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# APPLYING ANTIFOULING PAINT TO PAT TAGS

Fouling organisms can be hugely detrimental to tagging studies. It is imperative that tags be protected against marine growth, especially in tropical waters. Wildlife Computers endorses two anti-fouling coatings, Micron and Propspeed. While there are dozens of options available, these were selected from years of testing and researcher feedback.

## Overview of Micron and Propspeed Antifouling Paints

Micron is a copper-based ablative antifouling paint that kills biofouling on contact. Because of its toxicity, avoid skin contact—on the animal and the painter.

***Be careful not to paint any surface that will be in permanent contact with the skin of sharks or other species.***

Micron antifouling paint has been successfully used for decades to limit biofouling on sea turtle satellite tracking tags. Micron can also be used on all Wildlife Computers tags including PAT (Pop-up Archival Transmitting) tags. (MiniPAT, microPAT, mrPAT, Benthic sPAT, or sPAT). Micron paint adds additional weight to the tag therefore refer to Float Testing for tether and testing information.

Propspeed is a foul-release silicon coating that impedes biofouling adhesion. Propspeed relies on movement for its effectiveness—the more it moves, the better it performs as marine growth can't get a grip to grow. Propspeed can last up to a year and is relatively non-toxic according to the manufacturer.

Wildlife Computers leaves the decision to apply an antifoul coating entirely to the researcher's discretion, however, it is **strongly recommended** that tags be treated with some antifouling coating to ensure the best possible chance of a successful deployment ***as Wildlife Computers does not warrant against biofouling.***

Wildlife Computers offers an optional service to sand, mask, and paint tags with Micron CSC (as well as certain sensors with Propspeed) and coat the wet/dry sensors with conductive polymer. This comprehensive antifouling service is offered at a charge of $100 per tag prior to shipping.

## Importance of Proper Application

Proper application of antifouling paints, such as Micron and Propspeed, is crucial for ensuring the effectiveness and longevity of tracking tags. By following the correct procedures researchers can maximize the protective benefits of the antifouling coatings, ensuring that the tags function optimally throughout their deployment.

# PAT TAG ANTIFOULING PROTOCOL – CONTINUED

Deployments of over two years have been seen on properly painted tags. However, the effectiveness of antifouling paints can be compromised if the paint is hastily applied, or critical parts of the tag are left unpainted. For example, the Argos whip antennas and where applicable, Fastloc® GPS antennas MUST also be painted.

## Safety Information

The safety information varies depending on whether you are using Micron or Propspeed and following is a general guide. You MUST read all the label and safety instructions before you start.

### Personal Protective Equipment (PPE)

- Disposable Gloves—nitrile gloves are recommended.
- Safety Goggles—tight-fitting goggles or face shields are recommended. Avoid wearing contact lenses.
- Protective Clothing—wear impervious clothing or overalls if skin contact is likely to occur.
- Apply in a well-ventilated work area.
- Respirator—suitable respiratory protection should be worn in a confined space or in case of inadequate ventilation. A respirator must be worn if an aerosol or mist will be generated.

### Handling and Storage Precautions

***The safety guidelines must be followed and the correct PPE must be worn for the application of any antifouling coating.***

Please read all the instructions and safety information for the paint you will be applying. Micron and Propspeed are both considered toxic substances. The following link will provide access to the safety datasheets for both the InterProtect primer and Micron antifouling paint: https://bit.ly/4e19VhI. Check your paint can for the MSDS version number. For example, E5 for Micron66 Black. Use the following link to access the safety datasheet for Propspeed materials: https://bit.ly/4eRKIYd

Micron paints contain copper and biocides which are harmful to the environment. In contrast, while Propspeed is relatively less toxic, it is still classified as a hazardous substance by the EPA. Safety precautions should be taken for both antifouling paints.

As Micron is considered toxic, you must wear PPE for application and post-application handling. Once painted with Micron, tags can be stored in Ziploc® bags.

## Propspeed vs. Micron—Which One Do I Choose?

Propspeed is a silicone coating and relies on water movement to remain effective and is therefore best suited for faster moving species such as tuna and gamefish. Micron contains copper and biocides that will kill epibionts and effectively protects against biofouling on slower moving species such as some sharks and rays. It is also very effective for faster-moving species.

