

Spray Drift: What's Nozzle Size, Pressure And Wind Got To Do With It?

Spray drift is a common yet often unseen problem encountered while applying pesticides. Unseen until damage occurs and it's too late to stop it. To avoid drift problems, it is best to understand what drift is, what causes it, and how it can be prevented.



This is NOT what good crop protection should look like!

What is Drift?

Drift is defined as "the movement of chemical outside the intended target area by air mass transport or diffusion." In other words, drift is any movement of the product away from the target caused by wind or evaporation. With this in mind, drift is categorized as one of two types: vapor drift or particle drift.

Vapor drift occurs when a volatile chemical product evaporates or turns into a vapor or gas during or shortly after application. This vapor then stays in suspension in the air and can be moved along with the air for a great distance. Vapor drift is influenced by three factors:

1. Formulation of the product: some chemicals are very volatile, they will evaporate very quickly when exposed to warm air.
2. Weather conditions: high temperature and low humidity is a combination to watch out for. Volatile chemicals evaporate more easily in these conditions.
3. Atmospheric conditions: temperature inversions occur when the air is calm and a layer of warm air gets trapped between two layers of cooler air. Vapors get trapped in the layer near the ground and can move for a great distance before settling onto an unintended target.

Particle drift, also called airborne drift, is the movement of fine particles or droplets through the air while the pesticide is being applied to the target. Particle drift is caused by:

1. Droplet size: the smaller the droplet size, the greater the distance it can be carried along by the air. As pressure is increased for a given spray nozzle, the droplet size gets smaller.
2. Height of nozzle above target: the higher off the ground the nozzle is on the spray boom or wand, the greater the chance of particles being picked up and carried along by moving air.
3. Wind: the higher the wind speed, the greater the risk of particle drift.



Photos and charts provided by: TeeJet

Minimizing Drift

Completely eliminating drift is difficult to guarantee, however by observing the following precautions, drift potential can be greatly reduced.

1. Spray when the wind is calm and consistent in direction. The higher the wind velocity, the greater the potential for particle drift. Perfectly calm conditions may not be the answer either, in these conditions there may not be enough air movement to break up a temperature inversion which can lead to more vapor drift.

2. Select nozzles that have drift reducing characteristics. Nozzle manufacturer's rate each nozzle size and type on its droplet size potential throughout its range of operating pressure. These ratings are based on ASAE Standard S572. Charts are provided to aid in the selection of droplet size to match the criteria recommended by the chemical manufacturer. The table below illustrates the droplet size classifications and color codes:

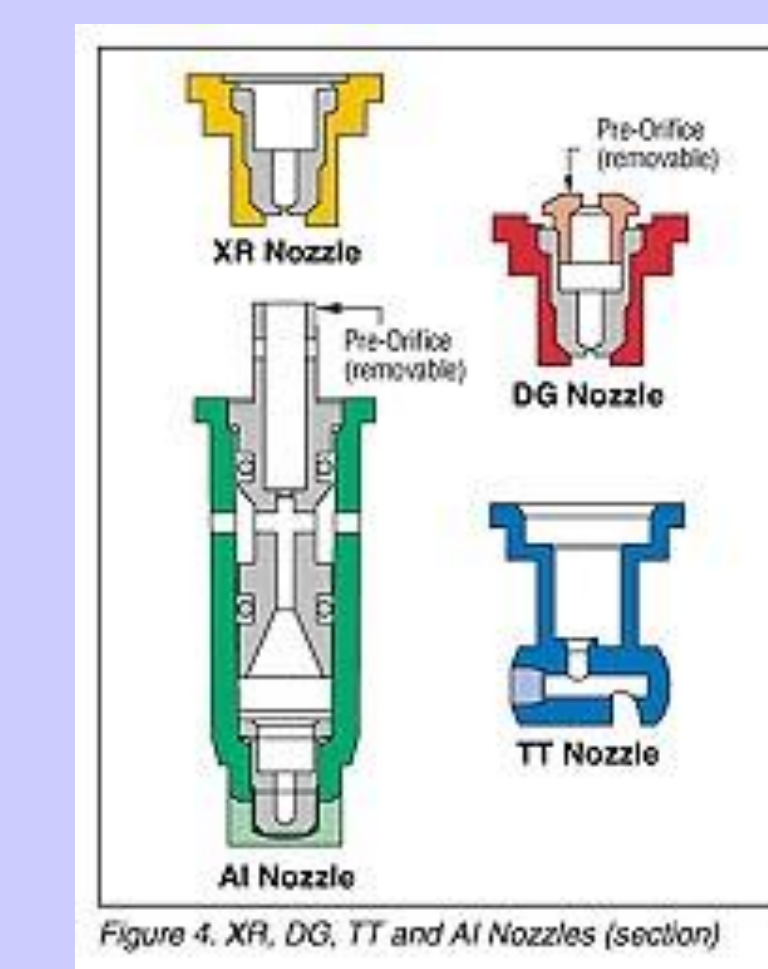


Figure 4. XR, DG, TT and AI Nozzles (section)

Don't confuse the droplet size color codes with the nozzle size color codes.

Nozzle Size	Droplet Size
30-100 AVI-11004	Very Fine (VF) - Red
15-115 ULD120-04	Fine (F) - Orange
15-60 LD03F10	Medium (M) - Yellow
30-60 ADI-11004	Coarse (C) - Blue
15-60 TR80-04	Very Coarse (VC) - Green
15-70 VR80-04	Extremely Coarse (EC) - White
15-70 VPI100-03	
20-60 AXI-11004	
15-60 AXI-8004	
30-60 30-04F80	
30-60 30-04F110	
30-60 API-3004	
30-60 API-11004	
15-60 TR110-04	
15-70 VPI100-02	
15-115 ULD120-02	
15-60 LD02H110	
30-60 ADI-11002	
30-60 30-02F80	
15-60 TR80-02	
15-70 TR110-02	
15-70 VR80-02	
20-60 AXI-8002	
30-60 AXI-11002	
30-60 30-02F110	
30-60 API-11002	
30-60 (100 M Strainer)	
30-100 AVI-11003	
15-115 ULD120-03	
15-60 LD03F09	
20-60 AXI-11003	
15-60 LD03F110	
30-60 ADI-11003	
30-60 30-03F80	
30-60 API-8003	
30-60 API-11003	
15-60 TR80-03	
15-60 TR110-03	
15-70 VR80-03	
15-70 VPI110-03	
20-60 AXI-8003	
30-60 30-03F110	
30-60 (100 M Strainer)	

Advise:

1. Use the lowest pressure setting recommended by the chemical manufacturer. Higher pressures produce more fine droplets and increase drift potential.
2. Avoid spraying when conditions are hot and dry. This promotes evaporation, which adds to vapor drift and also reduces droplet size, causing particle drift. Avoid spraying when temperature inversions occur.
3. Select drift reducing nozzles where practical. Check the manufacturer's ratings for each nozzle type.
4. Use shielded spray booms where possible. The shield around the nozzle reduces the possibility that wind will pick up the particles and carry them off site.
5. Keep the nozzle height as low as possible. Wide angle nozzles can be spaced farther apart and allow for a lower boom height.
6. Know the law. The North Carolina Pesticide Board is responsible for enforcing the North Carolina Pesticide Law and other regulations. Be sure you operate within the guidelines provided.