



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, DC 20460

OFFICE OF CHEMICAL SAFETY  
AND POLLUTION PREVENTION

May 12, 2021

Mark Mongiovi  
Sr. Regional Regulatory Manager  
UPL NA Inc.  
630 Freedom Business Center, Ste. 402  
King of Prussia, PA 19406

Subject: Notification per PRN 98-10 – Updated EPA Reg. No. and optional language  
Product Name: Bifenthrin 180 FS  
EPA Registration Number: 70506-383  
Application Date: 1/29/2021  
Decision Number: 571752

Dear Mr. Mongiovi:

The Agency is in receipt of your Application for Pesticide Notification under Pesticide Registration Notice (PRN) 98-10 for the above referenced product. The Registration Division (RD) has conducted a review of this request for its applicability under PRN 98-10 and finds that the action requested falls within the scope of PRN 98-10.

The label submitted with the application has been stamped “Notification” and will be placed in our records.

Should you wish to add/retain a reference to the company’s website on your label, then please be aware that the website becomes labeling under the Federal Insecticide Fungicide and Rodenticide Act and is subject to review by the Agency. If the website is false or misleading, the product would be misbranded and unlawful to sell or distribute under FIFRA section 12(a)(1)(E). 40 CFR 156.10(a)(5) list examples of statements EPA may consider false or misleading. In addition, regardless of whether a website is referenced on your product’s label, claims made on the website may not substantially differ from those claims approved through the registration process. Therefore, should the Agency find or if it is brought to our attention that a website contains false or misleading statements or claims substantially differing from the EPA approved registration, the website will be referred to the EPA’s Office of Enforcement and Compliance.

If you have any questions, you may please contact Kaitlin Saunders at 703-347-8454 or by email at [Saunders.Kaitlin@epa.gov](mailto:Saunders.Kaitlin@epa.gov).

Sincerely,

A handwritten signature in black ink that reads "J. Herrick".

Jacquelyn Herrick, Product Manager 03  
Invertebrate & Vertebrate Branch 1  
Registration Division (7505P)  
Office of Pesticide Programs

# RESTRICTED USE PESTICIDE

Toxic to fish and aquatic organisms.  
For retail sale to and use only by certified applicators, or persons under their direct supervision and only for the uses covered by the certified applicator's certification.

Bifenthrin Group 3A Insecticide

## Bifenthrin 180 FS [ABN: STartUP™ BIFEN SEED TREATMENT]

ACTIVE INGREDIENT:	% By Weight
Bifenthrin* [(2 methyl [1,1-biphenyl] 3-yl), methyl 3 (2-chloro, 3,3,3-trifluoro-1-propenyl) 2,2-dimethyl, cyclopropanecarboxylate].....	17.15%
OTHER INGREDIENTS: .....	82.85%
TOTAL: .....	100.0%

Bifenthrin 180 FS is a flowable concentrate for seed treatment containing 1.5 lbs bifenthrin per gallon or 180 grams bifenthrin per liter.

\*Cis isomers 97% minimum, trans isomers 3% maximum

## NOTIFICATION

70506-383

The applicant has certified that no changes, other than those reported to the Agency have been made to the labeling. The Agency acknowledges this notification by letter dated:

05/12/2021

EPA Reg. No. 70506-~~614~~-383

EPA EST. No. \_\_\_\_\_

## KEEP OUT OF REACH OF CHILDREN CAUTION

[Optional Booklet Use Statements: PEEL DOWN FOR DIRECTIONS

See inside for First Aid, Precautionary Statements, and complete Directions For Use.

See attached booklet for complete Precautionary Statements, and complete Directions For Use.]

FIRST AID	
<b>IF SWALLOWED</b>	<ul style="list-style-type: none"><li>• Call poison control center or doctor immediately for treatment advice.</li><li>• Do not give any liquid to the person.</li><li>• Do not induce vomiting unless told to do so by the 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.</li><li>• 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 ON SKIN OR CLOTHING</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 for treatment advise.</li></ul>
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. For medical emergency, call the Rocky Mountain Poison and Drug Safety at 1-866-673-6671.	
<b>NOTE TO PHYSICIAN:</b> This product is a pyrethroid. If large amounts have been ingested, the stomach and intestines should be evacuated. Treatment is symptomatic and supportive. Digestible fats, oils, or alcohol may increase absorption and so should be avoided.	