# PAT TAG ANTIFOULING PROTOCOL – CONTINUED

## Propspeed Antifouling Procedure

Below, you will find the full procedure for protecting tags with Propspeed antifouling paint. We recommend you read the instructions thoroughly and watch the video: Apply Propspeed.

### List of Supplies for Propspeed Application

- Propspeed Clear Coat
- Appropriate respirator, fume cabinet, or well-ventilated work area
- Drying area to hang tags with 'S' hooks or pegs
- Rags/Paper towels
- Multiple pairs of disposable gloves
- One sheet of 100 - 120 grit sandpaper
- 25 mm wide masking tape and scissors
- 500 ml of isopropyl alcohol or acetone
- Small disposable cups
- 50 ml syringe or spoon
- ~10 mm wide foam applicators or paint brushes
- Large Ziploc® or sealable zipper storage bags
- Optional: 3/8" (10 mm) and 1/4" (6 mm) hollow punches, hammer, and wooden/nylon board to punch out masking tape discs

### Propspeed Tag Masking and Procedure

***Do not paint the release pin inside the nose cone or ground plate on any PAT tag with any paint! It will stop the tag from releasing.***

Lightly sand the entire float section of the tag and wipe clean with isopropyl alcohol or acetone. You do not use a primer with Propspeed.

Depending upon the tag type, you will need to ensure that the light sensors, ground plate, wet/dry sensor ring or pin, communication port, depth and temperature sensors, and LED viewing area are covered with masking tape. Wipe the tag again with isopropyl alcohol or acetone.

You will want to work with a small amount of Propspeed as it dries quickly and will gum up. Spoon or use a syringe to transfer a small amount of Propspeed into a separate cup and reseal the Propspeed container.

When applying the Propspeed clear coat, paint carefully to avoid brush strokes, or apply Propspeed using the "dab" method as follows:

1. Dip a foam brush into the Propspeed.
2. Dab the tip of the brush onto the tag by pushing the brush onto the surface, then lift it off, and push it onto the adjacent surface again.
3. Repeat this process to cover the entire tag ***including the antenna***.

# PAT TAG ANTIFOULING PROTOCOL – CONTINUED

4. Ensure there are no runs or sags in the clear coat. Touch up any sags or runs within 5 minutes before the Propspeed dries.
5. Visually observe all areas to ensure there are no gaps. Propspeed will dry to a glossy finish helping to identify any uncoated areas.
6. Hang the PAT tags by the nose with 'S' clips or pegs.

**Drying Times**

Propspeed requires a minimum of eight hours to dry before deployment. In cold conditions, 5° C -13° C, tags should dry for at least 24 hours. Store in sealed Ziploc® bags once cured.

## Micron + Propspeed Antifouling Procedure

Below, you will find the full procedure for protecting tags with Micron antifouling paint. Because Micron is opaque, it can interfere with the functionality of certain sensors. Instead, use Propspeed, a clear antifouling coating that protects without compromising sensor performance. We recommend you read the instructions thoroughly and watch the video: Apply Micron. The video shows Micron being applied to a SPOT/SPLASH tag. While this is not a PAT tag, the application technique is still the same.

***If painting tags with Micron CSC, a primer is not required if the tags have been lightly sanded and cleaned.***

**List of Supplies for Micron + Propspeed Application**

- InterProtect 2000E Primer
- Micron Antifouling Paint
- Propspeed Clear Coat
- 500 ml of isopropyl alcohol or acetone
- Battery-powered drill with paint mixing tool or strong mixing sticks (for Micron paint)
- Appropriate respirator, fume cabinet, or well-ventilated work area
- Drying area to hang tags with 'S' hooks or pegs
- Rags/Paper towels
- Multiple pairs of disposable gloves
- One sheet of 100-120 grit sandpaper
- 25 mm wide roll of masking tape and scissors
- Six small paint mixing cups or bowls
- Wooden mixing sticks (Tongue depressors).
- Two 50 ml syringes or 100 ml cups for measuring the primer, paint, and hardener
- Six ~10 mm wide small paint brushes
- Large Ziploc® or sealable zipper storage bags
- Optional: 3/8" (10 mm) and 1/4" (6 mm) hollow punches, hammer, and wooden/nylon board to punch out masking tape discs

