

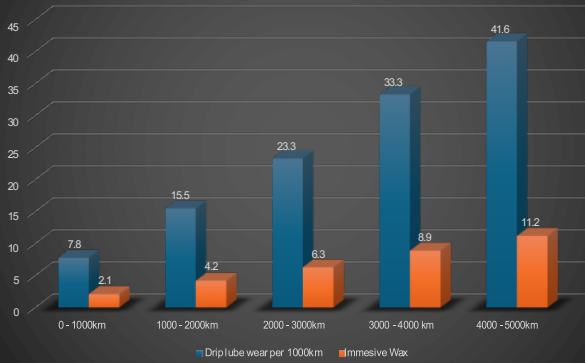
Immersive wax - Contamination Gathering and wear rate model

*Assumption - starting with 500ml of wax, and removing 5ml of wax per re wax

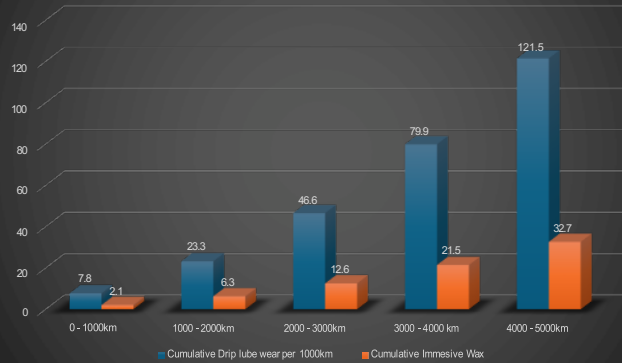
Ride KMs	Contamination Accumulated	Re -wax - adding 0.1 gram Cont, removing 5ml wax	Contamination to lubrication	Modelled wear rate	TOTAL CHAIN WEAR (% of 0.5% wear allowance)	chain wear rate averaged (rounded down) per 1000km
300		0.1	0.1/500	0.0002 grams per ml		
600		0.1	0.2/495	0.0004 grams per ml	2.1%	1st 1000km = 2.1%
900		0.1	0.3/490	0.0006 grams per ml		
1200		0.1	0.4/485	0.0008 grams per ml		
1500		0.1	0.5/480	0.001 grams per ml	6.3%	1000 to 2000km = 4.2%
1800		0.1	0.6/475	0.0013 grams per ml		
2100		0.1	0.7/470	0.0015 grams per ml		
2400		0.1	0.8/465	0.0017 grams per ml	12.6%	2000km to 3000km = 6.3%
2500		0.1	0.9/460	0.0020 grams per ml		
2800		0.1	1.0/455	0.0022 grams per ml		
3100		0.1	1.1/450	0.0024 grams per ml	21.5%	3000km to 4000km = 8.9%
3400		0.1	1.2/445	0.0027 grams per ml		
3700		0.1	1.3/440	0.003 grams per ml		
4000		0.1	1.4/435	0.0032 grams per ml		
4300		0.1	1.5/430	0.0035 grams per ml	32.7%	4000 to 5000km = 11.2%
4600		0.1	1.6/425	0.0038 grams per ml		
4900		0.1	1.7/420	0.004 grams per ml		

The amount of contamination vs lubrication makes is too small to estimate / model and interval wear rate. Chain lifespans on top Immersive waxes range from typically 10,000km to an astounding 25,000km - depending on cyclists riding, re-wax intervals and chain model. Approximately 15,000km to the recommended replacement mark of 0.5% elongation wear (100% wear) is the general benchmark for good road chains and top tested Immersive waxes. However, to be EXTREMELY CONSERVATIVE for this modelling, I will use 10,000km lifespan to 100% wear mark, which will put wear at approx. 35% by 5000km allowing for some increasing wear rate to be 100% by 10,000km. But you can see for yourself, in the numbers of contamination to lubrication, why Immersive waxing will typically deliver much greater than double the lifespan - generally 3 to 5x the chain wear lifespan is expected, vs average drip lubricant choice.

% chain wear in each 1000km block
Drip Lubricant vs Immersive wax



Cumulative wear % over 5000km
Drip lubricant vs Immersive Wax



Combo / Approach - Immersive Wax + Compatible wax drip lubricant.

