

# Zero Friction Cycling



## Wet Weather / Winter and waxing guide.

From riding and training in wet rides to legendary all weather commuters, please find this guide to help answer the most common questions with regards to riding in wet and waxing.

### **Q: Do I need to do anything with my wax chain after a wet ride?**

Most times yes, some intervention soon after wet ride is recommended. It is not always the case, ie a light spray on a freshly waxed chain - likely no problems. But any decent wet ride it is key to remember a few salient points;

- Your chain is being hosed by front wheel with gritty road water.
- Water provides the medium to transport contamination deep inside chain.
- The first part of chain to have wax abraded off is outside of rollers
- Rollers are made of high carbon steel for hardness – high carbon steels are prone to oxidising (rusting)

So if you do a decent wet ride and then just park bike and come back in a few days – outside of rollers may have started to spot oxidise or rust. Whilst inside where it counts is likely still fine as not exposed as directly to air, any rusting on chain is not optimal vs no rusting.

**Post wet ride as a minimum it is recommended to wipe chain dry and re wax.**

**Q: As I need to pay chain some attention post wet ride does this make waxing more labour intensive vs drip lubes?**

No. The time it takes to take care of chain post wet ride is very small – it is simply important to do so soon after wet ride. Whilst many drip lubes may have you able to simply park bike, leave for days, jump on and head out on next ride – it is important to note the cost of this supposed “convenience”

The amount of contamination that will have been soaked up by drip lube will be significant. Drip lubes DO NOT clean as they lubricate as they claim (refer to ZFC lubricant testing), so even if you add more lube and wipe chain etc – you will still have a grinding paste masquerading as your lubricant and the subsequent wear rates to chain and drive train components that accompany it.

So whilst chain may remain free of oxidisation, it is costing you big time in wear instead unless you take intervention to properly clean chain to reset contamination. This is much more time consuming and costly in cleaning products and solvents than simply wiping a chain dry and popping on pot of wax and turning a switch from off to low.

**Q: I am a high mileage trainer / daily commuter come rain hail or shine and am worried about staying on top of frequent re waxing**

Simply consider multiple chains in rotation. You are always going to need another chain sooner or later (usually quite soon if drip lube and wet weather) so pre buying next chain or two and having two or three chains in rotation, and simply re wax all at same time on rest day. Pre buying chains obviously costs no more vs hammering same chain – in fact by having chains in rotation this generally stops one from pushing waxing treatment limits. Re waxing more frequently vs pushing treatment limits delivers a nice lifespan bonus, on top of the lifespan bonus you were already enjoying by switching to waxing.

If a chain has seen a wet ride, thoroughly wipe dry with a microfiber cloth, then wrap in a second dry microfiber cloth. This will keep chain from exposure to air and oxidation for sufficient time until next weekly re wax.

**DO NOT** put in plastic bag – plastic traps moisture and acts as a humidifier / rust catalyst.

Again if chain has seen just a light spray and was re waxed not long ago, just wipe chain dry and all should be fine. If decent wet ride, thoroughly wipe dry, wrap in second dry cloth, and put next chain in rotation on.

### **Can I use a drip lube to supplement waxing?**

Sort of.

I have tested Smoove with msw, and if a single application (as per my advanced application guide in instructions tab), and you run that application until it is starting to feel a bit dry, then re waxing straight over seems to go ok – just not you will be contaminating wax in pot somewhat. Same with UFO Drip. I have heard from a customer similar with Squirt (which is same type of lubricant as Smoove).

If you add any other drip lube on top, then you will need to fully strip clean and prep chain again prior to waxing following Waxing Zen Master guide – with the addition of boiling water rinses first to melt off majority of wax before moving to solvents. Remember for chains the wax needs to bond to clean film free chain metal, if you put drip lube on top and then just re wax - expect wax will not bond to chain metal, and it may contaminate wax in the pot such that all future waxing's wont go too well either. Smoove / squirt is often used for long extreme events like 24hr mtb racing or mtb stage races over top of msw as that works brilliantly, but cleaning prior to re waxing after is required to keep wax in pot clean and ensure good wax bonding to chain metal.

**\*\*AS SUCH DO NOT SPRAY WAXED CHAIN WITH WD40\*\*** This will impact wax adherence next re wax and contaminate wax in pot.

**\*\*Do NOT use wend wax as a “protective” coating over top of MSW.** Wend will coat outside plates of chain with their very gunky **very hard to clean wax**, as well as much of your drive train. Independent testing of wend by ZFC was extremely concerning, as has other testing by other lab around the world, as was ZFC communication with Wend to discuss testing results. Obtaining ACTUAL test information not just marketing claims from wend themselves has been unsuccessful. Until information shows otherwise, it is ZFC recommendation to keep well away from drive trains, it is not fun stuff to deal with, regardless of what colour it is.

