

Aquatic Adjuvants / Surfactants

What's New? What's Available?

Where Do You Get Them?

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What's New?



Adjuvants & Surfactants

- Adjuvants are compounds that can be added to a spray solution to improve herbicide performance.
- Common adjuvants include crop oil concentrates, nitrogen sources, water conditioners, compatibility agents, drift control agents, defoaming agents and **surfactants**.

Surfactants (surface active agents) improve herbicide performance as a result of modifying one or more of the following spray solution characteristics:

- **mixing**, or emulsifying and dispersing oil-soluble and water-soluble molecules;
- **coverage**, or spreading and wetting on leaf surfaces;
- **spray retention**, or sticking on leaf surfaces; and
- **absorption**, or penetrating properties.

Adjuvant Regulation

- In the United States, agricultural tank adjuvants are essentially unregulated except in a few isolated cases.
- Washington and California require that adjuvants be registered before they can be sold.
- Other states may or may not regulate adjuvants at some level.
- There is no federal regulation of tank mix adjuvants.

WSU's Pesticide Information Center On-Line (PICOL)

- 13,515 Pesticides
- 2,765 Herbicides
- 168 Special Local Need
- 632 Adjuvants
- 44 (43) Aquatic Adjuvants

Why So Many Adjuvants?

- There is no universal adjuvant that will improve performance of all herbicides for all weeds under any environmental condition.

Aquatic Adjuvant Approval

- WSDA - Pesticide Management, Registration Program
- WSDA - Natural Resource Assessment Section
- Ecology – NPDES Permits

Adjuvant Approval Criteria

The following criteria must be met to register a spray adjuvant for aquatic use in Washington:

- The adjuvant must fulfill all requirements for registration of a food/feed use spray adjuvant in Washington.
- The adjuvant formulation must contain less than 10% alkyl phenol ethoxylates (including alkyl phenol ethoxylate phosphate esters).
- The adjuvant formulation must not contain any alkyl amine ethoxylates (including tallow amine ethoxylates).

Adjuvant Approval Criteria

The adjuvant must be either **slightly toxic or practically non-toxic** to freshwater fish. Rainbow trout (*Oncorhynchus mykiss*) is the preferred test species.



The adjuvant must be **moderately toxic, slightly toxic or practically non-toxic** to aquatic invertebrates. Either *Daphnia magna* or *Daphnia pulex* are acceptable test species.



LC50 and EC50

- LC50 is the concentration of the chemical in water that kills 50% of the test organisms during a given observation period.
- EC50 is the concentration of the chemical at which a specific response (i.e death or immobilization) would be elicited in 50% of the test organisms during a given observation period.
- Observation periods are 96 hours for Rainbow Trout and 48 hours for Daphnia.

Ecotoxicological Categories

Toxicity Category	Aquatic Organisms ppm* LC50/EC50	Avian (Acute Oral) mg/kg	Avian (Dietary) ppm	Mammalian (Acute Oral) mg/kg
Practically non-toxic	>100	>2000	>5000	>2000
Slightly toxic	>10-100	501-2000	1000-5000	501-2000
Moderately toxic	>1-10	51-500	501-1000	51-500
Highly toxic	0.1-1	10-50	50-500	10-50
Very highly toxic	<0.1	<10	<50	<10

*Concentration in water

Exceptions to Criteria

- These criteria do not apply to adjuvants that are permitted for use under an aquatic EUP issued by WSDA (WAC 16-228-1460).
- These criteria do not apply to adjuvants that are labeled and intended only for the aquatic uses listed in WAC 16-228-1231(2).
- On a case-by case basis, WSDA may register spray adjuvants for aquatic use that do not meet one or more of the above criteria if the registrant provides additional data (such as chronic aquatic toxicity studies, product physical characteristics and/or use site characteristics) which demonstrate that the proposed use will not cause unreasonable adverse effects to desirable aquatic species (including fish, aquatic invertebrates, shellfish and amphibians).

