



AU7000 ATOMISER

Operator's Handbook and Parts Catalogue

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1. INTRODUCTION

The AU7000 atomiser has been developed from over 40 years experience in the design and use of rotary atomisers for agricultural aircraft. The atomiser is precision engineered from proven chemical resistant materials. Micronair atomisers have been supplied to more than 75 countries and have been fitted to over 30 types of fixed wing aircraft and helicopters. This unique background, combined with continuous research and development, has enabled Micron Sprayers to produce a truly versatile and reliable atomiser.

AU7000 atomisers are intended specifically for slow fixed wing aircraft and helicopters with a maximum airspeed of 160 Km/hr (100 MPH). They must not be used on faster aircraft. The AU5000 and AU4000 models are designed for use at airspeeds of 160 Km/hr (100 MPH) and above.

The Micronair AU7000 atomiser uses a rotating wire gauze cylinder to produce spray droplets. This ensures a narrow, controlled spectrum of droplet sizes. The atomiser is driven by the airflow past the unit by means of four highly efficient fan blades. These are adjustable in pitch, enabling the rotational speed of the atomiser to be varied as required. As the size of the spray droplets is determined by the rotational speed, the atomiser can be set to produce the correct size for a particular application by a simple adjustment of blade angle.

The AU7000 atomiser has been designed to operate over a wide range of flow rates. The unit is ideally suited for all application techniques from conventional Low Volume (LV) spraying with water based formulations at 10 – 20 litres/hectare to specialised Ultra Low Volume (ULV) spraying at 1 L/ha or less. Chemical flow to each atomiser is regulated by means of a Variable Restrictor Unit (VRU). This provides quick and easy adjustment of output over the entire operating range of the atomiser.

The easy and independent adjustment of droplet size and flow rate enable an aircraft equipped with AU7000 atomisers to be calibrated for a wide variety of chemicals and application techniques with a minimum of delay. This contrasts with conventional boom and nozzle systems where it is normally necessary to change all nozzles when a different calibration is required.

As the AU7000 atomiser does not contain any small orifices and does not require a high pressure to operate, blockages are rare, even with viscous liquids or high concentrations of solids in suspension. Should field service be necessary, the simple design of the atomiser enables it to be dismantled and cleaned in minutes.

Because of its light weight and low drag, the AU7000 atomiser can be fitted directly onto the standard spray booms of many helicopters and fixed wing aircraft without any structural modification.

The number of AU7000 atomisers installed on an aircraft depends upon the aircraft type, swath width and application rate (see Calibration section) but a minimum of four units is recommended to ensure an even swath in conventional spraying.

AU7000 installation kits are supplied complete with all accessories including attachment clamps, variable restrictor units, diaphragm check valves for instant chemical shut-off and all necessary pipework, hardware etc.

Mounting clamps are available to fit AU7000 atomisers to a wide range of round and streamline boom profiles.

2. SPECIFICATION

Weight:	1.5 Kg (3.3 lb) complete with mounting bracket
Flow rate:	0 – 10 litres/min (0 – 2.6 USG/min) per atomiser ¹
Flow control:	By Micronair variable restrictor unit.
Chemical shut-off:	By diaphragm check valve
Spray droplet size:	Variable between 60 – 500 microns VMD ²
Rotational speed:	Variable between 2,000 – 7,500 (max) RPM
Operating airspeed:	64 – 160 Km/hr (40 – 100 MPH)
Mounting:	By lightweight mounting clamp – available for all popular boom sections
Chemical feed:	From 1/8" or 1/4" NPT tapped boom outlet holes ³

NOTES:

1. Maximum flow rate for efficient atomisation will depend upon fluid properties. Data shown here is for water.
2. Droplet size at a given atomiser speed will depend upon the formulation used. The size will be reduced with ULV formulations.
3. Alternative fittings may be supplied with some installation kits if necessary.

3. TEN KEY POINTS FOR OPERATORS

The following list of ten key points is intended to assist operators in the efficient use of Micronair atomisers. We hope that this section will encourage pilots and engineers to read the entire Handbook and follow its recommendations.

1. Thoroughly check all parts of the spray system daily. Check the condition of all atomisers before each flight.
2. Ensure that all atomisers run smoothly. The only friction should be a small amount of drag from the V-ring seal. Do not continue to operate an atomiser which does not run smoothly. Remove the unit, dismantle the bearing assembly and check the bearings and the two matched bearing spacers that should be of identical lengths. Return the unit to the factory if the problem cannot be found.
3. Check that the spindle retaining nut is tight and wire locked. Under no circumstances should the atomiser be operated if the nut is slack. If the atomiser has been used with a loose nut, it is almost certain that the bearings or spacers will be damaged.
4. If greased bearings are installed, ensure that they are greased regularly but not excessively. Overgreasing can cause heating and destroy the bearings.
5. Inspect each gauze for chemical deposit, damage or any condition which may cause it to run out of balance. Gauzes should never be repaired in the field as they must be dynamically balanced after repair.
6. Check that all fan blades are in good condition and are set to the correct angle for the work being undertaken. Replace any damaged blades and ensure that the clamp ring securing bolts are not over-tightened. If the bolts are correctly tightened, it should be just possible to move the blades by hand. The gap between the clamp ring and hub must NOT be completely closed.
7. Inspect the diaphragm check valve for chemical leakage. This indicates a damaged or wrongly installed diaphragm.
8. Ensure that all VRUs are correctly secured, set to the appropriate number and that there is no evidence of chemical leakage
9. Check that the Application Monitor (if fitted) is functioning correctly. Verify the accuracy of the readings by checking the volume of chemical sprayed against the actual area sprayed and the spray time.
10. Should any vibration be noticed from the boom or atomisers, do not continue to operate. Reduce airspeed, land as soon as possible and check for loose attachments, correct blade settings, worn bearings or out of balance gauzes. Ensure that the hub, clamp ring and gauze are correctly assembled and aligned.

If a problem cannot be resolved with reference to this Handbook, please telephone, fax, telex or write to your distributor or to Micron Sprayers in England. Our staff will usually be able to give immediate advice.

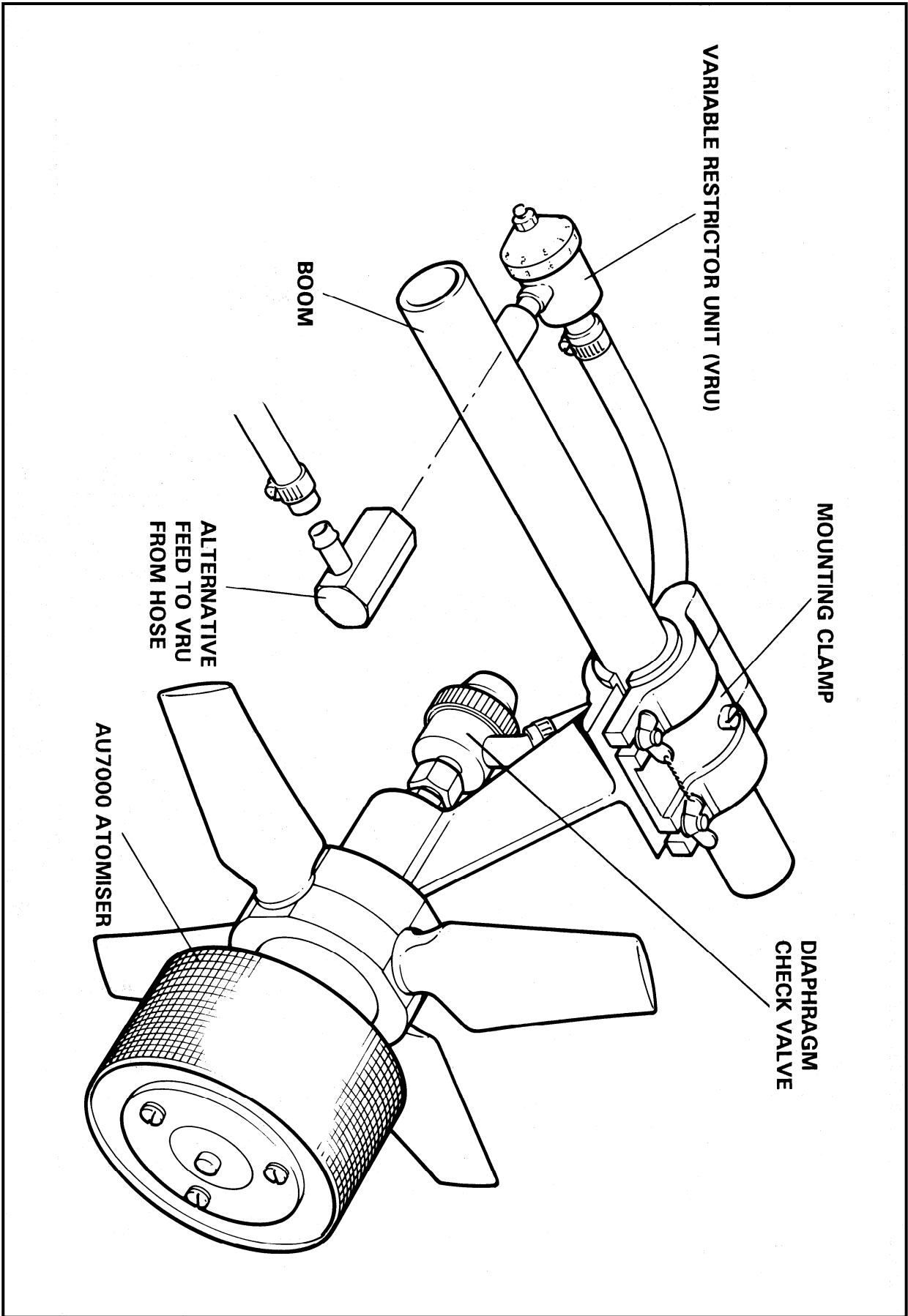


Fig. 1 – Typical Installation of AU7000 Atomiser

4. INSTALLATION

Micronair AU7000 atomisers are suitable for use on many types of helicopter and fixed wing aircraft operating at low airspeeds.

The atomisers are either installed on the existing spray booms or are mounted on special booms designed and manufactured by the customer for the purpose. In either case, the procedure for fitting the atomisers is as follows:

1. Inspect the spray booms, support brackets and attachments to the aircraft. These must all be in good condition and free of any cracks, leaks or corrosion. Replace any defective parts before installing the atomisers.
2. Remove all existing spray nozzles (where applicable).
3. Mark the centreline of each atomiser on the boom.
4. In the case of round section booms only: identify the nozzle hole nearest to each atomiser position and screw in a locating peg (EX1517). Use PTFE or similar thread sealant to ensure a leakproof fit. This peg will prevent the atomiser clamp from rotating on the boom.
5. Install an atomiser mounting clamp at each position marked in (3) above. Secure each clamp, using the wing nuts provided. Wire lock the two wing nuts. In the case of round booms: the clamps should be fitted over the locating pegs installed in (4) above, ensuring that each peg is correctly aligned in the hole of the clamp and that the atomiser mount protrudes to the rear of the aircraft. Rotate the boom in its mounting clamps as necessary to ensure that the hole for the spindle of the atomiser is horizontal when the aircraft is in the flight attitude. For round booms of less than 1.25" (32 mm) diameter, clamps are supplied with reducing bushes to suit the boom diameter. These must be fitted between the boom and clamp according to the instructions on the installation drawing.
6. Fit a Variable Restrictor Unit (VRU) part no EX2080 in a tapped nozzle hole adjacent to each atomiser. Each VRU has two inlet pipes. One is threaded 1/8" NPT male and the other 1/4" NPT male. Either of these may be screwed into the boom, depending upon the hole size. Use PTFE tape to seal these and all other screwed connections.

IMPORTANT: The VRUs feeding the outboard atomisers must be positioned at the extreme ends of the booms. This eliminates the possibility of air being trapped in the booms and causing a pulsating output of chemical or a slow shut-off at the end of the spray run.

