

Stewardship Needs: WDG/DF Formulation Products

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Problems: *In many situations*

- end users do not understand the properties of WDG/DF formulations
 - ...are NOT “Granules”
 - ...like WPs, WDGs / DFs must be measured by WEIGHT (not volume)
- end users do not use the measuring device supplied with the product
- dealers/suppliers do not give end users a proper measuring device and/or measuring instructions

Scenario...

- farmer problem...
- 'phone call from (good) field agent...
- discussion / points of misunderstanding...
- contact with sales, technical representatives....
- contact with local (ag) dealers...



Handling and Measuring DF / WDG Formulation Pesticide Products

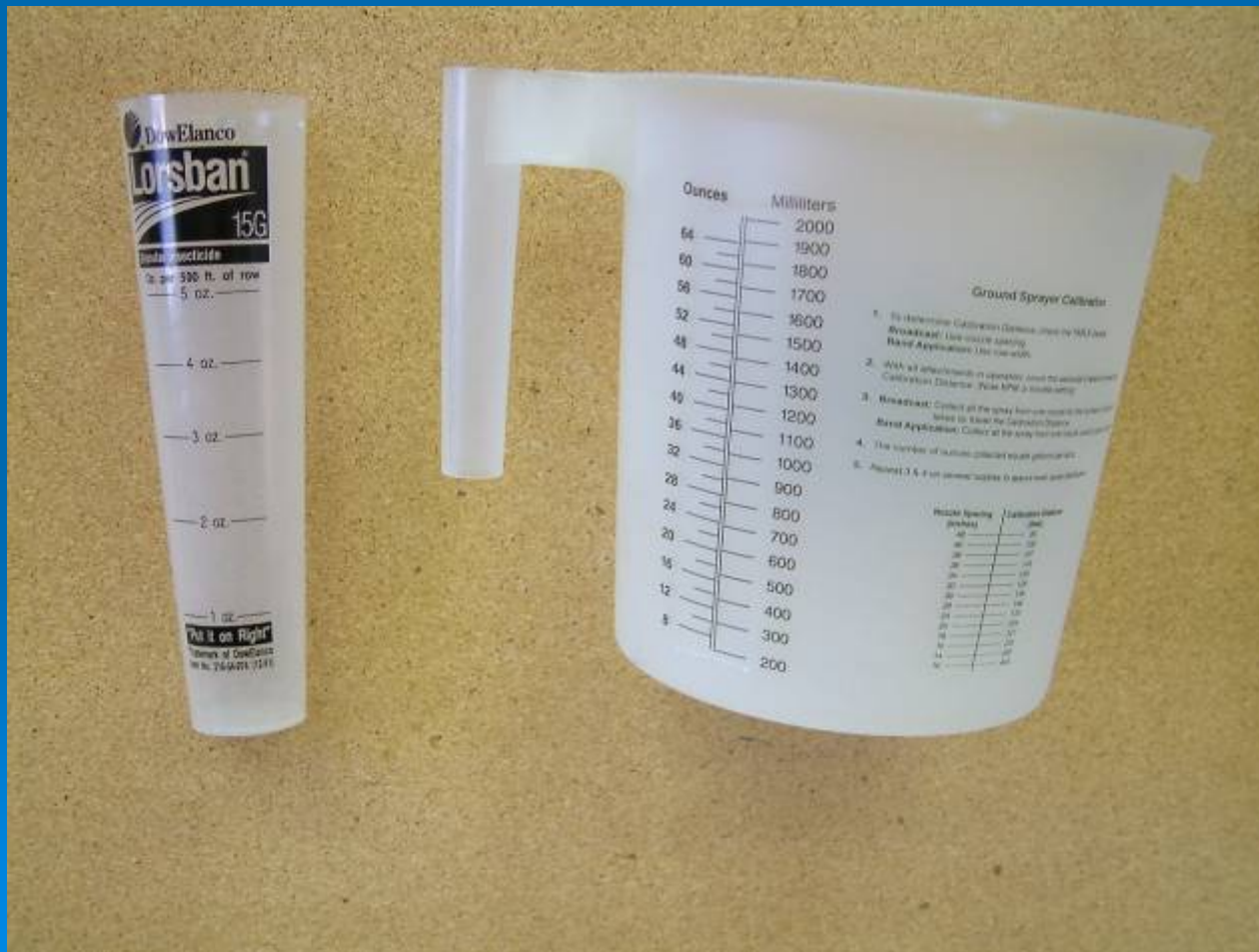
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Units of Measurement