WSU's Pesticide Information Center On-Line (PICOL)

WASHINGTON STATE UNIVERSITY

WSPRS
Pesticide Information Center Online

PICOL Simple

PICOL Tutorials on YouTube

State WA OR Year of application

Item to search on Operator

Crop EQ

Submit Query New Query

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- ADJUVANT (AQUATIC NON-CROP)
- ADJUVANT (AQUATIC)
- ADJUVANT (CROP)
- ADJUVANT (NON-CROP)
- ALFALFA
- ALFALFA (ROUNDUP READY)
- ALFALFA (ROUNDUP READY) SEED CROP
- ALFALFA SEED CROP
- ALL CROPLAND
- ALMOND
- ALMOND (NON-BEARING)
- ANIMAL QUARTERS
- ANISE
- APPLE
- APPLE (NON-BEARING)
- APPLE (POST HARVEST)
- APRICOT
- APRICOT (NON-BEARING)
- APRICOT (POST HARVEST)
- AQUARIA
- AQUATIC PLANT
- AQUATIC SITE
- AQUATIC SITE/ADJACENT AREA
- ARTICHOKE (GLOBE)
- ARTICHOKE (JERUSALEM)
- ARUGULA
- ARUGULA SEED CROP
- ASPARAGUS
- ASPARAGUS (NON-BEARING)

253-445-4611, [Contact Us](#)

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Approved Aquatic Adjuvants

- Agri-Dex
- AgriSolutions Inergy
- Atmos
- Bond
- Brandt Magnify
- Breeze
- Bronc Max
- Bronc Plus Dry
- Bronc Plus Dry-EDT
- Cide-Kick II M
- Class Act NG
- Competitor
- Cut-Rate
- Cygnet Plus
- Denali-EA
- Destiny HC
- Droplex
- Dyne-Amic
- Fast Break
- Forge
- Fraction
- Hasten-EA
- InterLock
- Kinetic
- Level 7
- LI 700
- Liberate
- NIS-EA
- One-AP XL
- Pro AMS Plus
- Rainier-EA
- Renegade-EA
- Sinker
- Sphere 7
- Spray-Rite
- Superb HC
- Syl-Tac-EA
- Tactic
- Trail Blazer
- Tronic
- Turbulence
- Winfield Solutions Inergy
- Yardage

Registered Adjuvant List

Spray adjuvants registered for use on aquatic sites in Washington 20151209.xps - XPS Viewer

File Permissions Signatures Find



Washington
State Department of
Agriculture

Washington State Department of Agriculture
Pesticide Management Division
Registration and Licensing Services Program
PO Box 42560 • Olympia WA 98504-2560
Telephone (360) 902-2030 • FAX (360) 902-2093

Spray Adjuvants Registered for Use on Aquatic Sites in Washington (Revised December 9, 2015)

These spray adjuvants are registered for use on aquatic sites in Washington, as of December 9, 2015. Before distributing or using an adjuvant, please verify that it is currently registered in Washington.

Spray adjuvants are listed in alphabetical order. No discrimination or endorsement is intended. The aquatic acute toxicity data are from studies that were submitted by the registrants.

Product Name / State Registration Number	Registrant	Principal Functioning Agents	Acute Toxicity - Rainbow Trout	Acute Toxicity - Daphnids
Agri-Dex / 5905-50094	Helena Chemical Company	Petroleum oil, polyoxyethylene sorbitan fatty acid ester, sorbitan fatty acid ester	LC50 (96 hour) >1000 mg/l, Practically non-toxic	LC50 (48 hour) >1000 mg/l, Practically non-toxic
AgriSolutions Inergy / 1381-13001	Winfield Solutions	Modified vegetable (seed) oil, polysiloxane polyether copolymer, alkyl phenol ethoxylate	LC50 (96 hour) 37.5 mg/l, Slightly toxic	EC50 (48 hour) 127.27 mg/l, Practically non-toxic
Atmos / 1381-13006	Winfield Solutions	Modified vegetable (seed) oil, saccharides, sorbitan fatty acid ester	LC50 (96 hour) 21.71 mg/L, Slightly toxic	EC50 (48 hour) 28.63 mg/L, Slightly toxic
Bond / 34704-04003	Loveland Products	Synthetic latex, alcohol ethoxylate	LC50 (96 hour) 190 mg/l, Practically non-toxic	LC50 (48 hour) 614 mg/l, Practically non-toxic

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Approved Aquatic Adjuvants

Product Name	Rainbow Trout	Toxicity - Rainbow Trout	Daphnids	Toxicity - Daphnids
Agri-Dex	>1000	Practically non-toxic	>1000	Practically non-toxic
Fast Break	>1000	Practically non-toxic	>100	Practically non-toxic
Spray-Rite	782.2	Practically non-toxic	223.6	Practically non-toxic
Fraction	782.2	Practically non-toxic	223.6	Practically non-toxic
Cut-Rate	782.2	Practically non-toxic	223.6	Practically non-toxic
Sinker	750	Practically non-toxic	>1000	Practically non-toxic
Class Act NG	447	Practically non-toxic	377	Practically non-toxic
One-AP XL	382.9	Practically non-toxic	223.6	Practically non-toxic
Bronc Plus Dry-EDT	382.9	Practically non-toxic	223.6	Practically non-toxic
Bronc Plus Dry	382.9	Practically non-toxic	223.6	Practically non-toxic
Bond	190	Practically non-toxic	614	Practically non-toxic
LI 700	130	Practically non-toxic	190	Practically non-toxic
Tactic	>100	Practically non-toxic	310	Practically non-toxic
Level 7	>100	Practically non-toxic	>100	Practically non-toxic
InterLock	>100	Practically non-toxic	>100	Practically non-toxic
Droplex	>100	Practically non-toxic	>100	Practically non-toxic
Breeze	>100	Practically non-toxic	>100	Practically non-toxic

