MONTANA PRIVATE PESTICIDE CERTIFICATION ADDENDUM

To be used in conjunction with the 2014, 2nd Edition National Pesticide Applicator Certification Core Manual

2017

MSU Pesticide Education Program
http://www.pesticides.montana.edu
MONTANA PRIVATE PESTICIDE CERTIFICATION ADDENDUM

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This supplemental material is to be used with the National Pesticide Applicator Certification Core Manual 2nd edition, 2014.

This manual is intended to be used by Montana Private (Farm) Pesticide Applicators.

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Helena, MT 59620-0201
Phone (406) 444-5400
http://agr.state.mt.us

Emergency Phone Numbers:
General Poisoning Information
Rocky Mountain Poison and Drug Center: 1-800-222-1222

Spills, Leaks and Fires
Pesticide Accident Hotline (CHEMTREC): 800-424-9300

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ACRONYMS

ARM Administrative Rules of Montana
DEQ Montana Department of Environmental Quality
EPA United Stated Environmental Protection Agency
FIFRA Federal Insecticide, Fungicide and Rodenticide Act
GPA Gallons per Acre
GPM Gallons per Minute
MACGWPA Montana Agricultural Chemical Groundwater Protection Act
MCA Montana Code Annotated
MDA Montana Department of Agriculture
MPA Montana Pesticides Act
MPDES Montana Pollution Discharge Elimination System
MPH Miles per Hour
MSU Montana State University
MWQA Montana Water Quality Act
NOI Notice of Intent
PAT Private Applicator Training
PEP Pesticide Education Program
PGP Pesticide General Permit
PPE Personal Protective Equipment
PSI Pounds per Square Inch
RPM Revolutions per Minute
RUP Restricted Use Pesticide
USDA United States Department of Agriculture
CHAPTER 1
MONTANA PRIVATE APPLICATOR CERTIFICATION

HOW TO GET THE MOST FROM THE TRAINING MATERIALS
1. Obtain and study this handbook and the National Certification Core manual before you attend any private applicator recertification sessions, or prior to taking the private applicator initial exam.
2. Work through the practice exam questions at the end of each section.
3. Take a calculator with you to take the private certification exam.
4. Keep this handbook and the National Certification Core manual as reference material for yourself even after certification.

PRIVATE APPLICATOR TRAINING & CERTIFICATION IN MONTANA
A pesticide is any chemical used to control pests. These pests include insects, plant diseases, weeds, and some mammals. Insecticides, fungicides, herbicides, and many other words that end in “-cide” are all types of pesticides.

The Environmental Protection Agency (EPA) classifies pesticides as either “general-use” or “restricted-use.” General-use pesticides are less likely to harm the user or the environment when used according to label instructions. Anyone can buy and apply general-use pesticides. On the other hand, restricted-use pesticides (RUP) can harm the environment or the applicator when not used as directed. Licensing and certification are required for the purchase and application of RUPs. Some RUPs include: Tordon 22K™, Hoelon 3EC™, Warrior™, Phostoxin™ and many more herbicides and insecticides.

A private applicator license allows applicators to apply RUPs on property owned, rented, or leased by the private applicator for the purpose of growing an agricultural commodity. Family members and employees of licensed applicators may purchase and apply RUPs, but they must be trained and supervised by the applicator. Licensed private applicators are legally responsible for any misuse of pesticides as a result of using their RUP license. Private applicators must ensure family members/employees under their license comply with all federal and state laws.

Both the Montana Department of Agriculture (MDA) and Montana State University Extension are responsible for the overall training, certification and licensing of private applicators in Montana. Extension agents at your county Extension office are usually designated as the county's Private Applicator Training (PAT) Coordinator. If you have any questions about private applicator certification in Montana, contact your local PAT Coordinator or see the MSU Pesticide Education Program (PEP) website (406-994-5067; www.pesticides.montana.edu). You can determine your PAT coordinator by navigating to the PAT Coordinator reference page at www.pesticides.montana.edu/pat/countycoordinators.html or call your county MSU Extension office.

INITIAL CERTIFICATION
To become certified for the first time, an individual must either attend an approved initial training program and take an un-graded open book exam, or pass an open book graded exam administered by an authorized representative of the MSU PEP, usually the local county or tribal agricultural Extension agent. Exceptions occur when individuals fail to accumulate enough recertification credits, thus allowing certification to lapse. Those individuals must attend an initial training program or pass a closed book graded exam at the local Extension office if attempting to re-qualify within 12 months of their lapsed certification. A 70% score is needed to pass
any graded exams to gain certification.

After becoming certified, an Application for a Farm Applicator Special Use Permit needs to be completed by the initial applicator and signed by the authorized representative. The initial applicator then mails this application, along with appropriate fees, to the MDA. The MDA will then mail the applicator a license, also known as a farm applicator license (Figure 1).

![Application for a Farm Applicator Special Use Permit]

**Figure 1.** An example of the Farm (Private) Applicator License an applicator receives when initially certified.

Your applicator ID Number is the set of numbers on the license ending in -11. This will help Extension and the MDA offices keep better track of applicator recertification credits. The authorized representative may also issue a temporary permit to the applicator. The temporary permit will remain valid until the applicator receives their license in the mail. This must be kept with the applicator at all times when applying pesticides, filling out RUP recordkeeping sheets, as well as attending recertification courses for applicator recertification credits. It is the responsibility of the relocating applicator to contact MDA at (406) 444-5400 to update incorrect personal information on the license.

**STAYING CERTIFIED**

Montana is divided into five regions for private pesticide applicator training (PAT) (Figure 2). Each region has a five-year recertification cycle with December 31 of the last year being the deadline for obtaining the required recertification credits. In order to renew a private applicator certification, an applicator must acquire six (6) recertification credits before the end of the region’s five-year recertification cycle (Figure 2). These credits are available by attending programs accredited by the MDA. An applicator can also choose to take a closed book exam during the last year of the cycle.

Private pesticide training opportunities in your area can be viewed on the MDA Course Locator website at [https://mtplants.mt.gov/PesticideApplicator/MeetingSearch.aspx](https://mtplants.mt.gov/PesticideApplicator/MeetingSearch.aspx).

It is the applicator’s responsibility to ensure private applicator credits are awarded for events they attend, not commercial/government applicator credits. A government identification card (private applicator license; state issued identification) and your private applicator license number will be needed when signing the pesticide applicator sign in sheets at each program you attend. If an applicator feels they should receive private applicator credits for a program they attended contact MDA at (406) 444-5400.
Every certified private pesticide applicator is responsible for maintaining their license. They are also responsible for keeping track of programs they attend. It is not wise to wait until the last minute before making a decision to attend recertification training programs. None may be available.

**CREDITS FOR NEW APPLICATORS**

An applicator initially certified after June 30 within the third year of their certification cycle (middle of the cycle) will only need three (3) private applicator recertification credits. Furthermore, an applicator initially certified in the last 12 months of the certification cycle will be grandfathered into the next cycle without the need to accumulate any recertification credits.

