

# New Developments in Rotary Atomiser Technology to Improve Drift Control.

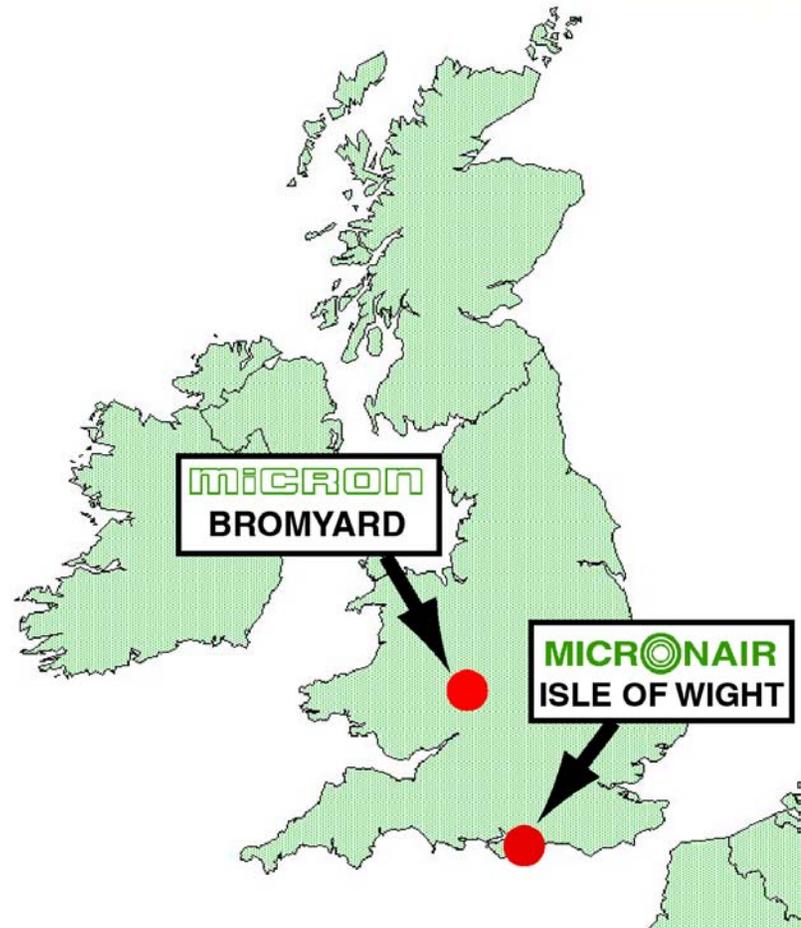
**John Clayton & Tim Sander**

Micron Sprayers Ltd, Bromyard, Herefordshire, England



# Micron Sprayers Limited

- UK based and owned
- Pioneer of CDA using rotary atomisers
- 50 employees
- Sales to over 90 countries
- Micronair Division on Isle of Wight



**SALVUCCI**  
Aviación

RESTRINGIDO  
RESTRICTED

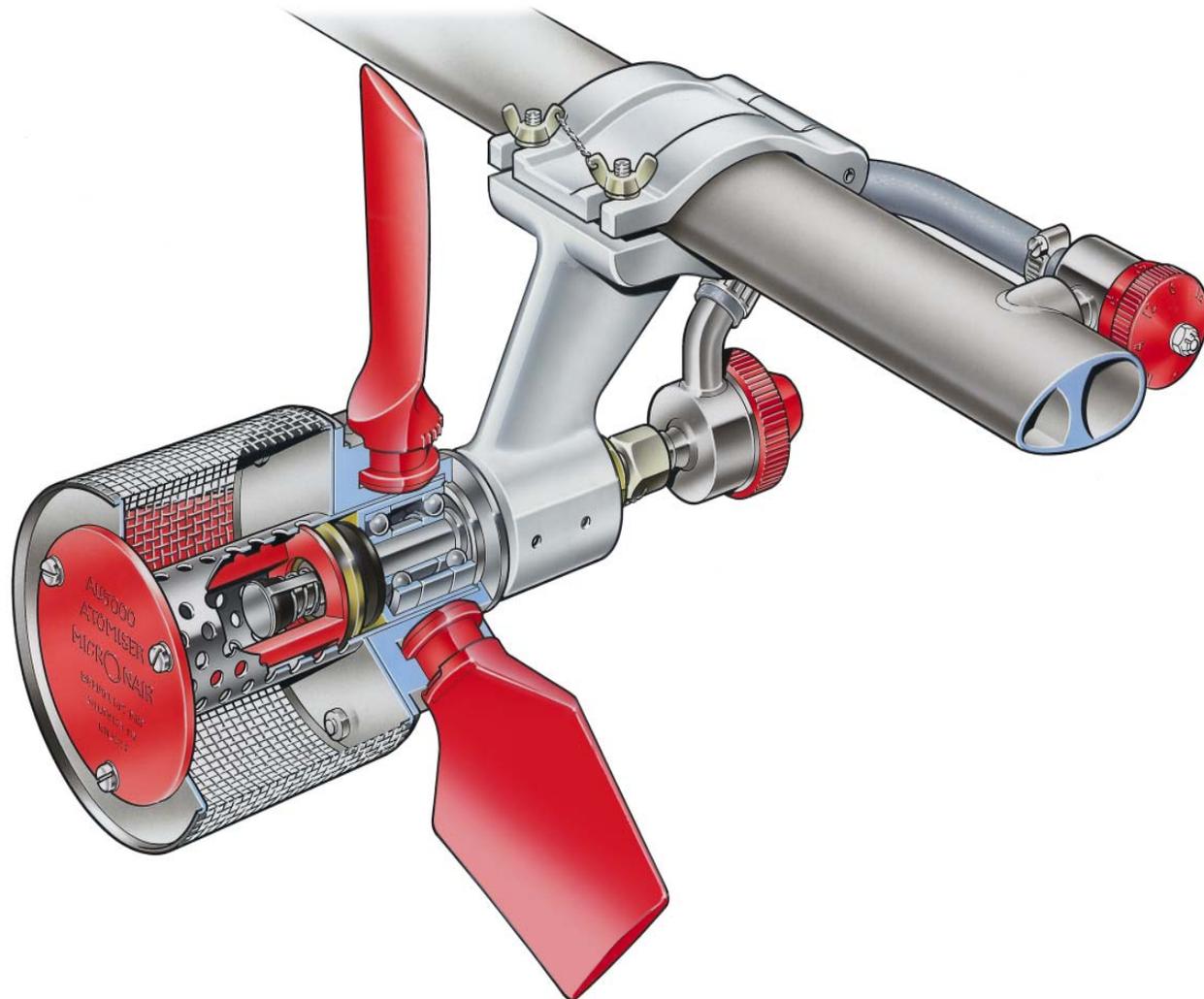
SATLOC  
GPS EQUIPPED

LV-ZIA





# Micronair AU5000 Atomiser



MICRONAIR

# Standard Micronair AU5000

- many 1000's of units in use world wide
- Operating range typically 30 - 200um VMD
- suitable for ULV or LV application
- applications in public health, forestry, migrant pest control, plantations, cereals, row crops
- not suitable for large droplet placement (LDP) with turbine aircraft e.g. 250um VMD

# Micronair AU5000LD Atomiser

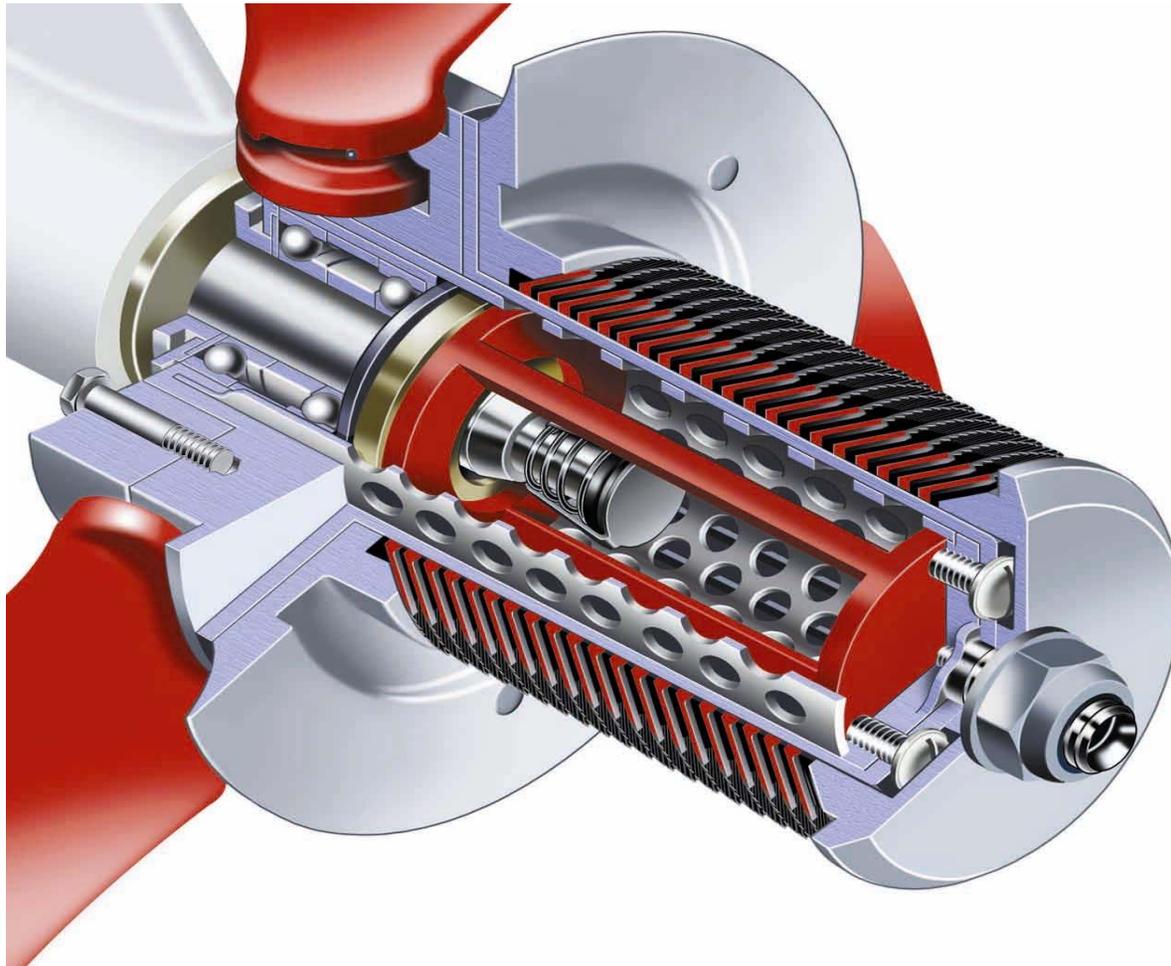
## Design Objectives:

- To produce spray droplets large enough LDP application to minimise off-target drift
- To produce these droplets within a narrow spectrum of sizes
- To work effectively over a wide range of airspeeds – from helicopters to fast turbine aircraft
- To be compatible with existing AU5000 atomisers

