

# ChemCert®

Guide to Using APVMA Approved Phenoxy Herbicides

Phenoxy herbicides are part of the Mode of Action

**GROUP**

**I**

**HERBICIDE**





# Using APVMA Approved Phenoxy Herbicides

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[www.ChemCert.com.au](http://www.ChemCert.com.au)

## Guide to Using APVMA Approved Phenoxy Herbicides

ChemCert has designed this guide to provide resellers with a reference tool when selling phenoxy herbicides. Since phenoxy herbicides can cause significant damage to sensitive crops, like cotton plants and grapevines, it is important to be able to control the risks of vapour drift and other threats caused by these pesticides. By informing people how to apply these herbicides safely, we can all assist to minimise any off-target damage.

The APVMA has suspended phenoxy herbicides containing the highly volatile ester formulations of 2, 4-D with 800g/L of the active constituent. For the remaining phenoxy herbicides that are available, the APVMA has placed mandatory spray drift restraints on these products to minimise damage to other crops. These restraints include using a minimum "Coarse" spray quality and having mandatory no-spray zones in place between the target area and people, livestock and sensitive areas. There are also specified wind speeds and warnings to not spray during surface temperature inversions.

Please use this guide to help explain to growers some of the basic issues around the application of phenoxy herbicides. We have used Amicide Advanced 700 as an example of a recently released, non-volatile, 2, 4-D herbicide to highlight the label restrictions on phenoxy herbicide use. By all working together, we can ensure continued access to these important chemicals.

ChemCert is committed to working with all industry groups involved with AgVet chemicals to develop innovative training resources and best practice management guidelines for chemical users. We hope that you find this guide a useful tool when explaining phenoxy herbicides to your customers and we thank you for continued support of ChemCert.

### Phenoxy herbicides include a large group of weedkillers with actives such as:

2,4-D (Actril DS<sup>®</sup>, Amicide<sup>®</sup>, Pyresta<sup>®</sup>), 2,4-DB (Trifolamine<sup>®</sup>), dichlorprop (Lantana 600<sup>®</sup>), MCPA (Agtryne<sup>®</sup> MA\*, Banvel M<sup>®</sup>, Barrel<sup>®</sup>, Basagran<sup>®</sup> M60\*, Buctril<sup>®</sup> MA\*, Chipco Spearhead<sup>®</sup>, Conclude<sup>®</sup>, Flight<sup>®</sup>, MCPA, Midas<sup>®</sup>, Paragon<sup>®</sup>, Precept<sup>®</sup>, Tigrex<sup>®</sup>, Tordon 242<sup>®</sup>), MCPB (Legumine<sup>®</sup>), mecoprop (Mecoban<sup>®</sup>, Mecopropamine<sup>®</sup>, Methar Tri-Kombi<sup>®</sup>)



#### Alan Brown - Head Trainer / Assessor

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Alan was appointed as the Head Trainer for ChemCert Training Group in 2011 and is serious about ensuring your ChemCert trainer is qualified and knowledgeable to provide you with the latest up to date information.

Regarded as a leader within the agricultural industry, Alan possesses a wealth of knowledge about chemicals through his experience as a farmer, member of council and various chemical boards and committees. His experience has led him to acquire knowledge about the development of State and Federal chemical use policy.

Alan's key area of expertise is risk management, gained through his roles as a farmer and Group Captain of the Rural Fire Service. Alan works with his community to reduce the likelihood of risks and hazards by focusing on risk reduction. Risk management is one of the core skills that drives today's chemical practices.

#### Jonathan Pearson - Course Developer / Trainer / Assessor

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Jonathan was appointed as Course Developer for ChemCert Training Group in 2009 and has developed the industry standard ChemCert AQF III course widely delivered throughout Australia

Jonathan has extensive knowledge in spray application techniques gained through his experience as a sheep, beef and deer farmer and Spray Nozzle technician at Silvan Australia.


Jonathan and all ChemCert trainers aim to help spray applicators limit the amount of pesticides which drift off target, affecting the environment and potentially creating residue issues, through a proactive approach to spraying and a heightened awareness of meteorology.

## Spray Applicators Checklist Summary

1. Start with the label as its legally binding and promotes efficacy and safe use and handling. Check the Restraints for droplet sizing (spray quality), buffer zones (especially sensitive areas downwind such as cotton, vineyards etc.), weather parameters, and record keeping requirements. If in a cotton area, check online at [cottonmap.com.au](http://cottonmap.com.au) for cotton fields close by.
2. Check the critical comments of the Directions For Use (DFU) for timing of application relative to weed size and also additional surfactant requirements
3. Refer to Safety Directions for the personal protection equipment (PPE) required to mix and apply the product safely.
4. Check for any Withholding Periods, generally found right under the DFU table, also Plantback Periods, Compatibility, Mixing and Re-Entry instructions.
5. Refer to the Label Protection Statements for protection of livestock, bees, aquatic environments and other sensitive areas.
6. Check the Directions For Use and Application Information for appropriate chemical and water rates per hectare.
7. Keep your boom at the right height, 40 - 50 cm from target for 110 degree nozzles, 70 cm for 80 degree nozzles in order to maintain double overlap, remembering if you were to double boom height you could increase the drift potential up to 10 fold
8. Maintain the label specified spray quality across the whole pressure range you operate at, watching that you don't drop pressure below the minimum required to maintain the full 110 degree spray angle (see nozzle manufacturer's specification), or go off label with a medium spray at higher pressure.
9. Spray nozzles are tested for spray quality using water, whereas tank mixes with some non-ionic surfactants can have significantly increased drift potential
10. Use the coarsest spray quality possible for night spraying that still gives appropriate efficacy and avoid spraying in the hours just prior to sunrise, monitoring wind speed as you go
11. Decontaminate your spray equipment thoroughly after use, especially before commencing in crop spraying, making sure you dispose of rinsate according to best practice and EPA requirements. See also the label directions on storage and disposal, utilising drumMuster for disposal of empty drums and Chemclear for any unwanted or deregistered pesticide.
12. Consult with your chemical reseller, agronomist and chemical manufacturer/distributor for further information, (especially crop and pasture rotations, managing plantbacks etc.). Also refer to DPI, GRDC and CRDC websites for guidance material and factsheets.



