BEST MANAGEMENT PRACTICES FOR APPLYING CARD-O-VAP 8™

Cardinal Professional Products
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Introduction to ULV Insecticides & Applications

ULV (Ultra Low Volume) applications are considerably different from the dispersal of pesticides by other methods. First, the quantity of material used in the micron generation process is greatly reduced when compared to most other methods of application. ULV applications require ounces of material to treat the same areas that otherwise would require gallons of products dispersed by other methods, such as fan spraying using a hand application device or a power spray rig. The concentration of insecticide can be much higher than that used for other methods of application, and this higher concentration combined with the precise particle size, accounts for the impressive pest management results while saving in chemical cost and application time.

While ULV treatments are a valuable tool, they should only be used as part of an overall IPM Program, not as a sole strategy. When ULV treatments are utilized, a considerable amount of preparation, planning and precautions must be taken to insure the desired results are obtained with minimal potential for issues such as odor complaints, excessive pesticide residues and employee/bystander exposures. When treating a structure, the doors, windows, exhaust fans or other openings to the atmosphere must be closed or sealed off to prevent loss of the ULV insecticides. Applications can only be performed when the facility is not in operation and no food/feed products are exposed. If unpackaged food/feed is exposed, remove or cover before treatment begins, and all surfaces that come in contact with food must be covered or thoroughly cleaned before using. Operators must use approved Personal Protective Equipment (PPE) as required by the EPA approved label.

When ULV Insecticides such as Card-O-Vap 8™ are used, excellent control of stored product pests can be attained with minimal risk to food, employees, bystanders or the environment. Other reasons to consider the use of ULV applications in your IPM program:

1. It’s proven-ULV applications have been at work in thousands of different organizations all over the world since its introduction in 1971. A large amount of publications documenting performance data, verifying outstanding results and economics is available
2. It’s practical-With minimal training, ULV applications are relatively easy to apply and maintain.
   Training is absolutely necessary and can easily be obtained through our trained representatives. Most companies find that in-house employees can handle the equipment and application along with their other daily duties
3. It’s cost effective-Dollar for dollar; ULV applications deliver more effective pest control than most any other method. ULV techniques allow maximum utilization of small amounts of insecticides for area treatments. This results in significant chemical and time savings. When used properly and safely, it is an extremely important part of your IPM program
Reviewing Key Points on the EPA Approved Label

Card-O-Vap 8

**NOT FOR USE OR STORAGE IN OR AROUND RESIDENTIAL SITES**

**FOR USE IN WAREHOUSES, SILOS, BULK BINS AND FOOD/FEED PROCESSING, FOOD/FEED MANUFACTURING, HANDLING AND STORAGE PLANTS CONTAINING NON-PERISHABLE, PACKAGED OR BAGGED RAW OR PROCESSED FOOD/FEED COMMODITIES OR BULK RAW OR PROCESSED FOOD COMMODITIES, AND IN THE NONFOOD/FEED AREAS OF FOOD/FEED HANDLING ESTABLISHMENTS**

**ACTIVE INGREDIENT:**

dimethyl 2,2-dichlorovinyl phosphate (Dichlorvos, DDVF) .................................................. 8.0%

**OTHER INGREDIENTS:**

Total ........................................................................................................ 92.0%

* Contains Petroleum Distillates

**KEEP OUT OF REACH OF CHILDREN**

**WARNING**

_Si Usted no entiende la etiqueta, busque a alguien que se la explique a Usted en detalle.
_(If you do not understand the label, find someone to explain it to you in detail.)_

EPA Reg. No. 8536-41  
EPA Est. 48498-CA-1

Label Date: March 21, 2013

**PRODUCED FOR:**

CARDINAL PROFESSIONAL PRODUCTS  
P. O. Box 782 • Hollister • CA 95024-0782

**WARRANTY DISCLAIMER**

Seller warrants that this product conforms to the chemical description on its label and is reasonably fit for the purposes stated on the label when used in accordance with directions under normal conditions of use. To the extent consistent with applicable law, neither this warranty nor any other warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE, express or implied, extends to the use of this product in a manner contrary to its label.

