

SPECIMEN

ARSENAL[®]

herbicide

APPLICATORS CONCENTRATE

For control of vegetation on forestry sites.

Active Ingredient:

Isopropylamine salt of Imazapyr(2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid)* 53.1%

Other Ingredients: 46.9%

Total: 100.0%

*Equivalent to 43.3% 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid or 4 pounds acid per gallon.

EPA Reg No. 241-299
U.S. Patent No. 4,798,619

EPA Est. No.

KEEP OUT OF REACH OF CHILDREN CAUTION/PRECAUCIÓN

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

In case of an emergency endangering life or property involving this product, call day or night 1-800-832-HELP (4357).

See inside booklet for complete **First Aid, Precautionary Statements, Directions For Use, Conditions of Sale and Warranty** and state-specific crop and/or use site restrictions.

Net Contents:

FIRST AID	
If inhaled	<ul style="list-style-type: none"> • Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. • Call a poison control center or doctor for further treatment advice.
If in eyes	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
If on skin or clothing	<ul style="list-style-type: none"> • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.
HOT LINE NUMBER	
<p>Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact BASF Corporation for emergency medical treatment information: 1-800-832-HELP (4357).</p>	

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS

CAUTION

Harmful if inhaled. Avoid contact with skin, eyes, or clothing. Avoid breathing spray mist.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks

Follow manufacturer's instructions for cleaning and maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

USER SAFETY RECOMMENDATIONS
<p>Users should:</p> <ol style="list-style-type: none"> 1. Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. 2. Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

ENVIRONMENTAL HAZARDS

For terrestrial uses, **DO NOT** apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. **DO NOT** contaminate water when disposing of equipment washwaters or rinseate. This herbicide is phytotoxic at extremely low concentrations. Nontarget plants may be adversely affected from drift.

PHYSICAL AND CHEMICAL HAZARDS

Spray solutions of **Arsenal® herbicide Applicators Concentrate** should be mixed, stored, and applied only in stainless steel, fiberglass, plastic, and plastic-lined steel containers.

DO NOT mix, store, or apply **Arsenal herbicide Applicators Concentrate** or spray solutions of **Arsenal herbicide Applicators Concentrate** in unlined steel (except stainless steel) containers or spray tanks.

DIRECTIONS FOR USE

It is a violation of federal law to use this product in a manner inconsistent with its labeling.

DO NOT apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application.

For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

Arsenal herbicide Applicators Concentrate may be used only in accordance with recommendations and restrictions on the booklet label. Keep containers closed to avoid spills and contamination.

Arsenal herbicide Applicators Concentrate may be applied using helicopters, ground-operated sprayers, low-volume hand-operated spray equipment such as backpack and pump-up sprayers, and tree injection equipment.

Observe all cautions and limitations in the package labels of products used in combination with **Arsenal herbicide Applicators Concentrate**.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

The requirements in this box apply to use on trees being grown for sale or other commercial use, or for commercial seed production, or for production of timber or wood products, or for research purposes.

DO NOT enter or allow worker entry into treated areas during the restricted-entry interval (REI) of **12 hours**.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Shoes plus socks

NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard (WPS) for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Noncrop weed control is not within the scope of the Worker Protection Standard. See the **GENERAL INFORMATION** section of this label for a description of noncrop sites.

DO NOT enter treated areas without protective clothing until sprays have dried.

STORAGE AND DISPOSAL

DO NOT contaminate water, food, or feed by storage or disposal.

PESTICIDE STORAGE: DO NOT store below 10° F.

PESTICIDE DISPOSAL: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

CONTAINER DISPOSAL:

Nonrefillable Container. DO NOT reuse or refill this container. Triple rinse or pressure rinse container (or equivalent) promptly after emptying; then offer for recycling, if available, or reconditioning, if appropriate, or puncture and dispose of in a sanitary landfill, or by incineration,

or by other procedures approved by state and local authorities.

Triple rinse containers small enough to shake (capacity ≤ 5 gallons) as follows:

Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times.

Triple rinse containers too large to shake (capacity > 5 gallons) as follows:

Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Repeat this procedure two more times.

Pressure rinse as follows: Empty the remaining contents into application equipment or mix tank. Hold container upside down over application equipment or mix tank, or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container and rinse at about 40 PSI for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Refillable Container. Refill this container with pesticide only. **DO NOT** reuse this container for any other purpose. Triple rinsing the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller.

Triple rinse as follows: To clean the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10% full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

When this container is empty, replace the cap and seal all openings that have been opened during use; return the container to the point of purchase or to a designated location. This container must only be refilled with a pesticide product. **DO NOT** reuse the container for any other purpose. Prior to refilling, inspect carefully for damage such as cracks, punctures, abrasions, worn-out threads and closure devices. Check for leaks after refilling and before transport. **DO NOT** transport if this container is damaged or leaking. If the container is damaged, or leaking, or obsolete and not returned to the point of purchase or to a designated location, triple rinse emptied container and offer for recycling, if available, or dispose of container in compliance with state and local regulations.