Resources

- Compendium of Herbicide Adjuvants, 13th Edition: <http://www.herbicide-adjuvants.com/>
- WSU - PICOL Database:
<http://picol.cahe.wsu.edu/LabelTolerance.html>
- WSDA – Pesticide Registration Website
<http://agr.wa.gov/PestFert/Pesticides/ProductRegistration.aspx>

State Contracts

- Washington State Purchasing Cooperative (Co-op) ended 6/30/2013
- Master Contracts Usage Agreement (MCUA)
- Currently 1,274 users
- Vegetation Management Master Contract #04611

Eligible Organizations

- State Agencies
- State Boards
- State Commissions
- Higher Education Institutions
- Offices of Separate Elected Officials
- Local Government Agencies
- Federal Agencies
- Washington State Tribal Entities
- Public Benefit Non-profit (PBNP)



Search Contracts

Search results for keywords: **herbicide**

-- Select Contract List -- or

herbicide

Enter 1 - 5 keyword(s), contract # or partial vendor name

Click on column heading to sort search results

Contract #	Contract Title	Award Date	Exp. Date	WTO	Diversity
02413	ANALYTICAL LABORATORY SERVICES	10-24-2013	10-31-2016	N	N
02811	HERBICIDE/ANTH-CER SPRAYERS	07-28-2011	07-31-2017	Y	N
04611	VEGETATION MANAGEMENT	02-08-2012	02-07-2018	N	N

State Contract - Herbicides

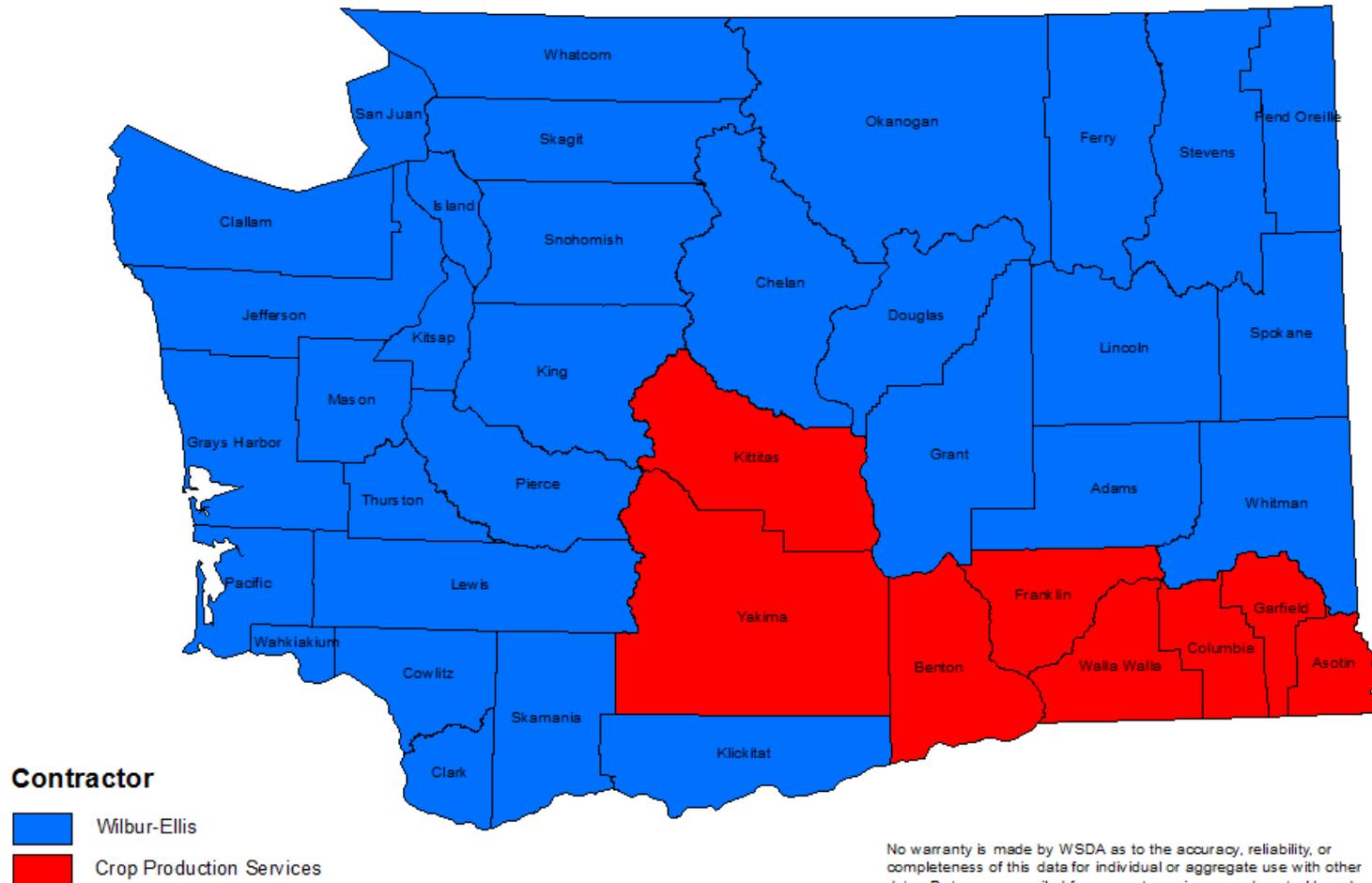
The screenshot shows a web browser window with the following details:

