MICRONAIR

AU8120 AIRBLAST ATOMISER

Installation Guide
Operator's Handbook
and
Parts Catalogue

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TABLE OF CONTENTS

1.0 INTRODUCTION

The Micronair AU8120 Airblast Atomiser has been developed from over 30 years experience in the design and use of rotary atomisers. Originally developed for agricultural aircraft, these atomisers are now used for aerial and ground applications in more than 75 countries. This unique background, combined with continuous research and development, has enabled Micronair to produce a range of truly versatile and reliable atomisers for almost every agricultural spraying requirement.

The Micronair AU8120 Atomiser is intended for installation in a wide range of airblast type orchard, vineyard, broadacre and public health sprayers. The atomiser uses a rotating wire gauze cage to break the chemical into droplets. This unique approach ensures that all of the spray volume is concentrated into a narrow range of droplet sizes. The size of the spray droplets can be adjusted by varying the speed of the atomiser, thus producing the optimum size droplet for the chemical and application technique being used.

The atomiser is driven by the airflow from the sprayer by means of adjustable pitch fan blades. These rotate the atomiser and impart a turbulent, swirling motion to the airstream. This carries spray to the target, disturbs foliage and ensures good penetration and even coverage in dense crops.

The AU8120 Atomiser operates over a wide range of chemical flow rates, enabling the same sprayer to be used for ultra low, low and high volume application. The atomiser is designed to handle all types of chemical formulations from specialised ULV products to high concentrations of emulsifiable concentrates or solids in suspension.

An airblast sprayer fitted with AU8120 Atomisers is ideally suited to many spraying tasks, whether in fields, bushes, orchards or in public health work. Whatever the application, the combination of controlled droplet size, wide range of application rates and air assistance will enable the user to achieve better coverage and control with a minimum wastage of chemical, thus ensuring the best possible biological results at a minimum cost.

As the atomiser does not contain any small orifices and does not require a high pressure to operate, blockages are rare, even with viscous liquids and formulations with a high solids content.

Should field service be necessary, the simple design of the atomiser enables it to be dismantled and cleaned in minutes.

Because of its versatility, the AU8120 Atomiser can be installed on a wide range of sprayers. These may be specially built or may be conversions of existing machines. Through its own experience and that of its customers, Micronair can advise Original Equipment Manufacturers (OEMs) on the design and construction of most types of sprayer.

The AU8120 Atomiser is designed especially for use in ground spray machines. It must not under any circumstances be fitted to any type of agricultural aircraft or helicopter.

2.0 SPECIFICATION

Length:	15.5 cm
Fan diameter:	22.5 cm[1]
Weight:	0.7 Kg
Chemical feedpipe:	9.5 mm inside dia
Chemical flow rate:	0.02 - 2.0 l/min
Rotational Speed:	2000 - 10,000 RPM[2]
Flow control:	By variable or fixed restrictor
Spray droplet size:	Adjustable 40 - 400 microns VMD subject to formulation used

NOTES

1. Fan diameter depends upon air velocity and duct size - See Installation Section

2. Subject to air velocity.

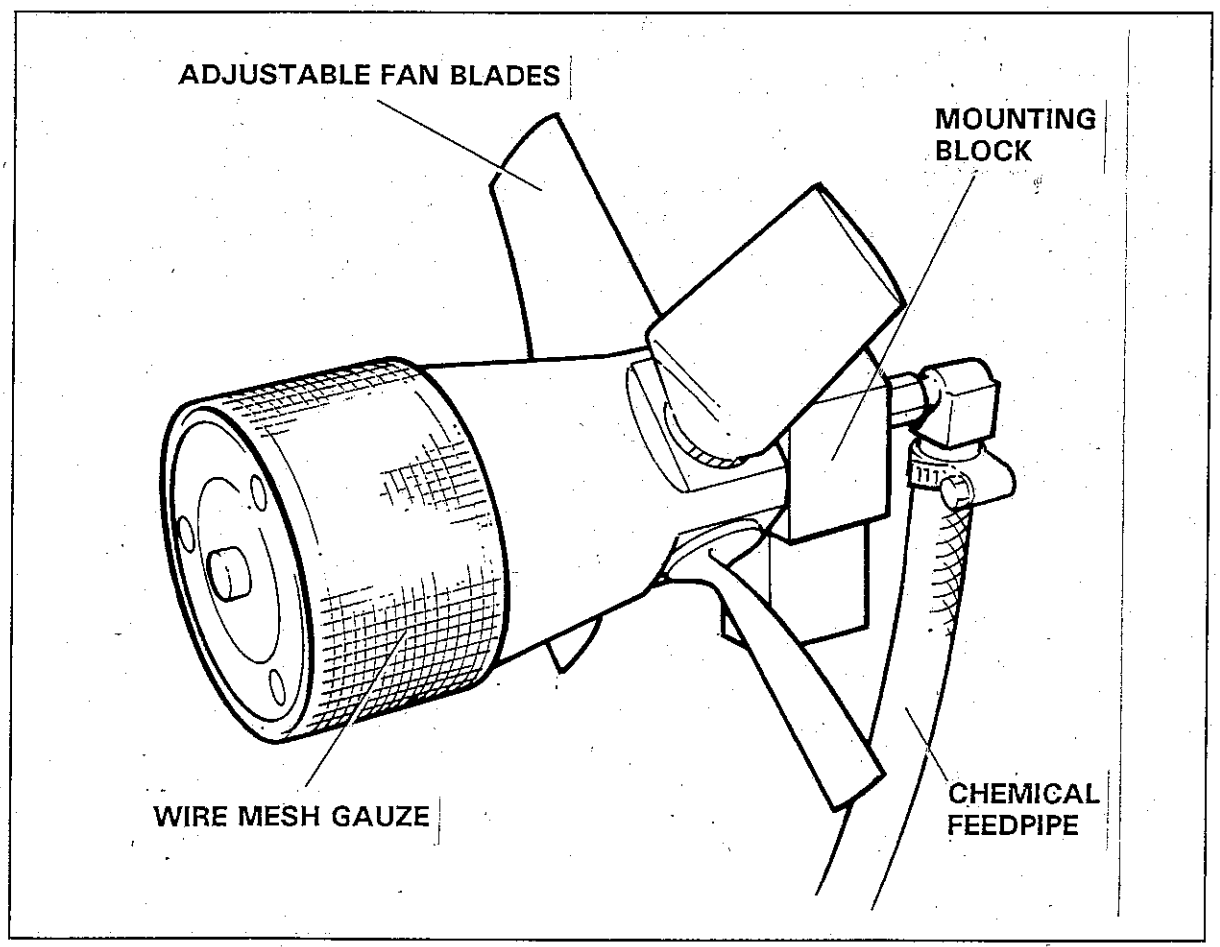


Fig. 1 - AU8120 Airblast Atomiser

3.0 TEN KEY POINTS FOR USERS

The following list of ten points is intended to assist users in the efficient use of sprayers fitted with AU8120 Atomisers. We hope that this section will encourage all personnel to read the entire Handbook and follow its recommendations.

1. Check that all atomisers rotate freely. The only friction should be a slight drag from the V-ring seal. If binding or roughness is felt, remove the unit as described in section 8.0 and inspect the bearings and atomiser attachment.

2. Check that each spindle securing nut is tight and wire locked. If an atomiser is run with the spindle nut loose, the matched bearing spacers will be worn, causing end loading and premature failure of the bearings.

3. Check that the atomiser gauzes are free of damage, blockage by dried chemicals or any condition which could cause them to run out of balance.

4. Check that the atomiser fan blades are not damaged or contaminated with debris blown through the fan.

5. Ensure that all fan blades are set to the correct angle and that all atomisers are rotating at the correct speed.

6. Check that the correct flow restrictor orifices are fitted or that the optional Variable Restrictor Units (VRUs) are correctly adjusted.

7. Ensure that all atomisers are correctly positioned in the sprayer to give the required coverage and that they are the correct distance from the target being sprayed.

8. Inspect the entire sprayer for damaged or twisted chemical hoses and ensure that there are no leaks anywhere in the system.

9. Whilst spraying, verify the accuracy of the calibration of the sprayer by checking the volume of chemical used against the area sprayed.

10. After use, always flush out the entire system with clean water or a suitable solvent. Never leave chemical residues in the atomisers, tank or pipework.

4.0 INSTALLATION

AU8120 Atomisers can be fitted into many types of sprayer. In general, these fall into two categories:

1. Axial fan orchard type sprayers. These normally use an axial fan at the rear of the unit to force air radially outwards through a slot around the periphery of the machine. Several AU8120 Atomisers can be mounted in the slot in place of the standard spray nozzles.

2. Air cannon sprayers. These use a wide variety of fan types but all direct the air into one or more cylindrical jets. Some machines use two fans to produce two jets; one on either side of the sprayer. One AU8120 Atomiser is normally mounted in each air outlet.

In order for the atomisers to work satisfactorily, the following conditions must be met:

1. The dimensions of the air outlet must allow the entire diameter of each atomiser's fan to be in the airflow. If the outlet is too small, only part of the fan will be operating efficiently. If the outlet is too large, it is possible that the majority of the air could escape without passing through the fan. It may be necessary to modify the size or shape of the air outlet to avoid these problems.

2. The air velocity at the outlet must be sufficient to rotate the atomiser at the required speed. This is discussed further in section 4.3.

3. The air velocity must be approximately equal at all points over the area of the atomiser fan and the direction of the airflow must be along the axis of the atomiser. It may be necessary to fit baffles or deflectors to provide an even and correctly directed air stream.

4. In the case of axial fan orchard sprayers, the air velocity may not be the same at each atomiser because of the rotation of the blower fan. It may be necessary to fit additional baffles to achieve an even velocity profile.

4.1 Mounting of Atomisers

AU8120 Atomisers are supplied with a rectangular aluminium mounting block (part number EX4411) as shown in Fig. 1. This should be drilled with two 4.8 mm (3/16") diameter holes for bolting the block to structure provided by the OEM. It is recommended that this block should be used whenever possible.

The structure for mounting the atomiser in the outlet duct must have a small cross-sectional area to cause a minimum of obstruction to the air.

The atomiser mounting block must be held securely in such a way that it cannot vibrate or move in the airflow. Fig. 2 shows a method which has proved satisfactory for many installations. The block is held between two strips of steel plate about 2 mm (0.08") thick. These are welded or bolted to the sides of the air duct. The strips cause a minimum of restriction because they are edge-on to the airflow.

