE	0000				000	0000	0000
SINCE <SEASON>	0000				0000	0000	0000
SINCE JAN 1	0000				0000	0000	0000

.....
WIND (MPH)

HIGHEST WIND SPEED	000	HIGHEST WIND DIRECTION	<DIR>	(000)
HIGHEST GUST SPEED	000	HIGHEST GUST DIRECTION	<DIR>	(000)
AVERAGE WIND SPEED	00.0			

SKY COVER
POSSIBLE SUNSHINE 000 PERCENT
AVERAGE SKY COVER 0.0

WEATHER CONDITIONS
THE FOLLOWING WEATHER WAS RECORDED YESTERDAY.
<W1>
<W2>
<W3>
<ETC.>

RELATIVE HUMIDITY (PERCENT)
HIGHEST 000 0000 PM
LOWEST 000 0000 AM
AVERAGE 000

.....
THE <CITY1 NAME> CLIMATE NORMALS FOR TODAY
 NORMAL RECORD YEAR
MAXIMUM TEMPERATURE (F) 000 000 YYYY
MINIMUM TEMPERATURE (F) 000 000 YYYY
SUNRISE AND SUNSET
<MONTH DD YEAR>.....SUNRISE 0000 AM <LT> SUNSET 0000 PM <LT> (today)
<MONTH DD YEAR>.....SUNRISE 0000 AM <LT> SUNSET 0000 PM <LT> (tomorrow)

- INDICATES NEGATIVE NUMBERS.
R INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T INDICATES TRACE AMOUNT.

&& (Standard Format end indicator entered locally)

<any additional local specialized climate data>

\$\$

Note 1: Note: The “xxx” in this product is the three-letter data site identifier, or WFO site identifier for reports with multiple non-LCD data sites.

Note 2: <Season-to-date> may be locally set to alternate season/year-to-date.

Default <seasons> in northern Hemisphere are defined as:

- Winter - December, January, February
- Spring - March, April, May
- Summer - June, July, August
- Fall - September, October, November

For American Samoa (in the Southern Hemisphere), the default seasons are reversed.

Note 3: WFOs may report only observed values for snowfall. However, if a WFO elects to report any other snowfall field (i.e., record value, year, normal value, departure from normal, or last year), then all snowfall fields will be reported.

4.1.4 Updates, Amendments, and Corrections

These will be done as needed.

4.1.5 Supporting Software

The AWIPS Climate Program uses the ASOS Daily Summary Message (DSM) to produce the CLI. The DSM is an automated coded message primarily for use by the NWS National Centers for Environmental Prediction (NCEP), NCEI, and WFOs. The DSM is not subject to WFO quality control. If some data entries are not available from the DSM, other sources, such as the METARs (Transmitted Aviation Weather Reports) may be used to fill in data resulting from gaps in the DSM. WFOs should correct erroneous data in the CLI. The “PRIMARY DSM XMIT TIME” will be set to 00:15 a.m. LST for each ASOS site. Intermediate DSMs may be generated and transmitted at any time to meet local needs. The ASOS Users Guide provides detailed guidance regarding the DSM.

4.2 Climatological Report - Monthly (CLM)**4.2.1 Mission Connection**

The CLM provides climatological data for a monthly basis.

4.2.2 Issuance Guidelines

Issuance Criteria: CLMs will be issued with a separate product for each ASOS LCD site (i.e., unique AWIPS ID for each ASOS LCD site [CLMxxx; xxx for the site] under the WFO’s WMO heading [CXaa5i CCCC] for the CLM product category). CLMs for non-LCD sites may be sent as separate products (using the xxx for non-LCD site) or grouped together within an LCD product separated by “&&.”

Issuance Time: The CLM will be issued at least monthly, no later than the 5th day of the following month. A monthly product can be generated using the AWIPS Climate Program any time after the last mandatory CLI issuance between 12:30 a.m. and 5:00 a.m. local time for the last day of the past month.

Valid Time: CLMs are valid from the time of release until the next issuance.

Product Expiration Time: The CLM does not have a product expiration time.

4.2.3 Technical Description

MND Product Type Line: The CLM MND is “CLIMATE REPORT.”

Content: The CLM contains the standardized data shown that follows. These data are required for all CLMs year-round except as noted by “*” in the generic format in Section “4.2.3.c” MM will be used to indicate missing data, as appropriate (i.e. one or more missing daily values result in “MM” for the preliminary monthly value). WFOs may append specialized data to the end of the standard fixed-fields to meet the needs of local users.

Format: The CLM is a tabular product. However, supplemental narrative information may be included to meet local user needs. When specialized or additional information is appended to the standard format, it will be separated from the standard fixed-fields by double ampersands (&&). Double dollar signs (\$\$) will be used to signify the end of the product.

Product Format

Description of Entry

(WMO Heading)
(AWIPS ID)

CLIMATE REPORT
NATIONAL WEATHER SERVICE <WFO> <ST>
<HMM> AM <LT> <DAY MMM DD YYYY>

.....

...THE <CITY NAME> CLIMATE SUMMARY FOR THE MONTH OF <MONTH> <YEAR>...

CLIMATE NORMAL PERIOD YYYY TO YYYY
CLIMATE RECORD PERIOD YYYY TO YYYY

WEATHER	OBSERVED VALUE	DATE (S)	NORMAL VALUE	DEPART FROM NORMAL	LAST YEAR'S VALUE	DATE (S)
---------	-------------------	----------	-----------------	--------------------------	----------------------	----------

.....

TEMPERATURE (F)
RECORD

HIGH	00	MO/DD/YYYY				
LOW	00	MO/DD/YYYY				
HIGHEST	00	MO/DD	00*	00*	00	00
LOWEST	00	MO/DD	00*	00*	00	00
AVG. MAXIMUM	00.0		00.0	0.0	00	
AVG. MINIMUM	00.0		00.0	0.0	00	
MEAN	00.0		00.0	0.0	00	
DAYS MAX >= 90	00		0.0	0.0	00	
DAYS MAX <= 32	00		0.0	0.0	00	
DAYS MIN <= 32	00		0.0	0.0	00	
DAYS MIN <= 0	00		0.0	0.0	00	

PRECIPITATION (INCHES)
RECORD

MAXIMUM	0.00	YYYY				
MINIMUM	0.00	YYYY				
TOTALS	0.00		0.00	0.00	00	
DAILY AVG.	0.00		0.00	0.00	00	
DAYS >= .01	00		0.0	0.0	00	
DAYS >= .10	00		0.0	0.0	00	
DAYS >= .50	00		0.0	0.0	00	
DAYS >= 1.00	00		0.0	0.0	00	
GREATEST						
24 HR. TOTAL	0.00	MO/DD TO MO/DD			00	

SNOWFALL (INCHES)

RECORDS
TOTAL 0.0 YYYY

TOTALS	0.0	0.0	0.0	00
SINCE 7/1	0.0	0.0	0.0	00
SNOWDEPTH AVG.	0	0	0	00
DAYS >= 1.0	0	0.0	0.0	00
GREATEST				
SNOW DEPTH	0	MM		00 00
24 HR TOTAL	0.0	MM/DD TO MM/DD		00
DEGREE_DAYS				
HEATING TOTAL	000	00	00	00
SINCE 7/1	0000	00	00	00
COOLING TOTAL	00	00	00	00
SINCE 1/1	00	00	00	00
WIND (MPH)				
AVERAGE WIND SPEED		0.0		
HIGHEST WIND SPEED/DIRECTION		00/000	DATE	MO/DD
HIGHEST GUST SPEED/DIRECTION		00/000	DATE	MO/DD
SKY COVER				
POSSIBLE SUNSHINE (PERCENT)	00			
AVERAGE SKY COVER	0.00			
NUMBER OF DAYS FAIR	00			
NUMBER OF DAYS PC	00			
NUMBER OF DAYS CLOUDY	00			
AVERAGE RH (PERCENT)	00			
WEATHER CONDITIONS. NUMBER OF DAYS WITH				
THUNDERSTORM	00	MIXED PRECIP		00
HEAVY RAIN	00	RAIN		00
LIGHT RAIN	00	FREEZING RAIN		00
LT FREEZING RAIN	00	HAIL		00
HEAVY SNOW	00	SNOW		00
LIGHT SNOW	00	SLEET		00
FOG	00	FOG W/VIS <= 1/4 MILE		00
HAZE	00			

- INDICATES NEGATIVE NUMBERS.
R INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T INDICATES TRACE AMOUNT.

&& (Standard Format end indicator entered locally)

(<any additional local specialized climate data>
\$\$

* optional – actually these are means and departure from means for the period of record.

4.2.4 Updates, Amendments, and Corrections

These are issued as needed, based upon user needs

4.2.5 Supporting Software

The AWIPS Climate Program usually uses the WFO's own database of monthly values (which were mainly derived from the ASOS DSMs) to produce the CLM. The WFOs, however, may optionally use ASOS Monthly Summary Message (MSM) to produce the CLM. The MSM is an automated coded message primarily for use by NCEP, NCEI, and WFOs. The MSM is not subject to WFO quality control. WFOs should correct erroneous or missing data in the CLM. The "MSM XMIT TIME" will be set to a time between 12:30 a.m. and 05:00 a.m. LST for each ASOS site. The ASOS Users Guide provides detailed guidance regarding the MSM.

4.3 Preliminary Local Climatological Data Report (CF6)

4.3.1 Mission Connection

NCEI uses the CF6 (also called the F-6) as a data source to resolve discrepancies with ASOS LCD and CD Publication data reports when preparing the final climate record for each ASOS LCD and CD Publication site. In addition CF6s are used by NCEI as a primary source of climate data for other ASOS sites. CF6s are also used by the public. WFOs will provide NCEI the name, e-mail address, and telephone number of a point of contact for questions relating to the CF6 data. The WFO CF6 web page will include the disclaimer stating that the data is "preliminary." See NWS Instruction 10-1003 for the disclaimer.

4.3.2 Issuance Guidelines

WFOs will at a minimum post on the World Wide Web the CF6 data and any remarks for the entire preceding calendar month no later than the 3rd day of the following month. CF6s should be posted to the standardized WFO climate web pages by sending (through AWIPS) a separate product for each ASOS site (i.e., unique CF6 AWIPS ID for each ASOS site [CF6xxx] under the WFO's WMO heading [CXaa5i CCCC] for the CF6 product category).

Any requests to add snowfall and/or snow depth data to an LCD or CD Publication at NCEI should be emailed to surface.qc@noaa.gov asking that snow data be added to the publication. Also ensure that the online CF6 has the correct data.

WFOs should post the CF6 data and any remarks more frequently (i.e. daily data postings for month to date along with the needed remarks, such as backup sensor information.)

WFO's should indicate the "final posting" with a note in the CF6 remarks section (i.e. "FINAL MM-YY for month [MM] and year [YY]). This does *not* mean the data are "final," as defined in section 1.

Other remarks will be posted in the "remarks" section of the CF6.

If the WFO makes corrections to any value(s) in a previously reported “final posting” of a CF6, NCEI will be immediately notified of the change and the updated “final posting” will be sent to NCEI by email at surface.qc@noaa.gov. Ensure you include what day, what was changed, and the corrected CF6 for updating of all relevant NCEI data sets and products. Notification and transmittal of the updated CF6 (as attachment) may take place by the submission of a Datzilla report (<https://datzilla.srec.lsu.edu/>).

4.3.3 Technical Description

Content: The CF6 will contain a row of data for each day and summary information of average and cumulative data. Missing data will be indicated with an "M" as appropriate (Section 4). To ensure consistency with NCEI routines, one or more missing daily values will result in an “M” for the corresponding preliminary monthly average or cumulative data value.

WFOs will document the following in the REMARKS section of the CF6.

- Data from backup sensor site and dates.
- Location of the backup site in reference to the ASOS site using eight point compass direction and distance in Statute miles (in tenths of a mile).

Format: WFOs posting CF6s will use the standard format following the key below. All data are for midnight to midnight LST.

KEY to CF6:

- Column 1 - Day of month.
- Column 2 - Maximum temperature for the day (nearest whole degree Fahrenheit).
- Column 3 - Minimum temperature for the day (nearest whole degree Fahrenheit).
- Column 4 - Average daily temperature (nearest whole degree Fahrenheit using columns 2 and 3).
- Column 5 - Departure of the average temperature from normal (whole degrees Fahrenheit).
- Column 6A - Heating Degree Days (HDD) using 65°F base, in whole degrees Fahrenheit.
- Column 6B - Cooling Degree Days (CDD) using 65°F base, in whole degrees Fahrenheit.
- Column 7 - Precipitation amount for the day (liquid equivalent, in hundredths of inches or trace).
- Column 8 - Snowfall amount (including ice pellets) for the day, in tenths of inches or trace.
- Column 9 - Snow depth (including ice pellets, glaze, and hail) to nearest whole inch (or trace) (taken at 1200 Universal Coordinated Time). Hail is noted in remarks section.
- Column 10 - Average daily wind speed in miles per hour.
- Column 11 - Fastest two-minute sustained (or average) wind speed in miles per hour.
- Column 12 - Direction of fastest wind speed; degrees clockwise from true north.
- Column 13 - Minutes of sunshine
- Column 14 - Percent of possible sunshine.
- Column 15 - Cloud cover from sunrise to sunset in tenths.
- Column 16 - Weather codes (from weather key on CF6 form).
- Column 17 - Peak wind gust in miles per hour.
- Column 18 - Direction of peak wind gust in degrees clockwise from true north.

