Oregon State University

BACKPACK SPRAYERS 101:
how to purchase, modify, & calibrate

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OUTLINE

Sprayer Types

Modifications

Calibration

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BACKPACK SPRAYER - USES

- Spot treatment
  - e.g medians or landscape beds
- Odd shaped areas
  - circles or triangles
- Around impediments
  - -tree, fences, steep slopes
- Directed spraying
  - landscape plants
- Small areas
  - < 1 acre

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BACKPACK SPRAYER - USES

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BACKPACK SPRAYER TYPES

Manual

Battery

Gas

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BACKPACK SPRAYERS - MANUAL TYPES

Piston

Diaphragm

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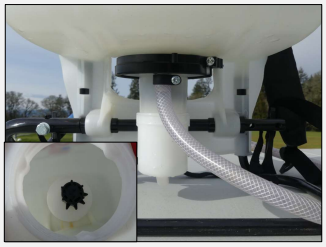
Manual Pump Type

Piston



Diaphragm

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Backpack Sprayer - Testing

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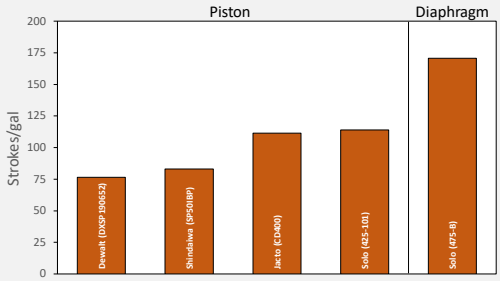
Pump Efficiency



* Test conducted using TeeJet TP9503EVS nozzle at 30 psi (0.26 GPM)

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Backpack Sprayers - Battery

Key Features

- Battery life
- Replaceable battery
- Pressure regulation
- Pump type
- Max pressure/volume (i.e. GPM)

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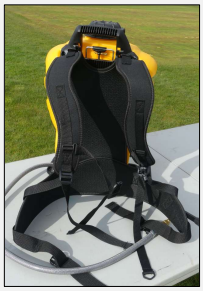
Backpack Sprayer - Comfort



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Backpack Sprayer Weights

Sprayer	Capacity	Weight	
		Empty	Full
	gal	lbs	lbs
Dewalt DXSP190652	4	13.5	46.9
Shindaiwa SP501BP	5	13.5	55.2
Jacto CD400	4.2	11.6	46.6
Solo 425-101	4	11	44.4
Solo 475-B	4	11	44.4
Ryobi RY40301	4	12	45.4
Jacto PBJ-16	4.2	11	46.0
Solo 416-Li	5	14	55.7
Solo 433	5.3	18.3	62.5

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Backpack Sprayer - Measuring

- Easy to read volume measurements
- Easy to see through material

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Backpack Sprayer Wands

Shindaiwa

Jacto

Dewalt

Solo

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Backpack Sprayer Wands

Shindaiwa

Jacto

Dewalt

Solo

11/16”- 16 (‘TeeJet’) thread compatible

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Backpack Sprayer Wands

Dewalt

“Spray optimizer” included with sprayer

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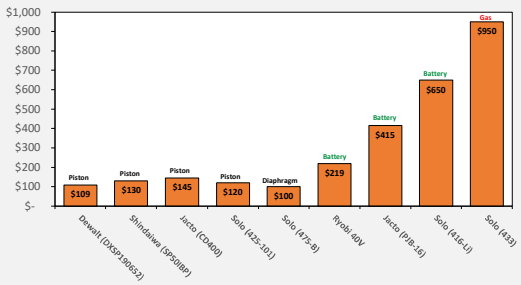
Backpack Sprayer Price



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Winners

Best Commercial Backpack Sprayer

Shindaiwa (SP501BP)

- Efficient pump
- Comfortable
- Affordable
- Compatible with 11/16” – 16 thread
  - “TeeJet” thread

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WINNERS

Best Homeowner Backpack Sprayer

Dewalt (DXSP190652)

- Efficient pump
- Affordable
- Comes with pressure regulator

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WINNERS

Electric backpack sprayers

- No pumping!
- More affordable
- Light weight

Caveats
- Battery life
- Pump longevity

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FlowZone
Typhoon 3

1.12 GPM

120 min run time

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GAS-POWERED + SPRAYHAWK

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GAS-POWERED + SPRAYHAWK

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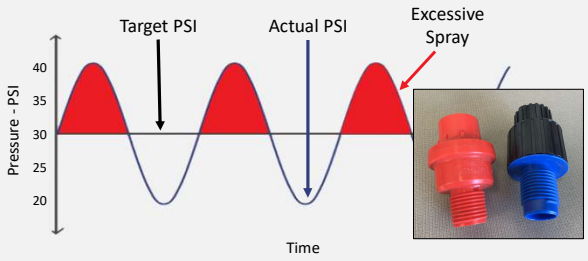
CALIBRATION PROBLEM