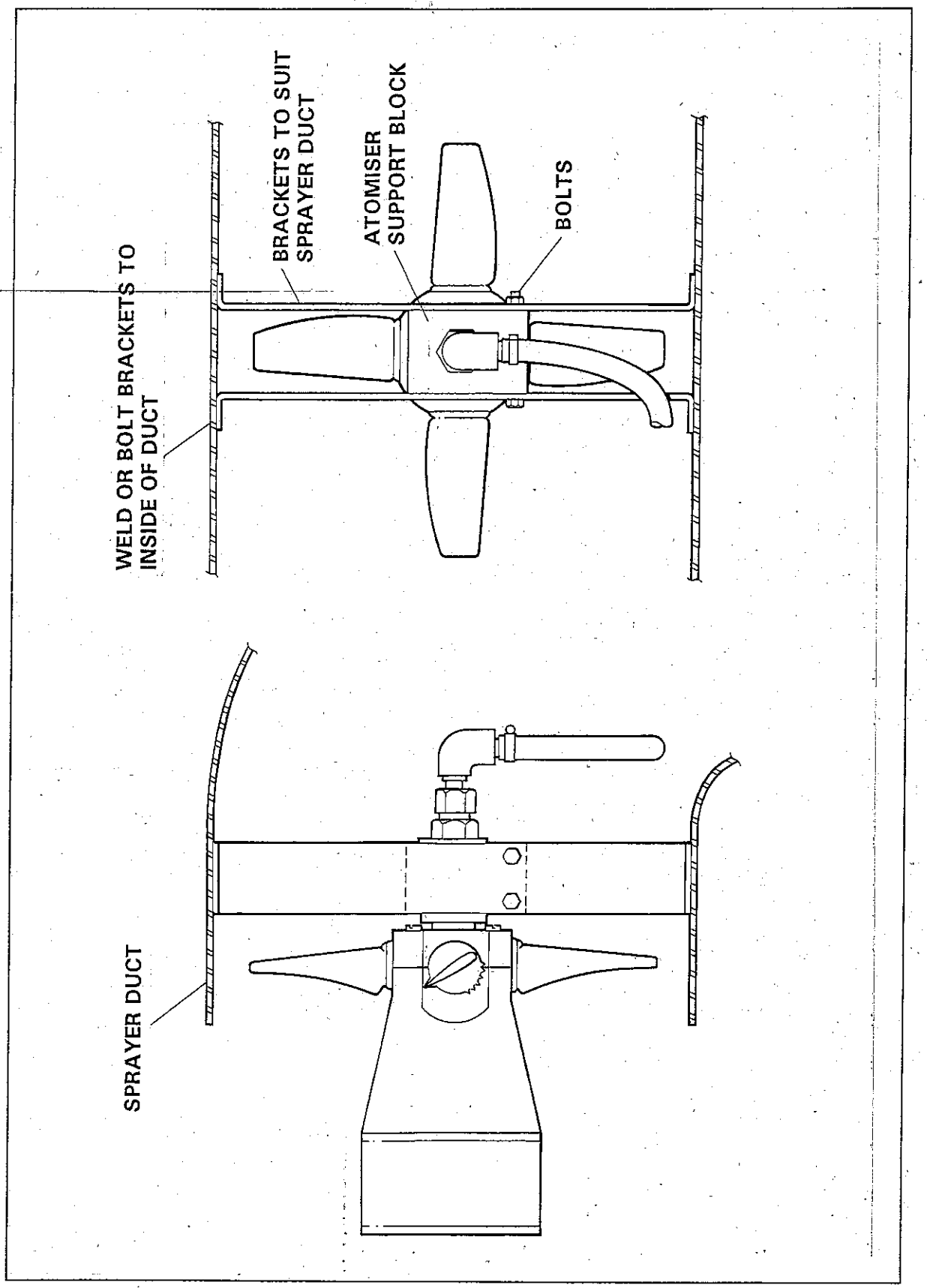


Fig. 2 - Typical Installation of AU8120 Airblast Atomiser

In exceptional circumstances, it may be necessary to design an alternative mounting arrangement. If this is attempted, the red Delrin atomiser support bush (EX2275) should be removed from the Micronair block and installed in the new mounting.

4.2 Air Velocity Profile

An AU8120 Atomiser must be mounted in an airflow which is parallel to the axis of the unit and which has a constant velocity over the entire diameter of the fan. Where several atomisers are mounted in one sprayer, the air velocity should be the same at each atomiser.

Unfortunately, some sprayers have an uneven air velocity profile and it may be necessary to fit deflector vanes or baffles to correct this.

The best method of checking the velocity profile is to use an anemometer to measure the airspeed at all points in the duct. If an anemometer is not available, an approximate assessment can be made by moving a hand in the airflow about 150 mm (6") outside the duct and judging the velocity profile by the force of the air.

The direction of the air can be checked by tying 300 mm (12") lengths of wool or light string in the duct. These will stream out in the direction of the airflow when the blower fan is running.

The final shape and position of any vanes or baffles will have to be determined by experiment. However, once a satisfactory arrangement has been found it should be applicable to all machines of the same model.

Fig. 3 illustrates typical problems with uneven air profiles and shows recommended solutions.

4.3 Length of Fan Blades

The length of the fan blades to be used in an AU8120 atomiser will depend upon the dimensions of the air duct and the available air velocity. The minimum recommended fan diameter is shown in Graph 1.

All AU8120 Atomisers are supplied as standard with EX2206 fan blades which are 90 mm long (from atomiser hub to blade tip). These give an effective fan diameter of 225 mm. However, many types of sprayer may need a different length of fan blade and it is often necessary to cut blades according to individual requirements. There is no reason why this should not be done, provided that the following precautions are observed:

1. All blades on all atomisers on any machine must be cut to the same length. A simple cutting jig will assist this.

2. All blades must be weighed to ensure that they are of equal weight. A weight difference of more than +/- 0.5 gram could cause excessive vibration.

3. The cut ends of all blades must be smoothed and rounded to minimise the risk of injury whilst handling the units.

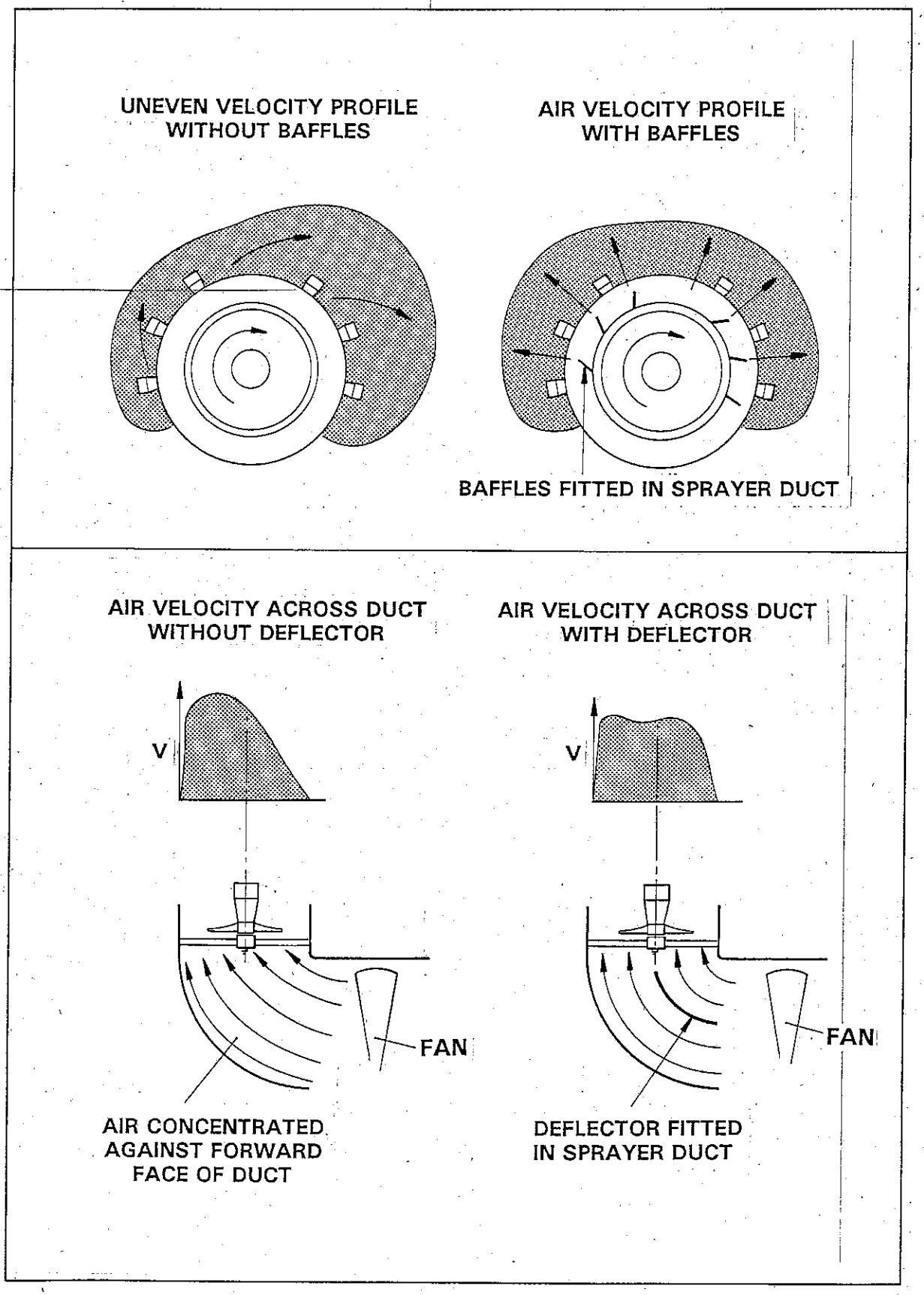
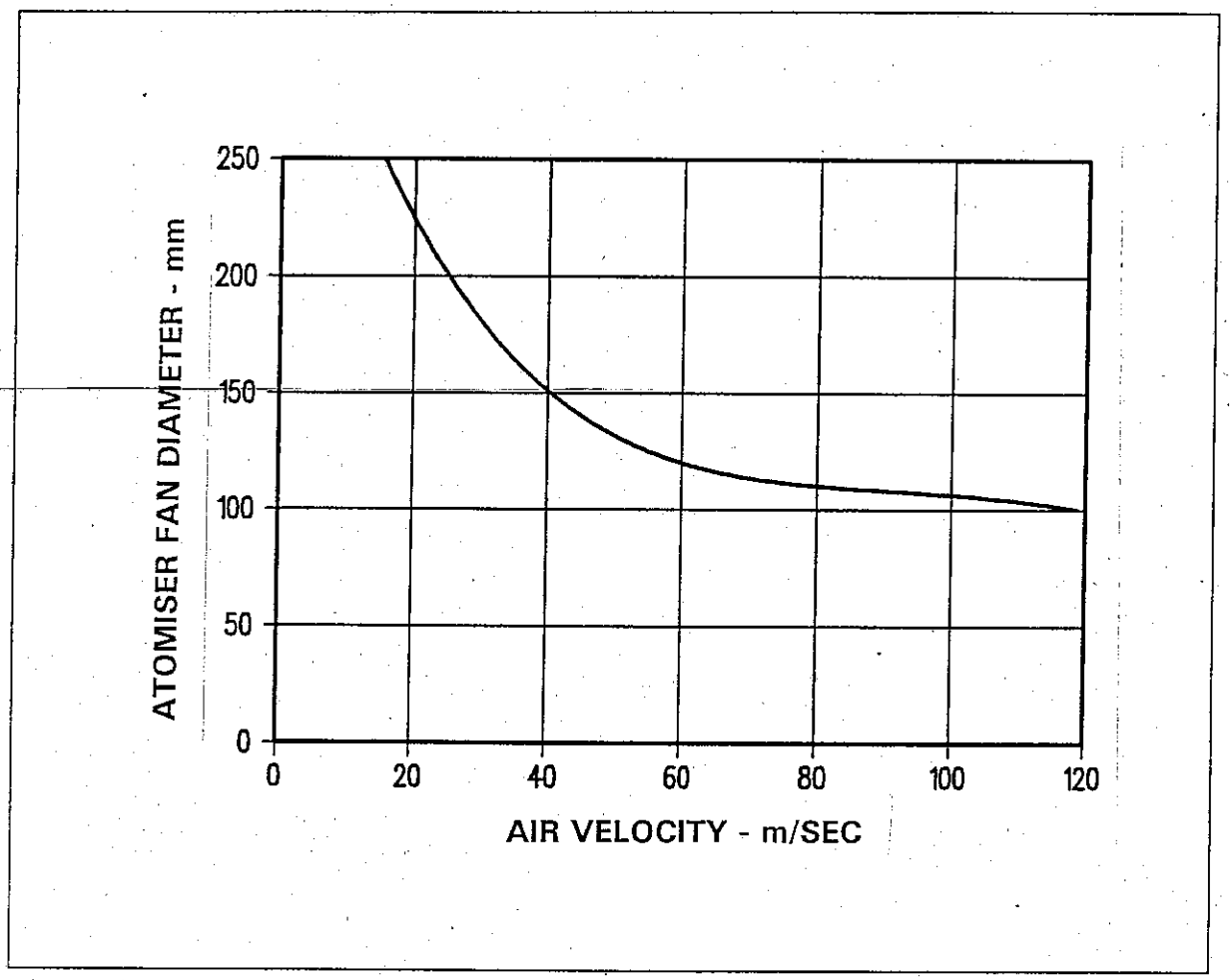