## 1. Start with the Label (In this case - Amicide Advance 700, a phenoxy herbicide)



**POISON**  
KEEP OUT OF REACH OF CHILDREN  
READ SAFETY DIRECTIONS BEFORE OPENING OR USING

**Nufarm**  
**Amicide® Advance 700**  
**Selective Herbicide**

**ACTIVE CONSTITUENT: 700g/L 2,4-D present as the dimethylamine and monomethylamine salts**

<b>GROUP</b>	<b>HERBICIDE</b>
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A non-volatile product for the control of broadleaved weeds in fallow before direct drilling or sowing of cereals and pastures; and in cereal crops, pastures, sugar cane, and non-agricultural areas as per the Directions for Use.  
Formulated for use with Roundup® Attack™ and Roundup® DST  
This is a PHENOXY HERBICIDE that can cause severe damage to susceptible crops such as cotton, grapes, tomatoes, oilseed crops and ornamentals.

READ COMPLETE DIRECTIONS FOR USE BEFORE USING THIS PRODUCT.  
® Amicide is a registered trademark of Nufarm Australia Limited

[nufarm.com.au](http://nufarm.com.au)

APVMA Approval No.: 66167/52898

### DIRECTIONS FOR USE RESTRAINTS

DO NOT spray if rain seems likely within 6 hours.  
DO NOT apply if crop or weeds are stressed due to dry or excessively moist conditions.

### SPRAY DRIFT RESTRAINTS

**DO NOT** apply with spray droplets smaller than a **COARSE** spray droplet size category according to “APVMA Compliance Instructions for Mandatory COARSE or Larger Droplet Size Categories” located under this title in the GENERAL INSTRUCTIONS section of this label.  
**DO NOT** apply when wind speed is less than 3 or more than 20 kilometres per hour (ground application) as measured at the application site.  
**DO NOT** apply when wind speed is less than 3 or more than 15 kilometres per hour (aerial application) as measured at the application site.  
**DO NOT** apply during surface temperature inversion conditions at the application site.

Users of this product **MUST make an accurate written record** of the details of each spray application within 24 hours following application and **KEEP** this record for a minimum of 2 years. The spray application details that must be recorded are: **1** date with start and finish times of application; **2** location address and paddock/s sprayed; **3** full name of this product; **4** amount of product used per hectare and number of hectares applied to; **5** crop/situation and weed/pest; **6** wind speed and direction during application; **7** air temperature and relative humidity during application; **8** nozzle brand, type, spray angle, nozzle capacity and spray system pressure measured during application; **9** name and address of person applying this product. (Additional record details may be required by the state or territory where this product is used.)

*Restrictions (including Spray Drift Restrictions) (below)*  
Use this section (and Spray Applications/Drift Risk Assessment) to develop your spray plan, determining the nozzle type, size and operating pressure to produce the required spray quality

## 2. Conservation Tillage Refer To Section “Spray Applications And Drift Risk Assessment pg 5” Before Application

Flaxleaf fleabane ( <i>Conyza bonariensis</i> )	All States	650mL-1.1L/ha plus a minimum of 1.15L/ha Roundup Attack <sup>§</sup>	Apply to cotyledon to 12 leaf rosette prior to stem elongation. Use the low rate in Autumn/Winter. Use the highest rate for Spring/Summer applications. For adequate coverage use a minimum application water volume of 70L/ha. A sequential application of Nuquat (refer below) is also recommended for situations where incomplete control is achieved with the first application, or where there are spray misses/shadowing, failures due to resistance, or under periods of temperature and/or moisture stress. In these situations, the sequential application is to be applied 7-14 days after the first application.
		As above followed by 1.6-2L/ha Nuquat®	Apply at stem elongation to flowering plants. Apply the sequential application 7-14 days after the first application. Use the low rate in Autumn/Winter. Use the highest rate for Spring/Summer applications. For adequate coverage use a minimum application water volume of 70L/ha. The sequential application of Nuquat is recommended for situations where incomplete control is achieved with the first application, or where there are spray misses/shadowing, failures due to resistance or under periods of temperature and/or moisture stress. In these situations, the sequential application is to be applied 7-14 days after the first application.

*Refer to DFU table (left) for, by example, Flaxleaf Fleabane control in No-till situations for use in your state, dosage, other chemicals that may be needed for efficacy reasons and the critical comments for timing of application relative to weed size and/or additional surfactant requirements, if needed.*

*\*Please note this is an abridged version of the actual table for this product*

### 3. Safety Directions

*Refer to Safety Directions (below)* use this section of the label to determine the necessary personal protection equipment to mix and apply Advanced 700 safely.