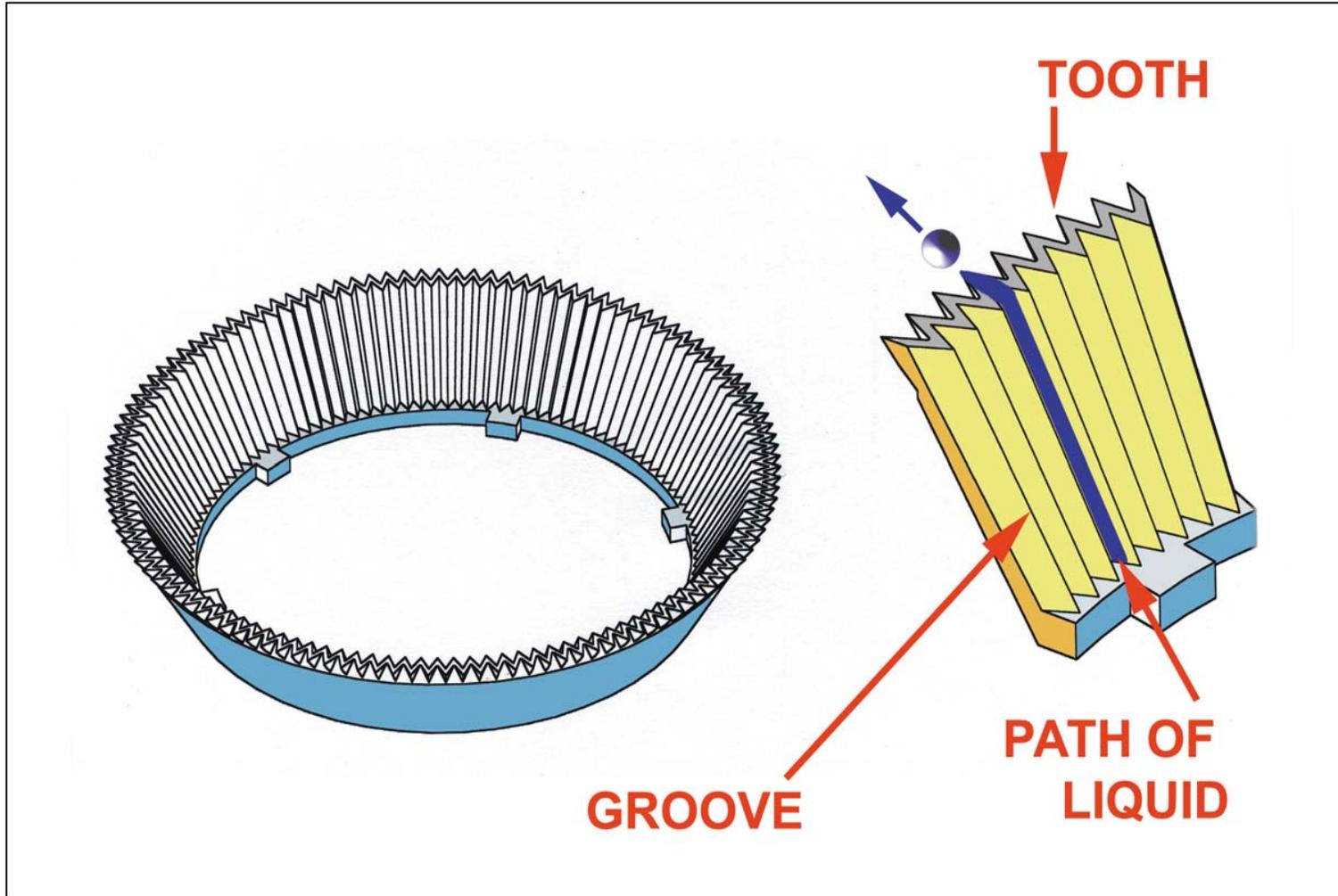
# AU5000LD Conversion Kit



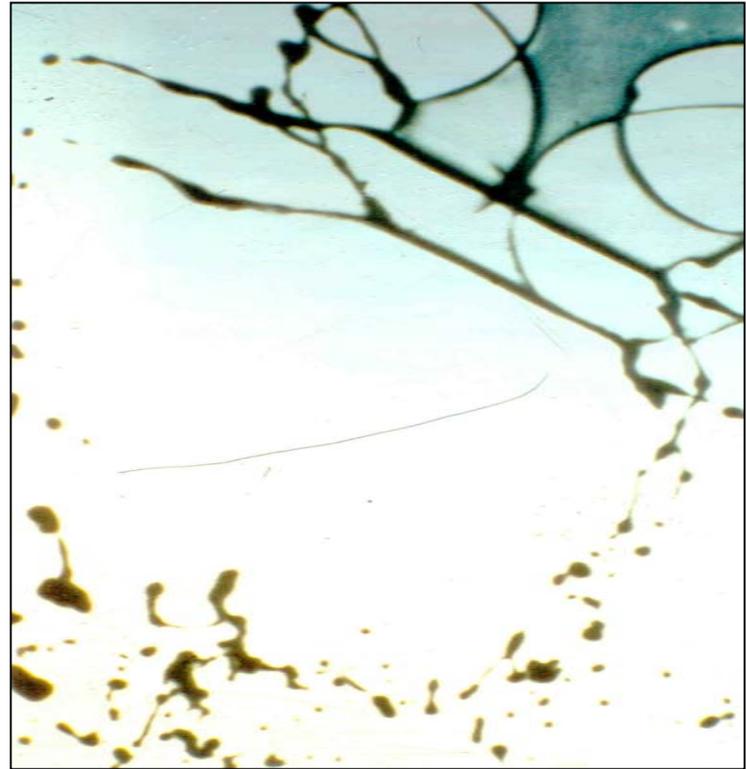
## Cross Section of AU5000LD Atomiser Assembly