**ONLINE CREDIT OPPORTUNITIES**

Montana private applicators may wish to take online exams to obtain private applicator recertification credits. Applicators can acquire up to two (2) online credits during their five-year certification cycle. Online opportunities are available on the MDA website located at https://mtplants.mt.gov/PesticideApplicator/MeetingSearch.aspx by selecting ‘Meeting Type’→‘Online Credits.’

**ACCESSING YOUR LICENSE INFORMATION ONLINE**

Private applicators may check the status of their license online at https://mtplants.mt.gov/PesticideApplicator/ApplicationExternalSearch.aspx by typing in their private applicator license number under “Program License Number.” By accessing this website an applicator may view total pesticide recertification credits accumulated, total credits needed to recertify, as well as the expiration date of their license. If you have questions contact your county PAT Coordinator or the MSU Pesticide Education
FEES
The fee for private pesticide applicators is currently $50 and is distributed in the following manner:

$15 (30%) to MDA for administration.
$20 (40%) to MSU Extension to support the pesticide certification and training program
$15 (30%) to MDA to fund the waste pesticides and pesticide container disposal program.

The $50 fee is prorated over the five-year recertification cycle. For example, an initial applicator applying for their license during the second year of their district’s cycle would pay $40. The fees for applicators applying for their license during the third year would be $30. Fees during the fourth year would be $20 and during the fifth year it would be $10.
PRACTICE QUESTIONS FOR CHAPTER 1
Answers are in the “Answers to Chapter Questions” section: page 22.

1. Name three types of pesticides.

2. Certification is required for the purchase of which classification of pesticide?

3. You need a private applicator certification to apply general use pesticides on an agriculture commodity on land that you own (True or False).

4. How many recertification credits are needed for an applicator to qualify for recertification at the end of their private applicator certification cycle?

5. What two digits will your private applicator ID number end in?

6. If you allow your private certification to lapse, how could you re-qualify for private applicator certification within the first 12 months?

7. You may apply RUPs on land of your immediate neighbor with a private applicator RUP license (True or False).

8. Who is your local contact for all of your private applicator pesticide certification needs?

9. If you were to be initially certified as a private applicator on June 18, 2019 in region 3, what would be your licensing fee?

10. When does your license expire if you are currently licensed in region 5?
CHAPTER 2
CALIBRATING PESTICIDE APPLICATION EQUIPMENT

To apply pesticides properly, the correct amount of a pesticide must be mixed with the correct amount of diluent (*dill-you-ent*). A diluent is anything used to dilute a pesticide concentration before application. In most cases this is WATER unless a label specifies otherwise. Before you can figure out the correct proportions to mix, you must first determine a sprayer’s application rate (or output). This process is called calibration. Calibration is a series of steps to determine how much liquid a sprayer will apply per acre. How much liquid a sprayer will apply depends on the types of nozzles installed on the sprayer, sprayer pressure, sprayer design, and sprayer speed. The best way to determine the application rate is to conduct a calibration test (trial run over a small area). You can then determine the actual application rate. Once the actual application rate is known, the area the equipment can cover can be determined. Based on pesticide label instructions, the proper amount of pesticide to add can then be determined.

PRE-CALIBRATION CHECKLIST
Immediately prior to calibration, give your equipment a thorough inspection. Check pumps, lines, and fittings for leaks while assessing entire sprayer for wear, severe rust, or breakage. It is also important to understand your field speed, nozzle flow rate, desired pressure and nozzle pattern uniformity.

1. Assessing ideal field speed to obtain given output (GPA, nozzle flow rate and nozzle spacing known). Field speed is critical when determining output of a sprayer. Proper speed takes into account efficiency and safety while ensuring a good application. Field speed may be unknown if you do not have a speedometer. If that is the case, applicators may determine miles per hour (MPH) by marking a 300 foot course and driving at a normal spraying speed (tank ½ full) while timing. Repeat this 2-3 times and calculate average time. Convert to MPH using this formula:

\[
\text{Miles Per Hour} = \frac{\text{Distance (feet)} \times 60}{\text{Time (seconds)} \times 88}
\]

It may be necessary to know the ideal field speed without changing out nozzles. If this is the case applicators can use the 5940 equation to determine field speed to achieve desired gallons per acre (GPA). GPA is the recommended sprayer output listed on the pesticide product label. GPM is the gallons per minute output of your nozzles. If unknown, measure the average output of your nozzles over one minute by placing jars under nozzles.

\[
\text{Field Speed (miles per hour)} = \frac{\text{GPM} \times 5940}{\text{GPA} \times W}
\]

W is the width between your nozzles in inches. By knowing ideal field speed, applicators can easily calibrate boom or broad-jet sprayers using shortcut or longhand methods.
2. **Selecting appropriate nozzles to obtain given output (field speed, GPA and nozzle spacing known).** At times applicators have less flexibility with field speed and may wish to change nozzles to deliver the proper output. Remember to purchase and use only nozzles which are correct for your application and are listed on the pesticide product label. The recommended sprayer output (in GPA) that a sprayer should be applying is also on your pesticide product label. You can use nozzle flow rate (GPM) to purchase appropriate nozzles using the 5940 equation. The 5940 equation makes it easy to select desired nozzles for recommended GPA outputs.

\[
GPM = \frac{GPA \times MPH \times W}{5940}
\]

If using boom sprayers be sure to install nozzles at a 10 degree angle off of the boom. By offsetting nozzles, spray patterns won’t cause interference by colliding with adjacent nozzles. Once appropriate nozzles are installed, applicators should easily be able to calibrate their spray equipment using the shortcut or longhand methods later in this chapter.

3. **Select Spray Pressure.** Recommended spray pressure varies by product, so read the label carefully. Increasing pressure raises the flow rate while lowering pressure decreases flow rate. To double flow rate, increase pressure by four times. Droplet size can also be controlled by pressure. Less than 30 pounds per square inch (PSI) of pressure are needed when using extended range nozzles if the applicator desires larger droplets to reduce drift. High pressures present greater risks of drift due to smaller droplet size. Certain nozzles including the ‘Extended Range (XR) Flat Fan nozzles’ can be used in a wide range of pressures (15 – 60 PSI) thus minimizing drift, while many of the standard fan nozzles can be used in only 30 – 60 PSI. The newer, low drift, ‘air induction’ nozzles create larger droplets which minimize drift under higher pressures (40 – 100 PSI). Pressure should never be altered to make large changes in sprayer output. However it can be useful in making minor adjustments.

4. **Testing Nozzle Uniformity.** Nozzle pattern uniformity should be evaluated by visually inspecting the spray pattern delivered over concrete or dry soil. Unevenness of the spray pattern may be due to clogged or damaged nozzles. Nozzles should be replaced or cleaned until an even spray pattern is evident.

