

Chapter 6

Equipment & Calibration



Equipment Selection

■ Depends on...

- target
- type of application
- pest to be controlled
- pesticide formulation

■ Equipment

- liquid sprayers, granular applicators, injectors, aircraft



Calibration of equipment is crucial to obtain the correct application rate according to the label.



Pesticide Deposit

■ Deposit on target depends on...

- concentration in tank
- rate of discharge
- equipment speed
- swath width
- ◆ evaporation and drift excluded



Application Equipment Components

- Tanks
- Agitators
- Strainers
- Pumps
- Pressure Regulators
- Pressure Gauge
- Hoses
- Nozzles



Tanks

- Large enough for tasks
- Stainless steel and fiberglass are best
- Shut off valve required



Agitators

- **Pesticide formulation determines agitation requirement**
 - liquid conc., soluble powders, emulsions....
 - ◆ Less.... By- pass
 - wettable powders
 - ◆ more... mechanical

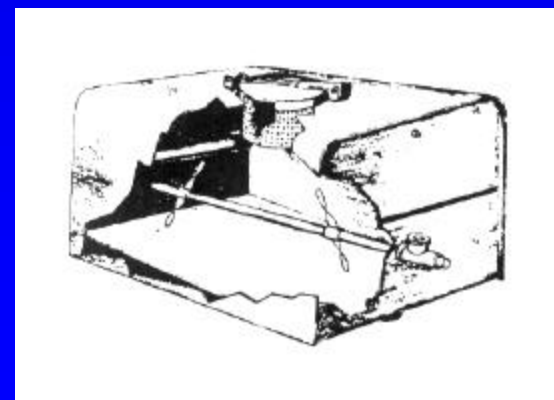


Agitators

- Mechanical

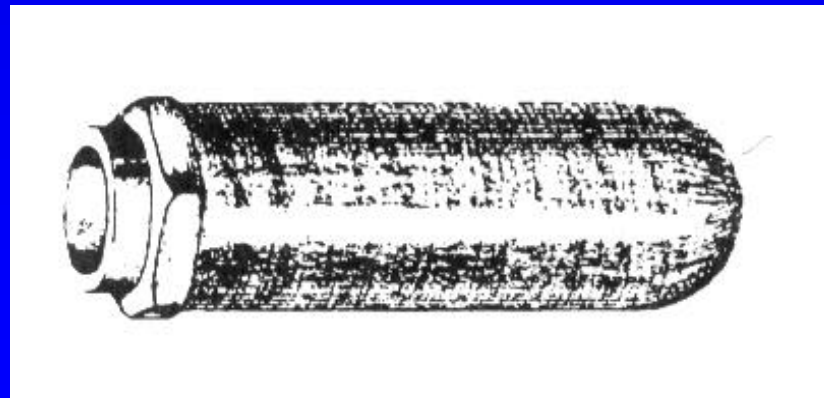
- Hydraulic

- by pass from pressure relief valve may not be sufficient



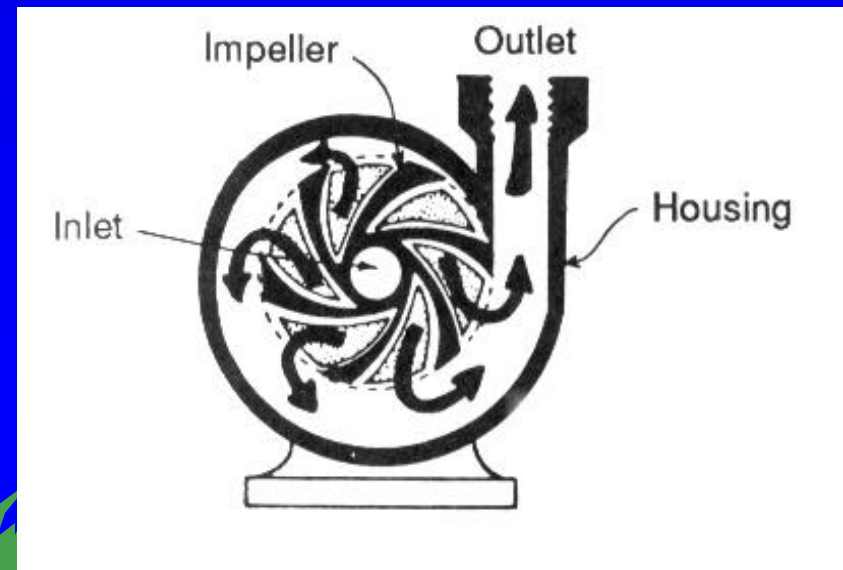
Strainers

- Prevent foreign material from plugging working parts
- Nozzle strainers not a substitute for pressure line strainer