# PAT TAG ANTIFOULING PROTOCOL – CONTINUED

## Micron + Propspeed Application Procedure

***Do not paint the release pin inside the nose cone or ground plate on any PAT tag with any paint! It will stop the tag from releasing.***

The following instructions are based on recommendations from the technical department of International Paints, the manufacturer of Micron paint. The process involves one coat of InterProtect 2000 E primer and one or two coats of Micron for MiniPAT, sPAT and Benthic sPAT, microPAT, and mrPAT tags. Proven choices are Micron66*, Micron77, 99, CSC, and Extra SPC, although other Micron paints will function well if applied correctly. When using Micron, only paint 2-3 tags at a time.

***Be careful not to paint any surface that will be in permanent contact with the skin of sharks or other species.***

**Micron66 has been discontinued but can still be found in some stores. Wildlife Computers has been testing Micron CSC and Micron Extra SPC as a replacement. MiniPAT, sPAT, Benthic sPAT, mrPAT, and microPAT pop-up tags will float with one coat of primer and two coats of Micron CSC. Micron Extra SPC is heavier, restricting its application on pop-up tags until further testing can be done. SPLASH and SPOT tags on other species such as sea turtles and sharks should be painted with one coat of primer and three coats of any Micron paint. Once antifouling paints and tethers are applied, Wildlife Computers recommends performing a float test. Micron66 is not suitable for use in fresh water. Other Micron paints are available for freshwater use.*

**Important Note:** *MiniPAT, sPAT, mrPAT, and microPAT pop-up tags will float with one coat of primer and two coats of Micron CSC. Most other Micron paints are heavier than Micron CSC and only one coat should be applied before float testing tags in seawater. Ensure that the top wet/dry sensor ring or pin are clear of the water by several mms with the tether and anchor dart attached.*

If Micron paint is unavailable in your area, try to find an alternative copper-based ablative antifouling paint. Wildlife Computers offers an optional service to sand, mask, and paint tags with Micron CSC (as well as certain sensors with Propspeed) and coat the wet/dry sensors with conductive polymer. This comprehensive antifouling service is offered at a charge of $100 per tag prior to shipping.

### Micron + Propspeed Tag Masking and Preparation

Lightly sand the entire float section of the tag and wipe clean with isopropyl alcohol or acetone. Depending upon the tag type, ensure that the light sensors (***MiniPATs have two***), ground plate, wet/dry sensor ring or pin, communication port, depth and temperature sensors, and LED viewing area are covered with masking tape. Also mask the tag return and serial number labels. Wipe the tag again with isopropyl alcohol or acetone, being careful not to dislodge the masking tape.

### Primer Application (For Paints Other Than Micron CSC)

1. Stir or shake each can of base and hardener thoroughly.
2. Measure three-parts by volume of 2000E base and one-part per volume of the 2001E hardener and mix completely.
3. Stir and allow it to rest for 10 minutes to pre-cure and to allow the bubbles to disperse.
4. Apply to the tag with a brush, painting all surfaces and antennas evenly to avoid drips and wet areas that will dry at different rates.

# PAT TAG ANTIFOULING PROTOCOL – CONTINUED

**Primer Drying Times and Tips**

Drying times vary depending on temperature and humidity; however, 10 minutes is typical in warmer climates. It is critically important that the first coat of Micron be applied while the primer is still tacky. This is determined using a "thumb-print test." After the primer has dried for 10 minutes, use a gloved hand to touch the tag's surface to see if it leaves a print on the paint. If paint sticks to the glove, it needs to dry longer.

If the primer feels tacky and leaves a mark without getting paint on the finger, then it is ready to overcoat with Micron. If the primer is left too long and has hardened, then another coat of primer will need to be applied, and the process repeated for a tacky base.