FOR CHEMICAL EMERGENCY: Spill, leak, fire, exposure, or accident, call CHEMTREC at 1-800-424-9300.

### Manufactured [For][By]:

UPL NA Inc.  
630 Freedom Business Center, Suite 402  
King of Prussia, PA 19406  
1-800-438-6071

NET CONTENTS: \_\_\_\_\_ Gallons

**PRECAUTIONARY STATEMENTS**  
**Hazards to Humans and Domestic Animals**  
**CAUTION**

Harmful if swallowed. Harmful if absorbed through skin. Causes moderate eye irritation. 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 (other than mixers and loaders) must wear:

- Long-sleeved shirt and long pants
- Chemical resistant gloves made of barrier laminate, butyl rubber  $\geq$  14 mils, nitrile rubber  $\geq$  14 mils, neoprene rubber,  $\geq$  14 mils polyvinyl chloride  $\geq$  14 mils, or viton  $\geq$  14 mils
- Shoes plus socks

Mixers and loaders must wear:

- Long-sleeved shirt and long pants
- Chemical resistant gloves made of barrier laminate, butyl rubber  $\geq$  14 mils, nitrile rubber  $\geq$  14 mils, neoprene rubber,  $\geq$  14 mils polyvinyl chloride  $\geq$  14 mils, or viton  $\geq$  14 mils
- Shoes plus socks
- Protective eyewear

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them. 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:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change clothing

**ENVIRONMENTAL HAZARDS**

This pesticide is extremely toxic to fish and aquatic invertebrates. Use with care when applying in areas adjacent to any body of water. 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 make applications when weather conditions favor drift from treated areas. Drift and runoff from treated areas may be hazardous to aquatic organisms in neighboring areas. Do not contaminate water when disposing of equipment washwaters.

This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds while bees are actively visiting the treatment area.

The use of bifenthrin is prohibited in areas that may result in exposure of endangered species to bifenthrin. Prior to use in a particular county contact the local extension service for procedures and precautions to use to protect endangered species.

**PHYSICAL-CHEMICAL HAZARDS**

Do not mix or allow to come into contact with an oxidizing agent. A hazardous chemical reaction may occur.

**DIRECTIONS FOR USE**

It is a violation of federal law to use this product in a manner inconsistent with its labeling. Read the label in its entirety before using this product.

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.  
Do not apply this product through any type of irrigation system.

#### **AGRICULTURAL USE REQUIREMENTS**

Use this product only in accordance with its labeling and with the Worker Protection Standard (WPS), 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 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,
- Chemical resistant gloves made of barrier laminate, butyl rubber  $\geq$  14 mils, nitrile rubber  $\geq$  14 mils, neoprene rubber,  $\geq$  14 mils polyvinyl chloride  $\geq$  14 mils, or viton  $\geq$  14 mils, and
- Shoes plus socks.

#### **PRODUCT INFORMATION**

Bifenthrin 180 FS provides protectant activity and offers no systemic control of insects. Activity occurs when treated material is contacted or ingested by soil borne insects. Protection provided by this product is for germinating seeds. Bifenthrin 180 FS can be applied in a standalone or in tank mixes with other registered seed treatment products. Best results for providing even coverage for standalone applications, is to apply with water at the total volume of solution normally used for desired application. It is important to observe all directions for use, crops use sites, use rates dilution ratios, restrictions and labeled precautions which may appear on the tank-mix partner label. 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. When mixing to make a solution, start with mechanical agitation and mix thoroughly. Maintain agitation before and during application for best results. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.

To provide a complete seed care solution it is advised to apply Bifenthrin 180 FS in conjunction with UPL STartUP products. Using Rancona 3.8FS or V100, STartUP METXL, STartUP AZOXY and STartUP IMIDA as a broad-spectrum IPM seed treatment solution.

#### **RESISTANCE MANAGEMENT**

For resistance management, Bifenthrin 180 FS contains a Group 3A insecticide. Any insect population may contain individuals naturally resistant to Bifenthrin 180 FS and other Group 3A insecticides. The resistant individuals may dominate the insect population if this group of insecticides are used repeatedly in the same fields. Appropriate resistance-management strategies should be followed.

