



GreenSolutionsUpdate

Common Questions about Tank Mixes

Tank mixes are getting more and more complicated as turf professionals attempt to limit the number of applications due to labor concerns and to limit disruption in play. Spray solutions now often include fertilizers, growth regulators, and/or wetting agents, in addition to the primary components of fungicides and/or insecticides. Increasing the number of components in a spray tank increases the chances of incompatibility or may affect stability of active ingredients. Following are a number of common mixing questions.

Can I add components directly to the tank?

It's usually best to ensure that the spray tank is agitating and at least half full of water before adding other components. To further help with dissolving components, use the premix tank that many sprayers come equipped with or mix individual components in a five gallon bucket before pouring into the tank. Lastly, some fertilizers or water-dispersible granules (WDG) dissolve better in warm water prior to adding to the spray tank.

What's the best order for adding products to the spray tank?

The best order for adding components when Signature Xtra Stressgard is included in the tank-mix is based largely on personal experience and the products to be included. The rule of thumb is to add all other pesticides including growth regulators first followed by Signature Xtra, then wetting agents, and lastly fertilizers/micronutrients. Signature Xtra drops the pH so it's important to add it after the other pesticides and PGR's to insure they are in solution first. Depending on the pH sensitivity of other products going into the tank, there are superintendents that effectively add Signature Xtra first. The preferred order for specific formulations is:

1. Water soluble packages (WSP's)
2. Water dispersible granules (WG's/WDG's)
3. Wettable powders (WP's)
4. Suspension concentrates (SC's)
5. Oil in water emulsions (EW's)
6. Oil dispersions (OD's)
7. Emulsifiable concentrates (EC's)
8. Soluble concentrates (SL's)
9. Liquid fertilizers

What's the ideal spray tank pH?

This varies depending on the active ingredient, but usually near neutral or slightly acidic is the ideal pH. See the last table on the next page for stability of Bayer active ingredients at various pH. Check the specific label and strongly consider using buffering agents if your spray water quality is far different than recommended. Be sure to check the water pH with every fill-up because pH can change relatively quickly in most water sources.

Can I use irrigation water to fill the tank?

Likely "yes", if your irrigation water is well water or city water. Likely "no", if your irrigation water is effluent, streams, or run-off fed. This is because the water quality of these sources may be poor with suspended solids, bicarbonates, etc. and water quality can change quickly and dramatically.

Is there an alternative to the "jar test"?

The jar test is on virtually every pesticide label encouraging you to premix small portions of all ingredients in a jar to check for chemical incompatibility. The jar test has worked well for years, but professionals sometimes struggle with measuring out small portions and proportions required for the jar test. In these cases, some superintendents use an empty 2.5 gallon jug, the more transparent the jug the better. Pour in the amount of water equivalent to your spray volume/1000 sq ft, likely between 1 and 2 gallons. Add in each component of the spray tank in the equivalent rate/1000 sq ft. An inexpensive postal scale or archery broadhead scale (\$30) can weigh granular formulations and liquid formulations can be measured using syringes available at any local pharmacy or farm store (1 US fl oz = 29.6 ml). Agitate the jug and check for any precipitate, flocculation or other incompatibility.

What's the ideal spray volume?

This is highly variable given the array of nozzles, pesticides, variable pressure sprayers, etc. The following table is a general guideline based on pesticide type.