**CRITICAL POINTS ON PAGE 1**

1. **Sites of application:**

   _FOR USE IN WAREHOUSES, SILOS, BULK BINS AND FOOD/FEED PROCESSING, FOOD/FEED MANUFACTURING, HANDLING AND STORAGE PLANTS CONTAINING NON-PERISHABLE, PACKAGED OR BAGGED RAW OR PROCESSED FOOD/FEED COMMODITIES OR BULK RAW OR PROCESSED FOOD COMMODITIES, AND IN THE NONFOOD/FEED AREAS OF FOOD/FEED HANDLING ESTABLISHMENTS_

2. **Contains petroleum distillates**

   This product is formulated with a small percentage of aromatic solvents which can result in a mild chemical-type odor after application. Measures should be taken to follow all recommendations in this BMP to minimize the potential for odor complaints after applications of Card-O-Vap 8™.

3. **Signal Word = “Warning”**
This has been recently downgraded from a Category 1, “Danger” signal word. EPA allowed us to reduce the hazard classification.

4. May be fatal if absorbed through the skin. This is an “organophosphate” insecticide which can penetrate through the skin and accumulate inside the body. Special care must be taken to prevent skin contact.

5. See page 9 on personal protective equipment (PPE).

6. Rinse skin immediately since Card-O-Vap 8™ can rapidly penetrate through the skin and accumulate within the body.
ENVIRONMENTAL HAZARDS
Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollution Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

PHYSICAL/CHEMICAL HAZARDS
Combustible. Do not use or store near heat or open flame. Do not apply this product in or on electrical equipment, due to the possibility of shock hazard. Do not allow this product to come in contact with acids, bases, or other strong oxidizing materials, as a chemical incompatibility reaction may occur.

DIRECTIONS FOR USE
IT IS A VIOLATION OF FEDERAL LAW TO USE THIS PRODUCT IN ANY MANNER INCONSISTENT WITH ITS LABELING. READ ENTIRE LABEL BEFORE USING. USE STRICTLY IN ACCORDANCE WITH LABEL AND WITH APPLICABLE STATE AND FEDERAL REGULATIONS.

LIQUID FORMULATION FOR USE ONLY IN COMMERCIAL APPLICATION EQUIPMENT, SUCH AS CONVENTIONAL OR ULV FOGGING EQUIPMENT (SPACE TREATMENT)
• USE IN HAND-HELD FOGGER OR HAND-HELD SMOKE GENERATOR EQUIPMENT IS PROHIBITED.
• USE IN RESIDENTIAL SITES AS A CRACK AND CREVICE OR SPACE SPRAY IS PROHIBITED.
• USE ON LAWNS, TURF OR ORNAMENTALS IS PROHIBITED.

USE IS ALSO PROHIBITED IN:
• The following food/feed manufacturing establishments: bottling plants (including wineries, breweries, soft drinks), frozen food/feed (including pizza plants and ice cream plants) excluding non-food/non-feed manufacturing areas.
• The following food/feed processing establishments: meat, poultry and seafood slaughtering and/or packing plants (including edible fats and oils), frozen food/feed plants (including fruit and vegetables), dairy product plants (including milk processing plants) excluding non-food/non-feed processing areas.
• Federally Inspected Meat and Poultry Plants

FOR USE IN WAREHOUSES, SILOS, BULK BINS AND FOOD/FEED PROCESSING, FOOD/FEED MANUFACTURING, HANDLING AND STORAGE PLANTS CONTAINING NON-PERISHABLE, PACKAGED OR BAGGED RAW OR PROCESSED FOOD/FEED COMMODITIES OR BULK RAW OR PROCESSED FOOD/FEED COMMODITIES AND NON-FOOD/NON-FEED AREAS OF PROCESSING/MANUFACTURING PLANTS, FOR CONTROL OF INSECTS SUCH AS INDIAN MEAL MOTHS, RED FLOUR BEETLE, CONFUSED FLOUR BEETLE, SAW-TOOTHED GRAIN BEETLE, MERCHANT GRAIN BEETLE, CIGARETTE BEETLE, DRUGSTORE BEETLE, AND GRANARY WEEVIL.

