

MICRONAIR AERIAL SPRAY EQUIPMENT FOR ENVIRONMENTAL HEALTH



MICRONAIR

**CONTROLLED
DROPLET
APPLICATION
USING
ROTARY ATOMISERS**

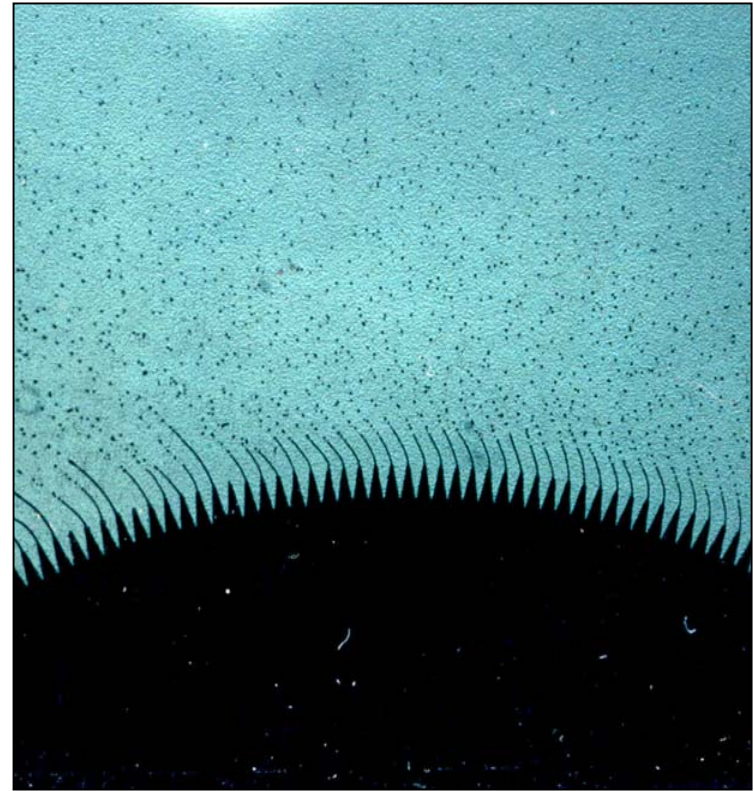
Controlled Droplet Application (CDA)

- Rotary atomisers produce the narrow, controlled spectrum of spray droplet sizes necessary for the effective application of insecticides and larvicides used in environmental health (EH) spraying
- The droplet size is adjusted by varying the rotational speed of the atomiser

Production of Spray Droplets



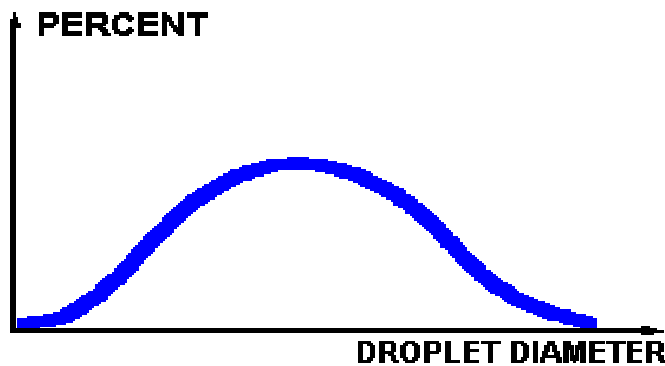
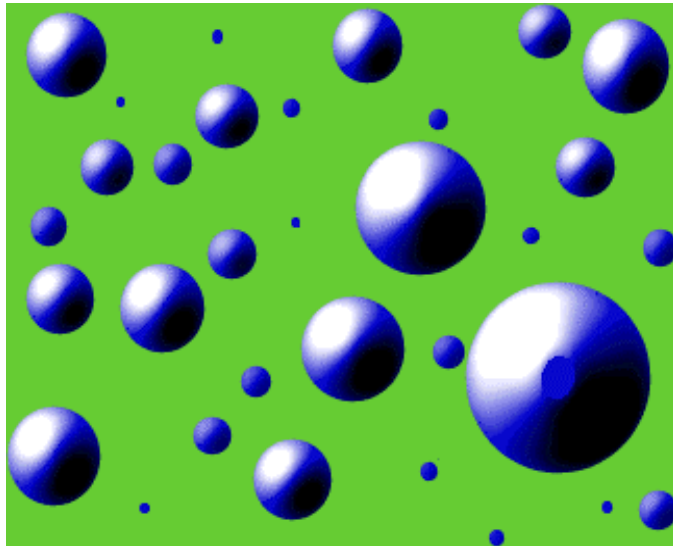
Flat fan pressure nozzle



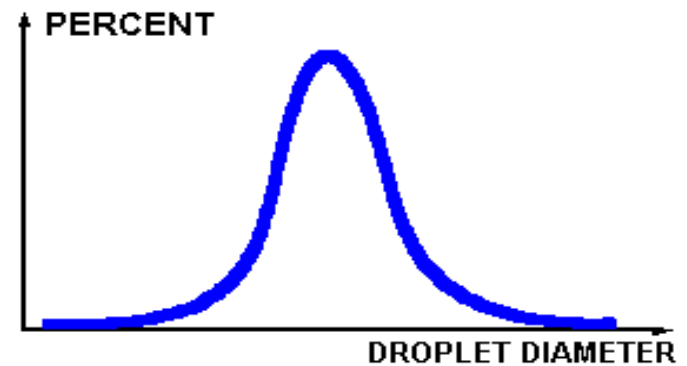
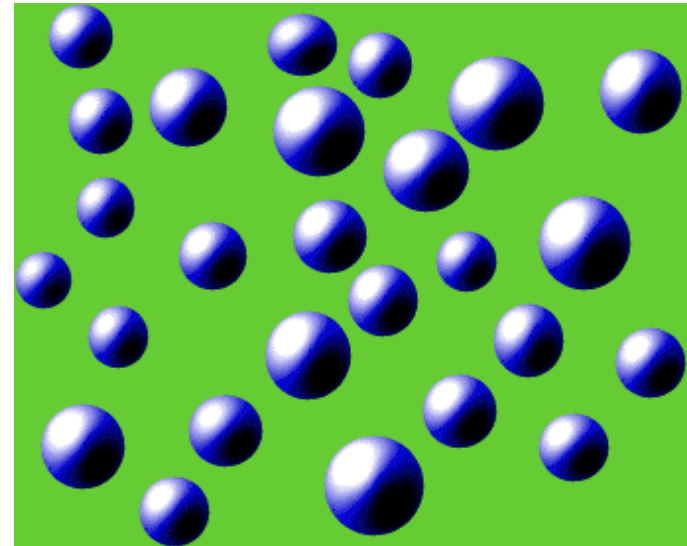
Rotary atomiser