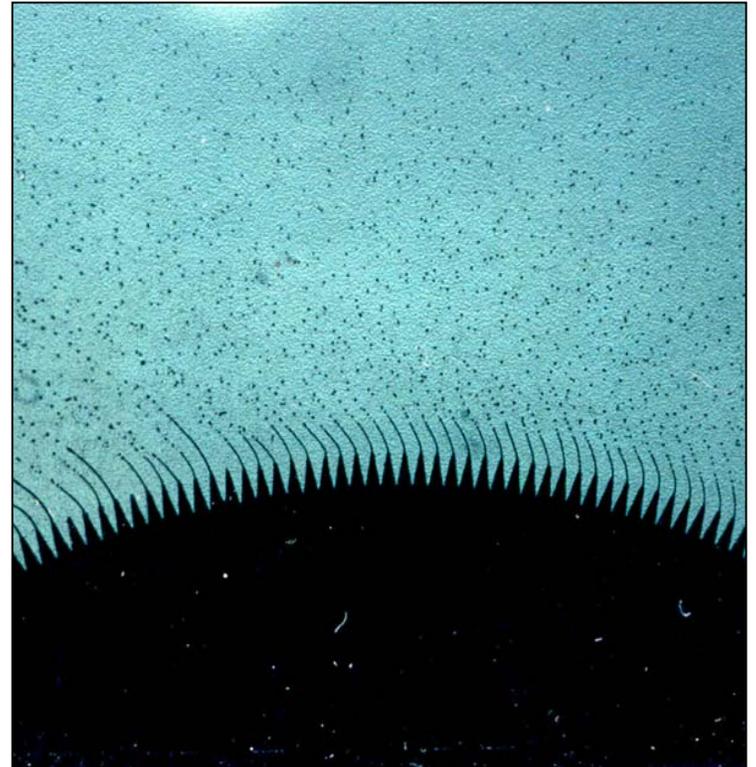
# AU5000LD Disc

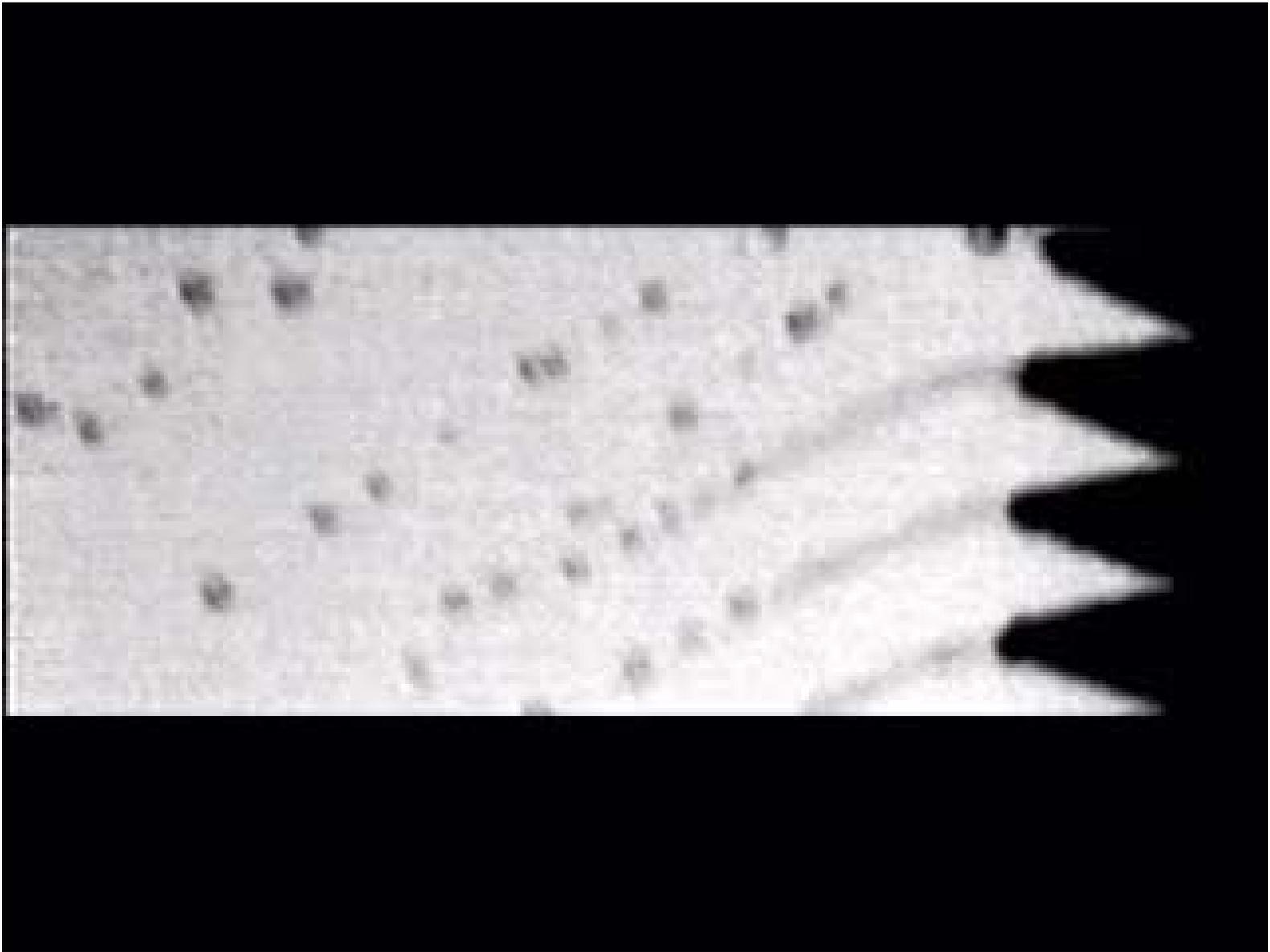


# Hydraulic Pressure nozzle

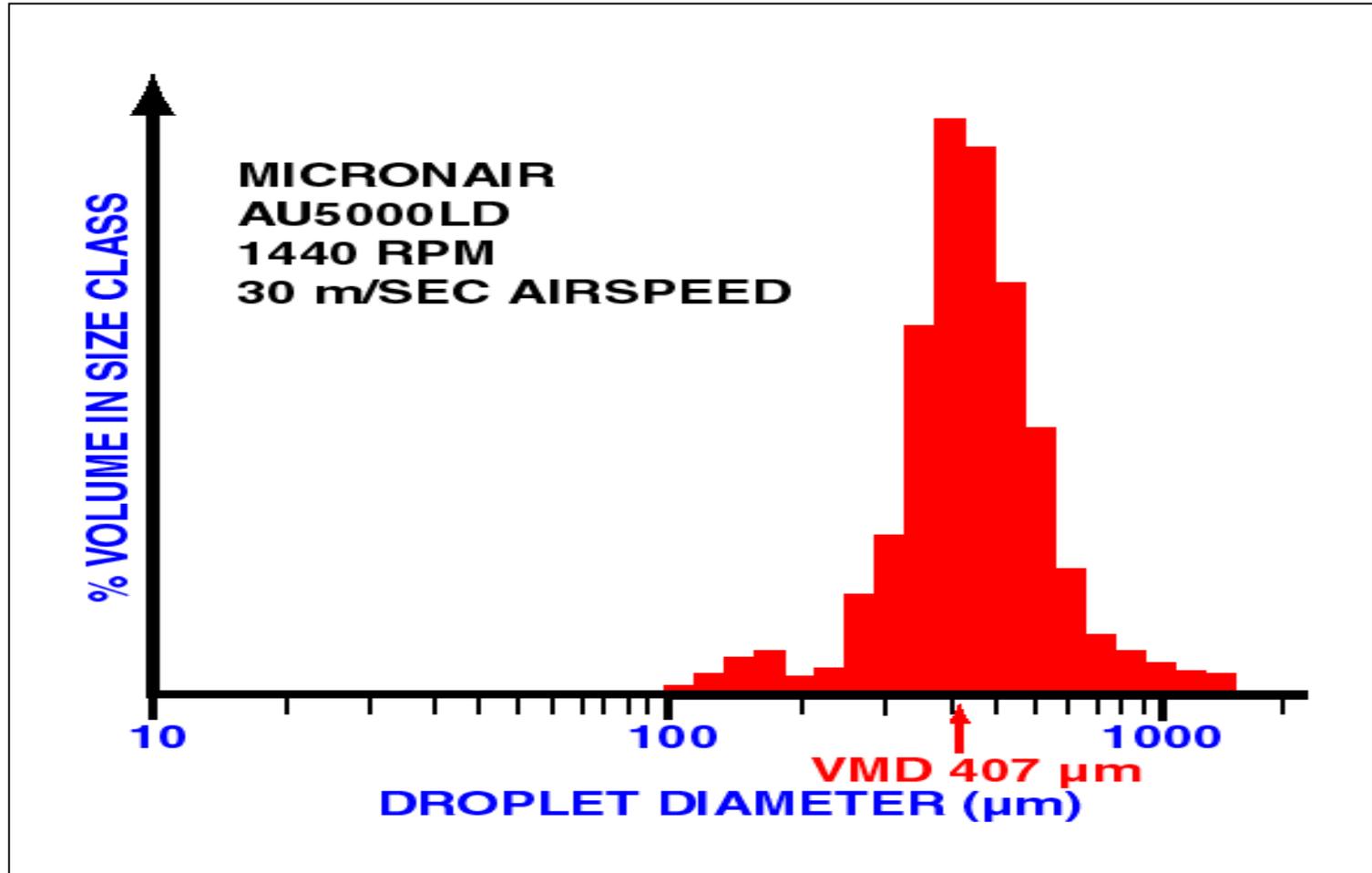


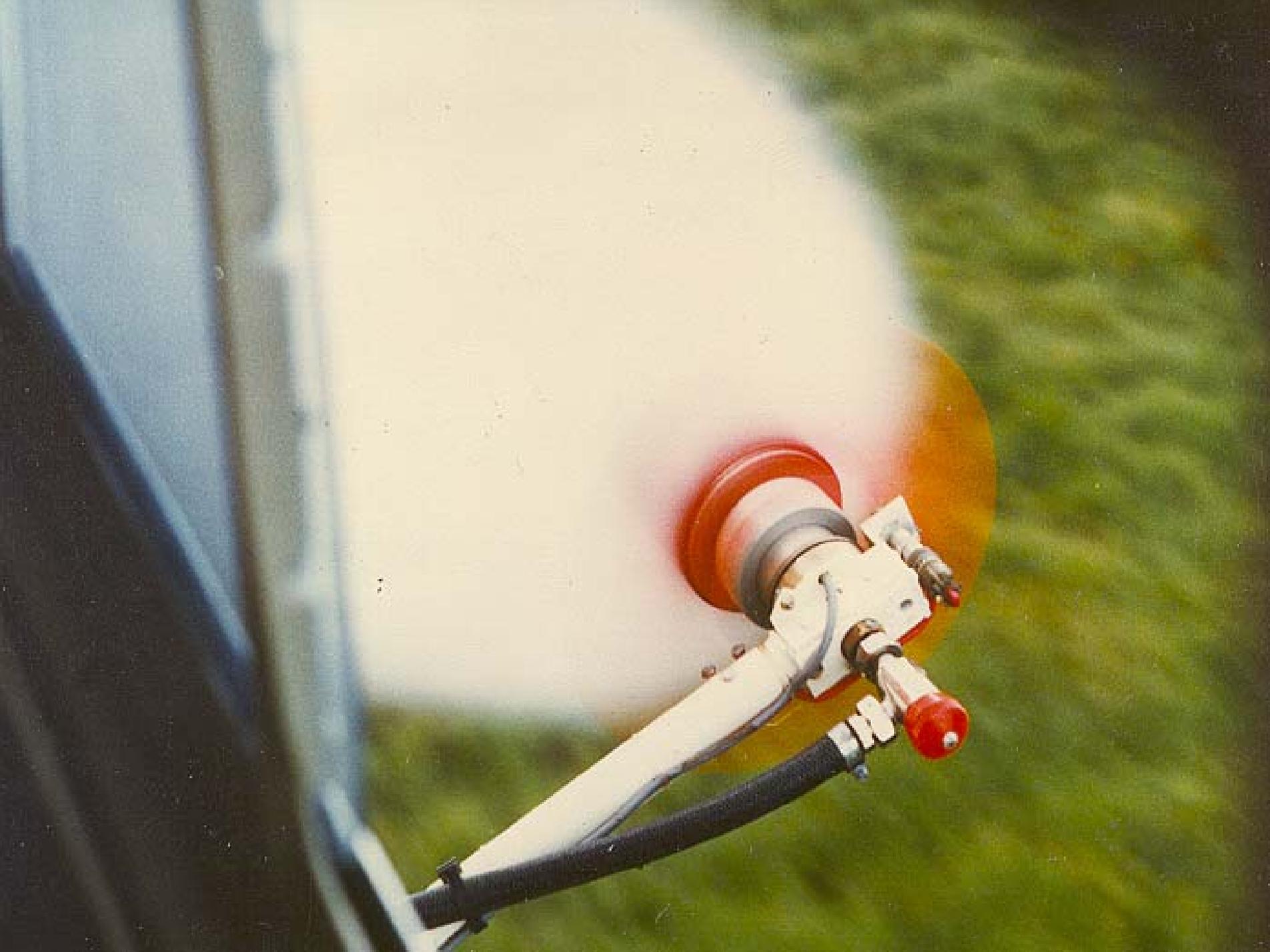
# Rotary Atomisation





# Droplet Spectra



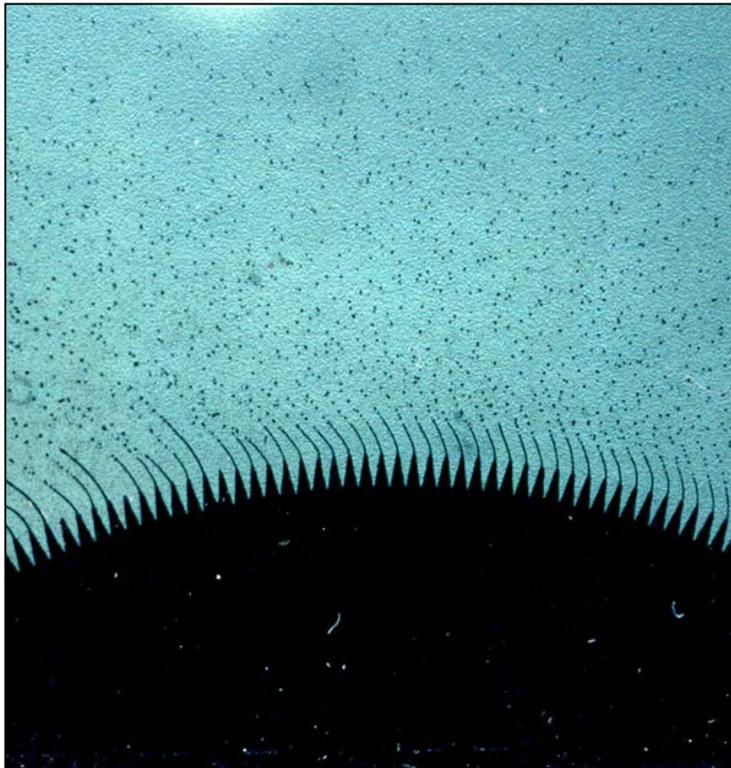


# Profiled Air Deflector

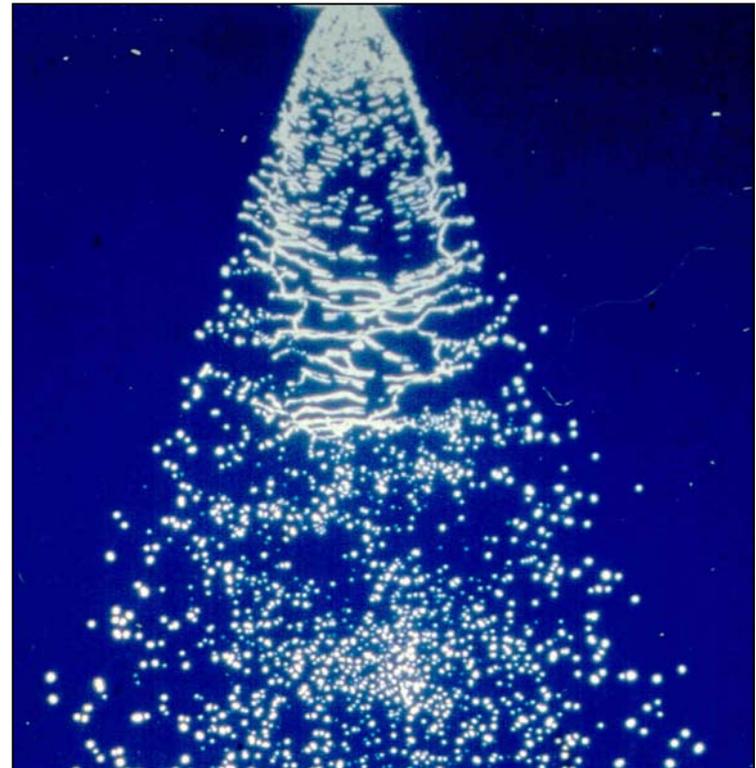