7. Card-O-Vap 8™ is incompatible with other compounds such as Insect Growth Regulators (IGR’s). Do not tank mix with Card-O-Vap 8™, but simultaneous co-applications can be made.
8. Do not hold ULV equipment during the application. Equipment must remain stationary during the treatment process to minimize exposure to employees involved with the application. Equipment can be moved during the application to improve coverage of Card-O-Vap 8™ in structures, but you must not be applying Card-O-Vap 8™ during the movement of equipment.
9. Card-O-Vap 8™ cannot be used in these areas.
10. Description of sites where Card-O-Vap 8™ can be used.
BEST MANAGEMENT PRACTICES FOR APPLYING CARD-O-VAP 8™

- Non-food/non-feed processing and manufacturing plant use areas include garbage rooms, lavatories, floor drains (to sewers entries and vestibules), offices, locker rooms, machine rooms, boiler rooms, garages, mop closets and storage (after canning or bottling).

- Keep a minimum of a 7-day interval between applications except on cocoa beans and raw (unshelled) peanuts where daily applications do not exceed 0.5 grams A.I. per 1,000 cubic feet of head space.

- Do not make applications when temperatures are below 60°F.

- The term “non-perishable” means any raw or processed food/feed not subjected to rapid decay or deterioration that would render it unfit for consumption. Raw commodities would include: Animal feed, cocoa beans, dried beans, grain crops, peanuts, soybeans and nut crops. Raw commodities do not include eggs, milk, meat, poultry, fish, fresh fruits and vegetables. Processed food/feed would include: flour, sugar, cereals, packaged goods and crackers. Processed food/feed do not include: hermetically sealed food/feed or manufactured dairy products and other processed food/feed requiring freezing or refrigeration.

- When using in food/feed processing, food/feed manufacturing, handling and storage areas:
  - Apply only during times when plant is not in operation and no food/feed products are exposed. If bulk, unpackaged food/feed is exposed, remove or cover before treatment begins.
  - All food/feed processing surfaces must be covered during treatment or thoroughly cleaned before using.

- All treatments must be made during the hours when buildings are unoccupied. Buildings treated must be closed and ventilation kept at a minimum during application. Lock all entrances and do not allow unprotected workers to enter building during treatment. Place WARNING signs at entrances stating:
  - “THIS BUILDING MUST BE OPENED AND AIRED PRIOR TO REENTRY OF UNPROTECTED WORKERS. THIS BUILDING MUST NOT BE ENTERED WITHOUT PERSONAL PROTECTIVE EQUIPMENT FOR 24 HOURS; OR, UNTIL A DIRECT INDICATING SHORT TERM CONCENTRATION MONITORING DEVICE (e.g. a Dräger) INDICATES THAT THE DDVP AIR CONCENTRATION IS EQUAL TO, OR LESS THAN, 50% OF THE PEL (0.1 ppm); AN AIR CONCENTRATION OF 0.05 PPM OR LESS REQUIRED FOR ENTRY WITHOUT PERSONAL PROTECTION EQUIPMENT. DO NOT ENTER PRIOR TO AM OR PM ON ___ (Date) WITHOUT PERSONAL PROTECTIVE EQUIPMENT UNLESS AIR CONCENTRATIONS OF DDVP ARE 50% OF THE PEL OR LESS.
  - In California, the building cannot be reentered without personal protection for 24 hours, unless the DDVP air concentration is 0.01 ppm or less. WARNING signs should read: “THIS BUILDING SHOULD BE OPENED AND AIRED PRIOR TO REENTRY OF UNPROTECTED WORKERS. THIS BUILDING MUST NOT BE ENTERED WITHOUT PERSONAL PROTECTIVE EQUIPMENT FOR 24 HOURS; OR, UNTIL A DIRECT INDICATING SHORTTERM CONCENTRATION MONITORING DEVICE INDICATES THAT THE DDVP AIR CONCENTRATION IS EQUAL TO, OR LESS THAN 0.01 PPM. AN AIR CONCENTRATION OF 0.01 PPM OR LESS IS REQUIRED FOR ENTRY WITHOUT PERSONAL PROTECTION EQUIPMENT. DO NOT ENTER PRIOR TO AM OR PM ON ___ (Date) WITHOUT PERSONAL PROTECTIVE EQUIPMENT UNLESS AIR CONCENTRATIONS OF DDVP ARE AT OR BELOW 0.01 PPM.”

