Pesticide Training:
Safely Mixing, Loading and Applying Pesticides

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Overview

- Employer/employee responsibilities
- Identify hazards
- Safe mixing/loading technique
- Container storage and disposal
- Proper application technique
- Calibration

Applying Pesticides

Effective Application

- The proper amount of pesticide must be uniformly applied to the target treatment area.
- Spills, leaks and drift may cause pesticide to get onto nontarget areas.
- Improper calibration of application equipment may cause too little or too much pesticide to be applied.

Employer Responsibilities

- Provide Training to Fieldworkers and Pesticide Handlers
- Notify employees of pesticide applications and restricted entry intervals (REI)
- Complete and post PSIS A-9
- Provide soap, water, disposable towels
- Provide medical treatment
- No discrimination or retaliation
- Provide workers comp. Insurance
- Make info on pesticides available to workers, their doctors or representatives
- Provide a safe and healthy workplace

Worker Rights

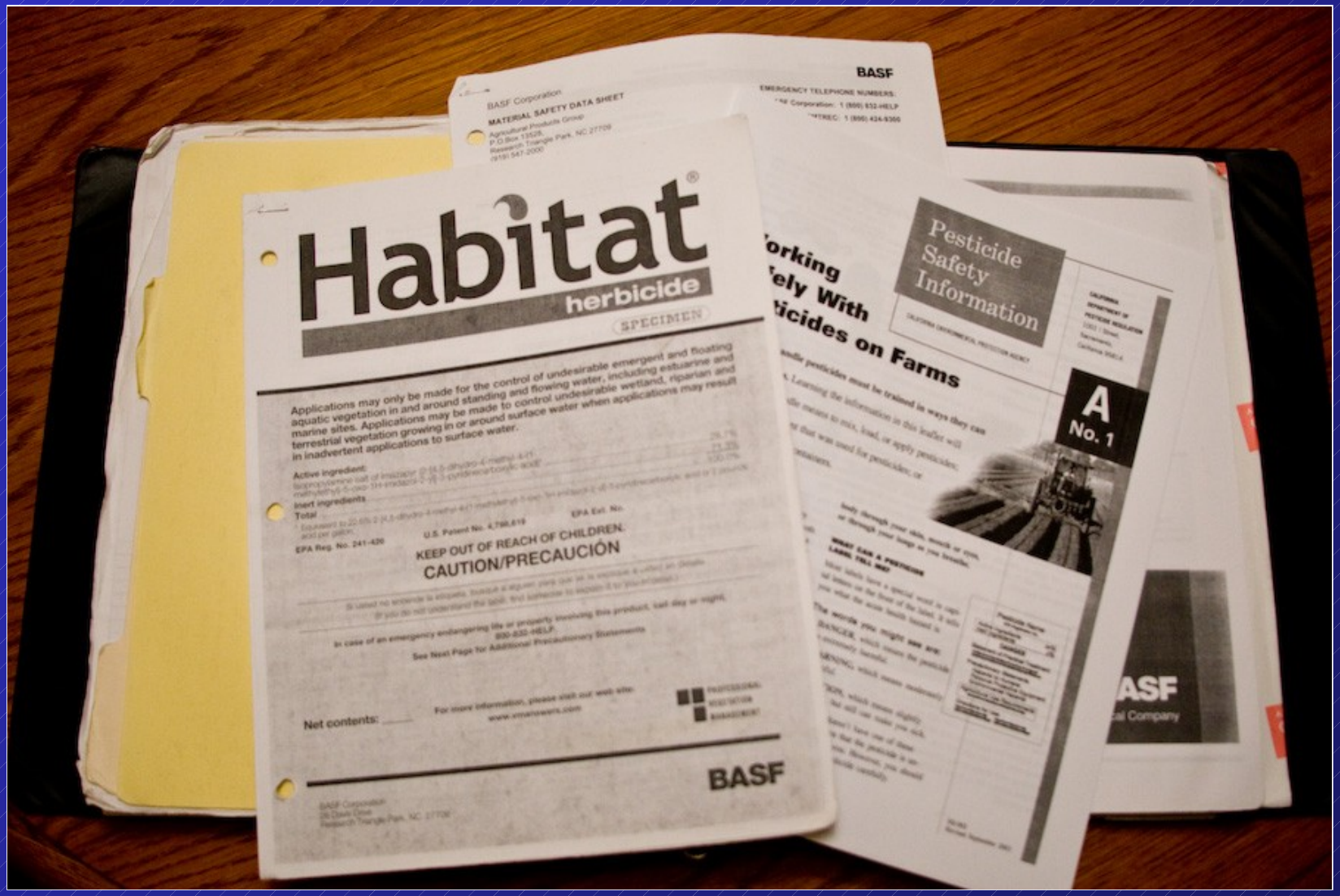
- Receive training
- Notification of pesticide applications
- Hand wash facilities
- Receive medical treatment
- Refuse any hazardous work
- File complaints (anonymous)
- Receive information (label, MSDS, PSIS)
- Worker's comp insurance
- Doctor's right to pesticide information
- Representative's right to pesticide information