If using a boom sprayer, applicators **must** also verify all nozzles are spraying the same volume of liquid. Applicators should collect liquid from each nozzle for one minute prior to calculating the average flow of all the nozzles. If the flow of any nozzle varies by more or less than 10 percent of the nozzle average, then those nozzles should be cleaned or replaced. It is easy to find 10 percent. Take the average and move the decimal one place to the left.

**Example.** Suppose there are six nozzles on a boom and you collected liquid from under each nozzle for 35 seconds:

<table>
<thead>
<tr>
<th>Nozzle</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ounces</td>
<td>40</td>
<td>40</td>
<td>41</td>
<td>39</td>
<td>38</td>
<td>42</td>
</tr>
</tbody>
</table>

Average nozzle output is 40.0 ounces (240.0 ounces ÷ 6 nozzles). To find 10% of 40.0 ounces move the decimal one place to the left (4.0 ounces). A ten percent error for 40.0 ounces is 4.0 ounces. The error range is 36.0 and 44.0 ounces. All nozzles fall within the acceptable 10% range.
DETERMINING OUTPUT OF SPRAYERS

Prior to adding product to a spray tank an applicator must determine the total amount of solution their spray equipment delivers over a given area. Product pesticide labels often indicate a required output range in GPA. Spray equipment should be calibrated within these ranges determined by the pesticide product label the applicator intends on using. Equipment should be recalibrated a minimum of once per year, or every time an applicator uses pesticides with different required outputs.

Spray output can be manually determined using two methods including shortcut methods or long hand (test strip) methods. Shortcut methods are specific to the types of equipment the applicator is using, but offer an easy way to determine output with little to no math involved. Shortcut methods have been developed for hand sprayers, boom sprayers, and broad-jet (boomless) sprayers. **Shortcut methods will be used on the private applicator exam.** Longhand methods can be used to calibrate almost all types of equipment, however this method involves some equations to determine output.

**Shortcut Methods when Calibrating Handheld Sprayers.** The 128th acre shortcut method can be used for calibrating the output of handheld sprayers. With this method, one ounce of discharge equals a one GPA output.

Measure an 18 ½ ft. x 18 ½ ft. area which represents a 128th acre. Then time how long it takes to spray this area with water at a constant speed and pressure (Example: 20 seconds to spray 128th acre). Repeat two to three times and calculate the average time required. Spray water into a measuring container for that amount of time. The number of ounces collected can be converted directly to GPA (Example: Collected 40 ounces from nozzle in 20 seconds which equals an output of 40 GPA).

**Shortcut Methods when Calibrating Boom Sprayers.** To determine the output of your boom sprayer use the 128th acre method. The 128th acre shortcut method involves determining the length of time necessary to drive a preset distance and then measuring the amount of liquid applied during that time. With this shortcut, one ounce of discharge per nozzle equals a one GPA output. Preset course lengths must be obtained by comparing nozzle spacing with Table 1.

1. Define course length using Table 1 (Example: 20” nozzle spacing = 204’ course length).
2. Time how long it takes to travel the course at a constant spray speed. Conduct the test two to three times and calculate the average time required (Example: Traveled 204’ in 30 seconds).
3. Collect liquid at a constant pressure and/or RPM from one nozzle for that amount of time (Example: Collected 30 ounces from one nozzle in 30 seconds).
4. Determine GPA by converting ounces of liquid collected into GPA (Example: 30 ounces collected = 30 GPA).

**Table 1.** Defined course lengths for calibrating boom sprayers.

<table>
<thead>
<tr>
<th>Nozzle Spacing or Band Width (in)</th>
<th>Course Length (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18”</td>
<td>227</td>
</tr>
<tr>
<td>20”</td>
<td>204</td>
</tr>
<tr>
<td>30”</td>
<td>136</td>
</tr>
<tr>
<td>36”</td>
<td>113</td>
</tr>
<tr>
<td>40”</td>
<td>102</td>
</tr>
</tbody>
</table>

If you have another nozzle width, use this formula to determine course length: 340/nozzle spacing in feet.

Applicators must ensure they tested uniformity of nozzles prior to determining GPA of all boom sprayers. See pre-calibration checklist for more information.
**Shortcut Methods when Calibrating Broadjet Sprayers.**
The 128th acre method is often difficult to use on broadjet (boomless) application equipment due to the limited course length resulting. An additional step has been added to the 128th acre method to make it easier to calibrate the output for broadjet sprayers. Follow these steps when calibrating your broadjet sprayers:

1. Determine spray width (feet) of broadjet sprayer (Example: 30 feet). This may be assessed by measuring the distance between spray passes.

2. Determine test strip distance by dividing 340.3 by the spray swath width and multiplying by 10 (Example: $340.3/30\text{ ft.} \times 10 = 113.4\text{ feet}$). This is the test strip distance (Table 2).

3. Time how long it takes to travel the course at desired spray speed and RPM (Example: Traveled 113.4 feet in 25 seconds).

4. Collect liquid from all nozzles contributing to spray swath width for that amount of time at desired spray pressure and/or RPM (Example: Collected 130 ounces in 25 seconds).

5. Divide ounces by 10 to obtain GPA (Example: 130 ounces/10 = 13 GPA).

**Longhand Methods when Calibrating.** Longhand method or what is commonly referred to as the test strip method is a uniform, step-by-step approach an applicator may use to determine output. This method is advantageous in calibrating almost all types of equipment and pesticide products, but does contain some algebra applicators must use to obtain output. Applicators must follow these steps:

1. **Determine area of test strip.** To calibrate your equipment or to assess the amount of pesticide needed for a routine pesticide application you will need to determine area. Test strip width is determined by pesticide equipment, while test strip length should be long enough to adequately measure the output of the pesticide equipment (see examples 1 - 4). Formulas may be used to determine the area of a rectangle, triangle, or circle (see the National Certification Manual, page 170). The most common test strip area is that of a rectangle which equals length x width.

2. **Convert area to product label recommended format.** Pesticide product labels often describe outputs in a format of GPA, pounds per acre, gallons per 1,000 ft$^2$ or pounds per 1,000 ft$^2$. The most common format used to describe output on agricultural pesticide product labels is in GPA. If this is the case, it is desirable to convert the test strip area (sq. ft.) to acres. This can be accomplished with the following formula:

   $$Area\ in\ Acres = \frac{Area\ in\ Square\ Feet}{43,560\ Square\ Feet}$$

3. **Time your application.** Time how long it takes to spray the test strip. For boom or broad-jet sprayers travel the length of the test strip at a constant spray speed without spraying and time how long it takes. For hand-sprayers time how long it takes to spray your test strip with water at constant speed and constant pressure. Conduct the test two to three times and calculate the average time required.