To delay insecticide/acaricide resistance, take the following steps:

- Rotate the use of Bifenthrin 180 FS or other Group 3A insecticides within a growing season, or among growing seasons, with different groups that control the same pests.
- Use tank mixtures with insecticides from a different group that are equally effective on the target pest when such use is permitted. Do not rely on the same mixture repeatedly for the same pest population. Consider any known cross-resistance issues (for the targeted pests) between the individual components

of a mixture. In addition, consider the following recommendations provided by the Insecticide Resistance Action Committee (IRAC):

- Individual insecticides selected for use in mixtures should be highly effective and be applied at the rates at which they are individually registered for use against the target species.
  - Mixtures with components having the same IRAC mode of action classification are not recommended for insect resistance management.
  - When using mixtures, consider any known cross-resistance issues between the individual components for the targeted pest(s).
  - Mixtures become less effective if resistance is already developing to one or both active ingredients, but they may still provide pest management benefits.
  - The insect resistance management benefits of an insecticide mixture are greatest if the two components have similar periods of residual insecticidal activity. Mixtures of insecticides with unequal periods of residual insecticide activity may offer an insect resistance management benefit only for the period where both insecticides are active.
- Adopt an integrated pest management program for insecticide use that includes scouting, uses historical information related to pesticide use, crop rotation, record keeping, and which considers cultural, biological and other chemical control practices.
  - Monitor after application for unexpected target pest survival. If the level of survival suggests the presence of resistance, consult with your local university specialist or certified pest control advisor.
  - Contact your local extension specialist or certified crop advisors for any additional pesticide resistance-management and/or IPM recommendations for the specific site and pest problems in your area.
  - For further information or to report suspected resistance contact UPL NA Inc. at 1-800-438-6071.

### **CROP ROTATION RESTRICTIONS**

Leafy vegetables and root crops may be rotated 30 days following planting of treated seed. Crops for which bifenthrin tolerances exist maybe rotated at any time. All other crops may be rotated 30 days after the last application.

### **SEED TREATMENT**

#### **Seed Bag Label Requirements**

The Federal Seed Act requires that containers containing treated seed be labeled with the following statements:

- This seed has been treated with 0.0246-0.0422 lbs of bifenthrin per 100 lbs of seed.
- Do not use treated seed for feed, food, or oil purposes.

The U.S. Environmental Protection Agency requires the following statements on containers containing seed treated with BIFENTHRIN:

- Store treated seed away from food and feedstuffs.
- Do not allow children, pets, or livestock to have access to treated seeds.
- Wear long pants, long-sleeved shirt and protective gloves when handling treated seed.
- Treated seeds exposed on soil surface may be hazardous to wildlife. Cover or collect treated seeds spilled during loading and planting.
- Dispose of all excess treated seed by burying seed away from bodies of water.
- Do not contaminate bodies of water when disposing of planting equipment wash water.
- Dispose of seed packaging or containers in accordance with local requirements.

### **CROP ROTATION RESTRICTIONS**

Leafy vegetables and root crops may be rotated 30 days following planting of treated seed. Crops for which bifenthrin tolerances exist maybe rotated at any time. All other crops may be rotated 30 days after the last application.

### Coloring Treated Seed

By law, any seed treated with this product must be colored to prevent use for feed for animals or food for humans. Any formulation of this product that does not already contain dye must use an EPA-approved dye to color treat seed. Refer to 40CFR§153.155 for more information.

### Directions for Seed Treatment

Apply this product as a slurry or mist seed treatment at the rate listed in the Specific Seed Instructions - Seed Treatment section below per 100 pounds of seed. To ensure effective results, seed should be in good condition and properly cured prior to treatment and applications of this product must be uniformly applied to all seed being treated. Consult a seed treatment specialist to determine appropriate slurry rates for the seed being treated.

### For Protection of Germinating Seed from Soil Born Insects

Bifenthrin 180 FS will aid in protection of germinating seeds against injury by certain early season insects such as Seed Corn Maggots, Wireworm, False Wireworm, and Imported Fire Ant. Apply Bifenthrin 180 FS at the lowest labeled rate of 2.1 fl oz/per hundredweight (cwt) of seed for protection against soil borne pest. If high pest pressure expected, use higher end of rate range.