### **Bonus Hints & Tips 1;**

Whilst wax being solid is the most contamination resistant lubricant – the chain is operating completely external and in very harsh conditions during wet rides. Imagine if you completed such rides with the seals off your bearings – they would be buggered after one ride.

The aim of the game is to keep your wax in wax pot as clean of contamination as possible for as long as possible. You can just re wax chain after wet ride and you will still be miles ahead of what you get with drip lubes, however – note that you will import a lot more

contamination from chain into wax in wax pot post wet ride vs post dry rides which brings a very minimal amount of contamination in.

Wax doesn't really respond to solvent but it melts above 60deg Celsius, so just boil up the kettle and using same swisher tool you use for waxing, swish around in a couple of quick rinses in an OPEN container with boiling water. This will melt off and flush clean most of the contaminated wax. Then wipe dry, and either leave to dry for a couple of hours or blast for a couple mins with hair dryer or heat gun and then pop into wax pot.

When wiping dry you will feel the chain is silky smooth. Vs if using drip lube and do first flush for a solve clean, you can feel all the grit in chain especially when bend side to side, you hear and feel all that grit crunching away inside chain.

With MSW one can do the muddiest harshest conditions cx or mtb race, give a couple of boiling water rinses and have chain feeling silky smooth. No solvents, takes about 1 minute of work after kettle boiled, it really is something.

Doing this will keep wax in wax pot very clean for a long time same as dry riding / re waxing.

**\*\*DO NOT AGITATE CHAIN IN BOILING WATER IN A CLOSED CONTAINER\*\***

If you put chain in a container of boiling water with a lid and shake, the agitation will release steam, the steam will blow lid off, and you risk boiling water and steam spraying over your hands and face.

**Swish in OPEN container only.**





**\*Note gritty contamination flushed clean with boiling water that is not being imported into wax pot.**





**\*How clean MSW chains are after harsh conditions rides with nothing more than a quick swish in boiling water ([cx race chain and oem shimano mtb training chain that came with groupset](#)).**

## **Bonus Hints & Tips 2;**

Especially for commuters, consider the anti corrosion chain (found in other products and accessories). The top of the line SLA chains aside from being super fast also have the highest level of hardening and wear resistant treatments. The Anti corrosion chain does not so it will wear like a budget chain (albeit on wax obviously this helps a lot), however its anti corrosion treatments mean you could commute to work via the ocean and park the chain for a month and it will not rust.

Smart commuters / high mileage trainers who have 2 or 3 chains on rotation as they ride rain hail or shine – it can make it easier to have one or two of those chains in the mix the anti corrosion chains. Depending on length of commute or training ride you may be able to get multiple rides in and simply park bike / pop off chain without worrying about drying / wrapping – it will not rust.

So for days that are likely to be dry – use top SLA chains as even if watts savings are not important, their longevity is well ahead of almost all other chains on market. For days where it is going to be obviously wet or very high chance of wet, pop on the anti corrosion chain. They may wear faster, but they are also much cheaper, and for some takes hassle out of winter commutes / training.

## **Final bonus Hint**

A good chain wear checker and frequent checking is your best friend for saving a fortune in drivetrain running costs over time. Up to 0.5% wear, a chains roller slots neatly between cassette and chain ring teeth, and then press directly forwards into teeth when rider pedalling load is introduced. Once a chains elongevity wear becomes greater than 0.5%, the rollers begin to hit tips of cassette / chain ring teeth and start sliding down face of tooth. As the chain heads towards 0.75% and beyond, the chain simply eats into cassette and chain ring teeth to match chains increased wear.

In short – replacing chains early by 0.5% means you will get multiple chains to a cassette, and many many many chains to a set of chain rings – chain rings should last 50,000km+ easily if staying on top of chain wear, and steel cassettes (ultegra & 105, sram cassettes of any level, chorus, Potenza) should see around 30,000km.

*(Alas dura ace cassettes for 6 biggest cogs are made of very fast wearing alloy so even replacing chains by recommended – 0.5 – those cogs still wear and often need replacing with*

*chain – even on msw. DA / XTR cassettes are the only cassettes we see where a chain may be at only 0.2 or 0.3% wear and yet perfectly fine chain has started jumping under power on bigger cogs as those cogs simply wear like butter just from the number of contacts with chains roller – even on MSW which delivers the greatest parts longevity known).*

The above quirky situation aside – running msw and replacing chains by 0.5% wear will simply save you hundreds or thousands of dollars over the coming years in drive train running costs depending on level of groupset you use, how much you ride etc. Not to mention savings in solvents / cleaning products for those who previously were fastidious in keeping drive train clean.

