



Plant growth regulator for thinning and control of pre-harvest drop of apples and pears, and for promoting return bloom of apples the following year

**Active Ingredient:** 1-Naphthaleneacetic Acid, Sodium Salt\* .....3.5%  
**Other Ingredients:** .....96.5%  
**Total:** .....100.0%

\*Equivalent to 3.1% of 1-Naphthaleneacetic Acid  
 Contains 0.3 lbs of active ingredient per gallon.

EPA. Reg. No. 62097-48-82917      EPA Est. No. 39578-TX-001      Net Contents: 1 gal (3.78 ltrs)

**KEEP OUT OF REACH OF CHILDREN  
 CAUTION**

<b>FIRST AID</b>	
<b>IF ON SKIN:</b>	<ul style="list-style-type: none"> <li>• Take off contaminated clothing.</li> <li>• Rinse skin immediately with plenty of water for 15-20 minutes.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
<b>IF SWALLOWED:</b>	<ul style="list-style-type: none"> <li>• Call a poison control center or doctor immediately for treatment advice.</li> <li>• Have person sip a glass of water if able to swallow.</li> <li>• Do not induce vomiting unless told to by a poison control center or doctor.</li> <li>• Do not give anything by mouth to an unconscious person.</li> </ul>
<b>IF IN EYES:</b>	<ul style="list-style-type: none"> <li>• Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
<b>IF INHALED:</b>	<ul style="list-style-type: none"> <li>• Move person to fresh air.</li> <li>• If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible.</li> <li>• Call a poison control center or doctor for further treatment advice.</li> </ul>
<p>Have the product container or label with you when calling a poison control center or doctor, or going for treatment. For non-emergency information concerning this product, call the National Pesticides Information Center (NPIC) at 1-800-858-7378 (NPIC Web site: <a href="http://www.npic.orst.edu">www.npic.orst.edu</a>). For emergencies, call the poison control center at 1-800-222-1222.</p> <p>No specific antidote is available. All treatments should be based on observed signs and symptoms of distress in the patient. Overexposure to materials other than this product may have occurred.</p>	

**PRECAUTIONARY STATEMENTS  
 HAZARDS TO HUMANS AND DOMESTIC ANIMALS**

**CAUTION.** Harmful if absorbed through skin. Harmful if swallowed. Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet. Remove and wash contaminated clothing before reuse.

## PERSONAL PROTECTIVE EQUIPMENT (PPE)

### Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Chemical-resistant gloves, such as barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, polyvinyl chloride or viton
- Shoes plus socks

### User Safety Requirements

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

### USER SAFETY RECOMMENDATIONS

Users should:

- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

### ENVIRONMENTAL HAZARDS

Do not apply directly to water, 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 wash waters or rinsate. Do not contaminate irrigation ditches or water used for irrigation or domestic purposes. Do not apply when weather conditions favor drift from treated areas.

### 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 State or Tribal agency responsible for pesticide regulation.

### Restrictions

Do not apply this product through any type of irrigation system.  
Do not use in a greenhouse.

### AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labelling 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.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 48 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
- Chemical-resistant gloves, such as barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, polyvinyl chloride or viton
- Protective eyewear

## SPRAY DRIFT MANAGEMENT

A variety of factors including weather conditions (e.g., wind direction, wind speed, temperature, relative humidity) and method of application (e.g., ground, aerial, airblast) can influence pesticide drift. The applicator and grower must evaluate all factors and make appropriate adjustments when applying this product.

### Wind speed restriction:

Do not apply when wind speeds are greater than 10 mph at the application site.

### For orchard air blast:

- Sprays must be directed into the crop canopy.
- Outward pointing nozzles should be turned off at row ends and when spraying outer rows.
- For ground-based applications and aerial applications, use only medium or coarser spray droplets (or nozzles) according to ASABE (S572) definition for standard nozzles.

## PRODUCT INFORMATION

Refine 3.5L contains 1-Naphthaleneacetic acid, sodium salt, a synthetic plant growth regulator, which is used in commercial fruit production. Uses in fruit production include thinning of fruit to help improve fruit size and quality, controlling pre-harvest fruit drop to reduce fruit losses and promoting adequate return bloom the following year. The response of fruit trees to an application may vary depending on factors such as variety, climatic factors, location, tree vigor, etc. Users need to consider these factors before choosing the desired rate and timing for an application.