Applying Pesticides

Read the label:

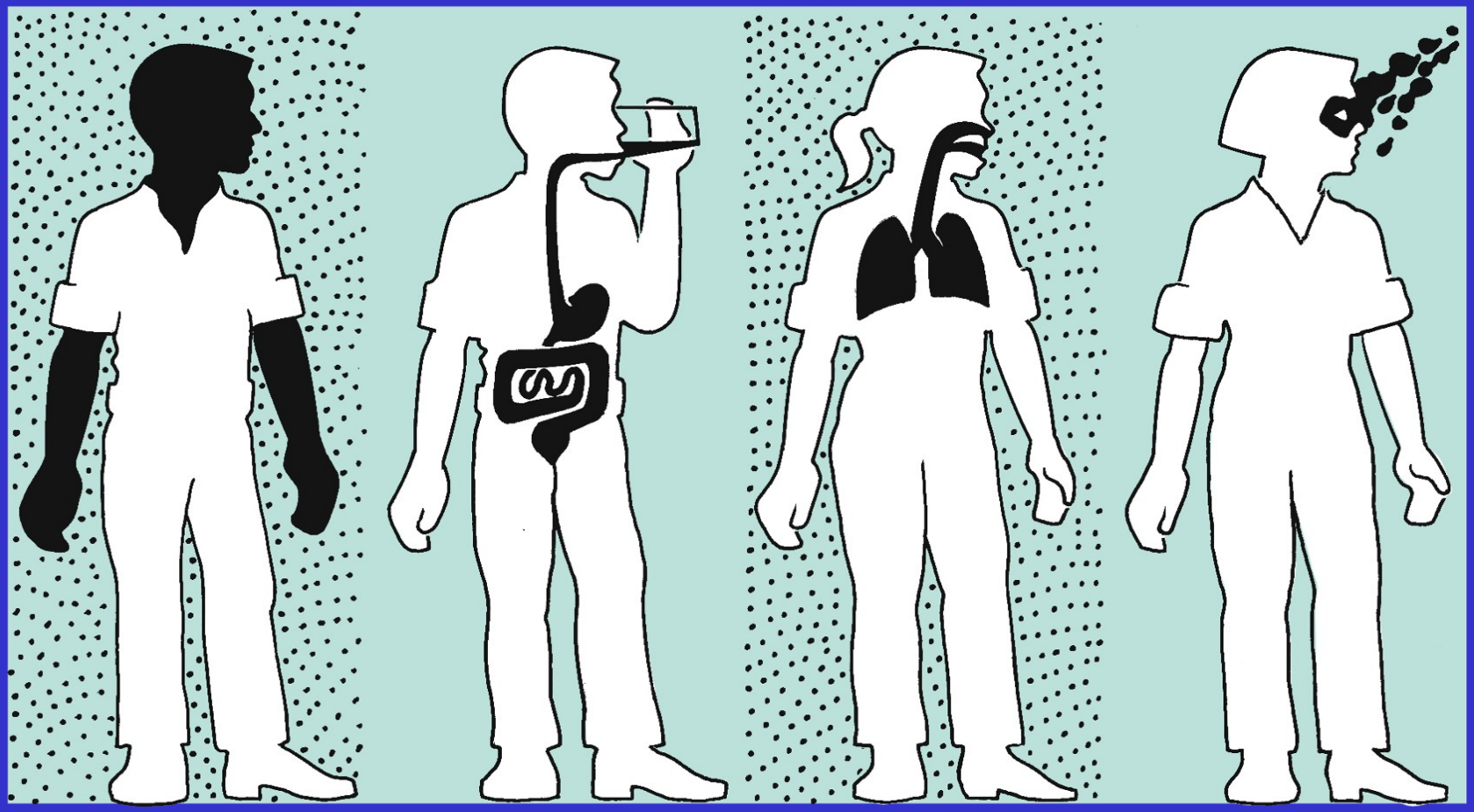
- DIRECTIONS FOR USE – order chemicals to be added to tank. Adjuvants first unless label says otherwise
- PRECAUTIONARY STATEMENT – Defines Personal Protective Equipment (PPE) required before mixing/handling any pesticide. In California all employees must wear gloves and eye protection when handling pesticides regardless of label.