7. Either close the unused VRU inlet pipe with the appropriate cap nut (EX1670 for the 1/8" thread or EX1671 for the 1/4" thread) or use this inlet as a second feed from the boom. The second feed should be used if the flow rate through each atomiser is likely to exceed 7 litres/min (1.8 USG/min).
8. Fit an atomiser into each mounting clamp, ensuring that the flat on the spindle is correctly located against the flat inside the shock bush in the bracket. The front and rear rubber shields (EX2255 and EX2261) must be fitted at each end of the shock bush prior to installing the atomiser. Ensure that the shields are correctly identified as they have different inside diameters and can easily be interchanged in error. Secure each atomiser with its retaining nut, making sure that the locking washer (EX2264) is fitted between the nut and the inner sleeve of the shock bush with its securing lug located in the slot of the bush.

Note that the locking washer has flats to allow it to be held with a 1¼" A/F spanner when the atomiser retaining nut is being tightened or undone. This avoids unnecessary strain on the rubber shock bush.

9. Fit an adaptor (EX2475) to the end of each atomiser spindle, using a brass olive (EX2571) to provide a seal to the end of the spindle.
10. Attach a diaphragm check valve (EX1525) to the adaptor on the spindle of each atomiser. The inlet pipe of the valve must face towards the boom.
11. Connect the outlet of each VRU to the inlet of the check valve, using the 1/2" hose and pipe clips supplied. Ensure that the hose cannot come into contact with the atomiser or any sharp edges and is not kinked. If the hose runs parallel to the boom for more than about 30 cm (12") or could move in flight it must be secured to the boom. Heavy duty nylon cable ties are suitable for this.
12. Blank off any unused holes in the boom, using the appropriate plugs supplied with the kit (EX1549 for 1/8" NPT holes or EX1566 for 1/4" NPT holes).
13. Wire (safety) lock all nuts and fittings as described in section 4.1.
14. Adjust all atomiser fan blades as described in the Calibration section.

IMPORTANT: Under no circumstances must the aircraft be flown until the fan blades have been adjusted and checked.

4.1. Securing and Wire Locking of Atomisers and Fittings

It is vital that the securing nuts and fittings of each AU7000 atomiser are wire (safety) locked in accordance with standard aircraft practice. Failure to comply with this requirement could result in chemical leaks, damage to components or loss of equipment and possible serious damage to the airframe.

Components must be wire locked as follows:

1. The two wing nuts of the mounting clamp must be evenly tightened to a torque of approximately 0.7 nm (0.5 lb ft) and wire locked together using the holes provided as shown in Fig. 2.
2. Tighten the atomiser securing nut (EX2265) to a torque of approximately 14 nm (10 lb ft) and wire lock to one hole in the locking washer (EX2264) as shown in Fig. 2. Note that this nut must never be allowed to become loose. Should an atomiser be run with a loose nut, the bearings and bearing spacers are likely to be damaged. If the atomiser is found not to run freely when the nut is tightened as described above, the bearing assembly must be dismantled, checked and parts replaced as necessary. Under no circumstances must the securing nut be wire locked until it has been correctly tightened.

3. Tighten the diaphragm check valve adaptor and securing nut and wire lock both of these to the second hole in the locking washer (EX2264) as shown in Fig. 2.

IMPORTANT: Under no circumstances should the atomiser securing nut or diaphragm check valve outlet be wire locked to the vertical portion of the mounting clamp. Movement of the shock bush could cause the wire to wear a groove in the clamp and weaken it.

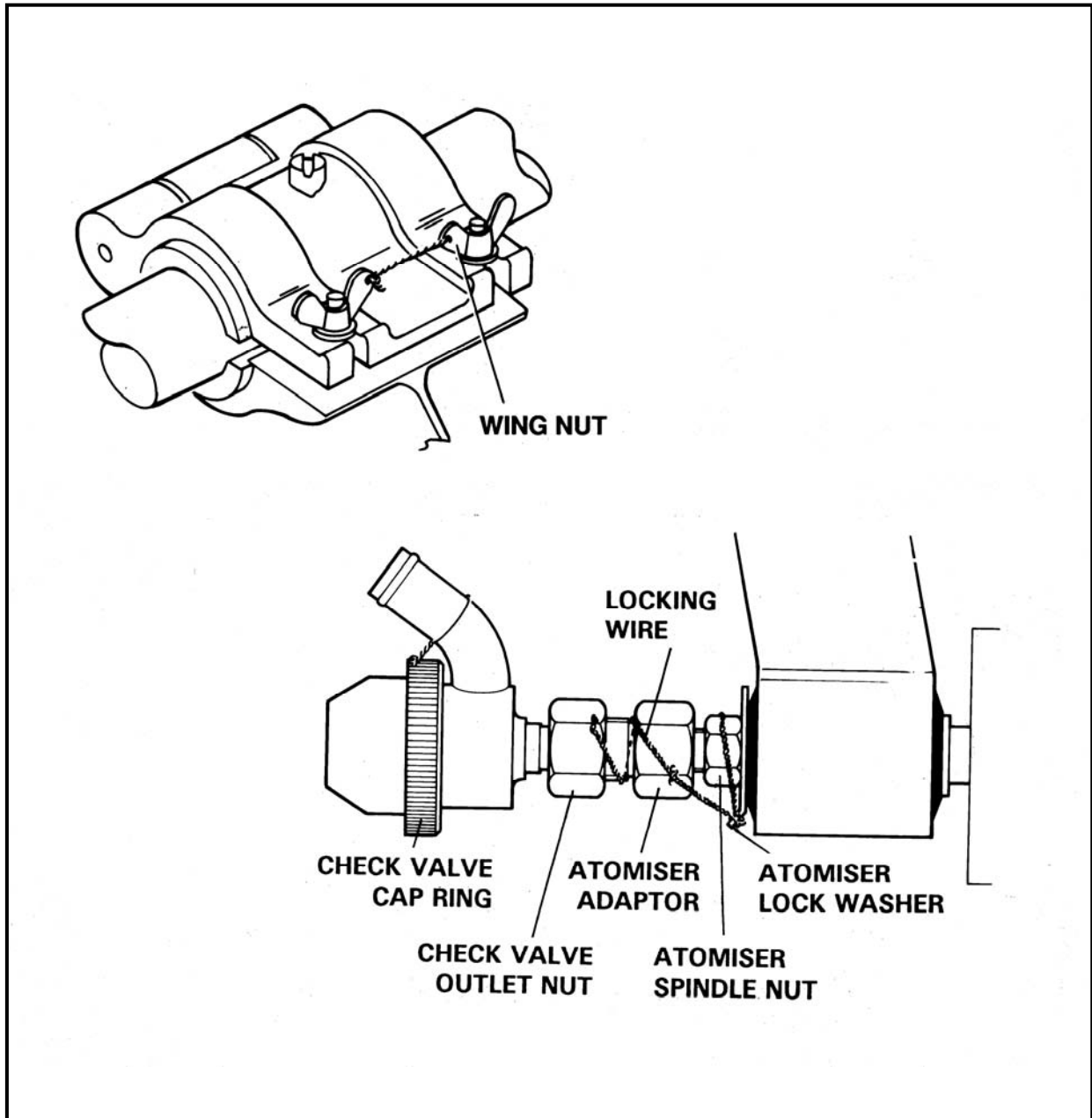


Fig. 2 – Wire Locking of Atomiser and Components

4.2. Alternative Mounting Clamps

Mounting clamps are available to install AU7000 atomisers on many different sections of round and streamline boom. Some of these are shown in the drawings below, together with their part numbers and dimensions. Operators must establish the correct clamp for their requirements and order by type, dimensions and part number. Special clamps can also be supplied to order for some non-standard boom profiles.