# Air Shear effects - Pre Droplet formation

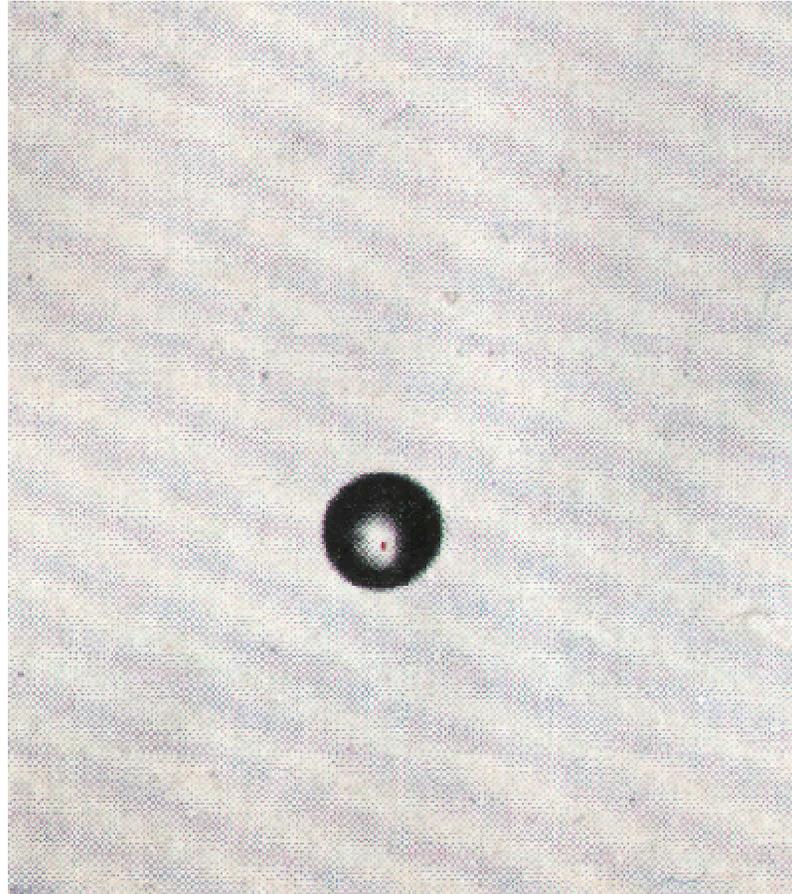
Rotary Atomiser

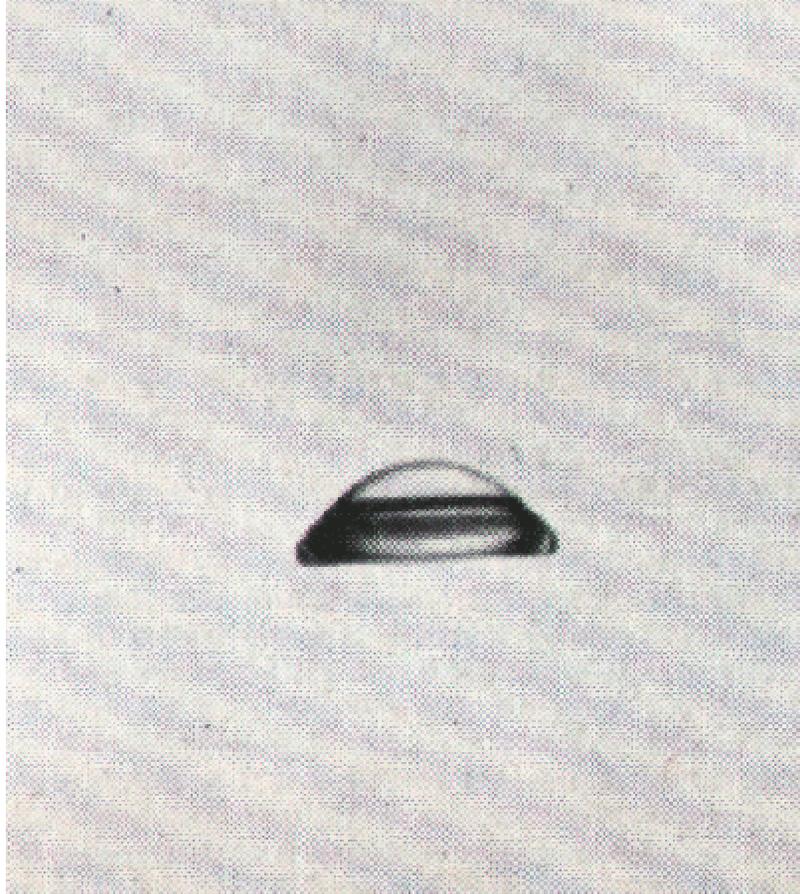


Hydraulic Pressure nozzle

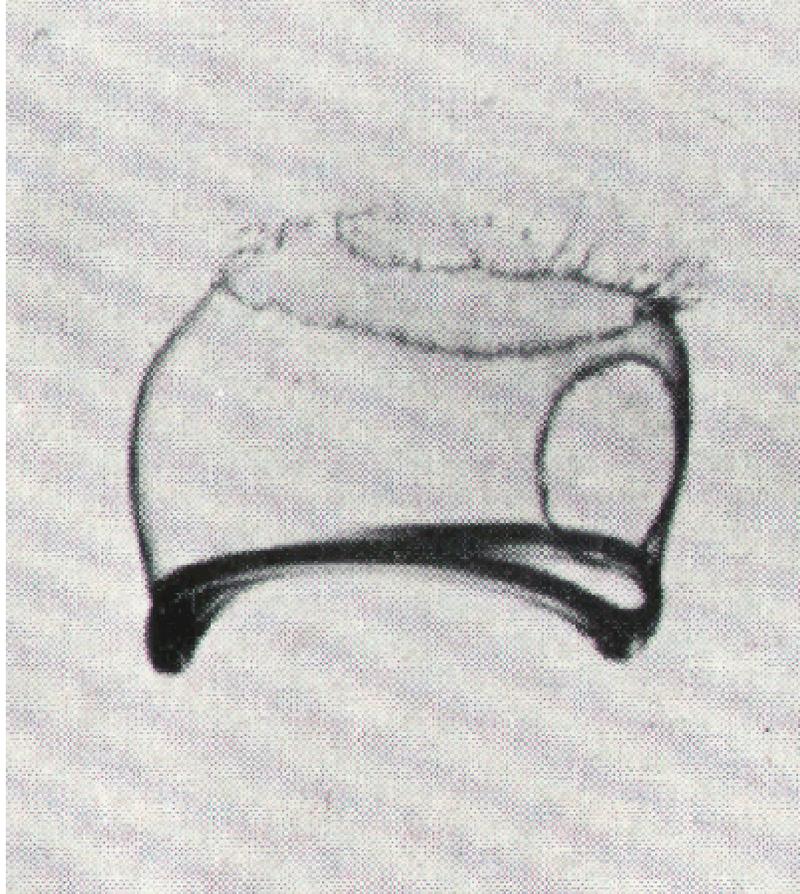


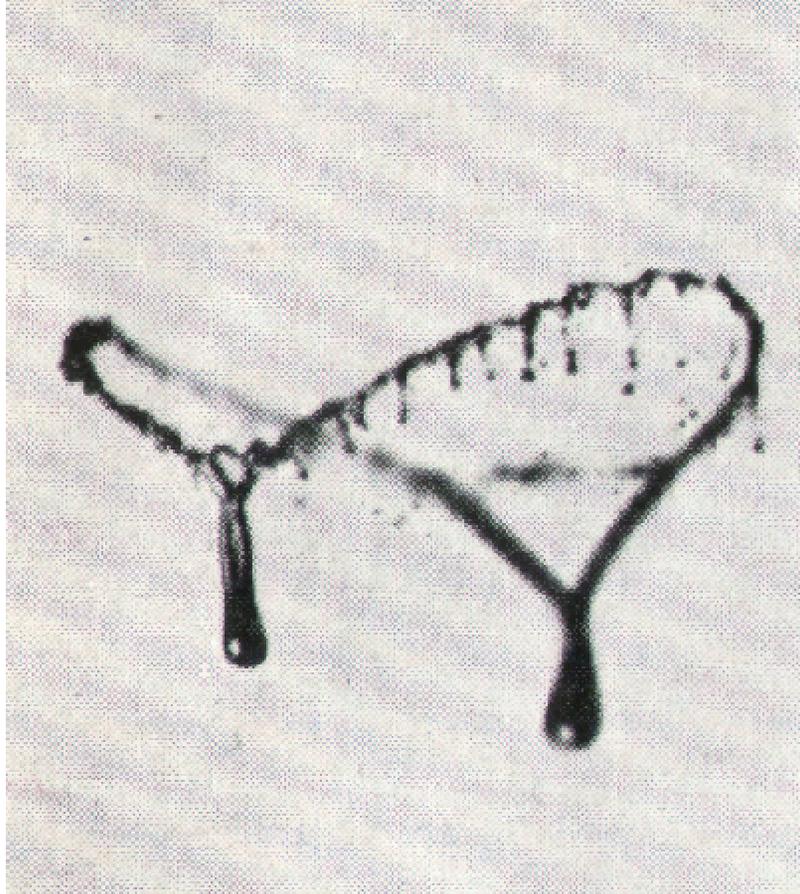
## Droplet Shatter - Post Droplet Formation





