

ADJUVANTS FOR HERBICIDES

Surfactants

The surfactant concentrations recommended in the guidelines are based on the use of surfactants that are 85% (+10%) active. All numbers have been rounded off to the nearest whole number in the following list of adjuvants currently registered. If a surfactant is used with a lower level of activity, proportionally more should be used to obtain the desired concentration. The surfactant market provides a variety of trade names with great differences in levels of active ingredients.

Because of the confusion that frequently occurs concerning the purchase of a suitable surfactant, the following suggestions are provided:

1. Purchase a surfactant specifically manufactured and marketed for use in agriculture; use only nonionic surfactants sold specifically for use with herbicides and cleared for use under Public Law 518.

2. Purchase on the basis of percentage active ingredient. It is less profitable, for example, to purchase a product with 20% active ingredient at \$4 per gallon than it is to purchase a product with 80% active ingredient at \$10 per gallon.

3. Do not consider isopropyl alcohol or water as active ingredients. Many products on the market are deceptive because they may include isopropyl alcohol (isopropanol) as a "functioning agent" or some other nondescript term to imply that the alcohol is an active ingredient. If the label on the container does not specifically state the percentage active ingredient (% surfactant) in the container, ask the dealer for this information.

4. Do not purchase products manufactured for household use to use with herbicides. Many of the surfactants present in household detergents and related products are excellent surfactants per se, but they may be present in low concentrations, in mixtures, or in combination with other products that interact with herbicides to reduce the level of weed control obtained.

5. Be wary of claims that a surfactant may cost much more but can be used at concentrations much lower than with conventional

surfactants. Evidence does not exist that there is any one particular surfactant being marketed that is so effective that the amount normally needed for adequate control can be greatly reduced as compared to other suitable surfactants that are available. Premium prices may be paid for surfactants marketed in this manner with a poor return on the investment.

6. In deciding on the most economical surfactant to purchase for use with herbicides, ignore the following claims: (1) the surfactant contains a silicone or some other agent that will help keep the spray equipment clean; (2) the surfactant increases water penetration into the soil; or (3) use of the surfactant will increase root penetration and nutrient uptake by the crop. Often these claims have not been verified. The use of such claims may imply that the product being offered will cost more than surfactants being offered by reputable agricultural outlets.

7. There are no "miracle" surfactants. There are many good surfactants on the market, but there are none that justify greatly increased prices. There are none that are so highly effective that the use rate can be reduced below that recommended for specific herbicides in these weed control guidelines.

8. Some companies recommend the use of certain adjuvants with their products. Consult labels for approved adjuvants.

Oil + Surfactants and/or Emulsifiers

Several poorly defined terms characterize this group of adjuvant mixtures. The suggested addition of a crop oil concentrate (COC) refers to products that contain 80 to 85% petroleum or vegetable oil plus 15 to 20% surfactant and emulsifiers. Use of blends, other than emulsifiable oils, containing more than 85% oil has not been evaluated adequately for use with herbicides.

The term "emulsifiable oil" generally refers to products that contain about 98% oil and 1 to 2% emulsifiers. The terms "non-phytotoxic oils" and "phytobland oils" also have been used for this group of adjuvants. Generally, crop oil concentrates are being used in place of emulsifiable oils in herbicide spray mixtures.