---

**Table 2. Defined course lengths for calibrating broadjet sprayers.**

<table>
<thead>
<tr>
<th>Spray Swath Width (ft.)</th>
<th>Course Length (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10’</td>
<td>340</td>
</tr>
<tr>
<td>15’</td>
<td>226</td>
</tr>
<tr>
<td>20’</td>
<td>170</td>
</tr>
<tr>
<td>25’</td>
<td>136</td>
</tr>
<tr>
<td>30’</td>
<td>113</td>
</tr>
</tbody>
</table>

If you have another spray swath width, use this formula to determine course length: $(340/$spray swath width in ft.$)*10
4. **Measure the amount of solution applied to the test strip.** Collect liquid from one nozzle for the same amount of time it took to spray the test strip. Or, you can refill the tank back to a set mark to determine how much liquid is applied to the test strip. Remember, in most cases, ONLY WATER is used for the calibration of liquid sprayers.

5. **Determine GPA (output) of sprayer.** Gallons sprayed on test strip divided by acres of test strip equals output of sprayer in GPA. Simply put, gallons applied to test strip divided by test strip acres equals gallons applied per acre.

\[
\text{Gallons Per Acre (GPA)} = \frac{\text{Gallons Sprayed in Test Strip}}{\text{Test Strip Acres}}
\]

**Longhand Example 1: Calibrating Boom Sprayers.** Booms have multiple nozzles along one boom. For that reason always ensure nozzles are delivering a uniform output (see pre-calibration instructions).

*A Swanson model 2121 boom sprayer has eight nozzles that cover a span of 16 feet. The nozzle spacing is 24 inches. The test strip distance is 200 feet. The product label makes a recommendation of 30 GPA.*

Step 1: Area = 2 ft. x 200 ft. \(\rightarrow\) the area of the test strip: \(2 \times 200 = 400 \text{ ft}^2\)
Step 2: Test area in acres: \(400 \text{ ft}^2 \div 43,560 \text{ ft}^2 = 0.009\) acres
Step 3: It takes 30 seconds to drive the test strip at constant field speed.
Step 4: 0.275 gallons of liquid is collected from 1 nozzle in 30 seconds.
Step 5: \(0.275 \text{ gallons/0.009 acres} = 30.5\) GPA.

**Longhand Example 2: Calibrating Boomless Sprayers.** Broadjet or boomless sprayers enable a wide swath to be sprayed without using a series of nozzles across a boom. Calibration of these sprayers is easy, as there is generally only one broadjet nozzle. At times, the spray swath may consist of one broadjet nozzle and multiple flat fan nozzles. In all circumstances applicators must remember the solution must be collected from any nozzles considered in the initial spray swath width.

*A Boom Buster Model 437 spray nozzle and two flat fan nozzles cover 30 feet of swath. The test strip distance is 200 feet. The product label makes a recommendation of 70 GPA.*

Step 1: Area = 30 ft. x 200 ft. \(\rightarrow\) the area of the test strip: \((30 \times 200) = 6,000 \text{ ft}^2\)
Step 2: Test area in acres: \(6,000 \text{ ft}^2 \div 43,560 \text{ ft}^2 = 0.138\) acres
Step 3: It takes 34 seconds to drive the test strip at a constant field speed.
Step 4: A total of 10.4 gallons was collected from all nozzles for 34 seconds.
Step 5: 10.4 gallons/0.138 acres = **75.4 GPA**

**Longhand Example 3: Calibrating a Granular Spreader (Pellets & Granular Formulations).** The technique for calibrating dry pesticide application equipment is similar in many ways to calibrating liquid spray equipment. The difference being that granular application equipment must be calibrated with the actual pesticide formulation. So always wear the label-prescribed personal protective equipment (PPE) when calibrating dry pesticide application equipment.

*A ZORO granular spreader model 201 delivers a 10-foot-wide swath. A 20-foot-long plastic sheet is placed on the ground to collect granules. The label makes a recommendation of 50 pounds per acre.*
Step 1: Area = 10 ft. x 20 ft. $\rightarrow$ the area of the test strip: $200 \text{ ft.}^2$

Step 2: Test area in acres: $(200 \text{ ft.}^2 \div 43,560 \text{ ft.}^2) = 0.0046$ acres

Step 3: Operate the spreader across the plastic test strip while delivering product.

Step 4: Granules are swept up from the plastic and weighed. Four ounces of dry granules are collected. This is a dry formulation and there are 16 ounces in a dry pound (4 ounces $\div$ 16 ounces per dry pound = 0.25 lb. collected).

Step 5: Test Strip lb./Test Strip Acres = lb. per acre $\rightarrow$ 0.25 lb./0.0046 acre = **54.3 lb. per acre**

**Longhand Example 4: Calibrating a Handwand.** This example can be used when using the longhand methods to calibrate ATV handwands, vehicle mounted handwands, or backpack sprayers. Applicators must apply at constant speed and air pressure. Never allow air pressures to fluctuate, and use a pressure regulator whenever possible.

*A Handyman model 101 backpack sprayer needs to be calibrated for spot applications of noxious weeds. A 20-foot by 20-foot test strip is marked on gravel using marker paint. The label makes a recommendation of 10 GPA.*

Step 1: Area = 20 ft. x 20 ft. $\rightarrow$ the area of the test strip: $400 \text{ ft.}^2$

Step 2: Test area in acres: $(400 \text{ ft.}^2 \div 43,560 \text{ ft.}^2) = 0.0092$ acres

Step 3: It takes 85 seconds to spray the entire plot at constant speed and air pressure.

Step 4: 0.11 gallons of liquid is collected from the hand sprayer in 85 seconds.

Step 5: 0.11 gallons/0.0092 acres = **11.9 GPA.**

**ADJUSTING OUTPUT**

If you calibrate your sprayer at a certain speed or pressure, make sure you use the same speed and pressure when you apply the pesticide. Pesticide labels can be very specific as to what is required to improve pesticide performance, pesticide uptake and for drift prevention. You may have calibrated your sprayer only to find that its GPA is either too high or too low according to label directions.

**Speed.** As you slow down, you apply more. As you speed up, you apply less. The decision to use speed, and the adjustments that need to be made, should be done before you mix and begin spraying. If you adjust “on the fly” you may be applying the pesticide in excess of the labeled rate (Figure 3).

**Nozzles.** Larger nozzle tips (larger nozzle tip openings or orifices) increase volume, while smaller ones reduce the output and volume. The changing of nozzle tips usually alters the pressure of the system requiring an adjustment of the pressure regulator. Be aware changes in nozzle tip size will also affect droplet size and spray pattern. Low-volume nozzle tips will generally increase the number of small droplets, thereby increasing the chance of drift. Whenever you change nozzle tips, recalibrate the sprayer and refigure the new output.

**Pressure.** In order to double output using pressure, you will need to increase pressure by four times as much. Increasing pressure can lead to drift problems, the increased incidences of equipment failure, improper coverage and improper placement of the pesticides. It is best to use pressure to fine tune a sprayer’s output and use speed or different nozzles for major adjustments.
HOW MANY ACRES YOUR SPRAY TANK CAN COVER
The accurate mixing of pesticides is dependent upon two major factors: (1) the area covered, usually in acres, and (2) the proper product or labeled rate as determined from the pesticide label (Example: 1 pint/acre, 1 quart/acre, etc.).