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Constant Flow Valves (CFV)

- Maintains constant flow and pressure during spray
- Improves accuracy of calibration
- 11/16" – 16 thread required
  - "TeeJet" thread

Modifications – Spray Wand


Trigger Valve


Valve Handle (¼")


¼" Swivel – Hose barb


Hose Clamp


Curved Extension

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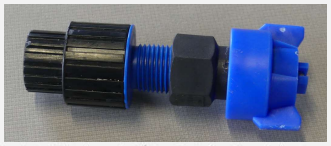
Modifications – CFV/Nozzle



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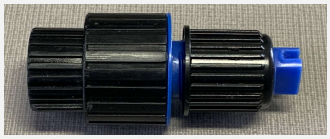
Modifications – CFV/Nozzle

For Jacto and Shindaiwa sprayers



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Nozzle Selection

	PSI	DROP SIZE 80°	DROP SIZE 110°	CAPACITY ONE NOZZLE IN GPM
XR8002 XR11002 (50)	15	M	M	0.12
	20	M	F	0.14
	30	F	F	0.17
	40	F	F	0.20
	50	F	F	0.22
	60	F	F	0.24
XR8003 XR11003 (50)	15	M	M	0.18
	20	M	M	0.21
	30	F	F	0.26
	40	F	F	0.30
	50	F	F	0.34
	60	F	F	0.37
XR8004 XR11004 (50)	15	C	M	0.24
	20	M	M	0.28
	30	M	M	0.35
	40	M	M	0.40
	50	F	F	0.45
	60	F	F	0.49

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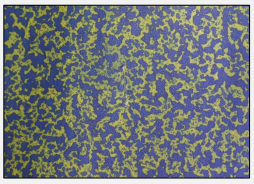
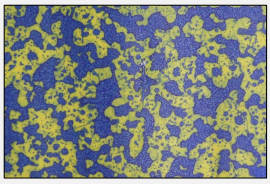
Nozzle Selection - Droplet size


Fine


Ultra Coarse

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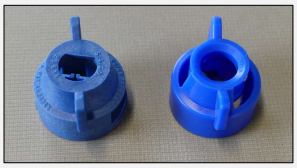
Nozzle Selection – Spot Apps

Nozzle Pattern

Flat Even Flat

Nozzle Cap



Notched Round

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Accurate Spot Applications

- Over application when spot treating with backpack spray
  - Estimated 3 - 5X product rate
- TeeJet MeterJet Spray Gun
  - Each trigger pull releases a predetermined amout of solution
  - Adjustable chamber allows calibration
  - Significant savings in chemicals

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Calibration – 3 steps

1) Walking speed (MPH)
2) Nozzle Output (GPM)
3) Spray Width (W; Inches)

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Walking Speed (mph)

I. Mark two points 100 ft apart
II. Record how long it takes to travel distance
III. Repeat till you achieve a consistent travel speed
IV. Calculate travel speed (MPH) by dividing 68.18 by the time required to travel 100 ft
   - *Example: 68.18/34 sec = 2.0 mph*

** DO NOT walk too fast*

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Nozzle Output (GPM)

I. Fill sprayer half full of water.
II. Pump the sprayer to pressurize the tank
III. Pull the handle trigger, start timer for 60 seconds, and collect spray output in a measuring container.
IV. Determine volume collected and convert the flow rate to gallons per minute (128 fl oz = 1 gal)

* GPM can be determined by looking up the manufacturer's specifications (i.e. TeeJet Catalog)

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Sprayer Width (W; inches)

* Important to maintain constant spray height

I. Find a comfortable spray height
II. Spray a test strip using water on dry concrete or gravel
III. Measure the width of the spray pattern

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CALIBRATION - CALCULATION

$$\text{gal/1000 ft}^2 = \frac{136 \times \text{GPM}}{\text{mph} \times \text{W}}$$

$$\text{gal/1000 ft}^2 = \frac{35.4}{36}$$

= 0.98 gal/1000 ft²

Example

mph = 2.0

GPM = 0.26 gal

W = 18 in

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HANDOUTS

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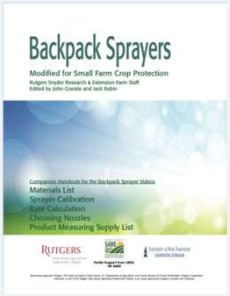
ACKNOWLEDGEMENTS



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