STANDARD FORMAT to CF6:

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

STATION:
 MONTH:
 YEAR:
 LATITUDE:
 LONGITUDE:

TEMPERATURE IN F:					:PCPN:		SNOW:		WIND		:SUNSHINE:			SKY		:PK WND		
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR
=====																		
...for each day of month... ..see column key on preceding page...																		
=====																		
SM ...summations for columns 2, 3, 6A, 6B, 7, 8, 10, 13 and 15...																		
=====																		
AV (for columns 2, 3)										FASTST		PSBL		%		MAX(MPH)		
										MISC ---->		#		(and direction)				
=====																		

NOTES:

LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION:
 MONTH:
 YEAR:
 LATITUDE:
 LONGITUDE:

[TEMPERATURE DATA]	[PRECIPITATION DATA]	SYMBOLS USED IN COLUMN 16
AVERAGE MONTHLY:	TOTAL FOR MONTH:	1 = FOG OR MIST
DPTR FM NORMAL:	DPTR FM NORMAL:	2 = FOG REDUCING VISIBILITY
HIGHEST: ON	GRTST 24HR ON	TO 1/4 MILE OR LESS
LOWEST: ON		3 = THUNDER
	SNOW, ICE PELLETS, HAIL	4 = ICE PELLETS
	TOTAL MONTH:	5 = HAIL
	GRTST 24HR ON	6 = FREEZING RAIN OR DRIZZLE
GRTST DEPTH: ON	7 = BLOWING DUST OR SAND:	VSBY 1/2 MILE OR LESS
		8 = SMOKE OR HAZE
[NO. OF DAYS WITH]	[WEATHER - DAYS WITH]	9 = BLOWING SNOW
		X = TORNADO
MAX 32 OR BELOW:	0.01 INCH OR MORE:	
MAX 90 OR ABOVE:	0.10 INCH OR MORE:	
MIN 32 OR BELOW:	0.50 INCH OR MORE:	
MIN 0 OR BELOW:	1.00 INCH OR MORE:	

[HDD (BASE 65)]	
TOTAL THIS MO.	CLEAR (SCALE 0-3)
DPTR FM NORMAL	PTCLDY (SCALE 4-7)
TOTAL FM JUL 1	CLOUDY (SCALE 8-10)
DPTR FM NORMAL	

[CDD (BASE 65)]
 TOTAL THIS MO.

DPTR FM NORMAL [PRESSURE DATA]
 TOTAL FM JAN 1 HIGHEST SLP ON
 DPTR FM NORMAL LOWEST SLP ON

[REMARKS]

4.3.4 Updates, Amendments, and Corrections

WFOs will perform a quality control check of the CF6 data before final posting for the month.

4.3.5 Supporting Software

At AWIPS sites, the AWIPS Climate Program produces the CF6.

4.4 Record Event Report (RER)

4.4.1 Mission Connection

The RER contains meteorological and hydrological events that equal or exceed existing extreme records. The RER will be used to report occurrences relating to both maximum and minimum extreme records.

4.4.2 Issuance Guidelines

Issuance Criteria: The RER is an event driven product.

Issuance Time: The RER will be issued on an as needed basis whenever an existing record value is met or exceeded.

Valid Time: The RER does not have a valid time.

Product Expiration Time: The RER does not have a product expiration time.

4.4.3 Technical Description

MND Product Type Line: The RER MND is “RECORD EVENT REPORT.”

Content: The RER should be used to report record occurrences of the following meteorological or hydrological events (Table 2, next page), as data availability allows. At AWIPS sites, events identified with an “*” should be automatically identified by the AWIPS Climate Program. “All time” in Table 2 means for the station’s period of record.

WFOs producing RERs may optionally add the following statement to RERs for non ASOS LCD sites without the latest 30-year decadal records.

“Record reports for this station may not be as meaningful as those for stations with 30-year decadal normals (1981-2010) as the period of record here is only XX years.”

Record Variable	Extreme For:
Temperature	
maximum	day*, month, season, all time
minimum	day*, month, season, all time
highest so early	spring
highest so late	fall
lowest so late	spring
lowest so early	fall
lowest maximum	day, month, season, all time
highest minimum	day, month, season, all time
Sea level pressure	
highest	all time
lowest	all time
Wind	
highest speed	all time
highest gust	all time
Largest hail size	all time
Most/least precipitation or snowfall/ snow depth	
within calendar day	day*, month, season, all time
within 24-hour period	month, season, all time
"storm" total	month, season, all time
Greatest snow depth	month, season, all time

Table 2. Station Extremes.

Format: The RER is a text product.

Description of Entry

(WMO Heading)

(AWIPS ID)

(MND)

(Issuing Office)

(Issuing time and date)

[TEXT]

\$\$

4.4.4 Updates, Amendments, and Corrections

As needed based upon user needs.

4.4.5 Supporting Software

The RER is automatically composed whenever the AWIPS Climate Program is run and an existing record value (which AWIPS CLIMAT monitors) is met or exceeded. Alternatively, the RER may be composed using the AWIPS text editor or any other text editor.

5 Surface National Climate Extremes

There is a National Climate Extremes Committee (NCEC) to assess the scientific merit of potentially new national extreme climate record events reported from the field. See Appendix D for details on the NCEC. The following list (Table 3) contains parameters that are monitored under the scope of NCEC for the final national climate extremes.

<p><u>Temperature (°F)</u> Maximum Minimum Maximum 24 hour change</p>	<p><u>Snow (inches)</u> Maximum 24 hour Maximum seasonal (July-June) Maximum Depth</p>	<p><u>Rain (inches)</u> Maximum 24 hour Minimum annual Maximum annual <u>Longest Dry Period (days)</u></p>
<p><u>Hail Size (inches & lbs/oz)</u> Largest diameter Largest circumference Heaviest</p>	<p><u>Pressure (millibars/inches Hg)</u> Lowest Highest</p>	<p><u>Wind (miles per hour)</u> Maximum gust</p>

Table 3. National Extremes

6 Surface State Climate Extremes

State Climate Extremes Committees (SCEC) may be formed to assess the scientific merit of potentially new state extreme climate record events reported from the field. See Appendix E for detailed guidance on SCECs. Should an SCEC be formed for a state, the guidance in Appendix E will be a requirement for a WFO to participate.

7 Base Period Means and Outlook Class Limits for Climate Outlooks

CPC provides this information for surface air temperature, precipitation, sea surface temperature, and 500 millibar heights as reference in their climate outlooks. The information applies to the valid times of the various outlooks. CPC and the Climate Services Division will announce the effective date of the new base period means and class limits at least 30 days in advance. These graphics are available on the CPC web page at <http://www.cpc.ncep.noaa.gov/products/predictions/90day> <http://www.cpc.ncep.noaa.gov/products/predictions/90day> under the “NORM” column.

7.1 Definitions

Base Period Mean: CPC computes base period means for each of the 102 climate outlook divisional areas in the conterminous U.S. and selected observing stations from a period comprising of three consecutive 10 year periods ending in a decadal year (e.g. 1981-2010).

Outlook Class Limits: CPC provides three climatologically equally likely classes: above, near, and below normal (for temperature) or median (for precipitation). The upper and lower limits of the middle class are defined, thereby defining the lower limits of the above class and upper limits of the below class, respectively.

7.2 Temperature and Precipitation Base Period Means and Outlook Classes

CPC calculates the information for each of 102 areal climate outlook divisions and/or selected cities. CSPM’s may request additions or deletions of selected cities to CPC’s Operations Branch.

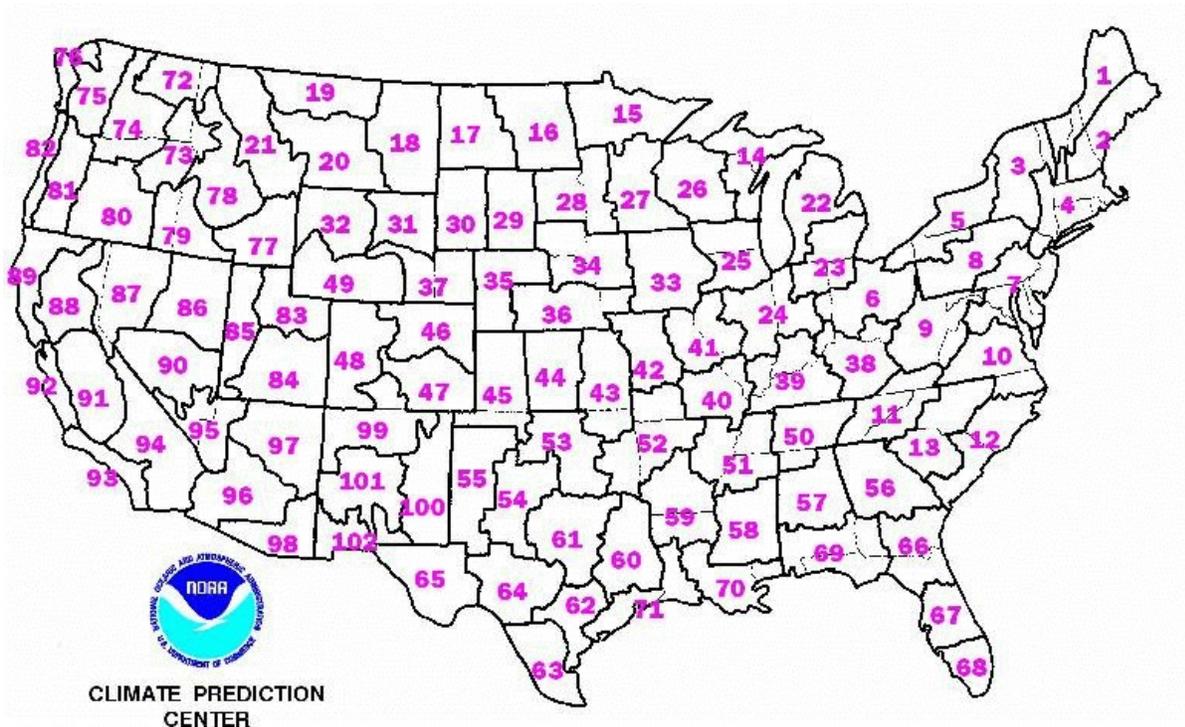


Figure 1. CPC Climate Outlook Divisions for contiguous U.S. (Note: Long Island NY is in division 4).

Base Period Means and Class Limits are calculated for the following valid times (Table 4). This information is available in both graphic and text formats on CPC’s web site. CPC may post just a subset of the valid time calculations for the 6- to 10-day and 8- to 14-day Outlooks (one or two valid times per month).

For Three-Month Outlooks:	For One-Month Outlooks:
January through March	January
February through April	February
March through May	March
April through June	April
May through July	May
June through August	June
July through September	July
August through October	August
September through November	September
October through December	October
November through January	November
December through February	December

For 8- to 14-day Outlooks:	For 6- to 10-Day Outlooks:
January 1 through January 7	January 1 through January 5
January 2 through January 8	January 2 through January 6
etc.	etc.
December 31 through January 6	December 31 through January 4

Table 4. Valid Times for Climate Outlooks.

The following are some examples of CPC base period mean maps available on their web site.

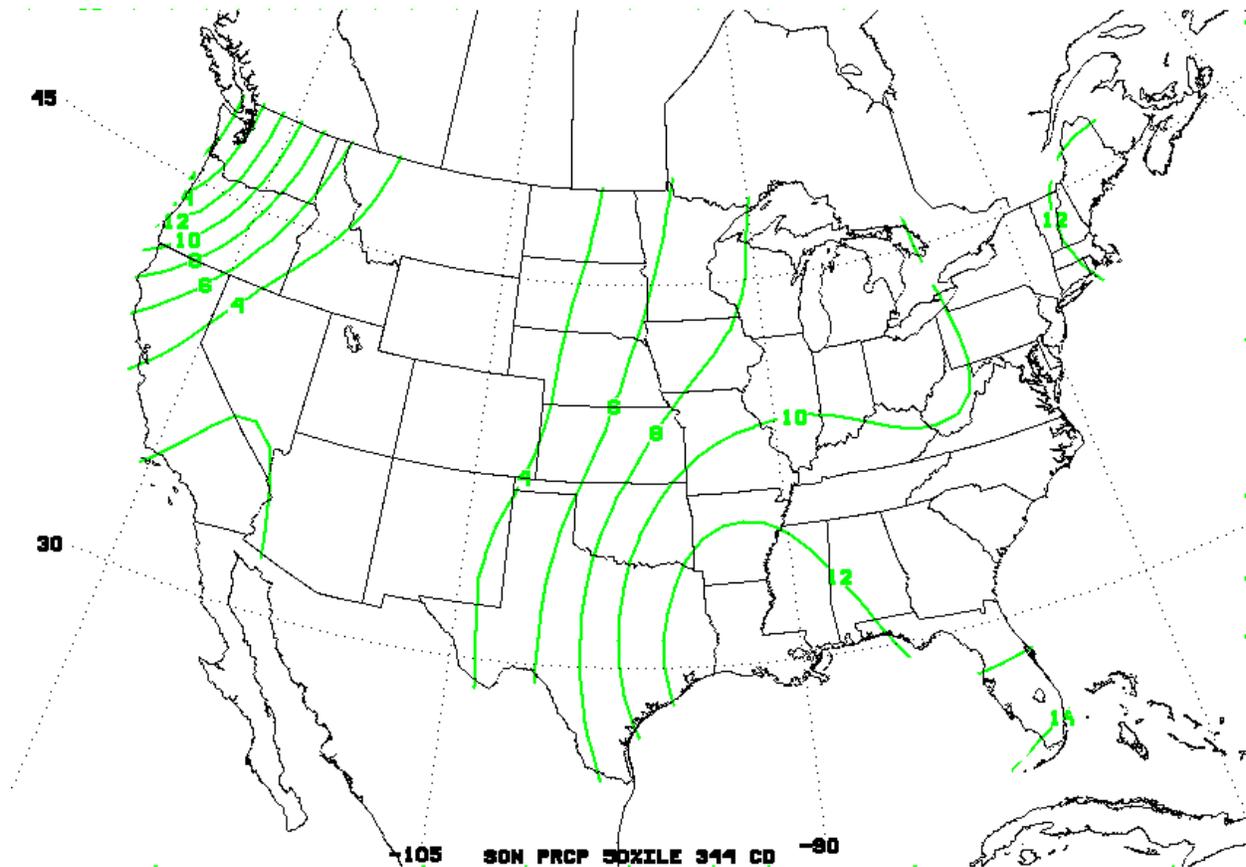


Figure 2. Map of CPC 1981-2010 base period mean total precipitation (inches) for September through November.