- Address Bar:** <https://fortress.wa.gov/ga/apps>
- Page Title:** Contract Summary
- Page Content:**
 - Section:** Vegetation Management
 - Contract#:** 04611 **Replaces:** 08205
 - Description:** This contract is for pesticides and herbicides. It is awarded by regions as established by the Washington State Department of Transportation. The awarded contractors are Wilbur-Ellis Company (WEC) and Crop Production Services, Inc. (CPS). Delivery location will determine which contractor to utilize.
 - Note:** If restrictions of any kind prohibit use of certain products in an area, it is the purchaser's responsibility to be familiar with such restrictions and purchase accordingly.
 - Current Term Start Date:** 02-08-2016 **Award Date:** 02-08-2012 **Est. Annual Worth:** \$1,387,691
 - Current Term Ends On:** 02-07-2018 **Final Term Ends On:** 02-07-2018 **Commodity Code(s):** 675-54 ,675-55
 - Diversity:** 0% WBE 0% MBE **# of Bids Received:** 4
 - Contact Info:** Master Contracts & Consulting – Melanie Williams at (360) 407-9399 or melanie.williams@des.wa.gov
 - Who can use this contract?**
 - Organizations with Master Contract Usage Agreements
 - Oregon Coop Members
 - Current Documents:**
 - Contract & Amendments
 - Pricing & Ordering Information
 - Historical Documents:**
 - Original Solicitation
 - Original Solicitation Amendment
 - Bid Tab
 - Resources:**
 - Contract Comments
 - Vendor and Contract Performance Feedback
 - Best Buy Form
- Table:**

Contractors	OMWBE	Veteran	Small Business
CROP PRODUCTION SERVICES INC. - W6553		N	N
WILBUR-ELLIS COMPANY - W6525		N	N

Washington State Herbicide Purchasing Contract Contractors by Region

Updated: 5/10/2016



No warranty is made by WSDA as to the accuracy, reliability, or completeness of this data for individual or aggregate use with other data. Data was compiled from county noxious weed control board staff, WSU Cooperative Extension and other sources. This product may be updated without notification. Information use only. Not for legal use.



SePro - Procellacor

- controlling Eurasian Milfoil and hybrids at rates under a part per billion with very short contact exposure time.
- It should have its US EPA registration between April and September of 2017.

Dow – Vastlan Herbicide

- Vastlan™ is a herbicide developed by Dow AgroSciences for the control of woody plant species and annual and perennial broadleaf weeds on industrial vegetation management, aquatic, Conservation Reserve Program (CRP), range and permanent grass pastures sites and grasses grown for hay.
- Vastlan herbicide is formulated as a soluble liquid (SL) and contains 4 pounds acid equivalent per gallon (lbs ae/ gallon) of triclopyr choline, Garlon 3A contains 3 pounds ae/gallon.
- The choline formulation of triclopyr reduced the signal from “Danger” on Garlon 3A to “Warning”. This reduced toxicity and higher concentration sets Vastlan herbicide apart from its predecessor Garlon® 3A. Grass tolerance and weed control spectrum of Vastlan herbicide is the same as Garlon 3A.
- Received registration in Washington State a few weeks ago.



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