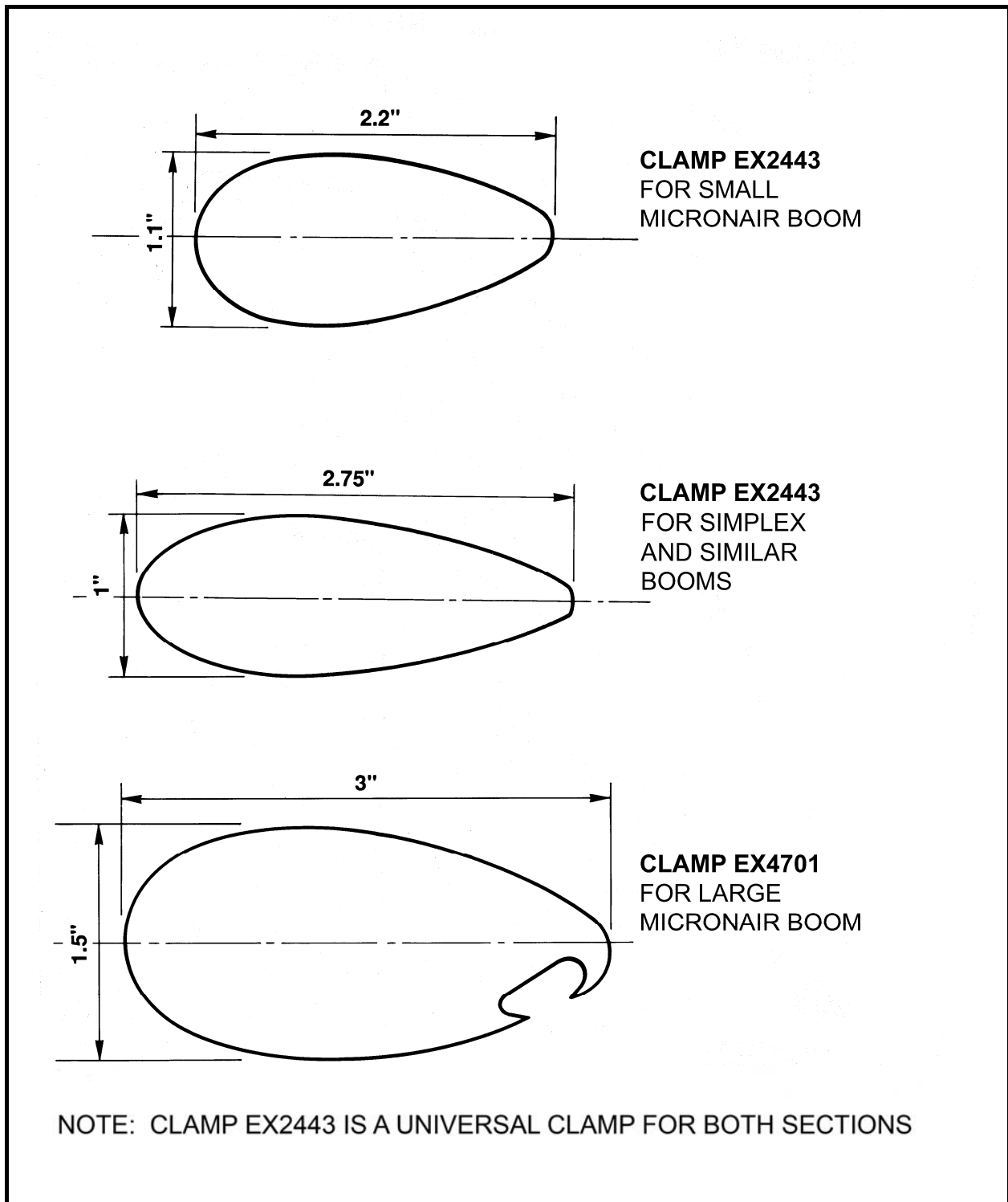


Fig. 3 – Dimensions of Clamps for Streamline Booms

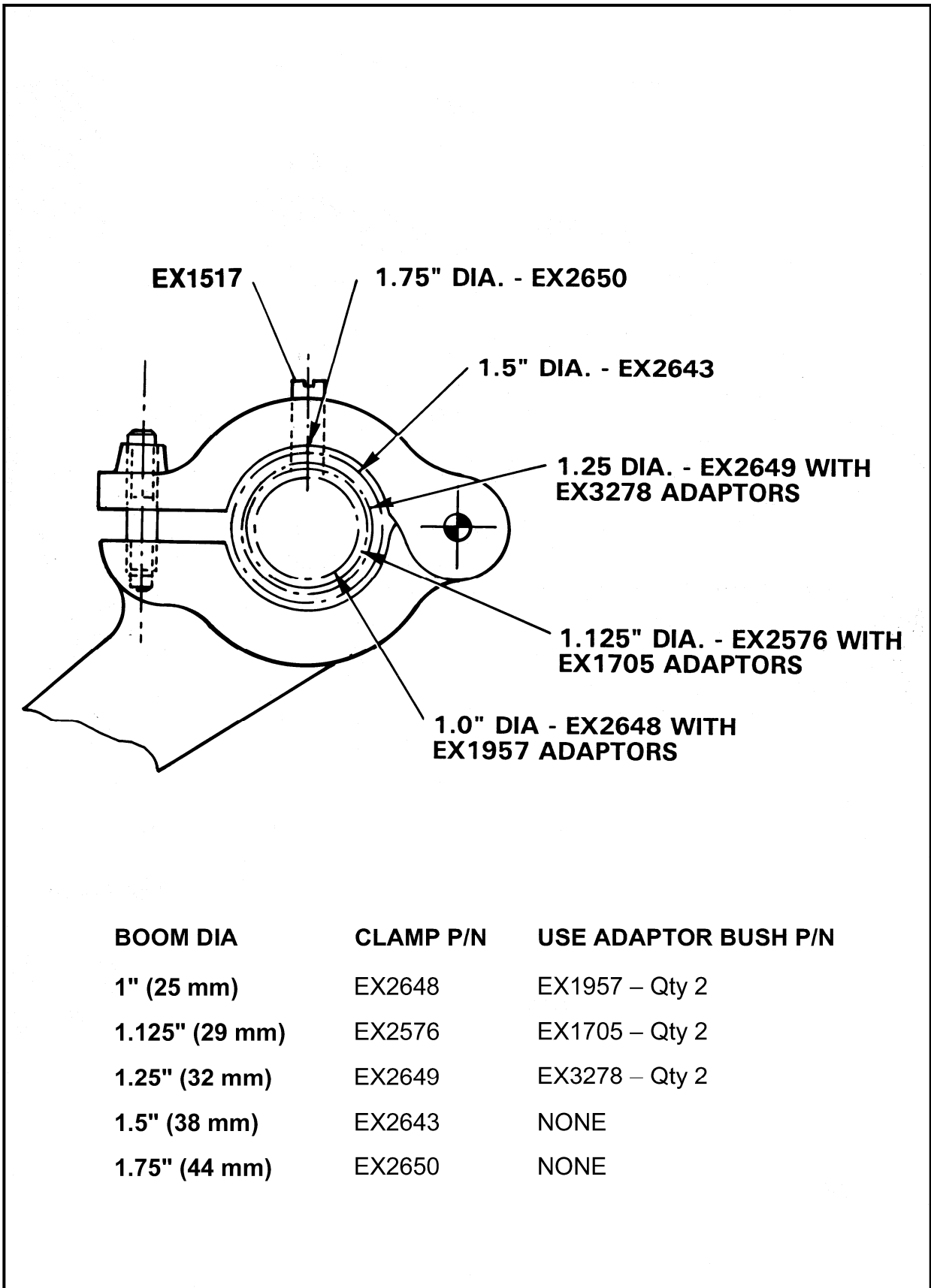


Fig. 4 – Clamps for Round Booms

5. OPERATION

As with all spraying equipment, optimum results will only be obtained with AU7000 Atomisers if they are correctly calibrated, operated and maintained. The role of the pilot in this is vital. Not only is he in the best position to monitor the performance of the equipment but the effectiveness and safety of the operation are in his hands.

It is important that every pilot who uses the equipment is completely familiar with its operation, calibration and use. It is therefore recommended that all pilots read this Handbook thoroughly before commencing operations. The following sections emphasise points of particular importance.

5.1 General Comments

Many pilots and operators who are not familiar with Micronair equipment believe incorrectly that it is only intended to produce very fine droplets at very low application rates.

In fact, an important advantage of Micronair atomisers is that they can be adjusted to give either a very small droplet or a large droplet depending upon the requirement of a particular treatment.

A small droplet is essential for ULV agricultural spraying and an even smaller droplet is necessary for aerosol or drift spraying as used for public health, tsetse, locust or mosquito control.

A placement spraying technique is used for LV insecticide or fungicide application and a larger droplet size is necessary to ensure that the droplets do not evaporate significantly or drift away from the target area.

Where herbicide application is envisaged, a much coarser droplet can be selected to keep the risk of drift to a minimum.

The operator or pilot must always be aware of the requirements for the treatment being undertaken and make certain that the equipment is set accordingly. Full details will be found in the Calibration section.

5.2 Daily Inspection

The pilot and engineer should check all parts of the spray system thoroughly at least once a day. A complete check list is included in the Maintenance section of this Handbook. However, particular attention must be paid to the condition of the atomisers and all clamps, pipes and fittings. All atomisers must run smoothly and the gauzes must be free of any dents or blockage due to dried chemical.

5.3 Calibration Procedure

Before use, the aircraft spray system must be accurately calibrated for both application rate and droplet size. 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.

5.4 Operating Technique

5.4.1 Low Volume (LV) Spraying

An aircraft fitted with AU7000 atomisers should be operated in exactly the same way as one fitted with a conventional boom and nozzle system.

The swath width will be a function of aircraft type, flying height, droplet size and climatic conditions. Generally, the swath width with AU7000 atomisers will be the same as with conventional spray equipment. See the Calibration section for details of methods of establishing swath width.

Flying height will depend upon the terrain, crop, obstructions and climatic conditions. However, the optimum height of the atomisers above the crop is 2 – 3 m (6 – 10 feet), provided that this can be achieved safely.

5.4.2 Ultra Low Volume (ULV) Spraying

The low volatility of most ULV formulations allows them to be sprayed from a greater height without loss due to evaporation. In order to achieve adequate coverage at ULV rates the droplet size must be reduced compared with that used with water-based LV formulations.

The combination of smaller droplet size and greater flying height result in a wider swath width than could be achieved at LV rates with the same aircraft. Any cross-wind should be utilised to increase the effective swath width. However, it is vital that the pilot should be aware of the downwind swath displacement so as to avoid accidental off-target application.

The choice of flying height and consequent swath width for ULV spraying must be made in the context of local conditions. As a guide, the height of the atomisers above the crop should be about 3 – 5 m (10 – 15 feet) and the swath width can be expected to be about 20 – 35% greater than for LV application with the same aircraft. Under some circumstances (e.g. drift spraying against locusts and migrant pests) the aircraft should be flown at a much greater height and the cross-wind allowed to carry the spray droplets over an effective swath of 100 m or more.

5.5 Observation in Flight

Once an aircraft has been calibrated, the pilot must monitor the system in flight. Output rate must be checked with the Application Monitor (if installed) or by noting the amount of product used from the aircraft tank or hopper in a given time.

The spray output from each atomiser should be checked visually. A reduced or uneven plume of spray from one unit indicates either blockage of a hose, incorrect adjustment of the VRU or a slow turning atomiser. Any discrepancies must be noted and reported to maintenance personnel for immediate attention.

If an RPM indicator is installed, the pilot should occasionally check the speed of each atomiser whilst spraying. The speeds of all atomisers should be approximately equal and should not normally differ by more than 200 – 400 RPM.

The pilot must check regularly for any signs of excessive vibration. This can be due to a damaged atomiser, a build-up of chemical in one or more of the atomiser gauzes, a worn bearing assembly, loose attachments or a damaged blade. Vibration will either be felt through the airframe or will be visible at the atomiser or the adjoining boom.

If excessive vibration is detected, the pilot must reduce airspeed as much as possible and land as soon as possible. Full details on the importance of atomiser balance will be found in the Balance section of this Handbook and the necessary corrective action is described in the Maintenance section.

6. HEALTH AND SAFETY

Legislation regarding the application of chemicals which are potentially harmful to individuals or the environment varies considerably between countries. Operators using chemicals and equipment must ensure they are working within the regulations applicable to their area.

Irrespective of legislation, Micron Sprayers advise the users of their equipment that all possible care must be taken to ensure the health and safety of the user and personnel in the vicinity of the spraying operation.

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

1. The application of each chemical should follow the recommendations of the manufacturer. Extreme care should be taken to prevent chemical reaching the operator or any other people, animals or neighbouring crops where contamination could have an adverse effect.
2. Ensure that the equipment is correctly calibrated for the chemical being used.
3. Suitable clothing, eye protection and masks must be worn when working with or near toxic chemicals and operators must adhere to all relevant handling precautions and regulations.
4. The entire spray system and all ancillary equipment must be thoroughly washed out after use or before maintenance.
5. All chemical residues must be safely stored or disposed of.
6. All used chemical containers must be safely disposed of in accordance with local regulations and requirements.
7. First aid and washing facilities must always be available and personnel must be trained in their use.

7. CALIBRATION AND ADJUSTMENT

7.1 General

The calibration procedure for an aircraft fitted with Micronair atomisers is in two stages: adjusting the application rate (see 7.2) and setting the droplet size (see 7.3). Unlike conventional pressure nozzles, these two variables are largely independent and one can be changed without significantly affecting the other.

7.2 Application Rate

The flow rate of product from the aircraft must be adjusted to give the correct application rate on the crop or target.

The output from each atomiser is controlled by its Variable Restrictor Unit (VRU). Each VRU contains a restrictor plate which has a series of holes of different sizes (see section 9.1). A selector plate attached to the adjustment knob exposes any one of these holes, providing a flow to the atomiser that depends upon the size of the orifice. The holes in the standard restrictor plate are numbered 1 – 13, odd numbers only. Higher numbers correspond to higher flow rates, with 13 being the highest and 0 a shut-off position. In addition to this standard plate, other special plates are available on request. See section 9.2 for full details.

The VRU can also be set to a full-flow position in which the restrictor plates are pulled apart and do not impede the flow. See section 9.2 for full details.

At a given VRU setting, fine adjustment of the total output from the aircraft is made by varying the boom pressure. The VRU settings must always be selected so as to allow a reasonable opening of the control valve (and hence boom pressure). This will ensure easy regulation of application rate.

Unlike conventional nozzles, a high pressure is not needed for the efficient operation of Micronair atomisers. A pressure of about 20 – 40 PSI (1.5 – 3 Bar) is recommended.

If it should be found that the swath from the aircraft is uneven, individual VRUs can be adjusted to regulate the flow through the appropriate atomisers and compensate for any under or over-application across the swath.

7.2.1 Aircraft Calibration

In order to establish the correct adjustment of each atomiser, it is first necessary to determine the total output from the aircraft. The procedure is as follows:

1. Refer to Table 1 or 2 to determine the coverage of the aircraft in hectares or acres per minute at the operating airspeed and swath width.
2. Multiply this figure by the required application rate in litres/hectare or gallons/acre to give the output from the aircraft in litres or gallons per minute.

3. Divide this by the number of atomisers to determine the output from each atomiser.
4. Refer to Table 3 or Graph 1 to establish the appropriate setting for the Variable Restrictor Units (VRUs). Note that standard VRUs are supplied with odd (/O) numbered restrictor plates (see section 9.2). If even (/E) numbered plates are being used for a specialised application, flow rates will be found in Table 4 and Graph 2. The VRU setting should be chosen to give the required flow rate at a boom pressure of between 20 – 40 PSI (1.5 – 3 Bar). The use of a lower pressure may not give a consistent output from all atomisers and higher pressures can result in unnecessary wear and tear on the system.

Note that the figures in this Handbook are based on tests with water. Actual flow rates will depend upon the properties (especially viscosity) of the liquid being sprayed. Actual flow rates must always be checked.

7.2.2 Adjustment of Flow Rate Through Atomisers on Ground

1. Fill the aircraft tank or hopper with the product to be used (or a liquid of similar viscosity).
2. Set each variable restrictor unit to the setting established in section 7.2.1 by aligning the appropriate number on the knob with the line on the VRU body. Note that two sets of numbers are shown on the knob. Standard VRUs use only the odd numbers shown on the side of the knob, so the even numbers at the end of the knob should be ignored.
3. If possible, run the chemical pump on the ground. If the design of the system does not permit this, connect the feed to the booms to an auxiliary pump.
4. Purge the system fully so as to eliminate all air from the pump and booms. Place a suitable container (e.g. a plastic bag or bucket) under each atomiser.
5. Open the boom valve for 1 minute or part of a minute depending on the rate of flow and size of container.
6. Measure the contents of each container and calculate the rate of flow from each atomiser. If this is insufficient, increase the boom pressure or select the next larger VRU orifice (higher number). If the output is excessive, reduce the boom pressure or select a smaller orifice.
7. Having established the appropriate VRU orifice and approximate boom pressure, the final adjustment of boom pressure must be made in flight.