Comparison of Spray Droplets

From standard nozzle

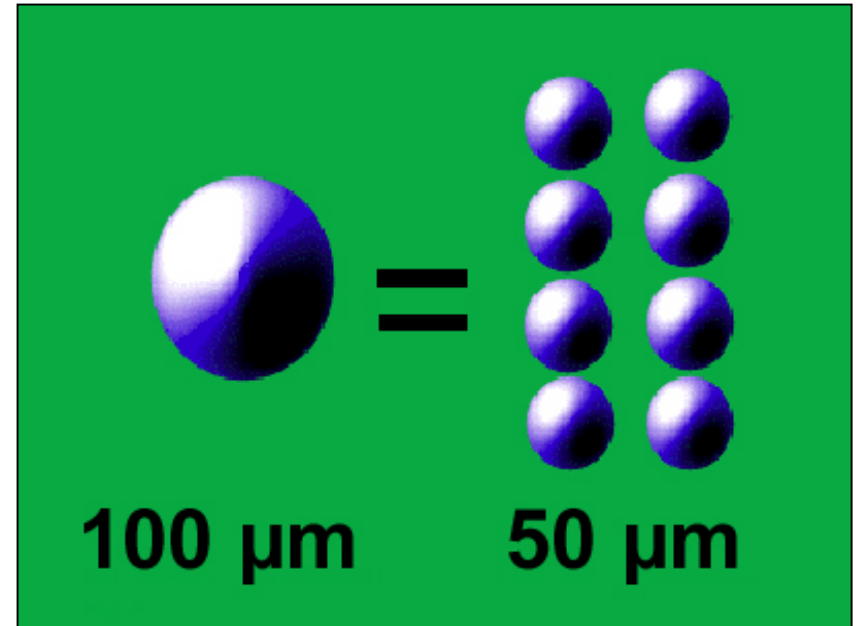


From Micronair Atomiser



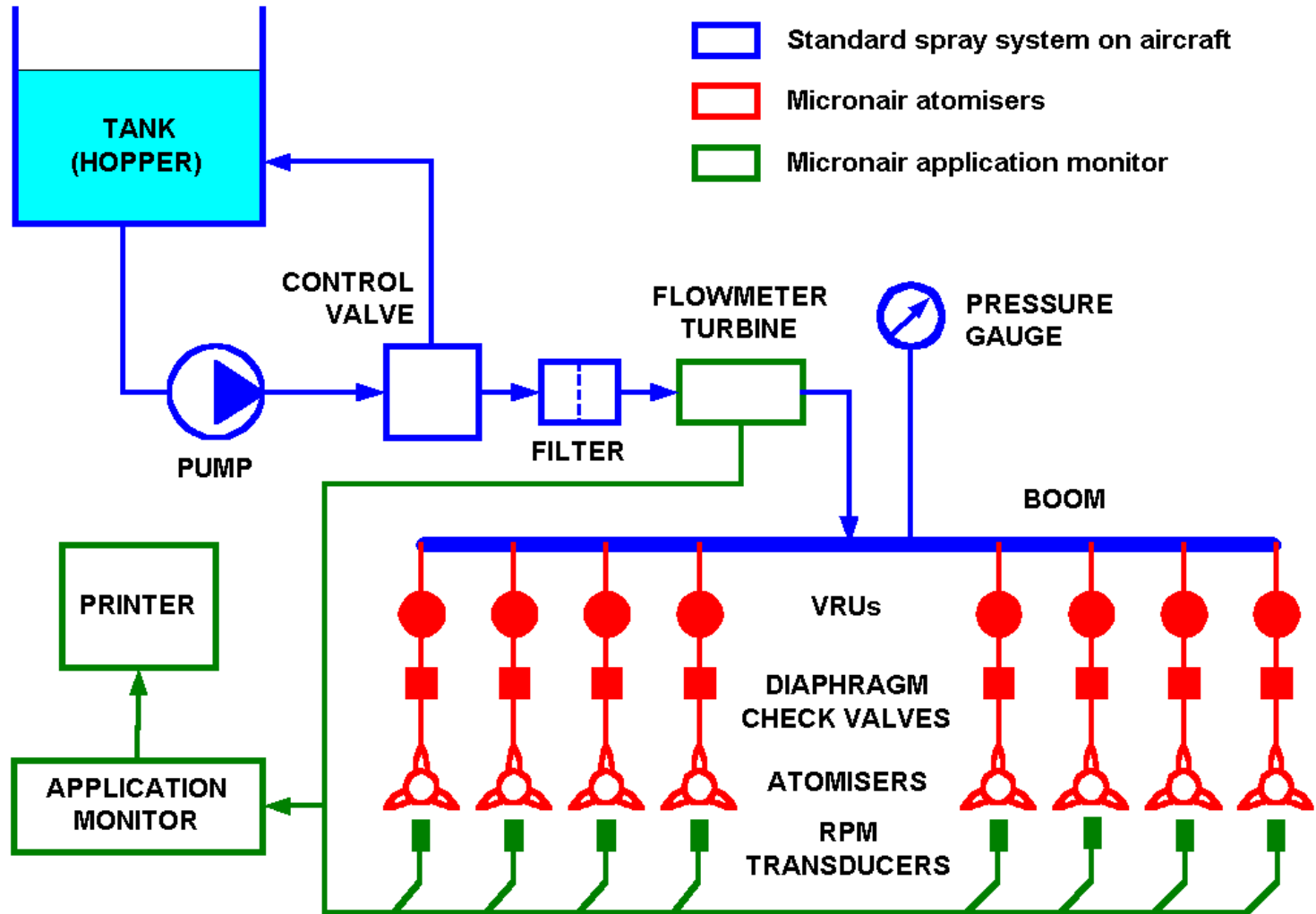
Droplet Size & Number

- The volume of a spray droplet is proportional to the cube of its diameter
- Halving the diameter produces 8x the number of droplets from the same amount of spray liquid
- Large droplets will settle quickly



EQUIPMENT

Typical Spray System



Micronair Atomisers for EH Spraying

AU4000

