



# Laundering Pesticide-contaminated Work Clothes



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### Laundering Pesticide-contaminated Work Clothes

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Personal protective equipment (PPE) is the first line of defense to protect the body from pesticide exposure. Often, contaminated work clothes are the primary form of PPE. Work clothes also are worn under more extensive garments such as aprons, chaps or chemical-resistant suits. Ultimately, work clothes will become contaminated with pesticides as part of the handling, loading, mixing and application process. Therefore, you need to handle and wash work clothing carefully.



**Some common-sense approaches for cleaning pesticide-soiled clothing include:**

- **Read the pesticide label.** Instructions often include how to wash and dry items (this is a legal requirement) (Figure 1).
- If garments are heavily contaminated, handwashing them may reduce or eliminate pesticide residue and color transfer separate from how they are cleaned or laundered with the proper detergent.
- If the label directs you to launder clothes that are not heavily contaminated, look for and follow label directions that direct you to use special procedures.
  - ... use detergent for best. Keep and wash PPE separately from other laundry.
- **Handing, separating, storing and washing clothes.** In a manner that will minimize contamination in the home and/or exposure to risk.
- **Using optimum wash settings** to remove pesticide contaminants from garments.
- **Discontaminating the washing machine** before using it for other household clothing.
- **Storing contaminated laundry** for 30 days with handwashing pesticide-contaminated garments, if you need your contaminated clothing to reuse.
- **Checking with the manager or owner** of a laundromat or public washing facility about prohibitions or special handling policies if you plan to wash your contaminated clothing at these facilities.

**Figure 1**  
Consult the pesticide label for washing instructions or specific handling instructions.

**Figure 2**  
Store pesticide-contaminated clothes in a separate bag or container.

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Store pesticide-contaminated clothes in a separate bag or container.

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Store pesticide-contaminated clothes in a separate bag or container.

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# Introduction

- ▶ Work clothing is often the primary form of Personal Protective Equipment (PPE)
- ▶ Work clothes are also worn under other PPE, such as:
  - ▶ Aprons
  - ▶ Chaps
  - ▶ Chemical resistant suits
- ▶ Clothing will become contaminated with pesticides as part of the loading, mixing, and application process
- ▶ Contamination is inevitable, but manageable



# Common sense approaches for cleaning pesticide-soiled clothes

- ▶ Review the pesticide label, it should explain if PPE can be laundered or not
- ▶ Handling, segregating, storing, and washing clothes
- ▶ Using optimum wash settings
- ▶ Decontaminating the washing machine
- ▶ Notifying commercial laundering firms
- ▶ Checking with laundromat owners/managers



# Reducing residue in homes

- ▶ Shake, sweep, dust off clothes outdoors, and remove any dry material
- ▶ Remove clothes outside the home (if possible)
  - ▶ If necessary, set up a changing spot in the house that can be easily decontaminated
- ▶ Contaminated clothes should be stored and washed separately from household laundry



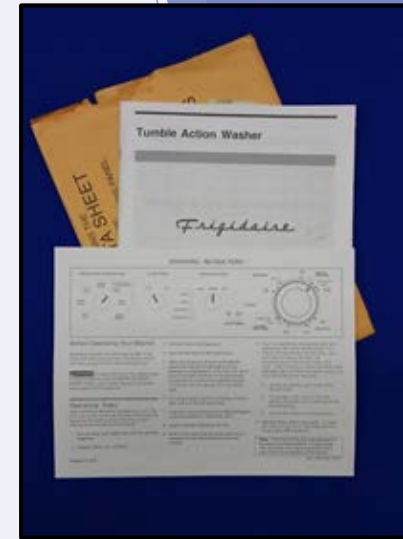
# When & how to handle the clothes

- ▶ Launder clothes as soon as possible
  - ▶ Waiting more than 24 hours reduces wash efficiency
  - ▶ If you have to wait, store clothes in a designated bag or container that can be decontaminated easily
  - ▶ If possible, store outside of the home
- ▶ Wear a long-sleeved shirt and gloves to reduce skin exposure when loading the machine



# Optimizing wash settings

- ▶ Read the manual for operation tips
- ▶ Wash small loads (50-75 percent of capacity)
- ▶ Use max. amount of high-quality detergent
  - ▶ Avoid gentle detergents
- ▶ Use hot water at the highest setting
- ▶ Use a pre-rinse or soak and an aggressive wash cycle with a high-speed spin
- ▶ Preferably, dry clothes on a clothesline
- ▶ Run an additional empty cycle without clothes, with detergent, before using on household laundry



# Additives & detergents

- ▶ Certain additives have not been proven to help decontamination, such as:
  - ▶ Bleach or ammonia
  - ▶ Pre-treating garments with stain removers
  - ▶ Fabric softeners
- ▶ Pouches and pods have not been evaluated in their ability to remove pesticides from clothing
- ▶ Regardless of detergent, if proper laundering procedures are used, work clothes that are lightly to moderately contaminated can be cleaned to an acceptable level



# Other points to consider

Research on laundering work clothing occurred in the 1980's and early 1990's





# Pesticide toxicity has changed



- ▶ Today, generally, pesticides have lower toxicity and the amount of active ingredient is significantly lower
- ▶ Manufacturers have improved formulation and packaging to reduce applicator exposure
- ▶ Pesticides are still toxic and can pose health risks
- ▶ A good laundering routine helps protect the applicator and other family members