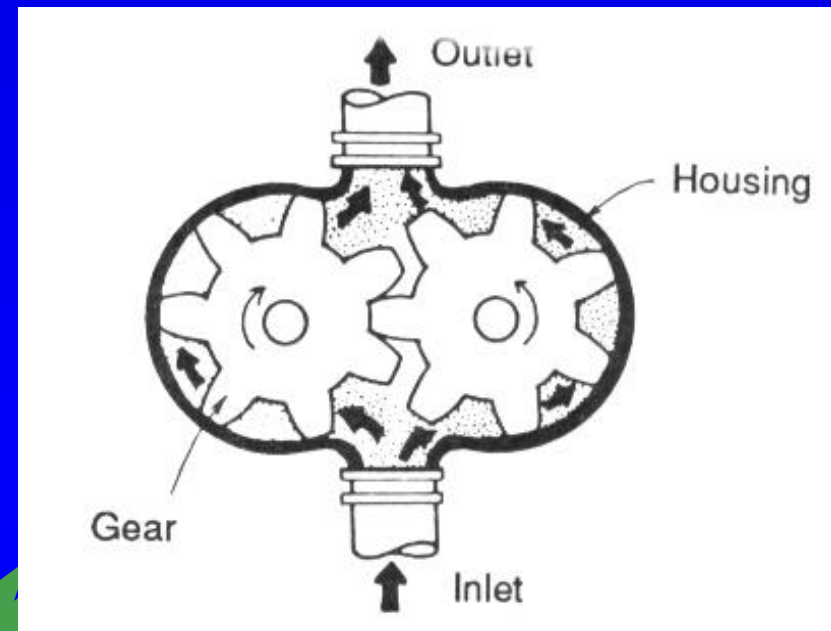
Centrifugal Pump

- High volumes at low pressures
- Used with abrasive materials
- Not self-priming
- Pressure regulators not needed
- Inexpensive



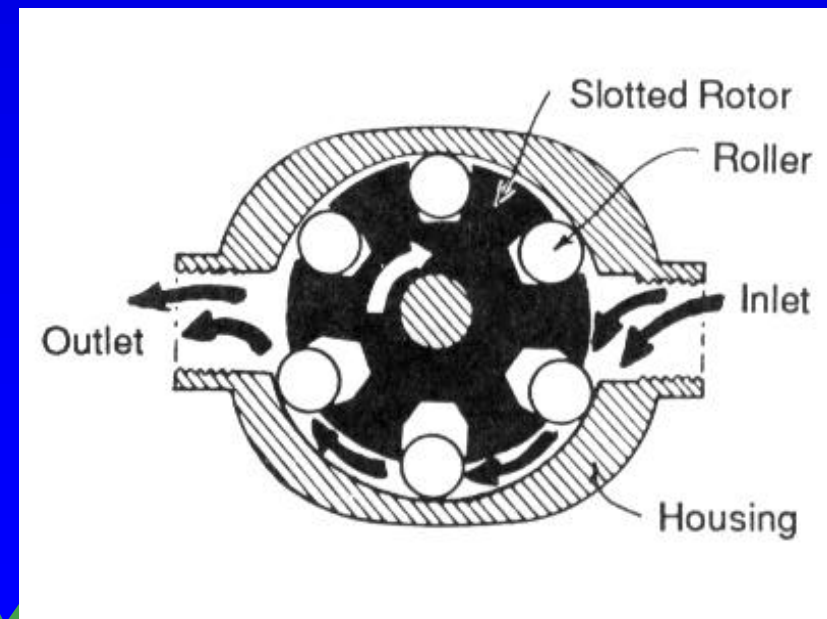
Gear Pump

- Simple & low cost
- Low pressure
- Not affected by solvents
- Disposable when worn