Determine how much area can be sprayed with a given volume in the spray tank. The area is usually expressed in acres. You must first know your sprayer’s application rate in GPA.

**Example:** Your sprayer is calibrated to 25 GPA and you are going to use a full 500 gallon tank.

\[
\frac{\text{Spray Tank Gallons}}{\text{GPA}} = \frac{500 \text{ gallons}}{25 \text{ GPA}} = 20 \text{ acres}
\]

**Example:** Your sprayer is calibrated to 25 GPA and you are going to use a full 250 gallon tank.

\[
\frac{\text{Spray Tank Gallons}}{\text{GPA}} = \frac{250 \text{ gallons}}{25 \text{ GPA}} = 10 \text{ acres}
\]

HOW MUCH SOLUTION TO MIX
When determining the amount of spray mixture needed in a spray tank, follow this formula:

\[\text{GPA} \times \text{Sprayed Acres} = \text{Spray Mix}\]

**Example:** If your sprayer was calibrated at 30 GPA and you needed to spray 15 acres you would need 450 gallons of spray mixture (30 x 15 = 450 gallons).

HOW MUCH PRODUCT DO YOU NEED TO ADD TO YOUR TANK
The amount of pesticide product needed can be determined once an applicator has determined the total solution in the pesticide tank and output of the sprayer. Two equations are available that may assist applicators in determining amount of pesticide product to add to tank.

**Acres Known.** If an applicator can determine the total acres he will be spraying then use this:

\[\text{Sprayable Acres} \times \text{Product Rate} = \text{Product to Add to Tank}\]

**Example:** A pesticide label calls for a rate of one pint/acre to be applied for the control of perennial noxious weeds. The sprayer to be used is calibrated to apply 25 GPA. A 20-acre field is to be broadcast sprayed with 500 gallons of this pesticide and water mix (500 gallons ÷ 25 GPA = 20 acres). How much product do you add to the tank?

20 acres x 1 pint/acre = **20 Pints**

**Acres Unknown.** It is often difficult for applicators to predict total acres to be sprayed when making spot applications. If that is the case, applicators often make a best guess of solution to add to the tank based on tank size and predicted past use.

Applicators can use the following formula to determine the amount of pesticide product to add per gallon of solution:
\[
\text{Amount of Pesticide Product to add per Gallon of Solution} = \frac{\text{Product Label Recommendation (per Acre)}}{\text{GPA}}
\]

**Example:** A pesticide label calls for a rate of one ounce/acre to be applied for controlling noxious weeds. The five-gallon backpack sprayer is calibrated at 15 GPA. You will be spot spraying along a fence line with this sprayer. You plan on using four gallons of solution for this application. How much product do you add to the tank?

\[
\text{Step 1: } 1 \text{ ounce per acre/15 GPA} = 0.06 \text{ ounces per gallon of solution}
\]

\[
\text{Step 2: } 0.06 \text{ ounces x 4 gallons of solution} = 0.24 \text{ ounces total product to add to tank}
\]

**CALCULATIONS FOR MIXING PESTICIDES**

When preparing to apply pesticides, it is most important to mix the correct amount of a concentrated pesticide with a diluent, usually water. But first, you should also have a working knowledge of basic weights and measures (Table 3).

**Table 3. Table of Weights and Measures**

<table>
<thead>
<tr>
<th>Have</th>
<th>÷ or * by</th>
<th>Want</th>
<th>Why, Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pints</td>
<td>8</td>
<td>Gallons</td>
<td>8 pints = 1 gallon</td>
</tr>
<tr>
<td>Quarts</td>
<td>4</td>
<td>Gallons</td>
<td>4 quarts = 1 gallon</td>
</tr>
<tr>
<td>Fluid ounces</td>
<td>128</td>
<td>Gallons</td>
<td>128 ounces = 1 fluid gallon</td>
</tr>
<tr>
<td>Fluid ounces</td>
<td>32</td>
<td>Quarts</td>
<td>32 fluid ounces = 1 quart</td>
</tr>
<tr>
<td>Fluid ounces</td>
<td>16</td>
<td>Pints</td>
<td>16 fluid ounces = 1 pint</td>
</tr>
<tr>
<td>Tablespoons</td>
<td>2</td>
<td>Fluid ounce</td>
<td>1 tablespoon = 0.5 fluid ounces</td>
</tr>
<tr>
<td>Tablespoons</td>
<td>3</td>
<td>Tablespoons</td>
<td>3 teaspoons = 1 tablespoon</td>
</tr>
<tr>
<td>Drops</td>
<td>60</td>
<td>Teaspoons</td>
<td>60 drops = 1 teaspoon</td>
</tr>
<tr>
<td>Square feet</td>
<td>43,560</td>
<td>Acres</td>
<td>43,560 ft² = 1 acre</td>
</tr>
<tr>
<td>Dry ounces</td>
<td>16</td>
<td>Dry pounds</td>
<td>16 dry oz. = 1 dry pound</td>
</tr>
</tbody>
</table>

**REFERENCE MATERIALS**

The MSU PEP has other tools on calibration to aid applicators.

**Calibrating Ground Sprayers Using Shortcut Methods.** Applicators wishing to calibrate their sprayers who have difficulty using longhand algebra may wish to use the MontGuide “Calibrating Ground Sprayers Using Shortcut Methods.” This MontGuide (publication # MT200915AG) is available from MSU Distribution (406-994-3273) or your local Extension office.

**Calibration Assistant.** Uses Microsoft Excel to assist applicators when calibrating hand, boom, or broadjet sprayers, as well as granular spreaders. This Excel program walks applicators through the calibration process, while easily performing all algebraic functions. The program is available for download from the MSU PEP website at [www.pesticides.montana.edu/reference/index.html](http://www.pesticides.montana.edu/reference/index.html).

**PocketGuides for Calibrating Hand Sprayers & Boom Sprayers.** These waterproof PocketGuides fit into a wallet yet contain all of the information an applicator would need to calibrate hand, boom or broadjet sprayers. Guides contain instructions on using shortcut methods to calibrate pesticide application equipment, as well as information on mixing and adding pesticide product and solution to tank. PocketGuides are available from MSU Extension for one dollar (406-994-3273).
1. An applicator has a 66-foot long calibration strip and his nozzle spacing is two feet. It takes him 30 seconds to run the course length. He collects 0.04 gallons from one nozzle for 30 seconds. What is the application rate of this sprayer in GPA?

2. A backpack sprayer applies 30 ounces to a test strip that is 18 ½ by 18 ½ feet in 60 seconds. What is the application rate of this sprayer in GPA?

3. A broadjet sprayer has a swath width of 40 feet. A test strip distance of 200 feet is established. It takes 45 seconds to cover the test strip distance with the sprayer. Five gallons are collected from the broadjet in 45 seconds. What is the application rate of this sprayer in GPA?