IMPORTANT

DO NOT use on food or feed crops. **DO NOT** use on Christmas trees. **DO NOT** treat irrigation ditches, or water used for crop irrigation or for domestic uses. Keep from contact with fertilizers, insecticides, fungicides, and seeds to prevent unintentional exposure of desirable vegetation to **Arsenal® herbicide Applicators Concentrate**. **DO NOT** apply or drain or flush equipment on or near sensitive desirable plants, or on areas where their roots may extend, or in locations where the chemical may be washed or moved into contact with their roots. **DO NOT** side trim desirable vegetation with this product. Prevent drift of spray to desirable plants.

Clean application equipment after using this product by thoroughly flushing with water.

GENERAL INFORMATION

Arsenal herbicide Applicators Concentrate is a surfactant-free aqueous solution to be mixed in water and generally applied as a postemergence spray for control of most annual and perennial grasses, broadleaf weeds, vines and brambles, and hardwood brush and trees for forestry site preparation and release of conifers from woody and herbaceous competition.

Arsenal herbicide Applicators Concentrate may be used for selective woody and herbaceous weed control in natural regeneration of certain conifers (see **CONIFER RELEASE TREATMENTS**). **Arsenal herbicide Applicators Concentrate** may also be mixed in water and used for stump and cut-stem treatment for control of unwanted woody vegetation. **Arsenal herbicide Applicators Concentrate** may be applied to control undesirable woody vegetation along forest roads that are contiguous with the treated forestry area.

Arsenal herbicide Applicators Concentrate is also recommended for the control of undesirable vegetation along nonirrigation ditchbanks and for the establishment and maintenance of wildlife openings, except in the state of California. See use directions for **STUMP AND CUT-STEM TREATMENTS, HERBACEOUS WEED CONTROL**, and **USE ARSENAL HERBICIDE APPLICATORS CONCENTRATE FOR SPOT TREATMENT OF UNDESIRABLE HARDWOOD VEGETATION**.

Arsenal herbicide Applicators Concentrate may be applied on forestry sites that contain areas of temporary surface water caused by the collection of water between planting beds, in equipment ruts, or in other depressions created by forest management activities, except in the states of California and New York. It is permissible to treat drainage ditches, intermittent drainage, intermittently flooded low-lying sites, seasonally dry flood plains, and transitional areas between upland and lowland sites when no water is present, except in the states of California and New York. Only the edge of drainage ditches can be treated for drainage ditches that contain water. It is also permissible to treat marshes, swamps, and bogs after water has receded, as well as seasonally dry flood deltas, except in the states of California and New York. **DO NOT** make

applications to natural or man-made bodies of water such as lakes, reservoirs, ponds, streams, rivers and canals.

SYMPTOMOLOGY

Arsenal herbicide Applicators Concentrate is readily absorbed through foliage and roots and is translocated rapidly throughout the plant, with accumulation in the meristematic regions. Treated plants stop growing soon after spray application. Chlorosis first appears in the youngest leaf tissue. In perennials, the herbicide is translocated into the roots, thus preventing most resprouting. Chlorosis and tissue necrosis may not be apparent in some plant species for several weeks after application. Woody plants, brush, and trees normally **DO NOT** display the full extent of herbicide control until several months following application.

MIXING AND APPLICATION INSTRUCTIONS

MANAGING OFF-TARGET MOVEMENT

The following information is provided as general guidance for managing off-target movement. Specific use recommendations for **Arsenal herbicide Applicators Concentrate** may differ depending on the application technique used and the vegetation management objective. **Spray Drift:** Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment- and weather-related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.

Spray drift from applying this product may result in damage to sensitive plants adjacent to the treatment area. Only apply this product when the potential for drift to these and other adjacent sensitive areas (e.g. residential areas, bodies of water, known habitat for threatened or endangered species, or nontarget crops) is minimal.

DO NOT apply when the following conditions exist that increase the likelihood of spray drift from intended targets: high or gusty winds, high temperatures, low humidity, temperature inversions.

To minimize spray drift, the applicator should be familiar with and take into account the following drift reduction advisory information. Additional information may be available from state enforcement agencies or the Cooperative Extension on the application of this product.

The best drift management strategy and most effective way to reduce drift potential is to apply large droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential but will not prevent drift if applications are made improperly or under unfavorable environmental conditions (see **Wind, Temperature and Humidity**, and **Temperature Inversions**).

Controlling Droplet Size:

- **Volume** - Use high flow-rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.

- **Pressure - DO NOT** exceed the nozzle manufacturer's recommended pressures. For many nozzle types, lower pressure produces larger droplets. When higher flow rates are needed, use higher flow-rate nozzles instead of increasing pressure.
- **Number of Nozzles** - Use the minimum number of nozzles that provide uniform coverage.
- **Nozzle Orientation** - Orienting nozzles so that the spray is released parallel to the airstream produces larger droplets than other orientations and is recommended practice. Significant deflection from the horizontal will reduce droplet size and increase drift potential.
- **Nozzle Type** - Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift. **DO NOT** use nozzles producing a mist droplet spray.

