

# Zero Friction Cycling

*Worlds most exhaustive independent bicycle chain lubricant and chain testing – over 300,000km of controlled testing to date.*



## Lubricant On Test : Factory Grease!!

Cost: \$0.00 upfront. Your drivetrain in short order if you do not clean off and replace with a top lubricant choice.

Size – N/A



Photo :

# Factory Grease – the zombie apocalypse that just will not die!

Well, here we are – for reasons currently still beyond my comprehension, I am needing to address the use of Factory Grease that comes with ones chain.

This is a surprise as I thought this was definitively dealt with from the Friction Facts days where Friction Facts proved just how far off the pace factory grease was vs top known drip lubricants, however recent marketing drives by KMC and Shimano on some major media outlets pushing that removing factory grease is the biggest mistake one can do for their chain – this must be addressed and addressed HARD.

I usually try to remain very diplomatic in my reviews even if calling out some concerning results, this one may be a bit more... interesting.

As one who has been working hard every day for a long time to improve the information getting to cyclists to help save as many drivetrains as possible from an early death by abrasion, it is frustrating when certain media channels pump out crap that impacts these efforts, and there is no shortage of that on a number of high profile you tube channels / websites / forums.

However, it is another level when very powerful industry players, WHO WOULD ABSOLUTELY KNOW BETTER (in my opinion), make concerted efforts to pump out absolute terrible advice / information (in my opinion).

Apologies in advance I will have to say in my opinion a bit for legal reasons to avoid legal action. Despite the evidence and logic I will be presenting below, this can be contested by parties soon to be named, and as such I cannot state it as empirical fact, and so must state many aspects as my opinion based on evidence below.

You can choose whose advice you wish to follow.

## So – what is going on with factory grease?

Over the last 12 months there have been a few very high profile instances where it has been stated that removing factory grease is the number one mistake one can make with their chain & its lubricant.

The first high profile drivetrain killer was with GMBN (Global Mountain Bike Network) tech podcast with Doddy. This was sponsored by KMC, and KMC using this video on chains & lubricants to get in a bit of marketing re how amazing their factory grease is, and that you would be nuts to remove it.

Alright I don't want to attack a Doddy as whilst it beggars belief that a long experienced tech reporter would advocate leaving factory grease on to head out into the world of dirt and dust where it will quickly become an abrasive paste – I think there is a decent chance that such content is directed at time from above for sponsorship / advertising \$\$\$. KMC paid the bucks for a message to be put out, and GMBN are happy to take the money and pump the content out. Accuracy of content and consequences to drivetrains and peoples running costs would be of nil consideration.

And of course, they are banking on the fact that not many of their viewers are going to have enough knowledge in the space to call out the Bullsh#t. They get away with putting out sponsored content all the time, and hundreds of thousands of people accept and run with that advice.

Over time ZFC task is to get more reach and educate more cyclists with proper information in this space, and then I need people power to not let Cycling media get away with very poor content without facing quite a backlash. Companies like that are never going to change because it would be the right thing to do, they are only going to change if revenue is at risk. If the concern re losing viewers starts to outweigh what they are paid to present utter rubbish – that is the only way they will think twice.

Obviously when putting forward a sponsored content message, they don't exactly check for accuracy with independent resources that might exist to cross check information.

It is up to the you – the cyclist, the consumer, to be aware of what is sponsored content whose information should be checked before following (and feeding back accordingly if you find that the content presented was very misleading in a bad way), and what information you believe is truly independent, robust, and dependable. This is true for pretty much all consumer aspects in life, and many times if we just follow marketing vs doing some checking – we can definitely take a hit to the wallet.

If you are reading this document, and make it through – woohoo! You will be much better for it re your drivetrain running costs I promise vs if you followed the advice of GMBN re factory grease. MUCH MUCH better for it. And so then ensure

your cycling friends also know, and overtime – it takes a global village not just me one little guy nerdily plugging away – but cyclists all around the world saying we are not accepting this type of content, you need to do better, or I’m not watching anymore.