Many cyclists quickly understand the inherent advantages of immersive waxing for bicycle chain lubrication. Firstly, it is a solid lubricant, so it has the highest contamination resistance possible. Secondly, every re-lube (re-wax) does a brilliant flush clean reset and re-lube in one, whereas to reset the contamination in a drip lube chain to the same level, would require a thorough solvent flush clean bath (or even multiple baths). That is much more mess, faff, cost and disposal headache vs a lovely re-wax.

Refer to waxing - concise version - to see just how quick and easy an immersive wax is, it will be easier than you think - <https://www.youtube.com/watch?v=TwXdeOBXIBQ&t=404s>

However - despite the rapid growth of Immersive waxing over the last few years, re-waxing every re-lube simply is not practical, or preferable, for all cyclists. Hence, the combo / hybrid approach has become very popular.

This is simply, start Immersive waxed, re-lube next circa 5 times with a **compatible** drip lubricant, then re-wax to reset any contamination starting to buildup.

I am hoping to control test this method, as soon as I can free up a test spot, but in the interim, the best guess is that you will get at least 75% of the benefit of immersive waxing all the time but only doing 1/5th of the time.

This also helps many who are concerned about master link cost, re-using master links etc. Refer also to the master link guide in this instructions tab on the ZFC website.

Currently we only have a small number of officially recommended drip lubricants to use in conjunction with your Immersive waxing, and they are;

Silca Super Secret Drip, Ceramic Speed UFO Drip, and Tru-Tension Tungsten All Weather. Others are also likely; I just have not had the resources to test this. Cyclowax have a drip lubricant to go with their Immersive wax, as does Optimize bike, as well as a host of other good wax drip lubricants like Session Components etc.

However, drip-on wax performance, possible penetration issues etc does vary a lot, so the official recommended list is small at the moment, but it will grow in time. Products like squirt, Smoove etc are typically OK, but not recommended. They use a very different wax base vs the top Immersive waxes, and over time this may affect the Immersive wax performance / ability to bond with chain.

Just one or two coatings every now and then (cycling holiday etc) is normally ok, it is just recommended to run that treatment until the chain is starting to sound dry, there will then be less than 1g of wax left on chain – re-wax then, and all will be fine.

If Immersive waxing or Combo approach sounds like a great idea to you, to have day in day out, the cleanest, lowest friction and lowest wear chain and drivetrain, for the least amount of time and yes, that's correct - Immersive waxing usually SAVES TIME overall vs drip lubricant maintenance, and for much better results;

Head to the guides in the ZFC website instructions tab such as Chain Prep Guide to get waxing, Waxing Zen Master Guide, as well as on you tube the Zero Friction Cycling videos of - [Waxing - Concise version](#), and for a deeper dive, as well as hints and tips - [Waxed Life Like a Boss video](#).

Wet conditions and waxing

Another pervasive myth frequently peddled by – surprisingly - mechanics, tech writers etc, - who really should know better by now, is that waxing / wax drip lubes are not suitable for riding frequently in the wet.

If someone tells you this, they simply lack basic knowledge around bicycle chain lubrication - which is actually a unique and extreme lubrication challenge.

Unless you get to just hand your bike over after every ride to a bike mechanic to reset your chain - the BEST lubricant option for you is EASIEST method TO RESET THE CONTAMINATION, after each ride.

If you don't remove all the crap that wet ride brought deep into your chain (and is now part of your lubricant), it will be their next ride in the sun, regardless of the few ml of lubricant added over the top of it.

If that is all you do, you are pretty much just putting a Band-Aid on a gunshot wound.

What is the easiest way to re-set a chain post wet conditions riding? Pop it in a wax pot, or faff with solvents / degreasers?

You decide, but - hint - hands down it's the wax pot! A deeper dive on this topic can be found in the Zero Friction Cycling You Tube video [Are Wax lubricants any Good in the wet?](#)

Just take note however, that unlike some wet lubes that keep an oily (and consequently abrasive) film over chain, post wet riding an Immersive waxed chain, or most wax drip lubricant chains, you cannot just park the bike for a day - the chains rollers will start to rust. Simply add a quick coating of compatible wax drip to protect and if necessary - re-lube, until you are able to re-wax and re-set the chain ready to rock super low friction and wear again.