

MALATHION is used undiluted in specially designed aircraft or ground equipment capable of applying ultra low volumes for control of the insects indicated below. Aerial applications are most effective when made at a boom height of 5 feet and a swath width of 50 feet. Do not make application when winds exceed 5 mph.

Mist blowers and boom sprayers utilizing a calibrated air flow to facilitate particle size and spray deposition may be used at a vehicle speed of 4 to 10 mph.

Mist blowers with a pump capable of producing up to 40 psi and blower speeds of 2600 rpm are satisfactory. Use flat fan nozzles, 8001 to 8002, placed 30" into an blast or rotary atomizers into the air blast that produce an efficient spray particle with a mass medium diameter of 40 to 100 microns. Swath widths should not exceed 30 feet, and applications should not be made when winds exceed 5 mph.

Boom sprayers with a filtered rotary air compressor, either PTO or gas engine driven or an air pump capable of producing at least 12 psi are satisfactory. Use air pressure on chemical tanks and an accurate metering valve to assure a calibrated flow of the pesticide. Air should be regulated with relief valve and gauge for proper air and liquid mixture. Pneumatic-type spray nozzles, as suggested by equipment manufacturer, should be used for spray particles with mass medium diameter of 30 to 100 microns. Applications should not be made when winds exceed 5 mph.

Repeat applications should be made as necessary unless otherwise specified.

ADULT MOSQUITO CONTROL - DIRECTIONS FOR USE:

(For Ultra Low Volume Aerial Application where automobiles, trailers and pleasure boats are present.)

IMPORTANT

Malathion LV Concentrate is to be used in ultra low volume spraying over cities, towns and other areas where automobiles, trailers and pleasure boats are present.

Apply with aircraft equipped for ultra low volume application. Generally, spraying should not be attempted when the wind is at or above 10 mph or temperatures are above 82° F.

Spray droplets of this product undiluted will permanently damage automobile paint unless all of the following conditions are met:

1. Aircraft is operated at 150 mph or more.
2. There are no leaks in the ultra low volume spray system.
3. Nozzles are placed on the boom at a 45° angle down and into the wind.
4. Diaphragm check valves are used on all nozzles to insure positive cut-off of the spray.
5. Dosage of the product does not exceed 3.2 fluid ounces per acre (40 acres per gallon).
6. The spray system produces droplets of this product in the 50 to 60 mass median diameter (MMD) micron range, with no more than 10% of the droplets exceeding 100 microns, as determined by readings made from microscope slides coated with Dr-Film.

This use is restricted to professional mosquito control personnel who have the experience, knowledge and equipment necessary to follow the highly technical and specific instructions which follow. If these requirements cannot be met, do not use those products for nonthermal aerosol LV application.

To be applied only by trained personnel of mosquito abatement districts or pest control operators.

DIRECTIONS FOR USE

Adult Mosquito Control - For control of adult mosquitoes over a 300-foot swath with nonthermal aerosols of MALATHION using the ultra low-volume method, use the following (low rates at the indicated truck speeds):

Truck Speed	Flow Rate of MALATHION Miles per Hour	Fluid Ounces per Minute
5	1 to 1.5 fluid ounces	
10	2 to 3 fluid ounces	

Flow rate must be constantly monitored by the operator to maintain uniform control of discharge rate.

IMPORTANT - Undiluted spray droplets of MALATHION will permanently damage automobile paint unless these specific instructions are followed:

DROPLET SIZE

1. Spray droplets must not be less than 5 microns in size as the smaller droplets do not impinge readily on adult mosquitoes.
2. Spray droplets must not exceed the range of 23 to 27 microns in size as larger droplets, when transported by natural air currents, impinge more readily on objects in their pathway and will permanently damage automobile paint.
3. More than one-half of the total spray must consist of droplets in the 5 to 15 micron range to achieve adequate disposal of insecticide over a 300-foot swath.

4. A minimum of two-thirds, preferably four-fifths, of the total spray must consist of droplets not exceeding 20 microns in range.
5. The mass median diameter (MMD) of the droplets should not exceed 14 microns. The MMD is the drop diameter which divides the spray volume into two equal parts; i.e. 50% of the volume is in the drop size below the MMD and 50% is above the MMD.

6. The average diameter of the droplets should not exceed 12 microns.

OPERATING EQUIPMENT

1. The Ultra Low Volume cold aerosol nozzle for dispersal of MALATHION to control adult mosquitoes must have the minimum capability of producing the droplet spectrum described under Droplet Size.

2. Tank Pressure - not less than 3 to 3.5 psi.

3. No insecticide pump is necessary with the ULV system.

4. Flow Rate - must be regulated by accurate flow meter - not greater than 3 fluid ounces per minute.

5. Nozzle Direction - rear of the truck - upward at an angle of 45° or more.

6. Vehicle speed - not greater than 10 miles per hour - shut off spray equipment when vehicle is stopped.

Directions for determining the droplet size of Malathion Ultra Low Volume nonthermal aerosols

Droplet size should be determined as frequently as necessary to insure that proper droplet size is being produced. Because of the ease of this technique, no guidelines exist as to how frequently droplet size should be rechecked. Until such guidelines can be developed by experience, we suggest droplet size determinations be made every time the

unit is installed on a vehicle, following any accident and in any event after every 50 hours of operation in the case of commercially manufactured units and more frequently in the case of other units. Equipment manufacturer instructions setting forth cleaning and maintenance procedures must also be completed and records of each droplet size determination must be kept and made available to American Cyanamid upon request.