**Spray Volume:** Always apply Refine 3.5L using sufficient water to ensure complete and uniform spray coverage. The appropriate spray volume (e.g. tree row volume) is determined by the type of equipment used, density of the foliage, tree spacing, coverage desired and intended spray pattern. Make applications by ground in up to 500 gallons of water per acre and aerial applications in 5-20 gallons of water per acre. Consider all variables in rate and application timing for each variety and orchard location prior to establishing the spray program.

**Product Compatibility:** Refine 3.5L, when diluted with the recommended amount of water, is physically compatible with a wide range of commonly used spray products. However, evaluating the full range of compatibilities under all conditions is impossible. Therefore, it is advised that users pre-mix a small quantity of a desired tank mix and observe for possible adverse changes (settling out, flocculation, etc.). Avoid mixtures of several materials and very concentrated spray mixtures. Observe all limitations and precautions on labeling of all products used in any tank mix. Maintain proper agitation throughout the mixing and application procedures for each spray mix applied. Please consult your local Extension agent or Pomologist for local recommendations or when tank mixing any product you have not previously used with Refine 3.5L. In addition, to ensure plant safety, always test spray a small area prior to the general use of a tank mix that you have not previously used.

Note: All use of ppm refers to the active ingredient (a.i.), not the formulated product.

**Table 1. Refine 3.5L spray preparation chart for dilute application.**

Rate (ppm)	Tree Row Volume Stated as Gallons of spray per acre*				
	100	150	200	300	400
	fl.oz. of Refine 3.5L	fl.oz. of Refine 3.5L	fl.oz. of Refine 3.5L	fl.oz. of Refine 3.5L	fl.oz. of Refine 3.5L
3	1.2	1.8	2.4	3.6	4.8
5	2.0	3.0	4.0	6.0	8.0
7.5	3.0	4.5	6.0	9.0	12.0
10	4.0	6.0	8.0	12.0	16.0
15	6.0	9.0	12.0	18.0	24.0
20	8.0	12.0	16.0	24.0	32.0

\*Use the listed fl.oz. of Refine 3.5L for the target rate to be applied at the appropriate Tree Row Volume (Gal/Acre) indicated in the table.

**CHEMICAL THINNING – APPLES (all approved states except California):**

Tree response to Refine 3.5L applications varies greatly based on the type of variety (see **Table 2**), climatic factors before and after application, tree vigor, pollination, fruit set and fruitlet size at time of application. The level of thinning can vary greatly from year to year. Knowledge of the orchard’s history and prior year’s performance can help determine the best spray program which is unique for that orchard.

**Table 2** below provides a list of apple varieties and specified use rates for Refine 3.5L. Rates for a moderate-to-thin apple variety in an orchard which requires 100 gallons of water per acre to achieve drip range from 1 to 4 fl. oz. of Refine 3.5L (3-10 ppm). **Table 1** provides amounts (fl.oz) of Refine 3.5L to apply per acre based on ppm and tree row volume. Higher rates may be needed for more difficult-to-thin varieties or for large, vigorous trees with high fruit set potential which would need aggressive thinning, or when applications are made towards the end of the thinning window. Lower rates may be best for weaker trees with poor pollination and lower fruit set potential.

Application timing typically ranges from full bloom to 30 days after full bloom. Refine 3.5L is most effective for fruit thinning when applied once the king fruitlets are 5 to 10 mm in diameter. Early applications of Refine 3.5L one week after full bloom (petal fall) when fruit size is 3-7 mm fruit size and/or 2-3 weeks after full bloom (early fruit set) when fruit size is 8-10 mm fruit size are the preferred application timing(s). The preferred application temperature is between 70°F and 75°F under slow drying conditions. Applications are not recommended at temperatures below 60°F or above 80°F. Over-thinning may occur when daytime temperature exceeds 85°F. Satisfactory thinning can be obtained under such conditions with lower rates. Direct spray applications to the top two-thirds of the tree canopy for optimal performance. Under normal conditions, one application for thinning should be adequate. However, if a second application is desired, do not make it earlier than 7 days after the first application.