- Designed specifically for continuous use at high speeds to produce small droplets

AU5000

- Widely used on agricultural aircraft & helicopters
- Can be used when a dedicated EH spray aircraft is not available

AU6539

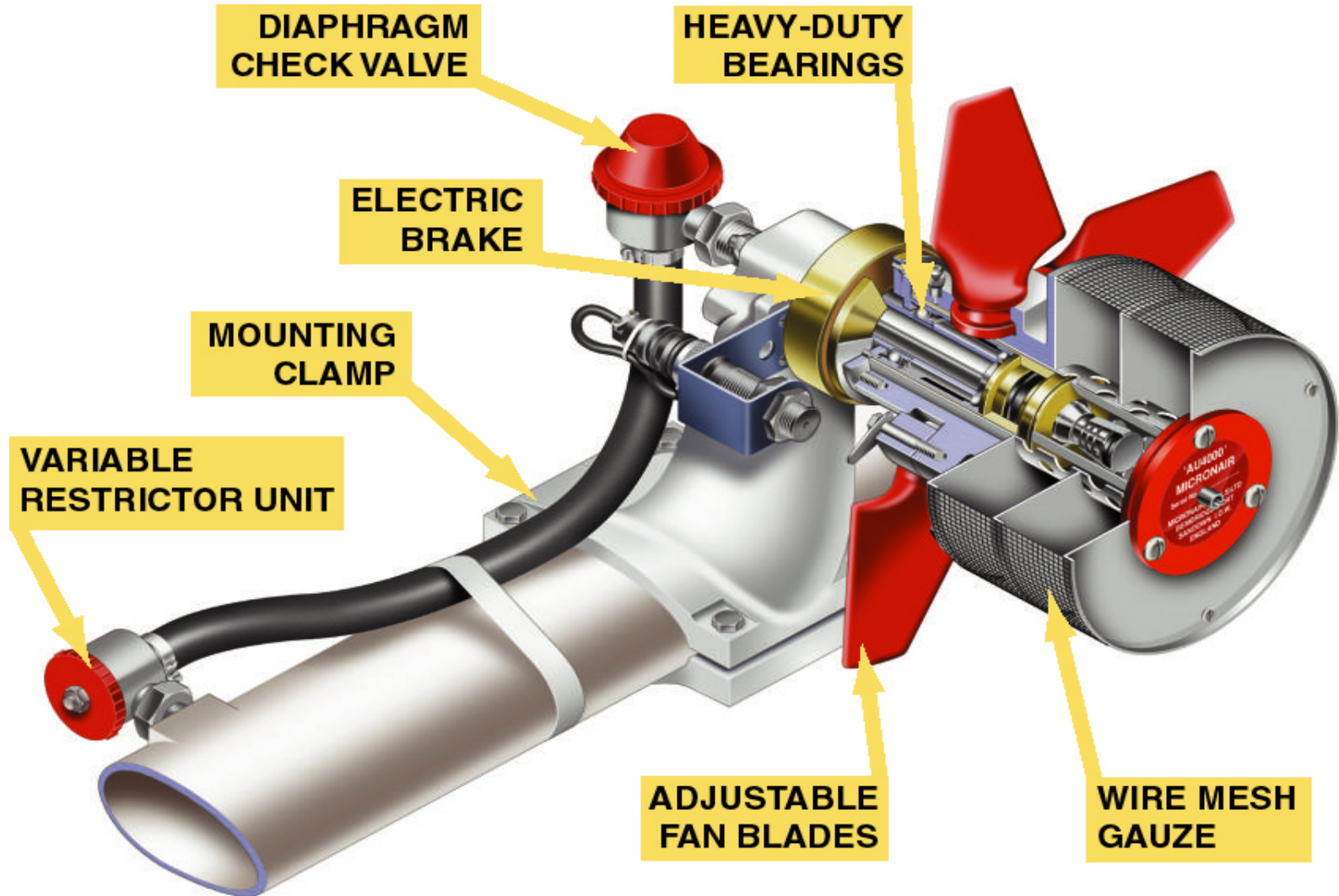
- Electrically driven atomiser for use on helicopters

AU4000 Atomiser

- Wind driven
- Narrow droplet spectrum
- Variable pitch blades to control rotational speed & droplet size
- Designed for continuous operation at high speed
- Electric brake to stop atomiser when not in use



