WATERFORD BIKE CARE GUIDE

REVISED JULY, 2005

TLC FOR YOUR DREAM BIKE

Every Waterford merits quality care, not only to maintain the beauty of the machine but to dramatically extend its useful life. In this guide, we'll discuss:

- Preventive Mechanical Maintenance Overview
- How paint works
- How bikes corrode
- How wax works
- When to wash and wax your Waterford
- How to wash and wax your Waterford
- Internal Corrosion Protection

Top pro race mechanics know how important regular cleaning and waxing is to the performance of the bike. Improved mechanical performance and reliability are the biggest reasons pro race bikes get washed and waxed regularly. All Waterford owners will benefit. The longer you plan to own your bike, the more important it is to maintain the finish.



Takashi Akimoto's stainless lug RS-22 on display.

Preventive Mechanical Maintenance

Mechanical maintenance, cleaning and waxing go hand-in-hand, each increasing your enjoyment and extending the life of your frame. By pre-planning your maintenance - for most people with an annual overhaul, you'll get:

- Better quality mechanical performance - avoiding the need for emergency support.
- Increased safety from properly adjusted brakes and so on.
- Fewer scratches and chips from mechanical failures like broken chains or spokes.
- Fewer mishaps from roadside repair emergencies.

The big result is that you'll have a more fun and fewer problems.

HOW PAINT WORKS

The best way to understand paint is to start with a world without paint:

If you applied lubricating oil to the surface of a bare steel frame every day and thereby prevented water from coming into contact with the metal, it would never rust. Unfortunately, this is inconvenient and messy. It wouldn't take long for the oil to rub or evaporate off, leaving the surface vulnerable to corrosion.

Some "oils", such as linseed oil or "tung" oil, dry to leave a protective surface because they contain polymers - the basis of today's paints. Our finishes consist of four components:

The polymers are known as binders or "**resins**". Acrylic, vinyl, epoxy and polyurethane are all examples of advanced resins used in today's paints. "**Solvents**" let us mix these resins into a liquid that can be applied to create a smooth finish. For the paint to dry, solvents must evaporate out of the paint.

Protection isn't the only reason we paint bicycles. We want color as well. For that, we must add "**pigment**".

Pigments also dramatically increase the ability of a resin to protect a finish, forming a composite of the resin with the pigment.

In the 1920's, chemists developed the first resins that harden through a chemical reaction as well as through evaporation. These "**hardeners**" represent the fourth major component in today's paints.

Waterford chooses paints that represent the best balance of beauty, toughness, durability and adaptability to custom painting. Right now the top of the heap are the polyurethane enamels.

"Enamel" refers to a type of paint which hardens both from evaporation and chemical reaction. Polyurethane enamels provide a tough, flexible finish resistant to cracking and chipping compared to other finishes. Just as important, these paints color easily, resist fading and dry to a very smooth finish.

As good as these finishes are, they cannot maintain their properties without continuing care.

Know Thy Enemy: Corrosion

We're often asked to comment on the corrosion of steel. The appearance of rust is the obvious sign of steel corrosion. Excessive corrosion can compromise the structure of some bikes.

All metals corrode – even titanium. Aluminum actually corrodes faster than steel – especially in salt-air environments. Corrosion is a chemical reaction where the metal is transformed by contact with water and salt. What makes a material corrosion-resistant is that the material forms a corrosion resistant skin that prevents further corrosion. That's exactly how titanium and stainless steel work – the skin is what protects the metal. With non-stainless steel, the corrosion typically offers little protection, making the surface vulnerable to addition corrosion.

Steel corrodes surely but slowly. It starts with surface rust. This is harmless and is easily removed. With continued exposure, pits form as corrosion follows the crystalline structure of the metal, eventually eating through the part.

Salts and certain other chemicals accelerate the process, so protection against these catalysts is even more critical. Exposure to the combination of salt and water comes from a variety of sources - salt air (near the ocean), road salt brine (where roads are salted druing winter), sports drinks and, of course, sweat.

Sweat is a major cause of corrosion, because it contains all sorts of goodies that aid corrosion, including sodium, chloride, potassium, calcium, ammonia, uric acid and phosphorus. Sweat varies from person to person, with some riders have highly corrosive sweat with pH levels as low as 4 - about the acidity of lemonade. Riders with corrosive sweat should take extra care with their finishes.