The video in question – nearly 500,000 views – so just how many tens of thousands of drivetrains have met an early death by abrasion thanks to the advice of number one mistake is to remove factory grease?!

Thanks GMBN & KMC.

<https://www.youtube.com/watch?v=8jVOD9vHt7Q>

Next is recently we have had Nick Murdick as head tech guy for Shimano re their chains, again advising that Shimano factory grease is brilliant stuff, it is a misconception that the first thing one should do is to remove factory grease, he absolutely leaves it on, and advocates that is what you should be doing too. He goes so far in one case as to state that in some cases (cyclists who ride only in good, dry road conditions) the factory grease will last the lifespan of the chain – so no added lubrication necessary.

Nick has also stated in some interviews / articles that “all lubricants work” – basically that he is not there to tell anyone what they should use if you do need to re-lubricate – if you like whatever wet lube that’s fine, sure if you want to go with some lubes you should clean chain as they are not compatible to mix, so sure go ahead and clean chain and use that lube if you need or want to – but, hey – basically all lubes work just fine.

Whereas we know, without any doubt re the accuracy of this statement whatsoever, that there is a MASSIVE difference in the friction and wear rate performance of the top known lubricants vs some of the worst lubricants tested to date. Even top vs medium performing lubricants the wear rate difference and cost to run per year is very large gap indeed.

So the overall message that he has pumped out on many interviews over the last decade re overall best thing to do is run factory grease, then if you need to move to basically whatever you like – that really does not help, at all.

And when the message comes from the head chain tech guy at a company the size of Shimano, such messaging carries huge weight with most cyclists who would read / hear such information. Why would someone who is say a lawyer or accountant, or builder and on and on, question the information given to them re how to best ensure great lubrication and lifespan of their chain from the head chain guy at Shimano?

Most would not, and do not, and so again not to be sounding too harsh here on one person – but holy batman just how many drivetrains has Nick sent to a very early death vs had much better information and advice been given from someone in the power of his position. It is impossible to put a tangible figure on it other than an enormous, massive amount of \$\$ and resources wasted on cyclists burning through drivetrains and really anywhere from double to 5 times or more the wear rate vs top known lubricant choice and maintenance options.

That is not a great legacy.

Again, will I be able to change Nick's messaging – extremely doubtful. I would love to have a chance to try though, Nick – if you ever come across this, after possible swearing about me for a while, if you are keen for an open chat – I would love to understand better - is it just towing the company line as to do otherwise would be career suicide, or does he genuinely believe it?

Alas here is where it gets a bit fun again. And, I don't want to be laying a heap of shite on top of Nick – but I personally just find it near impossible that someone in the position of head tech guy for Shimano re chains would not be across to a large degree the testing and information re factory grease vs top known lubricant choices, starting from Jason Smith and Friction Facts days, as well as what has been continued on from then.

It is to me just near improbable that a person in that position would not be well across what are the best lubricant options for one's chain for their type of cycling and maintenance comfort and come out with the answer that its factory grease and then whatever you like everything works.

Here are a couple of quotes I quickly found googling Nick Murdick and chains and clicking on a couple of articles that came up;

*"The grease that comes on a Shimano chain is applied at the factory to the individual pieces before the chain is assembled. The grease does a better job of reducing friction than aftermarket chain lubes and it lasts longer"*

And a very recent article;

## *"What's the best bike chain lube?"*

*Like chain lubing methods, the "best" lube is a source of contention. Some gear geeks will point to efficiency tests while others simply choose lubes based on experience, cost, and ease of use. Lube choice is not as important as regularly lubing your chain.*

*"Everything out there works." — Murdick*

*"I don't want to tell anyone what to use on their chain," Murdick said. "Everything out there works. Some prioritize friction reduction where my philosophy is generally about increasing chain durability. People are free to choose whatever fits their needs the best."*



Heavens to betsy.