#### SAFETY DIRECTIONS

Harmful if swallowed. Will damage the eyes. Will irritate the skin. Repeated exposure may cause allergic disorders. Avoid contact with eyes and skin. When opening the container, mixing and loading and preparing spray, wear cotton overalls over normal clothing and a washable hat and elbow length chemical resistant gloves, goggles and a half face piece respirator. When using the prepared spray wear cotton overalls over normal clothing and a washable hat and elbow length chemical resistant gloves, and goggles. If product on skin, immediately wash area with soap and water. If product in eyes, wash it out immediately with water. Wash hands after use. After each day's use wash gloves, goggles, respirator and contaminated clothing.

#### FIRST AID

If poisoning occurs, contact a doctor or Poisons Information Centre (Phone 13 11 26).

#### MATERIAL SAFETY DATA SHEET

For further information refer to the Material Safety Data Sheet (MSDS), which can be obtained from your supplier or the Nufarm website – [www.nufarm.com.au](http://www.nufarm.com.au)

**In case of emergency: Phone 1800 033 498** Ask for shift supervisor. Toll free 24 hours.

### 4 & 5. WHP and General Instructions

Check for any *Withholding Periods (below)*, generally found under the DFU table, also in *General Instructions* look up Plantback Periods, Compatibility, Mixing, Re-Entry instructions and also Protection statements which are mandatory controls to protect things like sensitive areas, native and non target flora and fauna and livestock

#### WITHHOLDING PERIOD

PASTURE, CEREAL CROPS

**DO NOT GRAZE OR CUT FOR STOCK FOOD FOR 7 DAYS AFTER APPLICATION.**

HARVEST WITHHOLDING PERIOD

**NOT REQUIRED WHEN USED AS DIRECTED.**

**IN TASMANIA, THIS PRODUCT MAY ONLY BE USED FROM 15 APRIL TO 15 SEPTEMBER UNLESS OTHERWISE PERMITTED BY THE REGISTRAR OF PESTICIDES.**

#### GENERAL INSTRUCTIONS

Before opening, carefully read Directions for Use, Precautionary Statements, Safety Directions and First Aid Instructions.

AMICIDE ADVANCE 700 is a water soluble liquid product with non-selective herbicidal activity against broadleaf weeds. AMICIDE ADVANCE 700 will control emerged weeds only, and provides no residual control although certain plant back periods should be observed. AMICIDE ADVANCE 700 is absorbed by plant foliage and accumulates to toxic levels in the regions of growth and reproduction, upsetting the ability of plants to balance the synthesis and use of nutrients. Visible effects are a gradual yellowing and wilting of the plants which advances to complete browning of above ground growth and deterioration of root systems. Effects may not be apparent for 7-10 days or even up to 21 days under cold or cloudy conditions. DO NOT treat weeds under poor growing or dormant conditions such as occur in drought, water-logging, disease, insect damage, following frost, weeds heavily covered with dust or silt. Reduced results may also occur if weeds are under stress from previous herbicide application. Rainfall occurring up to 6 hours after application may reduce effectiveness.

DO NOT spray if strong winds prevail

#### SPRAY APPLICATIONS AND DRIFT RISK ASSESSMENT



**DO NOT** apply when wind speed is less than 3 or more than 20 kilometres per hour (ground application) as measured at the application site.

**DO NOT** apply when wind speed is less than 3 or more than 15 kilometres per hour (aerial application) as measured at the application site.

USE ONLY COARSE or larger spray quality according to the ASAE S572 definition for standard nozzles.

For aerial application it is recommended where possible for this product to be applied by an aerial applicator business that holds current accreditation for the Aerial Application Management System issued by the Aerial Agricultural Association of Australia Ltd.

#### Checklist:

- Have you cleaned/decontaminated your boom sprayer?
- Have you contacted your neighbour prior to spraying?
- Is your sprayer set-up correctly for the particular application?
- Check
  - boom calibration
  - at nozzle - nozzle choice
  - low drift/what spray quality
  - coarse or larger spray quality?
  - boom height - speed of intended application
  - water volume
- You must check, determine and record the weather conditions immediately prior to, and immediately after the spray application is made.
- Record
  - Temperatures
  - Relative Humidity
  - Delta T
  - Wind speed
  - Is there a temperature inversion?
- Night Spraying - Extra care is required to ensure that inversion conditions are not present. Use smoke generator to determine wind direction and presence of inversion conditions.

For further information refer to [nufarm.com.au/spraywise](http://nufarm.com.au/spraywise)

Are there sensitive crops / areas downwind of the target area?

Use a hand held weather meter to measure weather parameters and a compass for wind direction (at application site)



[spraywisedecisions.com.au](http://spraywisedecisions.com.au) is an online weather forecasting program and is recommended for use when planning your pesticide application



When spraying in or near a cotton area, check online at [cottonmap.com.au](http://cottonmap.com.au) for the proximity of cotton fields

## 6. Water (Carrier) Rates

Use this section of the label to determine the appropriate water rate per hectare, which will be worked into your spray plan when determining a suitable nozzle size (and type)

### APPLICATION INFORMATION

#### In Crop Use:

GROUND SPRAYER APPLICATION - Use 50-250L/ha of water.

AERIAL APPLICATION - Use 40-90L/ha of water.

#### Fallow use:

GROUND SPRAYER APPLICATION -

Application of AMICIDE ADVANCE 700 plus Roundup® Attack™ (## refer also to compatibility section for all compatible glyphosate formulations) in a minimum spray volume of 50L/ha is recommended. When simazine and/or atrazine is included in the mixture a minimum spray volume of 100L/ha is recommended. USE ONLY COARSE or larger spray quality according to the ASAE S572 definition for standard nozzles. Boom height must be set to ensure double overlap of nozzle patterns at the top of the weed canopy.