Fig. 3 - Correction of Air Velocity Profile in Duct



Graph 1 - Minimum Fan Diameter Against Air Velocity

4.4 Chemical Feed

The flow of chemical to each AU8120 Atomiser must be regulated to give the correct total output from the sprayer and consequently the required application rate on the crop.

Chemical flow is regulated by either a fixed or a variable restrictor unit in the feedpipe to each atomiser.

The fixed restrictor uses an orifice plate fitted in a housing which is installed in the chemical hose to each atomiser. This unit also incorporates a diaphragm check valve. See section 9.0 for full details of the fixed restrictor and check valve. The Variable Restrictor Unit (VRU) operates on the same principle as the fixed restrictor. However, the body of the unit contains an orifice plate with seven different hole sizes. The hole to be used is selected by rotating a knob. This enables the orifice (and hence flow rate) to be selected without dismantling the unit and changing plates. See section 10.0 for full details of the VRU.

Fixed restrictors are supplied as standard with AU8120 Atomisers but variable restrictors are available as an option.

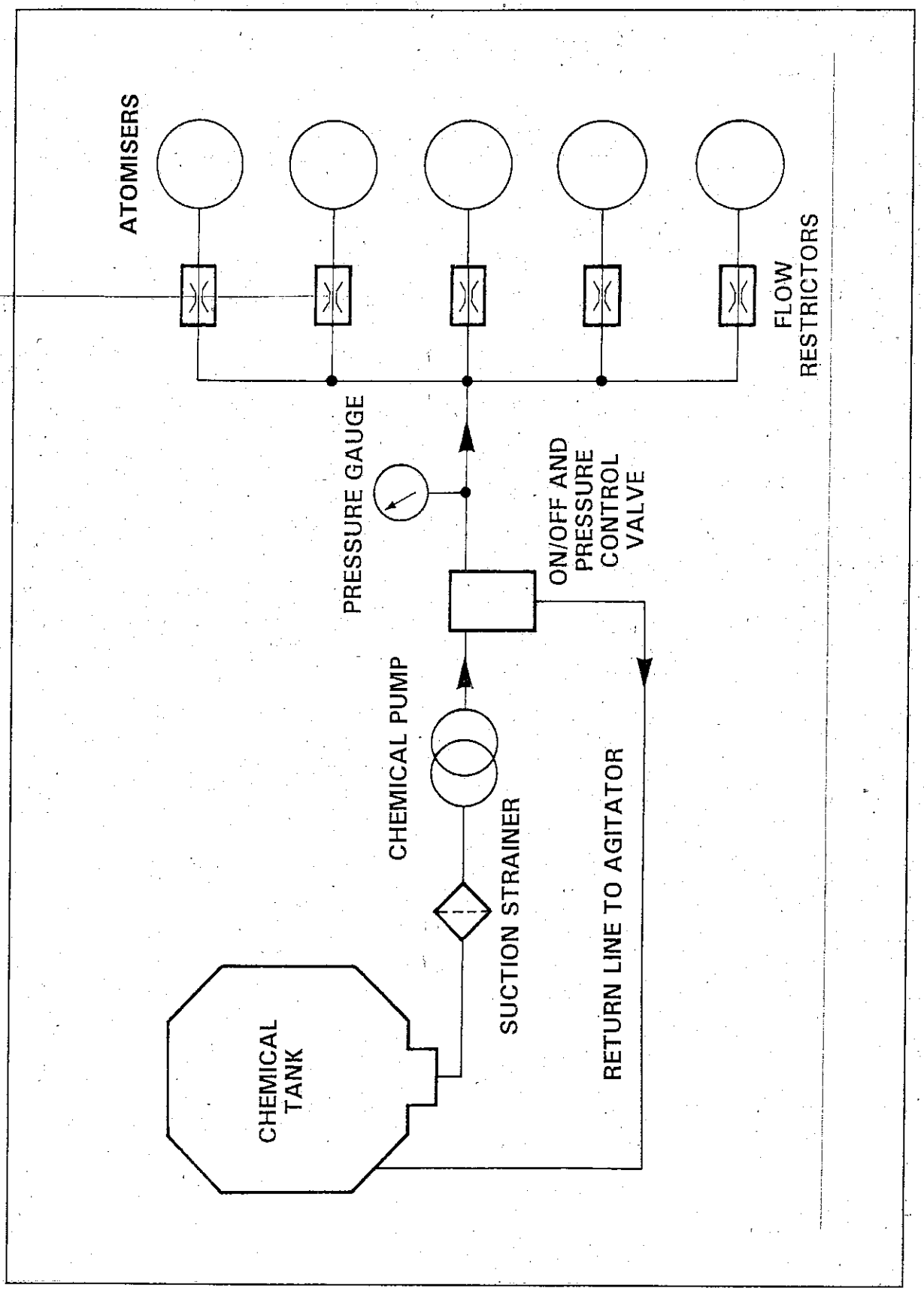


Fig. 4 - Typical Configuration of Chemical Feed to Atomisers

If VRUs are fitted, it may be necessary to connect a check valve in the hose to each unit. This will eliminate the possibility of any dripping of chemical from the atomisers if they are below the level of the tank. The standard fixed restrictor and check valve can be used for this provided that the restrictor orifice is removed.

Unlike hydraulic nozzles, Micronair atomisers do not require a high pressure to operate. Droplet size is unaffected by system pressure. The pressure should, therefore, be selected to give the correct chemical flow through the restrictor (see Calibration section).

If an existing sprayer is to be converted, the original chemical pump can often be retained. If this pump is a high pressure type or if it has excess capacity, it may be necessary to fit an adjustable pressure regulator in the feed to the atomisers. If a pressure regulator is already fitted but cannot be adjusted to a sufficiently low pressure, it will be necessary to fit a second low pressure regulator to the output of the main regulator. This allows the first regulator to by-pass the majority of the surplus flow to the tank and provide a stabilised input to the second regulator.

If a new sprayer is being designed or an original pump is to be replaced, it is suggested that a centrifugal type is chosen. This should provide a maximum pressure of about 2 - 3 Bar (30 - 45 PSI) and should be capable of delivering the maximum flow rate of the sprayer plus the flow required for tank agitation (if a mechanical agitator is not used).

A chemical on/off valve must be fitted in the main feed to the atomisers. This may be mechanically or solenoid operated. A multi-position valve can be used to select different groups of atomisers if required.

A filter must be incorporated in the chemical supply to the atomisers. This should have an 0.5 mm (50 mesh/inch) or finer mesh filter. The filter may be installed either in the suction or pressure line of the pump but the filter must always be before the flow restrictors and should preferably be before the pressure regulator. Fig. 4 shows the recommended chemical feed configuration for a typical sprayer.

4.5 Testing

Any new sprayer must be tested to ensure the following:

1. That the atomisers all rotate at the correct speed and that this speed can be varied to suit the chemicals and application techniques to be used.

2. That the chemical flow from each atomiser is equal and that the flow can be adjusted over the full range required.

3. That the atomisers are correctly positioned to give the required coverage without any tendency to 'striping'. No spray droplets should be blown towards the operator or onto the structure of the sprayer.

Full details of the procedures to achieve the above are given in the Operation and Calibration sections of this Handbook.

5.0 OPERATION

As with all sprayers, optimum results will only be obtained from a machine fitted with AU8120 Atomisers if it is correctly calibrated, operated and maintained.

It is important that every operator who uses Micronair atomisers is completely familiar with their calibration and use. The following sections emphasise points of particular importance.

5.1 Daily Inspection

All parts of the sprayer should be checked at least once a day. A complete check list for the atomisers is included in the Maintenance section of this Handbook. However, particular attention must be paid to the condition of the atomiser gauzes, chemical feedpipes and restrictors. All atomisers must run smoothly without vibration.

5.2 Calibration procedure

Before use, the sprayer must be calibrated for the correct application rate and droplet size from the atomisers. Full details are given in the Calibration section of this Handbook. It is important to note that the graphs and tables are based on performance with water and are intended only as a guide. Actual performance will vary according to the type and formulation of chemical being used. It is therefore vital that the calibration of the system is checked whenever a new chemical is used.

5.3 Position of Atomisers

The position and angle of the air outlets and atomisers must be checked and adjusted as necessary before use. When atomisers are mounted on an air cannon type sprayer, the entire outlet must be angled and adjusted in height to suit the crop being sprayed. With axial fan orchard sprayers it may be necessary to fit and adjust air baffles to produce a spray pattern to match the target being sprayed. The chemical feed to upper atomisers should be shut off if the trees are low and the spray would otherwise be blown over the top of the foliage.

When a sprayer is used for the first time on a new crop, the coverage of spray droplets on the foliage should be checked to ensure that the air ducts and atomisers are correctly positioned.

The coverage can sometimes be assessed visually if the colour of the active material leaves a clearly defined droplet (as with some fungicides). However, it is preferable to place sensitive papers in the foliage and to check the coverage by the droplet density on the papers. Alternatively, a fluorescent dye can be added to the spray mixture and the coverage assessed viewing the droplets with an ultra-violet lamp in the dark.

5.4 Sequence of Operation

It is important that all atomisers are rotating at their correct speed before the chemical supply is turned on. Similarly, the chemical supply must be shut off before the atomisers are stopped by disengaging the blower fan. This ensures that a stream of chemical does not run out of the atomisers and that the correct size of droplet is always produced.

It is not normally necessary to stop the atomisers every time the chemical flow is turned off. However, they must always be stopped before turning at the end of a row if there is the risk of accidental contact with foliage.