Applying Pesticides



Label must be on site. MSDS and PSIS available at central loaction for all employees.

Routes of Exposure



Applying Pesticides

Site Characteristics and Environmental Hazards

- Before beginning an application check the terrain and identify hazards.
- Select equipment and application speed based on terrain.

Environmental Conditions

- Schools, hospitals, public areas
- Water sources: wells, irrigations, ponds, streams
- Honey bees forage certain temperature
- CAC list of endangered species
- Utilize buffer strips

Weather Conditions

- Weather Inversions
- Extreme Heat
- Rain, fog and heavy dew can dilute and wash off pesticide from target
- Wind influences drift and volatilization

Applying Pesticides

- Check spray equipment for damage
- Make sure water source is clean: dirt/debris can damage equipment, chemicals may interact with pesticides lowering their effectiveness.
- If possible do a simple pH test. If necessary check with pesticide supplier for proper buffer/adjuvant to add to tank mix.

Inspect Equipment

Inspect Equipment

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Mixing/Loading

- Determine amount of pesticide to add to tank based on label rate for pest and application site.
- Determine number of applications per season. Some pesticides may be applied in several smaller doses per season or one large dose.

Mixing/Loading

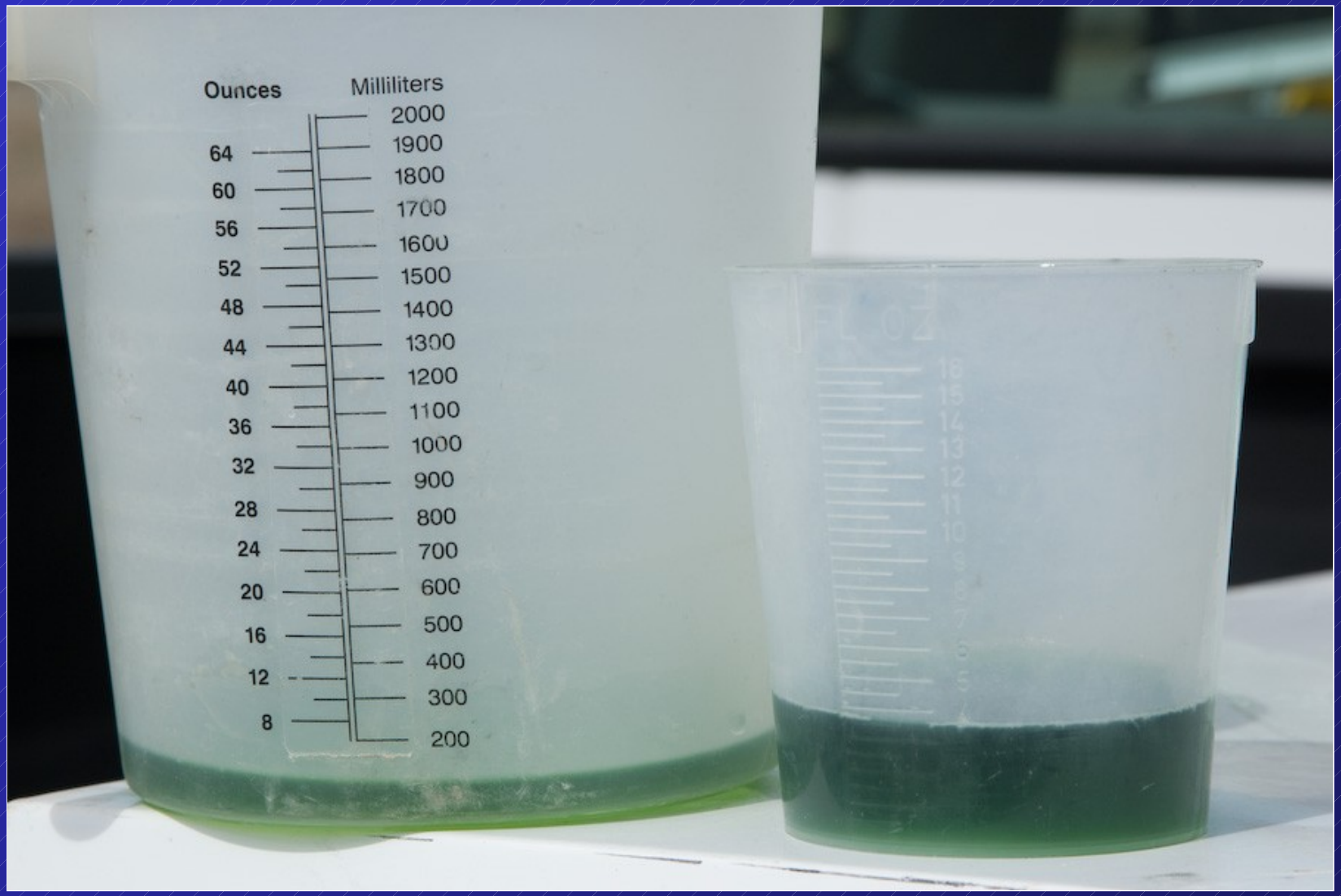
- Mixing: select a location that can easily be cleaned should an accident happen. Think of the possible impact to the immediate area when choosing a mixing site.
- Measure chemicals in a clear open area. Stand up wind to avoid drift.Wear an appropriate dust mask/respirator to avoid breathing dusts.
- Liquids are easily spilled and splashed so wear a rubber apron. Refer to the PRECAUTIONARY STATEMENT on the label for specific PPE required for mixing/loading. All employees must wear protective eyewear and rubber gloves when mixing even when not listed on the label.
- Always pour below eye level to avoid spills and splashes to the face or eyes.
- MIXING AND LOADING IS THE MOST DANGEROUS STEP OF HANDLING PESTICIDES. DEALING WITH CONCENTRATED MATERIALS.