All this talk about corrosion would make a pretty grim picture were it not for the combination of paint and wax.

Waxing on Wax

Wax is a complex organic compound designed to dry to a hard finish. Though not as hard as enamels, it works with enamel to prevent moisture from reaching the metal. As long as moisture is cut off from the metal, corrosion cannot take place. Because it's so much easier to apply than paint, wax is ideal for extending the life of paint.

The best bike (and car) waxes are made with wax made from the carnauba plant. It's one of the hardest waxes around, offering excellent protection.

Wax works because it makes paint work better. In addition to Carnauba wax, today's best waxes include a number of additives to enhance performance and make it easier to apply. The goals are to:

- Seal the molecular pores in the paint surface.
- Make the paint more resilient by reducing embrittlement.
- Reduce damage to the paint from abrasion.
- Prevent ultraviolet and oxidation damage to the paint.
- Slow the inevitable fading of the paint pigments.
- Expand the reflective properties of properties of the the paint - that is - to make it shine!

Waxes only lack the toughness of paint itself to serve as the perfect finish.

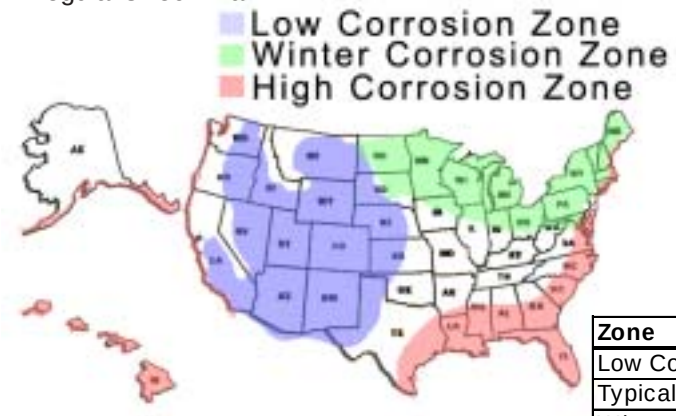


The Carauba Palm - source of the world's best wax - shown in its native Brazillian environment. The wax is extracted from the leaves making it a renewable resource. Carnauba wax is also used in cosmetics and the food industry. No wonder it is preferred by lug lickers the world over.

Scheduling your Maintenance

Like other long life products, your Waterford finish has a break-in period of 30 days after which you should follow the normal maintenance schedule.

Break-in: During this period, the paint is still curing. Wash your bike to eliminate dirt but use only a breathable wax like Meguiar's Show Car Mirror Glaze #7. At the end of the break-in period, apply the first coat of a high-quality non-breathable wax like Meguiar's Tech Wax.



Continuing maintenance: This map provides a guideline for the general level of recommended maintenance. For most riders, a wax job with your annual overhaul will do the trick. In more corrosive environments or with heavy use, you should wash and wax more frequently as below.

The green zone above shows areas where snowy roads are salted during the winter. If you ride during these periods, you should increase your maintenance to the levels recommended for the High Corrosion Zone.

Rule of thumb: Water beads up on a waxed frame. When the water stops beading up, it's time for more wax and buffing.

Zone	Wash	Wash/Wax
Low Corrosion Zone	2,000 Miles	6,000 Miles
Typical Corrosion Zone	1,000 Miles	3,000 Miles
Winter or High Corrosion Zone	750 Miles	2,000 Miles

A Clean Bike is a Happy Bike

Washing your bike makes all aspects of ownership work better. Beyond the pride you will feel, a clean bike is less likely to scratch and corrode. If accumulated dirt on the surface is rubbed, the dirt may abrade the surface even if what rubs it normally would not. What's more, the dirt can hold small amounts of moisture – especially sweat – that dramatically increases the ability of corrosion – especially on an unwaxed frame.







To wash your bike, start with the right tools:

- Bucket
- Soft brush (one that won't mar the finish).
- Soft sponge and/or mitt.
- Component cleaning brushes.
- Light soap that won't wash off the wax like Meguiars Gold Class Car Wash.
- Detergent like Simple Green for cleaning components.
- Hose for rinsing.
- Soft 100% cotton towel for wipe down.
- Workstand to hold your Waterford..

