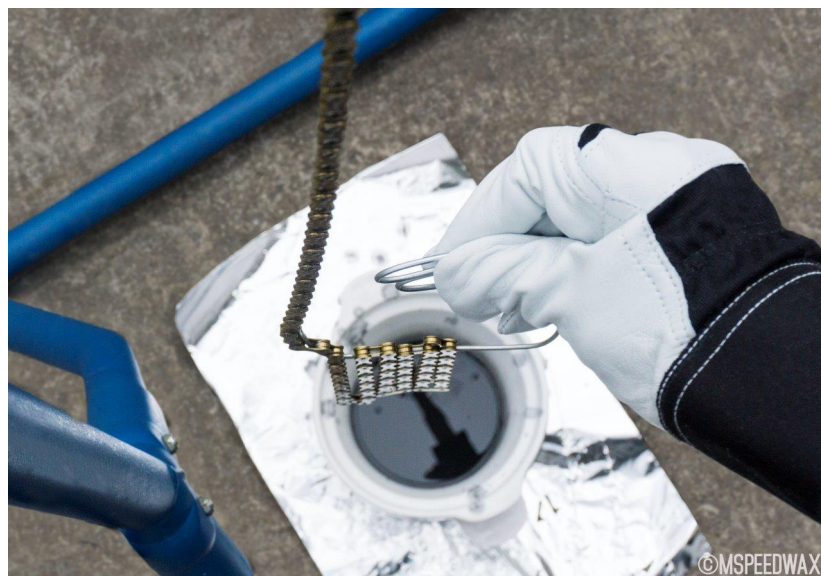


# *Zero Friction Cycling*

## Waxing Zen Master Guide



## HOW TO CLEAN MY CHAIN FOR WAXING

**\*\*Note - the following instructions apply the same when preparing a chain for waxing or any top drip lube as all of these will need to bond to clean clear chain metal\*\***

Having been in the field for awhile now, i am constantly surprised by just how complex a process some cyclists have arrived at over the years to clean their chain, which can be a 10 to 15 step process with 5 to 8 different products involved - if ever you read a forum on best way to clean chain - wow do you read some interesting processes.

Probably the biggest - what i would call "mistake" is using petrol or diesel to clean chains. Yes its cheap, but it leaves a heavy film behind, and this can block a lubes ability to bond to chain metal.

The second is soaking too long in solvents / de-greaser which can lead to corrosive stress making metal more brittle (hydrogen embrittlement). I have had customers soaking chains in degreasers or petrol for days, which is not good.

I also recommend using mineral turps vs de-greaser as it is generally a more effective solvent for factory grease on chains, it is cleaner leaving less of film for final step to deal with, and it is easily recycled via your local councils hazardous liquid waste facilities.

Chain cleaning is always a 2 step process - step one is cleaning chain, step 2 is ensuring no film is left on chain from cleaning to ensure wax / lube can bond to clean & clear chain metal.

### **CLEANING NEW CHAINS WITH FACTORY GREASE**



*\*recently there was a marginal gains podcast covering the issue of hydrogen embrittlement and people soaking chains too long / running in ultrasonics too long - and in the end recommended 2 mins shaking in a gatorade bottle. Unfortunately factory grease can be stubborn stuff, and alas 2 mins in a gatorade bottle just wont do it. I have prepped over 3000 chains for commercial sale and in all that time i have had to replace two (2) snapped chains at time of writing this process - so I am rather confident my recommended process does not risk any corrosive stress, and ensures a perfect prep for lube ever time\**

1. Soak factory grease chain in bath of mineral turps for 10 to 15 mins in a closed container (200ml per chain) then shake vigourously for about 30 secs.
2. Move into 2 x agitated baths of 2mins per bath of mineral turps(YBN, Shimano). Campy chains normally need an extra round, sram chains normally need 2 to 3 extra rounds thanks to their factory glue they apply. *ZFC does not at this time recommend KMC chains for waxing / wax based lubes as have found their coatings tend to repel wax lubes, leading to very short treatment lifespans which has chains feeling and sounding very dry very quickly - this has also led to very short chain lifespans despite running the best know lubricant choices.*
3. Move into 2 x agitated baths of methylated spirits (this is basically pure alcohol and ensures no film left behind from cleaning).
4. Dry, wax or apply top drip lube.

