

Curtis Dyna-Fog® Ltd.

**Spray Classifications and
Droplet Characteristics**

**Ultra-Low-Volume
Spraying and Thermal
Fogging**

SPRAY CLASSIFICATIONS, DROPLET SIZES, NUMBERS & COVERAGE

- Sprays are generally classified by droplet size as follows:
- Smoke less than 0.1 micron
- Fog 0.5 - 10 microns – Thermal Fog / Smoke
- Fine Aerosols 10 - 25 microns – ULV Equipment
- Course Aerosols 25 - 50 microns - Aerosol Cans
- Mists 50 - 100 microns - Motorized Knapsacks
- Fine Sprays 100 - 200 microns – Pump Up Sprayers
- Medium Sprays 200 - 300 microns - Agricultural Sprays
- Course Sprays greater than 300 microns

EXAMPLES

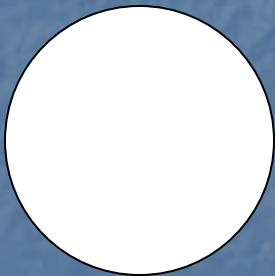
1 Micron = 0.001 mm = 0.00004 inches

Raindrop = 4000 Microns

Human Hair = 75 Microns

SPRAY CLASSIFICATIONS, DROPLET SIZES, NUMBERS & COVERAGE

**400 Micron Droplet
drawn 100x Size**



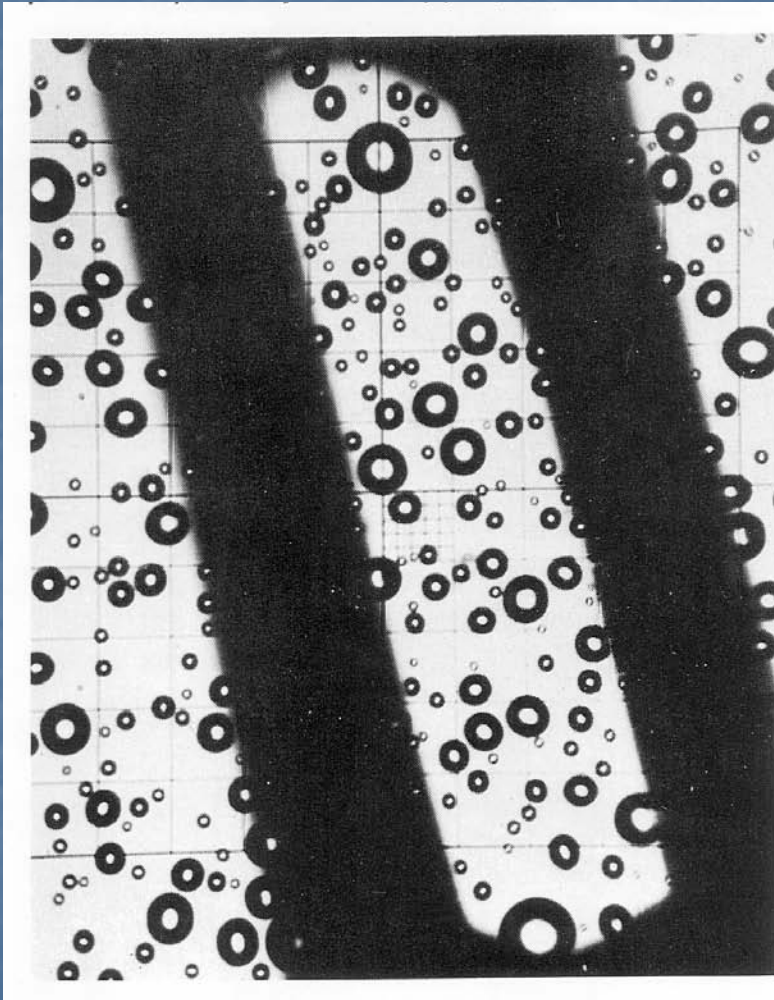
**80 Micron Droplet
drawn 100x Size**



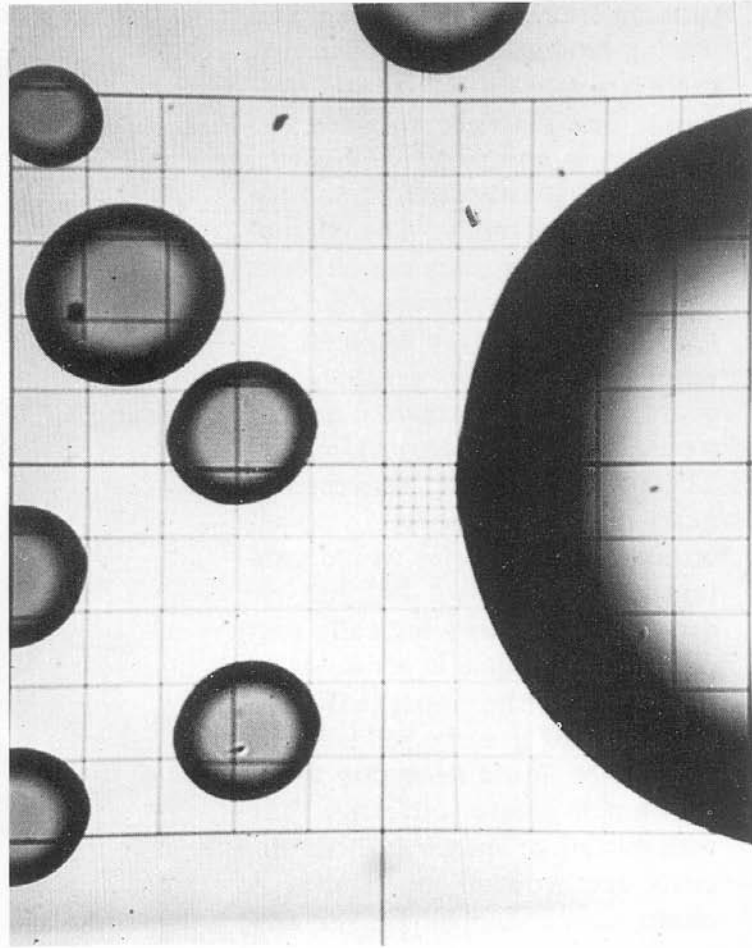
**20 Micron Drop
drawn 100x Size**



ULV Droplet vs. Typical Hand Pump Sprayer Droplet



ULV DROPLETS



COMPRESSION SPRAYER

QUANTITY VS. SIZE

If you were to applying an one (1) millilitre of liquid (formulation) over a acre and your standard droplet size is 15 microns.

YOU WOULD HAVE 556,000,000 PARTICLES!

If you were to applying an one (1) millilitre of liquid (formulation) over a acre and your standard droplet size is 14 microns.

YOU WOULD HAVE 466,000,000 PARTICLES!