SPEED Km/hr	SWATH WIDTH – METRES									
	12	14	16	18	20	30	40	50	75	100
120	2.4	2.8	3.2	3.6	4.0	6.0	8.0	10.0	15.0	20.0
130	2.6	3.0	3.4	3.9	4.3	6.5	8.6	10.8	16.3	21.6
140	2.8	3.2	3.7	4.2	4.6	7.0	9.3	11.6	17.5	23.3
150	3.0	3.5	4.0	4.5	5.0	7.5	9.3	12.5	18.8	25.0
160	3.2	3.7	4.2	4.8	5.3	8.0	10.6	13.3	20.0	26.6
170	3.4	3.9	4.5	5.1	5.6	8.5	11.3	14.1	21.3	28.3
180	3.6	4.2	4.8	5.4	6.0	9.0	12.0	15.0	22.5	30.0
190	3.8	4.4	5.1	5.7	6.3	9.5	12.7	15.8	23.7	31.7
200	4.0	4.7	5.3	6.0	6.7	10.0	13.3	16.7	25.0	33.3
210	4.2	4.9	5.6	6.3	7.0	10.5	14.0	17.5	26.3	35.0
220	4.4	5.1	5.9	6.6	7.3	11.0	14.7	18.3	27.5	36.7
230	4.6	5.4	6.1	6.9	7.7	11.5	15.3	19.1	28.7	38.3

FORMULA: Hectares/min = $\frac{\text{Speed (Km/hr)} \times \text{Swath (m)}}{600}$

Table 1 – Hectares Sprayed per Minute

SPEED MPH	SWATH WIDTH – FEET									
	30	35	40	45	50	75	100	200	300	500
75	4.5	5.2	6.0	6.7	7.5	11.2	15.0	30.0	45.0	75.0
80	4.8	5.6	6.4	7.2	8.0	12.0	16.0	32.0	48.0	80.0
85	5.1	5.9	6.8	7.6	8.5	12.7	17.0	34.0	51.0	85.0
90	5.4	6.3	7.2	8.1	9.0	13.5	18.0	36.0	54.0	90.0
95	5.7	6.6	7.6	8.5	9.5	14.2	19.0	38.0	57.0	95.0
100	6.0	7.0	8.0	9.0	10.0	15.0	20.0	40.0	60.0	100.0
110	6.6	7.7	8.8	9.9	11.0	16.5	22.0	44.0	66.0	110.0
120	7.2	8.4	9.6	10.8	12.0	18.0	24.0	48.0	72.0	120.0
130	7.8	9.1	10.4	11.7	13.0	19.5	26.0	52.0	78.0	130.0
140	8.4	9.8	11.2	12.6	14.0	21.0	28.0	56.0	84.0	140.0
150	9.0	10.5	12.0	13.5	15.0	22.5	30.0	60.0	90.0	150.0

FORMULA: Acres/min (approx) = $\frac{\text{Speed (MPH)} \times \text{Swath (feet)}}{500}$

Table 2 – Acres Sprayed per Minute

**FLOW THROUGH VRU WITH AU7000 ATOMISER WITH
DIAPHRAGM CHECK VALVE**

SETTING NUMBER	PRESSURE PSI	FLOW PER MINUTE PER ATOMISER		
		Imp pints	US pints	Litres
1	20	0.47	0.57	0.27
	30	0.95	1.15	0.54
	40	0.70	0.85	0.40
3	20	1.40	1.70	0.80
	30	1.75	2.12	1.00
	40	2.04	2.47	1.16
5	20	2.46	2.98	1.40
	30	3.16	3.83	1.80
	40	3.72	4.51	2.12
7	20	4.49	5.45	2.56
	30	5.79	7.02	3.30
	40	7.72	9.36	4.40
9	20	8.42	10.21	4.80
	30	10.00	12.13	5.70
	40	11.51	13.96	6.56
11	20	12.28	14.89	7.00
	30	15.44	18.72	8.80
	40	18.07	21.91	10.30
13	20	16.49	20.00	9.40
	30	19.65	23.83	11.20
	40	22.46	27.23	12.80

The above figures are based on tests with water. Actual flow rates will vary according to the installation and chemical used. Operators should always check flow rates under field conditions.

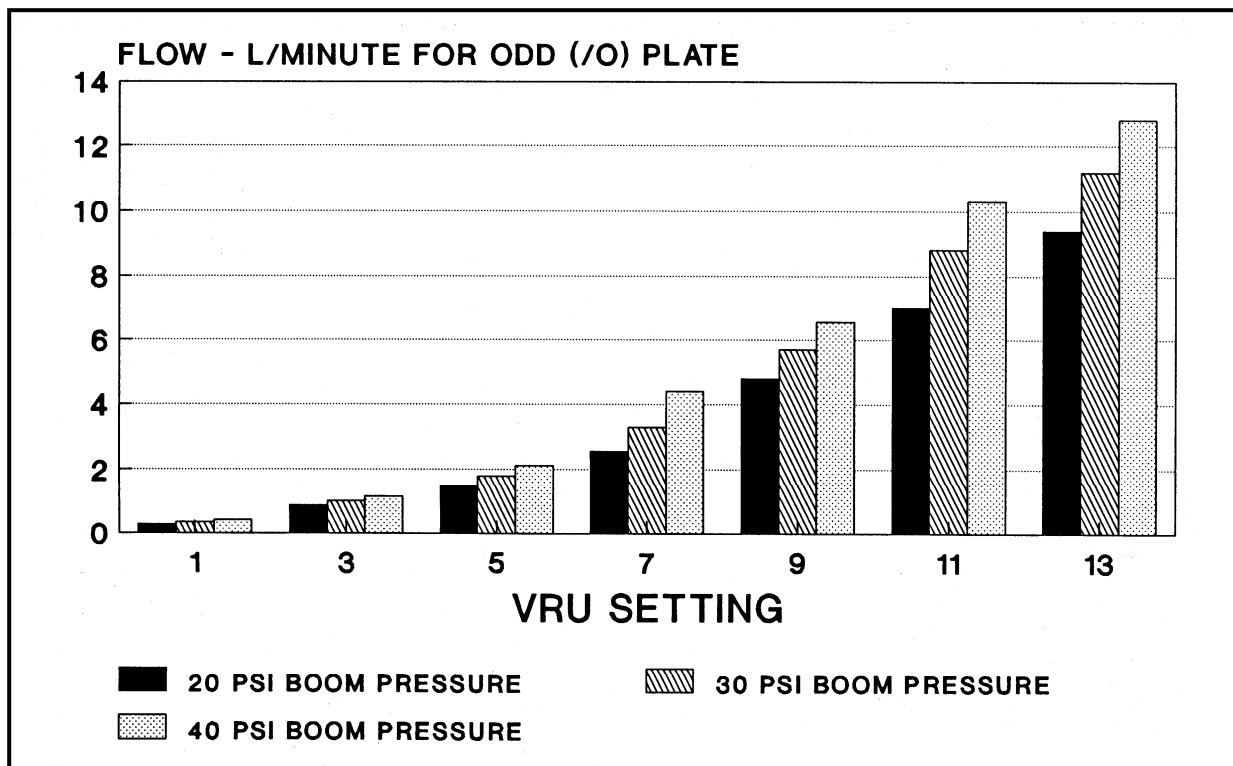
Table 3 – Flow from VRU Fitted with Standard Odd Numbered Plate

**FLOW THROUGH VRU WITH AU7000 ATOMISER WITH
DIAPHRAGM CHECK VALVE**

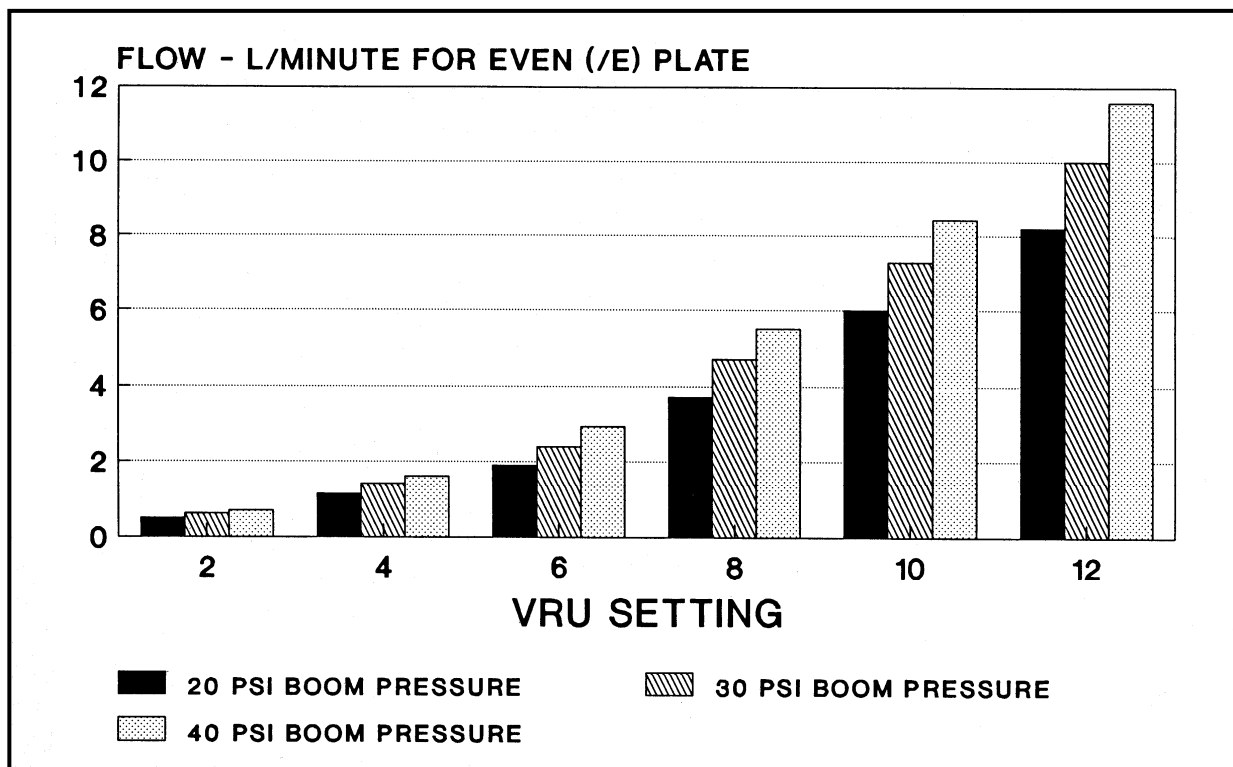
SETTING NUMBER	PRESSURE PSI	FLOW PER MINUTE PER ATOMISER		
		Imp pints	US pints	Litres
2	20	0.86	1.04	0.49
	30	1.05	1.28	0.60
	40	1.19	1.45	0.68
4	20	1.96	2.38	1.12
	30	2.46	2.98	1.40
	40	2.81	3.40	1.60
6	20	3.33	4.04	1.90
	30	4.21	5.11	2.40
	40	5.12	6.21	2.92
8	20	6.49	7.87	3.70
	30	8.26	10.02	4.71
	40	9.65	11.70	5.50
10	20	10.53	12.77	6.00
	30	12.81	15.53	7.30
	40	14.79	17.94	8.43
12	20	14.44	17.51	8.23
	30	17.54	21.28	10.00
	40	20.35	24.68	11.60

The above figures are based on tests with water. Actual flow rates will vary according to the installation and chemical used. Operators should always check flow rates under field conditions.