## **Existing / Used chains**



\*NOTE - i do not recommend cleaning existing chains that are past 1000, maybe 1500km old (road use) as the amount of solvent required is pretty big, and your chains low friction coating will already be

compromised. Cleaning a chain for waxing that is say 2,500km old is often really not worth it - either stay the course on drip lube for that chain but replace early to minimise drive train parts wear, or start with a new chain.

1. You do not need to soak, simply rip through agitated mineral turps baths until chain turps is coming out basically as clear as it went in. Expect circa 10 to 15 baths at 200 to 300ml per bath.
2. Once clean from turps, move into 2 x 2min agitated metho baths, dry, wax / add top lube.

### **Should i buy an ultraonic?**

I get this A LOT. If moving to waxing, absolutely not - you will never get the payback, once switched your cleaning days are over until cleaning next new chain, which will be a long time away. If you are staying on drip lubes, then an ultrasonic for the best periodic cleaning maintenance can be good, but again, you can get 95% of the way there with agitated container baths, and many people do a worse job with ultrasonic vs manual baths as they think the ultrasonic will just do this magic job and all is done by simply running it through a US bath. Often the solvent in US will be black after 10 seconds, so not much good cleaning is happening after that. How good a clean can one get if what is doing the cleaning is highly contaminated? Due to belief of the magic of US people skip the metho rounds leading to poor lube bond to chain. They don't degas before cleaning and so on. In short, they often cause more problems vs just doing a good agitated container flush clean process as per above.

For those wishing to prep fully optimised race chains at home / re-optimize race chains - pls refer to my Race chain /Ultrasonic Guide. Apologies its bit clunky atm, i will tidy up when i can. **DO NOT BUY AN ULTRASONIC BEFORE READING THIS GUIDE** is my strong recommendation - Ultrasonic prepping wax chains really needs temp control Ultrasonics, quality ones cost decent \$\$, cheap ones dont work for long. I prep around 1500 pre waxed / race chains per year so obviously i get my moneys worth from top quality ultrasonics - will you at home prepping a race chain a handful of times per year? for the avid tinkerer - for sure its worth it, for 99.9% of cyclists, no it is not - they are sexy and made to look like a magic easy way to get the perfect clean - not so much - you need to know what you are doing if using to prep for the top waxes and lubricants.

## Buying Pre-Prepped chains.

\*\*NOTE - LITERALLY OVER 95% of ZFC chain sales the customer chooses pre-prepped chains as the chain is prepped perfectly every time, customer doesn't have to faff with solvents and solvent disposal, and ZFC re-cycles all solvents used. Customer can skip straight to the fun part of just re-waxing / re-lubing with top lube. ZFC is the only place in the world where one can choose chains to be prepped with either Mspeedwax, Silca Hot Melt, or absoluteBlack Graphene. All top drip lubes can be added straight over top of these treatments, so you do not have to worry if not continuing with waxing, at least you have a prepped chain where factory grease has been dealt with, and you can now merrily re-lube with chosen top lube.

So.... How to wax, Here we go... 😊





- 1) Remove chain from bike by popping open master link and keep link somewhere safe (insert master link removal pliers as shown and squeeze pliers – master link will pop open, chain can then be easily removed).  
*\*Make sure you have in small chain ring and 11t cog otherwise spring tension from rear derailleur can make for an energetic chain opening!*



- 2) Thread chain onto swisher tool (made easily from coat hanger) – basically a piece of wire bent into a u shape



- 3) If planning to hang chain off a nail / screw after waxing, thread a paperclip through hole of last link
- 4) Turn slow cooker pot **onto low setting**, remove lid and place chain on top of wax in pot. *(It is best to let chain melt into wax. As the wax melts the chain will heat up with it, and the wax on the chain melt into the pot as well. That way, when you come back, you can just start swishing it around. If you melt wax first and then place chain in later – leave in there for 5 mins so the chain can heat up fully as well)*
- 5) Come back in about an hour or whenever you like after an hour – ish
- 6) By then wax should be all melted, and with it the chain has heated up very nicely too and the wax on the chain has melted into pot.