What chain wear checker does zfc recommend?

At the moment recommend the unior chain wear checker. Chain wear checkers with pins and dial are highly susceptible to the amount of force used, and pins can be easily bent if too much force used. Many other drop in checkers are cast and so vary in accuracy – when even 0.1mm makes for a notable difference in the measure result, one tool being different to another can either have one replacing chains unnecessarily early, or a bit too late.

Using digital calipers or ruler – eyeballing centre of pin to centre of pin to 0.1mm accuracy is tough. I could get 10 people to check measure a chain, and get 10 different wear results ranging from replace now, to its brand new, and everything in between.

The unior is short and strong so not easily bent or damaged if dropped, and are laser cut so each tool is exactly the same to each other.

One mildly annoying thing with the unior (which I advise on purchase) is whilst they are always exact to each other, the graduations are out...

0.2 = 0.0

0.5 = 0.2 – time to consider moving race chain to training chain

0.75 = 0.5 – time to replace training chain

1.0 = 0.75 – Don't let chains get this worn.

\*Unior can be purchased in other products and accessories section of online store. I am always keeping the hunt going for even better option.



**\*\*NOTE** AXS Road – still awaiting specific chain wear checker as they have larger rollers existing chain wear checkers will not work. It may be that 0.2 on unior = 0.5 for AXS road but this needs to be confirmed.

### **LASTLY – Although this is a winter waxing guide, what if im using drip lubes?**

This is going to assume you haven't read any of ZFC information from lubricant testing, here is super brief summary.

- My lube cleans as it lubes – **no it does not.**
- My lube forms a protective film / high strength membrane protecting chain metal from wear from abrasive contamination – **no it does not.**
- My lube conditions chain metal over time smoothing out troughs and peaks so I should just keep adding and wiping excess – **No it does not.**

Your chain is your hardest working mechanical part by a gazillion miles vs bearings, and aside from soaking up lots of watts if not looked after, it will cost you big time re drive train wear.

You only have to think for a moment the challenge that lubricants face to effectively lubricant all the moving parts of your chain by imagining what would happen to your bearings if you rode around without the weather seals on. They would go to crap in no time. The same is happening with your chain. If you don't put the time into looking after it, it will wear quickly, and if you don't keep an eye on that, it will take other drive train components with it such as your cassette and chain rings.

It literally is possible for a chain to increase its friction losses by 3 to 6w or even more depending on lubricant in a single decent wet ride, and whilst you may improve that by a very small amount by re-lubing chain and wiping outside with a cloth – the majority of the contamination will remain deep in the chain where it will be abrading down your chains pins, inner plate link bore and shoulders, roller bore etc.

So by doing some maintenance – the watts you save were literally going into eating through your chain and drive train components. Win win indeed for those that do, lose lose for those that just add lube and wipe outside of chain.

There are various levels one can do depending on time and mechanical confidence / willingness, but again I can only stress that as your hardest working, highest watts sapping, highest cost if don't look after component, it is at least best to make an informed decision.

**Level 1** – Add lube, work in , wipe outside of chain. Better than a poke in the eye with a stick, but don't expect great longevity or low friction running. Keep a very close eye constantly on chain wear.

**\*\*Pro tip** – do not spray chain with wd40 but spray cloth you are going to wipe with wd40. WD40 attracts contamination particles very well, so wiping chain with wd40 sprayed cloth before re lubing really helps, then lube, then wipe excess with second dry cloth.

**\*\*Silca gear wipes are next level for this approach. They will help take this minimalistic chain maintenance approach to the best level possible.**

**Level 2** – Spray degreaser to flush chain clean of good % of contaminated lubricant, dry, re lube, work in, wipe excess. **\*\* Take care that spray does not get on discs if disc brake bike. Removing wheel and using chain keeper is a great approach.**

**Level 3** – Remove chain using quick links, remove chain, put in small container, pour in mineral turps, agitate – it will go black in 5 seconds, pour out, wipe chain, wipe container, repeat, repeat, repeat – until you are happy with how clean the turps is coming out. Then finish with methylated spirits to ensure no film left which enables chosen lube not to need to fight through a film. This may sound like it is intensive, but in reality with quick links popping chain off and smashing through some full solvent flush cleans one can get done in 5 minutes and have an extremely clean chain. A clean chain is a fast chain. A clean chain is a very low wearing chain (assuming good lubricant).

**Level 4** – Ultrasonic Cleaner. Refer to ultrasonic / race chain guide for full information, but as quick info – do level 3 first, then finish with ultrasonic.

**\*\*At the time of writing this guide** – if not waxing, from exhausting testing recommend Smoove if riding off road, and Nix Frix Shun (NFS) for road.