Micronair AU4000 Atomiser



AU4000 Atomisers

Mosquito Control in Turkey

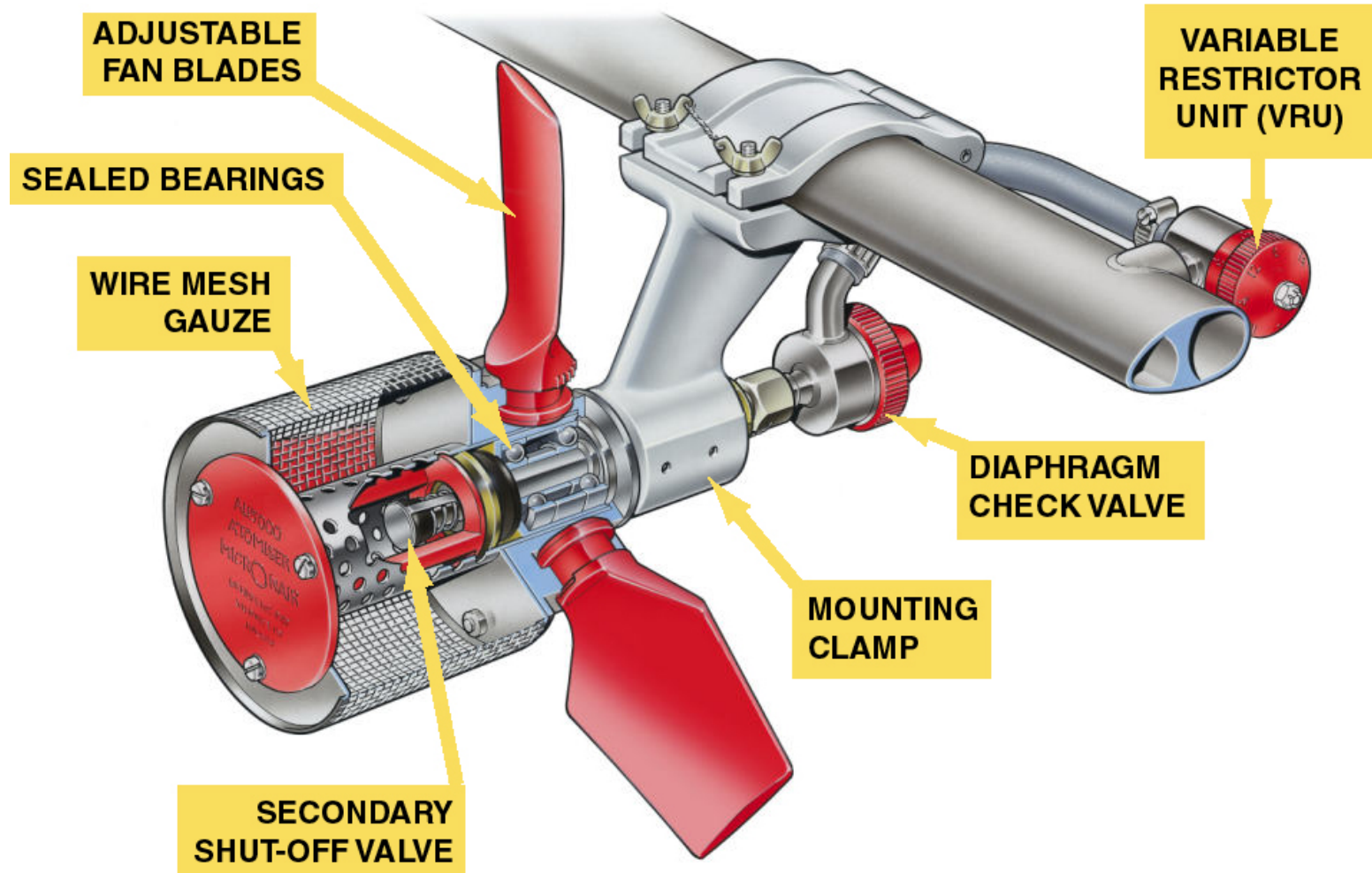


AU5000 Atomiser

- Wind driven
- Narrow droplet spectrum
- Variable pitch blades to control rotational speed & droplet size
- Mounted on standard booms
- Can be used on helicopters



Micronair AU5000 Atomiser



AU5000 Atomisers Fly Control in Australia



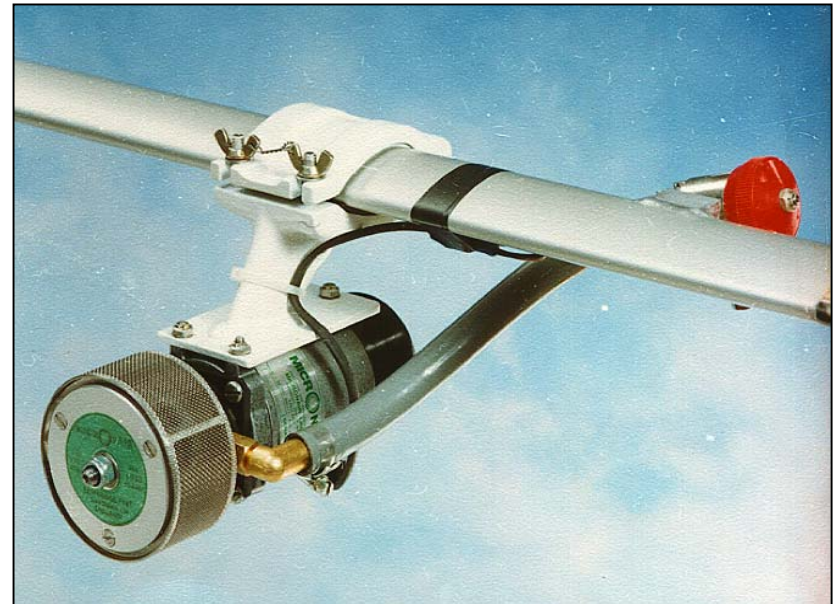
AU5000 Atomisers

Mosquito Control in Gulf Region



AU6539 Electric Atomiser

- Driven by DC electric motor
- Speed and droplet size adjustable by controller in cockpit
- Narrow droplet spectrum independent of airspeed
- Mounted on standard spray booms