And I have attached link at end of this article to Velonews podcast – listen from about 26 mins in, where you will hear him advocate re Shimano factory grease.

Not to sound like Uncle Ben in the Spiderman movies, but with great power does indeed come with some responsibility. What Nick says carries a lot of weight due to his position in a huge industry player, and so I believe he has a responsibility to provide the best information.

As you will see when we get to some testing and data below, what I am about to say is not based just on some trifling amount of not very robust data, but it is based on testing, data and information that is extremely sound, and information that again I just would find it improbable that a person in his position would not be at least competently aware of. It would be like a tech stockbroker not knowing about Tesla.

A quote from Nick along the lines of;

“Contrary to common belief our factory grease is not just for packing, but it is in fact something we believe to be a top level lubricant. However, depending on your riding, you should be aware that this lubricant type does attract contamination faster than other aftermarket lubricant options. Also, independent testing has shown that some top aftermarket lubricants can indeed be faster and deliver lower wear rates, so depending on how much you want to worry about getting the longest lifespan out of your chain and drivetrain – it is definitely worth taking the time to choose a proven top lubricant that matches your type of cycling and maintenance, and also if you do race and are worried about saving watts on race day -what the best options are”

From there – he could go into as much depth or keep it to generalities as he likes, as long as the generalities are at least pointing cyclists to think about a good direction.

Some lubricant choices are simply a complete mismatch for certain use cases. I.e., if you ride off road in the world of dirt and dust, then a grease or wet lubricant – the very nature of such lubricants means that every single particle of abrasive dust will stick on contact – that is simply a terrible lubrication choice to make. You can save a veritable Shiptonne of drivetrain wear and costs by running with solid chain coating type lubricant or at least a good wax emulsion lubricant which can have very high dust penetration / adherence resistance. And such lubricant choices DO NOT MIX with factory grease at all, and Factory grease must be removed before moving to those choices.

Considering Nick has done a lot of interviews re Shimano XTR launch, it is not like he is not well versed in off road cycling.

It simply beggars belief that someone in Nick's position, with a decade+ of experience, would not be aware of wear rate benefits for running some of the top known aftermarket lubricant options versus heading out onto the trails with Factory grease on the chain and then just drip on whatever as everything works.

Personally, I would never do a job if my legacy from doing that job was going to be a very negative impact to simply countless numbers of my customers who followed my advice.

The best analogy I can think of overall for selling factory grease as best option for your chain and drivetrain lifespan is someone selling cigarettes as the best thing you can do for your lungs. Despite the fact that now some factory grease's (like Shimano's) are not necessarily terrible like the old days of factory grease's – the fact is no one rides in a clean lab, and that lubricant type simply attracts contamination extremely quickly. For a part that operates completely exposed, it should come as no surprise that the best chain lubricants on the market are the ones that RESIST becoming quickly contaminated and remain a low friction lubricant when you actually ride them outside.

Which obviously Nick would know. If he genuinely doesn't after a decade as the head tech guy for Shimano – how? How would that be possible – it could only come from being willingly ignorant for the purpose of ensuring nothing can impact towing the company line / messaging.

I can only implore to Nick – what is your legacy on drivetrain lifespans for simply countless numbers of cyclists who followed the advice given from a person in a position of great power in this space.

Maybe he is stuck and he can do nothing other than what he is doing or it is career suicide, in which case yep, that's a tough spot to be in – most have bills to pay and families to help support and have worked hard to get to where they are so I get it, maybe he has no choice (or feels like he has no choice) – so to close this section I don't want to be calling out Nick as an evil drivetrain destroyer, he may simply be doing what he has to do – so again – any comments on articles – keep them respectful, call out the incorrect information, but don't abuse the person – we don't have all the dots joined re why what is happening is happening, and we are not likely to get them – but that does not mean we can't effect positive change through people power.