5.5 After Use

The entire sprayer must be emptied and flushed out with clean water or a suitable solvent after use. This eliminates the possibility of dried chemical residues blocking valves, restrictors or atomiser gauzes. This precaution is particularly important when using wetable powders as these will tend to sediment in the tank and pipework, causing serious blockages when the sprayer is next used.

In order to avoid contamination whilst flushing the sprayer, this should only be done in the spray area and not in a yard or workshop. The atomisers should be rotating during the flushing process to distribute the chemical and flushing liquid into the crop as spray droplets. This also ensures the most efficient cleaning of the atomiser gauzes. If it is not practical to allow the atomisers to rotate, the flushing liquid must be collected in a container placed under each atomiser and not allowed to run onto the sprayer, crop or ground in a concentrated stream.

6.0 HEALTH AND SAFETY

Any sprayer using AU8120 Atomisers must be used by a qualified operator in accordance with the recommendations and statutory requirements for the use of sprayers and the chemical being sprayed.

These requirements will be set out in the applicable local legislation and in the label of the chemical.

In the United Kingdom, the precautions and regulations concerning the use of pesticides and sprayers are defined in the Code of Practice for the Use of Pesticides on Farms and Holdings (Published by HMSO for the Ministry of Agriculture, Fisheries and Food and the Health and Safety Commission).

The use of pesticides and sprayers are subject to legislation or codes of practice in most other countries. It is the responsibility of the user to ensure that these are read, understood and complied with.

The following recommendations are for guidance only and do not exclude any statutory requirements:

1. Always wear adequate protective clothing, eye protection and respiratory protection when mixing, transferring or spraying pesticides. The minimum level of protection will be stated on the chemical label or in the Code of Practice in most countries.

2. Protective clothing, respirators etc. must be removed as soon as exposure to pesticides has ceased. All items must be washed or disposed of safely according to the manufacturers' recommendations.

3. Ensure that the sprayer is correctly calibrated for the chemical, application technique and crop or pest being sprayed.

4. Take note of the speed and direction of the wind. Ensure that spray droplets do not drift on adjacent crops, another person's land or an inhabited area. Do not drive the sprayer in an upwind direction so that spray could be blown back towards the operator.

5. Never walk into a sprayed area until it is safe to do so according to the chemical manufacturer's recommendations.

6. All traces of chemical must be washed from the operator's skin immediately after spraying and before eating, drinking or smoking.

7. Remove all traces of chemical from the tank, pipework and atomisers as well as from external surfaces of the sprayer.

8. All residues of chemical from the sprayer, pesticide containers or mixing vessels etc. must be disposed of safely by an approved means. Do not contaminate an off-target area or allow pesticides to reach streams, wells or groundwater.

9. Dispose of empty chemical containers safely by an approved means. Do not keep containers for re-use for other purposes.

7.0 CALIBRATION

A sprayer fitted with AU8120 atomisers must be calibrated before use. This involves setting the correct output rate of chemical and adjusting the rotational speed of the atomisers to produce the appropriate droplet size for the chemical and application technique being used.

The following sections describe the calibration of a typical sprayer. Some details of the procedures may differ according to the type and operation of the sprayer on which the AU8120 atomisers are fitted.

7.1 Output Rate of Chemical

The output rate of chemical from the sprayer will be determined by the required application rate (in litres/hectare) and the area sprayed per minute (in hectares/minute).

The flow of chemical from each atomiser is controlled by the interchangeable fixed restrictor orifice or the Variable Restrictor Unit (VRU) in the feed to the atomiser and by the chemical pressure. Chemical pressure is controlled by the pressure regulator or by-pass valve in the feed from the chemical pump.

The following steps describe the calibration procedure in detail:

1. Establish the average forward speed of the sprayer. The most accurate means of assessing the speed is to drive the sprayer in the actual crop. The speed can then be calculated from the time to cover a measured distance.

2. Establish the width of the swath of spray on the target. In orchard, vineyard and soft fruit spraying this can often be determined by the row spacing and the number of rows sprayed at a time.

3. Calculate the area treated by the sprayer per minute. As an example, Fig. 5 shows the sprayer being operated in an orchard crop.

   If the sprayer is being driven at S Km/Hr this corresponds to 1000 x S metres/hour:

   $$\text{Distance travelled} = \frac{1000 \times S}{60} \quad \text{metres/minute}$$

   If the width of the swath is W metres, then the area treated per minute is:

   $$\text{Area treated} = \frac{1000 \times S \times W}{60} \quad \text{sq metres/minute}$$

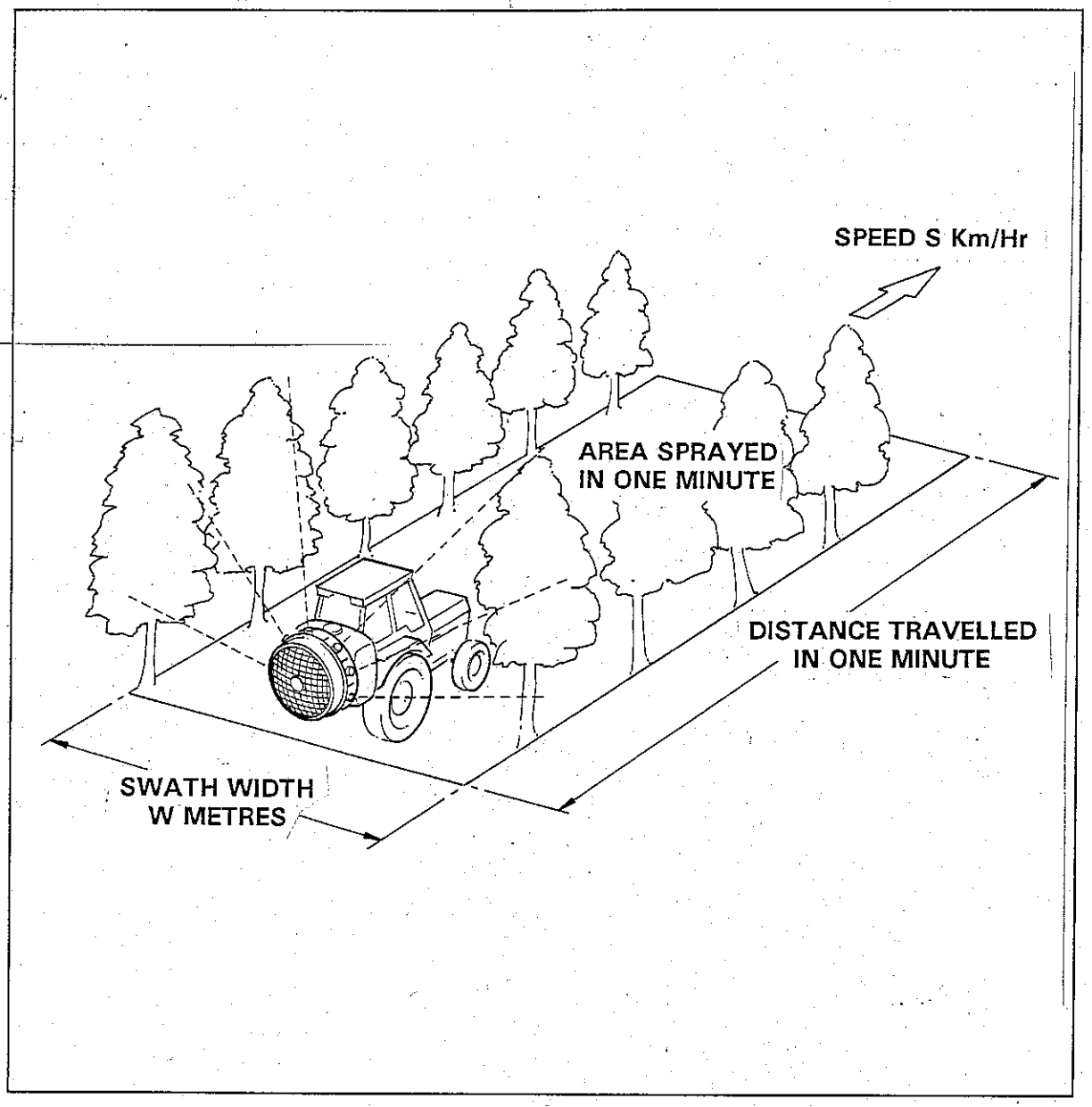


Fig. 5 - Coverage of Sprayer

This is converted to hectares by dividing by 10,000:

$$\text{Area treated} = \frac{1000 \times S \times W}{60 \times 10{,}000} = \frac{S \times W}{600} \quad \text{Ha/minute}$$

This gives the standard formula for calculating the coverage of a sprayer:

$$\text{Area/min} = \frac{\text{Swath Width (m)} \times \text{Speed (Km/Hr)}}{600} \quad \text{Ha/min}$$

Example:

Speed: 8 Km/Hour
Swath Width: 12 m

Therefore:

$$\text{Area treated} \quad \frac{S \times W}{600} \quad \frac{8 \times 12}{600} = 0.16 \text{ Ha/min}$$

Table 1 shows the coverage of the sprayer for various swath widths and spraying speeds.

4. Calculate the required output from the sprayer in litres/minute to give the correct application rate for the chemical being used.

   The output rate of chemical is given by the area sprayed (in hectares) per minute multiplied by the required application rate in litres per hectare.

   Example:

   Coverage: 0.16 Ha/min
   Application rate: 50 L/Ha
   Output = 0.16 x 50 = 8 L/min

5. Calculate the output of each atomiser by dividing the total output of the sprayer by the number of atomisers.

   Example:

   Output: 8 L/min from sprayer
   No of atomisers: 4
   Output/atomiser = 8/4 = 2 L/min

6. Select the correct fixed restrictor orifice or VRU setting to give the required flow rate per atomiser at the normal working pressure of the sprayer (typically about 30 PSI or 2 Bar). Table 2 and Graph 2 give the typical flow rates for fixed restrictor orifices used with the diaphragm check valve and Table 3 and Graph 3 give typical flow rates for VRUs fitted with low (/L) restrictor plates with holes 1 - 7. These figures are based on measurements with water. Actual flow rates may differ according to the viscosity of the chemical being used.

7. Fit the appropriate orifice in the fixed restrictor of each atomiser or adjust all VRUs to the correct setting.

8. Place a container under each atomiser.

9. Ensure that the chemical on/off valve is closed.

10. Fill the tank of the sprayer with at least 50 L of the chemical to be used or a liquid of similar properties.

11. Start the chemical pump of the sprayer but do not run the blower fan.

SPEED Km/Hr	SWATH WIDTH (METRES) 4	6	8	10	15	20	25	30
4	0.03	0.04	0.05	0.07	0.10	0.13	0.17	0.20
6	0.04	0.06	0.08	0.10	0.15	0.20	0.25	0.30
8	0.05	0.08	0.11	0.13	0.20	0.27	0.33	0.40
10	0.07	0.10	0.13	0.17	0.25	0.33	0.42	0.50
12	0.08	0.12	0.16	0.20	0.30	0.40	0.50	0.60
14	0.09	0.14	0.19	0.23	0.35	0.47	0.58	0.70

Table 1 - Coverage of Sprayer in Ha/Min

12. Open the chemical valve until all air is purged from the hoses and atomisers. Return the chemical collected in the containers to the tank of the sprayer.