- 7) Swish the chain around relatively vigorously in pot for about 20 – 30 seconds then lift out and hang for about 15 seconds above the pot to let wax drip off chain into pot  
*\*\*Note – it is possible – especially if wax is quite hot and therefore chain quite hot – that the swishing will cause a roller on end of chain to come out of link. Check that the rollers are in place when remove chain, and if not find roller in wax pot and pop back in (wear rubber gloves or use magnet). It is rare this happens – but I have heard of it happening and had it once myself – threading a paper clip through the chain ends will prevent from ever happening.*
- 8) *If using two pot system, repeat the swishing in pot 2. Two pot system has the advantage that any contaminants are flushed into pot 1, leaving pot 2 wax very clean. After approx. 30 waxes, pot 2 wax becomes pot 1, discard pot 1 wax (into a take away coffee cup works great), and fresh bag of wax into pot 1. Two pot system expect around 9000km per bag vs 6000km for single pot where recommend change wax after approx. 20 waxes x 300km ish vs 30 waxes for two pot system).*
- 9) Hang chain somewhere to dry. Some wax will drip off chain onto the ground, so if hanging over any marble and gold flecked tiles or expensive paving, place a matt over tiles (the wax can be cleaned off surface but



depending on surface it can be a bit tenacious. It bonds well to most surfaces, part of why it is most excellent on chains).



- 10) When wax is dry / set – about 15 mins most days – it will be very stiff and solid.

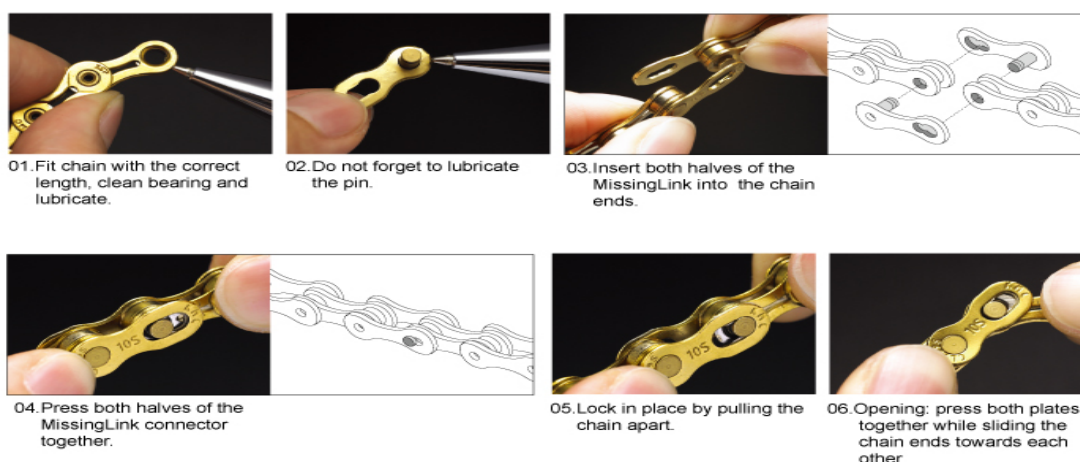
You can re-install now, but usually I just hang my chains to dry and then allow 2 mins before next ride to re-install. You get very quick at it in no time.

- 11) To re-install, you need to break the wax bond on each link. There are various methods of doing this, you can break each one by hand, I do mine of the handle of my big tool chest, you can do it standing over bike with chest on seat, wrap chain just around cassette and pull chain up towards you, bond on each link will be broken as it is pulled through cassette, or u can use a piece of dowel or plastic tubing – you will find an easy method that works for you. On warm days breaking wax bond is easy, if it set on cold day, it will be a bit harder.



- 12) Re-install chain on bike and reconnect master link. Simply push pins into wider part of link plate locking channel such that they will be able to be pulled back into the narrow part of the link plate locking channel. Pay close attention that the channels at end of pins are in correct place ON BOTH SIDES OF LINK such that when link is pulled in opposing direction they will slide back to lock into narrower part of link plate locking channel. It is possible to have just one side lock into a channel whilst other side misses locking into channel. This will lead to failure of the master link under pedalling load. It is simply reverse of step 1.