***It is critically important that the Micron be applied when the primer is still tacky.***

**Micron + Propspeed Paint Application**

1. While the primer is drying, mix the can of Micron well using a drill and paint mixer tool or strong mixing stick. Since Micron is a copper-based paint, ensure it is mixed properly. Simply shaking the can is not effective as the copper settles to the bottom of the can.
2. Immediately brush a coat of Micron onto the entire tag and antenna once the primer is tacky ("thumb-print test"). Once the first coat dries, you may paint an additional coat. Micron will add more weight compared to other coatings (~.7 grams per coat on average) because it is a metal-based paint. We recommend one coat minimum. If you are adding more than one coat of Micron, see Float Testing for testing information.
3. Once the tags are fully dry, you will need to remove the masking tape and paint certain critical areas with Propspeed. See Masking Tape Removal.

***Apply at least one coat of Micron. Micron adds weight so ensure it floats before deploying the tag.***

**Micron + Propspeed Drying Times and Tips**

The ideal drying time between coats of Micron is six hours at 23° Celsius (73° Fahrenheit). Cooler temperatures will extend the drying time. It is ideal to leave the tag overnight.

**Masking Tape Removal**

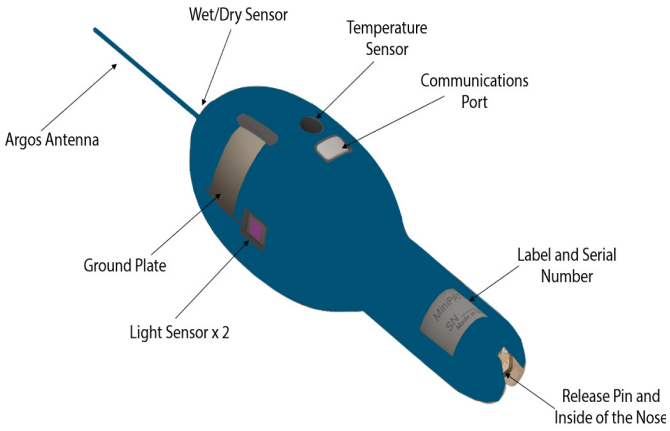
After the final coat of Micron paint has dried, remove ALL the masking tape from the light sensors, ground plate, wet/dry sensor ring or pin, communication port, depth and temperature sensors and LED viewing area.

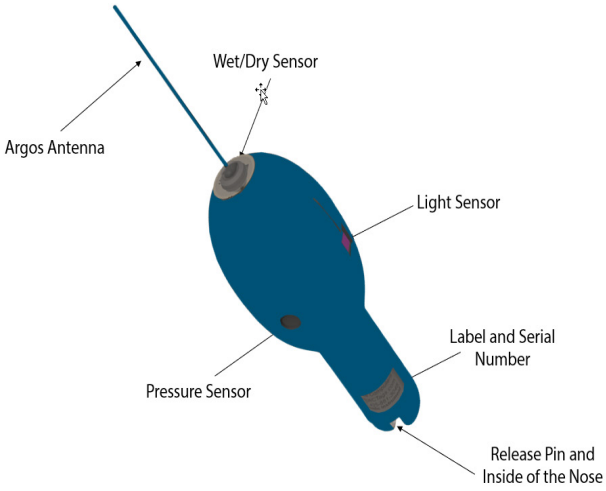
In cases when paint leaks under the masking tape, carefully clean the affected area with a rag and isopropyl alcohol or acetone.

# PAT TAG ANTIFOULING PROTOCOL – CONTINUED

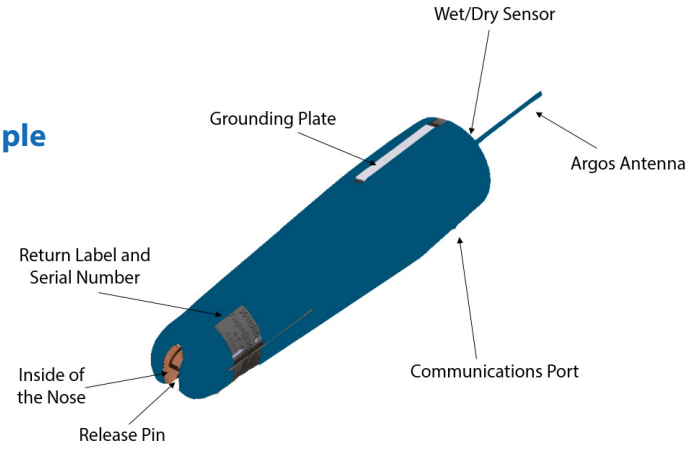
## MiniPAT Example

Note—The sPAT and Benthic sPAT are a similar shape to the MiniPAT but have different sensors. See your tag's User Guide for specific information.

