

SPRAYER FACTORS

- **SPRAYER PRESSURE**
- **4X PRESSURE = 2X VOLUME**
- **SPEED OF APPLICATION**
- **WALKING PACE**
- **NOZZLE OR SPRAY GUN HEIGHT**
- **BOOM—NOZZLE SPACING**
- **COVERAGE OF AREA**
- **DOUBLE COVERAGE/HALF RATE**

Consistency ~ Consistency ~ Consistency!

CONVERSIONS

gallon x 128 = fluid ounces (fl oz)

pints x 16 = fluid ounces (fl oz)

fl oz x 29.57 = milliliters (ml)

gallon x 4 = quarts (qts)

quarts x 2 = pints (pts)

fl oz x 2 = Tablespoons (tbs)

tbs x 3 = teaspoons (tsp)

tsp x 5 = milliliters (ml)

**CONSULT OUR CURRENT HERBICIDE
RECOMMENDATIONS**

Lincoln County Noxious Weed Control
405 Ross St.

Davenport, WA 99122

509-725-3646

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CALIBRATION MADE EASY

A USER FRIENDLY APPROACH TO CALIBRATION

Whatever your technique:

- **Hand gun sprayer**
- **Backpack sprayer**
- **Boom sprayer**



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CALIBRATION IS TOO HARD AND I DON'T HAVE TIME!

Admit it! You have either said it or thought it when filling your sprayer. Truth is calibration is as important as adding herbicide to your sprayer. Most often than not calibration is at least a part of the problem when spray applications don't work. In actuality, it takes very little time to calibrate your equipment and it could save you a lot of money and product. Whether you have an ATV, Backpack or Handgun, this publication will walk you through the steps that you need to know to easily and successfully calibrate your equipment.

HANDGUN / BACKPACK CONSIDERATIONS

- ♦ **Use a quick, positive pressure shutoff valve or a strainer with a check valve to prevent dripping after the shutoff valve is closed.**
- ♦ **Insert a 50 mesh in-line strainer and keep the solution constantly agitated to reduce nozzle clogging associated with wettable powders, dry flowables and water dispersable granules.**

SPRAY VOLUME: CALCULATIONS

- ⇒ **NOT CALIBRATION BUT MATH**
- ⇒ **LABEL STATES VOLUME RATE AS %**
- ⇒ **SO A 1.5% SOLUTION IF YOU HAD 100 GALLONS**
- ⇒ **1.5 GAL OF PRODUCT, 98.5 GAL WATER**

FOR THE NOT-SO-EASY TOTAL VOLUMES

- ⇒ **TAKE THE DESIRED TANK VOLUME AND MULTIPLY BY %**
- ⇒ **25 GALLON TANK X 0.015 = 0.375 GALLONS**
- ⇒ **0.375 GALLONS X 128 OZ/GAL = 48 OUNCES**

*** Always read and follow the herbicide label directions, and always wear the required PPE (personal protective equipment) when handling any pesticide. It is the law.**

SPRAY VOLUME: LABEL RATES

Prepare the desired volume of spray solution by mixing the amount of this product in water as shown in the following table:

Spray Solution

Desired Volume	Amount of Roundup Original MAX herbicide					
	0.4%	0.7%	1%	1.5%	4%	7%
1 Gal	0.5 oz	1 oz	1.3 oz	2 oz	5 oz	9 oz
25 Gal	0.8 pt	0.7 qt	1 qt	1.5 qt	4 qt	7 qt
100 Gal	1.6 qt	2.8 qt	1 gal	1.5 gal	4 gal	7 gal

2 tablespoons = 1 fluid ounce

Not all labels have charts, so you may need to calculate the volume of product needed per volume you desire to make up.



ATV—THINGS TO THINK ABOUT

ATV STABILITY:

- ◆ Independent vs. strut rear
- ◆ clearance, stability, comfort
- ◆ Seat height
- ◆ Machine width/weight
- ◆ Tire style



TANK:

- ◆ Capacity and weight
- ◆ One tank or two
- ◆ Pull-behind wagon
- ◆ PUMP CAPACITY—4.9 Gallon Per Minute is ideal
- ◆ Pressure gauge located in line from pump to nozzles
- ◆ Filters/screen in recirculation and nozzles

BOOM:

- ◆ Boom with flood jet or flat fan nozzles
- ◆ Boom Buster nozzles—up to 30 foot swath

ATV—THINGS TO THINK ABOUT (cont.)

