



# COLORADO ENVIRONMENTAL PESTICIDE EDUCATION PROGRAM

Pesticide Fact Sheet #105  
CEPEP 5/00  
Updated 6/06

## PESTICIDE FORMULATIONS

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This fact sheet defines the term active ingredient and describes several different pesticide formulations.

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## Pesticide Formulations

The **active ingredient** (a.i.) is the agent in a formulation which has a specific effect on a pest, weed, or disease. A single active ingredient often is sold in several different formulations. In making a choice of which formulation will be best for each use, consider:

- The plant, animal, or surface to be protected
- Application machinery available and best suited for the job
- Hazard of drift and runoff
- Safety to applicator, helpers, other humans, and pets likely to be exposed
- Habits or growth patterns of the pest
- Cost
- Type of environment in which the application will be made



The amount of active ingredient and the kind of formulation are listed on the pesticide label. For example, a 50W contains 50% by weight of a.i. and is a wettable powder. If it is a 10 lb bag, it contains 5 lb of a.i. and 5 lb of other ingredients. Liquid formulations indicate the amount of a.i. in pounds per gallon. For example, a 4E means 4 lb per gallon of the a.i. in an emulsifiable concentrate formulation.

### Types of Formulations

**Aerosol** - Either ready-to-use types such as household sprays or smoke or fog generators that break the liquid formulation into a fine mist or fog using a rapidly whirling disc or a heated surface.

**Baits** - Incorporate some sort of pest attractant. Baits are very commonly used to control rodents, cockroaches, and ants.

**Dry Flowable - DF** - Also known as water-dispersible granules (WDG). The a.i. is formulated on a granule. They form a suspension when mixed with water and require less agitation than wettable powders.

**Dust - D** - Formulations of pesticides on a dry particle that are designed to be applied dry. Formerly widely used, few dust formulations are currently made. Problems include difficulties in applying with currently used equipment, excessive drift, increased hazards to honeybees, and applicator inhalation problems.

**Emulsifiable Concentrate - EC or E** - A liquid formulation of pesticide containing the a.i., one or more solvents, and an emulsifier which allows mixing with water.

**Flowable - F or FL** - A liquid formulation consisting of a finely ground a.i. suspended in a liquid. Mixed with water for application.

**Granule - G** - Dry formulations mixed onto fairly large particles of clay, ground corn cob or walnut hulls, or manufactured granules. They are applied as formulated, without mixing. Most granules are prepared by spraying the pesticide onto the carrier particle, although some are "built" into the granule.

**Low Concentrate Solution** - Small amounts of a.i., 1% or less, used without dilution for structural pests, space sprays in barns, mosquito control, etc.

**Microencapsulation** - Particles of a pesticide, either liquid or dry, surrounded by a plastic coating. Mixed with water and applied as a spray. Encapsulation makes timed release possible. However, they are often somewhat more expensive and can increase hazards to honeybees.

**Soluble Powder - SP** - A dry formulation which, when mixed with water, dissolves readily and forms a true solution. When thoroughly mixed, no agitation is necessary.

**Solution - S** - A dry formulation of pesticide that will go into true solution when mixed with water. Relatively few pesticides are water soluble. These pesticides may also be formulated as liquids.

**Tracking powders** - Primarily used to control insects and rodents found in homes and other structures. They are applied to areas where the pests tend to travel. After they are picked up, the powder is often ingested as the animal grooms itself. Silica aerosols placed in wall voids for cockroach control and boric acid placed along routes traveled by ants are examples of tracking powders.

**Water-Soluble Packet - WSP** - Used to reduce the mixing and handling hazards of some highly toxic pesticides. Preweighed amounts of wettable powder or soluble powder formulations are packaged in water-soluble plastic bags. When the bags are dropped into a filled spray tank, they dissolve and release their contents to mix with the water.

**Wettable Powder - WP or W** - Dry, finely ground formulations which look like dusts. The a.i. is combined with a finely ground dry carrier, usually mineral clay, along with other ingredients that enhance the ability of the powder to suspend in water. The powder is mixed with water for application as a spray. One of the most widely used pesticide formulations.



## **References and Resources**

Buffington, E.J. and McDonald, S.K. 2001. *General Colorado Commercial Pesticide Application and Safety Training Guide*. Colorado State University and Colorado Department of Agriculture, Fort Collins, CO.

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