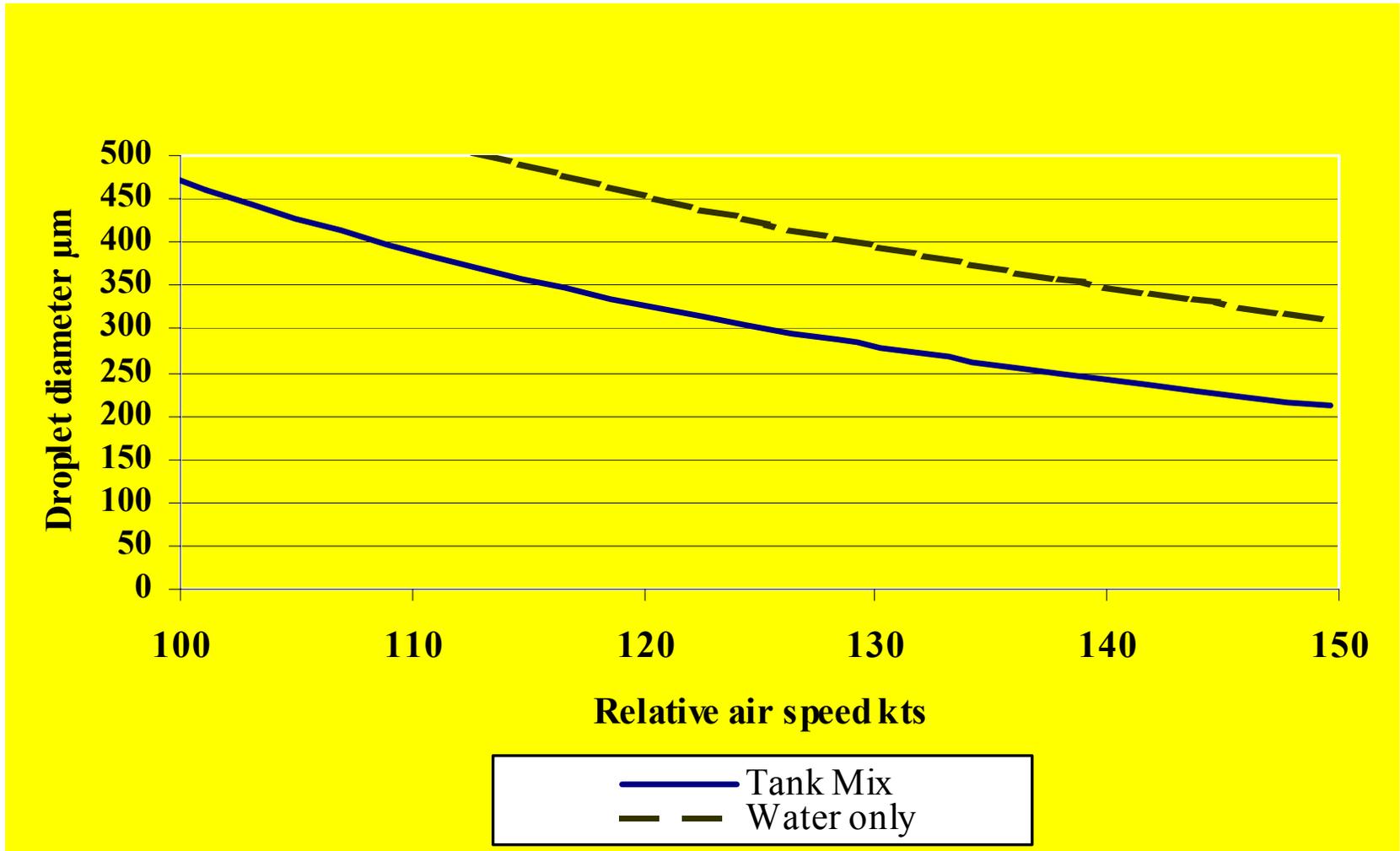




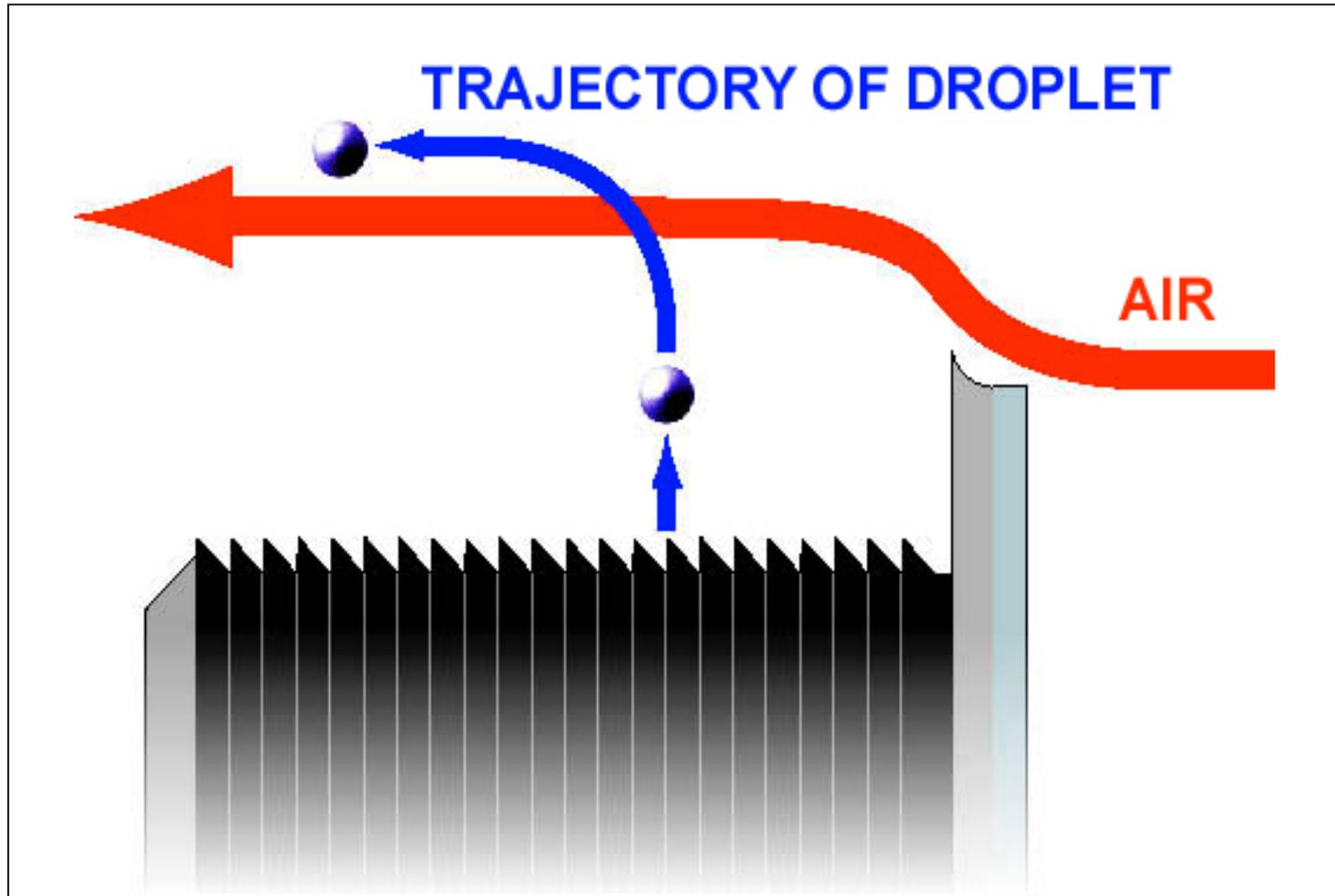




# Theoretical maximum droplet size surviving in an airflow



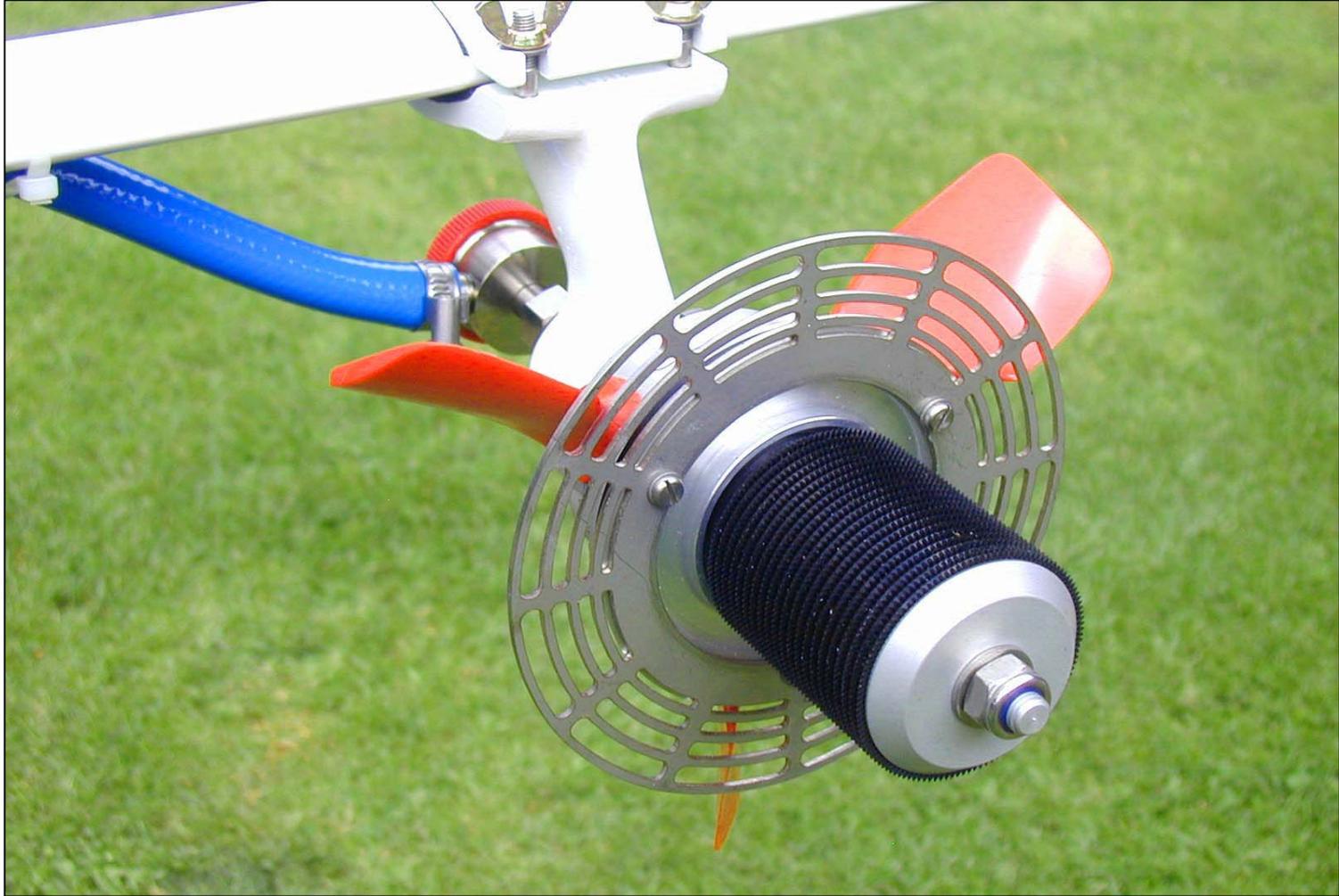
# Profiled Air Deflector



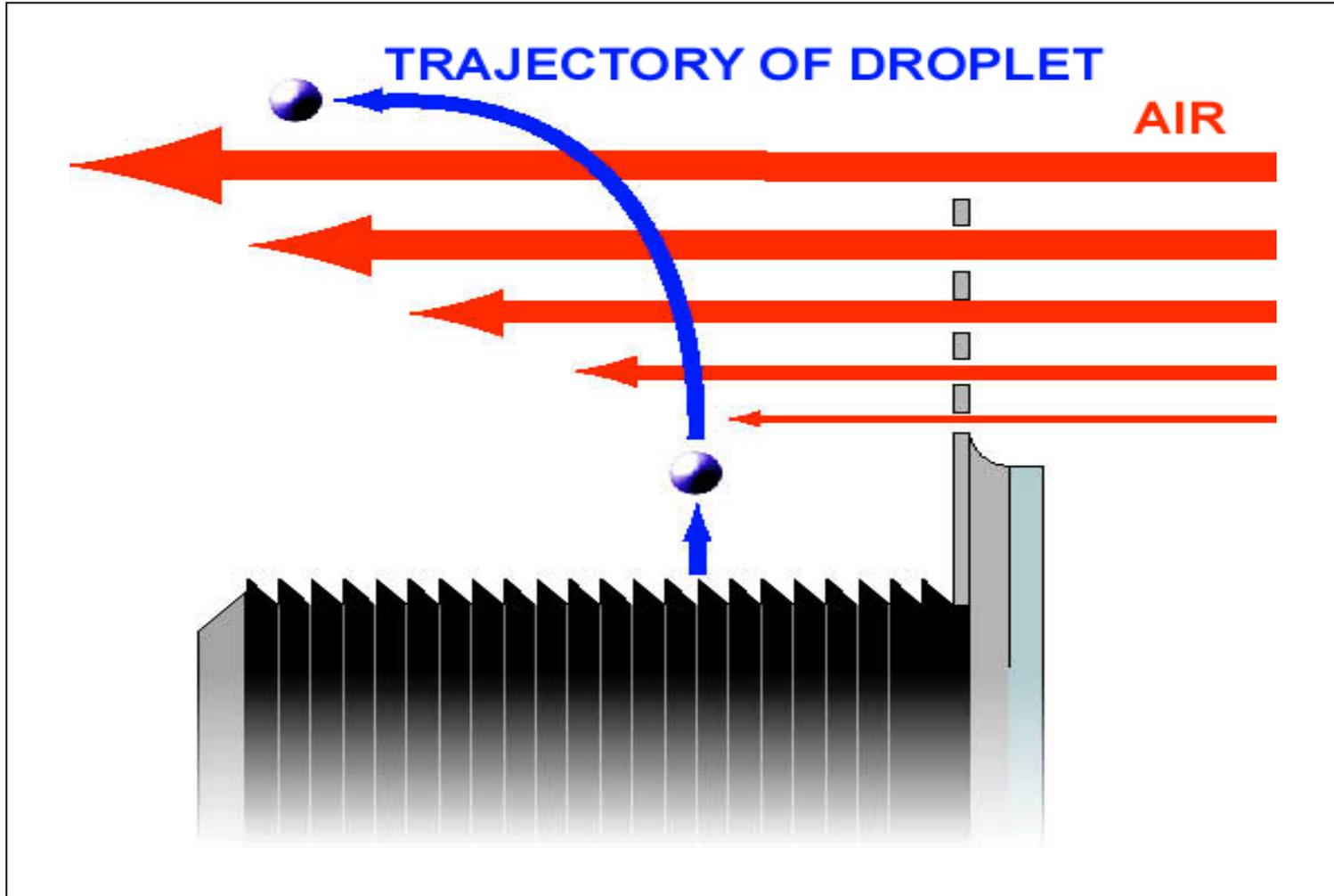
# Design of Air Deflector

- **Diameter of the slotted deflector must be:**
- **Large enough to create a velocity gradient that ensures gradual acceleration into the airstream**
- **Small enough not to significantly increase the drag of the atomiser**
- **AU5000LD atomiser with deflector has similar drag to AU5000 with standard fan blades set for ULV application**