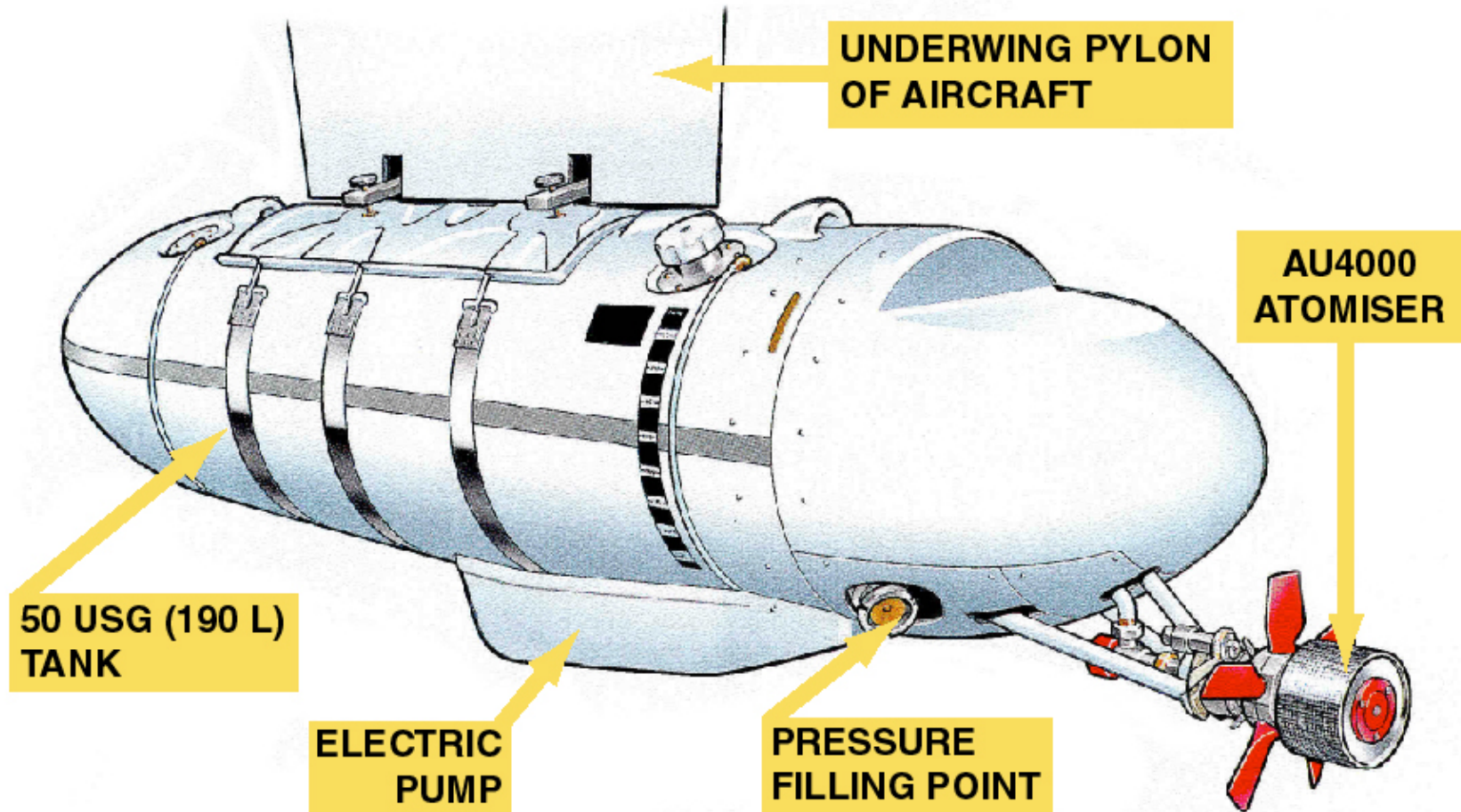


Spray Pod System

- Used on high-wing utility aircraft (eg BN-2 Islander)
- Completely self-contained
- Capacity of each pod 50 USG (190 l)
- Fitted with AU4000 atomiser
- Control panel in cockpit