Table 4 – Flow from VRU Fitted with Optional Even Numbered Plate



Graph 1 – Flow from VRU Fitted with Standard Odd Numbered Plate



Graph 2 – Flow from VRU Fitted with Optional Even Numbered Plate

7.3 Droplet Size

The mean size of the spray droplets produced by an atomiser is determined by the rotational speed of the gauze. As the gauze is turned by the fan blades in the airstream, the speed of rotation is controlled by both airspeed and blade angle. The airspeed is determined by the type of aircraft and spraying operation, hence the droplet size is controlled by the setting of the fan blades.

7.3.1 Determining Blade Angle

The AU7000 atomiser must only be used with EX4734 fan blades, which are 3.75" long (see Fig. 5). The approximate relationship between droplet size and rotational speed for the AU7000 atomiser with EX4734 fan blades is shown in Graph 3. To determine the correct rotational speed (RPM), find the desired droplet size on the vertical scale and draw a line across to meet the curve. Next, draw a vertical line down from this point and read the RPM on the horizontal scale at the bottom.

Note that the droplet size produced by an AU7000 atomiser is influenced by the properties of the chemical being sprayed. In general, ULV formulations will tend to form smaller droplets than water-based LV formulations at the same rotational speed. This is indicated by the shaded band below the curve in Graph 3.

Having established the correct RPM it is necessary to find the appropriate blade angle setting to produce this RPM at the operating airspeed. The relationship between airspeed, RPM and blade angle is shown in Graph 4.

Blade angle is shown over the range 25 – 55 degrees, which is the normal operating range of the atomiser. There are two lines on Graph 4 for each blade setting shown. These are marked Dry and 10 l/min corresponding to an atomiser spraying no (or very little) chemical and 10 l/min (2.6 USG/min). As the volume of chemical flowing through the atomiser is increased, greater power is required to break it into droplets. This results in the atomiser slowing down. Consequently, it is necessary to set the fan blades to a finer angle to bring the speed back to the required level when spraying higher volumes.

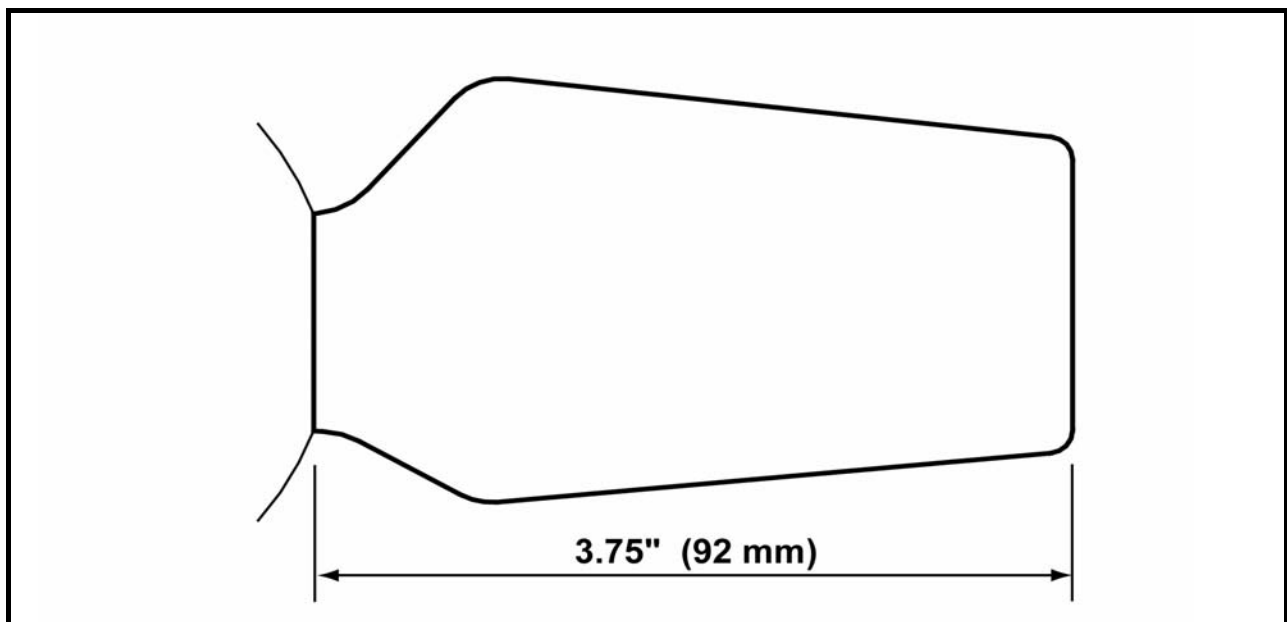
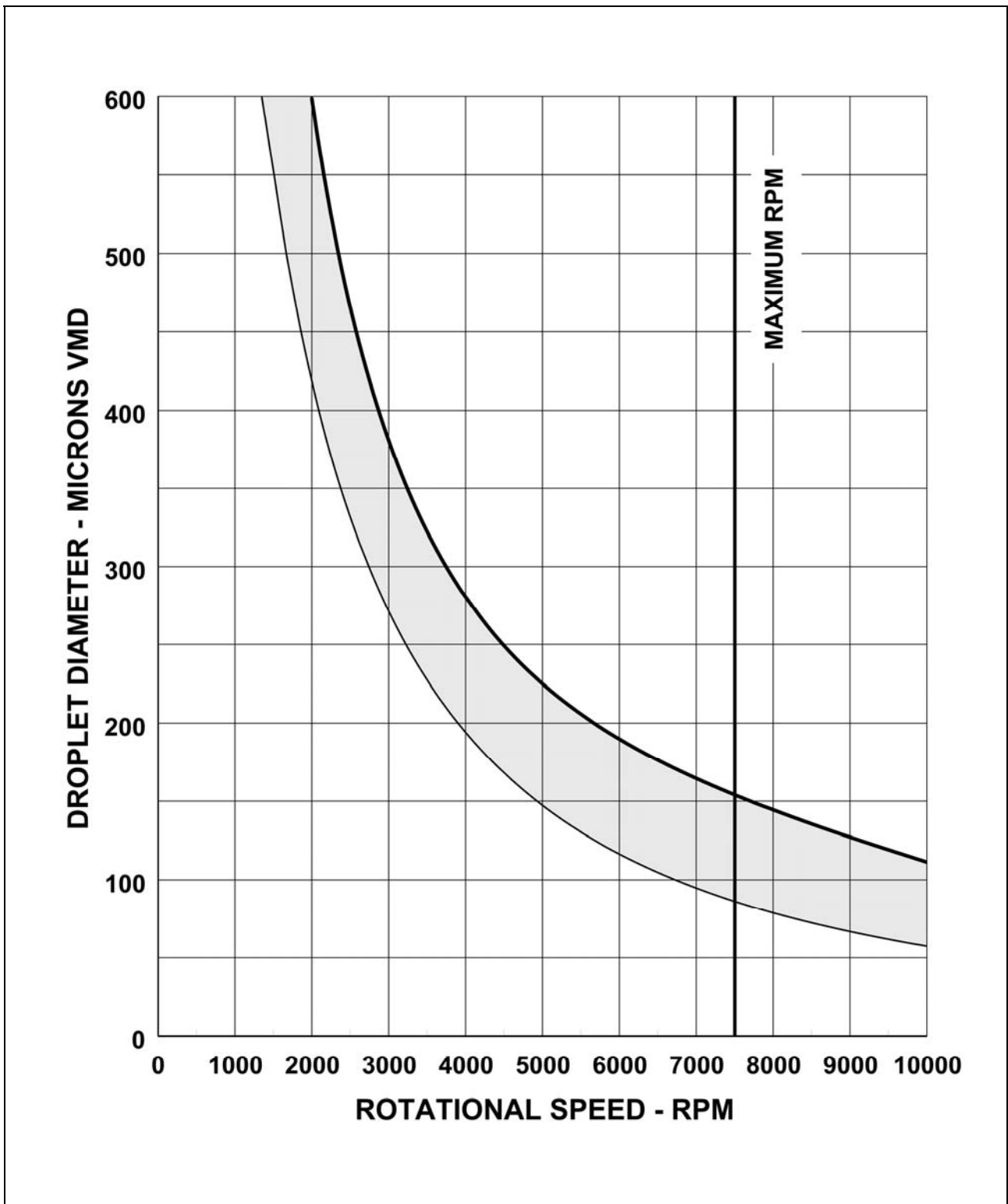
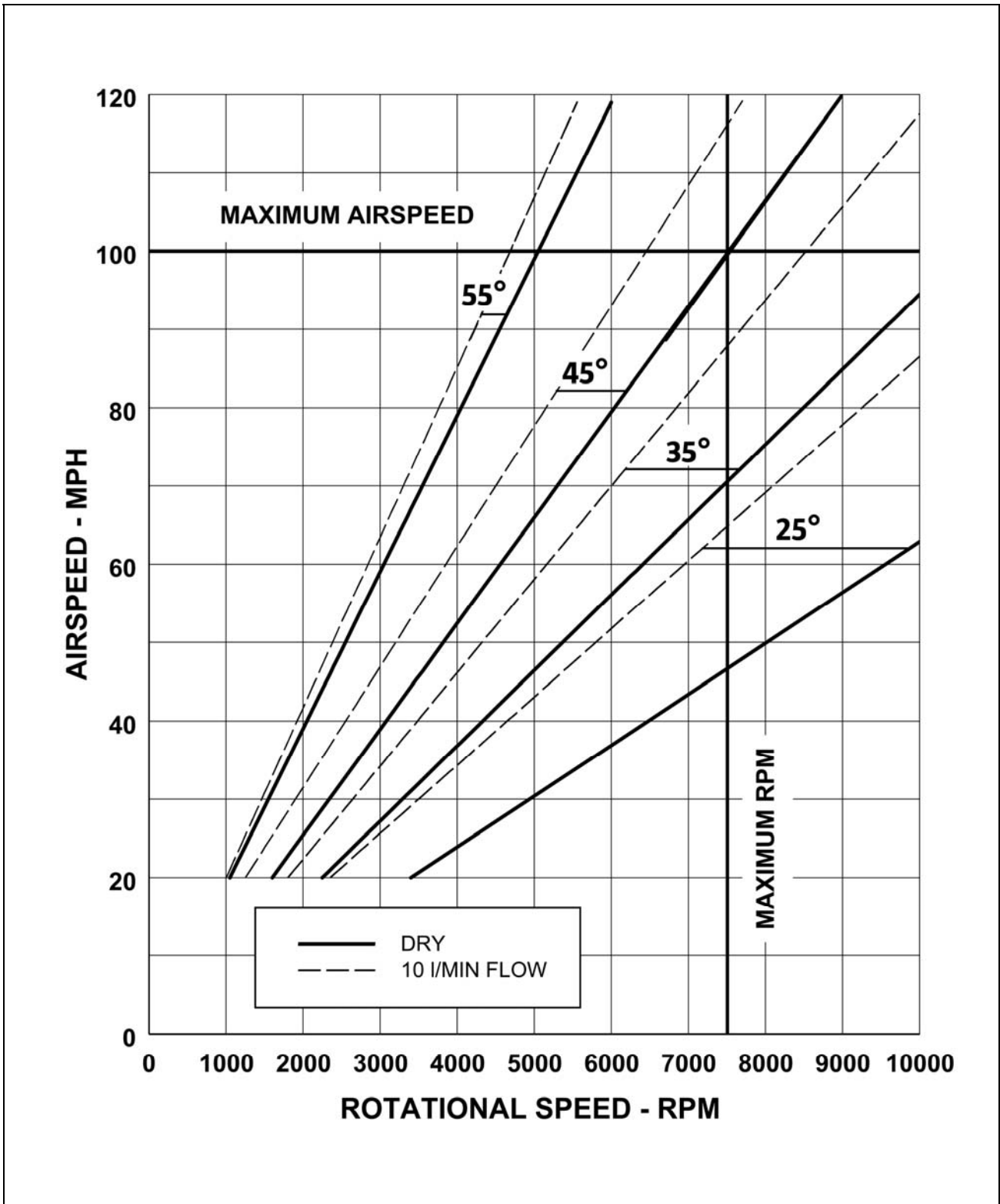


Fig. 5 – EX4734 Fan Blade



Graph 3 – Relationship Between Droplet Size and Atomiser RPM



Graph 4 – Relationship Between Atomiser RPM and Airspeed for EX4734 Fan Blades

7.3.2 Setting of Fan Blade Angle

IMPORTANT: The Micronair AU7000 atomiser is designed for a maximum continuous rotational speed of 7,500 RPM. When determining the fan blade adjustment, allowance must be made for increased airspeed during ferry flying and on the descent to spray runs. Note that the rotational speed of an atomiser increases when the flow of liquid is shut off. The maximum rotational speed must, therefore, be established from the DRY lines on Graph 4.

