

GROWNOTES™

SPRAY

APPLICATION MANUAL FOR GRAIN GROWERS

FOREWORD BY STEVE JEFFERIES

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LIST OF VIDEOS

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Foreword

Spray application is an integral operation in modern grain farming systems. The control of weeds, diseases and pests in a timely manner, while minimising risks to the environment, requires that the spray operator has a good understanding of all of the components that can influence the outcome of each spray job.

This GRDC GrowNotes™ Spray application manual for grain growers, as part of the GRDC GrowNotes™ series has been designed in digital format to provide information on how various spraying systems and components work, along with things the operator should consider to ensure the sprayer is operating to its full potential. The focus of the content is on issues that will assist in maintaining the accuracy of the sprayer output while improving the efficiency and safety of spraying operations.

It includes practical information – backed by science – on sprayer set-up, including self-propelled sprayers, new tools for determining sprayer outputs, advice for assessing spray coverage in the field, improving droplet capture by the target, drift-reducing equipment and techniques, the effects of adjuvant and nozzle type on drift potential, and surface temperature inversion research. The GRDC is continuing to invest in making tools and resources available to growers to assist with spraying decisions.

Bill Gordon, editor and lead author of this manual, has delivered many GRDC training workshops, on improving spray application results and minimising off-target effects. Bill is highly regarded by his peers and by the grains industry as a whole in communicating to spray operators spraying best practice.

In addition, several other key players in the industry have contributed to the production of this manual. They have decades of experience in various aspects of spray application, which they have shared in the 23 modules that make up this GrowNotes™. Each module has a practical focus and, with the addition of video content, there are many 'tips' that applicators will find useful.

We hope GRDC GrowNotes™ Spray application manual for grain growers highlights the need for applicators to plan their operations, and to conduct their own research before upgrading components or replacing the sprayer.

Yours sincerely



Steve Jefferies

Managing director
Grains Research and Development Corporation

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GRDC GrowNotes™ Spray Application Manual module videos

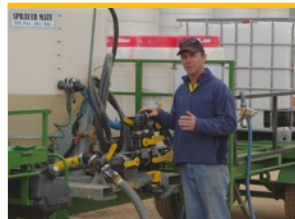
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Introduction to the GrowNotes™



An introduction to spraying operations



Mixing and handling – custom trailer

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Target, timing & technique



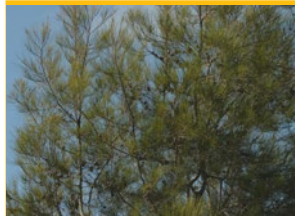
Weather monitoring using a hand-held meter

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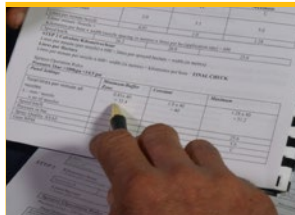


Drift reduction technology – vegetative barriers



Drift reduction technology – barrier structure

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Preparing a spray plan



Checking controller inputs & settings



Importance of checks for new operators

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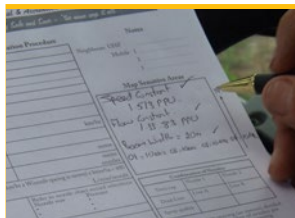
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Weighing the sprayer – ways to do it



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GRDC GrowNotes™ Spray Application Manual module videos

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Chemical mixing order



Mixing – conducting a jar test



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Module 8 – Calibration of the spray system



Options for measuring pressure at the nozzle



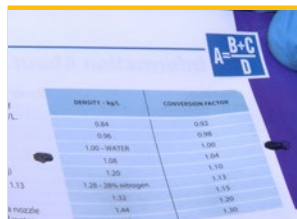
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Keeping a reference nozzle



Impact of density on the accuracy of a calibration



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Mixing and handling – custom trailer



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Mixing and handling water quality

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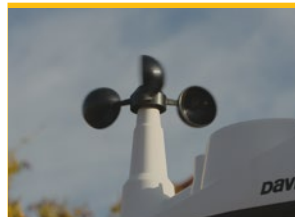
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Drift reduction technology – cloud observation