# Micronair AU5000LD Atomiser

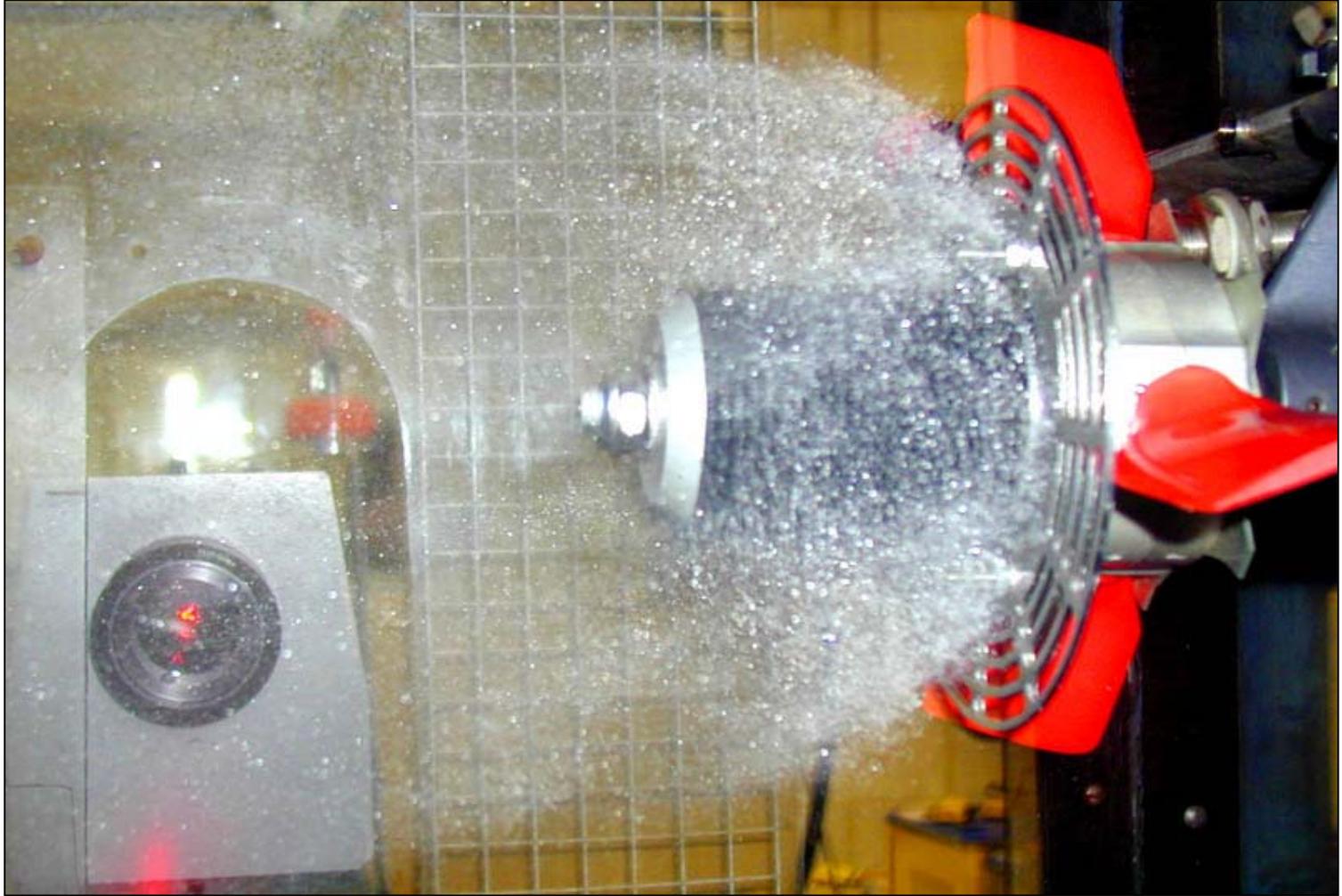


# Slotted Air Deflector

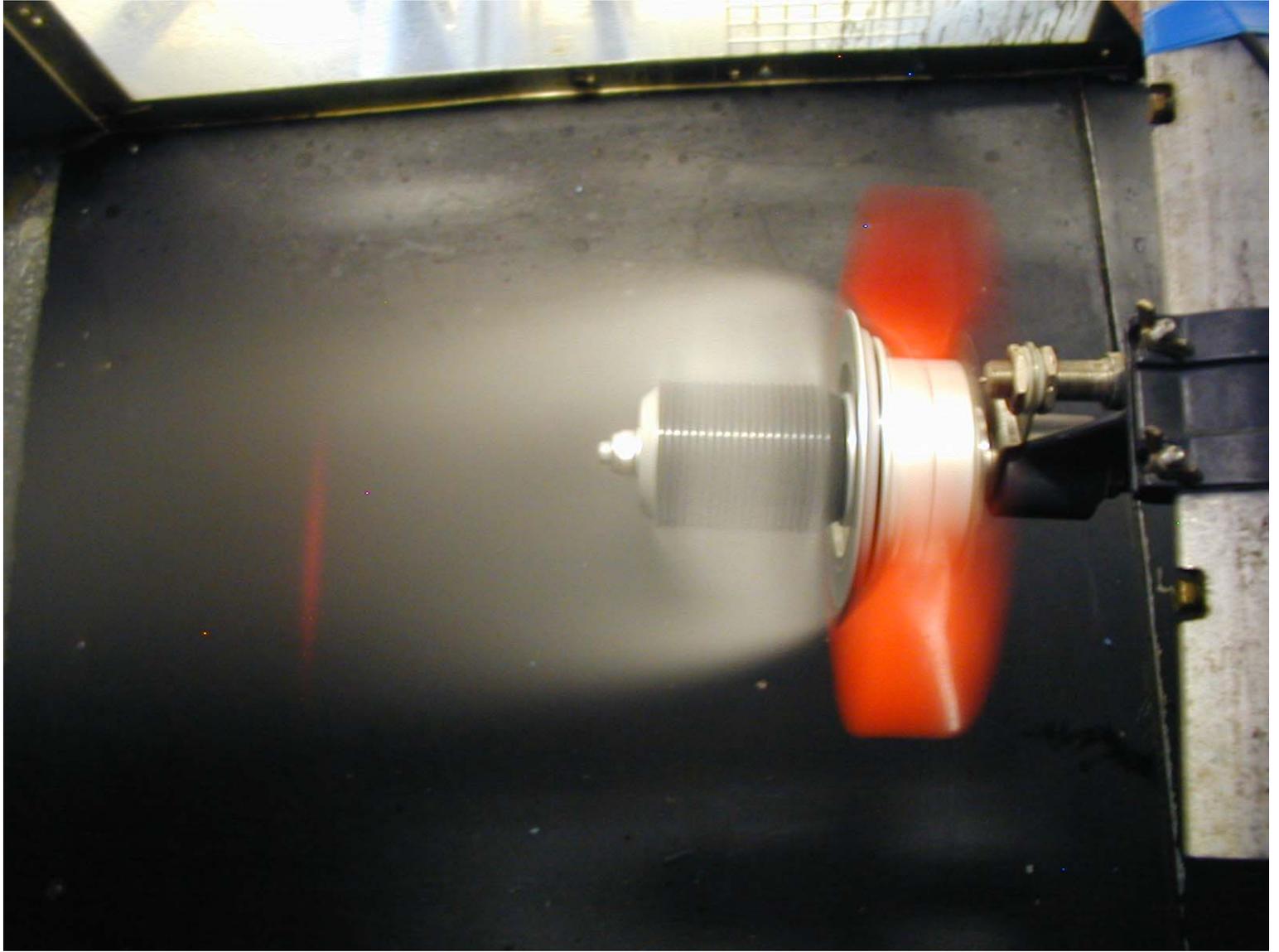


# Wind Tunnel Tests

# Slotted Air Deflector

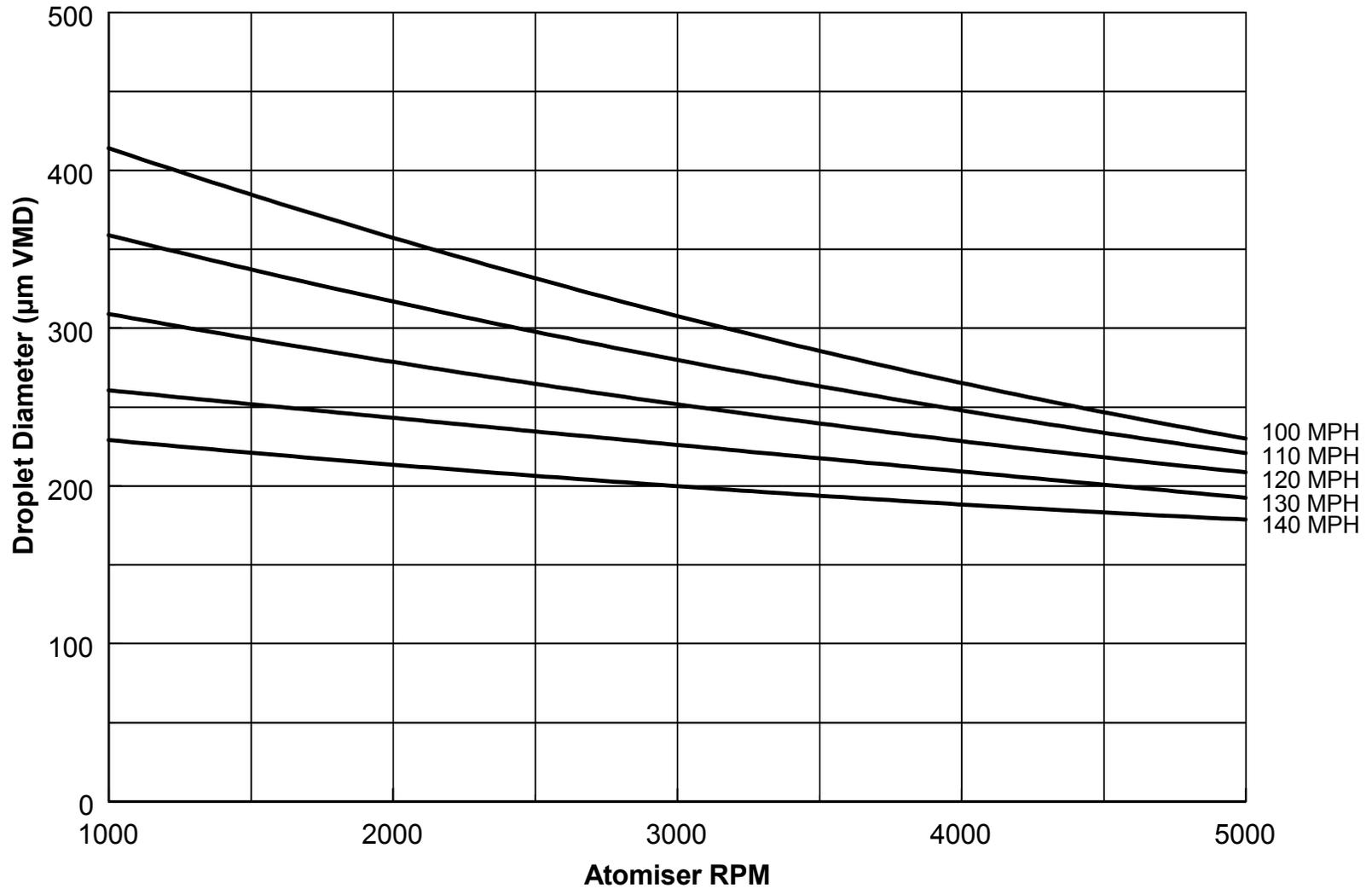




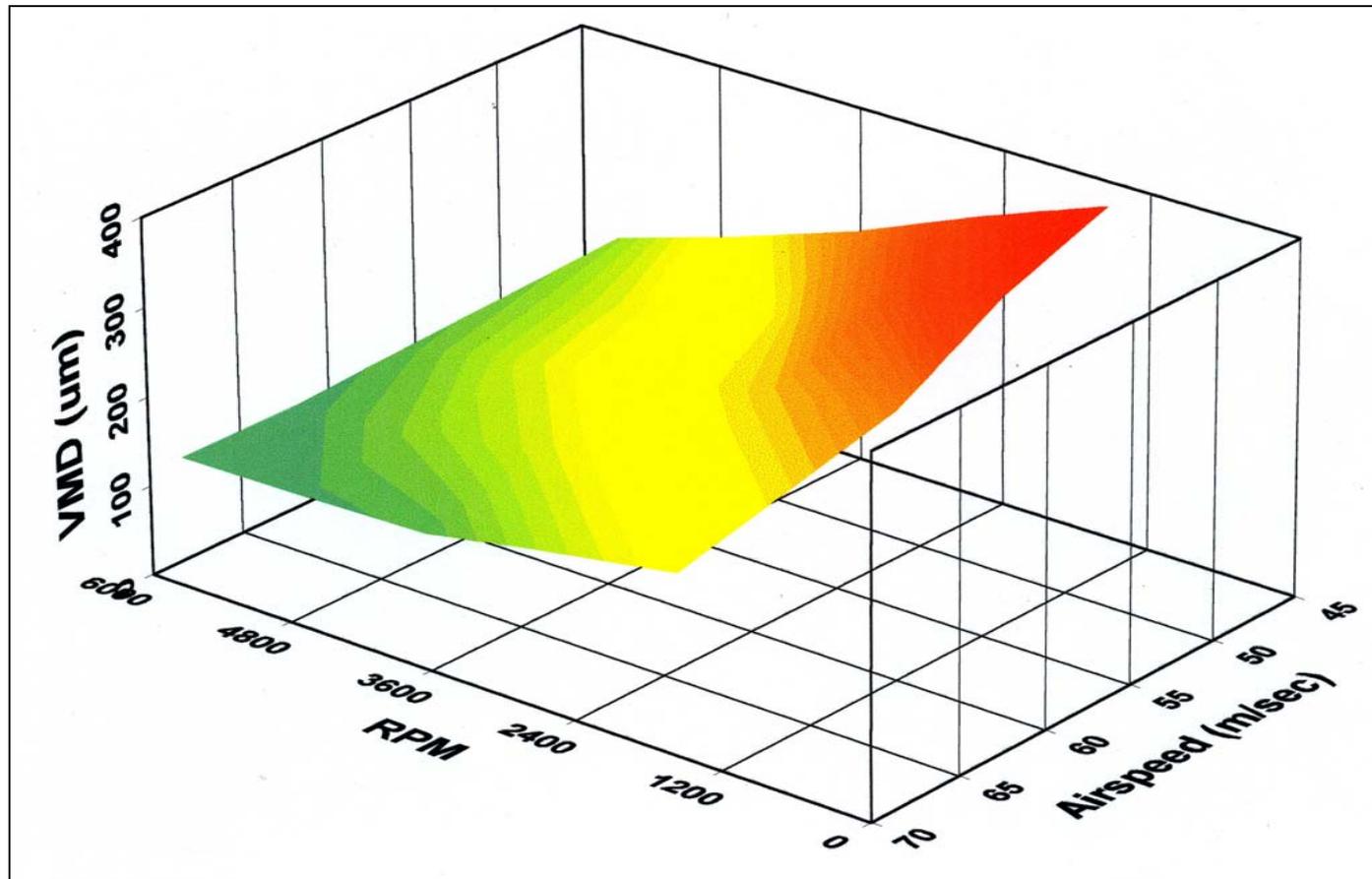


# AU5000LD WITH AIR DEFLECTOR

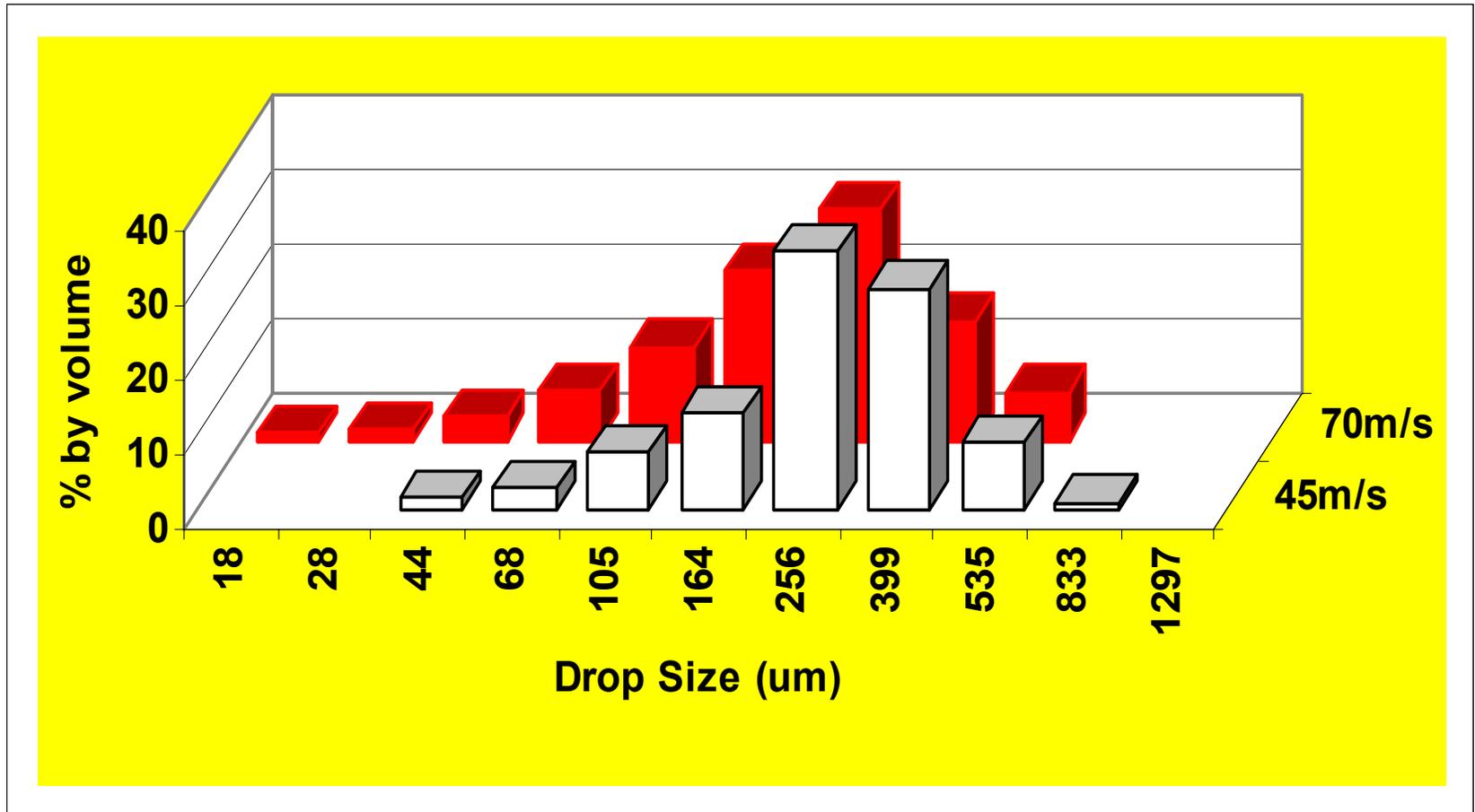
## Droplet Diameter vs RPM & Airspeed



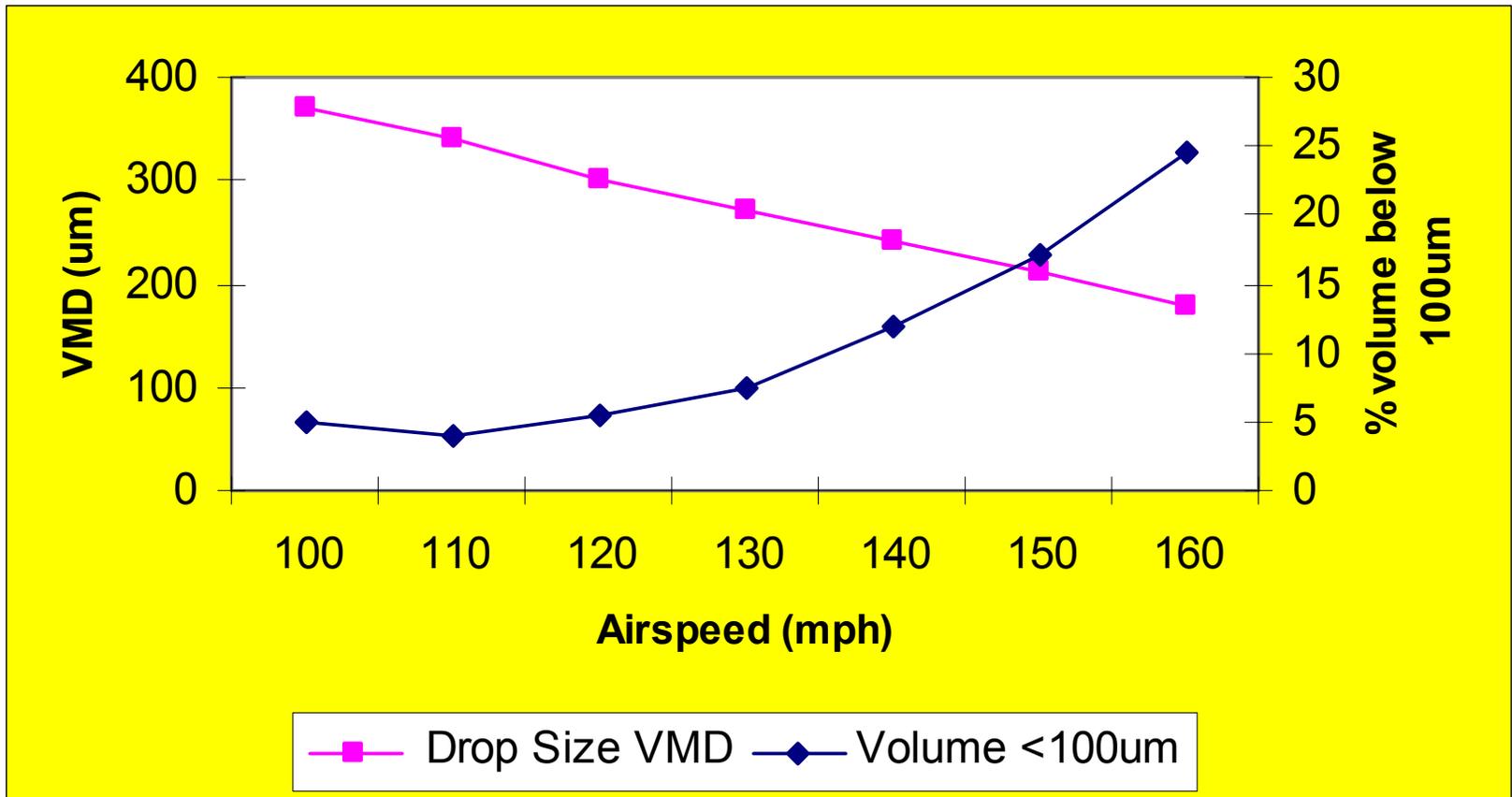
# Effect of Atomiser RPM & Airspeed on Droplet Size



# Effects of Airspeed on Drop Spectra



# Effect of Airspeed on Drop Size with Deflector Nozzle



(After Kirk, 1998)

# Field Trials

# Field Trials

- What worked?
- What didn't?



ET-AJV

A close-up, low-angle shot of a yellow biplane. The aircraft is painted a bright yellow and features the registration 'ET-AJV' in