Micronair Spray Pod



Spray Pod on BN-2 Islander



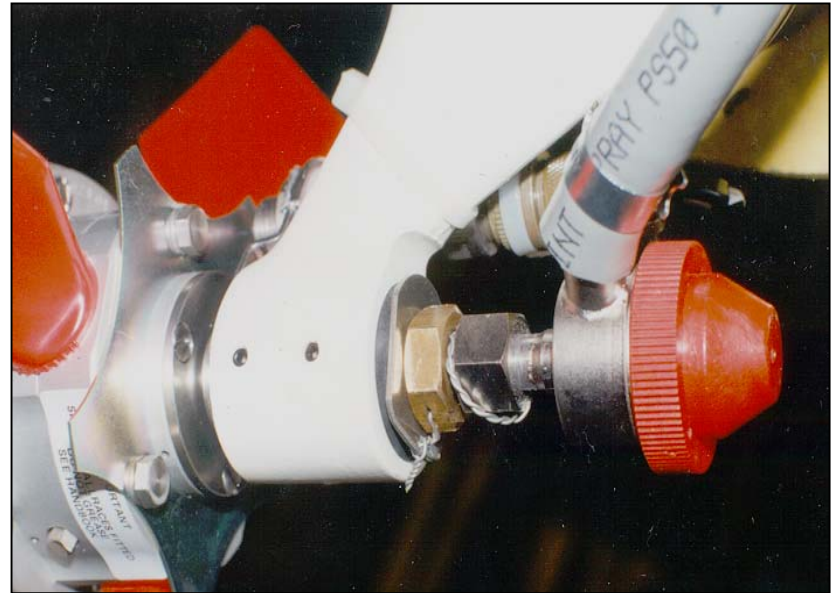
Spray Pod Control Panel



ACCESSORIES

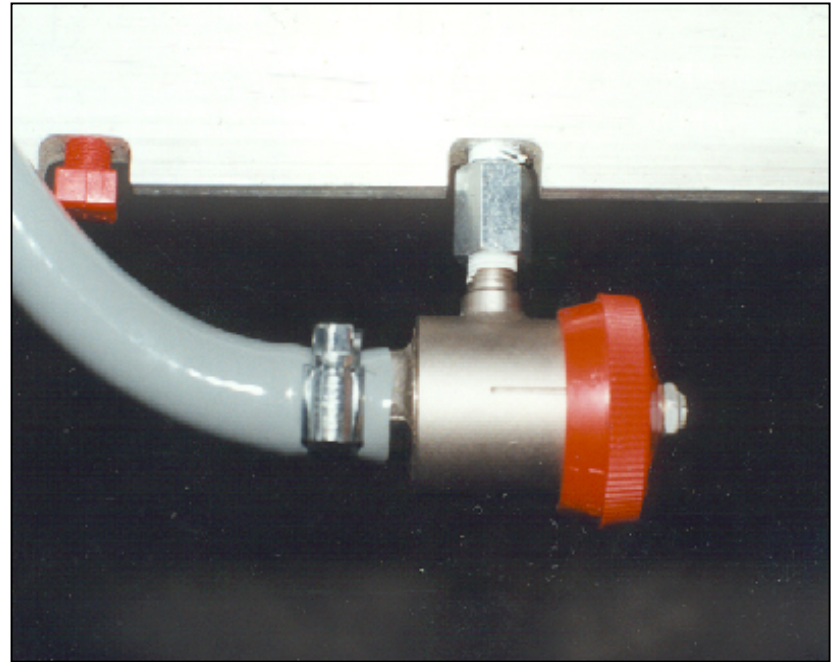
Diaphragm Check Valve

- Prevents leakage of spray liquid when atomiser is not operating
- Opens when control valve is opened and pressure in boom increases
- Installed on atomiser



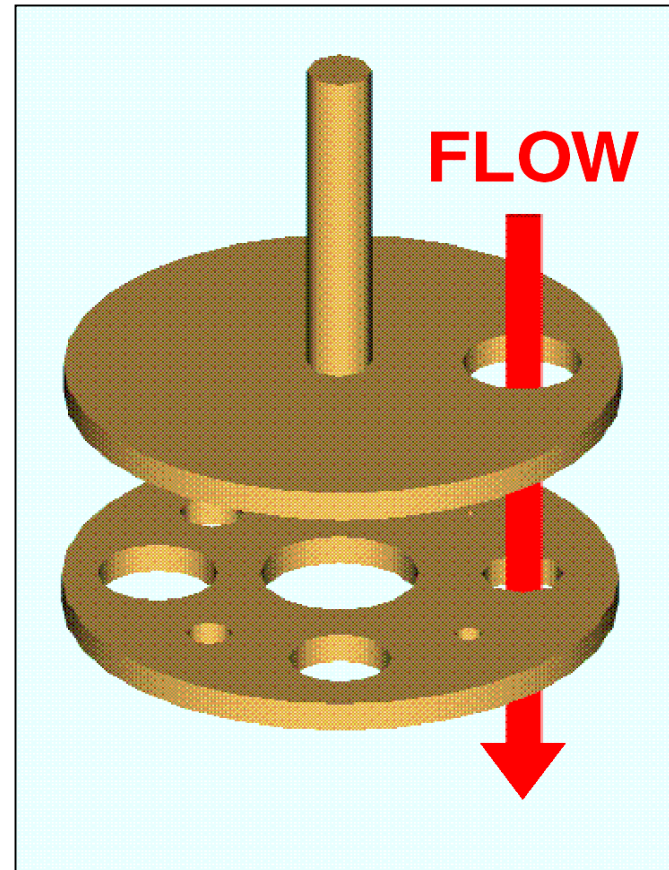
Variable Restrictor Unit (VRU)

- One VRU used with each atomiser
- Regulates flow rate to atomiser
- Installed on spray boom
- Adjusted on ground



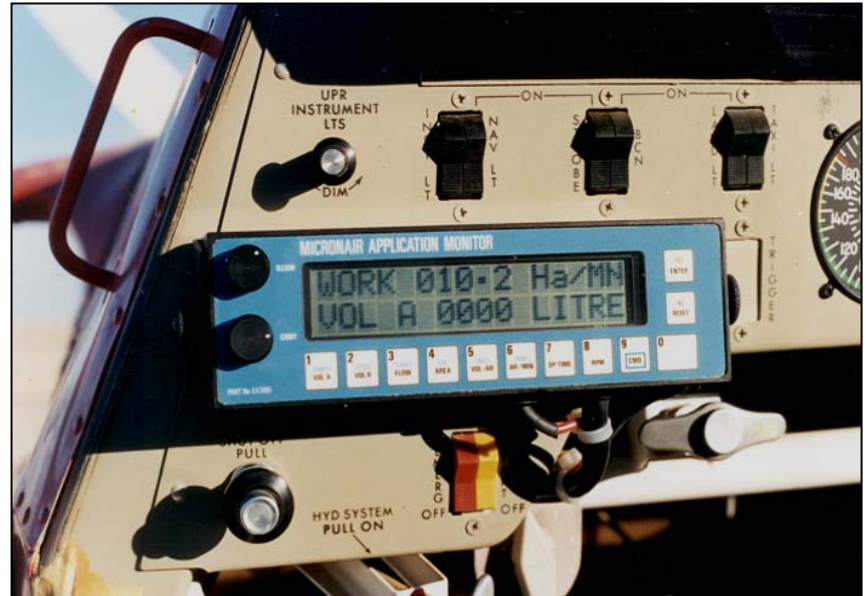
Variable Restrictor Plates

- Fixed restrictor plate drilled with 7 different size holes
- Rotating selector plate exposes one hole in restrictor plate
- Selector plate rotated by knob on VRU