Application Height: Making applications at the lowest possible height (aircraft, ground-driven spray boom) that is safe and practical reduces exposure of droplets to evaporation and wind.

Swath Adjustment: When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the application equipment (e.g. aircraft, ground) upwind. Swath adjustment distance should increase with increasing drift potential (higher wind, smaller droplets, etc.).

Wind: Drift potential is lowest between wind speeds of 3-10 mph. However, many factors, including droplet size and equipment type, determine drift potential at any given speed. Application should be avoided below 3 mph due to variable wind direction and high inversion potential.

NOTE: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

Temperature and Humidity: When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

Temperature Inversions: Drift potential is high during a temperature inversion. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud, which can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by

ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

Wind Erosion: Avoid treating powdery, dry or light sandy soils when conditions are favorable for wind erosion. Under these conditions, the soil surface should first be settled by rainfall or irrigation.

Aerial Application Methods and Equipment: Use 2 or more gallons of water per acre. The actual minimum spray volume per acre is determined by the spray equipment used.

Use adequate spray volume to provide accurate and uniform distribution of spray particles over the treated area and to avoid spray drift.

Managing Spray Drift from Aerial Applications:

Applicators must follow these requirements to avoid off-target drift movement: 1) boom length - the distance of the outermost nozzles on the boom must not exceed 3/4 the length of the wingspan or rotor, 2) nozzle orientation - nozzles must always point backward parallel with the air stream and never be pointed downward more than 45 degrees, and 3) application height - without compromising aircraft safety, applications should be made at a height of 10 feet or less above the crop canopy or tallest plants. Applicators must follow the most restrictive use cautions to avoid drift hazards, including those found in this labeling as well as applicable state and local regulations and ordinances.

Ground Application (Broadcast): Use 5 or more gallons of water per acre. The actual minimum spray volume per acre is determined by the spray equipment used. Use adequate spray volume to provide accurate and uniform distribution of spray particles over the treated area and to avoid spray drift.

HELICOPTER SPRAY EQUIPMENT

Thoroughly mix the recommended amount of **Arsenal® herbicide Applicators Concentrate** in 5 to 30 gallons of water per acre and uniformly apply with properly calibrated aerial equipment. A suitable nonionic surfactant may be added to the spray solution to enhance control of undesirable vegetation. All precautions should be taken to minimize or eliminate spray drift. Applications should not be made under windy or gusty conditions. The use of controlled droplet booms and nozzle configurations is recommended. A drift control agent may be added at the recommended label rate. A foam-reducing agent may be added at the recommended label rate, if needed.

IMPORTANT: DO NOT make applications by fixed wing aircraft. Maintain adequate buffer zones. Thoroughly clean application and mixing equipment, including landing gear, immediately after use. Prolonged exposure of this product

to uncoated steel (except stainless steel) surfaces may result in corrosion and failure of the exposed part.

GROUND OPERATED SPRAY EQUIPMENT

Thoroughly mix and apply the recommended amount of **Arsenal® herbicide Applicators Concentrate** in 5 to 100 gallons of water per acre. A suitable nonionic surfactant may be added to the spray solution to enhance control of undesirable vegetation. A drift control agent and a foam-reducing agent may be added at the recommended label rates, if needed. If desired, a spray pattern indicator may be added at the recommended label rate.

For best results, uniformly cover the foliage of the vegetation to be controlled with the spray solution.

IMPORTANT: DO NOT spray under windy or gusty conditions. Maintain adequate buffer zones. Clean application and mixing equipment after using this product by thoroughly flushing with water.

DIRECTED FOLIAR OR SPOT SPRAY EQUIPMENT

When making directed or spot spray applications with helicopter or ground spray equipment or low-volume hand-operated spray equipment, thoroughly mix a solution of 1 to 5 percent by volume of **Arsenal herbicide Applicators Concentrate** and a minimum of 1/4 percent by volume nonionic surfactant in water.

To mix the spray solution, add the volume of **Arsenal herbicide Applicators Concentrate** and nonionic surfactant indicated in the table below to the desired amount of water.

SPRAY SOLUTION MIXING GUIDE

Solution Volume (gallons)	Arsenal herbicide Applicators Concentrate (%)			Surfactant
	1	2.5	5	
	1	1-1/3 oz	3-1/3 oz	
5	6-2/3 oz	1 pint	2 pints	1-2/3 oz
10	13-1/3 oz	2 pints	4 pints	3-1/3 oz
25	2 pints	5 pints	10 pints	8 oz
100	1 gallon	2.5 gallons	5 gallons	2 pints

2 tablespoons = 1 fluid ounce

For best results, uniformly cover the foliage of the vegetation to be controlled with the spray solution. Avoid making applications directly to desirable conifers. For low-volume directed applications on bigleaf maple, a 2.5% by volume spray solution is recommended.

IMPORTANT: DO NOT overapply causing runoff from the treated foliage. Avoid direct application to desired plant species as injury may occur. **DO NOT** exceed recommended dosage rate per acre.