#### AERIAL EQUIPMENT-

Application of AMICIDE ADVANCE 700 and glyphosate mixtures using boom equipment should occur in a minimum spray volume of 50L/ha. USE ONLY when wind speed is more than 3km/h or less than 15km/h, as measured at the application site.

USE ONLY COARSE or larger spray quality according to the ASAE S572 definition for standard nozzles. Swath width should be 15-17m.

DO NOT apply by aircraft when temperature is above 35°C.

DO NOT use in intensive horticultural cropping areas. Thoroughly wash aircraft, especially landing gear after each day of spraying to remove herbicide residues.

### EQUIPMENT MAINTENANCE AND USAGE

Equipment that has been used for this chemical should not be used for the application of other materials to sensitive plants, unless it has been well washed out with hot soapy water or 1% solution of ammonia, followed by several clear water rinses or use Tank & Equipment Cleaner. If using a Sulfonylurea herbicides (Lusta®, Glean®, Ally\* or Associate®), follow decontamination procedures detailed on those product labels.

A 50 mesh primary filter and 80 mesh secondary filter(s) are recommended.

The use of in-line nozzle filters is not recommended.

Select Boom height to achieve 50 % overlap (40 -50 cm for 110°, 70 to 80cm for 80° (high clearance self-propelled)

## 7. Boom Height

Notice from the Teejet table below that you need to set your boom height at 35 to 50 cm from target (top of weed canopy) for 110 degree nozzles and 70 to 80 cm for 80 degree nozzles in order to maintain a double overlap pattern.

### Spray Width Relative to Spray Angle

INCLUDED SPRAY ANGLE	THEORETICAL COVERAGE AT VARIOUS SPRAY HEIGHTS (IN cm)							
	20 cm	30 cm	40 cm	50 cm	60 cm	70 cm	80 cm	90 cm
15°	5.3	7.9	10.5	13.2	15.8	18.4	21.1	23.7
20°	7.1	10.6	14.1	17.6	21.2	24.7	28.2	31.7
25°	8.9	13.3	17.7	22.2	26.6	31.0	35.5	39.9
30°	10.7	16.1	21.4	26.8	32.2	37.5	42.9	48.2
35°	12.6	18.9	25.2	31.5	37.8	44.1	50.5	56.8
40°	14.6	21.8	29.1	36.4	43.7	51.0	58.2	65.5
45°	16.6	24.9	33.1	41.4	49.7	58.0	66.3	74.6
50°	18.7	28.0	37.3	46.6	56.0	65.3	74.6	83.9
55°	20.8	31.2	41.7	52.1	62.5	72.9	83.3	93.7
60°	23.1	34.6	46.2	57.7	69.3	80.8	92.4	104
65°	25.5	38.2	51.0	63.7	76.5	89.2	102	115
73°	29.6	44.4	59.2	74.0	88.8	104	118	133
80°	33.6	50.4	67.1	83.9	101	118	134	151
85°	36.7	55.0	73.3	91.6	110	128	147	165
90°	40.0	60.0	80.0	100	120	140	160	180
95°	43.7	65.5	87.3	109	131	153	175	196
100°	47.7	71.5	95.3	119	143	167	191	215
110°	57.1	85.7	114	143	171	200	229	257

## 8. Spray Nozzle Options for Flaxleaf Fleabane

### Flaxleaf Fleabane Control in Fallow

- Select Label compliant spray nozzles for your speed and water rate
- “Coarse” spray droplets with 70 l/ha water (remember to double the flow, quadruple the pressure)

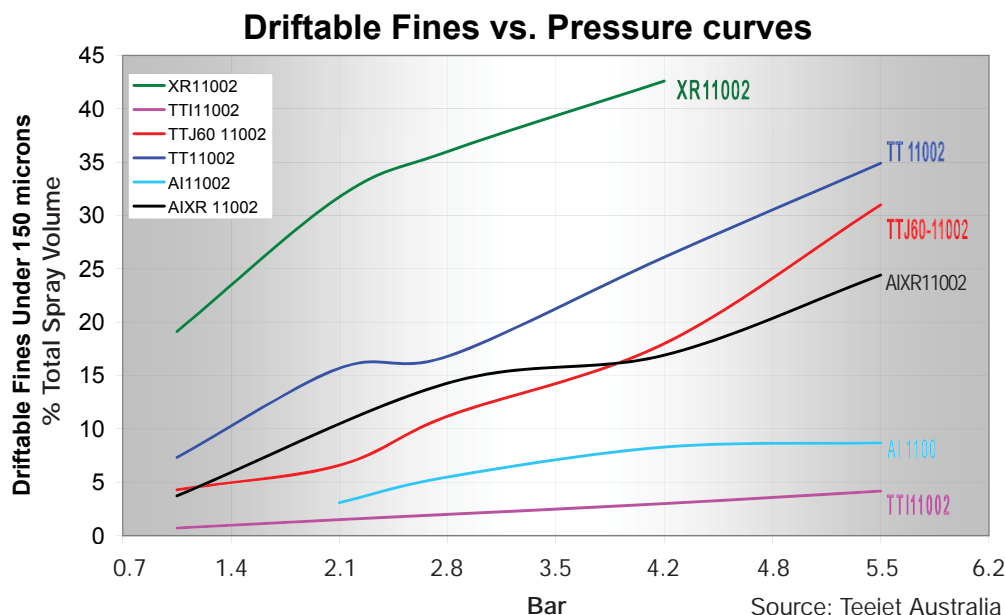
#### A. Coastal / Hilly Country

- AIXR110015, 71 l/ha @10kph, 3 bar with a “Coarse” droplet
- TT110015, M droplet from 2 bar, off label for phenoxyes, good option for post emergent sprays / in crop requiring a medium droplet
- High risk areas – TTI110015 (Turbo Teejet Induction), 76 l/ha @12 kph @ 5 bar with Extra Coarse droplet.