Certain varieties can be sensitive to Refine 3.5L and therefore growers should exercise caution prior to large scale use. Make applications of Refine 3.5L to trees younger than 5 years of age with caution as damage to the trees may occur. Pygmy or misshapen fruit formation or phytotoxicity may occur on some varieties under the following conditions: 1) higher rates, 2) when temperatures exceed 85°F and/or 3) when applications are made to fruit >15 mm in size. The incidence of pygmy fruit may be increased in susceptible cultivars by combinations of Refine 3.5L with 6-BA products. Delicious and Fuji apple varieties are particularly susceptible. Exercise care when using Refine 3.5L on such varieties. **Do not** use Refine 3.5L on early season varieties (those that mature before McIntosh) such as Early Williams Red and Oldenburg as injury may occur.

**Table 2.**

Apple Varieties	Thinning Rates <sup>1</sup> (fl.oz./100 gal of tree row volume) <sup>2</sup>	Application Timing
<b>Easy-to-thin:</b> Granny Smith, Braeburn, Pink Lady, Cortland, Delicious Baldwin, Idared, Jonathan, Northern Spy, MacIntosh, Red Delicious, Rome Beauty, Stayman, Rhode Island Greening, Minneiska, Twenty-ounce, Autumncrisp, Monroe, Redcourt, Zestar and others.	0.5 – 3.0	Petal fall (3-7 mm fruit size) and/or early fruit set (8-10 mm fruit size)  Use the lower concentrations for weaker trees, cooler weather, less food reserves, lower fruit set potential, and slow drying conditions
<b>Moderate-to-thin:</b> Gala, Golden Supreme, Honeycrisp, Cameo, Gingergold, Jersey mac, Rome, Jonagold, Empire, Olenberg (Duchess) Red Astrachan, Spartan, Mutsu, Yellow Transparent, Williams Early, Ambrosia, Pinata®, WA2, Winesap and others.	1.0 – 4.0	
<b>Difficult-to-thin:</b> Fuji, Golden Delicious, Jonamac, Lodi,	1.5 – 4.0	

Macoun, York, York Imperial, Yellow Newton, PaulaRed, Early Macintosh, Aceynmac, Taylor Rome, and others.		
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- Note: The rate ranges supplied are intended only as a general guide. Your intended results may require rates above or below those in the table. When Refine 3.5L is used in combination with a non-ionic surfactant or in a tank mix with another apple thinning product, reduce the application rate of Refine 3.5L appropriately.
- Volume of water required per acre required to achieve drip at the time of application.

**Tank mix combinations:** Tank mix combinations of reduced rates of Refine 3.5L plus Carbaryl or 6-BA (Exilis 9.5 SC) have been used to enhance thinning. Do not mix Refine 3.5L with any product containing a label restriction against such mixing. Always apply in accordance with the limitations and precautions of the most restrictive label for the tank mix being used.

It is the pesticide user's responsibility to ensure that all products are registered for the intended use. Read and follow the applicable restrictions and limitations and directions for use on all product labels involved in tank mixing. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.

**TO PROMOTE RETURN BLOOM ON APPLE TREES THE FOLLOWING YEAR (all approved states except California):**

Refine 3.5L can effectively promote return bloom during an off year in young trees that are slow to bear or on mature trees that are likely to produce only a limited number of blossoms in the following year. Refine 3.5L acts as a return bloom enhancer to certain apple varieties such as, but not limited to: *Fuji, Jonagold, Mutsu, Braeburn* and *Golden Delicious*. The application rate range is between 2 to 8 fl. oz. per acre, applied six to eight weeks after petal fall in sufficient water to ensure good coverage based on tree row volume. Results may be improved with repeat applications of 2 to 8 fl. oz. per acre made at 7 to 14 day intervals. These applications made during the summer months, may also provide an additional benefit of aiding pre-harvest fruit drop in certain varieties of apples (see above).

**Advisory:** Even when used at low rates, reduced fruit quality such as early ripening or water core or leaf drop can result on certain varieties which are sensitive to Refine 3.5L, (such as *Early MacIntosh* or other early summer varieties). Application of Refine 3.5L at rates higher than 8 fl. oz. per acre can also affect fruit quality and tree vigor on any variety and growers should exercise caution.

**CONTROL OF PRE-HARVEST DROP OF APPLES (all approved states except California):**

Refine 3.5L can be used to reduce pre-harvest drop losses of apples from wind and mechanical knockdown. Make applications within one to four weeks of anticipated harvest. Refine 3.5L becomes effective 1 to 3 days after application and can prevent fruit drop up to two weeks, depending upon use rates and environmental conditions. For maximum effectiveness, apply Refine 3.5L when orchard temperature is 70°F or higher. Apply Refine 3.5L to the entire canopy to assure complete coverage. Use the following rate recommendations only as a guide as variety, climatic conditions and other factors will determine the actual rate required. **Do not delay harvest beyond optimum maturity. Refine 3.5L may sometimes advance fruit maturity when applied alone.** Improvement in fruit size and color may be observed in certain varieties. Pre-harvest interval (PHI) is 2 days.