STUMP AND CUT-STEM TREATMENTS

Arsenal herbicide Applicators Concentrate may be used to control undesirable woody vegetation in forest management by applying a solution of the herbicide in water to the cambium area of freshly cut stump surfaces or to cuts on the stem of the target woody vegetation.

Applications can be made at any time of the year except during periods of heavy sap flow in the spring. Tree injection and cut-stem treatments are most effective in late summer and early fall.

MIXING

Arsenal herbicide Applicators Concentrate may be mixed as either a concentrated or dilute solution for stump and cut-stem treatments. The dilute solution may be used for applications to the surface of the stump or to cuts on the stem of the target woody vegetation. Concentrated solutions may be used for applications to cuts on the stem. Use of the concentrated solution permits application to fewer cuts on the stem, especially for large diameter trees.

Follow the application instructions to determine proper application techniques for each type of solution.

APPLICATION WITH DILUTE SOLUTIONS

To prepare a dilute solution, mix 6 fluid ounces of **Arsenal herbicide Applicators Concentrate** with one gallon of water.

For cut-stump treatments: Spray or brush the solution onto the cambium area of the freshly cut stump surface. Insure that the solution thoroughly wets the entire cambium area (the wood next to the bark of the stump).

For tree-injection treatments: Using standard injection equipment, apply 1 mL of solution at each injection site around the tree with no more than 1 inch intervals between cut edges. Insure that the injector completely penetrates the bark at each injection site.

For frill or girdle treatments: Using a hatchet, machete, or similar device, make cuts through the bark at intervals around the tree with no more than 2 inch intervals between cut edges. Spray or brush the solution into each cut until thoroughly wet.

APPLICATION WITH CONCENTRATED SOLUTIONS

To prepare a concentrated solution, use undiluted product or mix with up to 75% water, by volume.

For tree-injection treatments: Using standard injection equipment, apply 1 mL of solution at each injection site. Make at least one injection cut for every three inches of diameter at breast height (dbh) on the target tree. For example, a three-inch dbh tree will receive 1 injection cut, and a six-inch dbh tree will receive 2 injection cuts. On trees requiring more than one injection site, place the injection cuts at approximately equal intervals around the tree.

For hack and squirt treatments: Using a hatchet or similar device, make cuts at a downward angle completely through the bark and cambium at approximately equal intervals around the tree. Make at least one cut for every three inches of diameter at breast height (dbh) on the target tree. For example, a three-inch dbh tree will receive 1 cut and a six-inch dbh tree will receive 2 cuts. Using a squirt bottle, syringe, or similar device apply 1 mL of the

concentrated mix into each cut, ensuring that the solution does not run out of the cut.

NOTE: Injury may occur to nontarget or desirable woody plants if they extend from the same root system or their root systems are grafted to those of the treated tree.

SITE PREPARATION TREATMENTS

Arsenal® herbicide Applicators Concentrate may be used to control labeled grasses, broadleaf weeds, vines and brambles, and woody brush and trees on forest sites in advance of regeneration for the following conifer crop species:

Crop Species	Rate (oz/A)
Loblolly Pine (<i>Pinus taeda</i>)	24 - 40
Loblolly X Pitch Hybrid	24 - 40
Longleaf Pine (<i>Pinus palustris</i>)	24 - 40
Shortleaf Pine (<i>Pinus echinata</i>)	24 - 40
Virginia Pine (<i>Pinus virginiana</i>)	24 - 40
Slash Pine (<i>Pinus elliotii</i>)	20 - 32
Douglas Fir (<i>Pseudotsuga menziesii</i>)	12 - 24
Coastal Redwood (<i>Sequoia sempervirens</i>)	12 - 24
Western Hemlock (<i>Tsuga heterophylla</i>)	12 - 24
California Red Fir (<i>Abies magnifica</i>)	12 - 20
California White Fir (<i>Abies concolor</i>)	12 - 20
Jack Pine (<i>Pinus banksiana</i>)	12 - 16
Lodgepole Pine (<i>Pinus contorta</i>)	12 - 16
Pitch Pine (<i>Pinus rigida</i>)	12 - 16
Ponderosa Pine (<i>Pinus ponderosa</i>)	12 - 16
Sugar Pine (<i>Pinus lambertiana</i>)	12 - 16
White Pine (<i>Pinus strobus</i>)	12 - 16
Black Spruce (<i>Picea mariana</i>)	12 - 16
Red Spruce (<i>Picea rubens</i>)	12 - 16
White Spruce (<i>Picea glauca</i>)	12 - 16

Use the recommended rate of **Arsenal herbicide Applicators Concentrate** per acre applied as a broadcast foliar spray for long-term control of labeled woody plants and residual control of herbaceous weeds. Within 4 to 6 weeks of treatment, grasses and other herbaceous weeds will be controlled and may provide fuel to facilitate a site preparation burn, if desired, to control conifers or other species tolerant to the herbicide.

Apply the recommended rate of **Arsenal herbicide Applicators Concentrate** per acre in 5 to 30 gallons total spray solution for helicopter applications or 5 to 100 gallons total spray solution for mechanical ground spray and backpack applications. Use a minimum of 1/2 percent by volume nonionic surfactant. Use the higher label rates of **Arsenal herbicide Applicators Concentrate** and higher spray volumes when controlling particularly dense or multi layered canopies of hardwood stands, or difficult to control species.