#### B. Broadacre

- AIXR110025, 76 l/ha @18kph, 4 bar with a Coarse droplet (VMD 218 – 349 micron)
- TT110025, 54 l/ha @ 18 kph, 2 bar with a Coarse droplet or drop to 16 kph to get 61 l/ha at 2bar with a Coarse droplet, label specifies 50 l/ha as a minimum without other herbicides like simazine etc.
- Where sensitive crops are proximal –TTI110025 air induction, 76 l/ha @ 18 kph at 4 bar with an “Ultra Coarse” droplet, (VMD > 622 micron)

Influence of pressure on range of Teejet nozzles (TTJ60-11002 = Turbo twinjets)





Please note increasing spray pressure only causes a small increase in driftable fines for Teejet's TTI and AI nozzles, hence they are often called high pressure air inductions, although the TTI is a hybrid nozzle can be used down to low pressure as well. AIXR and Twinjets start to get appreciable drift above 50 psi, so the AIXR is regarded as a low pressure air induction, also because it holds spray angle at low pressure, whereas the AI has will lose angle below 2 bar, (so engage your minimum hold function on rate controller bar for the

*Teejet have a mobile nozzle selector Application for:*



**Android™**

In the Google play store search "Sprayselect"



**Apple®**

In the Apple App store search "Sprayselect"

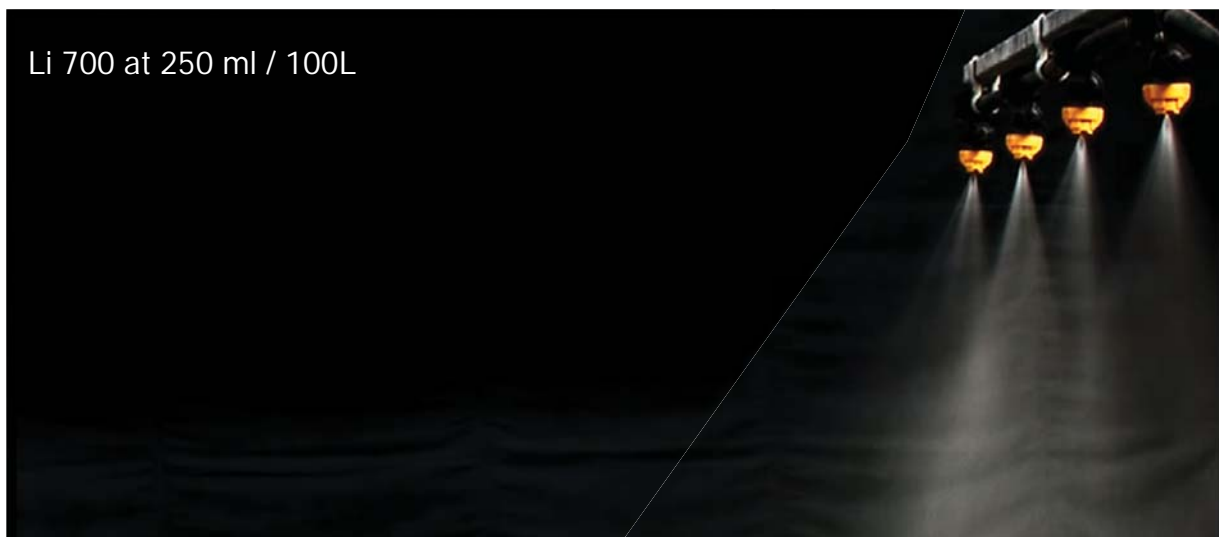


## 9. Nozzle Spray Quality and Surfactants

### Influence of Adjuvants on Drift Potential

Many adjuvants, such as non-ionic surfactants, usually lower the dynamic surface tension, which increases the amount of small driftable fines. In contrast, adjuvants containing lecithin or other types of oils will usually decrease the amount of driftable fines

Chemwet/BS1000 will significantly increase drift potential, even with AI nozzles, LI700 and Activator by contrast are regarded as quite good drift retardants.



## 10. Beware the Dangers of Night Spraying

GPS and boom lighting have given growers the opportunity to spray at night in periods of low Delta T. The flipside to this is the risk of pesticide moving off target under the influence of surface temperature inversions.

Using a coarser spray quality, lower speeds and keeping boom height as low as possible will help, but remember that the label specifies not to spray at wind-speeds less than 3 kph and not during conditions where surface temperature inversions exist. Night spraying is therefore best done on overcast and windy evenings, which also have the benefit of producing less dew which could otherwise diminish your spray result, depending on how rain-fast your product is. A heavy dew can produce up to 0.5 mm water of condensed atmospheric moisture.



Refer to the APVMA website [www.apvma.gov.au](http://www.apvma.gov.au) for information about surface temperature inversions. You can find the information by typing "inversions" into the search field in the top right search box.