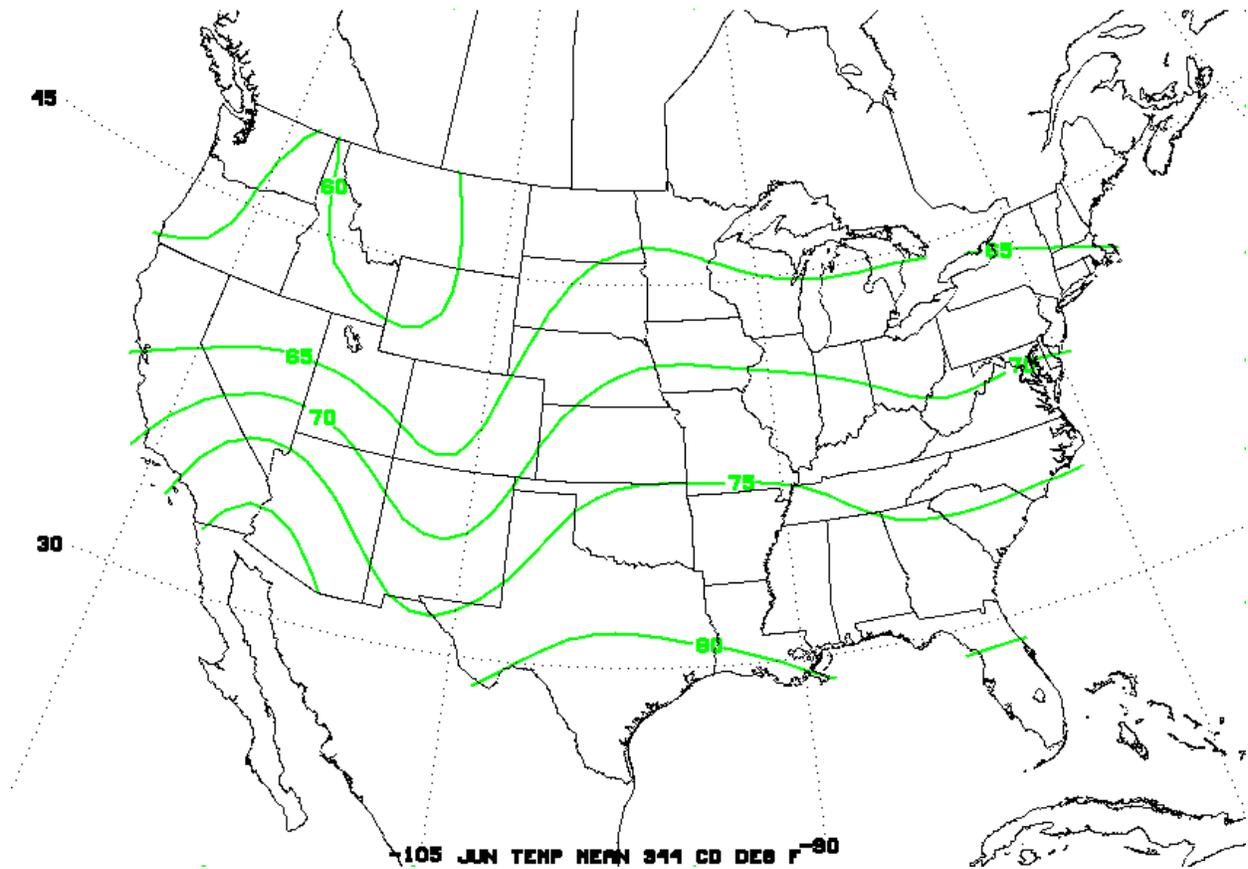


Figure 3. Map of CPC 1981-2010 base period mean temperature for June.

7.3 Base Period Means for Mean 500 millibar heights

CPC has calculated mean Northern Hemisphere 500 millibar heights for the 6-to 10-day and 8-to 14-day valid times listed in Table 4 in Section 7.2. This information is available in graphic format on CPC’s web site. The following is an example of base period mean 500 millibar chart.

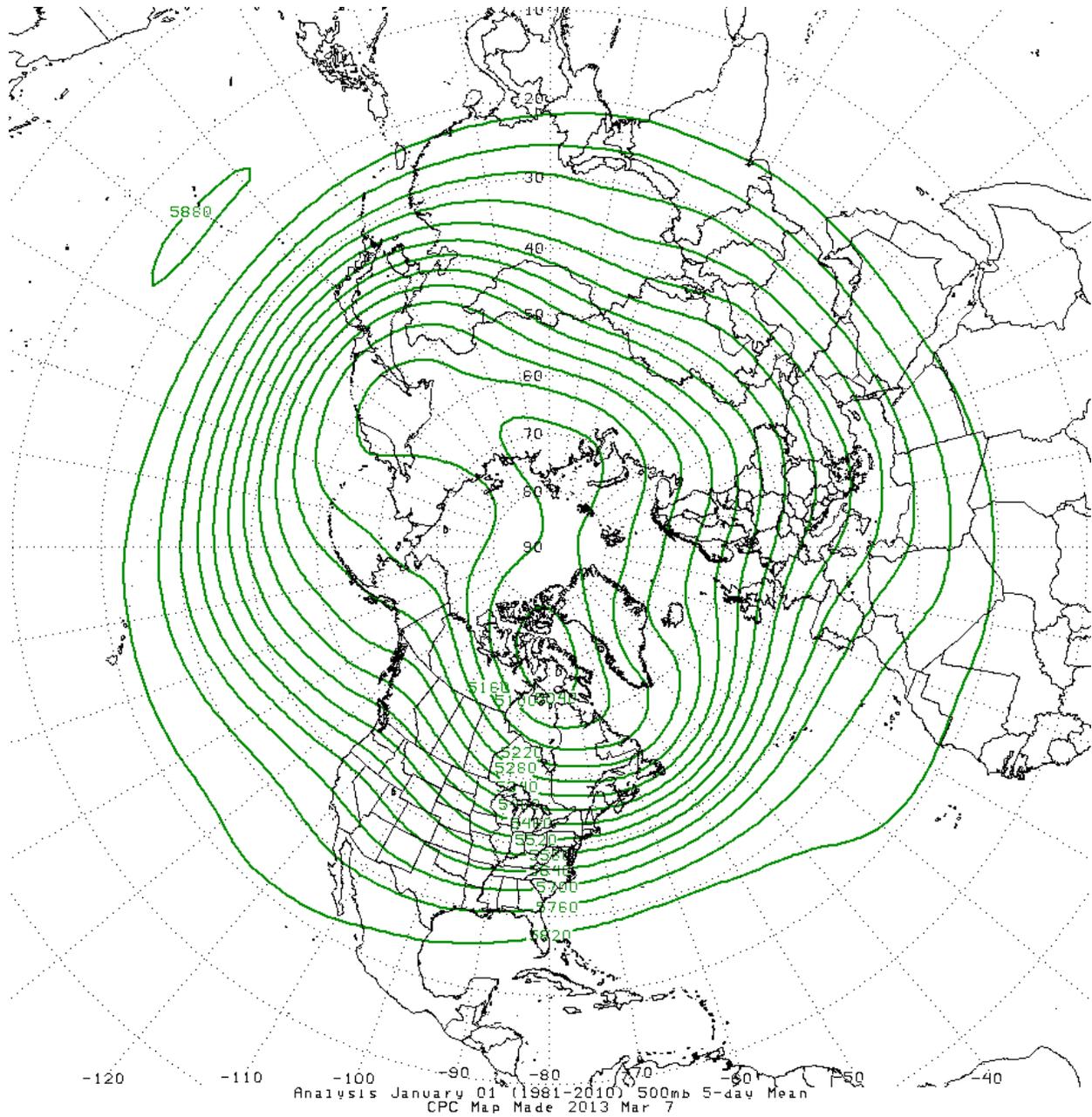


Figure 4. CPC 1981-2010 base period mean Northern Hemisphere 500 millibar height chart (in decameters) for January 1 through 5 (to be used to determine height anomalies in the 6- to 10-day 500 mb height outlook issued December 26).

7.4 Sea Surface Temperature (SST) Base Period Means

CPC has calculated SST means for each month as reference to the official Tropical Pacific SST Outlook (for the Pacific Niño 3.4 area [5°N to 5°S and 120°W to 170°W]). The CPC web site provides global maps of the base period SST means and charts for critical “Niño” subsections of the Tropical Pacific Ocean. Since the SST outlooks are valid for three-month periods, CPC averages the base period SST means of the three months as a reference to calculate the predicted three-month anomaly.

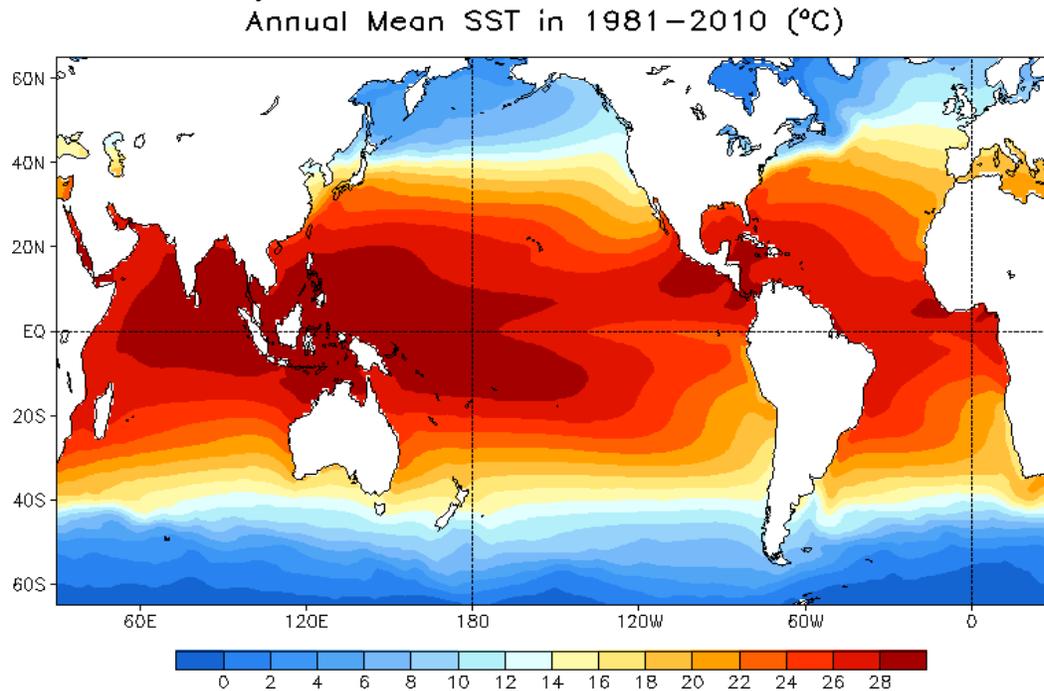


Figure 5. April 1981-2010 base period mean sea surface temperature chart. Temperatures are in Celsius

References:

Arguez, A., I. Durre, S. Applequist, R.S. Vose, M.F. Squires, X. Yin Jr., R.R.H. and Owen, T.W. NOAA's 1981–2010 US climate normals: An overview. *Bull. Am. Meteorol. Soc.*, 93 (11) (2012), pp. 1687-1697.

Durre, I., M. J. Menne, B. E. Gleason, T. G. Houston, and R. S. Vose, 2010: Comprehensive automated quality assurance of daily surface observations. *J. Appl. Meteor. Climatol.*, **49**, 1615–1633.

Menne, M. J., and C. N. Williams, Jr., 2009: Homogenization of temperature series via pairwise comparisons. *J. Climate*, **22**, 1700–1717.

Menne, M. J., and C. N. Williams, Jr., 2009: Homogenization of temperature series via pairwise comparisons. *J. Climate*, **22**, 1700–1717.

Menne, M.J., I. Durre, R.S. Vose, B.E. Gleason, T.G. Houston. An overview of the global historical climatology network-daily database. *J. Atmos. Ocean. Technol.*, 29 (7) (2012), pp. 897-910

APPENDIX A — Ten Principles of Climate Monitoring

The National Research Council (NRC 1999) recommended that the following ten climate monitoring principles, proposed by Karl *et al.* (1995), should be applied to climate monitoring systems:

1. **Management of Network Change:** Assess how and the extent to which a proposed change could influence the existing and future climatology obtainable from the system, particularly with respect to climate variability and change. Changes in observing times will adversely affect time series. Without adequate transfer functions, spatial changes and spatially dependent changes will adversely affect the mapping of climatic elements.
2. **Parallel Testing:** Operate the old system simultaneously with the replacement system over a sufficiently long time period to observe the behavior of the two systems over the full range of variation of the climate variable observed. This testing should allow the derivation of a transfer function to convert between climatic data taken before and after the change. When the observing system is of sufficient scope and importance, the results of parallel testing should be documented in peer-reviewed literature.
3. **Metadata:** Fully document each observing system and its operating procedures. This is particularly important immediately prior to and following any contemplated change. Relevant information includes: instruments, instrument sampling time, calibration, validation, station location, exposure, local environmental conditions, and other platform specifics that could influence the data history. The recording should be a mandatory part of the observing routine and should be archived with the original data. Algorithms used to process observations need proper documentation. Documentation of changes and improvements in the algorithms should be carried along with the data throughout the data archiving process.
4. **Data Quality and Continuity:** Assess data quality and homogeneity as a part of routine operating procedures. This assessment should focus on the requirements for measuring climate variability and change, including routine evaluation of the long-term, high-resolution data capable of revealing and documenting important extreme weather events.
5. **Integrated Environmental Assessment:** Anticipate the use of data in the development of environmental assessments, particularly those pertaining to climate variability and change, as a part of a climate observing system's strategic plan. National climate assessments and international assessments (e.g., international ozone or IPCC) are critical to evaluating and maintaining overall consistency of climate data sets. A system's participation in an integrated environmental monitoring program can also be quite beneficial for maintaining climate relevancy. Time series of data achieve value only with regular scientific analysis.
6. **Historical Significance:** Maintain operation of observing systems that have provided homogeneous data sets over a period of many decades to a century or more. A list of protected sites within each major observing system should be developed, based on their prioritized contribution to documenting the long-term climate record.
7. **Complementary Data:** Give the highest priority in the design and implementation of new sites or instrumentation within an observing system to data-poor regions, poorly observed variables, regions sensitive to change, and key measurements with inadequate temporal

resolution. Data sets archived in non-electronic format should be converted for efficient electronic access.