## To the Testing and data!

Almost 😊 Okay, before I get into the test data and some basic logic, let me state that due to A LOT of robust testing, not just by myself but by other industry leaders in this space (Jason Smith of Friction Facts, Josh Poertner who yes now makes competing lubricants but before that worked for a long time with many world tour teams / riders to make them go as fast as possible, and a key area on this was ensuring fastest chains, and no one used factory grease... (Some great Marginal Gains podcasts cover chain lubricants / factory grease)– the test data and logic is extremely convincing.

Factory grease is;

- A lot slower vs top known lubricants / waxes.
- Factory grease is a contamination magnet, and mostly what makes a great lubricant day in day out is one that resists absorbing contamination and turning into an abrasive paste masquerading as your chain lubricant (stated as my opinion vs empirical fact, but in my opinion the test results are similarly as conclusive as those proving the earth is in fact round and not flat. However, even that is contested! I would put stating factory grease as being superior, or even a good choice, vs removing and running a top known lubricant, in the same level of logic as believing the earth is flat. In my opinion.)

Let us take a quick duck back in time and look at some Friction Facts data, where Jason Smith was the first to efficiency test lubricants, he ended up testing I think 55 lubricants before being snapped up by Ceramic Speed, and also tested the major OEM's factory grease at the time.

How did this testing stack up in favour of factory grease?

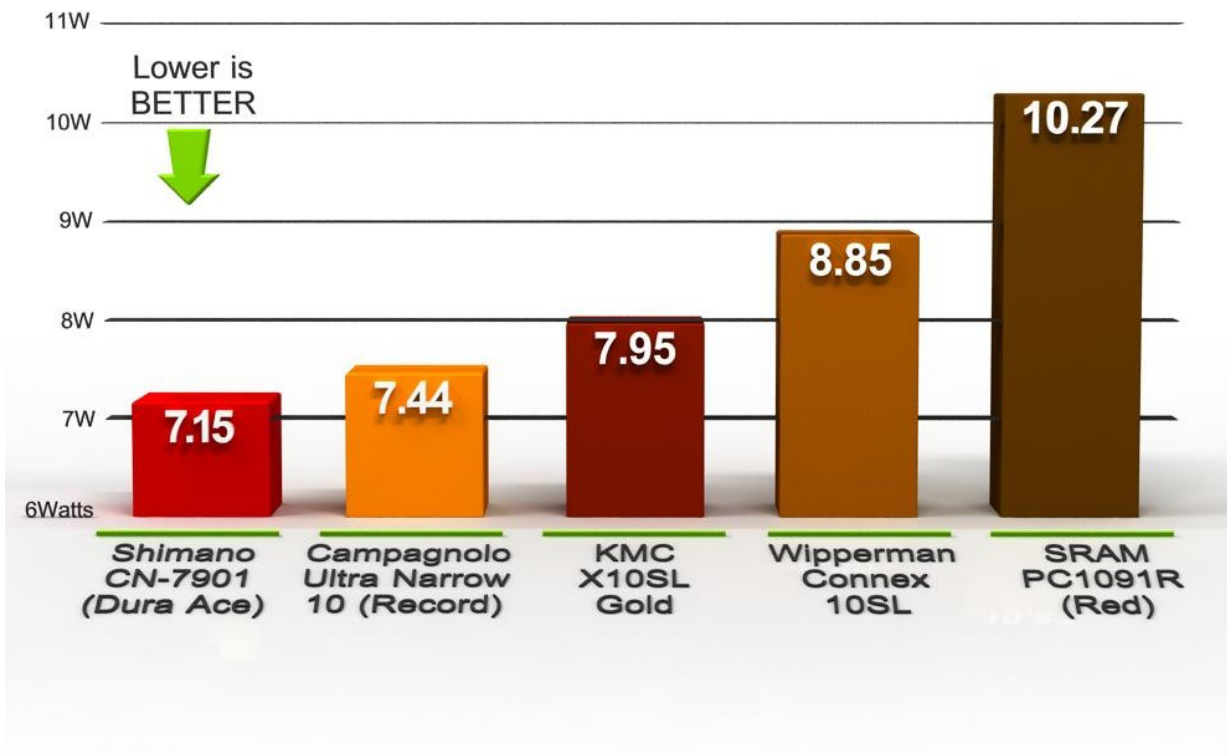
Here are a couple of quick highlight points from that test;