Mixing/Loading

- Measure pesticides carefully and accurately. Some pesticides require very small quantities be added to the tank. Small errors can lead to large errors in the amount of pesticide applied.
- Liquids and some granulars are measured by volume. Dusts, powders and dry formulations are measured by weight.
- Your measuring device must be calibrated to the smallest unit you will be using.
- Use only glass or plastic measuring devices, some pesticides may react with metal measuring devices.

Mixing/Loading

Mixing/Loading



Mixing/Loading

Steps for Mixing

- Begin by filling tank half full to allow room for pesticide, adjuvants and residue from triple rinsing of container.
- Carefully open pesticide container. Cut open paper containers rather than tearing.
- After measuring, add pesticide to tank. Rinse measuring container and dump rinse water in to tank. Drain containers in to tank for 30 seconds then rinse and drain 3 times (triple rinse).
- Once adjuvants, pesticide and all rinse water has been added to the tank add enough water to fill tank to the final volume.
- When adding water an air gap at least twice the diameter of the filling hose/pipe must be maintained to avoid siphoning pesticide back in to the water source.

Mixing/Loading

- Ensure an air gap when filling spray tanks.
- Utilize back flow device on larger tanks.

Mixing/Loading

Mixing/Loading

Measure pesticides and adjuvants individually in a properly marked measuring device. Add adjuvants first unless label says otherwise

Mixing/Loading

- Follow recommended mixing order: wettable powders, flowables, water soluble concentrates, emulsifiable concentrates
- Check label for incompatibility

Container Disposal

- Empty pesticide containers must be triple rinsed immediately after emptying.
- Triple rinsed container may be taken to a landfill for disposal
- Empty pesticide containers MAY NOT be used for any other use. It is recommended empty containers be punctured so they will no longer hold liquids.

Container Disposal

Fill empty containers ¼ full, cap and shake.

Container Disposal

Empty rinse water in to spray tank.

Container Disposal

- Safe water container

Container Disposal

- Illegal use of pesticide container

Pesticide Storage

- All pesticide containers which hold or have held a pesticide must be stored in a locked storage facility when not under the direct control of a responsible person.
- Any storage facility that contains pesticides with the signal word **DANGER** or **WARNING** must be posted on all sides of approach with a **Pesticide Storage Warning Sign** readable from 25 feet.
- No pesticide may be placed in a container commonly used for food, drink or other household products.
- If a pesticide should spill, immediate action should be taken to prevent the spill from spreading. Use dirt, kitty litter or an oil absorbent to control a liquid spill. The absorbent and all contaminated materials must be put into containers and shipped to a Class 1 disposal site. The pesticide's **MSDS** will provide information on handling spills

Pesticide Storage

Pesticides must never be put in food or drink containers

Pesticide Storage

Juice, cleaner or pesticide?