8. **Climate Requirements:** Give network designers, operators, and instrument engineers climate monitoring requirements at the outset of network design. Ensure instruments have adequate accuracy with biases sufficiently small to resolve climate variations and changes of primary interest. Ensure modeling and theoretical studies identify spatial and temporal resolution requirements.
9. **Continuity of Purpose:** Maintain a stable, long-term commitment to these observations, and develop a clear transition plan from serving research needs to serving operational purposes.
10. **Data and Metadata Access:** Develop data management systems that facilitate access, use, and interpretation of data and data products by users. Freedom of access, low cost mechanisms that facilitate use (directories, catalogs, browse capabilities, availability of meta data on station histories, algorithm accessibility and documentation, etc.), and quality control should be an integral part of data management. International cooperation is critical for successful data management.

References:

Karl, T.R., V.E. Derr, D.R. Easterling, C.K. Folland, D.J. Hoffman, S. Levitus, N.Nicholls, D.E. Parker, and G.W. Withee, 1995: Critical issues for long-term climate monitoring. *Climatic Change*, **31**, 185-221.

National Research Council (NRC), 1999: **Adequacy of Climate Observing Systems**, National Academy Press, Washington, D.C.

APPENDIX B — Accessing NOAA Daily Temperature and Precipitation Extremes Based on Combined/Threaded Station Records

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ABSTRACT

Daily records of both temperature and precipitation are of great interest to the public and many data users and are beneficial in climate perspectives. However, numerous station relocations over the years has resulted in inconsistent approaches to combining multi-location data sets, resulting in disparate reporting of record and extreme values at many prominent large metropolitan observing sites. To address this challenge, the methodology for establishing multi-location combined (or threaded) station data sets under the so-called “*ThreadEx*” project is presented.

1. INTRODUCTION

In the interest of ensuring consistent reporting of climatological data, NOAA's National Climatic Data Center (NCDC), in partnership with the Northeast Regional Climate Center (NRCC), NOAA's National Weather Service/Climate Services Division (NWS/CSD), and numerous data users, has established a data set of combined (or threaded) period of record daily temperature and precipitation values at 255 NOAA published *Local Climatological Data (LCD)* locations that generally correspond to most medium- and large-sized cities in the United States. This new ThreadEx data set provides a consistent basis for the reporting of daily extremes for the longest period of time meaningful. The development of this data set is especially timely given the increasing availability of historic daily values in digital form for the first half of the 20th century (and earlier in some cases) (Kunkel *et al.*, 1998; Guttman, 2002).

Many research applications rely on using a variety of homogenization techniques to account for non-climatic shifts resulting from station relocations, changes in instrument type, and variations in the time of observations (DeGaetano *et al.*, 2002). The ThreadEx project aims to report the *actual* values for a given region mapped to a given published LCD site for the express purpose of conveying general climate perspectives information. Thus, the daily values are preserved in spite of siting changes.

2. METHODOLOGY

Threads for a given published LCD will be developed as follows. The record of a currently active station will be the starting point for a station thread. This station's current record will be used as far back in time as possible, taking precedence over a closed station's record during any periods of overlap (for Automated Surface Observing System (ASOS) locations, this period of record is generally very short – no more than 12 years). A search will be conducted to identify other weather stations in the region that can be used to extend the thread further back in time. In this process, preference will be given to Weather Service/Bureau stations over volunteer COOP stations. The thread will be extended back in time as far as possible using NOAA daily data available in digital form.

For historic overlaps, all else being equal, the station with a more recent record will take precedence, unless partner input (*e.g.*, NWS field offices, State Climatologists, *etc.*) with compelling documentation determines otherwise. An attempt will be made to fill any gaps larger than six months in a station record with data from another station. Partner input will be sought during the development of this data set through a survey.

The period of record used for each portion of a thread will be clearly denoted in the station meta-data.

An example of a station thread for the Chicago area would be:

<i>Chicago O'Hare AP</i>	<i>11/1/1958 - present</i>		
<i>Chicago Midway AP</i>	<i>1/1/1942 - 10/31/1958</i>		
<i>Chicago University</i>	<i>1/1/1926 - 12/31/1941</i>		
<i>Chicago (COOP)</i>	<i>1/1/1896-12/31/1925</i>	<i>Chicago (CRB)</i>	<i>10/9/1871-12/31/1895</i>

¹ * *Corresponding author address*: Timothy W. Owen, National Climatic Data Center, 151 Patton Avenue, Asheville, NC 28801; e-mail: Tim.Owen@noaa.gov.

3. DATA SET ACCESS

The threaded data will be available in two formats:

- On xmACIS (the NWS interface for climate record queries) and other systems using the ACIS database (<http://www.rcc-acis.org/>), the threaded data station daily values will be fully available for query; thus, all data summaries currently available in xmACIS can be applied to this data set. These stations will be clearly identified as threaded stations.

The benefit of an extended record is illustrated using xmACIS output in Table 1. Presently, the Washington, DC record at National Airport, extends back to 1948. With ThreadEx, daily extremes will be extended back to the 1890s using pre-1948 Weather Bureau station observations, allowing climate perspectives inquiries such as determining the coldest/warmest/wettest Inauguration Day for a substantially longer period of record.

- Another data set containing summary tables for extremes will be produced. This will consist of the top 3 records per calendar day for maximum temperature (highest and lowest), minimum temperature (highest and lowest) and precipitation (highest). Metadata will consist of station information for the station fragments composing the thread. The period of analysis will consist of the earliest data available in digital form through the end of 2004.

Table 1. Sample xmACIS Output

WASHINGTON REAGAN NATIONAL AP (KDCA)		
Extremes		
Lowest Average Minimum Temperature		
Days: 1/20 - 1/20		
Length of period: 1 day		
Years: 1948-2004		
Rank	Value	Ending Date
1	-2.0	1/20/1985
2	8.0	1/20/1994
3	9.0	1/20/1984

4. FUTURE DEVELOPMENT AND UPDATE

A national oversight committee will be established to oversee future updates to the Threaded Extremes Data Set. This committee will seek to include members representing the Regional Climate Centers, AASC, NCDC, NWS field offices, NWS regional offices and NWS Headquarters. This committee will also be charged with making determinations in situations where a partner requests an exception be made to the methodology outlined above.

Both the xmACIS and table derivatives of the data set will be updated on an annual basis to include calendar year updates and extension of period of record based upon digitized daily data rescued from NOAA archives and offices as they are documented (including metadata such as latitude, longitude, elevation, station/instrument and other siting characteristics, etc.), quality assured, and made available.

5. CONCLUSION

NOAA’s commitment to excellence in climate services is punctuated by its synergies with partners in developing data feedback, quality assurance, and dissemination infrastructure. With the ThreadEx effort, maximized, consistent, updated daily extremes will be available for government, partner, and general public (especially media) use. The consistent use of such information will make clear regional extremes and lay the foundation for the expansion of this technique to additional locations and parameters.

6. REFERENCES

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APPENDIX C — Primary Local Climatological Data Stations

ALASKA

ANC ANCHORAGE INTL AP
 BRW BARROW POST-ROGERS AP
 BET BETHEL AIRPORT
 CDB COLD BAY AP
 FAI FAIRBANKS INTL AP
 JNU JUNEAU AP
 KTN KETCHIKAN
 AKN KING SALMON AP
 ADQ KODIAK STATE CG BASE
 OTZ KOTZEBUE RALPH WEIN
 MCG MCGRATH
 OME NOME MUNICIPAL AP
 SNP ST PAUL ISLAND AP
 YAK YAKUTAT STATE AP

ALABAMA

BHM BIRMINGHAM INTL AP
 HSV HUNTSVILLE INTL AP
 MOB MOBILE REGIONAL AP
 MGM MONTGOMERY DANNELLY

ARKANSAS

FSM FT SMITH MUNICIPL AP
 LIT LITTLE ROCK ADAMS FD
 LZK NORTH LITTLE ROCK

AMERICAN SAMOA

NSTU TAFUNA PAGO PAGO INTL AP

ARIZONA

FLG FLAGSTAFF AP
 PHX PHOENIX INTL AP
 TUS TUCSON INTL AP
 INW WINSLOW AP

CALIFORNIA

BFL BAKERSFIELD AP
 BIH BISHOP AP
 EKA EUREKA WSO CITY
 FAT FRESNO AIR TERMINAL
 LGB LONG BEACH AP
 CQT LOS ANGELES DOWNTOWN AP
 LAX LOS ANGELES INTL AP
 RDD REDDING MUNICIPAL AP
 SAC SACRAMENTO EXEC AR
 SAN SAN DIEGO LINDBERGH
 SFO SAN FRANCISCO INTL AP
 SFOC SAN FRANCISCO CITY
 SMX SANTA MARIA PBLC AP
 SCK STOCKTON METRO AP

COLORADO

ALS ALAMOSA BERGMAN FLD
 COS COLORADO SPRGS MUNI
 DEN DENVER INTL AP
 GJT GRAND JUNCTION WLKR
 PUB PUEBLO MEMORIAL AP

CONNECTICUT

BDR BRIDGEPORT SIKORSKY
 BDL HARTFORD BRADLEY INTL AP

DELAWARE

ILG WILMINGTN NEW CASTLE

FLORIDA

DAB DAYTONA BEACH INTL AP
 FMY FORT MYERS PAGE FLD AP
 GNV GAINESVILLE MUNI AP
 JAX JACKSONVILLE INTL AP
 EYW KEY WEST INTL AP
 MLB MELBOURNE
 MIA MIAMI INTL AP
 MCO ORLANDO INTL AP
 PNS PENSACOLA REGIONL AP
 TLH TALLAHASSEE MUNI AP
 TPA TAMPA INTL AP
 VRB VERO BEACH MUNI AP
 PBI W PALM BEACH INTL AP

GEORGIA

AHN ATHENS MUNI AP
 ATL ATLANTA HARTSFIELD INTL
 AGS AUGUSTA BUSH FIELD
 CSG COLUMBUS METRO AP
 MCN MACON REGIONAL AP
 SAV SAVANNAH INTL AP

GUAM

PGUM GUAM INTL APRT

HAWAII

ITO HILO INTL AP
 HNL HONOLULU INTL AP
 OGG KAHULUI AP
 LIH LIHUE AP

IOWA

DSM DES MOINES INTL AP
 DBQ DUBUQUE MUNI AP
 SUX SIOUX CITY MUNI AP
 ALO WATERLOO MUNI AP

NWSI 10-1004 MAY 17, 2020

IDAHO

BOI BOISE AIR TERMINAL
LWS LEWISTON NEZ PERCE CO. AP
PIH POCATELLO MUNICIPAL AP

ILLINOIS

ORD CHICAGO OHARE INTL AP
MLI MOLINE QUAD CITY AP
PIA PEORIA GTR PEORIA AP
RFD GREATER ROCKFORD AP
SPI SPRINGFIELD CAPTL AP

INDIANA

EVV EVANSVILLE REG AP
FWA FORT WAYNE INTL AP
IND INDIANAPOLIS INTL AP
SBN SOUTH BEND ST JOSEPH AP

KANSAS

CNK CONCORDIA BLOSSER MUNI AP
DDC DODGE CITY REG AP
GLD GOODLAND RENNER FLD
TOP TOPEKA MUNI AP
ICT WICHITA MID-CNTNT AP

KENTUCKY

JKL JACKSON J CARROLL AP
LEX LEXINGTON BLUEGRASS FLD
SDF LOUISVILLE STANDIFRD
PAH PADUCAH BARKLEY FLD

LOUISIANA

BTR BATON ROUGE RYAN AP
LCH LAKE CHARLES MUNI AP
MSY NEW ORLEANS INTL AP
SHV SHREVEPORT REGIONAL AP

MASSACHUSETTS

BOS BOSTON LOGAN INTL AP
MQE MILTON - BLUE HILL OBS
ORH WORCESTER MUNI AP

MARYLAND

BWI BALT-WASHGTN INTL AP

MAINE

BGR BANGOR INTL AP
CAR CARIBOU MUNI AP
PWM PORTLAND INTL JETPRT

MICHIGAN

APN ALPENA PHELPS COL AP
DTW DETROIT METRO AP
FNT FLINT BISHOP AP
GRR GRAND RAPIDS INTL AP
HTL HOUGHTON LAKE ROSCMN AP

LAN LANSING CAPITAL CITY AP
MKG MUSKEGON CO AP
MQT MARQUETTE CTY AP FAA
ANJ SAULT STE. MARIE AP

MINNESOTA

DLH DULUTH INTL AP
INL INTERNATL FALLS INTL AP
MSP MINNEAPOLIS/ST PAUL INTL
RST ROCHESTER INTL AP
STC ST CLOUD MUNI AP

MISSOURI

COU COLUMBIA MUNI AP
MCI KANSAS CITY INTL AP
SGF SPRINGFIELD REG AP
STL ST LOUIS LAMBERT INTL

MISSISSIPPI

JAN JACKSON INTL AP
MEI MERIDIAN KEY FLD
TUP TUPELO C D LEMONS AP

MONTANA

BIL BILLINGS LOGAN INTL AP
GGW GLASGOW INTL AP
GTF GREAT FALLS INTL AP
HVR HAVRE CITY/COUNTY AP
HLN HELENA AP
GPI KALISPELL GLACIER AP
MSO MISSOULA JOHNSN-BELL