4. You need to spray a 16-acre pasture. Your sprayer’s application rate is 25 GPA. You will be using a pesticide at a labeled rate of 1.5 pints per acre. How many pints will you add to the spray tank to spray this 16-acre pasture?

5. Your backpack sprayer is calibrated at 25 GPA and you plan on using three gallons of solution for a spot application. The product label requires a rate of five ounces per acre. How much pesticide product do you add to the tank?

6. Your spray tank is 500 gallons and is calibrated at 20 GPA. How much area can you cover?

7. You have five nozzles that deliver the following rates in 60 seconds: nozzle 1 = 80 oz., nozzle 2 = 100 oz., nozzle 3 = 95 oz., nozzle 4 = 101 oz., and nozzle 5 = 104 oz. If you were testing uniformity of nozzles, what would be the acceptable output range?
CHAPTER 3
MONTANA LAWS & REGULATIONS

This chapter only covers Montana specific pesticide laws and regulations. For additional information on federal pesticide laws and regulations refer to page 19 of the National Pesticide Applicator Certification Core Manual, 2nd edition. Private applicators should pay special attention to additional information regarding the Worker Protection Standards (page 25 in the 2nd ed. Core Manual or www.pesticides.montana.edu/wps/index.html).

USDA RECORDKEEPING REQUIREMENTS
All certified private pesticide applicators must keep records for each RUP they apply. While there is no standard form for keeping RUP records, there is a standard format. If you use a RUP, you have up to 14 days from the time of the application to record the following information. You must maintain these records for two (2) years following the application. This is for each RUP treatment applied on the same day. Following are a list of required elements that must be recorded within 14 days of all RUP applications.

1. The **applicator’s name and certification number**. Montana private applicator’s license numbers end with -11. If the application was made by someone who is not certified, but under the supervision of a certified private applicator, then record the name and number of the certified applicator supervising the application.

2. The **month, day, and year** of the application.

3. The **location** of the application. Record the actual location of the treated area, not the address of the farm or business. Your goal is to be able to identify the exact area of the application two years later if requested. The law allows you to use legal property descriptions, maps or written descriptions, USDA maps, or any method you want to accurately pinpoint the sprayed area.

4. The **size** of the area treated should be recorded in a unit of measure normally expressed on the pesticide label: acre, linear feet, bushel, cubic feet, square feet, number of animals, etc. For special applications such as alternate middles, weed wicks or band applications, record the total area covered.

   **Example #1.** If an 80-acre field is treated using a band application, the entire 80 acres would be recorded as the “size of area treated.” Knowing your sprayer’s calibration will help you determine the size of the area treated.

   **Example #2.** If your sprayer is calibrated to apply 30 GPA and you have sprayed out 300 gallons of a pesticide/water solution, this means you have sprayed 10 acres. Or suppose you are using a backpack sprayer calibrated at 80 GPA. If you have sprayed out five gallons of solution, the area you have sprayed is 0.0625 acres following this simple equation:

   \[
   0.0625 \text{ acres} = \frac{5 \text{ gallons}}{80 \text{ GPA}}
   \]

5. The **crop, commodity, stored product, or site** to which the pesticide was applied. Refer to the pesticide label. Labels can be very specific as to what sites can be treated. Remember, the application site must be listed on the label!
6. The **total amount** applied. Record the total quantity of **undiluted** product used—not the quantity after water or other substances were added. This does not refer to percent of active ingredient. **Do not enter “labeled rate” on your records.** Use the pesticide label for reference and record the amount in quantities similar to language on the label. For example, if the label states the pesticide is to be measured in pints or ounces, then record the amount in those measurements. Again, knowing your sprayer’s calibration will help you determine the total amount applied.

**Example #1.** Your sprayer is calibrated to apply 30 GPA and you have sprayed out 300 gallons, this means you have sprayed 10 acres (300 ÷ 30). If the pesticide rate you used was one pint per acre then you have applied 10 pints of concentrated pesticide per 300 gallons of solution with the following easy calculation:

\[
10 \text{ pints} = \frac{300 \text{ gallons}}{30 \text{ GPA}} \times 1 \text{ pint per acre}
\]

If you are using a backpack sprayer you may have to do a little more math. You will also need to know some common conversions such as there are 32 ounces in a quart, etc.

**Example #2.** Your backpack is calibrated to apply 80 GPA and you have sprayed out five gallons of a pesticide solution. The labeled pesticide rate is one quart per acre (32 ounces). You have applied two ounces of undiluted product.

\[
2 \text{ ounces} = \frac{5 \text{ gallons}}{80 \text{ GPA}} \times 32 \text{ ounces}
\]

7. The **brand or product name** of the RUP. The brand or trade name is the name under which the product is sold. The common name is the name of the active ingredient found in the pesticide formulation. For example, Tordon 22K is the brand name or trade name of picloram, the common name for the active ingredient found in Tordon 22K.

8. The **EPA Registration Number** found on the label. The registration number is not the same as the EPA Establishment Number also located on the label and tells where the pesticide was manufactured.

**Spot Treatments.** A spot treatment is the use of a RUP on the **same day** to a total area treated less than 1/10 of an acre (4,356 ft²). This could be 1/10 of an acre of weeds within a five-acre pasture. Record all **eight required criteria** for a normal application when conducting a spot treatment. However, you are required to record it as a spot application under the location.

**Example:** Suppose your sprayer is calibrated to 50 GPA. You have sprayed out five gallons of an herbicide mixture to control spotted knapweed in the north half of field six (a 10 acre pasture). The total area you sprayed was 0.1 acres (5 gallons ÷ 50 GPA). You would note the following in your records under location: “Spot application for noxious weeds in north half of field six.”

**Access to your pesticide applicator records.** The only individuals to have access to your RUP applications are the USDA-authorized representatives who present identification, state-authorized representatives who present identification, and/or licensed health care professionals, USDA representatives, and state regulatory representatives with credentials.
MONTANA PESTICIDE LAWS & REGULATIONS

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) established the laws and regulations governing pesticides in the U.S. It also decides the actions necessary to enforce those laws and regulations. Individual states are given the main enforcement authority when they have adopted adequate state laws and regulations governing pesticides. While state laws and regulations may not be less restrictive, they may be more restrictive than the federal laws and regulations. The MDA has established a cooperative agreement with the EPA and has assumed the primary responsibility of regulating pesticides in Montana. The two main laws and regulations that govern the use of pesticides in Montana are the Montana Pesticides Act (MPA) and the Administrative Rules of Montana (ARM).

Under the Montana Pesticide Act. Any pesticide used in Montana must be registered with the MDA, and any private applicator in Montana can lose their certification and may be fined if they commit any of the following:

- Sell or give away pesticides.
- Do not keep records of RUPs or make false records of restricted-use applications.
- Apply or recommend that any pesticide be used in a manner inconsistent with the pesticide’s labeling.
- Make false statements in regards to investigations involving pesticide misuse.
- Use pesticides in a manner inconsistent with the pesticide labels and labeling.