It takes 8000 (1 Micron) size droplets to fill the same space (volume) of a (20 Micron) size droplet.

AEROSOL GENERATORS

**THERMAL FOGGING VS.
COLD (ULV) FOGGING**

THERMAL FOGGERS



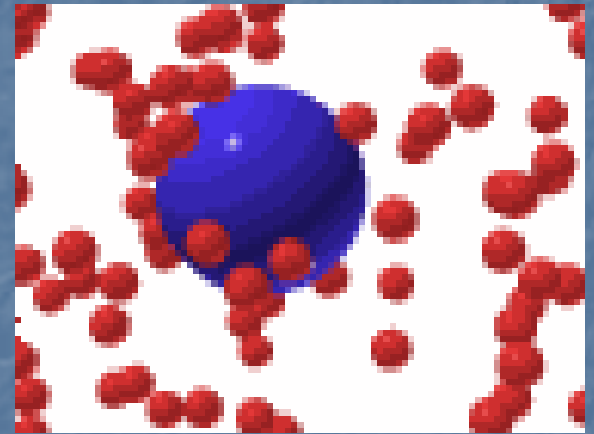
THERMAL FOGGERS

PRINCIPLE OF OPERATION:

The chemical – in concentrated or diluted form as desired is pumped into a heat source (i.e. combustion chamber, heat exchanger or resonant pulse engine) where it is instantly vaporized. The vapor condenses rapidly causing negligible formulation breakdown and emerges from the heat source forming a dense concentration of fine droplets that looks like a fog. As they are of miniscule size, the droplets distribute evenly in all directions

THERMAL FOGGING ADVANTAGES

Thermal Foggers produce droplets that are virtually fully uniform in size and can be as small as 0.5 micron in diameter. The tiny droplets shroud all objects and penetrate deeply. They distribute evenly throughout an enclosed area. This is ideal for applications where universal deposition or deep penetration is required; from treating dense foliage in a greenhouse to sanitizing stocked warehouses, decontamination complex structures or fighting molds or neutralizing odors in industrial commercial or hotel facilities



THERMAL FOGGING ADVANTAGES

A benefit of thermal fogging is its ability to atomize more insecticide with much less energy (BTUs) input than air blast ULV-delivery techniques.