NORTH CAROLINA

AVL ASHEVILLE REGIONL AP
HSE HATTERAS BILLY MITCHELL
CLT CHARLOTTE DOUGLAS INTL
GSO GREENSBORO REG AP
RDU RALEIGH DURHAM AP
ILM WILMINGTON NEW HANVR

NORTH DAKOTA

BIS BISMARCK MUNI AP
FAR FARGO AP
GFK GRAND FORKS INTL AP

NEBRASKA

GRI GRAND ISLAND AP
LNK LINCOLN MUNI AP
OFK NORFOLK STEFAN AP
LBF NORTH PLATTE L BRD FLD
OMA OMAHA EPPLEY AIRFLD
BFF SCOTTSBLUFF CNTY AP
VTN VALENTINE MILLER FLD

NEW HAMPSHIRE

CON CONCORD MUNI AP
MWN MT. WASHINGTON

NEW JERSEY

ACY ATLANTIC CITY INTL AP
ATLN ATLANTIC CITY MARINA
EWR NEWARK INTL AP

NEW MEXICO

ABQ ALBUQUERQUE INTL AP
CAO CLAYTON MUNI ARP
ROW ROSWELL INDSTRAL ARP

NEVADA

EKO ELKO REGIONAL AP
ELY ELY YELLAND FIELD
LAS LAS VEGAS MCCRN INTL
RNO RENO CANNON INTL AP
WMC WINNEMUCCA MUNI AP

NEW YORK

ALB ALBANY INTL AP
BGM BINGHAMTON LINK FLD
BUF BUFFALO GR BUFFLO INTL
ISP ISLIP L I MACARTHUR
NYC NEW YORK CITY R
JFK NEW YORK J F KENNEDY
LGA NEW YORK LAGUARDIA
ROC ROCHESTER INTL AP
SYR SYRACUSE HANCOCK INTL

OHIO

CAK AKRON-CANTON REG AP
CLE CLEVELAND HOPKINS INTL
CMH COLUMBUS INTL AP
CVG CINCI-NORTHERN KY AP
DAY DAYTON INTL ARPT
MFD MANSFIELD LAHM AP
TOL TOLEDO EXPRESS AP
YNG YOUNGSTOWN MUNI AP

OKLAHOMA

OKC OKLA. CITY ROGERS INTL
TUL TULSA INTL AP

OREGON

AST ASTORIA CLATSOP AP
BNO BURNS MUNICIPAL AP
EUG EUGENE MAHLON SWEET
MFR MEDFORD ROUGE VLY INTL
PDT PENDLETON MUNICPL AP
PDX PORTLAND INTL AP
SLE SALEM MCNARY FIELD

PENNSYLVANIA

ABE ALLENTOWN A-B-E INTL
AVP AVOCA WILKES-BARRE SCR
ERI ERIE INTL AP
MDT MIDDLETOWN HARRISBRG
PHL PHILADELPHIA INTL AP
PIT PITTSBURGH INTL AP
IPT WILLIAMSPRT-LYCOMING AP

PACIFIC ISLANDS

PKWA KWAJALEIN RMI
PKMR WSO MAJURO, RMI
PTTP WSO POHNPEI, FSM
PTKK CHUUK INTL APRT FSM
PTYA YAP INTL APRT FSM

PUERTO RICO

SJU ISLA VERDE INTL AP

RHODE ISLAND

PVD PROVIDENCE GREEN ST AP

SOUTH CAROLINA

CHS CHARLESTON INTL ARPT
CHLS CHARLESTON CITY
CAE COLUMBIA METRO AP
GSP GREER GREENV'L-SPART

SOUTH DAKOTA

ABR ABERDEEN REGIONAL AP
HON HURON REGIONAL AP
RAP RAPID CITY REGINL AP
FSD SIOUX FALLS FOSS FLD

TENNESSEE

TRI BRISTOL TRI CITY AP
CHA CHATTANOOGA LOVELL
TYS KNOXVILLE MCG TYSON
MEM MEMPHIS INTL AP
BNA NASHVILLE METRO AP
OQT OAK RIDGE, TN

TEXAS

ABI ABILENE MUNI AP
AMA AMARILLO INTL AP
AUS AUSTIN BERGSTROM INTL
ATT AUSTIN/CAMP MABRY ANG
BPT BEAUMONT/P. ARTHUR REG
BRO BROWNSVILLE INTL AP
CDS CHILDRESS MUNI AP
CRP CORPUS CHRISTI INTL
DAL DALLAS-LOVE FIELD
DFW DALLAS-FT WORTH AP
DRT DEL RIO INTL AP
ELP EL PASO INTL AP
IAH HOUSTON INT'CNTNL AP
LBB LUBBOCK REGIONAL AP

MAF MIDLAND-ODESSA INTL AP
SJT SAN ANGELO MATHIS FD
SAT SAN ANTONIO INTL AP
VCT VICTORIA REGIONAL AP
ACT WACO MADISN COOPR AP
SPS WICHITA FALLS MUN AP

UTAH

SLC SALT LK CITY INTL AP

VIRGINIA

LYH LYNCHBURG MUNI AP
ORF NORFOLK INTL AP
RIC RICHMOND BYRD AP
ROA ROANOKE WOODRUM AP
WAL WALLOPS ISLAND FLGT FAC
DCA WASHINGTON DC NATL AP
IAD WASHINGTON DC DULLES

VERMONT

BTV BURLINGTON INTL AP

WASHINGTON

OLM OLYMPIA AP
UIL QUILLAYUTE AP
SEA SEATTLE-TACOMA AP
SEW SEATTLE SAND POINT
GEG SPOKANE INTL AP
YKM YAKIMA AIR TERMINAL

WISCONSIN

GRB GREEN BAY AUSTIN STR
LSE LA CROSSE MUNI AP
MSN MADISON DANE CNTY AP
MKE MILWAUKEE MTCHLL FLD

WEST VIRGINIA

BKW BECKLEY RALEIGH AP
CRW CHARLESTON KNWA AP
EKN ELKINS RNDLPH CO AP
HTS HNTNGTN TRI-STATE

WYOMING

CPR CASPER NATRONA CO AP
CYS CHEYENNE MUNI AP
LND LANDER HUNT FIELD
SHR SHERIDAN COUNTY AP

**APPENDIX D — Request for National Climatic Extremes Committee (NCEC) Activation
for Potential Extreme Events**

The NOAA policy source for the following is provided at
<https://www.ncdc.noaa.gov/extremes/ncec/index.php>

When the possibility that a new national climate extreme has occurred, the NCEC will consider requests for activation to evaluate and decide the validity of the event using the following procedures.

1. NCEC chair (NCEI) will accept direct requests for activation only from the following official requesting contacts. Observers (or reporters of automated events) can report to any one of these contacts for forwarding to NCEC except all WFO observations or WFO received reports will be forwarded through one of their NWS Regional Headquarters.

- State climatologists
- Regional Climate Center directors
- NWS Regional Headquarters (any one of the following; Regional Climate Services Program Managers, Regional Warning Coordination Meteorologist, or Regional COOP Program Manager).
- NWS Climate Services Branch (W/AFS23)
- NWS Office of Observations, Program Management Branch (W/OBS31)
- NCEI Climate Science and Services Division (E/NE3)

2. Official requesters can make activation requests by email to the NCEC chairman with cc to the other NCEC members or by a telephone call to the NCEC chair. If the chair is not unavailable via telephone, other NCEC members may be called. Requests should include the following:

- Name and affiliation of requester and address, e-mail, telephone, etc.
- Observer or reporter name and affiliation (COOP, FAA or NWS contractor, WFO, etc.) and address, e-mail, telephone, etc.
- Station and instrument types; COOP, ASOS, snowboards, stakes, rulers, etc.
- Type of event being requested for evaluation as per list of existing records
- Time of event (date, month, year, and time of day)
- Place of event (distance and direction from known landmark, city, etc.)
(e.g. 30 miles west of Sioux Falls, 2 miles south of Mt. Rushmore)

3. Official requesters should screen the observation or report to ensure that the event falls under the charter of the NCEC's authority (i.e., a national climate record is in question as per list of existing records).

4. Requests for NCEC activation will receive a response from the chair or backup member as soon as possible. NCEC should expedite responses to requests with "perishable" evidence such as hail or snow.

APPENDIX E — State Climate Extremes Committees

1. Purpose

The formation of a State Climate Extremes Committee (SCEC) addresses the consideration of potentially record-setting extreme meteorological elements observed at the statewide level. The purpose of the SCEC is to mirror the activities of the [National Climatic Extremes Committee \(NCEC\)](https://www.ncdc.noaa.gov/extremes/ncec) (<https://www.ncdc.noaa.gov/extremes/ncec>), but for observations challenging state records, rather than national ones. The SCEC serves as a panel that will make determinations regarding state records, ultimately referred to the Climate Monitoring Chief of the National Oceanic and Atmospheric Administration's (NOAA's) National Centers for Environmental Information (NCEI). With the acknowledgment of the NCEI Climate Monitoring Chief, such records will become officially sanctioned, and recognized by the meteorological and climatological community.

2. Scope

The SCEC is to provide counsel and a recommendation regarding the status of an observation of a meteorological element (*e.g.*, maximum temperature) that challenges the existing, official record value for that element for a given state. If such observations also challenge a national record, the involvement of the SCEC will be to render a recommendation regarding the state record only. The case will be forwarded and considered separately by the NCEC.

While many aspects of meteorological elements may be tracked, and record extremes determined, officiating and tracking many of the elements that are of extremely limited interest or use to the public would unnecessarily burden the SCEC. Therefore, the SCEC has compiled a list of elements that are to be tracked. The list can be found at <https://www.ncdc.noaa.gov/extremes/scec/track>. These elements have demonstrated a strong public interest, and the historical data for these elements are readily available for a large number of observation stations across the United States.

Additionally, NCEI's state and regional partners have expressed a repeated desire to vet state records for other meteorological parameters. These records will be adjudicated, resources permitting among SCEC members, with the following guidelines:

- The records are for single-station or single-point phenomena (*i.e.*, not regional or statewide averages)
- Based on resource constraints, records for specific months (*e.g.*, the coolest temperature observed in June) are not considered by the SCEC. All-time monthly records (*e.g.*, the coolest month observed by any station during any month) are considered within scope. However, due to resource constraints, these adjudications are uncommon.

3. Composition and convening

The SCEC will be an *ad hoc* committee comprised of the following five voting members:

- A representative from NOAA’s National Weather Service (NWS) Weather Forecast Office (WFO) holding jurisdiction over the station recording a potential record. The Meteorologist in charge (MIC), or the climate focal point is preferred.
- The State Climatologist (SC) for the state in which the record is being challenged. If the state does not have an SC, the SC from a neighboring state will be asked to serve.
- A representative from the NWS Regional Headquarters. Preferably this will be the NWS Regional Climate Services Program Manager (CSPM) or the Regional COOP Program Manager.
- A representative from the relevant Regional Climate Center (RCC). Preferably this will be the Regional Climatologist or the RCC Director.
- A representative from NCEI. The NCEI National Partnership Liaison will facilitate this selection.

Additional non-voting members may be asked to participate. This is often the case where the input of a particular subject matter expert is desirable. A quorum of the committee is considered to be three of the five voting members.

The committee may be called by any member, but in general, it will be expected that either the relevant WFO or the SC for the affected state will call for the committee to convene. The committee will dissolve once a recommendation has been reached regarding a challenged record value, or when the challenge has been withdrawn. The SCEC will strive for consensus determinations. In the event that a unanimous determination cannot be reached, determinations will carry with at least three votes, and dissenting opinions will be included in its decision report. This decision report will be compiled by the NCEI representative serving on the SCEC and will be accessible on the NCEI SCEC website.

It is expected that most discussion and voting of the committee will take place via either E-mail or teleconference (see Section 4). Occasionally, it may be necessary for the committee to meet in person. If the in-person meeting is to discuss a particular state record, the meeting should occur in the state in question (as a site visit may be necessary). Such a meeting should be arranged by a member based in that state.

4. Record Recognition Process

The SCEC compiled an initial list of records listed in Table 1 for each state of the United States. These records were reviewed to determine their validity and, if found to be acceptable, were recommended to the NCEI Climate Monitoring Chief for inclusion in the statewide records data set. In the mid-2000s, NCEI reviewed and updated the statewide extremes tables for all-time maximum and minimum temperature, 24-hr precipitation and snowfall, and all-time greatest snow depth. Remaining tables of the tracked elements have been subsequently updated. Here forward, the challenge of an SCEC officially recognized statewide record is expected to follow the following guidelines:

If the WFO or the SC thinks a statewide record may have been set, a representative from the WFO or SC office (preferably the WFO) should visit the site of the record within 2 days of notification of the record and take the following action.

- Test equipment to ensure proper working order (if applicable).
- Examine and describe exposure and take pictures.

After the site visit, the WFO representative or SC should send an E-mail to all members of the SCEC (see Section 3) informing them of a challenge to the record. Information/photos from the site visit should be attached to the E-mail or a common access location determined and shared with the SCEC members for proper review of the evidence.

At this point, the WFO should transmit a preliminary Record Event Report (RER). The RER should clearly indicate that the record is under review, and final determination will be forthcoming.

Once the WFO or SC sends the initial SCEC E-mail, they should set up a teleconference call that includes all members of the SCEC.

- The teleconference should take place within the soonest practical timeframe after the E-mail from the WFO or SC is received.
- If any member of the SCEC is unavailable, they should notify the committee of their absence. They may provide input via E-mail, but their vote would either be abstained, or cast by their alternate or other proxy acceptable to the committee.

Each SCEC member will review the validity of the proposed record value, using all tools available to them, prior to the teleconference. They should be prepared to discuss and vote on the validity of the record during the conference call. A second call may be needed if new information is brought to light in the first call.

The SCEC will vote for or against determining that the record be updated. A majority (at least three votes) will carry the vote.

The NCEI Climate Monitoring Chief will be informed of the challenge to the record, and will be given the determination of the SCEC. The chief, or their officially designated proxy, will render an official decision on the record. The decision of the NCEI Climate Monitoring Chief or proxy will be final. The decisional report will be drafted by the SCEC's NCEI representative and made available on the [SCEC website \(https://www.ncdc.noaa.gov/extremes/scec\)](https://www.ncdc.noaa.gov/extremes/scec).