Pesticide Storage

CHEERS!!!

Applying Pesticides

Safe Application Technique

- Droplet deposition is influenced by droplet size, pressure, force/volume of air and speed of travel of the application equipment
- Droplet size depends on nozzle size, style and condition combined with spray volume, pressure and weather .

Applying Pesticides

Minimize drift:

- Large droplet size
- Proper nozzle size
- Keep boom/nozzles close to ground
- Low pressures
- Adjuvants increase droplet size
- Avoid windy conditions
- Consider weather: temperatur, inversions, precipitation.

Calibration

Calibrating granular applicator – **Output Rate**

- Fill hopper to known level with granuals
- Operate equipment for a measured amount of time
- Measure weight of granules required to fill hopper to original level
- Repeat several times and average results.
- Divide amount by time: lbs./minutes

Test	Operating Time	Weight of Granules
1	2 min.	6 lbs.
2	2 min.	5.8 lbs.
3	2 min.	6.2 lbs.
Average = 6 lbs./2 min = 3 lbs./min.		

Calibration

Calibrating granular applicator – **Rate per Acre**

- Determine acres per minute by dividing swath width by 43,560 and multiply result by speed of travel in feet per minute.

Ex. 20 ft (swath) / 43,560 sq. ft./acre x 326 ft/min = 0.150 ac/min.

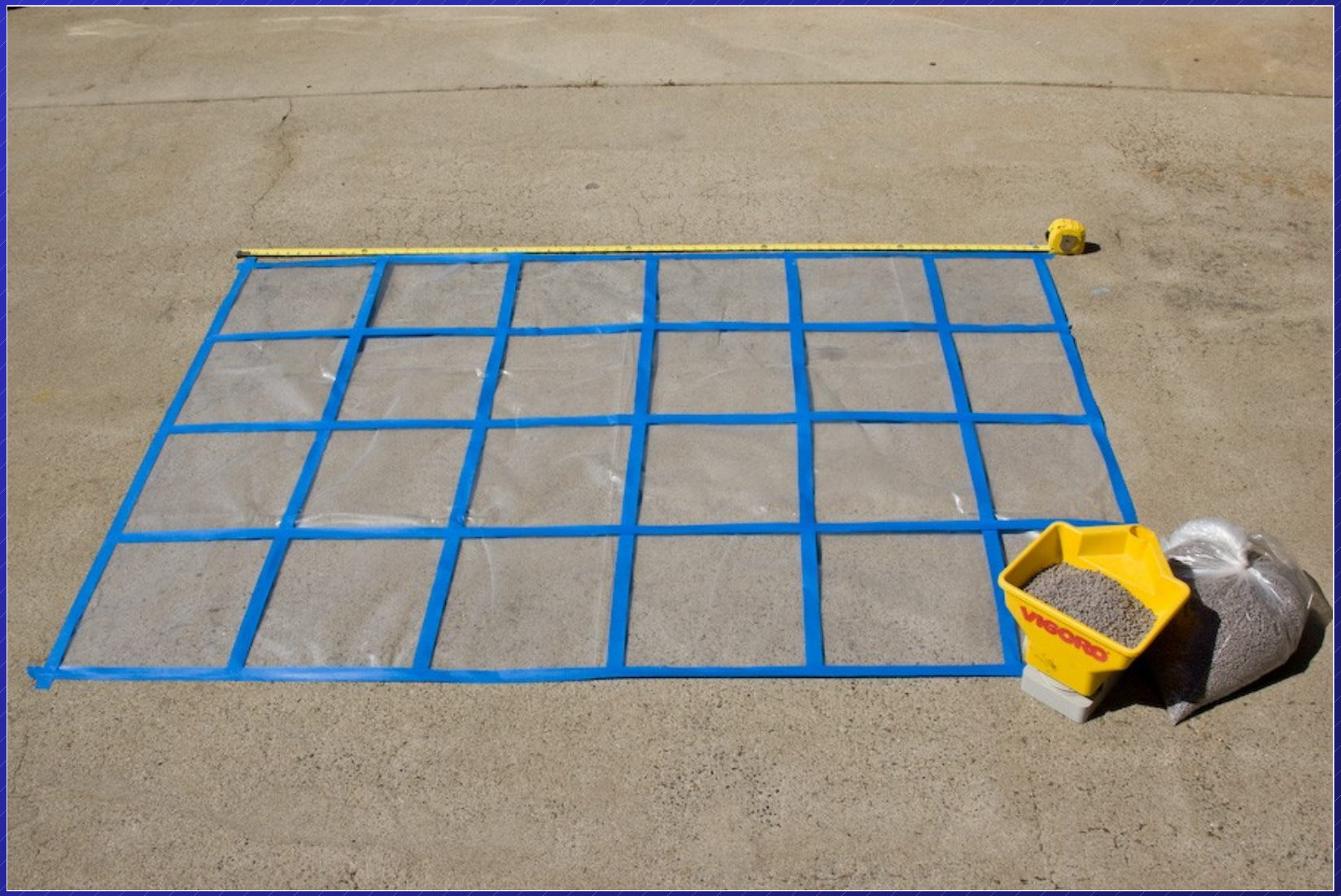
- Divide output rate by acres per minute result