13. Place the containers back under the atomisers and open the chemical on/off valve again and collect chemical for a measured time of one or two minutes. Use a measuring cylinder or calibrated container to measure the output and calculate the flow rate in litres per minute.

14. Compare the measured output rate with the calculated rate from step (4).

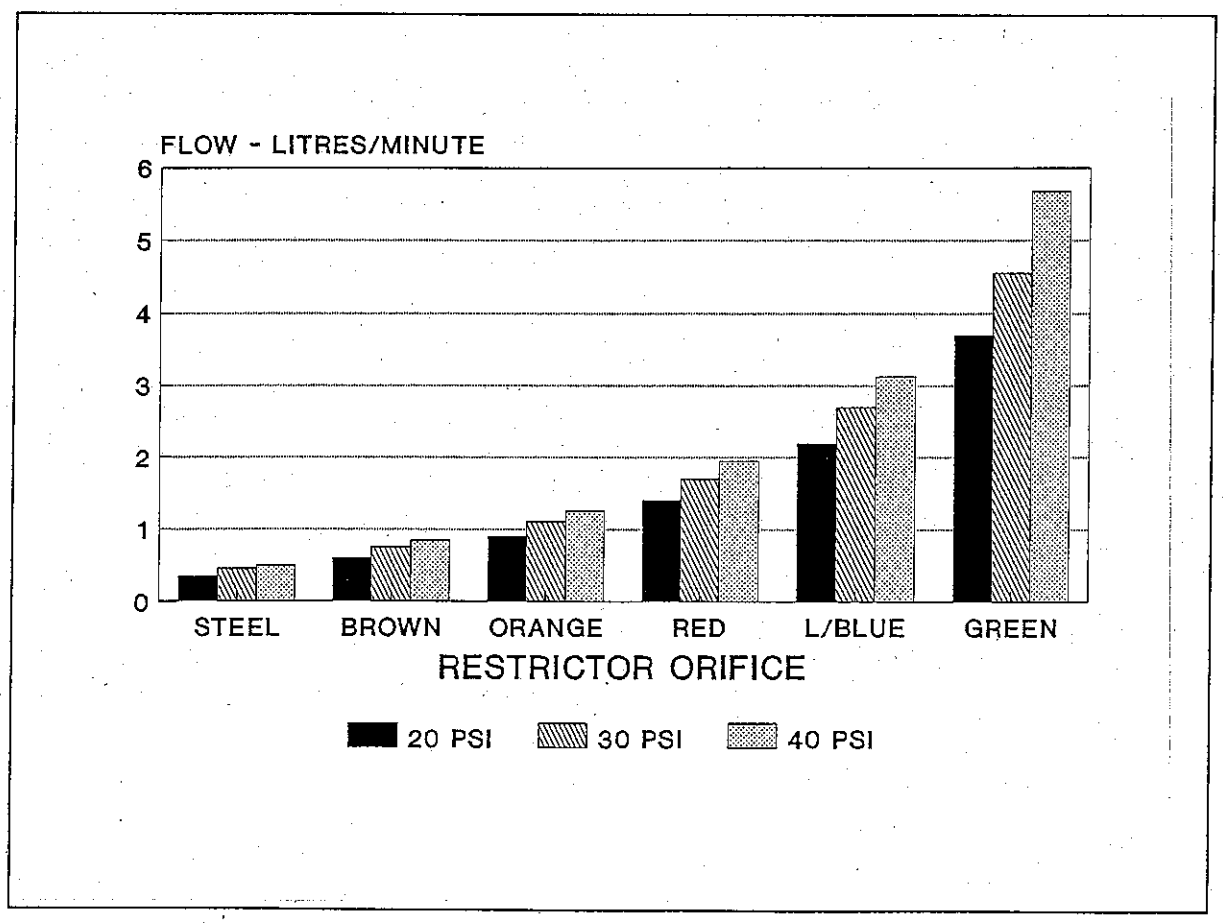
15. If the actual output is slightly too high or too low, it may be possible to adjust it by varying the chemical pressure.

16. If this adjustment is insufficient, the restrictor orifice or VRU adjustment for each atomiser must be changed to a smaller size or number to reduce the flow or a larger size or number to increase the flow.

17. The flow must always be re-checked after making any adjustments to the restrictors, VRUs or chemical pressure.

RESTRICTOR ORIFICE	FLOW RATE (LITRES/MINUTE)		
	1.4 Bar (20 PSI)	2.1 Bar (30 PSI)	2.8 Bar (40 PSI)
Stainless Steel #31	0.35	0.45	0.50
Brown	0.60	0.75	0.85
Orange	0.90	1.10	1.25
Red	1.40	1.70	1.95
Light Blue	2.20	2.70	3.12
Green	3.70	4.55	5.68

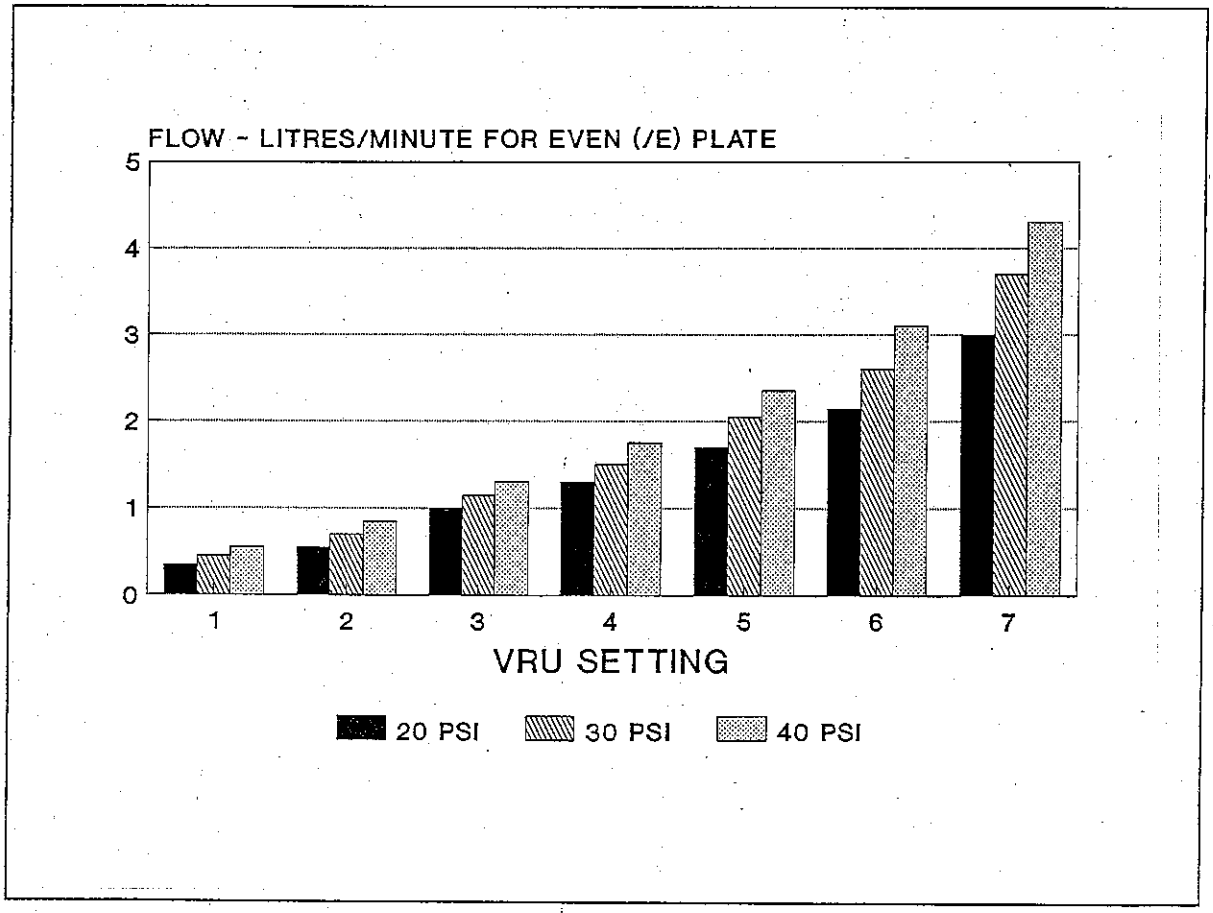
Table 2 - Approximate Flow Rates for Fixed Restrictor Orifices



Graph 2 - Approximate Flow Rates for Fixed Restrictor Orifices

RESTRICTOR NUMBER	FLOW RATE (LITRES/MINUTE)		
	1.4 Bar (20 PSI)	2.1 Bar (30 PSI)	2.8 Bar (40 PSI)
1	0.35	0.45	0.55
2	0.55	0.70	0.85
3	1.00	1.15	1.30
4	1.30	1.50	1.75
5	1.70	2.05	2.35
6	2.15	2.60	3.10
7	3.00	3.70	4.30

Table 3 - Approximate Flow Rates for VRU with Low (/L) Plate



Graph 3 - Approximate Flow Rates for VRU with Low (/L) Plate

7.2 Adjustment of Droplet Size

The size of the droplets produced by an AU8120 atomiser depends upon its rotational speed and the properties of the chemical. The speed of the atomiser is controlled by the velocity of air from the blower fan and by the length and angle of the fan blades.

The relationship between droplet size and rotational speed is shown in Graph 4. Note that this is based on tests with water and is not necessarily typical of all chemical formulations.

As most sprayers are designed to run at a fixed blower speed, the speed of the atomiser must be set by adjusting the angle of the fan blades.

AU8120 atomisers are supplied with the fan blades pre-adjusted to setting number 2 (see Fig. 6). This setting should provide a satisfactory starting point for tests with most machines.

If the droplet size is found to be too small, it can be increased by reducing the speed of the atomiser by setting the fan blades to a coarser angle. Similarly, the droplet size can be reduced by setting the fan blades to a finer angle and increasing the speed of the atomiser.

The atomiser blade angle can be changed as follows:

1. Slacken the four atomiser clamp ring securing screws (item 18 in Fig. 7) just sufficiently to allow the atomiser fan blades to be adjusted.

2. Adjust all four blades of the atomiser to a finer or coarser angle as required. See Fig. 6 for positions of setting marks. The blades should not be set finer than position 1 or coarser than position 6.