NWS Instruction 10-1004 limits recognition of statewide climate records to those values originating from official NOAA-sanctioned weather stations. However, it has become evident that limiting the recognition of official climatological records to only official observations (e.g., NOAA weather stations) may result in legitimate meteorological observations being dismissed on non-scientific grounds. Therefore, the SCEC has taken the informal stance that a meteorological observation being considered for a statewide record may come from any legitimate meteorological observation platform, provided the value has first been vetted by either the State Climatologist or a local NWS representative. When evaluating a value that has come

from a source external to NOAA's officially sanctioned weather observing network, the SCEC requires that:

- The observation is meteorologically sound and climatologically representative of the climate of the region (*e.g.*, not biased by micro-climatological, anthropogenic, geologic, or combustion factors).
- The observing platform meets or exceeds instrument and siting standards set forth by the World Meteorological Organization (WMO), the Office of the Federal Coordinator for Meteorology (OFCM), and NOAA.
- The instrument/sensor has operational parameters which support the observation. If an observation is beyond the operational envelope of the instrument, the instrument may be forwarded to a standards facility for testing.
- The data collected by the instrument is archived indefinitely, along with any quality control and metadata information pertaining to the data, sensor, platform or network.
- Public access to the data and all accompanying metadata is unrestricted (although the access may be fee-based).

5. Erroneous Records

If upon future examination, it comes to the attention of a member of an organization represented on the SCEC that an officially recognized statewide record may be in error or otherwise invalid, that member of the SCEC should send an E-mail to the committee, informing them of the questionable record, and including documentation in support of the challenge.

The challenging member should then invite all members to a teleconference, where the record will be discussed and a determination regarding validity voted upon.

If a challenge to the validity of an existing official statewide record is made by someone outside the committee structure, the challenge should be directed toward the relevant WFO or SC, who will review the challenge and, if the evidence warrants it, forward the challenge to the committee as per the steps outlined in the previous paragraph.

6. Public Visibility

NCEI, NWS, State Climatologists, and/or the American Association of State Climatologists (AASC) may wish to publish a table of state records and/or post them on the web. The table may include the officially sanctioned record values, the date on which the records were set, and the stations at which they were set. Web postings may also describe the SCEC mission, the records it tracks, the steps for reporting potential records or challenging existing records and decisional reports issued by the SCEC. This SCEC website contains all of the aforementioned information.

Exhibit: C1

PROJECT:
 COMMUNITY GARDENS
 COMMUNITY GARDENS
 500 SCHOOL STREET
 MANSFIELD, MA 02048

PROJECT NUMBER: 19195



STAMP:

ISSUE: PRELIMINARY DATE: 06.16.2020

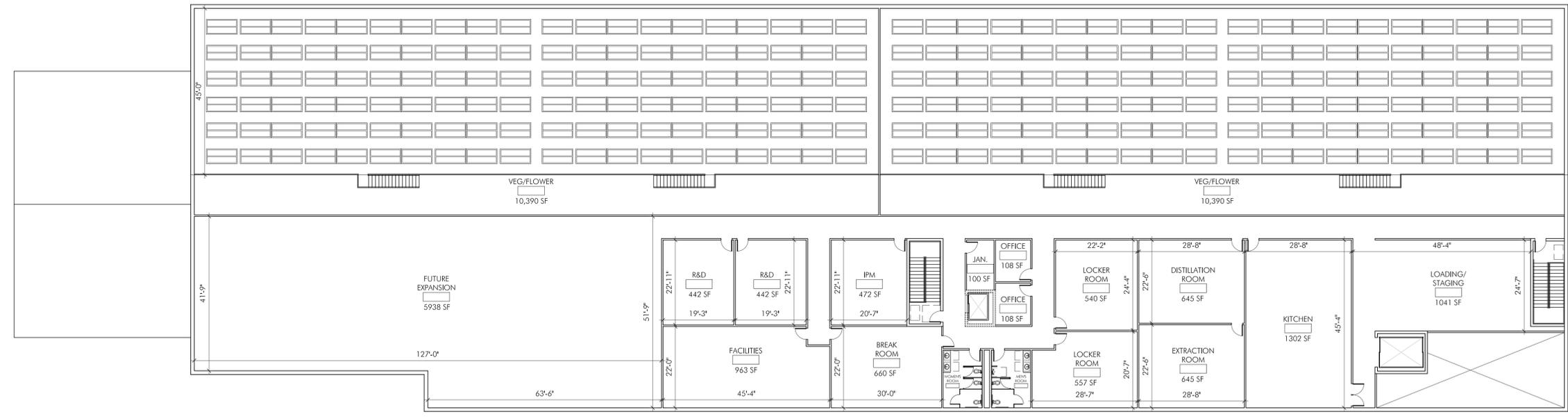
DRAWING SCALE: 1/16" = 1'-0"

DRAWN BY: CJD CHECKED BY: DMC

DRAWING TITLE: FLOOR PLANS

DRAWING NUMBER:

A1.0



SQUARE FOOTAGE CALCULATIONS

FIRST FLOOR:	44,016 SF
MEZZANINE:	8,272 SF
SECOND FLOOR:	19,272 SF
TOTAL PROPOSED:	71,560 SF

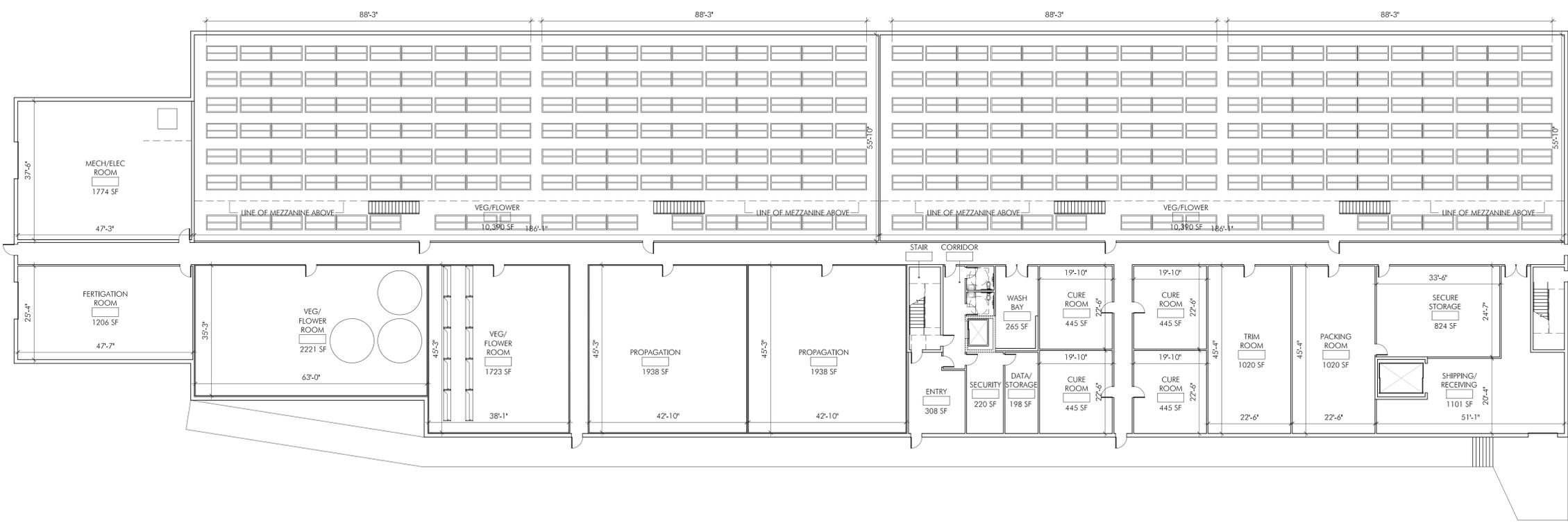


Exhibit: D1

MECHANICAL BASIS OF DESIGN

Client: Mr. Stephen Chorney
Project: Community Gardens - Mansfield, MA
Project No.: Unassigned
Date: September 8, 2020
Submitted By: Frank Zaino III

Project Overview

1. Community Gardens. is proposing a new Marijuana Cultivation Facility located on School Street, Mansfield, MA.
2. The project will be an approximately 80,000 ft² two-story building.
3. The building program will be comprised of a propagation area, harvesting area, extraction lab, commercial Kitchen, flower rooms, utility rooms, and offices in a pre-engineered building.
 - a. Grow Rooms – 70°F year round, 55% RH
 - b. Clone Room - 76°F year round, 70% RH
 - c. Dry/Cure Room - 65°F year round, 55% RH
 - d. Extraction Room - 70°F year round, 55% RH
 - e. Kitchen - 70°F year round, 55% RH
 - f. Trim Room- 70°F year round, 55% RH
 - g. Packaging Room- 70°F year round, 55% RH
 - h. Vault - 65°F year round, 55% RH
 - i. Shipping & Receiving
 - j. General Occupied Spaces- 72°F winter, 75°F summer
4. Ventilation
 - a. Outdoor air CFM to be provided per ASHRAE 62.1-2019 ventilation requirements per occupants and space area for occupied spaces.

Scope of Work

1. Air Handling Units

- a. Propose variable volume air handling units (AHU) for each pair of Flower Rooms. The Flower Room systems will include displacement ventilation, chilled water cooling, hot water reheat and dehumidification control. The Flower Rooms supply ducts will include a motorized damper for isolation of one AHU for service while the other remains operating.
- b. Propose variable volume air handling unit (AHU) for each Veg, Mother, and Clone room. The room systems will include overhead distribution, chilled water cooling, hot water reheat and dehumidification control.
- c. The units will consist of a double wall galvanized steel insulated casing, MERV 8 Pre-filters, fan-array supply fan section, UV lights, chilled water cooling coils, wrap around heat pipe section, hot water heating coils and MERV 15 final filters.
- d. Air velocities across the coils and filters shall not exceed 500 feet per minute.
- e. The coils shall be provided with modulating 2-way control valves.

2. Fan Coil Units

- a. The grow facility support areas, back of house areas, and admin areas will have 4-pipe fan coil units for conditioning the spaces. Each fan coil unit shall be provided with 2-way control valves and return side MERV-8 filters.

3. Ventilation and Exhaust System

- a. An Energy Recovery Unit (ERU) shall meet the exhaust and ventilation air requirements of the occupied spaces in the facility. Ventilation air from the ERU shall be hard ducted to all building terminal devices. Any areas of the grow facility requiring exhaust shall be hard ducted back to the ERU. The ERU will consist of a double wall galvanized steel insulated casing, MERV 8 pre-filters and MERV 15 final-filters, fan-array supply fan & exhaust fan sections, UV lights, chilled water cooling coils, pre-conditioning energy recovery wheel and a hot water heating coils.
- b. Air velocities across the coil and filters shall not exceed 500 feet per minute.
- c. The coils shall be provided with new 2-way control valves.
- d. Along with the EcoBuds system, three other mechanical measures will mitigate all exhaust air exiting the Community Gardens. The non-hazardous exhaust air, from the ERU, will be filtered through activated carbon filters, heated sufficiently in temperature for buoyancy (+10-20°f), and diluted via high plume exhaust fans. After exiting the high plume exhaust fans, the diluted

exhaust air is anticipated to reach significant altitude in order to avoid being a nuisance to town residents. Once high in the atmosphere, the sun will work to further breakdown the exhaust air, naturally, into inert compounds.

4. Air Purification Units

- a. Each room that a cannabis plant is located pre-harvest, Flower, Veg, Mother, and Clone room will include deodorizing recirculating units located within the room.

5. Chilled water System:

- a. Outdoor chillers will supply chilled water to the facility air handling units and fan coil units.
- b. Chilled water equipment on the project will be designed to supply 40°F chilled water with 20% glycol solution.

6. Hot Water System:

- a. Propose hot water, 650 MBH output, gas fired condensing boilers located in the mechanical room. The boilers shall be furnished with primary secondary pumping system and associated hydronic equipment.
- b. The boilers will operate at 100°F – 140°F to supply heating hot water to each air handling unit and fan coil unit.

7. Temperature Controls

- a. The grow facility shall be provided with a DDC/electronic temperature control system. All necessary equipment, control valves, software, panels and power shall be provided for the control system. All OEM controllers shall be fully integrated into the temperature control system. A complete fully functional, fully integrated system is to be provided. BMS system shall have adequate storage to measure and store readings of all sensors every 15 minutes.

8. Miscellaneous Terminal Equipment:

- a. Stairwells shall be heated by hot water unit heaters.
- b. Vestibules shall be heated by hot water unit heaters.
- c. MEP spaces shall be heated by hot water unit heaters.
- d. Shipping/Loading shall be heated by natural gas-fired unit heaters.
- e. Data rooms shall be conditioned by dedicated split systems.

9. Vibration Provisions:

- a. Vibration isolation for equipment and mechanical distribution systems shall be in accordance with the 2015 ASHRAE HVAC Applications Handbook's Sound and Vibration Control, Chapter 48, International Building Code (IBC) and Seismic Restraint Manual Guidelines for Mechanical Systems published by SMACNA.

10. Acoustic Criteria

- a. Provisions shall be made with sound attenuating devices and the maintenance of acceptable duct

11. Power for HVAC equipment is 480/ 208V.

Codes and Standards

- The Project will be designed to comply with all applicable Codes and Standards including:
 - 9th edition of the Massachusetts State Building Code
 - IBC 2015 International Building Code
 - IMC 2015 International Mechanical Code
 - IECC 2015 International Energy Conservation Code
 - ANSI/SMACNA 006-2006 HVAC Duct Construction Standards
 - ASHRAE Standards American Society of Heating, Refrigerating and Air Conditioning Engineers
 - IFC 2015 International Fuel Gas Code
 - CSI Construction Specification Institute
 - And to consider regulations set forth by the local Authority Having Jurisdiction (AHJ)

Exhibit: E1



AGRIFY

PRECISION ELEVATED

Fully-Integrated Vertical Farming System



THE FUTURE OF CANNABIS RELIES ON DELIVERING A CONSISTENT, HIGH-QUALITY EXPERIENCE TO THE CONSUMER

TOGETHER, LET'S BUILD THIS.