I. Preparation of Slides

MALATHION droplet sizes are determined by depositing a sample of the aerosol on a coated glass slide and measuring the droplets under a high-power microscope. Ordinary 3 x 1 1/2 inch glass slides must be coated with a thin layer of Dr-Film. The slides are then subjected to sampling to prevent evaporation or coalescence of the droplets. The slides are dipped into a 10 percent solution of Dr-Film in toluene, drained and dried at about 200°F. for 30 minutes, after which they are dipped in acetone, allowed to dry and stored in a tight slide box. Coating solution must be freshly prepared. Do not store coating solution because it will become unusable. Slides must be kept in airtight slide box before using to remove any foreign particles.

II. Deposition of MALATHION Droplets on Slides

Droplets should be collected under ideal operating conditions to insure representative sampling of droplets in the aerosol. A sample of the MALATHION aerosol is deposited on a slide by waving the slide as rapidly as possible perpendicular through the aerosol cloud at a distance of 25 feet from the point of discharge. The slide velocity may be increased by attaching a clip. At least two slides should be exposed to insure an adequate sample. Store slides in a tight slide box for transfer to a location where measurements can be made. Avoid excessive heat during transit and store in a cool place until measurements can be made.

Although label specifications require the aerosol nozzle to be angled upward at 45° or more during operation, it is more convenient to position the nozzle parallel to the ground when making a measurement. If this is not possible it will be necessary to be positioned at a sufficient height to obtain a representative sample of the aerosol.

III. Determination of MALATHION Droplet Sizes

A microscope with mechanical stage and an eyepiece micrometer are used to determine the size of the individual aerosol droplets. Prior to taking measurements, the divisions of the eyepiece micrometer must be calibrated to microns by means of a stage micrometer. The slides are placed on the stage and the droplets are measured at 400x magnification. At that magnification each division of the eyepiece was calibrated to equal 3.5 microns.

At least 200 droplets should be measured. Usually this is easily accomplished on one slide. An accurate method is to measure all droplets that pass through the eyepiece field as the slide is moved from one edge to the other. The slides are measured in the same manner. Measurements should not be taken along the margins of the slides. It is more convenient to measure in terms of the divisions of the eyepiece micrometer and then convert these divisions into microns.

The measurements converted into microns must then be corrected for the amount of spread that occurred during the measurement. The slides are coated with silicone coated slides at 0.5. Therefore, in Table 1 each division of the eyepiece actually equals 1.75 microns (3.5 microns times the 0.5 spread factor). The measurements are tabulated and processed as in Table 1. The Maximum Diameter is calculated by converting the diameter of the largest droplet measured into microns. In Table 1, the largest droplet measured was 19 divisions. 19 x 1.75 = 33.3 microns. Therefore, the Maximum Diameter is 33.3 microns (19 x 1.75 = 33.3).

To determine the Mass Median Diameter (MMD), the accumulative percentages from the last column in Table 1 are plotted against the eyepiece divisions (D) on arithmetic probability paper as in Figure 1. Directly across from the 50 percent point on the line is the mass median diameter. In Figure 1, the mass median diameter is converted to microns. In Figure 1, 9.2 eyepiece divisions times the conversion factor of 1.75 equals a Mass Median Diameter of 16.1 microns.

Table 1

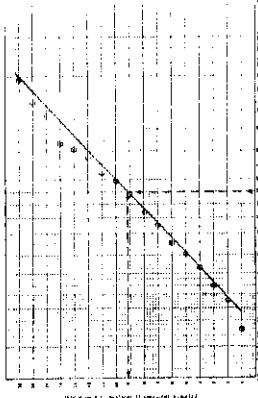
Representative Count of Malathion ULV Concentrate Aerosol Droplets Impinged on Microscope Slides.

Eyepiece Divisions (D)	Number of Droplets (N)	% of Total D.N.	Accumulative % Percentages
1	5	0.31	0.31
2	10	0.62	1.33
3	9	0.56	1.89
4	12	0.75	2.64
5	15	0.94	3.58
6	12	0.75	4.33
7	25	1.56	5.89
8	14	0.88	6.77
9	28	1.75	8.52
10	19	1.18	9.70
11	14	0.88	10.58
12	10	0.62	11.20
13	6	0.38	11.58
14	4	0.25	11.83
15	11	0.68	12.51
16	2	0.13	12.64
17	2	0.13	12.77
18	2	0.13	12.90
19	1	0.06	12.96
Total	199	100	

* Measurements were taken at 400x magnification. Each eyepiece division equals 1.75 microns (3.5 microns times the 0.5 spread factor).

Figure 1.

Percentage of the total volume of aerosol samples below each stated droplet size (from Table 1). The Mass Median Diameter is determined from the 50 percent point on the line. The Mass Median Diameter (MMD) 9.2 divisions times 1.75 = 16.1 microns.



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