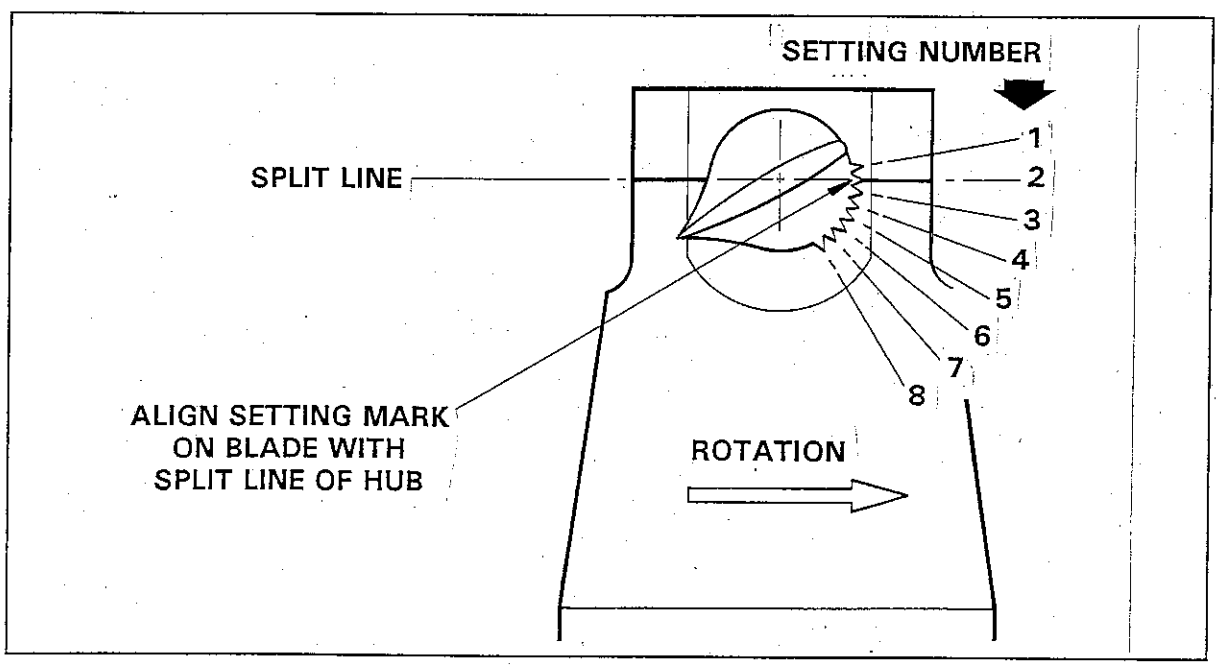
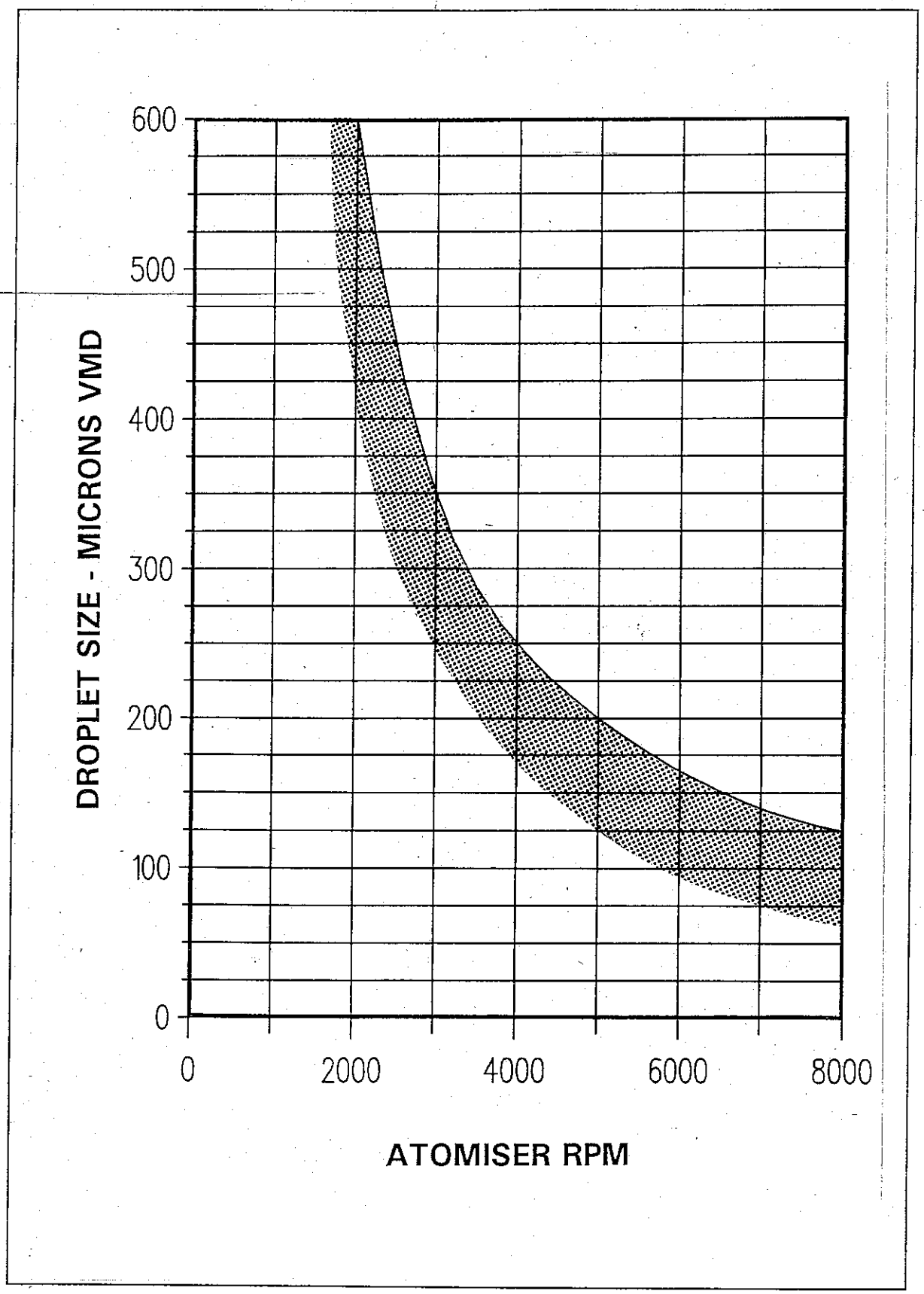


Fig. 6 - Setting Marks on Blade



Graph 4 - Relationship Between Rotational Speed & Droplet Size

3. Tighten the clamp ring screws just sufficiently to trap the fan blades and prevent them from moving. A torque of 0.3 nm (1 lb in) is sufficient. Overtightening the screws could distort the hub or clamp ring.

4. Carry out a test by spraying the actual chemical to be used onto sensitive cards, paper or slides. Check that the spray deposit is appropriate for the chemical and application technique. Note that sensitive cards only give a good indication of the number of droplets larger than about 60 microns. Smaller droplets may not mark some types of card. The apparent size of droplets on the card will be larger than the actual size due to spreading on the surface.

   Note that the end cap of the gauze is provided with a conical recess in the centre. This is intended to drive a hand-held tachometer to measure the speed of the atomiser. It is strongly recommended that atomiser speeds are checked when they are first fitted to a new type of sprayer.

8.0 MAINTENANCE

The AU8120 Atomiser is built from chemical resistant materials and its simple design and robust construction will ensure many years of trouble-free performance provided that it is not mistreated and is properly cleaned after use.

Every AU8120 Atomiser is dynamically balanced to ensure that it will run smoothly without vibration. Some chemicals, particularly certain solids in suspension or ULV formulations, can dry or crystalise on the gauze, blocking the mesh and causing the atomiser to vibrate. This can easily be avoided by spraying 1 - 2 litres of liquid from the atomiser at the end of each spray job. The liquid must be a solvent for the chemical which has been used. Water will normally only dissolve water-based formulations. Kerosene or diesel fuel is suitable for most ULV products.

The bearings of the AU8120 are sealed and are lubricated for life. The bearings should be replaced if they become worn.

If it is necessary to replace the bearings or any other part, the procedure to dismantle an atomiser is as follows (numbers in brackets refer to items in Fig. 7):

1. Cut the locking wire and remove the pipe elbow (25) and atomiser securing nut (12). Slide the atomiser from the support block.

2. Remove the four screws (18) and washers (19) from the blade clamp ring (3), lift off the ring and remove the blades.

3. Remove the three screws (22) securing the cap and deflector assembly (5). Pull the cap from the end of the gauze and push the spindle (2) through the atomiser.

4. If it is necessary to remove the gauze, insert a screwdriver through the holes in the rear of the gauze and take out the three screws (20) securing the gauze to the hub.

5. If it is necessary to remove the bearings, use a pair of circlip pliers to remove the circlip (17) from the front of the hub. Next, push an aluminium or brass drift against the inner part of the rear bearing and tap both bearings out through the front of the hub. Ensure that the hub (1), spacers (6 and 7) and ring (10) are not damaged or lost.

After dismantling the atomiser, the following should be checked:

Gauze (4)	- Free of dents or chemical contamination.
Bearings (13)	- Both in good condition. If one bearing is faulty, both must be replaced.
Tolerance Rings (16)	- Not cracked or deformed.
Bearing Spacers (6 and 7)	- Not corroded or worn.

V-Ring Seal (14)	- In good condition and not cut or worn.
Nilos Ring (15)	- Not worn or bent.

Any worn and damaged parts must be replaced with genuine Micronair spares. Any attempt at local repair or the use of substitute parts could seriously damage the unit and impair its performance.

The procedure to re-assemble an atomiser is the reverse of the dismantling procedure. It is important that the following points are observed:

1. A new Nilos ring should always be fitted when the bearings are replaced.

2. Fill the recess of the Nilos ring and brass sealing ring with grease. The bearings, spacers and lip of the V-Ring should also be coated with a thin film of grease before assembly.

3. The bearings must be pressed squarely into the hub and must not be allowed to become mis-aligned. They must NOT be driven in with a hammer.

4. The clamp ring (3) must be assembled in the correct position with the dimples in the ring and hub body aligned.

9.0 FIXED RESTRICTOR AND CHECK VALVE

Micronair supply a combined fixed flow restrictor and diaphragm check valve as standard with all AU8120 Atomisers. This restrictor is suitable for operators who normally work at the same application rate for all jobs. However, some operators may work at widely varying flow rates and may prefer the convenience of a variable restrictor which enables the flow rates to be changed without dismantling the restrictor. In these cases, a variable restrictor is available instead of the fixed restrictor (see section 10.0).

9.1 Principle of Operation

The fixed restrictor uses an interchangeable orifice plate which is retained in the body by a plastic cap. The cap is provided with a bayonet lock mechanism which enables it to be easily removed by hand. The body of the unit incorporates a spring-loaded diaphragm check valve to eliminate the possibility of chemical dripping from the atomiser when the main on/off control is closed.

9.2 Instructions for Use

All fixed restrictors must be fitted with the correct orifice plate. See section 7.1 for details of orifice plates and flow rates.

The restrictor cap should be removed by turning it a quarter turn anti-clockwise by hand. The orifice plate is held in position by a rubber ring. When changing the orifice plate, ensure that the ring remains in position and that the new plate is correctly seated before replacing the cap.

IMPORTANT: Orifice plates should not normally be changed when the system is filled with chemical. Should it be necessary to open a restrictor which contains chemical it is vital that the operator should wear suitable gloves and protective clothing.

9.3 Maintenance

Every fixed restrictor and check valve should be checked and cleaned periodically. The procedure is as follows:

1. Open the restrictor and remove the orifice plate and sealing washer.

2. Clean the orifice plate and check its hole for blockage and signs of wear. Should the hole be worn (often indicated by a rounded or eroded edge to the hole) the plate must be replaced. This is vital to ensure accurate calibration.