Registered Adjuvants

Manufacturer	Brand name	% Active agent
Access Business Group	Apsa-80 All Purpose Spray Adjuvant Concentrate	80%
Agtime Company	Visible Soil Penetrant & Enhancer Granular	20%
Agtime Company	Visible Soil Penetrant & Enhancer Liquid	99.97%
Agxplore International	Tyrant	100%
Arch Chemicals	Hth Spa Non-Chlorine Oxidizer	44.7%
Becker-Underwood	Termitafoam	36%
Becker-Underwood	Canteen	20%
Brewer International	Poly Control 2	30%
Brewer International	Cide-Kick II	100%
Check-Mark	Transmit	81.75%
Chemorse	Chem-Trol Deposition Aid-Drift Retardant	1%
Davidon	Drp-955 Drift Retardant and Penetrator	5.2%
Diacon Technologies	Diamulse D	87%
Diacon Technologies	Diamulse CX	60%
Drexel Chemical	Drexel Sir-Factant	80%
Drexel Chemical	Drexel Special 80	80%
Drexel Chemical	Drexel Surf AC 820	80%
Drexel Chemical	Drexel Surf-AC 910	90%
Drexel Chemical	Drexel Pas-800	80%
Drexel Chemical	Drexel AMS - Supreme	36.5%
Drexel Chemical	Drexel AMS - XTRA	34.5%
Drexel Chemical	Drexel Lox	100%
Drexel Chemical	Drexel Lox Plus	45.2%
Drexel Chemical	Drexel Holzit	100%
Drexel Chemical	Drexel Hum-AC 820	80%
Ecolab	Boost 3001	16.9%
Ecolab	ES-2000	1.75%
Evonik Goldschmidt Corp.	Break-Thru-A Nonionic Wetter/Spreader Penetrant	100%
Evonik Goldschmidt Corp.	Break-Thru T&O Nonionic Wetter/Spreader Penetrant	100%
FMC Corp.	HRS	18.1%
FMC Corp.	HRS II	13.4%
FMC Corp.	Peradigm	86%
Garrco Products	Improve TM	90%
Garrco Products	Condition ND	100%
Garrco Products	Control TM	37%
Garrco Products	Prevent TM	100%
Garrco Products	Control WM	37%
Helena Chemical	Optima	90%
Helena Chemical	Foambuster	20%
Helena Chemical	Grounded	99%
Helena Chemical	Align	35%
Helena Chemical	Ad-Spray 80	80%
Helena Chemical	Dyne-Amic	100%
Helena Chemical	Penetrator Plus	99%
Helena Chemical	Quest	50%
Helena Chemical	Induce	90%
Helena Chemical	Blendex VHC	90%
Helena Chemical	Interactive	43%
Helena Chemical	Kinetic HV	99%
Helena Chemical	Accuquest WM	45%
Helena Chemical	Kinetic	99%
Helena Chemical	Sta-Put Plus	1%
Helena Chemical	Ground Zero	100%
Helena Chemical	Cidewinder	71%
Helena Chemical	Strikezone MXD	100%
Helena Chemical	Soy-Dex Plus	99%
Helena Chemical	Pointblank WM	100%
Helena Chemical	Harvest Boost Liquid	39%
Helena Chemical	Helena STA	
Helena Chemical	Kammo Plus	100%
Helena Chemical	Inlet	90%
Helena Chemical	Agri-Dex	99%
Helena Chemical	Cohere	90%
Helena Chemical	Ad-Spray 90	90%

Manufacturer	Brand name	% Active agent
Helena Chemical	Hyper-Active	80%
Helena Chemical	Pro-Mate DLZ	92%
Helena Chemical	Pro-Mate Citrus Plus	100%
Helena Chemical	Dyna-A-Pak	76%
Helena Chemical	Hel-Fire	90%
Helena Chemical	Request	50%
Helena Chemical	NXS	80%
Helena Chemical	First Up ST	15%
Helena Chemical	DLZ	92%
Helena Chemical	Nutrasyst	5%
Helena Chemical	Nutrasyst Concentrate	20%
Helena Chemical	Accuzone DC	100%
Helena Chemical	Foambuster Max	30%
Jimmy Sanders	Surfoil	83%
Jimmy Sanders	Low Foam Surfactant	80%
Jimmy Sanders	Soysurf	100%
Jimmy Sanders	Super Surf 90	
Jimmy Sanders	Surfoil Plus	97%
Jimmy Sanders	Soysurf Plus	100%
Jimmy Sanders	High Foam Marker	
Jimmy Sanders	Ag-Edge	100%
Jimmy Sanders	Super Max AMS	36%
Jimmy Sanders	Contact	30%
Jimmy Sanders	Complement	80%
Jimmy Sanders	Sil-Surf	99%
Jimmy Sanders	Super Fact	95%
Jimmy Sanders	Soysurf MSO	100%
Jimmy Sanders	Soysurf X-Tra	76%
Jimmy Sanders	Equalizer	60%
Loveland Products	Attach	100%
Loveland Products	Choice	50%
Loveland Products	Amigo	93%
Loveland Products	Liberate	100%
Loveland Products	Freeway	100%
Loveland Products	Activator 90	90%
Loveland Products	LI 700	80%
Loveland Products	Phase	100%
Loveland Products	Tactic	62.5%
Loveland Products	Plyac	27.5%
Loveland Products	Intac Plus	15%
Loveland Products	Choice Weather Master	54%
Loveland Products	Fighter-F10	10%
Loveland Products	Actamaster Spray Adjuvant	99%
Loveland Products	Actamaster Soluble Crystal Spray Adjuvant	99%
Loveland Products	E-Z Mix	65%
Loveland Products	Maximizer Crop Oil Concentrate	100%
Loveland Products	Spreader 90	90%
Loveland Products	Reign	1%
Loveland Products	Phase II	80%
Loveland Products	Flame	52.7%
Loveland Products	Compadre	100%
Loveland Products	MSO Conc. With Leci-Tech	100%
Loveland Products	Timbersurf 90 Non-Ionic Spreader	90%
Loveland Products	Timberland 90 Low Foam Non-Ionic Spreader	90%
Loveland Products	Weather Gard Complete	100%
Loveland Products	Vader	90%
Loveland Products	Widespread Max	100%
Loveland Products	Amaze Gold	34%
Loveland Products	Unfoamer	12.5%
Loveland Products	Scanner	80%
Loveland Products	Franchise	100%
Loveland Products	Gunsmoke	80%
Loveland Products	MSO Concentrate	100%
Mey Corp.	N-Go	81%
Miller Chemical & Fertilizer	Spray-Aide Surfactant-Compatibility-Acidifying	70%