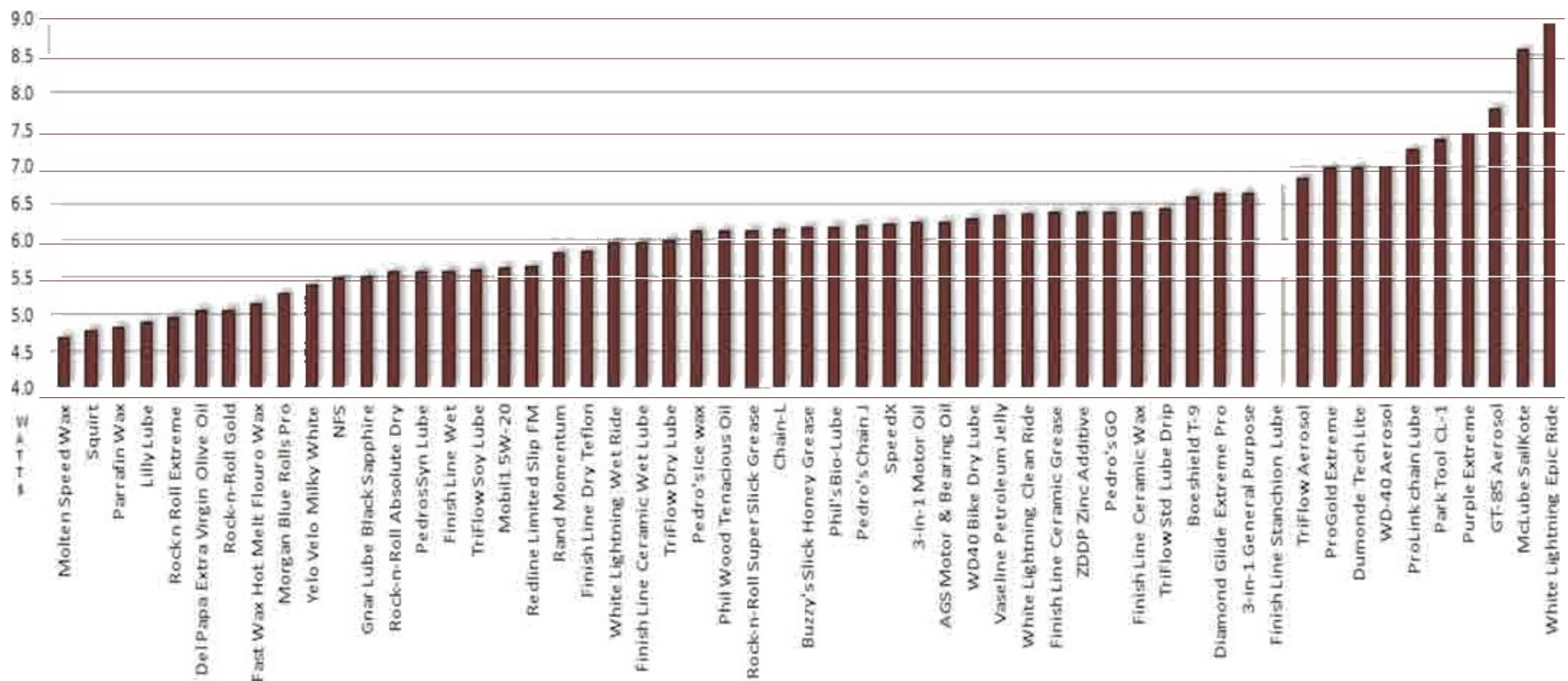
## ***CHAIN EFFICIENCY TEST, Part 1***

### ***5 HIGH-END MODELS, FACTORY LUBE***

- 5 high-end chains models were tested for efficiency using both the Full Load Test Method (FLT) and Full Tension Test Method (FTT). 25 samples were tested with each test method, 5 samples of each of the 5 models.
- Of the five models tested, the Shimano CN-7901 (Dura Ace) is the most efficient chain out-of-the- box. The Dura Ace consumed an average of **7.15 watts @ 250W (97.22% efficiency)**. The results show the SRAM PC-1091R to be the least efficient chain out-of-the-box, consuming an average of 10.27 watts @ 250W (96.05% efficiency).
- A **difference of 3.12 watts (1.17% efficiency difference)** is seen between most efficient and least efficient models.



What were the results for chain lubricant tests at the time?



So, from the FF test information above, we have 49 lubricants out of 55 tested recording lower outright efficiency losses vs fastest factory grease at the time, **and all 55 faster** than the slowest factory grease at the time. And there are some truly

shocking performing lubricants in the bottom third of those 55 tested ( ie ZFC has tested White lightning Epic Ride and you may as well run a cutting fluid as your chain lubricant).

We have the top 7 lubricants testing 2w+ faster than the fastest factory grease, and circa 5w+ faster than the slowest.

That is not a small amount. % wise especially that is pretty huge. People can pay \$1k+ in ceramic bearing upgrades across their bike to achieve a smaller friction efficiency benefit vs just moving from factory grease to a faster lubricant.

Not a great start for the defence of Factory Grease.

A critical point that will be delved into a bit deeper soon, but worth reminding now to get the noodle ticking over re this aspect, is that one of the most critical performance aspects that makes a great bicycle chain lubricant is not just its outright efficiency performance in a clean lab test – which whilst one obviously would like it to be at the pointy end vs the 9w loss end – critical importance is HOW WELL DOES THE LUBRICANT RESIST ABSORBING CONTAMINATION.

Many lubricants once taken out of the lab can quickly become highly abrasive as every particle of dust / airborne contamination sticks on contact.