### Seed Treatment Application

Crops	Use Rate	Application Information
Canola Crambe Rapeseed	Apply 2.1 – 3.6 fluid ounces of per hundredweight (cwt) of seed as a mist seed treatment or slurry.	For overtreatment applications of Canola apply in a total slurry volume used for base Canola treatment applications.

Crops	Use Rate	Application Information
Corn – Field Popcorn Sweet	<p>Apply 2.1 – 3.6 fluid ounces of per hundredweight (cwt) of seed (0.062 - 0.106 mg a.i. per seed assuming 1800 seeds per pound) as a mist seed treatment or slurry.</p>	<p>For overtreatment applications of Corn apply in a total slurry volume up to 16 fl oz/cwt.</p> <p>Observe the most restrictive limitations, rates, and precautions from each tank mix product.</p> <p>Field Corn - Do not apply more than 0.3 lbs. ai per acre per season including at-plant plus foliar applications of other products containing bifenthrin.</p> <p>Sweet Corn - Do not apply more than 0.2 lbs. ai per acre total per season including pre, ppi, at-plant, and foliar applications of other products containing bifenthrin.</p>

Crops	Use Rate	Application Information
<p>Cucurbits.  Chayote (fruit)  Chinese waxgourd (Chinese preserving melon)  Citron melon  Cucumber  Gherkin  Gourd. edible  (includes hyotan. cucuzza) (Luffa spp.)  (includes hechimaba Chinese okra) (Marnordica spp.)  (includes balsam apple, balsam pear, bitter melon,  Chinese cucumber)  Muskmelon  (hybrids and/or cultivars of Cucumis melo)  (includes true cantaloupe, cantaloupe, casaba, crenshaw melon, golden pershaw melon. honey-dew melon, honey balls. mango melon, Persian melon. Pineapple melon, Santa Claus melon, and snake melon  Pumpkin (<i>Cucurbita</i> spp.)  Squash summer  (includes crookneck squash. scallop squash, straightneck squash, vegetable marrow, zucchini)  Squash Winter  (Includes butternut squash. calabaza. hubbard squash (C. mixta; C. pepo) includes acorn squash, spaghetti squash)  Watermelon  (includes hybrids and/or varieties of Citrullus spp.)</p>	<p>Apply 2.1 – 3.6 fluid ounces of per hundredweight (cwt) of seed as a mist seed treatment or slurry.</p>	<p>Observe the most restrictive limitations, rates, and precautions from each tank mix product.</p> <p>Do not apply more than 0.3 lbs. ai per acre per season including at-plant plus foliar applications of other products containing bifenthrin.</p>



Crops	Use Rate	Application Information
<p>Succulent Peas and Beans.</p> <p>Pea (<i>Pisum</i> spp.):</p> <p>Dwarf pea</p> <p>Edible-pod pea.</p> <p>English pea</p> <p>Garden pea,</p> <p>Green pea,</p> <p>Snow pea,</p> <p>Sugar snap pea</p> <p>Pigeon pea</p> <p>Bean (<i>Phaseolus</i> spp.):</p> <p>Broad bean (succulent)</p> <p>Lima bean (green)</p> <p>Runner bean</p> <p>Snap bean</p> <p>Wax bean</p> <p>Bean (<i>Vigna</i> spp.):</p> <p>Asparagus bean</p> <p>Blackeyed pea</p> <p>Chinese long bean</p> <p>Cowpea</p> <p>Moth bean</p> <p>Southemgea</p> <p>Yardlong ean</p> <p>Jackbean</p> <p>Soybean (immature seed)</p> <p>Sword bean</p>	<p>Apply 2.1 – 3.6 fluid ounces of per hundredweight (cwt) of seed as a mist seed treatment or slurry.</p>	<p>Observe the most restrictive limitations, rates, and precautions from each tank mix product.</p> <p>Do not apply more than 0.2 lbs ai per acre per season including at-plant plus foliar applications of other products containing bifenthrin.</p>
<p>Peppers, Bell and Non-Bell</p>	<p>Apply 2.1 – 3.6 fluid ounces of per hundredweight (cwt) of seed as a mist seed treatment or slurry.</p>	<p>Observe the most restrictive limitations, rates, and precautions from each tank mix product.</p> <p>Do not apply more than 0.2 lbs. ai per acre per season including at-plant plus foliar applications of other products containing bifenthrin.</p>