11. Describes non-food/non-feed areas within a facility that can be treated, but can include other non-food/non-feed areas.

12. Daily applications for cocoa beans and peanuts cannot be treated with more than 0.5 oz/1,000 cubic feet. All other commodities must have a minimum treatment interval of 7 days.

13. Thorough description of the commodities that can be within the structure that is treated with Card-O-Vap 8™.

14. All food/feed must be removed or covered during treatment. All food processing surfaces must be covered or thoroughly cleaned after treatment.

15. Treatments can only take place in unoccupied buildings. Warning signs must be placed at all entrances to the structure, and all entrances must be locked. Re-entry cannot occur within 24 hours of treatment by unprotected workers, unless the Dräger phosphoric acid ester colorimetric tubes indicate a “negative” reading. Special warning signs are required for California, which require a re-entry level of 0.01 ppm. As an
option, all workers can re-enter the building without the use of Dräger tubes if 24 hours has passed from the time at which the application process has completed.

**CONVENTIONAL APPLICATION METHOD:**
- Apply at the rate of 1 to 2 grams A.I. per 1,000 cubic feet or ½ to 1 oz. of liquid per 1,000 cubic feet. Check amount in insecticide tank or auxiliary tank before and after treatment to assure proper dosage has been applied.

**STORAGE AND DISPOSAL**
*Do not contaminate water, food or feed by storage or disposal.*

**PESTICIDE STORAGE:** Store product in original container in a cool, dry, locked place, out of reach of children.

**PESTICIDE DISPOSAL:** Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

**CONTAINER HANDLING—Non-refillable containers:** Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. For containers 5 gallons or more, use 1/5 the volume of water for rinsing. Then offer for recycling, if available. If recycling is not available, triple rinse (as directed above); then puncture container and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

**APPLICATION USING CO₂ TO PRESSURIZE CYLINDERS:**
- Card-O-Vap 8 is packaged in cylinders to be pressurized with carbon dioxide (CO₂) and applied as a fog, using a timer or other device, or manually.
  1. Apply at the rate of 1 to 2 grams A.I. per 1,000 cubic feet or ½ to 1 oz. of liquid per 1,000 cubic feet.
  2. Place the Card-O-Vap 8 cylinder on a scale, with a CO₂ cylinder close by.
  3. Remove protective cylinder bonnets from both cylinders and check to determine that the valves are firmly in the “OFF” position; then remove safety caps. Using a high-pressure hose, connect the two cylinders.
  4. Open the CO₂ cylinder valve; then open the Card-O-Vap 8 cylinder valve, and fill with the desired amount of CO₂ into the Card-O-Vap 8 cylinder. Turn off both valves. Replace the safety cap and bonnet on the CO₂ cylinder and reserve it for future use.
  5. Using a high pressure hose, connect the Card-O-Vap 8 cylinder to the application system. Turn on the Card-O-Vap 8 cylinder and dispense the required dosage to the space to be treated, according to the scale, by using a timer, or by other dispensing method.
  6. When the desired amount of Card-O-Vap 8 has been dispensed, close the Card-O-Vap 8 cylinder valve. Purge the application system with CO₂ for a minimum of 5 minutes. Replace the safety cap and bonnet on the Card-O-Vap 8 and CO₂ cylinders.
  7. The empty Card-O-Vap 8 cylinder must be returned to Cardinal Professional Products per STORAGE AND DISPOSAL directions, below.