Tank mixes may be necessary for chemical control of conifers and other species tolerant to **Arsenal herbicide Applicators Concentrate** in certain cases. Observe all precautions and restrictions on the product labels. Always follow the most restrictive label. Combinations with other

products labeled for forest site preparation may kill certain plants such as legumes and blackberry, which are desirable for wildlife habitat.

Where quick initial brown out (deadening of foliage) is desired for burning, apply a tank mixture of 16 to 32 oz **Arsenal herbicide Applicators Concentrate** with 16 to 64 oz glyphosate or 16 to 48 oz triclopyr ester per acre. For control of seedling pines, apply 16 to 32 oz **Arsenal herbicide Applicators Concentrate** with 3 to 4 quarts glyphosate. For site preparation, rates less than 24 oz **Arsenal herbicide Applicators Concentrate** will provide suppression of hardwood brush and trees, and some resprouting may occur.

DO NOT plant seedlings of black spruce (*Picea mariana*) or white spruce (*Picea glauca*) on sites that have been broadcast treated with **Arsenal herbicide Applicators Concentrate** or into the treated zone of spot or banded applications for three months following application or injury may occur.

HERBACEOUS WEED CONTROL

Use **Arsenal herbicide Applicators Concentrate** for selective weeding in the following conifers:

Crop Species	Rate (fl oz/A)
Loblolly Pine (<i>Pinus taeda</i>)	6 - 10
Loblolly X Pitch Hybrid	6 - 10
Virginia Pine (<i>Pinus virginiana</i>)	6 - 10
Longleaf Pine (<i>Pinus palustris</i>) ¹	4 - 6
Slash Pine (<i>Pinus elliotii</i>) ¹	4 - 6
Douglas Fir (<i>Pseudotsuga menziesii</i>) ¹	4 - 6

¹Use of surfactant is not recommended.

Arsenal herbicide Applicators Concentrate may be applied as a broadcast treatment, banded over tree rows, or as a directed spray for release of young conifers from herbaceous weeds. To prevent possibility of conifer injury, **DO NOT** apply **Arsenal herbicide Applicators Concentrate** when conifers are under stress from drought, diseases, animal or winter injury, planting shock, or other stresses reducing conifer vigor. Broadcast applications may be made by helicopter, ground, or backpack sprayer. For difficult-to-control weeds, use the higher labeled rates. Where herbaceous weeds have overtopped conifer seedlings, a nonionic surfactant may be added to improve weed control (except for slash pine, long-leaf pine, and Douglas Fir), at a rate not to exceed 1/4 percent of spray solution volume. Some minor conifer growth inhibition may be observed when herbaceous weed control treatments are made during periods of active conifer growth.

Arsenal herbicide Applicators Concentrate may also be applied using backpack or hand-held sprayers to control herbaceous weeds around individual conifer seedlings. Mix 0.4 to 0.6 oz **Arsenal herbicide Applicators Concentrate** and 0.2 oz nonionic surfactant per gallon of water. Direct the spray to the weeds and minimize the amount applied to conifer foliage for best conifer toler-

ance. Ensure that maximum labeled rates per acre listed for crop species above are not exceeded.

Arsenal® herbicide Applicators Concentrate may be tank mixed with sulfometuron to broaden the spectrum of weeds controlled. For loblolly pine, apply 4 to 6 oz **Arsenal herbicide Applicators Concentrate** plus 1-2 oz sulfometuron per acre. The application of **Arsenal herbicide Applicators Concentrate** plus sulfometuron on other conifer species may cause growth suppression.

CONIFER RELEASE TREATMENTS

Arsenal herbicide Applicators Concentrate may be applied as a broadcast or directed spray application for suppression of labeled brush, tree, and herbaceous weed species. Directed spray applications may be made with low-volume applications in conifer stands of all ages by targeting the unwanted vegetation and avoiding direct application to the conifer. Ensure that maximum labeled rates per acre listed for crop species below are not exceeded.

Use broadcast applications of Arsenal herbicide Applicators Concentrate for release of the following conifers from hardwood competition:

Crop Species	Rate (fl oz/Acre)
Loblolly Pine (<i>Pinus taeda</i>) ³	12 - 20
Loblolly X Pitch Hybrid ³	12 - 20
Virginia Pine (<i>Pinus virginiana</i>) ³	12 - 20
Longleaf Pine (<i>Pinus palustris</i>)	12 - 16
Pitch Pine (<i>Pinus rigida</i>)	12 - 16
Shortleaf Pine (<i>Pinus echinata</i>)	12 - 16
Slash Pine (<i>Pinus elliotii</i>)	12 - 16
White Pine (<i>Pinus strobus</i>) ¹	8 - 16
California Red Fir (<i>Abies magnifica</i>)	8 - 12
California White Fir (<i>Abies concolor</i>)	8 - 12
Lodgepole Pine (<i>Pinus contorta</i>) ²	8 - 12
Douglas Fir (<i>Pseudotsuga menziesii</i>) ²	8 - 12
Jack Pine (<i>Pinus banksiana</i>) ²	6 - 12
Black Spruce (<i>Picea mariana</i>) ²	6 - 12
Red Spruce (<i>Picea rubens</i>) ²	6 - 12
White Spruce (<i>Picea glauca</i>) ²	6 - 12

¹ **DO NOT** make applications to white pine stands younger than three years old. To minimize potential white pine injury, release treatments should not be made prior to July 15.