The technique produces a very uniform droplet spectrum of very small droplets if a dry fog is maintained. The small droplets do not settle quickly and may penetrate foliage better than the larger cold aerosol droplets.

Thermal aerosols are often used in third-world countries because of their efficiency. They have the additional advantage that the public can easily see that something is being done.

THERMAL FOGGING ADVANTAGES

Thermal aerosols are often less expensive to purchase and several can be obtained in lieu of just one ULV machine.

The visible fog generated from a thermal fogger is ideal in applications where the aerosol is required to be directionally aimed, such as fogging for bird control and dispensing tear gas in crowd management applications.

THERMAL FOGGING DISADVANTAGES

Oil-Based thermal foggers use large amount of non-insecticidal petroleum distillates that function only as a carrier and can have possible damaging side effects on the environment.

Although the total volume of thermal fogs is greater than the ULV technique, the amount of insecticide is often one half to one third of the ULV rate.

The risk associated with a dense enveloping fog is that it creates a traffic hazard outside and can obscure exits when used indoors.

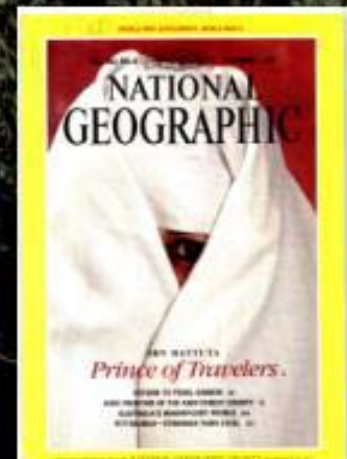
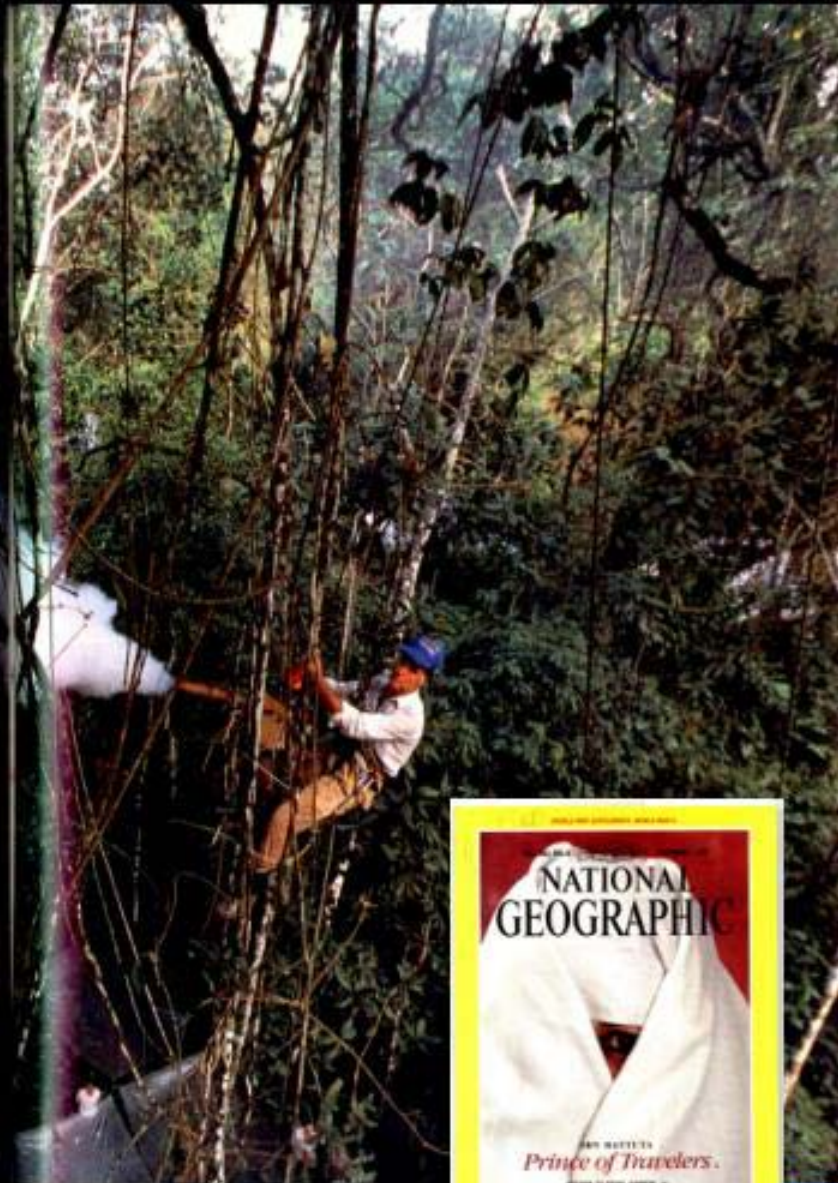
Can cause a fire hazard if applied incorrectly during indoor use.