- ♦ Hose Length—25-5- feet for spot spraying
- ♦ Wand or Gun Nozzle



CALIBRATION VARIABLES

- ♦ Backpacks and ATV's
- ♦ Swath width
- ♦ Single nozzle or full boom
- ♦ Height (make sure its comfortable)
- ♦ Application speed
- ♦ Nozzle output (pressure/orifice size)
- ♦ Modify wand with a pressure gauge to keep constant pressure
- ♦ Handguns
- ♦ Effective Swath
- ♦ Time/Placement to wet or soak, not runoff

Tip:

Use a syringe to measure herbicide if you are applying a low-rate product like Milestone (e.g., 5 to 7 fl oz/ac).

CALIBRATION EXAMPLE:

SPRAY PER AREA: VOLUME BASED

IT TOOK 50 SECONDS FOR AN APPLICATOR TO SPRAY THE 5 FT. BY 200 FT. CALIBRATION COURSE.

THE AMOUNT OF SPRAY COLLECTED FROM THE GUN FOR THE 50 SECONDS WAS 1.4 GALLONS.

The application rate for this example is:
1.4 GALLONS PER 1,000 SQ. FT.



Example of a calibration course.

CALIBRATION FOR SPRAY PER AREA- VOLUME-BASED

continued

- MARK OFF A 1,000 sq. ft. CALIBRATION COURSE.
- ACCURATELY MEASURE THE TIME REQUIRED TO SPRAY THE CALIBRATION COURSE USING A PROPER TECHNIQUE. ONLY RECORD THE AMOUNT OF TIME THE GUN IS ACTUALLY SPRAYING.
- USING THE TIME RECORDED ABOVE, SPRAY INTO A MEASURING CONTAINER FOR THAT SAME LENGTH OF TIME.
- AMOUNT IN THE CONTAINER REPRESENTS THE APPLICATION RATE PER 1,000 sq. ft.



Calibration is based on the herbicide label -

- ♦ Per acre or 1,000 sq. ft
- ♦ Spray to wet
- ♦ Volume requirements
- ♦ % Volume

Use a 1.5 % Solution

Application Rates	Program 1
gal/acre	0.09
fl oz/acre	12
fl oz/ 1000 sq ft	0.28



Hand-Held and High-Volume Equipment

Hand-held spray guns, backpacks, or other similar sprayers may be used to apply this product. Apply to foliage of vegetation to be controlled. For applications made on a spray-to-wet basis, spray coverage should be uniform and complete. Do not spray to the point of runoff. Use coarse sprays only.

SPRAYING INSTRUCTIONS FOR PENDULUM WDG HERBICIDE

Apply with properly calibrated ground equipment in sufficient water per acre to provide uniform spray distribution (at least 40 gallons of water per acre). Low pressure (e.g., 20-40 psi) sprayers are recommended.

SINGLE WAND / GUN CALIBRATION PER ACRE

The following calibration method is to be used for calibrating an **ATV single wand** or **Backpack single wand**.

- ♦ 1 Acre = 43,560 sq. ft
- ♦ 1 Gallon = 128 ounces
- ♦ 43,560 sq. ft. divided by 342 sq. ft. = 128 (1/128th of an acre)
- ♦ 1 Gallon divided by 128 ounces = 1/128th of a gallon

VOLUME METHOD

The object of the **Volume Method** is to find how many **Ounces** you are spraying in a 342 sq. ft. area and **convert** that to **Gallons per Acre**.

1. **Measure** a 18.5' X 18.5' area (342 sq. ft.).
2. **Spray** area with water using your equipment
How much did you spray out?
3. **Multiply** the amount you sprayed out by 128
4. **Divide** that number by 128.
The number you get is the **Gallons Per Acre** your equipment is spraying out.