² Applications should be made after formation of final conifer resting buds in the fall or height growth inhibition may occur.

³ Mid-rotation release: For broadcast applications below the pine canopy in established stands of loblolly pine, loblolly X pitch hybrid, and Virginia pine, use 16-32 oz product per acre. For mid-rotation release of other species, use rates listed above.

For slash pine and longleaf pine, broadcast release treatments over the top of pines for the purpose of woody plant control must be made after August 15 and only in stands 2 through 5 years old. For applications over the top of slash pine and longleaf pine, DO NOT add surfactant and use lower labeled rates on sandy soils.

Apply the recommended rate of **Arsenal herbicide Applicators Concentrate** per acre when making broadcast applications with helicopter or ground spray equipment. Refer to mixing and application instructions for proper spray volumes. A nonionic surfactant may be added at no more than 1/4 percent by volume.

Use the higher label rates of **Arsenal herbicide Applicators Concentrate** when controlling particularly dense stands or difficult-to-control species

Some minor conifer growth inhibition may be observed when release treatments are made during periods of active conifer growth. To minimize potential conifer height growth inhibition, **DO NOT** make broadcast applications to conifer stands, except loblolly pine, before the end of the second growing season. To minimize potential conifer height growth inhibition, broadcast release treatments may be made late in the growing season. To prevent possibility of conifer injury, **DO NOT** apply **Arsenal herbicide Applicators Concentrate** when conifers are under stress from drought, diseases, animal or winter injury, or other stresses reducing conifer vigor.

Arsenal herbicide Applicators Concentrate may be used to release loblolly pine seedlings during the first growing season following planting or for one-year-old natural loblolly pine regeneration. For one-year-old loblolly pine release, apply 12-20 oz/A of **Arsenal herbicide Applicators Concentrate** after July 15. The use of rates below 16 oz/A is intended for hardwood growth suppression and some hardwood resprouting should be expected.

USE OF ARSENAL HERBICIDE APPLICATORS CONCENTRATE FOR SPOT TREATMENT OF UNDESIRABLE HARDWOOD VEGETATION

Arsenal herbicide Applicators Concentrate may be used as a directed foliar or cut-stem application to control undesirable brush and hardwoods in the management of stands of all ages for the conifer species listed in the broadcast application section above. Refer to mixing and application instructions in the directed foliar or cut-stem sections above for proper use rates, equipment, and application techniques. Ensure that the maximum labeled rates per acre listed for crop species are not exceeded. Cut-stem applications may be used for spot treatment of undesirable hardwoods in Ponderosa pine stands using 12 oz or less of product per acre.

Avoid direct application to desired plant species as injury may occur. Injury may occur to nontarget or desirable hardwoods or conifers if they extend from the same root system or their root systems are grafted to those of the treated tree or if their roots extend into the treated zone.

LATE ROTATION VEGETATION CONTROL IN WESTERN CONIFERS

In California, the Pacific Northwest and Inland Northwest, broadcast aerial applications of **Arsenal® herbicide Applicators Concentrate** up to 24 oz/A are permissible in conifer stands that are targeted for harvesting the year following treatment. Use minimum spray volume of 15 gallons per acre. Significant conifer injury or mortality must be expected. **DO NOT** use this treatment if conifer injury or mortality cannot be tolerated.

BAG AND SPRAY APPLICATIONS FOR CONIFER RELEASE

In Douglas Fir and Ponderosa pine stands, broadcast applications of **Arsenal herbicide Applicators Concentrate** up to 16 oz/A are permissible when the trees are covered by bags prior to the application. The bags must prevent the spray mix from contacting the conifer foliage. On sites with coarse textured soils (e.g. decomposed granite, pumice, sandy or rocky sites) or low levels of soil organic matter (generally 5% or less), significant conifer growth inhibition and mortality is possible. **DO NOT** use this treatment on these types of sites if conifer growth inhibition and mortality cannot be tolerated.

WEEDS CONTROLLED

Arsenal herbicide Applicators Concentrate will provide postemergence control and some residual control of the following target vegetation species. Degree of control is both species and rate dependent. **Arsenal herbicide Applicators Concentrate** should be used only in accordance with the recommendations on this label.