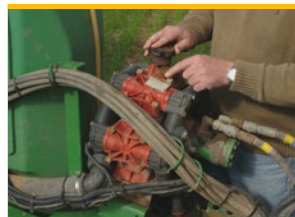


Weather monitoring using a hand-held meter

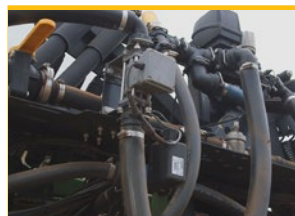


Drift reduction technology – weather stations

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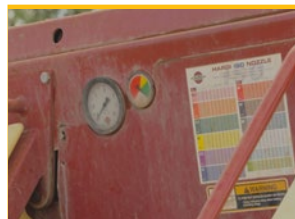
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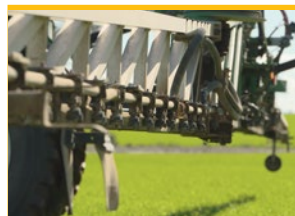
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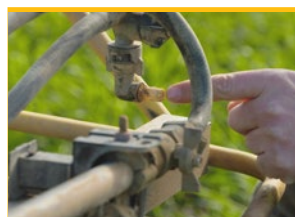
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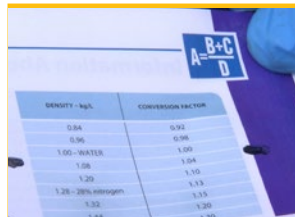


Tyre tip – aligning tyre centres

Module 13 – Rate controller functions and settings



Rate controller functions – grower experience

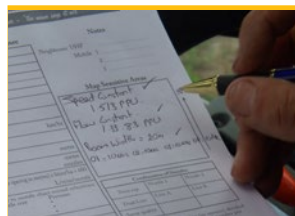


DENSITY - kg/L	CONVERSION FACTOR
0.84	0.92
0.96	0.96
1.00 - WATER	1.00
1.08	1.04
1.20	1.10
1.28 - 30% nitrogen	1.13
1.32	1.15
1.44	1.20

Impact of density on the accuracy of the calibration



Using a minimum setting in the rate controller



Checking controller inputs and settings

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Module 14 – Boom stability and height control



Benefits of height-control systems



Boom stability – rigid boom centres



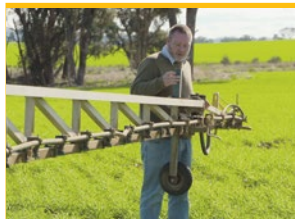
Boom stability – pendulum booms



Boom stability – inverted trapeze



Boom stability – pendulum trapeze boom – Hardi® (coil spring)



Height control systems – touchdown or jockey wheels

GRDC GrowNotes™ Spray Application Manual module videos

Module 14 – Boom stability and height control (continued)



Auto height control grower experience



Auto boom height systems

Module 15 – Weight, balance and tyres



Introduction – sprayer weight, balance and tyres



Remote systems for checking tyre pressure



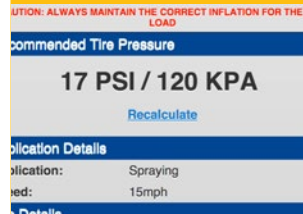
Tyre information – importance for purchase



Importance of matching tyre pressure to weight on each wheel

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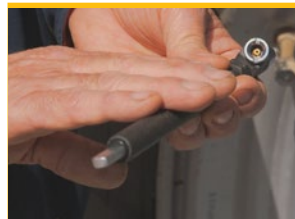
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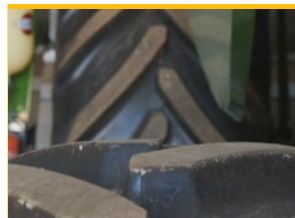
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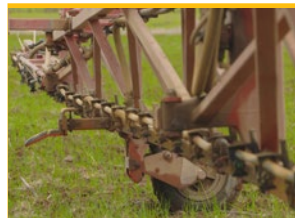


Tyre gauges require calibration



Tyre tip – aligning tyre centres to improve auto steer function

Module 16 – Overview of the spraying systems available



Spray systems – single line



Pulse width modulation – how it works

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Module 16 – Overview of the spraying systems available (continued)



**Single line multi-step system.
The ARAG® Selectron 4 nozzle
system**



**Spray systems – three step dual
boom**

Module 17 – Pulse-width modulation systems



**Nozzle selection & duty cycle for
pulse width modulation**

Module 18 – Single line and multi-step systems



Spray systems – three tier



**A growers view on
multi-step systems**

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Module 21 – Assessing spray deposits



Assessing deposition in fallow and wheel tracks

Module 22 – Integration of the sprayer with other farm equipment



Aligning tyre centres

Module 23 – Upgrading the sprayer



Buying a sprayer – a grower perspective



Buying a sprayer – part 2