large, black, sans-serif letters on the side of the fuselage. The plane is parked on a dark red gravel surface. The upper wing is visible, supported by several yellow struts. The lower wing is also visible, with a series of landing gear struts and wheels extending downwards. The cockpit area is partially visible, showing a brown interior. The background is a cloudy sky.





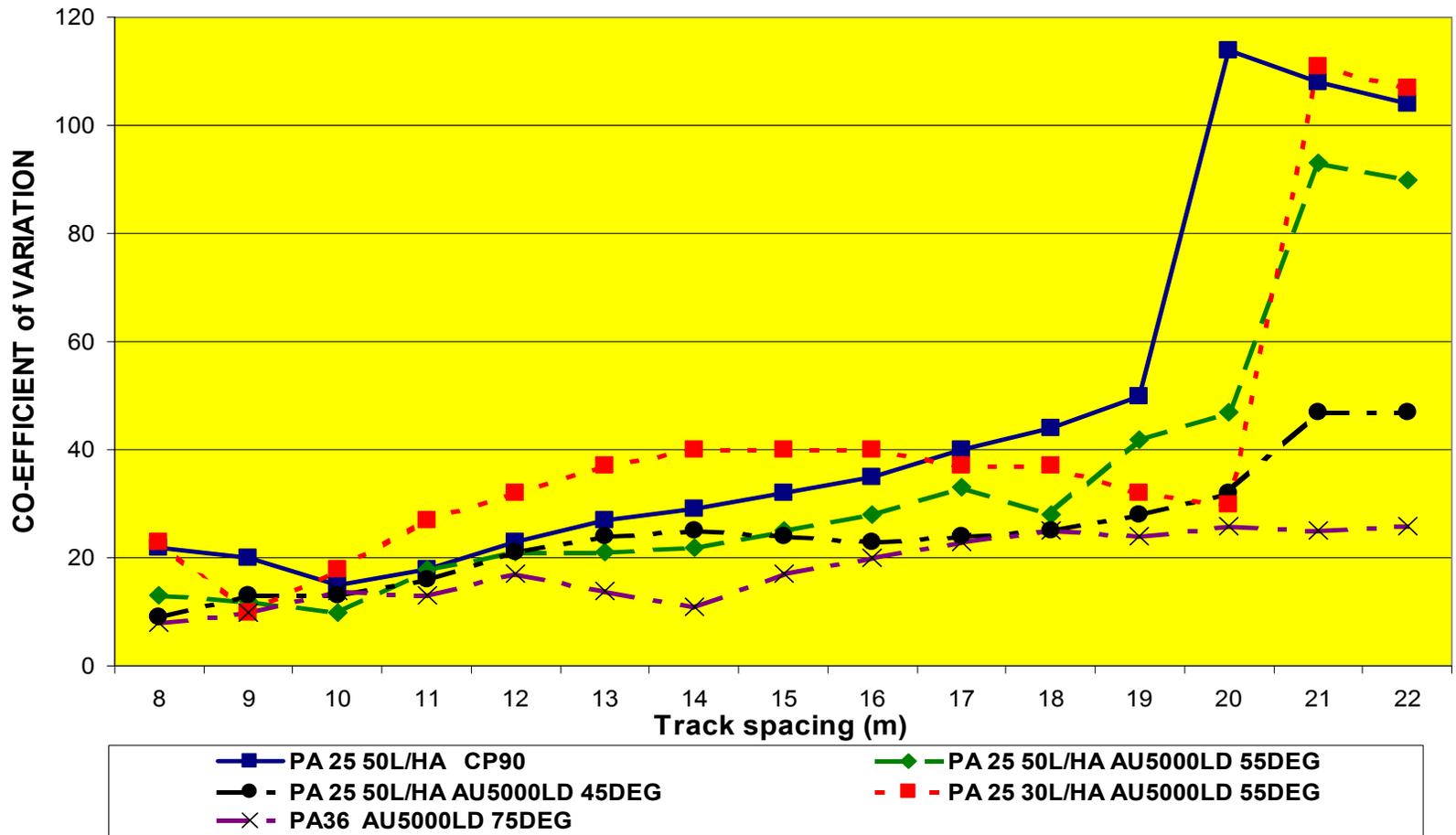






NO PUSH

# Coefficient of Variation with Swath Width





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**looks familiar?**





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# Conclusions

# Drift Control -Key factors

- **control of drop size critical to avoid 'fines'**
  - atomiser type and operation
  - tank mix
  - airspeed
- **Flying Height**
- **Windspeed**
- **nozzle position relative to wing tip vortices**
- **vegetative cover**

# Installation of AU5000LD

- Available as complete atomiser – directly compatible with standard AU5000
- Also available as conversion kit for existing AU5000 atomisers to replace standard gauze
- Original hub, spindle, mounting clamp, pipework etc retained
- Atomiser can be re-fitted with standard gauze

# Performance of Atomiser

- **Droplet size increased relative to standard AU5000**
  - Helicopter/Piston Aircraft (80 - 400um VMD)
  - Turbine Aircraft (80 - 250um VMD)
- **Same atomiser can be adjusted in field for conventional LV application**
- **Liquid flow rate up to 25 l/min per atomiser**
- **Choose appropriate drop size for target**
  - large drops (250um ) are not always appropriate

Thanks for listening

[www.micron.co.uk](http://www.micron.co.uk)