| PRODUCT | SPRAY VOLUME | | NOTES |
|--|---|---|---|
| | GREENS/TEES (GALS/1000 FT ²) | FAIRWAY/ROUGH (GALS/1000 FT ²) | |
| Systemic Herbicides: Broadleaf herbicides, Celsius®, Tribute® Total, Acclaim® Extra | 1.0-1.5 | 0.5-1.0 | Need to keep AI on the foliage |
| Soil-Applied Products: PRE herbicides, white grub insecticides, fungicides for soil borne-diseases (large patch, fairy ring, summer patch, etc.) | 1.5-2.0+ | 1.0-2.0 | Must move AI past the foliage. Follow with watering-in to further move AI down in to the soil |
| Contact Fungicides: Daconil®, Fore® Rainshield®, etc. | 1.5-2.0 | 1.0-2.0 | Good coverage is needed since AI won't move within plant. |
| Systemic Fungicides for Foliar Diseases | 1.5-2.0 | 1.0-1.5 | Ensure AI remains on the leaf. Use higher spray volume for diseases lower in the plant like large patch or anthracnose basal rot. |

Stability of Active Ingredients in Water of Various pH ● <1 hr ● <1 day ● >1 day ○ data not available

| BRAND NAME | ACTIVE INGREDIENT(S) | 50% HYDROLYSIS OF AI ¹ | | |
|-----------------------|---------------------------|-----------------------------------|------|------|
| | | pH 5 | pH 7 | pH 9 |
| 26GT® | Iprodione | ● | ● | ● |
| Chipco® 26019 Flo | Iprodione | ● | ● | ● |
| Acclaim® Extra | Fenoxaprop | ● | ● | ● |
| Banol® | Propamocarb-hydrochloride | ● | ● | ● |
| Bayleton® Flo | Triadimefon | ● | ● | ● |
| Celsius® | Dicamba | ● | ● | ● |
| | Iodosulfuron | ● | ● | ● |
| | Thiencarbazone | ● | ● | ● |
| Compass® | Trifloxystrobin | ● | ● | ● |
| Dylox® 420SL | Trichlorfon | ● | ● | ● |
| Exteris® Stressgard® | Trifloxystrobin | ● | ● | ● |
| | Fluopyram | ● | ● | ● |
| Fiata® Stressgard | | ○ | ○ | ○ |
| Finale™ | Glufosinate | ● | ● | ● |
| Indemnify® | Fluopyram | ● | ● | ● |
| Interface® Stressgard | Iprodione | ● | ● | ● |
| | Trifloxystrobin | ● | ● | ● |
| Merit® 2F | Imidacloprid | ● | ● | ● |
| Merit 75 WP | Imidacloprid | ● | ● | ● |
| Merit 75 WSP | Imidacloprid | ● | ● | ● |
| Mirage® Stressgard | Tebuconazole | ● | ● | ● |

| BRAND NAME | ACTIVE INGREDIENT(S) | 50% HYDROLYSIS OF AI ¹ | | |
|----------------------------|-----------------------|-----------------------------------|------|------|
| | | pH 5 | pH 7 | pH 9 |
| Nortica® 10WP | Bacillus Firmus | ● | ● | ● |
| Prograss® EC | Ethofumesate | ● | ● | ● |
| Proxy® | Ethephon | ● | ● | ● |
| Prostar® WG | Flutolanil | ● | ● | ● |
| Revolver® | Foramsulfuron | ● | ● | ● |
| Rhapsody® | Bacillus Subtilis | ○ | ○ | ○ |
| Ronstar® Flo | Oxadiazon | ● | ● | ● |
| Sevin® SL | Carbaryl | ● | ● | ● |
| Signature® XTRA Stressgard | Fosetyl | ● | ● | ● |
| Specticle® Flo | Indaziflam | ● | ● | ● |
| Specticle Total | Indaziflam | ● | ● | ● |
| | Glyphosate | ● | ● | ● |
| | Diquat | ● | ● | ● |
| Tartan® Stressgard | Triadimefon | ● | ● | ● |
| | Trifloxystrobin | ● | ● | ● |
| Tempo® SC | Beta Cyfluthrin | ● | ● | ● |
| Tribute® Total | Foramsulfuron | ● | ● | ● |
| | Thiencarbazone-methyl | ● | ● | ● |
| | Halosulfuron | ● | ● | ● |

¹Hydrolysis of active ingredient only and does not measure when in formulation