16. In most cases, 0.5 ounces/1,000 cubic feet is adequate for achieving excellent control of stored product insects. Use 1.0 ounces/1,000 cubic feet only for severe pest infestations when a “cleannout” is desired, and potential odor issues can be mitigated.

17. Empty containers must be “triple-rinsed” according to the label instructions located here, or if local authorities have requirements above and beyond what the label requires. All rinsate must be applied according to label directions.

18. Using carbon dioxide as a propellant requires a separate stewardship training program. Do not attempt to use this procedure without the appropriate training.
BEST MANAGEMENT PRACTICES FOR APPLYING CARD-O-VAP 8™

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.

PESTICIDE STORAGE: Store product in original container in a cool, dry, locked place, out of reach of children.
PESTICIDE DISPOSAL: Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinseate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.
CONTAINER HANDLING—Refillable Containers (steel cylinders): When the Card-O-Vap 8 cylinder is empty, close valve, screw safety cap tightly onto valve outlet, and replace protection bonnet. Return all empty cylinders to Cardinal Professional Products. If a cylinder is partially full and there is no further requirement for the product, contact Cardinal Professional Products for return instructions.

19. Card-O-Vap 8™ must be stored in a cool, dry, locked storage area, out of reach of children with appropriate pesticide storage signs. California law required storage signs to meet certain specifications:

- Signs visible from any direction of probable approach shall be posted around all storage areas where containers that hold, or have held, pesticides required to be labeled with the signal words "warning" or "danger" are stored. Each sign shall be of such size that it is readable at a distance of 25 feet and be substantially as follows:
  - DANGER
  - POISON STORAGE AREA
  - ALL UNAUTHORIZED PERSONS KEEP OUT
  - KEEP DOOR LOCKED WHEN NOT IN USE
- The notice shall be repeated in an appropriate language other than English when it may reasonably be anticipated that persons who do not understand the English language will come to the enclosure.
BEST MANAGEMENT PRACTICES FOR APPLYING CARD-O-VAP 8™

Personal Protective Equipment

PERSONAL PROTECTIVE EQUIPMENT (PPE)

- **Note:** Some materials that are chemical-resistant to this product are Barrier Laminate, Butyl Rubber, Nitrile Rubber, Neoprene Rubber, Polyvinyl Chloride or Viton. If you want more options, follow the instructions for category “C” on an EPA chemical-resistance category selection chart.

- **Mixers, loaders, applicators and other handlers must wear:** long-sleeved shirt, long pants, shoes and socks, chemical-resistant gloves, protective eyewear, and a NIOSH-approved respirator with:
  - an organic-vapor-removing cartridge with a prefilter approved for pesticides (MSHA/NIOSH approval number prefix TC-23C) or,
  - a canister approved for pesticides (MSHA/NIOSH approval number TC-14G) or,
  - an organic-vapor-removing cartridge or canister with any N, R, P, or HE prefilter.

No matter what your specific procedures are for applying Card-O-Vap 8™, somewhere along the line, the potential for exposure exists. Make sure to identify these steps in your process and have the proper PPE available and ready ahead of time. Don’t become complacent. This material absorbs rapidly through the skin and can build up in the body. Even if you are only going to be exposed for a few seconds, use the proper PPE. The specific requirements are detailed on the pesticide label and shown above. The bottom line is that your body must be covered to prevent exposure. Examples of the proper PPE are shown below.