# Detergents have changed

- ▶ No longer contain phosphates
- ▶ Generally much better at dissolving contaminants
- ▶ More liquids being used
- ▶ Pouches and pods are being used, but they have not been evaluated in their ability to remove pesticides from clothing
- ▶ Regardless of detergent, if proper laundering procedures are used, work clothes that are lightly to moderately contaminated can be cleaned to an acceptable level



# Washing machine design has changed

- ▶ Washing machines are being moved towards:
- ▶ Digital controls
- ▶ Programmable pre-soak cycle
- ▶ Wash cycles that can be set for aggressive and for an hour or more
- ▶ Customizable spin setting
- ▶ Rinse cycle duration and intensity
- ▶ Steam-assisted cleaning
- ▶ Front or top load machines without agitators



# More on washing machine design

- ▶ Superheated water will likely help sanitize heavily soiled clothes
- ▶ Basic or simple machines pose challenges, but can still be used
- ▶ Water and energy conservation can be an issue
  - ▶ Applicators should minimize exposure when handling pesticides
  - ▶ Use loads that are closer to 75% of capacity
  - ▶ Extend cycles, may help, but not researched



# New fabric and finishes

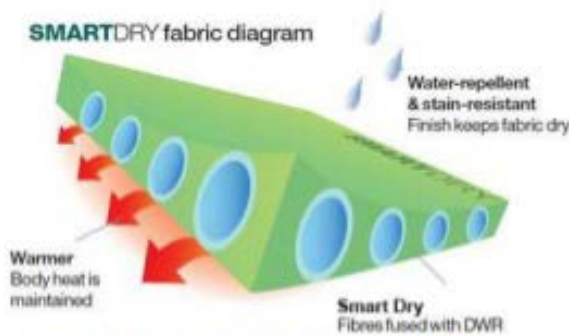
- ▶ No research has been done
- ▶ All recommendations are based on conventional fabrics
- ▶ Consult supplier or manufacturer



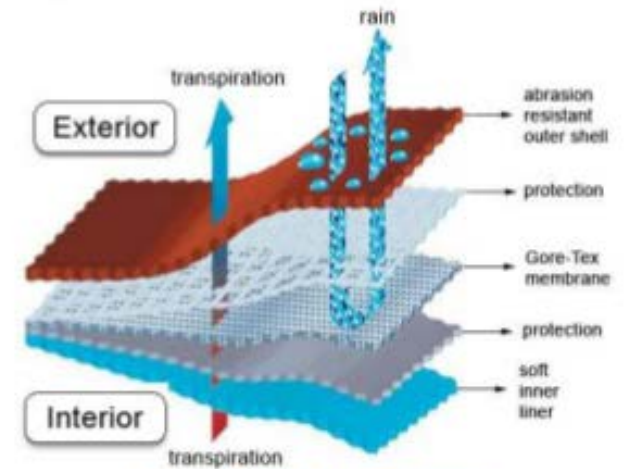
Densely Woven Fabric  
(Micro denier < 10 micron)



Closely woven fabrics  
(oxford weave) up to 20 min



Smart Breathable fabrics (PCP)  
SMP – PU material



Micro porous Membrane

For more information, go to...

PS1778

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Personal protective equipment (PPE) is the last line of defense to protect the body from pesticide exposure. Often, conventional work clothing is the primary form of PPE. Work clothes also are worn under more extensive garments such as aprons, chaps or chemical-resistant suits.

Ultimately, work clothes will become contaminated with pesticides as part of the handling, loading, mixing and application process. Therefore, you need to handle and wash work clothing carefully.

**NDSU** EXTENSION SERVICE  
January 2016



<http://tinyurl.com/NDSU-ps1778>

## Some common-sense approaches for cleaning pesticide-soiled clothing include:

- **Reviewing the pesticide label** to determine if the clothing can be washed and if so, how (This is a legal requirement.) (Figure 1)
  - If garments are heavily contaminated, laundering them may not be an option. *"Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate."*
  - If the label allows you to launder clothes that are not heavily contaminated, look for and follow label statements that direct you to use special procedures. *"... use detergents and hot water. Keep and wash PPE separately from other laundry."*
- **Handling, segregating, storing and washing clothes** in a manner that will minimize contamination in the home and/or exposure to skin
- **Using optimum wash settings** to remove pesticide contamination from garments. For more information on washing machines, refer to the fact sheet, *Washing Machines for Farming* (Figure 2)
- **Notifying commercial laundering firms** that they will be handling pesticide-contaminated garments if you send your contaminated clothing to them
- **Checking with the manager or owner** of a laundromat or public washing facility about prohibitions or special handling policies if you plan to wash your contaminated clothing at those facilities

Figure 1. Consult the pesticide label for washing prohibitions or special laundering instructions. (NDSU photo)



## Minimize Pesticide Residues in the Home and Avoid Human Exposure

Pesticide labels require pesticide applicators, handlers and workers to protect themselves and others from exposure to pesticides. Thus, pesticide-contaminated clothing should be handled as follows:

- While outdoors, shake, sweep or dust off the clothing with compressed air and remove any dry material from the clothing. Pay special attention to cuffs and pockets where residues often collect.
- Remove clothing outside the home or establish a changing place in the home that can be decontaminated easily after each use.
- Launder clothes as soon as possible. Studies indicate that holding clothes for 24 hours or more significantly reduces the washing efficiency.
- If you don't wash clothes immediately:
  - Store them outside the home in a garage, shop or porch if possible. Otherwise, store them in a designated area in the home that can be decontaminated easily after each use.
  - Store separately in plastic bags or sealed plastic bags (Figure 2)



Figure 2. Plastic storage bin with sealable lid available at most home improvement stores. (NDSU photo)