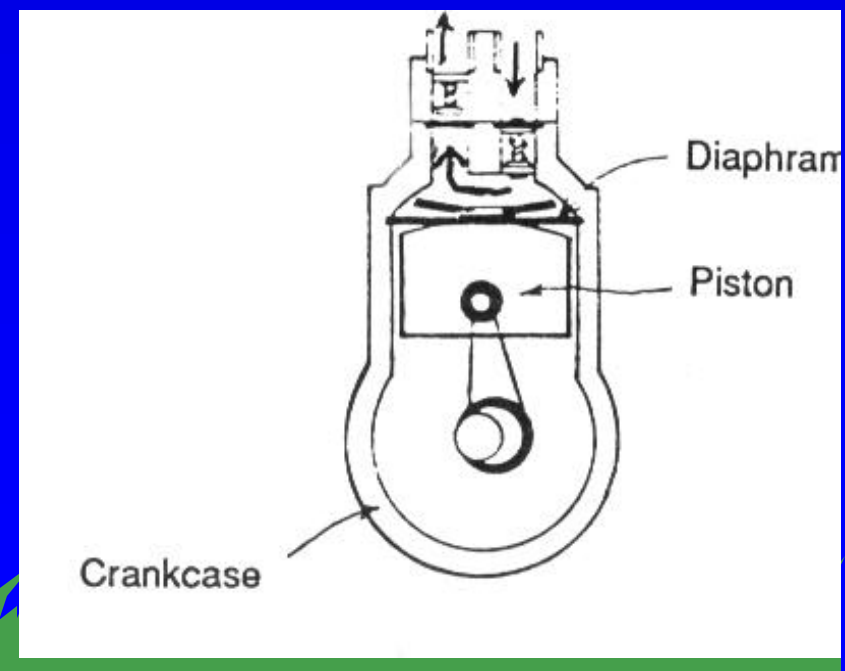
Roller Pumps

- Low pressure, positive displacement, self-priming
- Similar to gear pumps, but abrasion resistant, repairable
- Somewhat more costly