**NITRILE GLOVES OFFER EXCELLENT PROTECTION FOR HANDLING CARD-O-VAP 8. THEY ARE READILY AVAILABLE AND RELATIVELY INEXPENSIVE.**

**A FULL-FACE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE AND PRE-FILTER IS RECOMMENDED. A HALF-FACE RESPIRATOR AND GOGGLE COMBINATION, A SELF-CONTAINED Breathing Apparatus (SCBA), OR A TC-14G CANISTER FOR PESTICIDES MAY ALSO BE USED AS AN ALTERNATIVE.**

**LONG SLEEVES AND LONG PANTS ARE THE ONLY REQUIRED CLOTHING WHEN HANDLING CARD-O-VAP 8, HOWEVER, WE RECOMMEND DISPOSABLE COVERALLS, PREFERABLY CHEMICAL RESISTANT, WITH A HOOD. WHEN WEARING CHEMICAL RESISTANT CLOTHING, THERE ARE TEMPERATURE RESTRICTIONS YOU MUST ABIDE WITH. YOU CANNOT WEAR CHEMICAL RESISTANT CLOTHING WHEN THE TEMPERATURES ARE ABOVE 80°F DURING THE DAY, AND 85°F DURING THE NIGHT. (CHEMICAL RESISTANT CLOTHING ARE ONLY RECOMMENDED)**

When mixing, loading, or applying Card-O-Vap 8™, all handlers must wear personal protective equipment, which includes protective clothing, shoes and socks, chemical resistant gloves, protective eyewear, and a respirator.
Application Equipment

Choosing the right equipment is critical for applying ULV insecticides efficiently and effectively. The optimum particle size that should be generated by your equipment is in the 5-15 µm size (1 micron is 1 millionth of a meter). A raindrop is approximately 4,000 microns, a typical spray particle that is generated from a handheld sprayer is around 400 µm, so a ULV insecticide particle is very small in comparison. Research has shown that a 5 µm particle is ideal for impingement on an insect, which will translocate the droplet down the hair shaft to control the typical insect:

When generating particles in the sub-15 µm size, you are creating billions of insecticide particles, which allows for penetrating into deep harborage points, such as in cracks and crevices, under pallets, and other areas where insects typically hide. These small particles can suspend in the air for a period of time, and when landing on a surface, will only last for a few hours before degrading to non-toxic compounds.

Typical ULV equipment use a “cold generating” method, where the use of "Venturi action" draws the insecticide up through nozzles and disperses them in very small particles. There are many commercially available foggers such as the Micron-Master™ EL or A Series foggers from Cardinal Professional Products:

The Micron-Master™ EL Series foggers generate particle sizes in the sub-15 µm range, and operates very simply by using air running through small orifices to generate small insecticide particles. In order to maximize control of insects, and to minimize odor complaints from Card-O-Vap 8™ solvents, it is critical that you use good equipment for safe and effective use of our insecticides. The generation of small particles reduces the chance for the formation of “oil slicks” on surfaces in front of the foggers which will potentially create odor issues. Make sure the nozzles are not directed toward a wall or any surface allowing the material to build up and/or not allow proper dispersal. If you are treating large areas, make sure enough foggers are used which will provide good coverage in a short period of time. It is recommended that one fogger is used per 300,000 cubic feet, which will efficiently apply the ULV particles in minimal time.

Calibration of the foggers are critical and important to validate proper application doses. If you are using the Micron-Master™ EL foggers, each nozzle will apply approximately 2 ounces per nozzle per minute. This depends on the insecticide, and the viscosity of the product which will affect application rates, so it is recommended that you calibrate your equipment on a monthly basis. Calibration can be performed by carefully measuring the amount of Card-O-Vap 8™ prior to and after the application, and carefully noting the time. Divide the volume applied by the time, which will give you the ounces applied per minute per fogger. If your fogger applies 6 ounces per minute, it will take 21 minutes and 20 seconds to apply one gallon of insecticide. For calibration assistance, contact your local Cardinal representative (see page 14,15).
Calculating Volume and Using the Correct Dose

Calculating the volume of a structure is integral to ensuring that the correct dosage of Card-O-Vap8™ is used. There are several factors to consider when calculating the correct cubic footage of a structure to be fogged:

- **Area that is to be fogged:** Sometimes not all of the areas inside of a structure are to be fogged. If office areas, production areas, maintenance areas, etc. are to be excluded from the fogging, you must exclude them from the calculation.