3. Check the condition of the sealing washer. This must be replaced if it has swollen or become hardened with chemical.

4. Unscrew the cap of the check valve and remove the diaphragm. Check the condition of the diaphragm and the cap and plunger assembly. If the diaphragm is damaged or split it must be replaced with the appropriate spare part. The cap and plunger assembly cannot be dismantled or serviced and must be replaced complete if it is damaged or if the plunger sticks in the cap.

5. Reassemble the restrictor and check valve, ensuring that the protrusion on the face of the diaphragm locates in the hole of the plunger in the cap.

The calibration of a sprayer must always be checked after orifice plates have been changed or replaced.

See Fig. 8 for details of the construction and part numbers of the fixed restrictor and check valve.

10.0 VARIABLE RESTRICTOR UNIT

10.1 Principle of Operation

The Variable Restrictor Unit (VRU) is available as an optional alternative to the fixed restrictor described in section 9.0.

The VRU controls the flow to each atomiser by means of an orifice plate with a number of holes of different sizes drilled around its periphery. The orifice plate lies against a selector plate. This has a single hole and is attached by a shaft to the calibrated knob at the end of the unit. The hole in the selector plate can be set to align with any one of the holes in the orifice plate, thus controlling the chemical flow according to the hole size. Additionally, the selector plate can be aligned with a blank part of the orifice plate, providing a shut-off position. The thimble is made to 'click' into the appropriate position by means of a spring in the body which engages in grooves inside the thimble. This ensures that a hole in the orifice plate is always aligned with the hole in the selector plate. The positive location of the thimble eliminates any possibility of the selected orifice being altered unintentionally.

IMPORTANT: The flow must always enter the side of the VRU. This forces the selector plate against the orifice plate. Should the VRU be incorrectly installed with the chemical entering the end, the plates would be forced apart and an erratic flow would result.

10.2 Instructions for Use

The knob of the VRU is marked with odd numbers 1 - 13 around the outside and even numbers 2 - 14 on the end. VRUs supplied with AU8120 Atomisers are fitted with low numbered (/L) plates with holes 1 - 7 only. The VRU should be set by aligning one of the numbers 1 - 7 with the line on the VRU body. The numbers 8 - 14 are not used on standard VRUs supplied with these atomisers and should be ignored.

Should an unrestricted flow be required, the VRU can be set to the full flow position by turning the thimble to number 7, pulling it back and rotating through 90 degrees until it locks in the outward position. This separates the two plates and provides an uninterrupted flow. To release the unit from the full flow position, turn the knob in either direction until the spring returns the selector plate to the normal position. It is advisable to push down on the knob with the palm of the hand to ensure positive seating.

Should the unit become blocked after selecting the full flow position, it can sometimes be cleared by turning the selector plate backwards and forwards. Any contamination between the plates will hold the plates apart and give an irregular output.

10.3 Maintenance

Each VRU should be checked and cleaned periodically. Should it be necessary to dismantle the unit, the procedure is as follows:

1. Remove the VRU by disconnecting the outlet hose and unscrewing the unit from the feedpipe or inlet adaptor.

2. Remove the red knob by unscrewing the nut in the centre. Ensure that the washers on either side of the knob cap are not lost.

3. Using a spanner, unscrew the outlet fitting of the VRU. If this is tight, the body must be held by two locating holes under the thimble at the opposite end to the outlet. A special key, part number EX1942, is available from Micronair to assist in dismantling the VRU.

   IMPORTANT: Do not clamp the VRU by its body or inlet pipes as these may be permanently damaged.

4. Remove the orifice plate from the body and slide out the selector plate assembly and spring.

5. The shaft is sealed by a gland which is retained by a brass ring at the end of the body. This should not be disturbed unless the gland requires replacing. If replacement is necessary, the brass ring should be unscrewed and the old packing eased out of its seat.

Before re-assembly, all parts must be thoroughly cleaned. Particular attention must be given to the faces of the orifice and selector plates, the selector shaft and the indexing grooves inside the knob. Check that all are clean and correctly located.

The assembly procedure is as follows:

1. If the gland packing has been removed: fit a new packing into the seat in the body and screw down the retaining ring so that it just touches the packing. DO NOT TIGHTEN AT THIS STAGE.

2. Fit the spring against the selector plate and insert the assembly into the body, passing the shaft through the gland packing.

   IMPORTANT: Do not allow the step at the end of the shaft to damage the gland in the body.

3. Position the orifice plate in the body, making certain that the FLAT face rests against the selector plate and the locating pin engages in the hole inside the body.

4. Screw the outlet into the body and tighten with a spanner.

5. If the gland packing has been replaced or if the gland has shown signs of leaking: tighten the gland retaining ring to compress the packing. The ring should be tightened about half a turn before rotating the shaft. This procedure should be repeated until the shaft has seated into the packing. Loosen the ring slightly to enable the plates to close positively. If the shaft has a tendency to stick, check that the spring has sufficient tension

to overcome any resistance in the gland packing. If the packing shows signs of being tight or dry, lubricate the packing with light grease.

6. Fit the flat washer against the step on the selector shaft.

7. Fit the knob and lock in place with the 10-32 nut and lock washer.

8. Ensure that the knob rotates smoothly and 'clicks' positively in each position - see (5) above.

See Fig. 9 for details of the construction of the VRU and part numbers.

11.0 PARTS LISTS

When ordering spare parts, please specify the following information:

- Serial number of atomiser
- Approximate date of purchase
- Description of part
- Part number as shown in this section
- Number of parts required

11.1 AU8120 Airblast Atomiser

Item	Part No	Description	Qty	Notes
1	EX3667	Hub and Drive Tube	1	See Note 1
2	EX3677	Spindle Assy.	1	
3	EX3669	Clamp Ring	1	See Note 1
4	EX3676	Gauze Assy.	1	
5	EX4642	Cap and Deflector	1	
6	EX3685	Inner Spacer	1)	Supplied only
7	EX3686	Outer Spacer	1)	as a pair.
8	EX3670	Spacer Bush	1	
9	EX2206	Blade	4	Standard (224 mm fan diameter)
9	EX6380	Blade	4	Alternate (136 mm fan diameter)
9	EX4681	Blade	4	Alternate (117 mm fan diameter)
10	EX5044	Sealing Ring	1	
11	EX2701	Washer	1	
12	EX2265	Nut	1	
13	CBP776	Bearing	2	
14	CBP777	V-Ring Seal	1	
15	CBP774	Nilos Ring	1	
16	CBP808	Tolerance Ring	2	
17	CBP2107	Circlip	1	
18	CBP1720	Screw	4	
19	SP127C	Washer	4	
20	EX2612	Screw	3	
22	A206-C10	Screw	3	
23	EX4411	Mounting Block	1	
24	EX2275	Bush	1	
25	EX3315	Elbow	1	See Note 2
26	EX5062	Wave Washer	1	Not shown – fitted under rear bearing

Note:

1. Items 1 & 3 not available separately. These are only supplied as a pair – P/N EX3666.

2. This item is shown here for clarity. It is supplied as part of the installation kit but is not a part of the atomiser assembly.

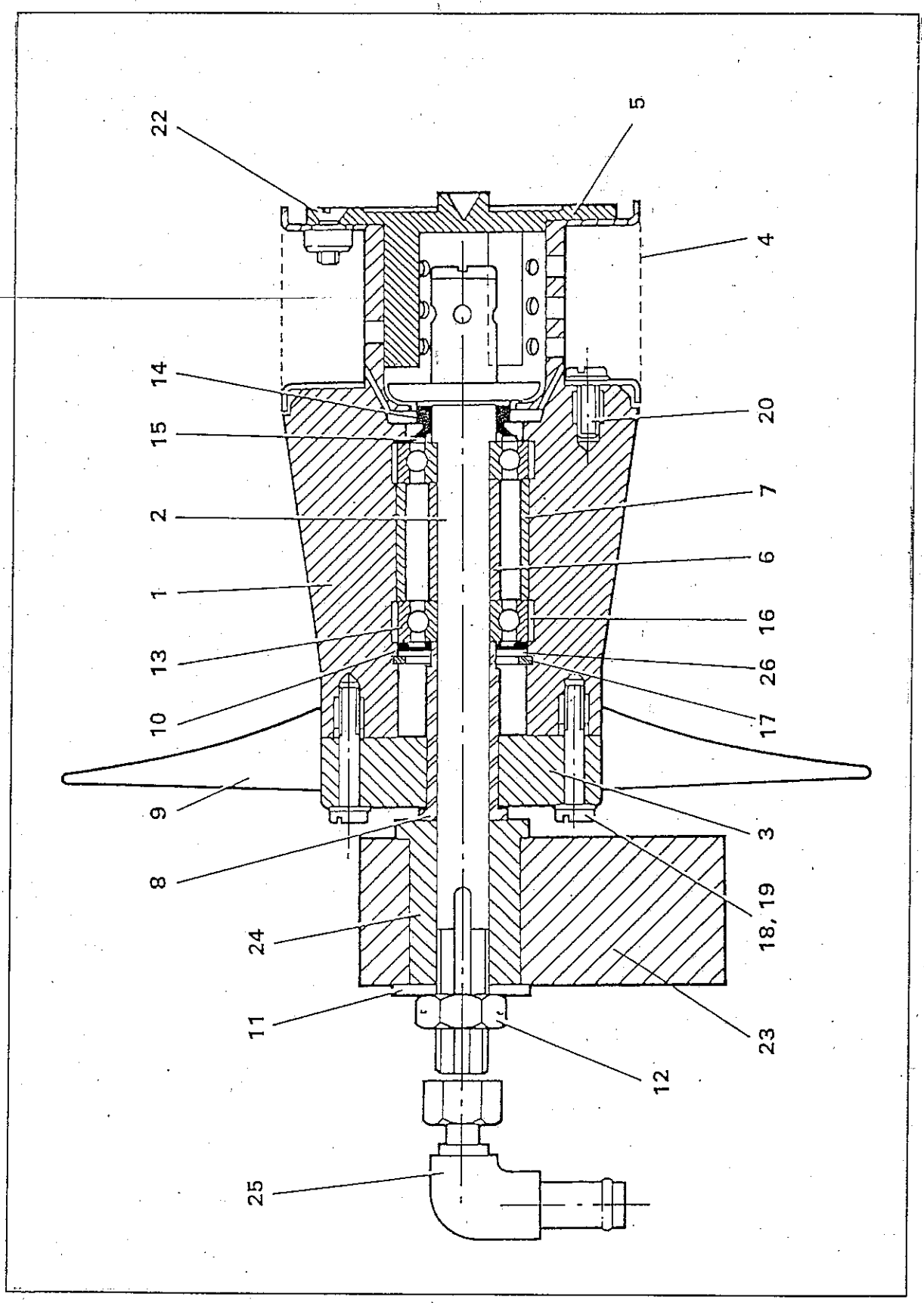


Fig. 7 - AU8120 Airblast Atomiser

11.2 Fixed Restrictor and Check Valve

Item	Part No	Description	Qty	Notes
1	CBP1797	Cap	1	
2	CBP1786	Outlet Fitting	1	3/8" Hose
3	CBP1849	Sealing Washer	1	
4A	CBP1873	Restrictor Orifice	1	S/Steel #31
4B	CBP1853	Restrictor Orifice	1	Brown
4C	CBP1854	Restrictor Orifice	1	Orange
4D	CBP1855	Restrictor Orifice	1	Red
4E	CBP1856	Restrictor Orifice	1	Light blue
4F	CBP1858	Restrictor Orifice	1	Green
5	CBP1796	Restrictor Body & Cap	1	Supplied together
6	CBP1848	Diaphragm	1	
7	CBP1785	Inlet Fitting	1	1/2" Hose
	EX4402	Complete Assembly	1	