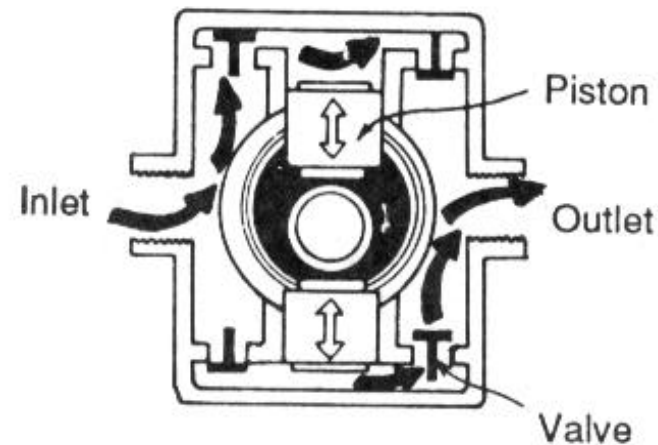
Diaphragm Pump

- Similar in pressure & volume to gear pumps
- Very abrasion resistant



Piston Pumps

- High volumes
- High pressures
- Rugged & versatile



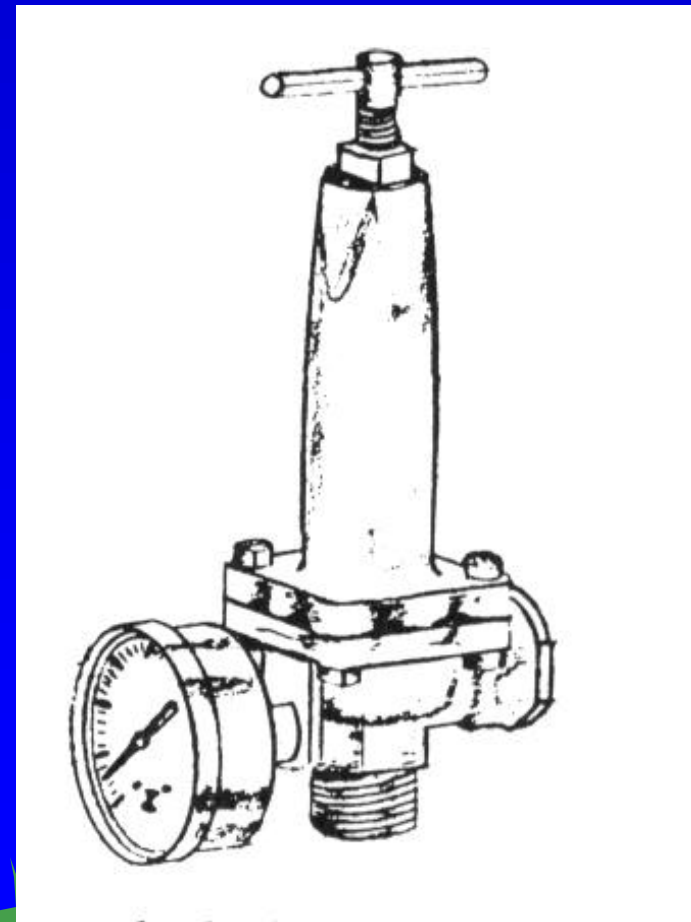
Pressure Regulators

- **Controls pressure**
 - rate deliver to nozzles
- **By -passes excess material back to tank**



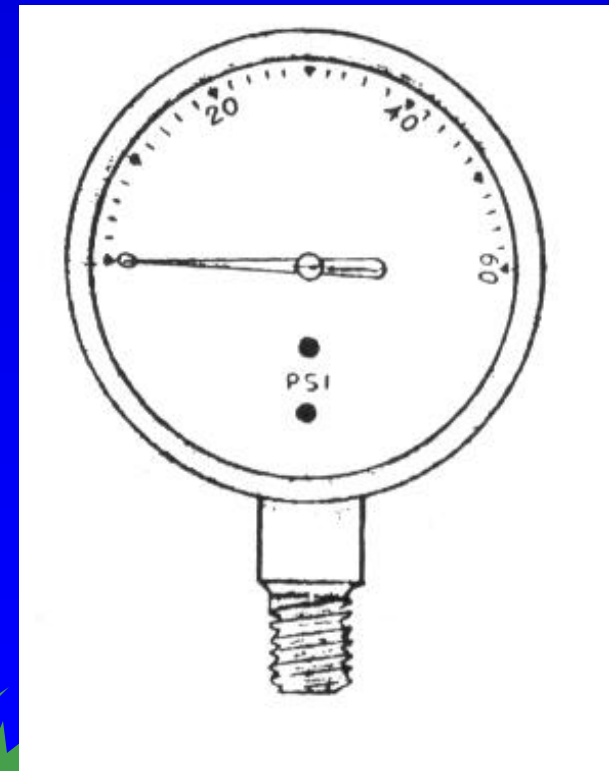
Pressure Regulators

- **Two types**
 - simple relief valves
 - pressure unloaders



Pressure Gauge

- **Essential**
 - pressure affects delivery
- **Gauges do wear out or become clogged**



Hoses

- **Composition (chief liner material)**
- **Construction**
 - reinforcement, rigidity, flexibility
- **Working pressure**
- **Size**



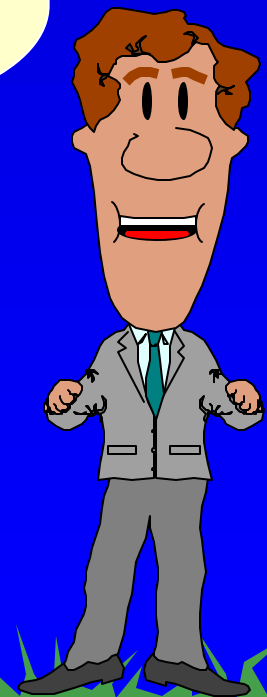
Nozzles

- **Complete assembly consists of..**
 - Body
 - Screen
 - Cap
 - Tip or orifice plate
- **Many designs are available**
 - all spread a liquid into droplets



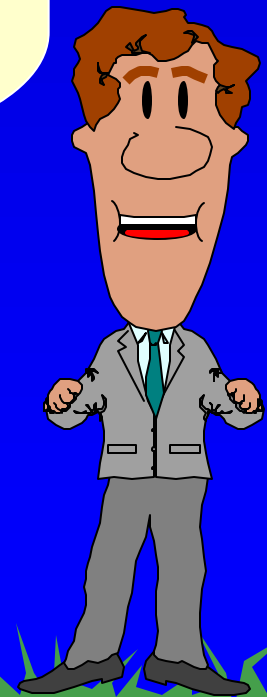
Manufacturer tech sheets are crucial.

Application rate depends on ground speed and pressure



Never operate at higher pressures to compensate for the wrong size.

This will cause nozzle wear and drift.