Manufacturer	Brand name	% Active agent
Miller Chemical & Fertilizer	Nu-Film 17 Extender Sticker Spreader	96%
Miller Chemical & Fertilizer	Nu Film P Sticker Spreader	96%
Miller Chemical & Fertilizer	Exit Non-Ionic Herbicide Penetrator Activator	100%
Miller Chemical & Fertilizer	Foam Fighter	10%
Miller Chemical & Fertilizer	Mist-Control Drift Retardant/Deposition Aide	2%
Miller Chemical & Fertilizer	Nu-Film-IR Non-Ionic Sticker-Spreader	96%
Monsanto Agricultural Co.	Entry II Surfactant	35%
Monty's Plant Food Co.	Monty's Nanoboost	9.5%
Nalco Company	Nalco 03PO125	0.5%
Nalco Company	Nalco 60615	15%
Nalco Company	Nalco 60620	20%
Nalco Company	Nalco 60630	30%
Nohowe Product Development	Profoam Platinum	60%
OHP	Suffusion Liquid	100%
OHP	Suffusion Granules	22%
OHP	Suffusion Tablets	100%
Oro Agri	Wetcit	8.92%
PBI/Gordon Corp.	Gordon's Spreader Sticker	80%
Precision Laboratories	Protyx	100%
Precision Laboratories	Direct	100%
Precision Laboratories	Border XTRA 81	100%
Precision Laboratories	Speed	100%
Precision Laboratories	Import	100%
Precision Laboratories	Gundown Max	100%
Precision Laboratories	Exchange	100%
Precision Laboratories	Transport Ultra	100%
Precision Laboratories	Simplyx	100%
Precision Laboratories	Transport LPH	100%
Precision Laboratories	Kixyt	100%
Precision Laboratories	AMS Elite	100%
Prentiss Incorporated	Ecoadjuvant Spreader-Emulsifier	50%
Red River Specialties	Rebound	92%
Red River Specialties	Sun Set	100%
Red River Specialties	Red River 90	40%
Red River Specialties	Red River Defoamer	3.5%
Red River Specialties	Red River Supreme	99%
Sanag Div. Sanitek Products	38-F Drift Retardant Additive	32%
Sanag Div. Sanitek Products	41-A Drift Retardant Additive	30%
Sewer Sciences	Corn Foam	78.5%
Southern Ag. Insecticides	Home and Garden Spreader-Sticker	
Southern States Coop	De-Fac 820	
Sterilex Corp.	Sterilex Ultra Activator Solution	16.9%
Sterilex Corp.	Sterilex Ultra-Kleen Solution 2	16.9%
Stoller Enterprises	Natur'l Oil	93%
Sunoco (R & M)	Sun Ag Oil 11N	100%
Sunoco (R & M)	Sun Ag Oil 7N	100%
Sunoco (R & M)	Sunspray 6E Horticultural Spray Oil	100%
Sunoco (R & M)	Sunspray 11N	100%
Syngenta Crop Protection	Supercharge Adjuvant	100%
United Agri Products (UAP)	UAP Surfactant 80/20	80%
Voluntary Purchasing Group	Hi-Yield Buffer/Blender	65%
Voluntary Purchasing Group	Hi-Yield Synergizer	97%
Voluntary Purchasing Group	Hi-Yield Spreader Sticker	100%
Voluntary Purchasing Group	Hi-Yield Drift Control	1%
Voluntary Purchasing Group	Hi-Yield (Non-Ionic) 90/10 Spreader	90%
Voluntary Purchasing Group	Hi-Yield (Non-Ionic) 80/20/Spreader	80%
Winfield Solutions	Placement Propak	45.2%
Winfield Solutions	Prime Oil EV	100%
Winfield Solutions	Destiny	92%
Winfield Solutions	Corral Poly	35.25%
Winfield Solutions	Complete Compatibility	60%
Winfield Solutions	Class Act Next Generation	50.5%
Winfield Solutions	Transfix	99.7%
Winfield Solutions	Top Surf	80%
Winfield Solutions	Promark	38%

Manufacturer	Brand name	% Active agent
Winfield Solutions	Placement	100%
Winfield Solutions	Rivet	100%
Winfield Solutions	Silkin	99%
Winfield Solutions	Activate Plus	90%
Winfield Solutions	Alliance	50%
Winfield Solutions	Complex	23.2%
Winfield Solutions	Fast Break	10%
Winfield Solutions	Windcheck	1%
Winfield Solutions	Superb HC	92%
Winfield Solutions	N-PAK AMS Liquid	34%
Winfield Solutions	AD 100	100%
Winfield Solutions	Interlock	100%
Winfield Solutions	Preference	89.5%
Winfield Solutions	Level 7	51.55%
Winfield Solutions	Powerlock	50%
Winfield Solutions	Destiny HC	92%
Winfield Solutions	Class Act	50.5%
Winfield Solutions	AG 3018	52%