Ex. 3 lbs/min / 0.150 ac/min = 20 lbs/acre

Calibration

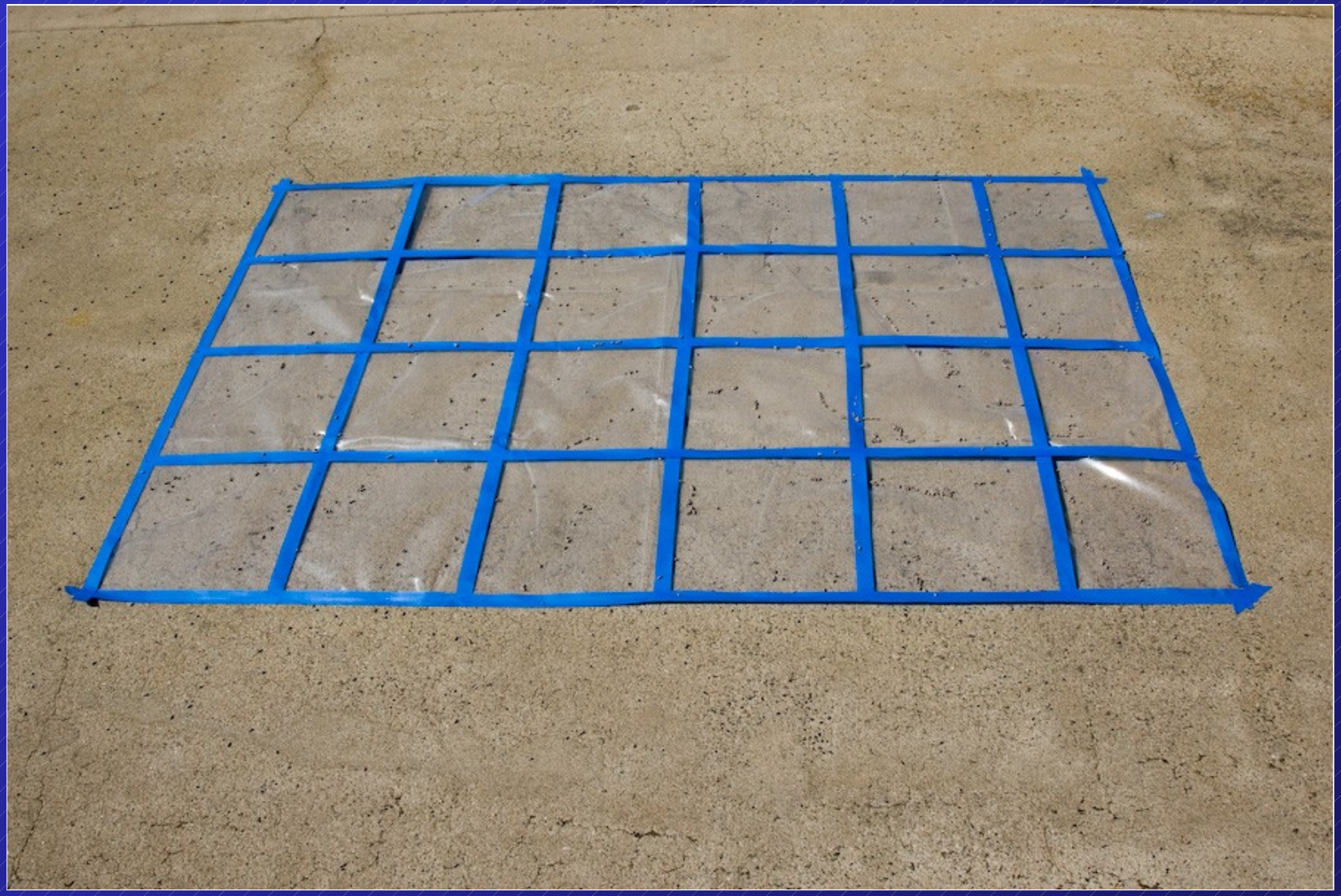
Tarp method

Calibration



Measure tarp to determine area in square feet

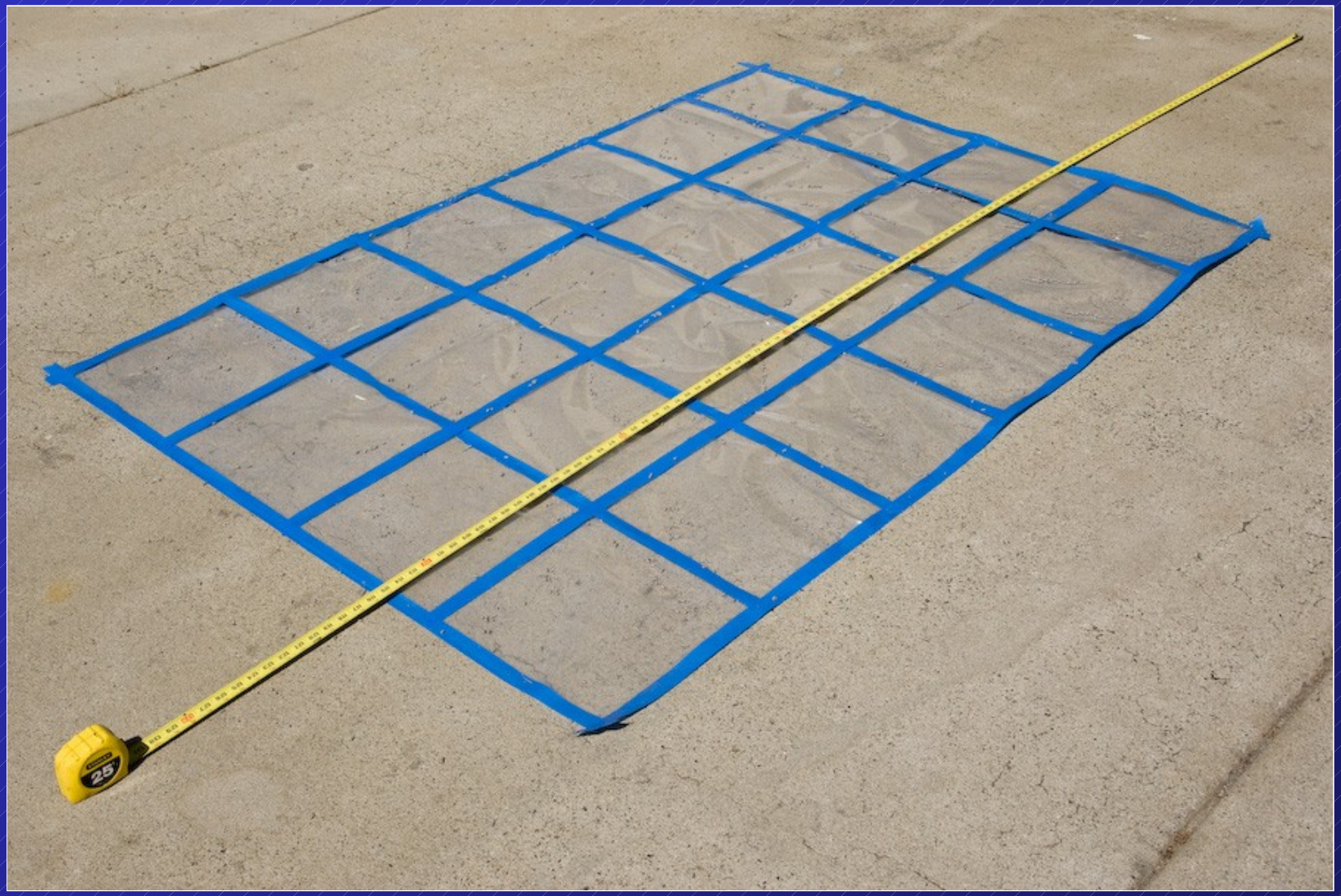
Calibration



Treat area at regular treatment speed

Calibration

Calibration



Measure swath width

Calibration

Collect granules on tarp and measure weight

Calibration

Ounces per square foot can easily be converted to pounds per acre.