GRASSES

The species of annual and perennial grasses controlled by **Arsenal herbicide Applicators Concentrate** include the following:

Annual bluegrass (*Poa annua*)
Bahigrass (*Paspalum notatum*)
Barnyardgrass (*Echinochloa crus-galli*)
Beardgrass (*Andropogon* spp.)
Bermudagrass (*Cynodon dactylon*)¹
Big bluestem (*Andropogon gerardii*)
Broadleaf signalgrass (*Brachiaria platyphylla*)
Canada bluegrass (*Poa compressa*)
Cattail (*Typha* spp.)
Cheat (*Bromus secalinus*)
Cogongrass (*Imperata cylindrica*)²
Crabgrass (*Digitaria* spp.)
Crowfootgrass (*Dactyloctenium aegyptium*)
Dallisgrass (*Paspalum dilatatum*)
Downy brome (*Bromus tectorum*)
Fall panicum (*Panicum dichotomiflorum*)
Feathertop (*Pennisetum villosum*)
Fescue (*Festuca* spp.)
Foxtail (*Setaria* spp.)
Giant reed (*Arundo donax*)
Goosegrass (*Eleusine indica*)
Guineagrass (*Panicum maximum*)
Italian ryegrass (*Lolium multiflorum*)
Itchgrass (*Rottboellia exaltata*)
Johnsongrass (*Sorghum halepense*)¹
Junglerice (*Echinochloa colonum*)

GRASSES (continued)

Kentucky bluegrass (*Poa pratensis*)
Lovegrass (*Eragrostis* spp.)¹
Orchardgrass (*Dactylis glomerata*)
Panicum spp.
Paragrass (*Brachiaria mutica*)
Phragmites (*Phragmites australis*)
Prairie cordgrass (*Spartina pectinata*)
Prairie threeawn (*Aristida oligantha*)
Quackgrass (*Agropyron repens*)
Reed canary grass (*Phalaris arundinacea*)
Saltgrass (*Distichlis stricta*)
Sand dropseed (*Sporobolus cryptandrus*)
Sandbur (*Cenchrus* spp.)
Smooth brome (*Bromus inermis*)
Sprangletop (*Leptochloa* spp.)
Timothy (*Phleum pratense*)
Torpedograss (*Panicum repens*)
Vaseygrass (*Paspalum urvillei*)
Wild barley (*Hordeum* spp.)
Wild oats (*Avena fatua*)
Wirestem muhly (*Muhlenbergia frondosa*)
Witchgrass (*Panicum capillare*)
Woolly cupgrass (*Eriochloa villosa*)

¹Use higher labeled rates.

²Use minimum of 24 oz per acre.

BROADLEAF WEEDS

The species of annual and perennial broadleaf weeds controlled by **Arsenal herbicide Applicators Concentrate** include the following:

Arrowwood (*Pluchea sericea*)
Broom snakeweed (*Gutierrezia sarothrae*)
Bull thistle (*Cirsium vulgare*)
Burclover (*Medicago* spp.)
Burdock (*Arctium* spp.)
Camphorweed (*Heterotheca subaxillaris*)
Canada thistle (*Cirsium arvense*)
Carolina geranium (*Geranium carolinianum*)
Carpetweed (*Mullugo verticillata*)
Chickweed, mouseear (*Cerastium vulgatum*)
Clover (*Trifolium* spp.)
Cocklebur (*Xanthium strumarium*)
Common chickweed (*Stellaria media*)
Common ragweed (*Ambrosia artemisiifolia*)
Cudweed (*Gnaphalium* spp.)
Dandelion (*Taraxacum officinale*)
Desert camelthorn (*Alhagi pseudalhagi*)
Diffuse knapweed (*Centaurea diffusa*)
Dock (*Rumex* spp.)
Dogfennel (*Eupatorium capillifolium*)
Fiddleneck (*Amsinckia intermedia*)
Filaree (*Erodium* spp.)
Fleabane (*Erigeron* spp.)
Giant ragweed (*Ambrosia trifida*)
Goldenrod (*Solidago* spp.)
Gray rabbitbrush (*Chrysothamnus nauseosus*)
Henbit (*Lamium aplexicaule*)
Hoary vervain (*Verbena stricta*)
Horseweed (*Conyza canadensis*)
Indian mustard (*Brassica juncea*)
Japanese bamboo/knotweed (*Polygonum cuspidatum*)
Knotweed, prostrate (*Polygonum aviculare*)
Kochia (*Kochia scoparia*)
Lambsquarters (*Chenopodium album*)
Little mallow (*Malva parviflora*)

BROADLEAF WEEDS (continued)