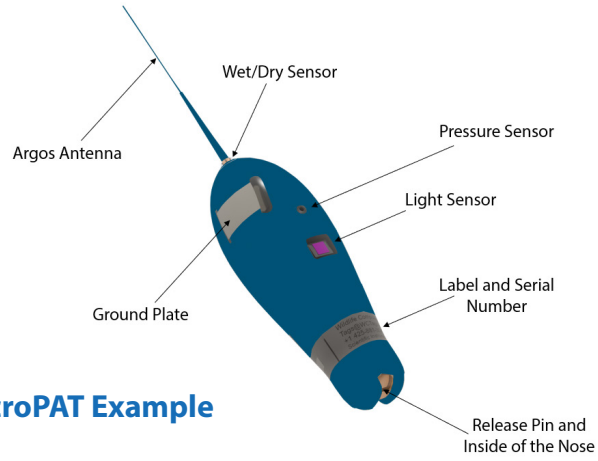


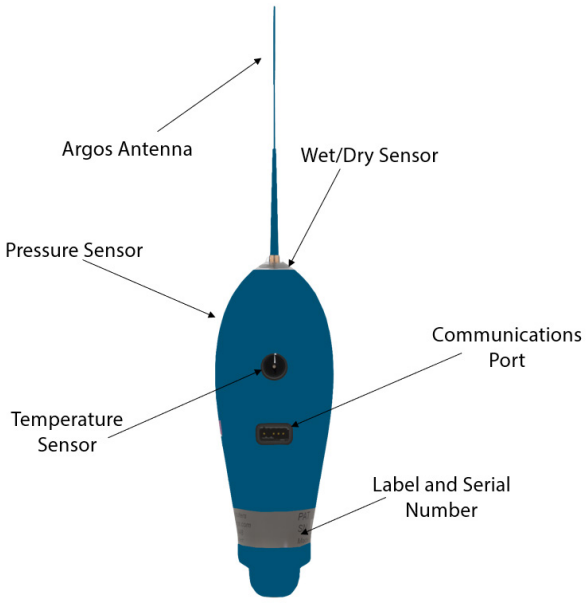




## mrPAT Example




## microPAT Example



# PAT TAG ANTIFOULING PROTOCOL – CONTINUED

For Micron-painted tags, you will need to paint the following sensors with one coat of Propspeed:

- Light sensors (MiniPATs have two)
- Wildlife Computers return label/serial number
- LED viewing port at the base of the antenna

## Post Application Procedures

### Tag Handling and Storage

After the tags are painted and dried, they must be handled using disposable gloves. They should be stored in a resealable plastic bag like a Ziploc®, especially Micron-painted tags as they may emit a strong odor. Store the tags in a cool place. A refrigerator is good, but tags should not be stored with food.

### Float Testing

Once the coating and tether are applied to the PAT tag, you must perform a simple float test. Micron adds more weight compared to other coatings (~.7 grams per coat on average) because it is a metal-based paint. The ideal float test is performed in sea water. If that is not possible, fill a bucket with fresh water, add the tags including tethers, and make sure they float with the wet/dry sensor top ring or pin clear of the water. Obviously, tags will be more buoyant in sea water depending upon the salinity. Tethers may need to be shortened if tags do not float with the wet/dry sensor ring or pin out of the water.