CALIBRATION FOR SPRAY PER AREA VOLUME-BASED

- **MEASURE & MARK AN AREA OF 1,000 sq ft.**
- **ADD A MEASURED AMOUNT OF WATER TO TANK**
- **SPRAY THE 1,000 sq. ft AREA**
- **MEASURE THE AMOUNT REMAINING IN THE TANK**
- **THE DIFFERENCE BETWEEN THE AMOUNT IN THE TANK BEFORE AND AFTER SPRAYING IS THE AMOUNT APPLIED PER 1,000 sq. ft.**
- **ADJUST AND RECALIBRATE UNTIL DESIRED RATE IS OBTAINED.**



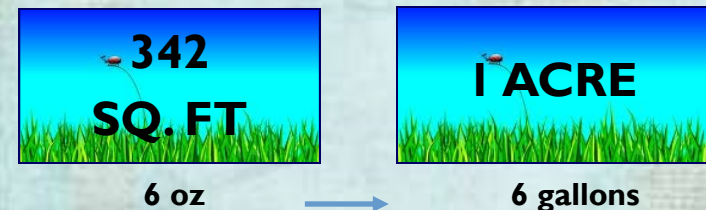
BOOM SPRAY PER ACRE

continued

- ♦ **FIRST, SPRAY A KNOWN DISTANCE** (e.g. 200 Ft).
- ♦ **THEN MEASURE YOUR SWATH WIDTH** (e.g. 12 Ft).
- ♦ **CALCULATE AREA:** $12 \times 200 = 2,400$ sq. ft. (0.055 Acres).
- ♦ **NOW MEASURE THE TOTAL VOLUME THE BOOM DELIVERS**
 - Collect from one nozzle over calibration course (10 oz).
 - Multiply by number of nozzles (7 nozzles).
 - **VOLUME DELIVERED** = 70 oz (70 oz/128 oz per gal = 0.55 gal).
- ♦ **KNOW THE VOLUME THAT IS DELIVERED TO THE AREA.** ie 0.55 gallons per 0.055 acres.
- ♦ **CONVERT TO GALLON PER ACRE RATE**
 $0.55 \text{ Gallons} \div 0.055 \text{ ACRES} = 10 \text{ G.P.A.}$

EXAMPLE

You spray the 18.5' X 18.5' area and find that your equipment sprayed **6 oz.** You then multiply the **6 oz.** by **128 oz.** You find that equals **768 oz.** Now take the **768 oz.** and divide it by **128oz/ gallon.** You find that equals **6 Gallons per Acre.**



Now Wasn't That Easy?!



** The correct spray tip increases yield, reduces waste & improves safety.*

SINGLE WAND/GUN CALIBRATION PER ACRE

TIME METHOD

The Time Method is more tedious and involves more calculation than the Volume Method. Your result will still be the same.

- Time how long it takes to cover 18.5' X 18.5'
 - Repeat step one 3 times, then calculate the average.
 - Bring wand/gun up to pressure, dispense spray into a clean bucket for the noted time; measure volume.
- ___ Ounces per 342 sq. ft. = ___ gallons per acre.

20 sec
= 6 oz



6 Gallons



BOOM SPRAYER PER ACRE

- **TO SPRAY AN ACRE:**
Measure out an acre and volume used to spray it.
- **MATH FORMULA:**

$$\text{GPA} = \frac{5940 \times \text{GPM (SINGLE NOZZLE)}}{\text{MPH} \times \text{NOZZLE SPACING IN INCHES}}$$

REMEMBER: You must measure the correct units: **GPM, MPH, Inches.**

Speed in MPH	Time Required in SECONDS to Travel a Distance of:		
	100 Feet	200 Feet	300 Feet
0.5	136	273	409
1.0	68	136	205
1.5	45	91	136
2.0	34	68	102
2.5	27	55	82
3.0	23	45	68
3.5	19	39	58
4.0	17	34	51
4.5	15	30	45
5.0	14	27	41
5.5	—	25	37
6.0	—	23	34
6.5	—	21	31
7.0	—	19	29
7.5	—	18	27
8.0	—	17	26
8.5	—	16	24
9.0	—	15	23