Milkweed (*Asclepias* spp.)
Miners lettuce (*Montia perfoliata*)
Mullein (*Verbascum* spp.)
Nettleleaf goosefoot (*Chenopodium murale*)
Oxeye daisy (*Chrysanthemum leucanthemum*)
Pepperweed (*Lepidium* spp.)
Pigweed (*Amaranthus* spp.)
Plantain (*Plantago* spp.)
Pokeweed (*Phytolacca americana*)
Primrose (*Oenothera kunthiana*)
Puncturevine (*Tribulus terrestris*)
Purple loosestrife (*Lythrum salicaria*)
Purslane (*Portulaca* spp.)
Pusley, Florida (*Richardia scabra*)
Rocket, London (*Sisymbrium irio*)
Rush skeletonweed (*Chondrilla juncea*)
Russian knapweed (*Centaurea repens*)
Russian thistle (*Salsola kali*)
Saltbush (*Atriplex* spp.)
Shepherdspurse (*Capsella bursa-pastoris*)
Silverleaf nightshade (*Solanum elaeagnifolium*)
Smartweed (*Polygonum* spp.)
Sorrell (*Rumex* spp.)
Sowthistle (*Sonchus* spp.)
Spurge, annual (*Euphorbia* spp.)
Stinging nettle (*Urtica dioica*)
Sunflower (*Helianthus* spp.)
Sweet clover (*Melilotus* spp.)
Tansymustard (*Descurainia pinnata*)
Texas thistle (*Cirsium texanum*)
Velvetleaf (*Abutilon theophrasti*)
Western ragweed (*Ambrosia psilostachya*)
Wild carrot (*Daucus carota*)
Wild lettuce (*Lactuca* spp.)
Wild parsnip (*Pastinaca sativa*)
Wild turnip (*Brassica campestris*)
Woollyleaf bursage (*Ambrosia grayi*)
Yellow starthistle (*Centaurea solstitialis*)
Yellow woodsorrel (*Oxalis stricta*)

VINES AND BRAMBLES

The species of vines and brambles controlled by **Arsenal® herbicide Applicators Concentrate** include the following:

Field bindweed (*Convolvulus arvensis*)
Hedge bindweed (*Calystegia sepium*)
Honeysuckle (*Lonicera* spp.)¹
Morningglory (*Ipomoea* spp.)
Poison ivy (*Rhus radicans*)
Redvine (*Brunnichia cirrhosa*)
Trumpet creeper (*Campsis radicans*)
Virginia creeper (*Parthenocissus quinquefolia*)
Wild buckwheat (*Polygonum convolvulus*)
Wild grape (*Vitis* spp.)
Wild rose (*Rosa* spp.)¹
Including: Multiflora rose
(*Rosa multiflora*)
Macartney rose
(*Rosa bracteata*)

¹Use higher labeled rates.

WOODY BRUSH AND TREES

The species of woody brush and trees controlled by **Arsenal herbicide Applicators Concentrate** include the following:

Alder (*Alnus* spp.)
American beech (*Fagus grandifolia*)
Ash (*Fraxinus* spp.)¹
Aspen (*Populus* spp.)
Autumn olive (*Elaeagnus umbellata*)
Bald cypress (*Taxodium distichum*)
Bigleaf maple (*Acer macrophyllum*)
Birch (*Betula* spp.)¹
Black oak (*Quercus kelloggii*)
Blackgum (*Nyssa sylvatica*)²
Boxelder (*Acer negundo*)
Brazilian peppertree (*Schinus terebinthifolius*)
Ceanothis (*Ceanothis* spp.)
Cherry (*Prunus* spp.)^{1, 2}
Chinaberry (*Melia azedarach*)
Chinese tallow tree (*Sapium sebiferum*)
Chinquapin (*Castanopsis chrysophylla*)
Cottonwood (*Populus trichocarpa* and *Populus deltoides*)
Cypress (*Taxodium* spp.)
Dogwood (*Cornus* spp.)¹
Eucalyptus (*Eucalyptus* spp.)
Hawthorn (*Crataegus* spp.)
Hickory (*Carya* spp.)¹
Huckleberry (*Gaylussacia* spp.)
Lyonia spp.
Including: Fetterbush (*Lyonia lucida*)
Staggerbush (*Lyonia mariana*)
Madrone (*Arbutus menziesii*)
Maple (*Acer* spp.)
Melaleuca (*Melaleuca quinquenervia*)
Mulberry (*Morus* spp.)^{1, 3}
Oak (*Quercus* spp.)¹
Persimmon (*Diospyros virginiana*)²
Poison oak (*Rhus diversiloba*)
Popcorn tree (*Sapium sebiferum*)
Poplar (*Populus* spp.)
Privet (*Ligustrum vulgare*)
Red alder (*Alnus rubra*)
Red maple (*Acer rubrum*)
Saltcedar (*Tamarix pentandra*)
Sassafras (*Sassafras albidum*)
Sourwood (*Oxydendrum arboreum*)²
Sumac (*Rhus* spp.)
Sweetgum (*Liquidambar styraciflua*)
Sycamore (*Platanus occidentalis*)
Tanoak (*Lithocarpus densiflorus*)¹
Titi (*Cyrilla racemiflora*)⁵
Tree of heaven (*Ailanthus altissima*)
Vaccinium spp.
Including: Blueberry (*Vaccinium* spp.)
Sparkleberry (*Vaccinium arboreum*)
Willow (*Salix* spp.)
Yellow poplar (*Liriodendron tulipifera*)¹

¹Use higher labeled rates.

²Best control with applications prior to formation of fall leaf color.

³The degree of control may be species dependent.

⁴For Water oak (*Quercus nigra*), Laurel oak (*Q. lauriflora*), Willow oak (*Q. phellos*) and Live oak (*Q. virginiana*), use higher labeled rates.

⁵Suppression only.

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