- **Which formula for finding the volume is the right formula:** Different structures have different shapes, and in order to calculate the cubic footage of a structure, you have to know how to find the volume of many different shapes. Here are some examples of formulas used for calculating cubic footage:

\[
V = \pi r^2 h \quad \text{(Cylinder)}
\]
\[
V = lwh \quad \text{(Rectangular Prism)}
\]
\[
V = \frac{1}{2} (bh)l \quad \text{(Triangular Prism)}
\]

An example: when factoring the volume of a facility with a peaked roof, you’ll need to calculate the volume of the peak portion (example on the right above) as well as the volume of the base portion (Example in the middle above). Then both volumes should be added together to find the total cubic footage of the facility.

- **Product/equipment placement:** Once you’ve calculated the volume of the entire area to be fogged you must factor out the space that any product/equipment inside of the structure occupies. Since Card-O-Vap8™ is not a penetrating insecticide, it is very important to remove the “space” that any product/equipment occupies to insure that the correct dosage is applied.

Example: If you have a 100,000 cubic foot structure to be fogged, and 30% of the space inside the structure is full of palleted product or production equipment, then the actual volume to be fogged will be 70,000 cubic feet, rather than 100,000 cubic feet:

\[
100,000 \times 30\% = 30,000
\]
\[
100,000 - 30,000 = 70,000
\]
Once you know the cubic footage of the area to be fogged, you can then calculate the dosage required for a successful fogging. Per the label, Card-O-Vap8™ can be dispensed at ½-1 oz. per 1000 cubic foot, depending on the target pest and the amount of pest pressure at the location. As a pest professional, it is up to you to determine what dosage will work best for any given situation.

- **Example:** If you have a 100,000 cubic foot facility that needs fogged, and you wish to dispense ½ oz. per 1000 cubic feet, you will need 50 oz (.39 gallons) of Card-O-Vap8™ to achieve the desired application rate:

\[
\frac{100,000}{1000} \times \frac{1}{2} = 50\text{oz.}
\]

\[
50\text{oz.}/128 = .39\text{ gallons of Card-O-Vap8™ required}
\]

The labeled dosage rates should never be exceeded, so it is important to make sure that your volume and dosage rate calculations are correct. If there are ever any questions regarding proper application calculations, please contact your Cardinal Professional Products representative before any application of Card-O-Vap8™.

- **Other key points:**
  - It is recommended to use 1.0 oz/1,000 ft³ only under high pest pressures
  - Use 0.25-0.5 oz/1,000 ft³ under most conditions and low to normal pest pressures
  - If the structure is not reasonably sealed, you may need to consider a higher dose
  - If the structure is fairly air tight, under normal pest pressures, a dose of 0.25 oz/1,000 ft³ is usually adequate for 100% control of adult insect populations
Best Practices to Minimize Odor Complaints