To adjust the fan blade angle, first slacken the four screws on the clamp ring and then twist the blades to the required angle by aligning the appropriate mark on the blade boss with the split line of the clamp ring as shown in Fig. 6.

When the four blades are correctly set, tighten the screws evenly until the blades are just nipped and check that the blade angles have not altered. Continue lightening the bolts to a maximum torque of 0.69 nm (6 lb in).

IMPORTANT: The clamp ring bolts must not be over-tightened. This could cause serious stresses in the roots of the blades and could lead to cracking and blade failure.

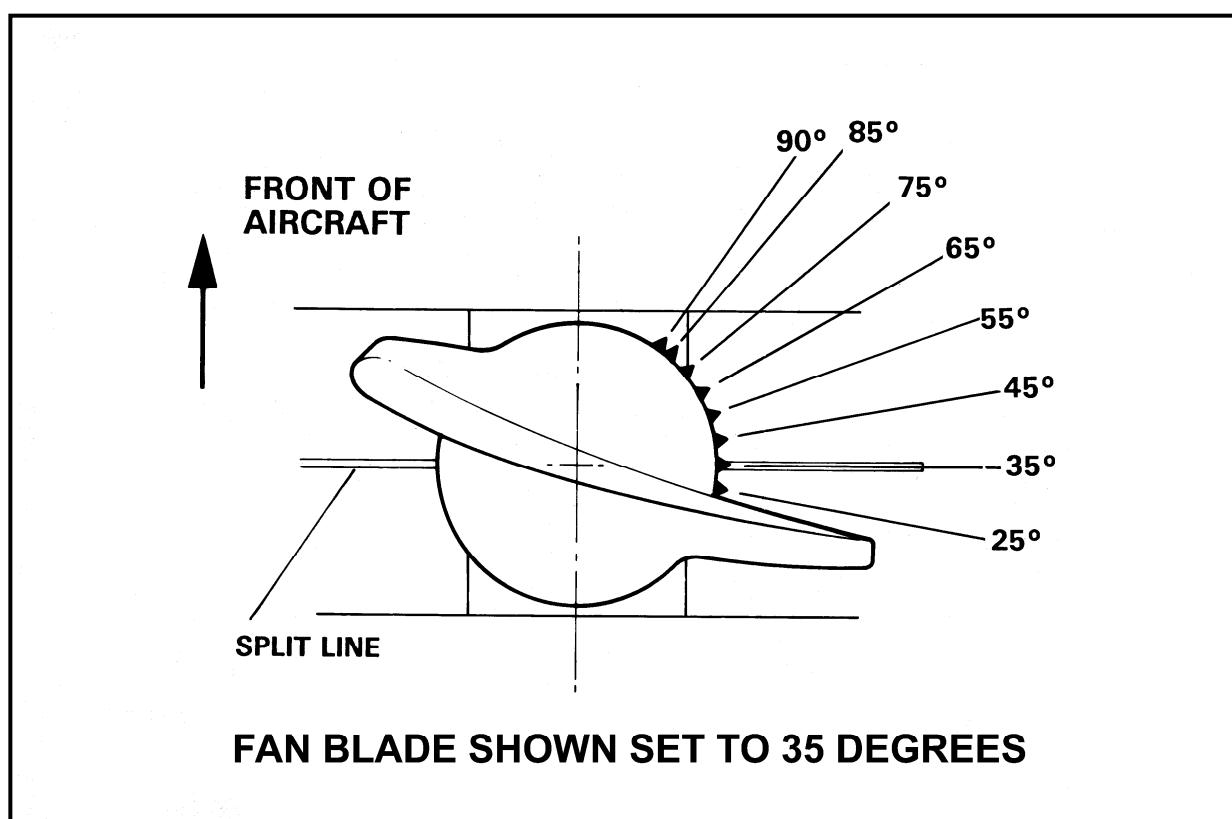


Fig. 6 – Adjustment of Fan Blade Angle

The gap between the clamp ring and the hub must NOT be completely closed. Should this gap appear to be closed, it is likely that the clamp ring bolts have been overtightened. The correct tightening of the clamp ring bolts can be verified by turning the blades by hand. It should be just possible to turn the blades by hand after all four bolts have been evenly tightened.

The minimum blade setting is 25 degrees. Fan blades should not be set to a smaller angle as they will not produce adequate torque and the atomiser speed may become unstable.

7.4 Alternative Gauzes

Certain chemical formulations, especially those containing solids in suspension, may have a tendency to block the standard 20 mesh gauze. This results in the gauze 'flooding' with chemical and producing a poor droplet spectrum. There is also a risk that a build-up of chemical can lead to an out of balance condition and serious vibration. This problem can be overcome by the use of a coarser 14 mesh gauze, part number EX2228/14. This is unlikely to block under any conditions and will ensure a good droplet spectrum and will minimise the possibility of vibration.

Operators must note the importance of keeping all gauzes clean, especially when using chemicals containing solids in suspension.

8. MAINTENANCE OF ATOMISER

8.1 General

The AU7000 atomiser is precision engineered from chemical resistant materials to ensure maximum reliability under field conditions. In order to obtain the best performance and longest life it is vital that atomisers should be regularly checked and cleaned.

The entire spray system should be flushed out at the end of each day to ensure that no chemical remains inside the lines or atomisers to cause contamination or blockage. Note that clean water is only suitable for removing water-based formulations and can cause some ULV formulations to form a gel. Advice should be sought from the suppliers of ULV or specialised formulations as to the best cleaning solvent or detergent.

8.2 Pre-flight Checks

Before spraying, check each atomiser for the following points:

1. All screws, pipe connections and mounting brackets correctly tightened and wire locked where necessary.
2. Fan blades free of any chips (normally due to stone damage) and correctly adjusted. All four blades on each atomiser MUST be set to the same angle. See Calibration section for setting details.
3. Hub clamp ring screws correctly tightened and not over-tightened so as to overload blade root.
4. Gauze free of dents and not blocked with dried chemical.
5. Bearings in good condition. The atomiser should spin smoothly when rotated by hand and must not have excessive play in any direction.

8.3 Dismantling Procedure

Should an atomiser require attention, the dismantling procedure is as follows (numbers in brackets refer to items shown in Fig. 8).

8.3.1 Removal from Aircraft

1. Cut locking wire and unscrew check valve and adaptor (27) from end of spindle (3). Ensure that the sealing olive (26 is not lost).
2. Remove spindle retaining nut (20) and special lock washer (19) at forward face of mounting clamp. Use 1" A/F spanner to grip the lock washer to prevent the spindle from turning in the rubber shock bush.
3. Withdraw complete atomiser and spindle from mounting clamp. If necessary tap end of spindle, using a SOFT hammer or block.
4. Remove the rubber shields at the front and rear face of the atomiser shock bush. Ensure that neither the shields nor the shock bush show any sign of deterioration. Any defective parts must be replaced.

8.3.2 Removal of Spindle

1. Remove the three pan head screws (12) and washers (13) securing the end cap (5) at the rear of the atomiser. Remove the cap and the deflector assembly.
2. Remove the bush (23) from the front (threaded) end of the spindle.
3. Push the spindle through the atomiser and remove through the end of the gauze.

8.3.3 Removal of Gauze

1. Remove the three pan head retaining screws (12) and washers (13) from the front face of the hub flange.
2. Withdraw the hub and drive tube assembly from the gauze.

8.3.4 Removal of Fan Blades

1. Remove the four screws (21) and washers (13) from the clamp ring (2).
2. Remove the clamp ring and extract the four fan blades (25).

8.3.5 Removal of V-ring

1. Identify the black Viton V-ring seal on the spindle.
2. Ease the seal off the spindle, taking care not to cut or tear the rubber lip.

8.3.6 Removal of Bearings

1. Remove the four screws (24) securing the bearing retaining plate (22) at the front of the hub assembly.
2. Remove the Nilos ring (15) from behind the plate.
3. Using a suitable drift inserted from the rear of the atomiser, tap both bearings (16) through the hub. Ensure that the drift does not damage the rear Nilos ring (15). Remove both the inner and outer spacers (17 & 18) from between the bearings. A drift is available from Micronair, part number EX4718.

IMPORTANT: This procedure subjects the bearings and sealing ring to an end-load and hence should be used with caution. Bearings should not normally be removed except for replacement.

8.3.7 Removal of Shock Bush from Clamp

The shock bush must only be removed if it is to be replaced as removal may destroy the outer sleeve of the bush.

1. Slacken the two grub screws securing the shock bush and the delrin bush, using a 3/32" A/F hexagon key, and remove.
2. Drive out the shock bush, using a suitable piece of tube or a punch.

8.4 Assembly Procedure

8.4.1 Installation of Bearings

1. Ensure that the bearing housing in the hub is not worn and is free of any chemical or grit.

Fill the recess of the rear Nilos sealing ring with grease and fit it to the bearing housing, ensuring that the grease filled recess faces towards the bearings.
2. Place the first (rear) bearing in the bearing housing and make certain it is aligned in the bore. Push in with a suitable drift. Ensure that pressure is applied to the outer edge of the bearing only as this avoids transferring the load via the balls. An assembly tool is available from Micronair, part number EX4719.
3. Lightly grease and insert both bearing spacers, one for the inner and one for the outer part of the bearing.
4. Fit the second bearing using the procedure in step 2 above.
5. Fill the recess of the front Nilos sealing ring with grease and insert into the end of the hub so that it rests with the lip against the outer bearing.

6. Fit the bearing retaining plate in the front of the hub and align the locating mark on the edge of the plate with the dimple on the hub.
7. Fit and tighten the four countersunk screws to secure the plate.

8.4.2 V-ring

1. Slide the V-ring over the threaded end of the spindle with the lip facing away from the deflector on the spindle.
2. Locate the V-ring firmly against the deflector on the spindle.
3. Coat the lip of the V-ring with a thin film of grease.

8.4.3 Gauze

Reverse the dismantling procedure, ensuring that the deflector end cap assembly is left off until the spindle is installed.

8.4.4 Blades

1. Replace all blades in their sockets and fit the clamp ring after checking that the numbers on the hub and clamp ring match. Check that the dimple on the ring aligns with the dimple on the hub. This ensures that the atomiser will be correctly balanced. Note that a locating pin on the hub will align with a hole in the clamp ring in this position.
2. Fit the four screws and washers and tighten evenly just to trap the blades.
3. Adjust all four blades to the correct angle.
4. Tighten the clamp ring securing screws to a maximum torque of 0.69 nm (6 lb in). This should be just sufficient to prevent the blades rotating in their sockets. See section 7.3.2.

IMPORTANT: The clamp ring screws must be tightened evenly and must not be exceed the specified torque. Over-tightening can damage the blades and cause in-flight failure.

8.4.5 Spindle

Reverse the dismantling procedure, making sure that the end cap of the gauze (together with the deflector assembly) is replaced.

8.4.6 Shock Bush

If the shock bush is to be replaced, the new assembly must be installed as follows:

1. Coat the outer sleeve of the shock bush with a thin layer of non-setting chromate jointing compound.

2. Insert the assembly into the clamp, ensuring that the flat in the bore is at the bottom (i.e. away from the boom).
3. Press the shock bush home, using a suitable piece of tube or a vice or press.

IMPORTANT: The load must be applied to the outer sleeve ONLY. No pressure should be applied to the inner sleeve. If the assembly tool is not available, apply the load via a short tube resting on the outer sleeve.