43,560 sq. ft. per acre divided by size of tarp.
8’ X 10’ tarp = 80 square feet.

43,560 / 80 = 544.5

Multiply by amount collected on tarp

544.5 X 2 oz. = 1,089 oz.

Divide by 16 to convert ounces to pounds

1,089 oz. / 16 oz. = 68 lbs.

2 oz./80 sq. ft. = 68 lbs. per acre

Violations?

Violations?

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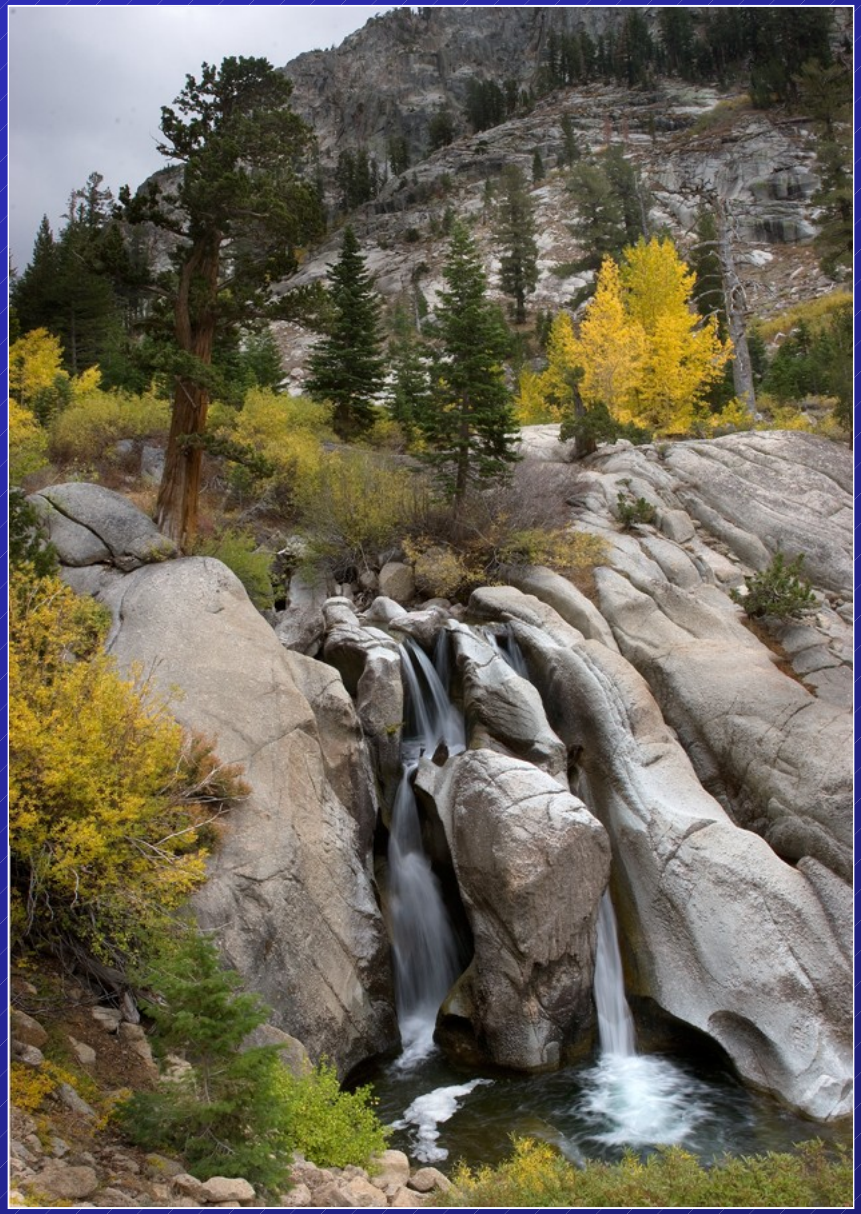
Violations?



Thank you!