Application Monitor

- Measures flow rate of spray liquid from aircraft with turbine in pipe to booms
- Displays flow and application data
- Measures atomiser rotational speed
- Installed in cockpit

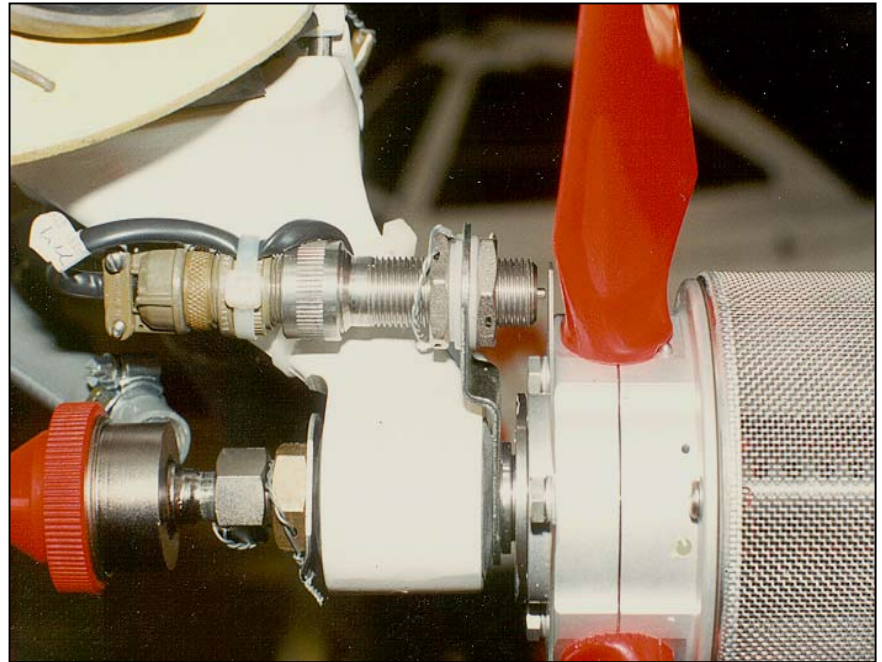


Application Monitor Functions

- Flow rate from aircraft (Litres/Minute)
- Volume sprayed (Litres)
- Application Rate (Litres/Hectare)
- Area sprayed (Hectares)
- Spray time (Minutes : Seconds)
- Work rate (Hectares/Minute)
- Atomiser RPM

Atomiser RPM Indicator

- Measures speed of each atomiser (max 10 units)
- Allows all atomisers to be adjusted to rotate at same speed
- Magnetic transducer installed on each atomiser



Application Printer

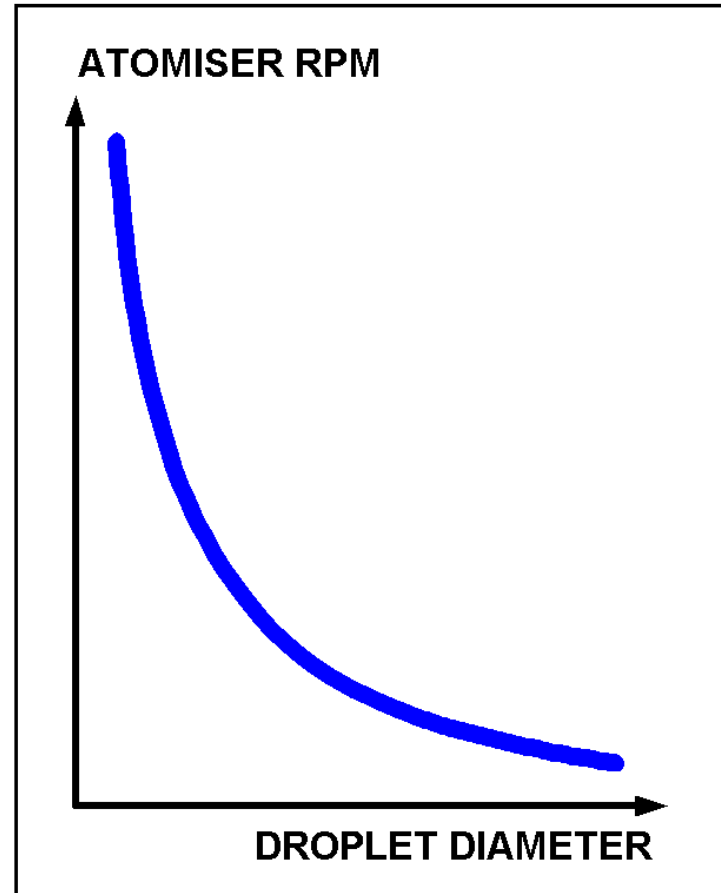
- Prints data from application monitor
- Provides permanent record of each spray job
- Installed in cockpit of aircraft