4. Insert and tighten the grub screws at the side of the clamp so as to lock the shock bush in position.

8.5 Balance

Both the hub assembly and the gauze of all Micronair atomisers are dynamically balanced. This ensures that the atomiser will run smoothly and without vibration, which might otherwise cause damage to the unit or its mounting. As the hub and gauze are individually balanced, any gauze may be fitted to any atomiser. It is, however, vitally important that the hub is correctly assembled with its original clamp ring.

As an additional precaution, a moulded rubber shock bush assembly is fitted in the atomiser mounting clamp. This is designed to absorb any vibration caused by an exceptional condition until the aircraft can be landed and the problem rectified. The shock bush is NOT intended to absorb vibration from a damaged or wrongly assembled atomiser for a prolonged period.

Any attempt to modify or repair either the atomiser or gauze is liable to cause it to run out of balance. No such repairs should be attempted unless full dynamic balancing facilities are available. Full balancing instructions are available to organisations equipped to handle this work.

Should any unusual vibration be noticed in flight, the atomisers must be inspected as soon as possible and any defective parts replaced immediately with genuine Micronair spares. The shock bush must be checked frequently and replaced if it shows any sign of deterioration.

IMPORTANT: Use of substitute parts or unauthorised repair will void all warranties.

Vibration can also be caused by worn bearings, a build-up of dried chemical in the gauze or broken fan blades. These problems should not occur if the equipment is properly flushed out, cleaned and maintained. Operators and pilots must be made aware of the importance of regular inspection of the atomisers to prevent the above problems.

9. VARIABLE RESTRICTOR UNIT

9.1 Principle of Operation

The Variable Restrictor Unit (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 shut-off position. This applies only when plate EX194/O is fitted. The knob is made to 'click' into the appropriate position by means of a spring in the VRU body which engages in grooves inside the knob. This ensures that the hole in the orifice plate is aligned with the hole in the selector plate. The positive location of the knob eliminates any possibility of the selected orifice being altered unintentionally. A full flow position is also provided.

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 flow entering the end, the plates would be forced apart and an erratic calibration would result.

9.2 Instructions for Use

The knob of the VRU is marked with odd numbers 1 – 13 and even numbers 2 – 14. These numbers correspond to the hole sizes in the orifice plates EX194/O (odd) and EX194/E (even).

All variable restrictor units are fitted as standard with the odd plate EX194/O. This plate has all the odd numbered orifice sizes (1 – 13), and is supplied to enable the operator to use a wide flow range from ULV to high volumes without changing the plate. A number of alternative plates can, however, be supplied on request to suit special needs. It is seldom necessary to use these special plates and customers are encouraged to use the standard plate covering all ranges unless exceptional circumstances exist.

To establish which plate is installed in a VRU, the marking on the plate can be viewed through the outlet. See Fig. 7 for details of markings.

Should an unrestricted flow be required, the VRU can be set to the full flow position by turning the knob to number 7, pulling back and rotating it through 90 degrees until it locks in the outward position, separating the two plates and providing 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.

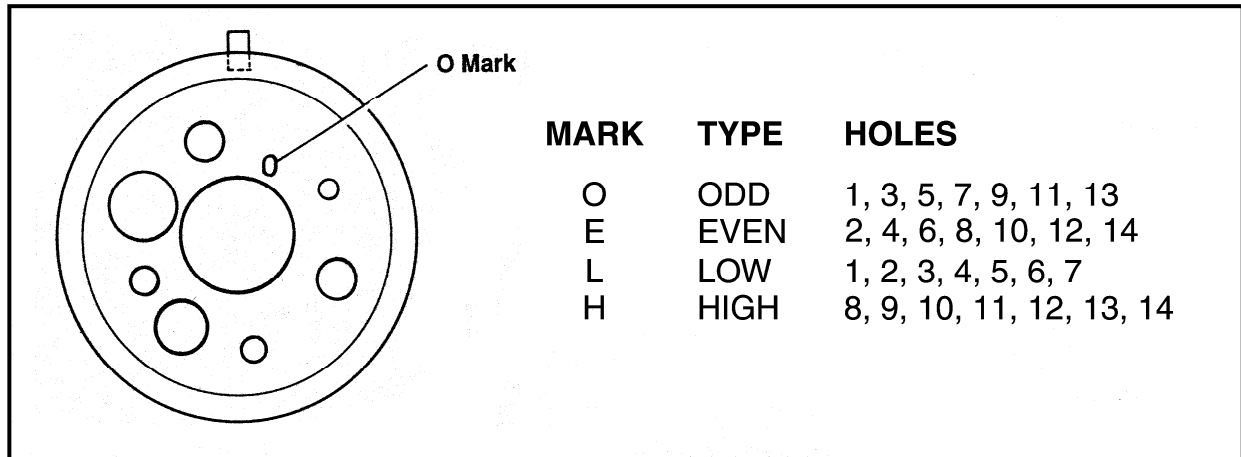


Fig. 7 – Alternative VRU Plates

9.3 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 boom.
2. Remove the red knob by unscrewing the 10-32 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 knob 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 that 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.

Full details of the VRU are shown in Fig. 9.

10. DIAPHRAGM CHECK VALVE

10.1 Principle of Operation

The diaphragm check valve uses a spring loaded diaphragm to shut off flow to an atomiser when not spraying. This eliminates the possibility of leakage of any residual liquid in the boom or pipework and ensures a quick shut-off of spray when the control valve is closed at the end of a run. When the spray is turned on again, the pressure of the liquid acts against the spring behind the diaphragm and forces it away from its seat, allowing it to flow into the atomiser.

10.2 Maintenance

Because of its simple construction, the diaphragm check valve requires very little maintenance. The diaphragm, however, should be checked periodically and replaced if it shows any signs of wear or deterioration.

IMPORTANT: The diaphragm is made from either reinforced Viton or PTFE. It must only be replaced with the appropriate Micronair spare part (CBP487 – Viton or EX2762 – PTFE).

Should it be necessary to dismantle the unit completely, the procedure is as follows:

1. Cut all locking wire and remove the check valve from the atomiser spindle and feedpipe.
2. Unscrew the cap retaining ring and remove the ring, cap and diaphragm.
3. Ease the spring clip from its groove inside the cap and remove the plunger and spring.

Before re-assembling the valve, clean all parts and remove any traces of chemical, especially from inside the cap behind the plunger and around the seating faces of the diaphragm. To re-assemble, reverse the dismantling procedure, ensuring that the spring clip is correctly positioned and the diaphragm is accurately aligned. When tightening the cap retaining ring, the cap should be held firmly to prevent it from rotating and buckling the diaphragm. A drop of oil inside the retaining ring can assist assembly.

After re-fitting the valve on the aircraft, wire lock the cap and the outlet fitting as described in the Installation section.

10.3 Chemical Resistance of Diaphragms

The standard diaphragm supplied with all check valves is made from fabric reinforced Viton. This material has proved to provide the best possible resistance to a wide range of chemicals. However, operators may occasionally have to use a formulation that damages the Viton diaphragm. Should this be the case, an alternative PTFE diaphragm is available.

Full details of the diaphragm check valve are shown in Fig. 10.

11. APPLICATION MONITOR

The Micronair Application Monitor is a complete monitoring system for any spray aircraft. Chemical flow is measured by a flowmeter turbine, which is connected to a microprocessor-based electronic unit. This takes the chemical flow rate, together with the swath width and ground speed of the aircraft and displays:

- Application rate in litres/Ha or gallons/acre
- Flow rate in litres or gallons/minute
- Total volume A, which can be reset at any time
- Total volume B, which cannot be reset and provides a job total
- Area sprayed in Ha or acres
- Work rate in Ha or acres/minute
- Spray time

The electronic unit incorporates a large liquid crystal display and a touch keyboard. The keyboard is used to select the function shown on the display. All information is shown in plain English and prompts are displayed whenever necessary.

The unit is provided with an adjustable back-light for use under poor lighting conditions and at night.

The unit can be programmed by the user to operate in Metric, US or British units. The Application Monitor can be calibrated to work with either of two flowmeter turbines. This provides maximum flexibility for operators who require a wide flow range.

Every Application Monitor is programmed to operate with the optional Application Printer. When this is installed, the unit will print a permanent record of every spray job.

12. RPM INDICATOR

The application Monitor may be used to measure the rotational speed of each of up to 10 atomisers. These may be Micronair AU3000, AU4000, AU5000 or AU7000 units. In order to do this, each atomiser must be provided with a transducer and associated wiring etc. These parts may be ordered with the Application Monitor or may be added later.

13. 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

13.1 AU7000 Atomiser EX2250

Item	Part No	Description	Qty	Notes
1	EX2242	Hub Body Assy	1)	Available only
2	EX2243	Clamp Ring	1)	as a pair
3	EX2219	Spindle Assy	1	Includes item 28
4	EX2228/20	Gauze Assy	1	20 mesh standard
4A	EX2228/14	Gauze Assy	1	14 Mesh alternative
5	EX4727	End Cap & Deflector	1	
6	Various	Boom Clamp Assy	1	Order separately
7	EX2255	Shield Front	1)	Items 7 to 11 incl
8	EX2441	Bush	1)	incorporated on
9	CBP936	Grub Screw	2)	item 6 assembly
10	EX2254	Shock Bush	1)	
11	EX2261	Shield Rear	1)	
12	EX2612	Screw	6	
13	SP127C	Washer	10	See Note 1
14	CBP777	V Ring Seal	1	
15	CBP774	Nilos Ring	2	
16	CBP776	Bearing	2	
17	EX2244	Spacer, Inner	1)	Available only
18	EX2245	Spacer, Outer	1)	as a pair
19	EX2264	Washer	1	
20	EX2265	Nut	1	
21	CBP1720	Screw	4	See note 1
22	EX2246	End Plate	1	
23	EX2247	Spacer Bush	1	
24	A206B16	Screw	4	
25	EX4734	Fan Blade (3.75" long)	4	See note 2
26	EX2571	Olive	1	
27	EX2475	Adaptor	1	
28	EX2218	Plug	1	
29	EX1662	False Grease Nipple	1	See note 3

NOTES:

1. Items 13 & 21 are shown out of position on the hub for clarity.
2. Only EX4734 fan blades must be used on the AU7000 atomiser.
3. Although the bearings of standard AU7000 atomisers are not intended for external lubrication, the false grease nipple EX1662 must be fitted to maintain the balance of the unit.