THERMAL FOG MARKETS

- Mosquito / Fly Control
- Bird Control
- Odor Control (Trash Facilities, Automobiles, Homes, Morgues)
- Disinfectants (Hospitals, Laboratories, Swine/Poultry Houses)
- Greenhouses
- Special Effects Industries (Movies/TV)
- Crowd Management (Military, Police, & Correctional Facilities)
- Fire/Water Restoration
- Warehouses (Stored Product Pests, General Insect Control)
- Surface Decontamination (Bio-Hazards, Military Vehicles)
- Mold Remediation (Water-Based Products & Equipment)



A fog of biodegradable insecticide sprayed by Smithsonian's Terry Erwin in Peru will soon bring a ruin of spiders, insects,



(ULV) ULTRA LOW VOLUME AEROSOL GENERATORS



ULTRA LOW VOLUME (ULV)

PRINCIPLE OF OPERATION:

The unit consists of either an electric or gasoline/diesel engine that drives a blower. The blower supplies air pressure to the nozzle. The air pressure is adjustable by varying the engine speed. The formulation is delivered to the nozzle by means of a electric pump or vacuum that siphons the formulation from a supply tank. The nozzle typical has several stationary fins which create a swirling effect of the air as it leaves the nozzle. In the center of this exiting swirling air, a liquid supply tube injects formulation supplied by the pump/vacuum that is sheared into extremely small droplets (1-30 μm) and then dispersed into the atmosphere.

(ULV) ADVANTAGES

A benefit of ULV aerosols is that they do not require large amounts of diluents for application and are therefore much cheaper and may be environmentally safer.

The spray plume is nearly invisible, does not create a traffic problem, and may not be perceived as an undesirable function.

The machinery to generate cold aerosols can be much simpler in design and operation than that of thermal foggers.

Electric ULV units are very stealthy and can be used in sensitive areas where noise can be an issue.

(ULV) DISADVANTAGES

Risks associated with ULV aerosols include the problems related to applying any undiluted technical pesticide. The material is being handled and transported in a concentrated form. The droplet spectrum is rather wide (submicron- <40 micron), can be difficult to change and may settle into non-target areas more readily than a dry thermal aerosol.

The cost associated with this equipment (Truck-Mounted Units) can be considerably higher to purchase and maintain.

ULV Equipment requires sophisticated nozzles and, with pneumatic equipment, a great deal of energy input (horsepower) is required to atomize even a small flow of insecticide.

ULTRA LOW VOLUME MARKETS

- Mosquito Control Districts and Professional Pest Control Companies
- Farms, Feed Lots, & Associated Agricultural Applications (Grain Storage)
- Vector (Mosquito) Control on Golf Courses and Driving Ranges
- Bird Control (Hurricane/Cyclone usage in Lumberyards)
- Odor Control (Hotels, Hospitals, Homes, Morgues)
- Disinfectants (Hospitals, Laboratories, Swine/Poultry Houses)
- Small Greenhouses
- Warehouses (Stored Product Pests)
- General Insect Control
- Food Handling Establishments
- Surface Decontamination (Bio-Hazards)
- Mold Remediation
- Air Duct Applications

AGRICULTURE ULV APPLICATION