CALIBRATION

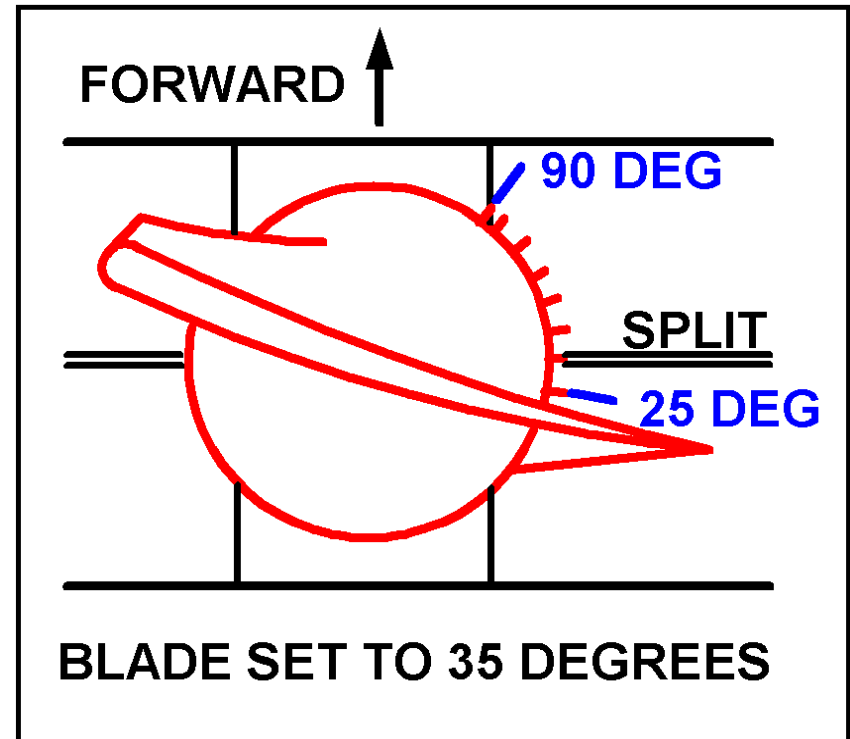
Adjustment of Droplet Size

- Droplet size is determined by rotational speed (RPM) of atomiser
- Increasing RPM reduces droplet size
- RPM is controlled by atomiser fan blade angle



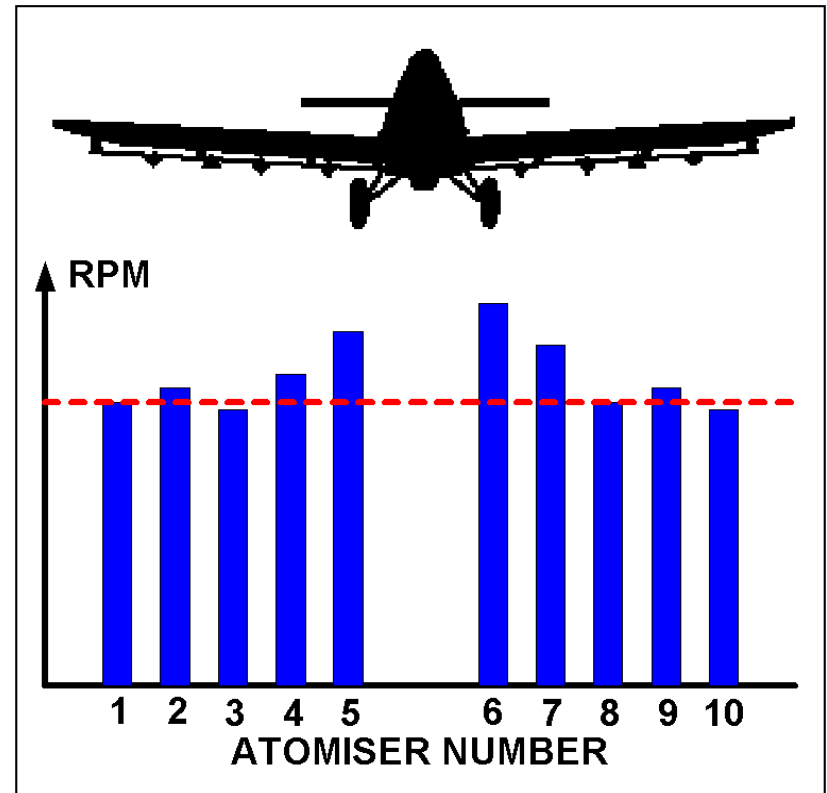
Adjustment of Atomiser RPM

- Atomiser fan blades must be adjusted on ground before flight
- Reducing blade angle increases atomiser RPM and produces smaller droplets
- Atomisers must not exceed 10,000 RPM continuous speed



Variation in Atomiser RPM

- Some atomisers can rotate faster than others because of:
 - Effect of propeller
 - Effect of fuselage
- RPM indicator can assist adjustment of all atomisers to rotate at correct speed



Coverage of Aircraft

The coverage of an aircraft whilst spraying depends upon:

- Track Spacing
- Ground Speed

$$\text{COVERAGE (Ha/Min)} = \frac{\text{TRACK SPACING (m)} \times \text{SPEED (Km/Hr)}}{600}$$

Example:

Track = 50 m

Speed = 160 Km/Hr

$$\begin{aligned} \text{COVERAGE} &= \frac{50 \times 160}{600} \\ &= 13.3 \text{ Ha/Min} \end{aligned}$$

Output from Aircraft

- Output from aircraft depends upon:
 - Coverage of aircraft (Ha/Min)
 - Required application Rate (L/Ha)
- Output is set by adjusting VRUs and boom pressure

**OUTPUT FROM AIRCRAFT (L/Min) =
COVERAGE (Ha/Min) x APP RATE (L/Ha)**

Example:

**Coverage = 13.33 Ha/Min
Application Rate = 5 L/Ha**

**OUTPUT FROM A/C = 13.33 x 5
= 66.7 L/Min**

Adjustment of VRUs

- VRUs must be adjusted to give correct output from each atomiser
- VRUs have setting numbers 1, 3, 5 ... 13
- Higher numbers give higher outputs
- All VRUs should be set to the same number

$$\text{OUTPUT FROM EACH VRU (L/Min)} = \frac{\text{OUTPUT FROM AIRCRAFT (L/Min)}}{\text{NUMBER OF ATOMISERS}}$$

Example:

$$\begin{aligned} \text{Output from a/c} &= 66.7 \text{ L/Min} \\ \text{Number of atomisers} &= 10 \end{aligned}$$

$$\begin{aligned} \text{OUTPUT FROM VRU} &= \frac{66.7}{10} \\ &= 6.67 \text{ L/Min} \end{aligned}$$

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