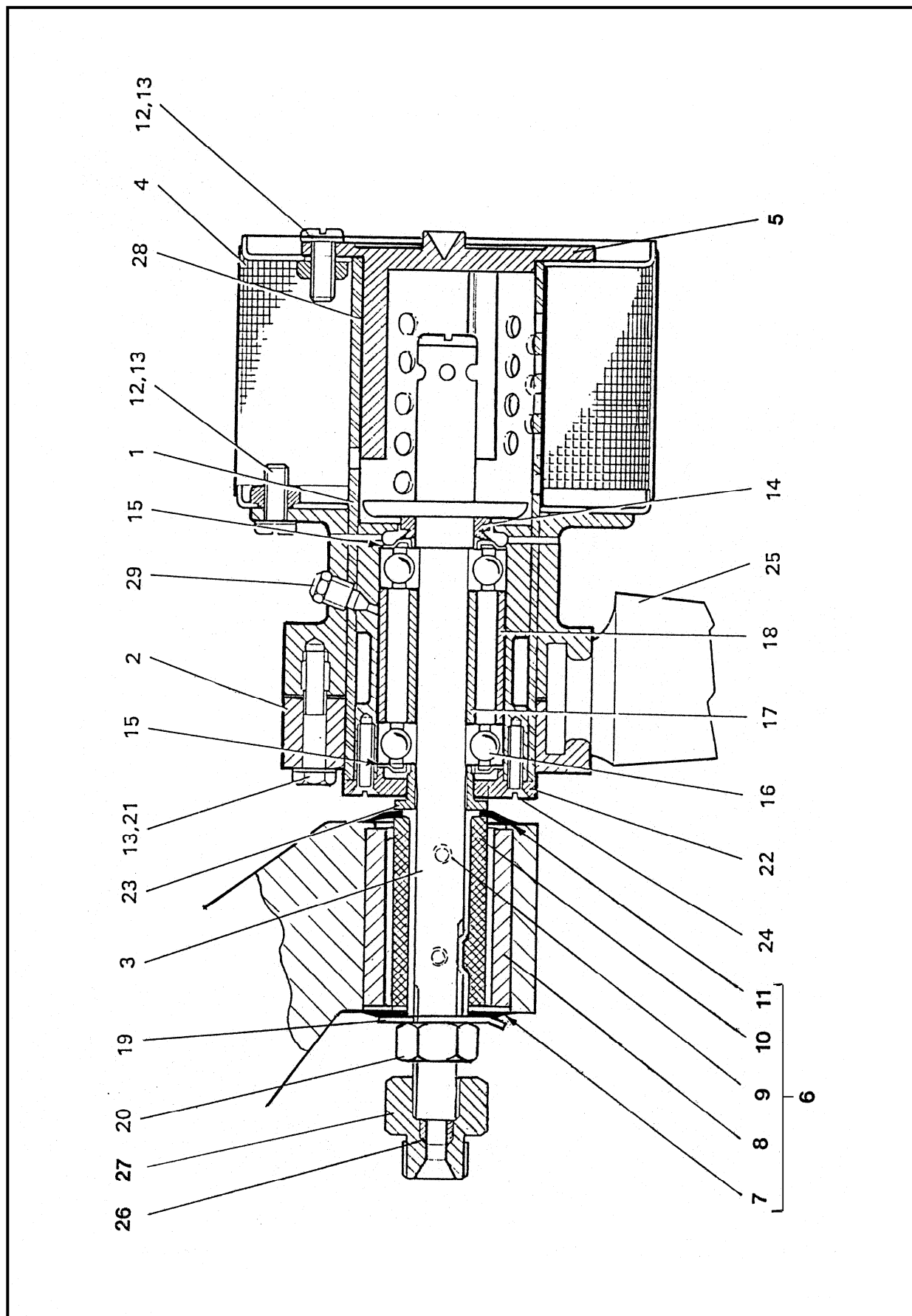


Fig. 8 – AU7000 Atomiser

13.2 Variable Restrictor Unit

NOTE: Variable restrictor units are supplied with various inlet and outlet adaptors according to the installation kit. The standard configuration is EX4156. This includes adaptors and fittings to suit most standard spray booms.

Item	Part No	Description	Qty	Notes
1	EX1556	Outlet Fitting	1	1/2" Hose
2	EX194/O	Restrictor Plate	1	Odd (Standard)
2A	EX194/E	Restrictor Plate	1	Even (Option)
2B	EX194/H	Restrictor Plate	1	High (Option)
2C	EX194/L	Restrictor Plate	1	Low (Option)
3	EX2081	Shaft & Selector Assy.	1	
4	CBP493	Spring	1	
5	EX2078	Body Assy	1	1/8" + 1/4" NPT
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	EX1670	Cap, Blanking	1	1/8" NPT
14	EX1671	Cap, Blanking	1	1/4" NPT
15	EX1672	Elbow	1	1/4" NPT
17	EX2094	Body Assy	1	1/4" NPT Inlet
18	EX1954	Inlet Adaptor	1	1/2" Hose
19	EX2080	VRU Assy. Complete		
20	EX4156	VRU Assy. with Standard Fittings		

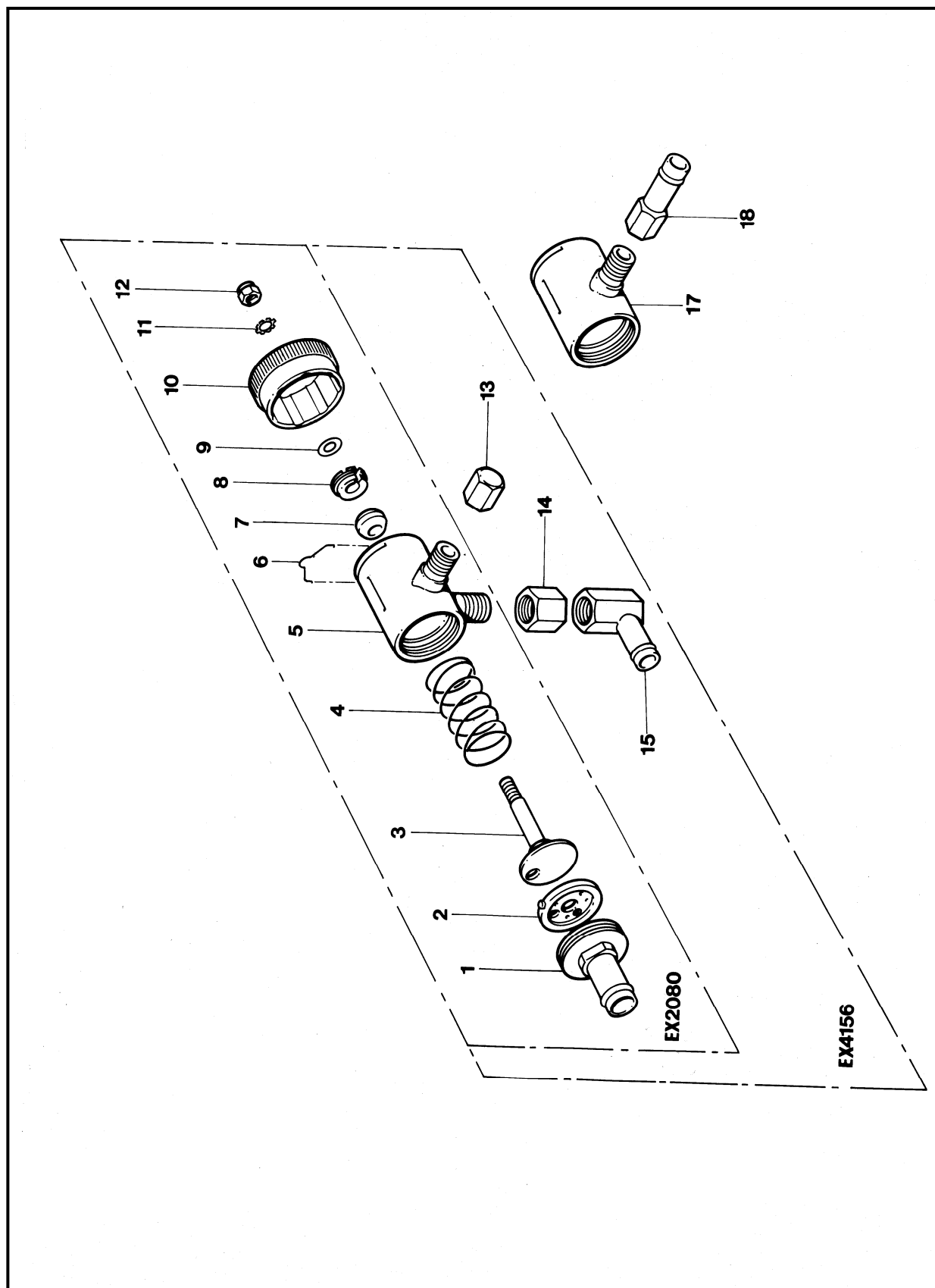


Fig. 9 – Variable Restrictor Units and Optional Adaptors

13.3 Diaphragm Check Valve EX1525

Item	Part No	Description	Qty	Notes
1	EX1533	Ring, Securing	1	
2	EX1530	Cap	1	
3	CBP485	Spring	1	
4	EX1531	Plunger	1	
5	CBP486	Spring Clip	1	
6	CBP487	Diaphragm	1	Viton (Standard)
6	EX2762	Diaphragm	1	PTFE (Optional)
7	EX1526	Body Assy.	1	
8	EX1527	Cap Assy.	1	Items 1,2,3,4 & 5
9	EX1525	Check Valve Assy. Complete		

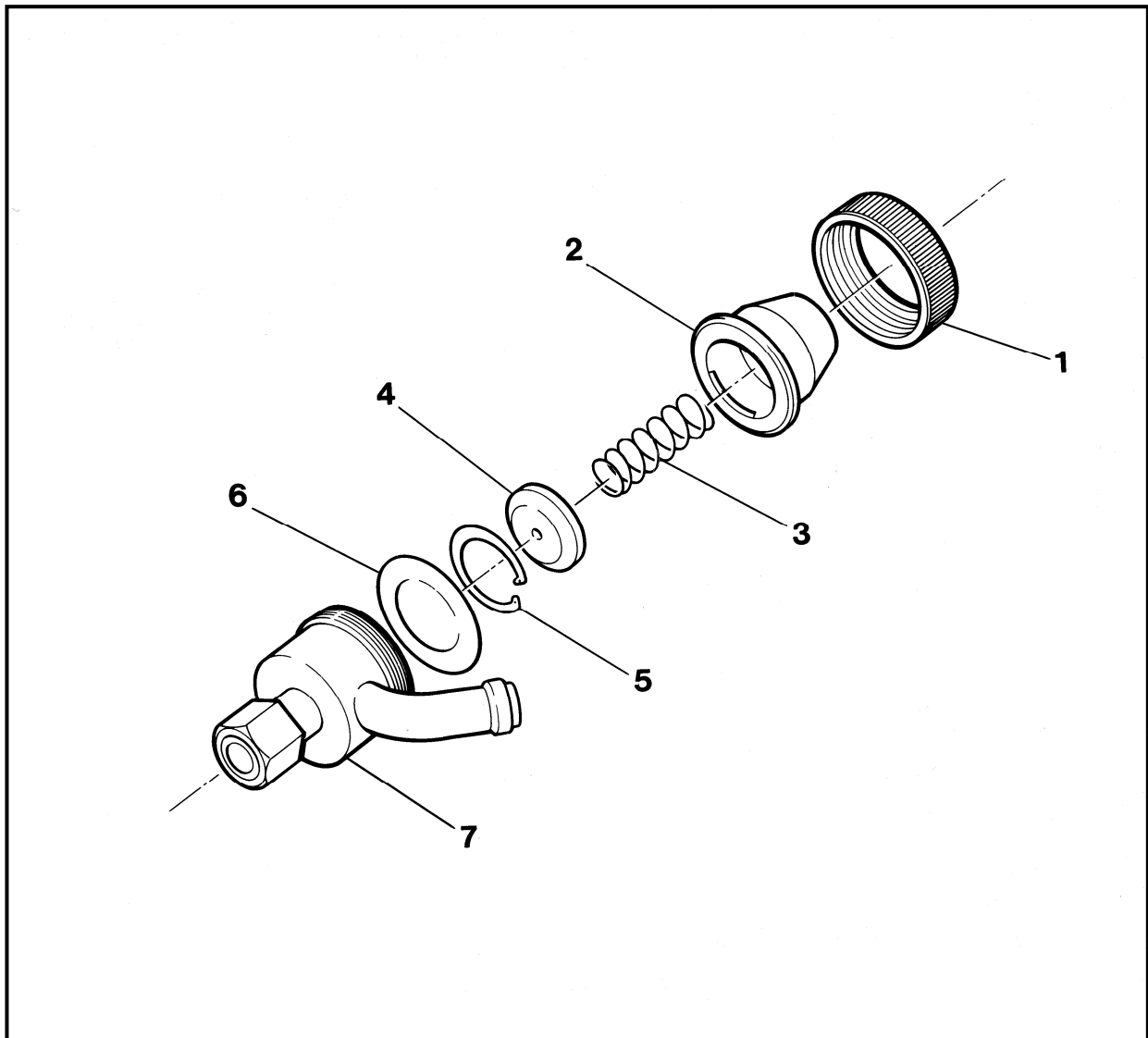


Fig. 10 – Diaphragm Check Valve

13.4 Special Tools Available from Micron Sprayers

The following special tools are available from Micron Sprayers to assist with the maintenance of AU7000 atomisers and accessories. None of these tools are essential to carry out any work described in this Handbook but they are highly recommended for any workshop maintaining a number of atomisers.

Part No	Description
EX1942	Key for dismantling and tightening VRU body
EX4718	Drift for removal of bearing assembly
EX4719	Tool for installation of bearings

14. 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, is performing according to his requirements and that all statutory requirements and airworthiness regulations are being complied with.