## 11. Spray Equipment Decontamination

Decontaminate your spray equipment thoroughly after use, especially before commencing any crop spraying. Making sure you dispose of rinsate according to best practice and EPA requirements. See also the label directions on storage and disposal, utilising drumMuster for disposal of empty drums and ChemClear for any unwanted or deregistered pesticide.



## 12. Further Information and Consultation

Consult with your chemical reseller, agronomist and chemical manufacturer/distributor for further information, (especially crop and pasture rotations, managing plantbacks etc.). Also refer to DPI, GRDC and CRDC websites for guidance material and factsheets.

## Calibration Exercise - How to Calculate L/ha at a Measured Speed



Note: If any nozzle puts out more than 10% above what it should relative to the ISO flow chart for that nozzle size at the designated pressure, then replace the nozzle, or the whole set if they are the same age and wear.

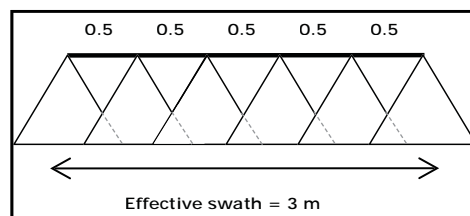
1. MEASURE NOZZLE OUTPUT (mL/min)									
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

**Total Sprayer output** = total output of all nozzles .....(m/L min) ÷ 1,000 = ..... L/min

2. CHECK ACTUAL GROUND SPEED	
<b>Speed</b> = ..... Distance ..... x 3.6 ÷ Time taken ..... = ..... Km/h	
(km/h)	(m) (sec)

3. MEASURE EFFECTIVE SPRAY WIDTH
<b>Swath</b> = .....m

example of a broadcast boomsprayer swath width:



TO CALCULATE SPRAY APPLICATION RATE (Litres per sprayed ha) at a MEASURED SPEED
Spray application rate = Total sprayer output .....(L/min) x 600 ÷ speed ..... (Km/h) ÷ swath .....(m)
Spray application rate = ..... /ha

## Spray Nozzle Selection Guide

Spray nozzle evolution has evolved from the standard flat fan to Extended range, to Low drift (pre-orifice) through to high and then low pressure air induction nozzles.

### A. Extended Range Nozzles

(XR110025, 1 to 4 bar operating pressure, **pictured**) or Hardi F

Can be operated at very low pressures, the XR110025 is Medium in spray quality at 1.5 bar, Fine from 2 bar. Generally phased out now as off label for many herbicide applications which specify a minimum of no smaller than a Coarse droplet sizing. With a fine spray quality, up to half the spray volume is susceptible to drift (off target), although some golf courses and vegetable growers still use the larger orifices, with the XR11006 Coarse up to 1.5 bar.



### B. Pre-orifice (often called Low drift)

Turbo Teejet (TT11002, Hammerhead shape, 1 to 6 bar operating pressure, **pictured**), also Driftguards (2 to 4 bar) and Hardi LD

As a medium spray quality often used for in-crop applications, 20 % of spray volume subject to off target drift as a medium droplet.



### C. Low Pressure Air Induction

Teejet AIXR11002, (other brands – Hardi Mini-drift, Agrotop Airmix, Lechler IDK)

AIXR11002, **pictured** coarse at 3 bar. As a coarse spray quality, roughly 10 % is susceptible to drift. Generally an all-rounder for use in-crop as well as in fallow situations, except in high risk situations although you could lower the pressure and produce a Very Coarse droplet, or increase to high pressure to gain a medium spray quality for in crop efficacy where a medium spray quality is specified. Will fit into most knapsack caps so useful for councils etc trying to control drift in amenity/public areas., generally go with a red, i.e.AIXR11004



### D. High Pressure Air Inductions

Teejet AI11002, **pictured** 3 to 8 bar, (also Hardi Injet and Lechler ID)

AI11002 Very Coarse to 6 bar, good drift control, used in fallow with translocated products and pre-emergents. If using with SpraySeed or other contact bipyridils increase the carrier volume to 70 l/ha, compared to 50 l/ha with glycines. With a VC droplet about 5% of spray volume is susceptible to drift.

The longer stem is more susceptible to breakage, particularly in 3 way nozzle bodies when retracted back onto boom cradle. Also with rate controllers set minimum hold function to 3 bar to prevent angle droop into headlands and treed areas



### E. Hybrid Nozzle

(TT11002, **pictured**) Maximum levels of drift control with an operating pressure (OP) 1.5 to 7 bar, best above 4.5 bar due to its very large droplet sizing of Ultra Coarse below 5 bar.

Good choice for pre-emergents and penetration through stubble. Sometimes also used for fertiliser application, but Streamjets are more often used for liquid nitrogen applications..



### F. Twinjets

(Teejet TTJ60 or for Air induced AITTJ60 **pictured**, OP of 1.5 to 6 and 1.5 to 7 bar respectively) TTJ60-11002 is Coarse below 3.5 bar, AI version Coarse below 6 bar.

The double outlet of a twinjet gives improved canopy coverage and penetration; use the AI version where drift control is of greater concern. Not recommended for higher travel speeds.



# Droplet Size Classification

Nozzle selection is often based upon droplet size. The droplet size from a nozzle becomes very important when the efficacy of a particular plant protection chemical is dependent on coverage, or the prevention of spray leaving the target area is a priority.