Apply by ground or by air in sufficient water to ensure thorough coverage. Make aerial applications using at least 5 gallons of water per acre. Utilize spray equipment that gives thorough coverage to all portions of the tree canopy. Apply only when weather conditions favor minimal spray drift. A typical application for controlling pre-harvest drop is 8 to 32 fl. oz. per acre, made one to four weeks prior to harvest. If needed, repeat applications may be made at weekly intervals.

**CHEMICAL THINNING OF PEARS (all approved states except California):**

Tree response to Refine 3.5L applications varies greatly based on the type of variety treated, climatic factors before and after application, tree vigor, pollination, fruit set and fruit size at time of application. Therefore, results can vary greatly from year to year. Previous orchard history, good record keeping, and

evaluating use rates prior to large scale use can help determine the best spray program for that orchard. The following rates only serve as a guide for thinning pears. As noted above, tree response can vary greatly based on variety, tree vigor and climatic conditions. Refine 3.5L can be applied at 10-15 ppm for dilute sprays in up to 400 gal water/acre. A typical rate for thinning Bosc or Bartlett pears is 4 fl. oz. of Refine 3.5L per acre when applied in 100 gallons of water per acre to achieve drip or 8 fl. oz. when applied in 200 gallons to achieve drip (alternatively, see **Table 1** for use rates based on ppm and tree row volume). Large, vigorous trees with high fruit-set potential or for applications made towards the end of the thinning window may require higher rates to obtain optimum results. Weaker trees with poor pollination and lower fruit set potential generally require lower rates. Spray application timing can range from full bloom to 30 days after full bloom, but optimum results are obtained when sprayed within 2 to 3 weeks after full bloom. Under normal conditions, one application for thinning should be adequate. However, if a second application is desired, do not make it earlier than 7 days after the first application. The preferred application temperature range is between 70°F and 75°F. Applications are not recommended at temperatures below 60°F or above 80°F. Apply in sufficient water utilizing properly setup spray equipment to ensure thorough coverage.

**Varietal Advisory:** Some varieties of pears (such as *D'Anjou*) are easy to over-thin, and, under certain conditions, are susceptible to the formation of pygmy fruit. Consult your local extension agent or pomologist for specific regions.

**CONTROL OF PRE-HARVEST DROP ON PEARS (all approved states except California):**

Refine 3.5L can be used effectively to reduce pre-harvest drop of many pear varieties. However, since varietal response to Refine 3.5L can be different, conduct evaluations for efficacy and post-harvest fruit quality on a small scale in an orchard setting prior to large-scale use. Treatments become effective within 3 to 4 days after application and pre-harvest fruit drop can be minimized for up to two weeks, depending on rates and environmental conditions. An increase in fruit size may be observed when Refine 3.5L is applied to reduce pre-harvest drop in pears.

Apply by ground or air in sufficient water to ensure thorough coverage. Aerial applications must be made using at least 5 gallons of water per acre. Apply only when weather conditions favor minimal spray drift. Make ground applications in sufficient water (typically based on tree row volume) to ensure adequate coverage. A typical rate range for controlling pre-harvest drop is between 8 to 32 fl. oz. per acre, made one to four weeks prior to harvest. Higher rates may be needed for varieties such as *D'Anjou* and for large, vigorous trees with high fruit-set potential. Treat smaller less vigorous trees with low fruit-set potential at the lower labelled rate.

**Restrictions:**

Make an additional application one week following the first application, but do not make more than two applications per year for this use.

Pre-harvest interval (PHI) is 2 days.

Do not delay harvest beyond optimum maturity.



## STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

**PESTICIDE STORAGE:** Keep container tightly closed when not in use. Store in a cool, dry place. Protect from temperatures below 32°F. This product may freeze. If freezing should occur, thaw and shake gently to unify the product. Do not store diluted product.

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

**CONTAINER HANDLING:** Non-refillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Triple rinse 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 ¼ 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. Then offer for recycling or reconditioning, if available, or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

## WARRANTY DISCLAIMER AND LIMITATION OF LIABILITY

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