### Process Tips & Tricks

- Watch the videos: Apply Propspeed and Apply Micron.
- Apply any antifouling coating at least 48 hours in advance of deployment.
- Paint the antennas!
- Use a hammer and hollow punch on a nylon or wooden board to prepare masking tape discs in various sizes.
- The application of any paint requires planning so make sure you have all the necessary equipment and a thorough understanding of the process.
- After painting, avoid abrasive cleaning material.
- For MiniPAT tags, take extra care when masking the wet/dry sensor ring and the LED viewing area at the base of the antenna.
- When using Propspeed, once the application is complete, inspect the tag. The clear coat dries to a glossy finish making it easier to identify uncoated areas.
- When using Micron, mix the Micron with a battery drill and paint mixer to dislodge the copper off the bottom of the can. Otherwise mix it thoroughly with a wide paddle to ensure all the copper is mixed into the paint.
- Only prime 2-3 tags with Micron primer at a time to ensure that Micron is applied when the primer is tacky and not dry.

# PAT TAG ANTIFOULING PROTOCOL – CONTINUED

## Resources and References

### Paint Manufacturer Information


#### International Paints Primer

Wildlife Computers recommends InterProtect 2000E primer. This primer is a two-part epoxy coating formulated to create an overlapping water barrier. This primer provides excellent adhesion to fiberglass, composite, metal, and wood. InterProtect 2000E is available in one-gallon or three-gallon sizes. If InterProtect primer is not available then "Primocon" or "Gelshield" primers can be used although they do not bond as well as epoxy primer.

#### International Paints Micron Antifouling Paint

Micron is available in most countries from International® paint dealers and ship handlers. If Micron cannot be sourced, other brands of copper-based anti-fouling paint will suffice. Do not deploy tags without anti-fouling unless the tags are on species that are deep divers or in cold water. In tropical waters tags will be subject to biofouling that will severely impact their performance.



#### Propspeed Antifouling Paint

Propspeed is available in three kit sizes depending on the size of the area you are coating. Propspeed can be used in fresh or saltwater.

### Additional Reading on Antifouling Techniques

- Learn more about InterProtect 2000E: https://www.interlux.com/en/us/boat-paint/primer/interprotect-2000e
- Learn more about Micron: https://www.interlux.com/en/us/boat-paint/antifouling/micron-66
- Find Micron Paints: https://www.interlux.com/en/us/paint-shops/stores-near-me#1,0,retailer,0,0,0,grid
- Propspeed Safety Brochure: https://propspeed.b-cdn.net/Final-Documents/SDS/NZ-and-AU/Propspeed/Marketing/Propspeed-Clear-Coat-SDS-APAC.pdf
- Propspeed Technical Documentation: https://propspeed.b-cdn.net/Final-Documents/TDS/English/Propspeed-Clear-Coat-TDS.pdf
- Propspeed Application Manual: https://propspeed.b-cdn.net/Documents/Application/Propspeed_-New_-Application_Guide_2024_USA.pdf

# PAT TAG ANTIFOULING PROTOCOL – CONTINUED

## Wildlife Computers Antifouling Paint Test


We know companies change formulations so in November 2019 we initiated another round of antifouling testing. We looked at Micron66, Lightspeed, Propspeed, an unnamed competitive product, and a placebo. We painted the tags according to the manufacturer's recommendations and secured it to a floating wharf in Northland, New Zealand.

After 4.5 months, the blue tag, painted with Micron66, showed no evidence of fouling, with Propspeed coming in second. Micron66 has been used successfully for over two decades to limit biofouling on sea turtle satellite tracking tags.

# PAT TAG ANTIFOULING PROTOCOL – CONTINUED

In August 2020, we added four additional tags. The tags were attached to the floating dock in a tidal channel in Whangaroa Harbour, New Zealand. The image was taken after a light hose wash to remove mud.

# PAT TAG ANTIFOULING PROTOCOL – CONTINUED

## Contacting Wildlife Computers

### U.S. and International

Members of the Wildlife Computers technical sales and support team are located in Redmond, WA, USA, and Havelock North, New Zealand, allowing us to cover promptly a wide range of time zones.

### Mailing and Shipping Address

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### For Asian Clients

While we welcome your direct correspondence, we recommend that you contact our colleague, Yong Huang, for assistance. Mr. Huang understands the special purchase processes for your countries, and will provide you with the best service for the best price. He also is fluent in Japanese, Chinese, and English.

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