The majority of the nozzles used in agriculture can be classified as producing droplets in the range of fine to ultra coarse droplets. Nozzles that produce droplets in the finer to middle portion of the range are usually recommended for post-emergence contact applications, which require excellent coverage on the intended target area. This may include herbicides, insecticides and fungicides. Nozzles producing droplets from the middle to coarser end of the range, while offering less thorough surface coverage, provide significantly improved drift control. These nozzles are commonly used for systemic and pre-emergence surface applied herbicides.

An important point to remember when choosing a spray nozzle that produces a droplet size in one of the eight categories is that one nozzle can produce different droplet size classifications at different pressures. A nozzle might produce medium droplets at low pressures, while producing fine droplets as pressure is increased.

Category	Symbol	Color Code	Approximate Dv0.5 (VMD) (microns)
Extremely Fine	XF	Purple	≈50
Very Fine	VF	Red	<136
Fine	F	Orange	136–177
Medium	M	Yellow	177–218
Coarse	C	Blue	218–349
Very Coarse	VC	Green	349–428
Extremely Coarse	XC	White	428–622
Ultra Coarse	UC	Black	>622

Droplet size classifications are based on BCPC specifications and in accordance with ASABE Standard S572.1 at the date of printing. Classifications are subject to change.



Droplet size classes are shown in the following tables to assist in choosing an appropriate spray tip.

## Turbo TwinJet® (TTJ60)

Nozzle	bar									
	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
TTJ60-11002	C	C	C	C	M	M	M	M	M	M
TTJ60-110025	VC	C	C	C	C	C	C	M	M	M
TTJ60-11003	VC	C	C	C	C	C	C	C	M	M
TTJ60-11004	VC	C	C	C	C	C	C	C	C	M
TTJ60-11005	VC	C	C	C	C	C	C	C	C	C
TTJ60-11006	XC	VC	C	C	C	C	C	C	C	C

## AIXR TeeJet® (AIXR)

Nozzle	bar										
	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
AIXR110015	XC	VC	VC	C	C	C	C	M	M	M	M
AIXR11002	XC	XC	VC	VC	C	C	C	C	C	M	M
AIXR110025	XC	XC	XC	VC	VC	C	C	C	C	C	C
AIXR11003	XC	XC	XC	VC	VC	C	C	C	C	C	C
AIXR11004	UC	XC	XC	XC	VC	VC	VC	C	C	C	C
AIXR11005	UC	XC	XC	XC	XC	VC	VC	VC	C	C	C
AIXR11006	UC	XC	XC	XC	XC	VC	VC	VC	C	C	C

## Turbo TeeJet® (TT)

Nozzle	bar										
	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
TT11001	C	M	M	M	F	F	F	F	F	F	F
TT110015	C	C	M	M	M	M	F	F	F	F	F
TT11002	C	C	C	M	M	M	M	M	M	M	F
TT110025	VC	C	C	M	M	M	M	M	M	M	M
TT11003	VC	C	C	C	C	M	M	M	M	M	M
TT11004	XC	VC	C	C	C	C	C	C	M	M	M
TT11005	XC	VC	VC	VC	C	C	C	C	C	M	M
TT11006	XC	VC	VC	VC	C	C	C	C	C	C	M
TT11008	XC	XC	VC	VC	C	C	C	C	C	C	M

## AI TeeJet (AI) and AIC TeeJet (AIC)

Nozzle	bar											
	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	8
AI110015	UC	XC	XC	XC	XC	VC	VC	VC	VC	C	C	C
AI11002	UC	XC	XC	XC	XC	VC	VC	VC	VC	C	C	C
AI110025	UC	UC	XC	XC	XC	XC	VC	VC	VC	VC	C	C
AI11003	UC	UC	XC	XC	XC	XC	VC	VC	VC	VC	C	C
AI11004	UC	UC	XC	XC	XC	XC	VC	VC	VC	VC	C	C
AI11005	UC	UC	XC	XC	XC	XC	VC	VC	VC	VC	C	C
AI11006	UC	UC	XC	XC	XC	XC	VC	VC	VC	VC	VC	C
AI11008	UC	UC	UC	XC	XC	XC	XC	VC	VC	VC	VC	C
AI11010	UC	UC	UC	XC	XC	XC	XC	VC	VC	VC	VC	C
AI11015	UC	UC	UC	XC	XC	XC	XC	VC	VC	VC	VC	C


## Air Induction Turbo TwinJet (AITTJ60)

Nozzle	bar										
	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	7
AITTJ60-11002	XC	VC	VC	VC	C	C	C	C	C	C	M
AITTJ60-110025	XC	VC	VC	VC	C	C	C	C	C	C	M
AITTJ60-11003	UC	XC	XC	VC	VC	VC	C	C	C	C	C
AITTJ60-11004	UC	XC	XC	VC	VC	VC	C	C	C	C	C
AITTJ60-11005	UC	XC	XC	XC	VC	VC	VC	C	C	C	C
AITTJ60-11006	UC	XC	XC	XC	VC	VC	VC	C	C	C	C


## Turbo TeeJet Induction (TTI)

Nozzle	bar											
	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	7
TTI110015	UC	UC	UC	UC	UC	UC	XC	XC	XC	XC	XC	XC
TTI11002	UC	UC	UC	UC	UC	UC	UC	UC	XC	XC	XC	XC
TTI110025	UC	UC	UC	UC	UC	UC	UC	UC	XC	XC	XC	XC
TTI11003	UC	UC	UC	UC	UC	UC	UC	UC	XC	XC	XC	XC
TTI11004	UC	UC	UC	UC	UC	UC	UC	UC	XC	XC	XC	XC
TTI11005	UC	UC	UC	UC	UC	UC	UC	UC	XC	XC	XC	XC
TTI11006	UC	UC	UC	UC	UC	UC	UC	UC	XC	XC	XC	XC