Washing your bike isn't as sloppy as washing your kids or dog, but you'll still want to work where you feel comfortable with lots of splatter. We also recommend soaps that won't be harmfull to your grass or the environment.

Don't be shy about using lots of sudsy water. The detergents loosen the dirt, but the generous flow of water is what lifts it off the frame without abrading the finish.

The sponge works best for broad surfaces while the soft brush can clean in the tighter spots.

You need tougher measures to clean off components, so use Simple Green and a harder brush to clean off grime.





The soft brush is great for washing wheels. Use your stiff brush on the cogs.



It takes a real flow of water to make sure dirt, sweat and road grime are removed from your bike. Do not use high pressure sprays as they may drive water and dirt into bearings and, for non-clear coated bikes, damage the decals.



Finally, wipe down the bike with the soft towel to prevent water spots.

You are now ready to wax the bike. If this is a wash only-job, you'll now need to re-lube the chain, brake calipers, derailleurs and any other moving parts.

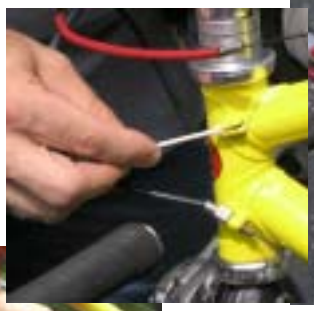


Waxing Your Waterford

Waxing is the easy part, once you're properly prepared.

- After thoroughly washing the frame, let the frame fully dry before applying wax.
- If you find dirt embedded in the existing wax, you may want to consider removing the wax as well as cleaning the frame, using a strong cleaner like Mequires Deep Crystal System Paint Cleaner to cut through the wax and remove the embedded dirt.
- Start by removing the cables from the cable stops (You'll be re-lubing the cables, anyway).
- Using a soft, preferably 100% cotton cloth, apply the wax (like Mequires Tech Wax, their Deep Crystal System Carnauba Wax or Johnson's Turtle Wax) following the manufacturer's instructions.
- Cotton swabs can be helpful for reaching tight areas like cable stops.
- Creative use of your application rag lets you reach the areas under the seat cluster or under the water bottle holders.
- Give the wax a chance to dry before buffing. This gives the protective coating more depth.









The Inside Story on Corrosion Protection

With all the attention paid to protecting the outside finish, what do we do about the internal surface of the tubes? The same principles apply to protecting the insides of the tubes as apply to the outside except the conditions are different:

- It's hard to spray the interior.
- It's not subject to abrasion like the exterior.
- Ultraviolet light doesn't get inside and solvent evaporation is slow.

Recently, paraffin based coatings, like J.P. Weigle's Framesaver have appeared on the market. These relativelyh odorless products are applied through special spray nozzles. They also include additives to dissolve existing rust and arrest its spread.

For fair weather riders in most areas, internal rust protection is nice but not essential. In high corrosion areas and especially if riding during the winter and early spring in areas that salt the roads, internal protection is very important.

The better products recommend an application once every three years for most users and every two years for hard use.



Draining your Bike

Even fair weather riders find themselves caught out in the rain. A surprising amount of water accumulates in the interior cavities of your frame. Waterford drills several drain holes which are natural inlets for water. After a wet ride or washing, just hold the front wheel directly over the rear (as shown at right) and the water will drain out the stays.

Residual moisture then evaporates through the very same drain holes.

The Touchy Topic of Touch-Up

Every well-used bike accumulates scratches and chips. Though you can buy high-quality touch-up enamels from hobby shops, it's hard to find a good color match. Waterford offers the service of custom matching any of its classic colors as well as colors out of the PPG color guide. Each color is mixed on demand based on your special order. You can order touch-up with your frame order. This may be helpful for special color matches.

Storage Tip: Store your paint with the cap side down. This dramatically reduces the inevitable hardening of the paint.

If your paint thickens: If your paint starts thickening, add a few drops of clear nail polish and stir up until you achieve the original viscocity.

To apply: Clean the area of all dirt. If the chip goes down to the metal, use a clean ink eraser to clean off any light surface rust. Do not sand the edge since you want the edges to "cradle" the brushed-on paint. Let dry. Use a blow drier to speed the cure. Give it about a month before applying wax over the area.

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