Dry Ounce -vs- Fluid Ounce



Fluid Ounce

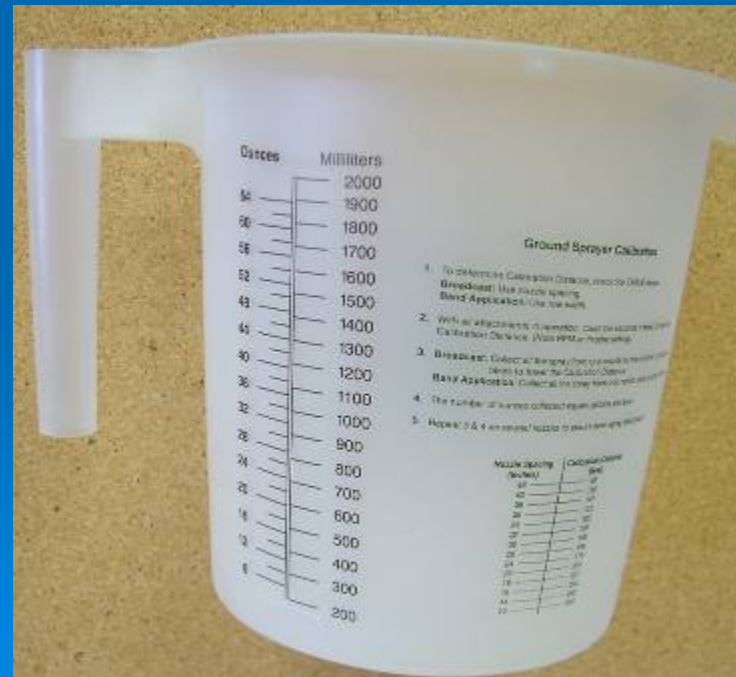
Measure of Volume

1 fluid ounce = 1.8 cubic inches
= 2 tablespoons
= ~ 30 cc's (= 29.6 cm³)
= ~ 30 mL (= 29.6 mL)

Fluid Ounce

1/128 of a US Gallon

1/16 of a US Pint



Dry Ounce

Measure of Weight
 $1/16$ of a Pound



Fluid Ounce -vs- Dry Ounce

➤ 3-oz table salt
measured by volume

➤ 3-oz table salt
measured by weight





Salt (NaCl)
3 fluid ounces

Salt (NaCl)
3 ounces by weight

Dry Ounce

Product-specific Measuring Containers for Dry Flowables/Water-Dispersible Granules



32 fl. oz. —
31 fl. oz. —
30 fl. oz. —
29 fl. oz. —
28 fl. oz. —
27 fl. oz. —
26 fl. oz. —
25 fl. oz. —
24 fl. oz. —
23 fl. oz. —
22 fl. oz. —
21 fl. oz. —
20 fl. oz. —
19 fl. oz. —
18 fl. oz. —
17 fl. oz. —
16 fl. oz. —
15 fl. oz. —
14 fl. oz. —
13 fl. oz. —
12 fl. oz. —
11 fl. oz. —
10 fl. oz. —
9 fl. oz. —
8 fl. oz. —
7 fl. oz. —
6 fl. oz. —

—16 oz—
—15 oz—
—14 oz—
—13 oz—
—12 oz—
—11 oz—
—10 oz—
—9 oz—
—8 oz—
—7 oz—
—6 oz—
—5 oz—
—4 oz—

24 oz. —
23 oz. —
22 oz. —
21 oz. —
20 oz. —
19 oz. —
18 oz. —
17 oz. —
16 oz. —
15 oz. —
14 oz. —
13 oz. —
12 oz. —
11 oz. —
10 oz. —
9 oz. —
8 oz. —
7 oz. —
6 oz. —
5 oz. —
4 oz. —



Measuring
Herbicide
Volumetric
Weigh
more precise
Not for use

Made in
Form 140



Dry Ounce

- Note the placement of the mark for 1 dry-ounce (weight measure) mark:





Coffee Creamer
3 ounces by weight

Grits
3 ounces by weight

Sugar ($C_6H_{12}O_6$)
3 ounces by weight


Epsom Salts ($MgSO_4$)
3 ounces by weight

Salt ($NaCl$)
3 ounces by weight

What is a DF / WDG?