### XR TeeJet® (XR) and XRC TeeJet (XRC)

	bar						
	1	1.5	2	2.5	3	3.5	4
XR8001	M	F	F	F	F	F	F
XR80015	M	M	F	F	F	F	F
XR8002	M	M	M	M	F	F	F
XR8003	M	M	M	M	M	M	M
XR8004	C	M	M	M	M	M	M
XR8005	C	C	C	M	M	M	M
XR8006	C	C	C	C	C	C	C
XR8008	VC	VC	C	C	C	C	C
XR11001	F	F	F	F	F	VF	VF
XR110015	F	F	F	F	F	F	F
XR11002	M	F	F	F	F	F	F
XR110025	M	M	F	F	F	F	F
XR11003	M	M	F	F	F	F	F
XR11004	M	M	M	M	M	F	F
XR11005	C	M	M	M	M	M	M
XR11006	C	C	M	M	M	M	M
XR11008	C	C	C	C	M	M	M
XRC11010	VC	C	C	C	C	C	M
XRC11015	XC	VC	VC	VC	C	C	C
XRC11020	XC	XC	XC	VC	VC	VC	VC


### TeeJet® (TP)

	bar				
	2	2.5	3	3.5	4
TP8001	F	F	F	F	F
TP80015	F	F	F	F	F
TP8002	M	M	F	F	F
TP8003	M	M	M	M	M
TP8004	M	M	M	M	M
TP8005	C	M	M	M	M
TP8006	C	C	C	C	C
TP8008	C	C	C	C	C
TP11001	F	F	F	VF	VF
TP110015	F	F	F	F	F
TP11002	F	F	F	F	F
TP11003	F	F	F	F	F
TP11004	M	M	M	F	F
TP11005	M	M	M	M	M
TP11006	M	M	M	M	M
TP11008	C	C	M	M	M


### TurfJet (TTJ)

	bar						
	1.5	2	3	3.5	4	4.5	5
1/4TTJ02	UC	UC	XC	XC	XC	XC	XC
1/4TTJ04	UC	UC	UC	UC	UC	UC	UC
1/4TTJ05	UC	UC	UC	UC	UC	UC	UC
1/4TTJ06	UC	UC	UC	UC	UC	UC	UC
1/4TTJ08	UC	UC	UC	UC	UC	UC	UC
1/4TTJ10	UC	UC	UC	UC	UC	UC	UC
1/4TTJ15	UC	UC	UC	UC	UC	UC	UC


### Turbo FloodJet® (TF)

	bar				
	1	1.5	2	2.5	3
TF-2	UC	XC	XC	XC	VC
TF-2.5	UC	UC	XC	XC	XC
TF-3	UC	UC	XC	XC	XC
TF-4	UC	UC	UC	XC	XC
TF-5	UC	UC	UC	UC	XC
TF-7.5	UC	UC	UC	UC	XC
TF-10	UC	UC	UC	UC	XC


### DG TwinJet (DGTJ60)

	bar				
	2	2.5	3	3.5	4
DGTJ60-110015	F	F	F	F	F
DGTJ60-11002	M	M	F	F	F
DGTJ60-11003	C	M	M	M	M
DGTJ60-11004	C	C	C	C	C
DGTJ60-11006	C	C	C	C	C
DGTJ60-11008	C	C	C	C	C


### TwinJet® (TJ)

	bar				
	2	2.5	3	3.5	4
TJ60-6501	F	VF	VF	VF	VF
TJ60-650134	F	F	F	VF	VF
TJ60-6502	F	F	F	F	F
TJ60-6503	M	F	F	F	F
TJ60-6504	M	M	M	M	F
TJ60-6506	M	M	M	M	M
TJ60-6508	C	C	M	M	M
TJ60-8001	VF	VF	VF	VF	VF
TJ60-8002	F	F	F	F	F
TJ60-8003	F	F	F	F	F
TJ60-8004	M	M	F	F	F
TJ60-8005	M	M	M	F	F
TJ60-8006	M	M	M	M	M
TJ60-8008	C	M	M	M	M
TJ60-8010	C	C	C	M	M
TJ60-11002	F	VF	VF	VF	VF
TJ60-11003	F	F	F	F	F
TJ60-11004	F	F	F	F	F
TJ60-11005	M	M	F	F	F
TJ60-11006	M	M	M	F	F
TJ60-11008	M	M	M	M	M
TJ60-11010	M	M	M	M	M

### DG TeeJet® (DG E)

	bar				
	2	2.5	3	3.5	4
DG95015E	M	M	F	F	F
DG9502E	M	M	M	M	M
DG9503E	C	M	M	M	M
DG9504E	C	C	M	M	M
DG9505E	C	C	C	M	M

### DG TeeJet (DG)

	bar				
	2	2.5	3	3.5	4
DG80015	M	M	M	M	F
DG8002	C	M	M	M	M
DG8003	C	M	M	M	M
DG8004	C	C	M	M	M
DG8005	C	C	C	M	M
DG110015	M	F	F	F	F
DG11002	M	M	M	M	M
DG11003	C	M	M	M	M
DG11004	C	C	M	M	M
DG11005	C	C	C	M	M

Source TeeJet Catalogue 51M

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