REACH NEW HEIGHTS WITH PRECISION ELEVATED

- Precision Elevated is a tech-forward, bundled solution of equipment, software, and services that is turnkey, end-to-end, and fully-integrated for optimal growth.
- Agrify products and services enable our customers to consistently produce quality cannabis efficiently.
- We enable our customers to:
 - Operate profitably
 - Adapt continuously
 - Grow sustainably
- Our software empowers cultivators to optimize their outcomes by providing unique insights into their operations with an unparalleled breadth and depth of information.
- Valiant-America, our general contracting service and primary installer, enables optimization of facility build-out to ultimately meet the needs of the end consumer.

EVOLUTION OF CULTIVATION

WHERE THE INDUSTRY IS HEADED

In order to understand where the industry is going, first, we need to understand how we got here. Traditional cultivation arose during an era of cannabis prohibition, where it was more important to be discreet rather than efficient. Now, as regulations loosen and we head towards federal legalization, we can anticipate more changes each year. The pace of growth for this nascent yet booming industry will be determined by the adoption of new regulations, the evolution of consumer buying habits, and ultimately the ability of growers and facilities to adapt.

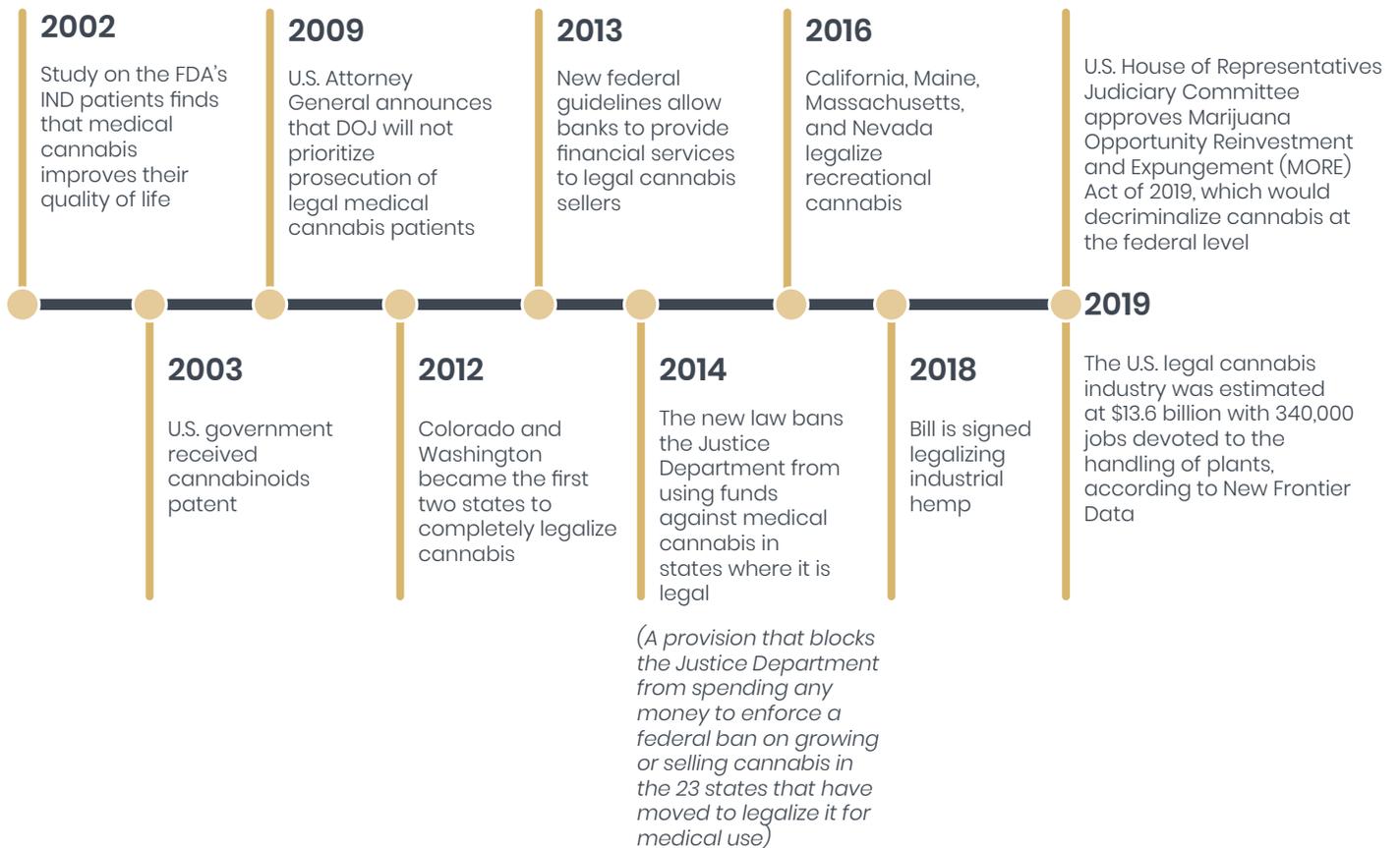


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- 19 *Design-Build Solution*
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CULTIVATION CHALLENGES

CURRENT CULTIVATION TECHNIQUES ARE NOT BUILT TO MEET THE NEEDS OF THE MARKET

LACK OF DATA



- No historical and predictive data for decision making
- Art-based rather than scientific approach
- Inconsistency in quality and yield

UNSCALABLE



- Difficult to manage multiple grows
- Hard to deliver a consistent product
- Unrestricted canopy space

MASTER GROWERS



- Key man risk
- Art-based rather than scientific approach
- Varying degrees of experience with commercial-size operations

USE OF PESTICIDES



- Harmful to consumers
- Hygiene issues
- Potential harm to employees
- Harmful to plant's integrity and quality
- Presents issues when processing Certificates of Analysis/Lab Testing for consumer products

AGRIFY'S SOLUTIONS ADDRESS THESE CHALLENGES HEAD-ON

WITH OUR SUITE OF PRODUCTS AND SERVICES

EMPOWERED TEAM



- Provide your team with the tools to optimize genetics and production

SUPERIOR PRODUCT QUALITY



- Cultivation as a manufacturing process.
- Highly automated with precision control

DESIRABLE END PRODUCT



- High-quality flower and concentrates
- High potency with desirable cannabinoid & terpene profiles

LOW COST OF PRODUCTION



- Contact us to find out how low your cost per lb can be!

Increased Yield | Higher Profitability | Lower Risk

AGRIFY'S VERTICAL FARMING UNIT (VFU)

Agrify's Proprietary Vertical Farming Unit (VFU) technology is the only product on the market that offers a modular, compartmentalized micro-climate growing system for indoor vertical farming. Agrify's VFU system is designed for large single-state and multi-state operators who are looking to produce higher quality crops consistently at scale.

Agrify's VFU is an 8.5 ft. long x 4 ft. wide x 9.3 ft. tall integrated hardware and software 2-tier growing system. The unit is designed to line up horizontally in rows, and they can be stacked vertically up to 3 units tall allowing a total of 6 layers of canopy, taking advantage of unused indoor vertical space.



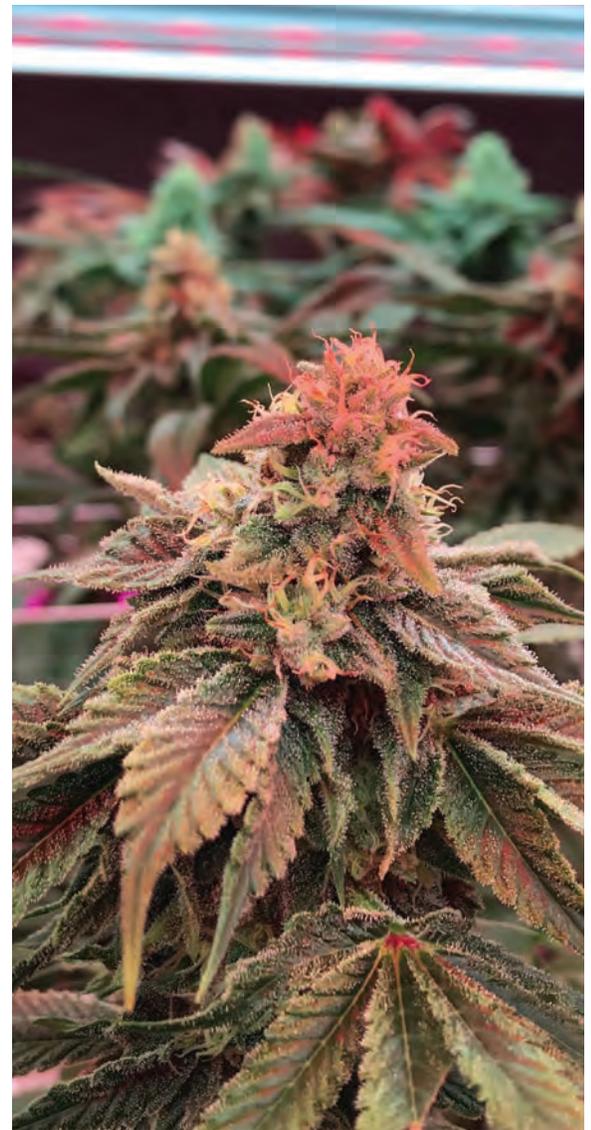
| Agrify's Vertical Farming Unit |

GENERAL CONTRACTING AND INSTALLATION: VALIANT – AMERICA



Valiant-America is a leader in consulting and general contracting of a wide range of industrial facilities, but they have a particular specialization and expertise in the development of cannabis cultivation facilities and dispensaries. With General Contracting, Electrical, Plumbing and HVAC licenses in MA, NY, NJ, CT, NH, RI, and FL, and strategic partners in CA, NV, CO, and TX, Valiant-America has developed approximately 2,816,000 million square feet of indoor cultivation with 43 clients including some of the leading MSO's. Valiant's qualified professionals possess a deep working knowledge of Agrify's grow systems and how to integrate our offerings when developing cannabis cultivation facilities.

The Agrify-Valiant Joint Venture complements our offering and provides our clients an end-to-end turnkey solution. Valiant is the primary installer of Agrify's VFU.





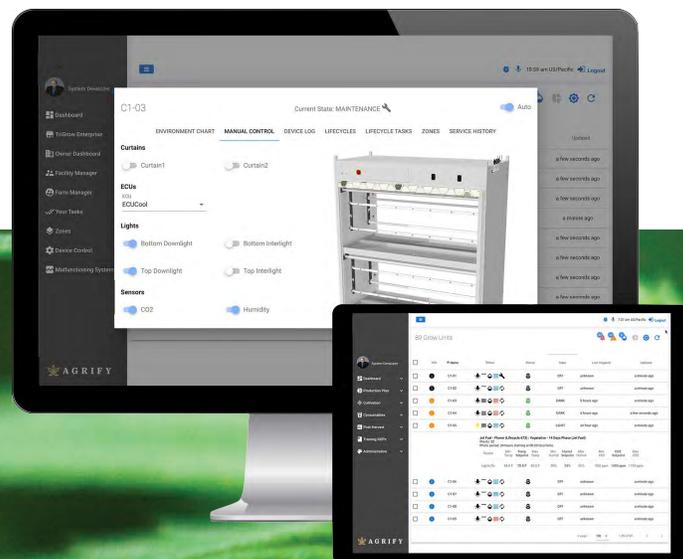
CULTIVATION SOFTWARE : AGRIFY INSIGHTS

A key component of Agrify’s cultivation offerings is Agrify Insights, a subscription-based software that is integrated with Agrify’s hardware and provides facility owners, facility managers, and cultivators real-time control and monitoring of facilities, growing conditions, and insights into production and profit optimization

Agrify Insights software is focused around optimizing four key components:

- Plant
- VFU
- Facility
- Overall Business/Operation

By reducing human error and providing insights through data collection and analysis, Agrify Insights minimizes risk and increases operational function.

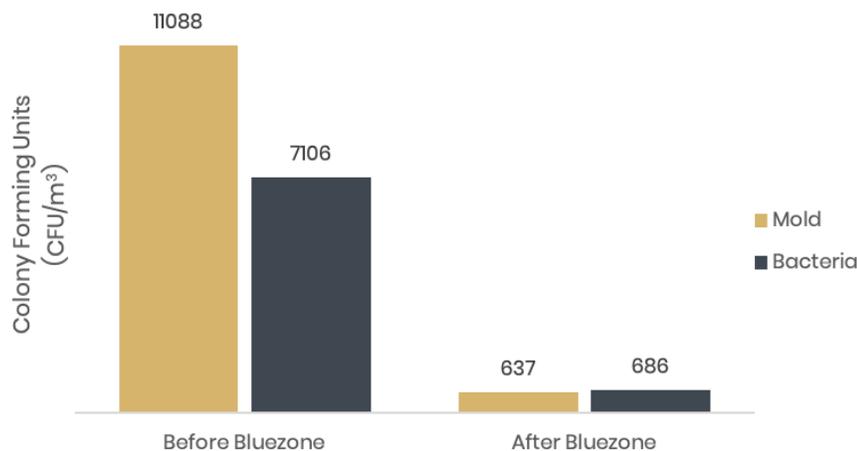


AIR PURIFICATION

Bluezone® is a revolutionary technology tested and fielded by the U.S. military to prevent the spread of airborne diseases. Bluezone® has now applied this military-grade technology to protect your grow facility, killing and/or converting airborne pathogens with ultraviolet-enhanced oxidation.

Bluezone® works by circulating air through a reaction chamber designed to destroy pathogens. Chemical compounds that create odors are oxidized, while mildew spores and botrytis are drawn through self-contained ultraviolet light.