- Water-Dispersible Granule (WDG) and Dry Flowable (DF) formulations are made by compressing (“aggregating”) a Wettable Powder (WP) into “dust-free” particles.

DF / WDG -- DISadvantages

- Like WPs, form a suspension (**not** a solution) in a spray tank
 - As a result, they
 - require agitation
 - may clog strainers/screens
- 

DF / WDG -- Advantages

➤ Like WPs:

- low dermal hazard
- less likely to be phytotoxic than some other sprayable formulations (ex. ECs) because they don't contain any oils or solvents

➤ Unlike WPs

- Easier to take out of packaging
- Easier to measure....but mixer-loaders MUST use device specifically calibrated for that product AND that "batch " of product*
- Reduced inhalation hazard to the applicator (due to larger "dust-free" particle size)

What is a DF / WDG?

- easier and safer to handle...BUT
- measured by weight (batch density), not by volume

Maneb 75DF
Dry Fungicide

ACTIVE INGREDIENTS
Maneb (2-benzothiazolyl disulfanyl methyl) sulfide 75.0%
Inert ingredients 25.0%

NET CONTENTS

KEEP OUT OF REACH OF CHILDREN
CAUTION

Read the entire label carefully. Because a fungicide may cause or aggravate a child's asthma, do not use this product in or near a child's play area.

HAZARD STATEMENTS
H302: Harmful if swallowed.
H312: Harmful in contact with skin.
H332: Irritating to the respiratory system.

PRECAUTIONS
Avoid breathing dust or fumes. Do not get on clothing. Wash hands thoroughly after use. Do not eat, drink, or smoke while using this product. Do not use in areas where children or livestock are present. Do not use in areas where food is produced or stored. Do not use in areas where food is processed or stored. Do not use in areas where food is prepared or stored. Do not use in areas where food is served or consumed. Do not use in areas where food is stored. Do not use in areas where food is transported. Do not use in areas where food is sold. Do not use in areas where food is distributed. Do not use in areas where food is consumed. Do not use in areas where food is stored. Do not use in areas where food is transported. Do not use in areas where food is sold. Do not use in areas where food is distributed. Do not use in areas where food is consumed.

NET CONTENTS

DRIVE
75 DF HERBICIDE

ACTIVE INGREDIENTS
Glyphosate (as glyphosate isopropylamine salt) 75.0%
Inert ingredients 25.0%

NET CONTENTS

KEEP OUT OF REACH OF CHILDREN
CAUTION

Read the entire label carefully. Because a herbicide may cause or aggravate a child's asthma, do not use this product in or near a child's play area.

HAZARD STATEMENTS
H302: Harmful if swallowed.
H312: Harmful in contact with skin.
H332: Irritating to the respiratory system.

PRECAUTIONS
Avoid breathing dust or fumes. Do not get on clothing. Wash hands thoroughly after use. Do not eat, drink, or smoke while using this product. Do not use in areas where children or livestock are present. Do not use in areas where food is produced or stored. Do not use in areas where food is processed or stored. Do not use in areas where food is prepared or stored. Do not use in areas where food is served or consumed. Do not use in areas where food is stored. Do not use in areas where food is transported. Do not use in areas where food is sold. Do not use in areas where food is distributed. Do not use in areas where food is consumed.

NET CONTENTS

DUPONT
DuPont™ Curzate® 60DF
fungicide

“..... A Growing Partnership With Nature™”

Measuring WDG/DF Products

- The weight of each product -- and each batch of the same product (!) -- will vary, depending on the amount of active ingredient AND the properties of the carrier used.
- WDG/DF products come with a measuring device calibrated for a specific “batch” of a specific product. The lines on the container indicate weight, NOT volume.





Summary

- DFs and WDGs have many advantages, including being easier and safer to use than many other pesticide formulations
- DFs and WDGs must be measured properly



In some situations...

- dealers / distributors *and* end users do not understand the properties of WDG/DF formulations
- dealers / distributors do not give end users a proper measuring device and/or measuring instructions
- end users do not use the appropriate measuring device / method

1:1



6:8



Solutions

- Education/Outreach
- Packaging
 - *Shrink-wrap* measuring device to product container
- Labeling
 - *Color code and mark* both product container and corresponding measuring device (name and year + “batch”): ex:
 - **Osprey 2008-A**
 - **Ally 2008-B**

Conclusion

Stewardship efforts
are needed to ensure
that DF/WDG formulation
product users
apply these materials
at the proper rate.