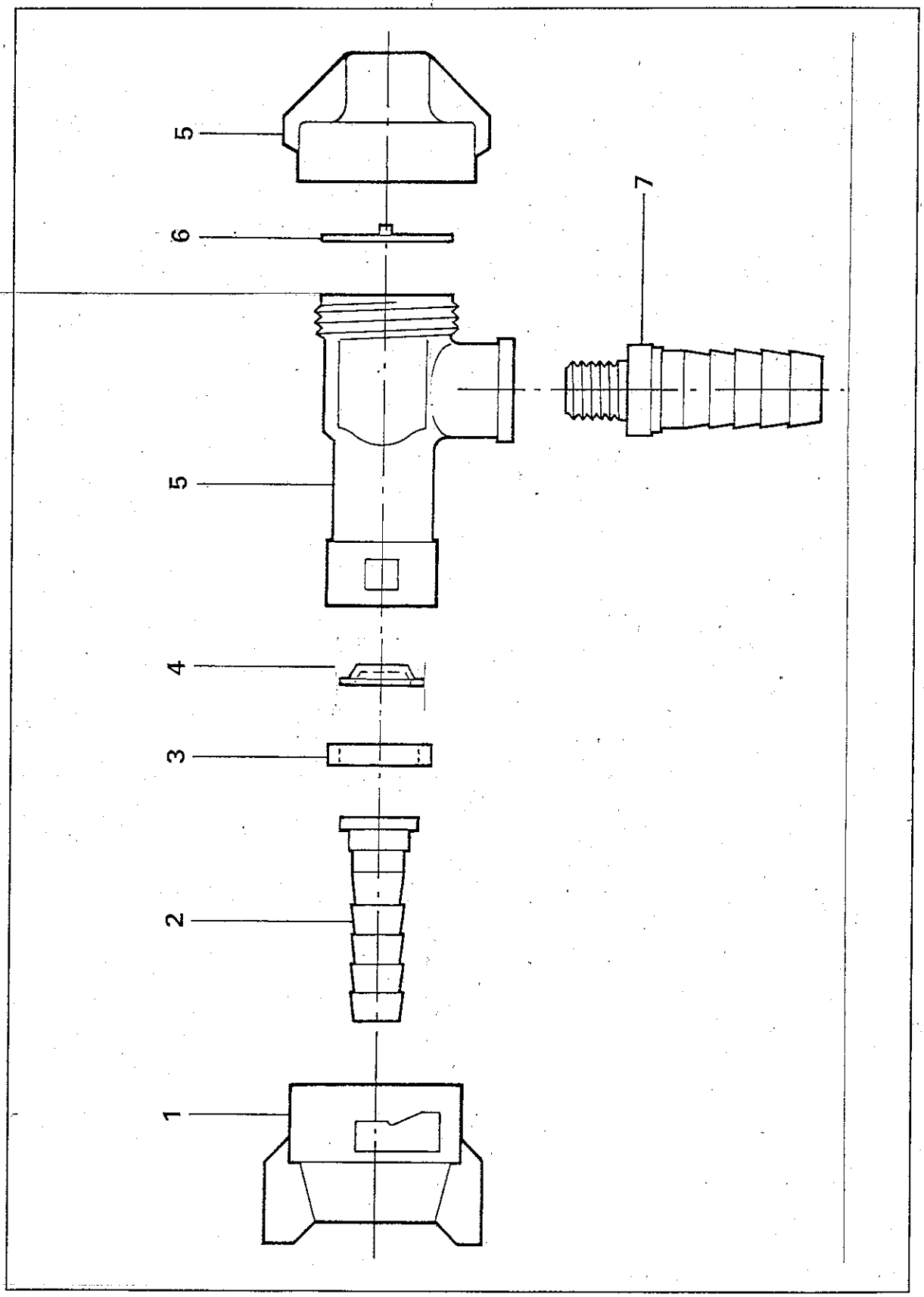


Fig. 8 - Fixed Restrictor and Check Valve EX4402

11.3 Variable Restrictor Unit

Item	Part No	Description	Qty	Notes
1	EX2188	Outlet Fitting	1	3/8" Hose
2	EX194/L	Restrictor Plate	1	Numbers 1 - 7
3	EX2081	Shaft & Selector Assy	1	
4	CBP493	Spring	1	
5	EX2094	Body Assy	1	1/4" NPT inlet
6	EX2077	Spring, Index	1	
7	EX72	Gland Packing	1	
8	EX71	Gland Retainer	1	
9	SP127D	Washer	1	
10	EX2069	Thimble	1	
11	AGS2037C	Washer, lock	1	
12	AN364-1032C	Stiffnut	1	
13	EX1954	Inlet Adaptor	1	1/2" Hose
	EX2336/L	Complete Assembly	1	With /L plate

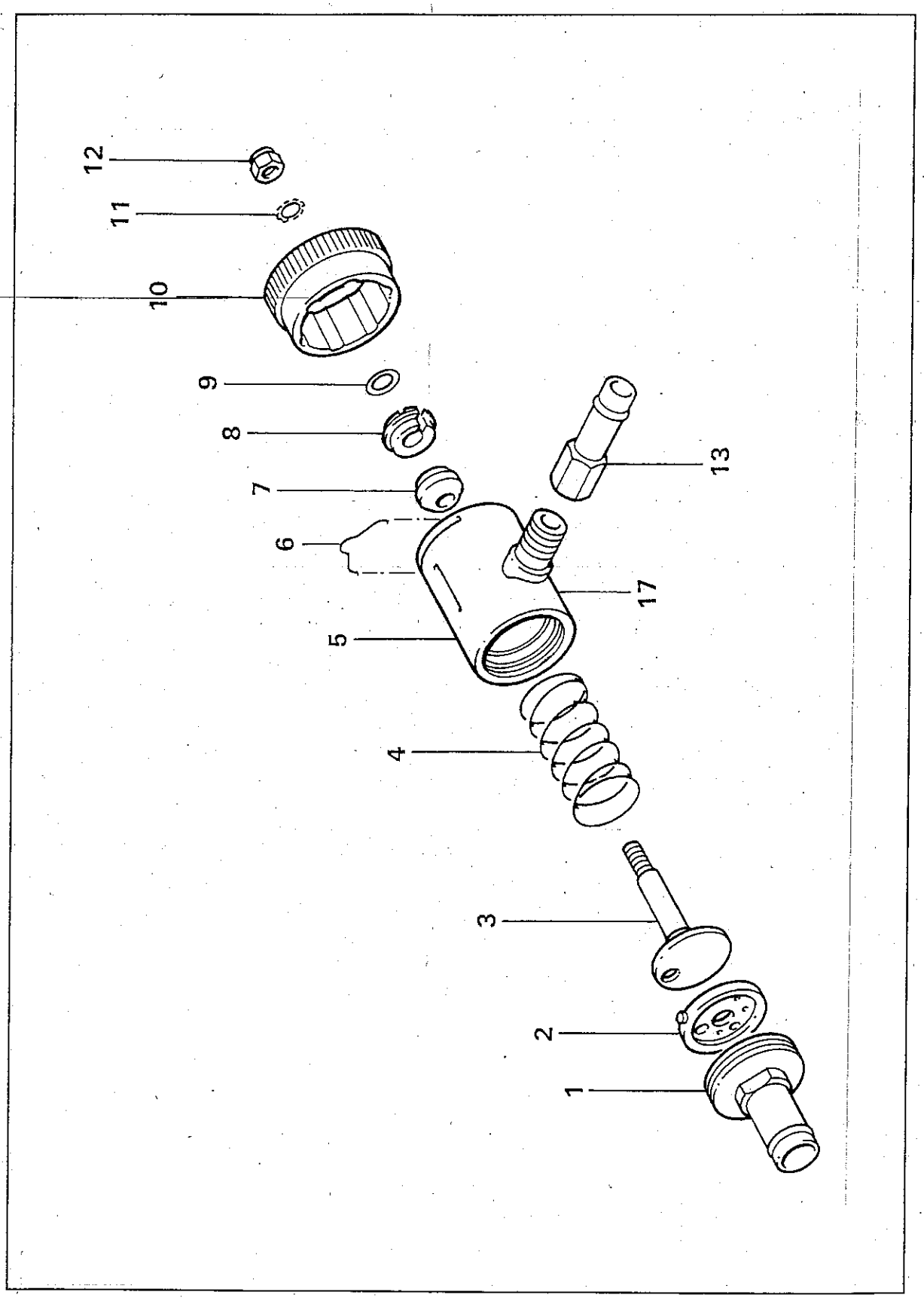


Fig. 9 - Variable Restrictor Unit EX2336/L

12.0 CONVERSION FACTORS

1 yard	= 3 feet	= 0.91 metre
1 metre	= 39.37 inches	= 1.09 yards
1 statute mile	= 0.87 nautical mile	= 1.61 kilometres
1 nautical mile	= 1.15 statute mile	= 1.85 kilometres
1 kilometre	= 0.62 statute mile	= 0.54 nautical mile
1 statute mile	= 1760 yards	= 5280 feet
1 nautical mile	= 2027 yards	= 6081 feet
1 kilometre	= 1094 yards	= 3282 feet
1 metre/sec	= 2.237 miles per hr	= 196.9 ft/min
1 acre	= 43560 sq feet	= 4840 sq yards
1 acre	= 4047 sq metres	= 0.40 hectare
1 hectare	= 107600 sq feet	= 11955 sq yards
1 hectare	= 10000 sq metres	= 2.47 acres
1 sq mile	= 640 acres	= 259 hectares
1 sq kilometre	= 247 acres	= 100 hectares
1 US gal	= 0.83 Imp gal	= 3.78 litres
1 Imp gal	= 1.20 US gals	= 4.54 litres
1 litre	= 0.26 US gal	= 0.22 Imp gal
1 US pint	= 16 US fl ounces	= 0.47 litres
1 Imp pint	= 20 Imp fl ounces	= 0.57 litre
1 US gal/acre	= 8 US pint/acre	= 9.45 litres/hectare
1 Imp gal/acre	= 8 Imp pints/acre	= 11.35 litres/hectare
1 litre/hectare	= 0.11 US gal/acre	= 0.081 Imp gal/acre
1 pound	= 16 ounces	= 0.45 kilogram
1 kilogram	= 2.20 pounds	= 35.3 ounces
1 ounce	= 28.35 grams	
1 pound/sq inch	= 0.068 atmosphere	= 0.067 bar
1 atmosphere	= 14.70 pounds/sq in	= 1.01 bar
1 bar	= 14.50 pounds/sq in	= 0.98 atmosphere

Every care has been taken in the design of this equipment and the preparation of this Handbook. However, Micron Sprayers Limited cannot accept responsibility for errors or the consequences thereof. The user must satisfy himself that the equipment is suited to his needs and is performing according to his requirements.