- Do not perform applications when the temperature drops below 60°F.
- Utilize intelligent aeration strategies
  - Use all available aeration/ventilation fans within the treated area.
  - “Dead air spaces” within or adjacent to the fogging area may require the use of additional portable fans to help move the air into the main airspace where the exhaust fans can evacuate it.
    - i.e.: Closets, store rooms, stairways, offices, electrical rooms, boiler rooms, hand sorting rooms, equipment panels, etc.
  - Provide ample time for mechanical aeration which will exhaust the solvent’s odor.
  - If possible, always allow 24 hours or more for ventilation of treated areas.
- Utilize the lower dose of 0.25-0.50 oz/1,000 ft³ to minimize the solvent which has the odor.
  - Consider using 0.5-1.0 oz/1,000 ft³ for severe pest infestations only.
- Ensure you calculate your volume and dose correctly accounting for load factor.
- Make sure your equipment generates the optimum particle size of 5-15 μm. Calibrate your equipment on a monthly basis.
- Educate your staff that the odor comes from the solvent, not the active ingredient. The active ingredient is below the legal re-entry limit before they are allowed to enter the building.
- Clean obvious “oil slicks” or other surfaces that may contain high concentrations of Card-O-Vap 8™ residues to minimize the potential for solvent odors.
- Remove or temporarily remove cardboard, fabric, or other types of material that might hold on to the odor more readily.
- Use the Dräger Phosphoric Acid Ester Tubes prior to entering without respiratory protection within 24 hours after application. It is suggested you use these colorimetric tubes before every re-entry after each application. Document your readings in a prepared form. Instructions for using these tubes can be downloaded from www.cardinalproproducts.com/downloads.
- In California, it is required to offer a Pesticide Application Notification either written or orally to any person that may enter an area treated with a pesticide. This form will explain the hazards of Card-O-Vap 8™, and the odors that are sometimes associated with it. This form can be downloaded from www.cardinalproproducts.com/downloads.
- It is suggested that a re-entry card be posted at all entrances to the treated facility stating that the area was treated on a certain date, and has been properly aerated and cleared for re-entry to all unprotected workers. Do not post the re-entry card if any odor is detected. This re-entry card can be downloaded from www.cardinalproproducts.com/downloads.
- If overexposure to Card-O-Vap 8™ occurs, take a copy of the MSDS with the employee to the doctor/hospital. Make sure the responding physician understands that the exposure may be due to the aromatic solvent carrier, and not necessarily caused by dichlorvos (DDVP, Vapona), especially if the Dräger Phosphoric Acid Ester Tubes show a negative reading for dichlorvos.
Company Information

Northern California Office

<table>
<thead>
<tr>
<th>Steve Garofalo</th>
<th>Cavan Bruederle</th>
<th>Sean Glover</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Steve Garofalo" /></td>
<td><img src="image" alt="Cavan Bruederle" /></td>
<td><img src="image" alt="Sean Glover" /></td>
</tr>
<tr>
<td>Cellular: (530) 304-8307</td>
<td>Cellular: (209) 670-5208</td>
<td>Cellular: (559) 284-7962</td>
</tr>
<tr>
<td>Email: <a href="mailto:steve@cardinalproproducts.com">steve@cardinalproproducts.com</a></td>
<td>Email: <a href="mailto:cavan@cardinalproproducts.com">cavan@cardinalproproducts.com</a></td>
<td>Email: <a href="mailto:sglover@cardinalproproducts.com">sglover@cardinalproproducts.com</a></td>
</tr>
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</table>

Southern California Office

<table>
<thead>
<tr>
<th>Mike Watkins</th>
<th>René Borja</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Mike Watkins" /></td>
<td><img src="image" alt="René Borja" /></td>
</tr>
<tr>
<td>Cellular: (714) 609-2513</td>
<td>Cellular: (714) 264-1178</td>
</tr>
<tr>
<td>Email: <a href="mailto:fumemikew56@aol.com">fumemikew56@aol.com</a></td>
<td>Email: <a href="mailto:Rdborja@aol.com">Rdborja@aol.com</a></td>
</tr>
</tbody>
</table>

Decatur, IL Office

<table>
<thead>
<tr>
<th>Shawn Wilson</th>
<th>Ben Harl</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Shawn Wilson" /></td>
<td><img src="image" alt="Ben Harl" /></td>
</tr>
<tr>
<td>Cellular: (217) 972-6190</td>
<td>Cellular: (217) 972-3099</td>
</tr>
<tr>
<td>Email: <a href="mailto:swilson@cardinalproproducts.com">swilson@cardinalproproducts.com</a></td>
<td>Email: <a href="mailto:bharl@cardinalproproducts.com">bharl@cardinalproproducts.com</a></td>
</tr>
</tbody>
</table>
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