*As my photography is terrible, I have pulled an image of the good ol interweb. This demonstrates what is happening nice and clearly. What it doesn't show is that some force is required to pull pins into locking channels. Master link connect pliers make this easy, they simply do the reverse of release pliers. Release pliers squeeze link together so that pin pops out of wider part of channel, connect pliers force pins away from each other such that pins are pulled into locking channels.*



*You do not have to purchase connect or release tools, you can squeeze links together with pliers, you can lock link into place by first setting pins in place ready to be pulled into channels, spin back wheel anti clockwise to move chain to top of drive train, the give pedal a sharp tap forwards to put tension on chain which will pull pins into locking channels. This method does increase risk of only one side of link engaging, so be sure to always check both sides of link before riding.*

*Note that YBN master links are re-usable (recommend 5 re uses per link then replace) and not directional.*

- 13) After you have re- installed chain, pedal the chain in small chain ring and in smallest cog for about 30 seconds, this will break the wax in a bit more and fling excess dried wax away that will simply brush off bike or anything else. The chain will initially feel very stiff as the solid wax starts to be broken in, and it can be harder for rear derailleur to change gears until after a few minutes of riding.
- 14) First ride on freshly waxed chain it is best to ride in small chain ring and small cogs for a few minutes (I aim for 5minutes). Small chain ring + small cogs articulate the links through full range of motion and will I ensure wax is nicely broken in and ready to rock your world with silky smooth & clean lubrication for hundreds of km's.
- 15) Being very thorough – If the chain is freshly waxed and the next ride is a race, MSW recommend **at least** 20mins of riding to ensure wax is properly broken in and surface polished. 30-45mins is the real butter zone where a wax treatment is hitting its absolute lowest friction. But bear in mind, if you don't manage to get that run in time before a race, even after a couple

of minutes of riding it is still going to be way lower friction than any oiled chain, and it will just keep getting better as the race goes on.

- 16) Speaking of racing part 1 – If you use Molten Speed Wax Race Powder which reduces friction a further approx. 6% - the chain needs to be run in for at least 20mins to create enough space between the wax for the powder to penetrate. Even better if you have the time is the run the chain for another 10-20mins after first powder application and then re-apply powder. To apply just brush on with small brush, use a little rectangular container or tray underneath chain to catch excess powder, and wear gloves as it is quite staining. Apply to top and bottom of chain.
- 17) Speaking of Racing part 2 – Consider a dedicated race chain. For those who race it is simply a very smart way to go. You are always going to need another chain sooner or later (sooner with drip lubes, later with waxing). So simply pre buying another chain to be a dedicated race chain doesn't really cost any more at all. Then when training chain hits 0.5% wear – race chain moves over to become training chain, buy new chain to become dedicated race chain. Racing on the same chain you hammer away at in training is not as clever as having a chain kept as mint as possible for races. As a chain begins to wear, its efficiency losses increase, and also the first coating to be abraded away is a chains low friction coating. Dedicated race and training chain = very smart and one of the most cost effective ways to minimise friction losses from your hardest working mechanical component.

**DUE TO EXPANSION OF WAXING FAQ'S, PLEASE REFER TO SEPARATE FAQ DOCUMENT IN INSTRUCTIONS TAB PRIOR TO EMAILING ANY WAXING QUESTIONS.**

ZFC has become synonymous with waxing around the world as such I wake up to a flooded email inbox every morning with a hundred questions on waxing from all

over the globe, 99.9% of which the answer is in the FAQ.

For Australian / NZ customers with waxing questions – I am here for you if you get stuck and endeavour to respond to all enquiries within 24 hours – however again 99.9% of questions are covered in the FAQ guide so you can likely get the answer to your question there in a jiffy – if the question asked is covered in the FAQ guide I will likely refer you to the guide – alas ZFC has reached the point where if I manually answered every email I received on waxing, that is all I would do all day every day – hence the comprehensive FAQ.

It should be noted that overall waxing is EXTREMELY EASY, pop chain off, pop on swisher, stick on slow cooker and turn from off to low, swish when melted and hang to set, break wax link bond and re-install, go ride beautiful ultra low friction low wear waxed chain. However quite an astounding number of questions on this little process do come up – so the FAQ is quite.... Comprehensive. If your answer isn't in there pls let me know so I can consider if it needs to be added – and again if you need support in AU / NZ – im here – zing me email / call / text – I will answer as soon as I possibly can.