Under the Montana Pesticides Act, certified (licensed) private pesticide applicators can apply restricted-use pesticides to ground they own, rent, or lease; furthermore a private applicator may apply general-use pesticides to ground they own, rent, or lease and that of their immediate neighbor as long as it is not done commercially (no money is involved). Certified private pesticide applicators CANNOT: apply pesticides commercially; apply RUPs on land they do not own, rent, or lease; sell or give away pesticides; give their permit to non-family members or non-employees to buy RUPs.

Under the Administrative Rules of Montana:

1. No applicator, family member or employee can purchase or use a RUP without a license in hand.

2. RUPs can be applied by a certified applicator’s family members or employees but only under DIRECT supervision by the certified applicator.

3. All empty pesticide containers must be triple-rinsed, power rinsed, or rinsed by procedures approved by the MDA within 48 hours of the time the container is rendered empty.

4. The rinse water from triple-rinsing can be used as diluent for future pesticide applications as long as all pesticides being used are the same or compatible. Rinsewater can also be used to dilute pesticide mixes as long as the mixing of different pesticides is not prohibited by the label, and the application site is listed on the label.

5. Rinsewater (rinsate) can be temporarily stored for one year and the rinsewater container must be labeled with the following information: (1) date rinsewater was placed in container, (2) active ingredient, (3) company name, trade name, formulation and EPA Registration number for each product, (4) signal word of each pesticide, (5) name of the applicator.

6. Rinsewater must be used or disposed of in a manner that prevents any agricultural, environmental or human health problems.
7. All rinsed pesticide containers, except containers authorized for refilling, must be punctured or rendered useless, and disposed of within 90 days.

8. Any person rinsing pesticide containers must adhere to the PPE standards set forth on the labels of the pesticides being rinsed.

9. Pesticide containers cannot be burned in Montana.

10. All pesticide spills must be contained, confined and cleaned up.

11. Spills exceeding five liquid gallons of a spray mixture or 100 pounds of a dry formulation must be reported to the MDA.

12. Any applicator using water to mix, load or clean pesticide equipment must use a backflow device or other procedures (air gap, check valve, etc.) to prevent contamination of water resources.

OTHER MONTANA LAWS GOVERNING PESTICIDE USE
The Montana Agricultural Chemical Ground Water Protection Act (MACGWPA) is administered by both the MDA and the Montana Department of Environmental Quality (DEQ). The DEQ is responsible for the adoption of ground water quality standards for agricultural chemicals whose presence has been verified in ground water.

**Monitoring.** Both the MDA and DEQ are required to conduct groundwater evaluations across Montana to determine: (1) whether residues are present in ground water, and (2) the likelihood of an agricultural chemical entering ground water. MDA and DEQ review and evaluate monitoring and sampling jointly. These departments make response decisions based on water quality standards, water classification and risk to human health, based on consumption patterns.

**Management.** The MDA is responsible for developing groundwater management plans for the protection of groundwater resources through the management of agricultural chemicals. A management plan must be initiated when an agricultural chemical is at or above 50% of the human risk threshold. Any person using an agricultural chemical in the geographic area of concern of a management plan must comply with the management plan. All management plans must be adopted as administrative rules and are enforceable under the MACGWPA.

Violations of the MACGWPA by any person(s) are subject to a fine up to $25,000 for each day violation continues or imprisonment for up to one year or both. Subsequent convictions amount to fines up to $50,000 for each day the violation continues and up to two years imprisonment.

**Montana Water Quality Act (MWQA).** Under the MWQA, it is unlawful to pollute any state waters, or to place or cause to be placed any wastes, in a location where they will cause pollution of state waters. The Montana Constitution defines state waters as all surface, underground, flood, and atmospheric waters within the boundaries of the state. Exempt from this definition of state waters are ponds or lagoons used for treating, transporting, or impounding pollutants; or irrigation or land application disposal waters used up and not returned to state waters. You would be in violation of the MWQA if pesticide runoff from a field you sprayed entered into a river or stream. Montana Pesticide General Permit (PGP) is the permitting mechanism for anyone who applies pesticides into or over state surface water. The PGP is not a pesticide permit; it is a wastewater discharge permit regulated under the DEQ Montana Pollution Discharge Elimination System (MPDES) program. Discharge of pollutants to state water without a permit is a violation of the MWQA in 75-5-605, Montana Code Annotated (MCA).
A Notice of Intent (NOI) submittal is required before a pesticide is applied to or over surface water. The NOI is a legal notification by the owner/operator to DEQ that they will comply with the PGP. If the application of pesticides occurs within the boundaries of Indian Lands, the owner/operator will need to comply with the permit requirements of the EPA’s Pesticide Program (https://www.epa.gov/pesticide-applicator-certification-indian-country). Contact the DEQ for more information (406-444-3480, http://www.deq.mt.gov).

**Montana Food, Drug and Cosmetic Act.** The Miller Amendment (1954) of the Montana, Food, Drug and Cosmetic Act requires any raw agricultural commodity be condemned as adulterated if it contains pesticides for which there is no established tolerance or for which established tolerance limits are exceeded.

**Montana Solid Waste Laws.** The Montana Solid Waste Management Act prohibits the disposal of any solid waste in any location not licensed as a solid waste disposal site by the DEQ. Refuse is defined as “all putrescible and non-putrescible solid industrial wastes.” In this context, some pesticides are included within the definition. Under the Montana Solid Waste Laws it is illegal to burn pesticide containers other than in an approved facility. Any person found violating this act is guilty of a misdemeanor.
PRACTICE QUESTIONS FOR CHAPTER 3
This section contains questions regarding Federal Laws on page 19 of the Core Manual.
Answers are in the “Answers to Chapter Questions” section on page 23.

1. What is the main law that regulates pesticides in the U.S.?

2. How much time does a private applicator have before recording their RUP applications?

3. If you spilled one liquid gallon of pesticide you must report this to the MDA (True or False).

4. Rinsate can be temporarily stored for how long?

5. You are calibrated to spray 80 GPA, and you applied eight gallons of mixed solution. You have sprayed how many acres? Does this qualify as a spot application?

6. Time, month, day, and year are mandatory when recording RUPs (True or False).

7. A management plan must be initiated if an agricultural chemical is at or above 75% of the human risk threshold in groundwater (True or False).

8. What type of pesticide can a private applicator apply upon land of their immediate neighbor?

9. How long do you need to keep your records for your RUP applications?

10. How many times must a pesticide product container be rinsed prior to disposal?
ANSWERS TO CHAPTER QUESTIONS

ANSWERS TO CHAPTER 1 (MONTANA PRIVATE APPLICATOR CERTIFICATION)

1. Insecticides, Fungicides, Rodenticides, Herbicides, etc…. ends in ‘cide’.
2. RUPs
3. False: Only RUPs
4. 6 recertification credits
5. 11
6. By passing a closed book graded examination or taking the six hour initial training course
7. False: Only general use pesticides
8. Contact your local county extension office
9. $20
10. December 31st, 2017

ANSWERS TO CHAPTER 2 (CALIBRATING PESTICIDE EQUIPMENT)

1. An applicator has a 66 foot long calibration strip and his nozzle spacing is two feet. It takes him 30 seconds to run the course length. He collects 0.04 gallons from one nozzle for 30 seconds. What is the application rate of this sprayer in GPA?