Microbial Load in Trim Room Before and After Bluezone



Bluezone Air Cleaning System

SURFACE SANITIZATION

Enozo® uses aqueous ozone to kill 99.9% of harmful pathogens while keeping your workers, plants, and users completely safe. Enozo does this by utilizing their patented Active Diamond Electrolytic Process Technology™ (ADEPT) to create a sustainable, easy-to-use low-concentration ozone sanitizer from water in water. This electrical charge creates one of the most powerful oxidizers on the planet



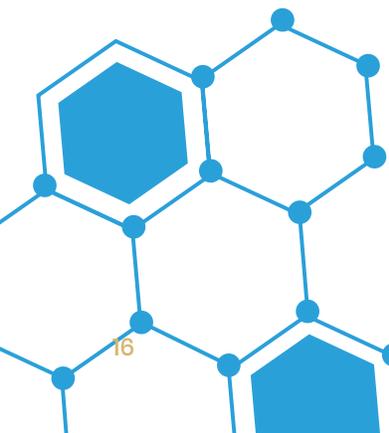
Image shows visible powdery mildew on plant Day 1 prior to Enozo application



Two days after Enozo application Image shows little to no signs of powdery mildew

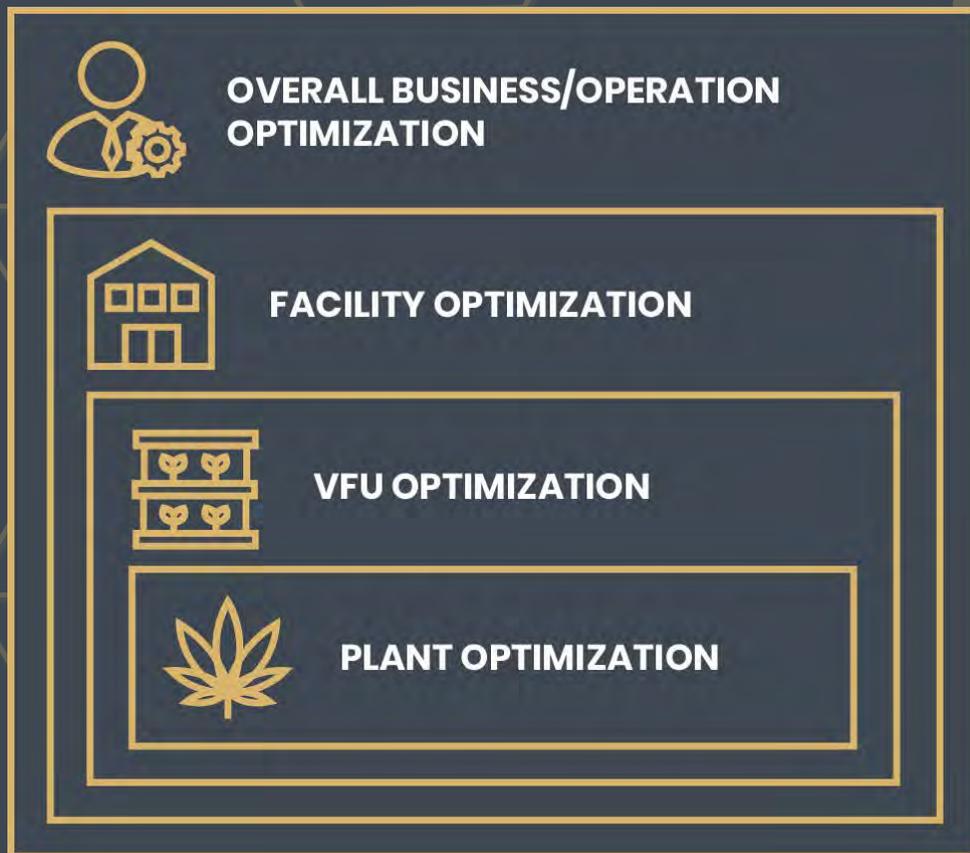
* Coming soon - EnozoWASH

- The EnozoWASH is an industrial spray washer developed by MIT masterminds that utilizes Enozo's patented Technology™ (ADEPT)
- The EnozoWASH attaches to a standard hose or backpack sprayer and delivers 7,500 gallons of ozonated water.



THE AGRIFY ECOSYSTEM

Agrify's products and services work in tandem to provide end-to-end cultivation solutions. Each element has been designed in house and custom engineered to work seamlessly together to produce the highest quality, most consistent flower, with the lowest associated operating cost.



Precision Elevated Ecosystem

PLANT LEVEL OPTIMIZATION



The end products of cultivation are determined by both the plant's genetics and the growing environment in which they are grown. Central to Agrify's solution is the ability to granularly control the growing environment by integrating Agrify Insights cultivation software to control the hardware.

Agrify Insights' Grow Plans

Grow Plans are templates used to plan the operational life cycles for individual strains. Grow Plans allow operators to customize environmental settings such as light exposure, temperature, humidity, and CO² levels. Grow Plans also incorporates scheduling of "plant-touching" tasks such as bottoming, defoliation, and harvesting.

The screenshot shows the 'Production Planning Calculator' interface. It features a sidebar with navigation options like Dashboard, Production Plan, Calculator, OPEX Calculator, Cultivation, Consumables, Post-Harvest, Training/SOPs, and Administration. The main area displays a table of grow plans with columns for Strain, Grow Plan Name, Genotype, Clone Size, Veg Days, and Harvest Date. A 'NEXT' button is visible at the bottom of the table.

Strain	Grow Plan Name	Genotype	Clone Size	Veg Days	Harvest Date	
<input type="checkbox"/>	Cookies & Cream	Cookies & Cream - Flower	50% Indica/50% Sativa	21	14	56
<input checked="" type="checkbox"/>	Cookies & Cream	Cookies & Cream (21 Day Veg)	50% Indica/50% Sativa	21	21	56
<input type="checkbox"/>	Cookies & Cream	Cookies & Cream (21 Day Veg Manual Transition)	50% Indica/50% Sativa	21	21	56
<input type="checkbox"/>	Cookies & Cream	Cookies & Cream - Flower	CB0	21	14	60
<input type="checkbox"/>	Fatima	Fatima - Flower	Indica Dominant Hybrid	21	14	56
<input type="checkbox"/>	Gen Cake	Gen Cake Pheno Hunt (21 Day Veg)	50% Indica/50% Sativa	21	21	56
<input type="checkbox"/>	Gen Cake	Gen Cake (Veg Manual Transition)	50% Indica/50% Sativa	21	21	56
<input type="checkbox"/>	Gen Cake	Gen Cake 2 wk Veg	50% Indica/50% Sativa	21	14	36
<input type="checkbox"/>	Gen Cake #1	Gen Cake #1 - Flower	50% Indica/50% Sativa	21	21	62
<input type="checkbox"/>	Gen Cake #1	Gen Cake #2 - Flower	50% Indica/50% Sativa	21	21	62
<input type="checkbox"/>	Gen Cake #3	Gen Cake #3 - Flower	50% Indica/50% Sativa	21	21	62
<input type="checkbox"/>	Gen Cake #4	Gen Cake #4 - Flower	50% Indica/50% Sativa	21	21	62

Production Planning

Precise Environmental Control

All VFUs operate independently from one another, capable of reproducing different environments in each one. Each VFU has an Environmental Control Unit (ECU) that is integrated with our proprietary cultivation software, Agrify Insights. This integration allows for precise control and automation over light photoperiod and intensity, temperature, humidity, VPD, CO², fertigation, and irrigation throughout the lifecycle of the plants.





UNIT LEVEL OPTIMIZATION

Agrify's Vertical Farming Units (VFU) provide a precision-controllable microclimate environment. Our Vertical Farming Units are complete with highly-efficient horticultural grow lights, inter-canopy lights, integrated Agrify Insights software, automated irrigation, and CO² delivery, photoperiod control via motorized curtains, and the ability to collect over 1 million data points annually.

The unit has a motorized curtain on both sides that compartmentalize the VFU to prevent light-leak and the spread of disease that would typically lead to facility-wide crop failure. Contamination can be controlled and limited to the affected unit(s) which are designed with sanitation in mind. From the aluminum frame to the selection of antimicrobial plastics and down to the IP65 electronics and polycarbonate-lensed LED lights, the entire VFU can be easily sanitized.

Vertical Farming Units:

- Controlled – micro-climate
- Reproducible data – consistency
- Scalable – maximize yields
- Stackable – maximize space
 - up to 3 units tall
- Vertical – minimize the footprint
- Sanitation – healthy grow environment

Three Key Benefits

- Vertical farming = greater output
- Reduction of operating costs
- The potential increase of overall revenue by as much as 3x





FACILITY LEVEL OPTIMIZATION



Agrify's modular VFUs are deployed to maximize the customer's footprint and facility capabilities.

Modular Scalability

Each VFU supports 2 tiers of the canopy and is designed for deployments up to 3 units tall, sextupling production over the same footprint. Each unit is designed to easily integrate with a mezzanine catwalk system.

Our facility design experts can implement Agrify's Bluezone® for overlapping zones of protection from environmental threats.

Powdery mildew and botrytis can damage your crops or wipeout the entire grows. Cannabis has not benefited from modern plant breeding for pest and disease resistance making widespread contamination a common problem. Limited treatment options vary from state to state and the risk of crop loss is significant

Agrify's modular VFUs offer superior safety and accessibility, maximizing the productivity of the worker.

Worker Safety

The unit's working area allows for easy access, allowing easy access to both rows of plants within the unit. Motorized curtains can be lifted on either side, this allows for efficient ergonomics and plant access at arm's length. Similarly, Agrify's Interlight LED technology is dimmed or turned off when the curtains are raised for a more comfortable working environment.

Agrify Insights is designed to operate these individual VFUs as a combined facility. Agrify Insights features at the facility level include:

Production Planning

This feature is designed to maximize a facility's utilization by executing a "best-fit" scheduling algorithm for

the facility's selected Grow Plans. The Production Planning module is a critical component for optimizing the plants' schedules, significantly increasing plant productivity and reducing the cost per pound.



Production Software

Workforce Management

Agrify Insights includes a workforce planning feature to assign tasks to staff based on the user's role or their knowledge, skills, and abilities. The calendar displays the estimated amount of time required to complete plant-touching tasks on any given day. Get access to the workforce dashboard and information specifically suited to your workforce's various needs.

Automatic Notification System

Users can select to subscribe to anomalous events and will receive notifications in chain-of-command order, providing the operation with 24/7 monitoring and notifications. Preventative maintenance schedules and related tasks are also contained, tracked, and monitored within Agrify Insights.

Facility Infrastructure Controls

Agrify Insights controls irrigation on a facility level as well as by unit, connecting with water chiller HVAC systems and ambient lighting systems.



OPTIMIZATION AT THE BUSINESS LEVEL

Agrify's VFUs minimize OPEX with superior space utilization and the ability to meet supply chain needs by allowing for a single space to be multi-use.

Superior Floor Space Utilization

The unit provides 64 sq. ft. of a canopy, which can veg/flower 48 to 64 plants over a 32 sq. ft. floor print producing an estimated average of 35lbs+ of dried cannabis flower and 14 lbs of trim each year. This eliminates the need to build out multiple separate, dedicated photoperiod-based rooms reducing buildout costs. Our approach allows an open-room facility design to maximize available cultivation floor print space while offering superior risk mitigation via individual compartmentalized cultivation chambers.

Agrify Insights' analyzation tools enable customers to understand how cultivation decisions impact their overall business. Understanding data can help you better plan and make more informed decisions for the future.

Consumables Procurement Integration

Setting tasks that are consumable-related allows customers to effectively manage supply levels and automatically create/submit purchase orders so that they stay well-stocked on required supplies.

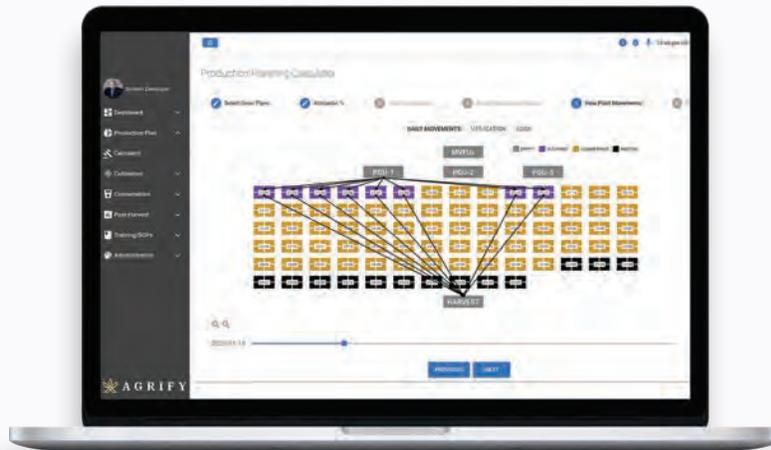


Online SOPs and Safety Datasheets

Access digital copies of Agrify's Standard Operating Procedures (SOPs) and datasheets, or upload your own via our content management system.

Role-Based Dashboards

Facility owners have access to high-level information about crop yields and equipment used in an easy to understand scorecard. Cultivation managers receive a worksheet and calendar that lets them manage their workforce and automatically assign plant-touching tasks. This insight allows your facility manager to have an ongoing look into consumables and lets them set inventory levels as needed.



Role-Based Dashboard

Data Collection

Agrify Insights is a centralized depository for all data that relates to your cultivation, including R&D testing data and the ability to capture and compare test results. Agrify Insights becomes your operation's cultivation statement of record.

Regulatory Reporting Integration

Agrify Insights includes integration with Metrc, a leading seed-to-sale system, enabling customers the ability to produce regulatory reporting through the software.



Valiant

Integrity • Synergy • Execution

Leading Indoor Farm GC and Consultant



AGRIFY

Developer of Premium Indoor Grow Solutions

Facility Mgmt.
Software

Equipment
Financing

Agrify Grow
Systems

**One - Stop Shop
Design Build Solution**

Architectural
Design

Construction

Engineering
Services



Developer of Premium Indoor Grow Solutions | agrify.com





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