Crops	Use Rate	Application Information
Lettuce, Head	Apply 2.1 – 3.6 fluid ounces of per hundredweight (cwt) of seed as a mist seed treatment or slurry.	Observe the most restrictive limitations, rates, and precautions from each tank mix product.  Do not apply more than 0.5 lbs. ai per acre per season including at-plant plus foliar applications of other products containing bifenthrin.

### STORAGE AND DISPOSAL

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

**Pesticide Storage:** If storing this product below freezing, user should shake or roll the container to ensure proper product consistency.

Keep out of reach of children and animals. Store in original containers only. Store in a cool, dry place and avoid excess heat. Carefully open containers. After partial use, replace lids and close tightly. Do not put concentrate or dilute material into food or drink containers. Do not contaminate other pesticides, fertilizers, water, food, or feed by storage or disposal.

In case of spill, avoid contact, isolate area and keep out animals and unprotected persons. Confine spills. **Call CHEMTREC (Transportation and Spills): (800) 424-9300.**

To confine spill: If liquid, dike surrounding area or absorb with sand, cat litter or commercial clay. If dry material, cover to prevent dispersal. Place damaged package in a holding container. Identify contents.

**Pesticide Disposal:** Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative of the nearest EPA Regional Office for guidance.

**Container Handling: [One of the following will be used:]**

**Non-refillable container (in sizes 5 gallons or less).** Do not reuse or refill this container. Triple rinse as follows: Empty the remaining contents into application equipment or mix tank and drain for 10 seconds after flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds, pour rinsate into application equipment or mix tank or store rinsate for later use or disposal. Drain for 10 seconds after flow begins to drip. Repeat this procedure two more times. Then offer for recycling if available, or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by State and local authorities.

**Non-refillable container (in sizes greater than 5 gallons).** Do not reuse or refill this container. Triple rinse or pressure rinse. Triple rinse 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 back and forth several times. Turn the container over onto its other end and tip 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 a mix tank and continue to drain for 10 seconds after the flow begins to drip. 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.

## READ BEFORE USING PRODUCT

### CONDITIONS OF SALE AND LIMITATION OF WARRANTY AND LIABILITY

**NOTICE:** Read the entire Directions for Use and Conditions of Sale and Limitation of Warranty and Liability before buying or using this product. If the terms are not acceptable, return the product at once, unopened, and the purchase price will be refunded.

The Directions for Use of this product reflect the opinion of experts based on field use and tests, and must be followed carefully. It is impossible to eliminate all risks associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as manner of use or application, weather or crop conditions, presence of other materials or other influencing factors in the use of the product, which are beyond the control of UPL NA INC. or Seller. Handling, storage, and use of the product by Buyer or User are beyond the control of UPL NA INC. and Seller. All such risks shall be assumed by Buyer and User, and Buyer and User agree to hold UPL NA INC. and Seller harmless for any claims relating to such factors.

TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, UPL NA INC. AND SELLER MAKE NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS STATED ON THIS LABEL.

To the extent consistent with applicable law, UPL NA INC. or Seller shall not be liable for any incidental, consequential or special damages resulting from the use or handling of this product and **THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE EXCLUSIVE LIABILITY OF UPL NA INC. AND SELLER FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY, CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR OTHERWISE) RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, SHALL BE THE RETURN OF THE PURCHASE PRICE OF THE PRODUCT OR, AT THE ELECTION OF UPL NA INC. OR SELLER, THE REPLACEMENT OF THE PRODUCT.**

UPL NA INC. and Seller offer this product, and Buyer and User accept it, subject to the foregoing conditions of sale and limitations of warranty and of liability, which may not be modified except by written agreement signed by the duly authorized representative of UPL NA Inc.

STartUP is a trademark of UPL NA Inc.

[Information in [ ] are optional text or reviewer notes]

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