   - Test Strip Area = 66 x 2 feet = 132 square feet
   - 132 square feet/43,560 square feet = 0.003 acres
   - Volume applied over Test Strip = 0.04 gallons
   - GPA = volume applied/test strip acres = 0.04 gallons/0.003 acres = **13.33 GPA**

2. A backpack sprayer applies 30 ounces to a test strip that is 18 ½ by 18 ½ feet in 60 seconds. What is the application rate of this sprayer in GPA?

   - 18 ½ x 18 ½ area = Handgun Shortcut Method = 30 ounces = **30 GPA**

3. A broadjet sprayer has a swath width of 40 feet. A test strip distance of 200 feet is established. It takes 45 seconds to cover the test strip distance with the sprayer. Five gallons are collected from the broadjet in 45 seconds. What is the application rate of this sprayer in GPA?

   - Test Strip Area = 40 x 200 = 8,000 square feet
   - 8,000/43,560 = 0.1836 acres
   - Volume applied over Test Strip = 5 gallons
   - GPA = volume applied to test strip/test strip acres = 5 gallons/0.1836 acres = **27.2 GPA**

4. You need to spray a 16 acre pasture. Your sprayer’s application rate is 25 GPA. You will be using a pesticide at a labeled rate of 1.5 pints per acre. How many pints will you add to the spray tank to spray this 16-acre pasture?
• Acres x Product Rate = Total Product Needed
• 16 x 1.5 pints = **24 pints of product**

5. Your backpack sprayer is calibrated at 25 GPA and you plan on using three gallons of solution for a spot application. The product label requires a rate of five ounces per acre. How much pesticide product do you add to the tank?

• Pesticide Product Recommendation/GPA = Pesticide Product to Add to Tank
• 5 ounces per acre/25 GPA = 0.2 ounces per gallon of solution
• 0.2 ounces x 3 gallons = **0.6 ounces total product to add to tank**

6. Your spray tank is 500 gallons and is calibrated at 20 GPA. How much area can you cover?

• Tank Size/Output of Sprayer = Total Area you can cover
• 500 gallons/20 GPA = **25 acres**

7. You have 5 nozzles that deliver the following rates in 60 seconds: nozzle 1 = 80 oz., nozzle 2 = 100 oz., nozzle 3 = 95 oz., nozzle 4 = 101 oz., and nozzle 5 = 104 oz. If you were testing uniformity of nozzles, what would the acceptable output range?

• Average Nozzle Range = (80 oz. + 100 oz. + 95 oz. + 101 oz. + 104 oz.)/5
• 480 oz./5 = 96 oz.
• 96 oz. x 0.10 = 9.6 oz
• 96 oz. + 9.6 oz. = 105.6 oz. = upper range
• 96 oz. − 9.6 oz. = 86.4 oz. = lower range
• **86.4 oz. − 105.6 oz. = total range**
• Nozzle 1 would need to be cleaned or replaced

**ANSWERS TO CHAPTER 3 (PESTICIDE LAWS & REGULATIONS)**

1. FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act)
2. 2 weeks
3. False: 5 gallons
4. 1 year
5. 0.10 acres or 1/10th of an acre: yes, spot treatment
6. False: Time is not mandatory
7. False: At or above 50% of the human risk threshold.
8. General Use Only
9. 2 years
10. Triple
FARM APPLICATOR SPECIAL USE PERMIT

STATE OF MONTANA
DEPARTMENT OF AGRICULTURE
AGRICULTURAL SCIENCES DIVISION
APPLICATION FOR A FARM
APPLICATOR SPECIAL USE PERMIT
For Year Ending December 31, 20

PLEASE PRINT OR TYPE

APPLICANT NAME

Last
First
Middle Initial

TELEPHONE

Area Code
Phone Number

MAILING ADDRESS

Street or Box No.
City
County of Residence
State
Zip

☐ $50.00 FEE FOR A 5 YEAR PESTICIDE FARM APPLICATOR LICENSE

AGRICULTURAL PEST CONTROL (Includes Restricted: Insecticides, Herbicides, Fungicides, Rodenticides, etc.)

SODIUM CYANIDE CAPSULES FOR USE IN M—44 DEVICES (Special training is required for this use)

AQUATIC HERBICIDES (Special training is required for this use)

LIVESTOCK PROTECTION COLLAR (Special training is required for this use)

OPTION: I HEREBY REQUEST THE DEPARTMENT TO ISSUE TWO (2) CREDENTIALS FOR THE PURCHASE AND USE OF RESTRICTED PESTICIDES ON LANDS UNDER MY ADMINISTRATION FOR MY FAMILY MEMBERS OR EMPLOYEES.

I hereby certify that the information on this application is true and correct, and agree to comply with all the provisions of the Montana Pesticides Act, and rules adopted thereunder.

DATE
SIGNATURE

MAIL TO:
DEPARTMENT OF AGRICULTURE
AGRICULTURAL SCIENCES DIVISION
P.O. BOX 200201
HELENA, MT 59620-0201

DEPARTMENT OFFICE USE ONLY

PRIVATE APPL
DISPOSAL
COUNTY (_____) M.S.U.

DATE RECEIVED:
AMOUNT RECEIVED:
CK. or M.O. No.:
COLLECTION REPORT:
COLLECTION DATE:
<table>
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<tr>
<th>Date</th>
<th>Location</th>
<th>Size Treated</th>
<th>Crop/site</th>
<th>Amount Applied</th>
<th>Pesticide Brand Name</th>
<th>EPA Reg #</th>
</tr>
</thead>
</table>

To find area: Gallons applied + GPA = acres
Example: 500 gallons used / 25 GPA = 20 acres

To find undiluted amount: acres applied x product rate
Example: 20 acres x 1 pint per acre = 20 pints of undiluted product
<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Size Treated</th>
<th>Crop/site</th>
<th>Amount Applied</th>
<th>Pesticide Brand Name</th>
<th>EPA Reg. #</th>
</tr>
</thead>
</table>

* To find area: gallons applied + GPA = acres  
Example: 500 gallons used / 25 GPA = 20 acres

** To find undiluted amount: acres applied x product rate  
Example: 20 acres sprayed x 1 pint per acre = 20 pints of undiluted product

Recordkeeping Form for Restricted-use Pesticides
<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Size Treated</th>
<th>Crop/site</th>
<th>Amount Applied</th>
<th>Pesticide Brand Name</th>
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Recordkeeping Form for Restricted-use Pesticides