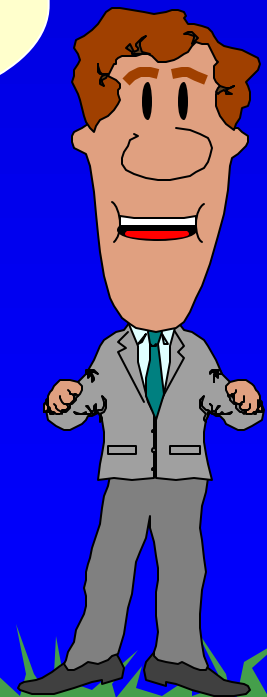
Nozzle Materials

- Aluminum
- Brass
- Ceramic
- Plastic
- Nylon
- Stainless steel
- Tungsten carbide



Carbide & stainless steel are most abrasion resistant.. More expensive.

No single material is perfect for all applications methods.



Regular Flat Fan Nozzle

- Used for broadcast spraying on boom
- 30-50% pattern overlap, 40 psi
- Calibrate frequently to check for nozzle wear



Off Center Nozzles

- Roadside and railroad work
- Specialized booms for obstructions
- Possible wide application in a single pass



Other Nozzle Types

■ Boomless

- wide swath without a boom
- affected by winds

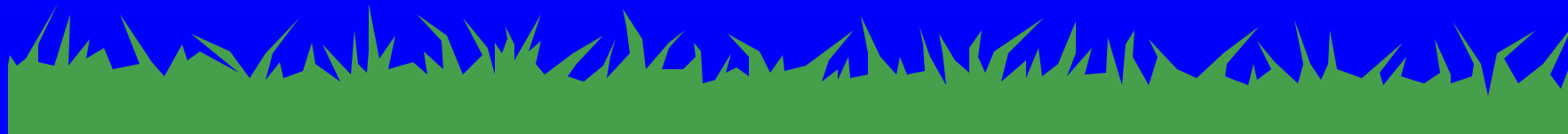
■ Whirling disks

- reduce fine droplets



Sprayers for Right-of-Way *Maintenance*

- **Backpacks to aircraft**
- **Often specialized for tasks**
 - don't try to clean herbicides from sprayers used for other pesticide applications
 - *ammonia or detergent at 1 qt per 25 gallons of water
 - ◆ * test before using



Portable Sprayers

■ Compressed air

- convenient spot and small zone treatment

■ Mist blower

- greater coverage zone, faster
- greater drift potential



Sprayers Carried by Vehicles

- Higher pressure sprayer
 - wide range of uses, with modifications
- Low pressure boom sprayers
- Aerial sprayers



Boom Sprayer Adjustment

- Nozzle spacing
- Nozzle tip orifice
- Pressure
- Ground speed



Calibration

- **Correct & effective amount of pesticide is delivered**
- **Saves money & legal problems**
 - exceeding legal rate
- **Reduces off target movement**



Calibrating Boom Sprayers

- Check nozzles
- Clean nozzles and screens
- Check delivery for each nozzle
- Select ground speed
- Select pump pressure
- Measure swath width



Calibrating Boom Sprayers

- Measure watered deliver in one minute by all nozzles
- Determine the amount of time to cover one acre

$$\text{Minutes per acre} = \frac{1}{\text{ground speed} \times \text{swath width} \times .002}$$



Calibrating Boom Sprayers

- Convert to gallons per acre

Gal per acre = gal per minute x min per acre



Calibrating Boom Sprayers

- **If amount delivered is too little...**
 - increase pump pressure
 - decrease ground speed
 - use larger nozzles



Calibrating Boom Sprayers

- **If amount delivered is too much..**
 - decrease pump pressure
 - increase tractor speed
 - use smaller nozzles



Dosage Regulated Applications

- **Based on target size and material concentration**
 - spray to drip
 - basal spraying
 - frill treatment
 - stump treatment



Error Factors

- Improperly measuring and mixing
- Over application



Chapter 7

Public Relations



Public Relations

- Differences in perception
- Carelessness
- Other areas of concern
 - water ways
 - toxic plants
 - farm operations
 - pets
 - brown out



Avoid Job Problems

- **Choose contractors carefully**
- **Write contracts carefully**
 - follow up on performance
- **Consistent policies**
- **Educate the public**



Contractors

- You're selling your reputation
- Choose employees carefully
- Train employees
- Keep records
- Inspect work
- Follow- up on complaints



Applicators Should...

- **Have product information**
 - labels, MSDS
- **Respond to public inquiries**
- **Be professional**
 - be polite, overall appearance