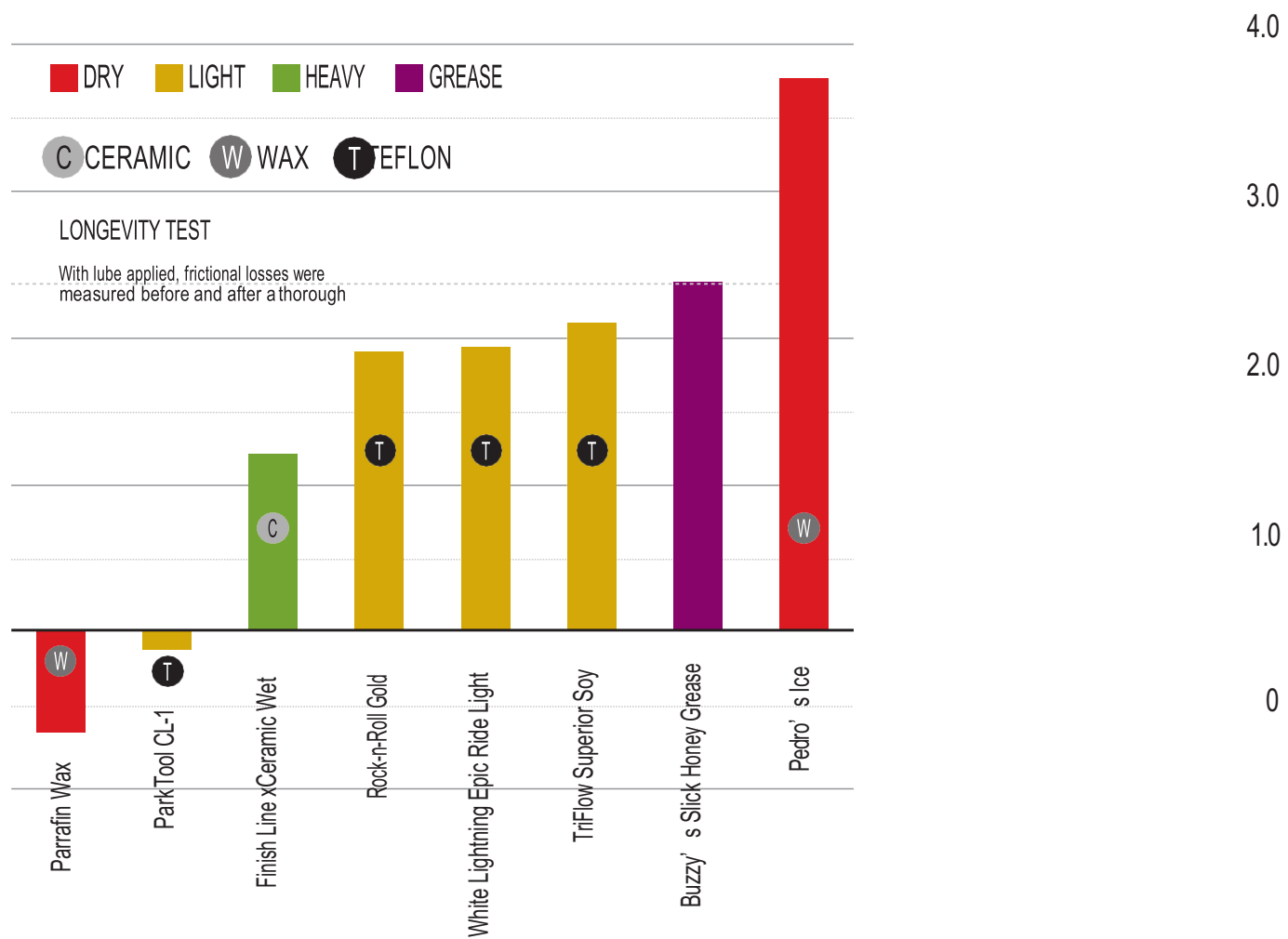


Factory grease falls into this category. It has ZERO performance rating re resisting absorbing contamination. Basically every particle of abrasive contamination that comes into contact with a factory grease chain will adhere to the factory grease and become part of what is lubricating your chain.

Many of the top known lubricants tested by Zero Friction Cycling demonstrate a very high resistance to absorbing contamination, and as such remain very low friction and at the pointy end of the league table once they leave the lab and are actually ridden outside.

Contamination resistance / absorption is a CRITICAL factor when comparing top known lubricants vs Factory Grease vs just outright efficiency losses. The performance gap demonstrated above between top lubricants tested vs Factory Grease would very quickly widen in favour of the top lubricants tested.

Here is some info from the very very early days of Friction Facts doing a collaboration article with Velonews. After some initial efficiency testing, chains were run for an hour whilst being dripped on a mix of water and sand. The below graph is the watts increase (or decrease) for that lubricant (or in this case lubricant group type) after that hour of running in harsh conditions vs its clean test results;



## And what did the article have to say about wax;

Once again, the old technology of paraffin wax vanquished all comers. In the longevity test, it was completely unperturbed by water, sand, and dirt; in fact, it was over 0.5 watts faster after being run for an hour in the grime. We believe that the wax needs to bed in a bit for maximum efficiency. And, since nothing really sticks to it, the goop was simply shed before it could slow anything down. The only other lube to increase efficiency after the dousing and dirtying was Park Tool's CL-1.

Pedro's Ice Wax performed the worst of our eight representative lubes, requiring more than 3.5 additional watts to turn around. By the end of the hour-long test, the chain with Ice Wax on it was completely dry. The super fast Rock-n-Roll Gold jumped nearly two watts after the grime run, as did the Buzzy's grease, TriFlow Soy, and Finish Line Ceramic. The Gold lube also began to dry out, and was running audibly louder.

**This, of course, points to the obvious: The most efficient lubes in perfect conditions are likely not the fastest when the going gets rough, with the exception of paraffin.**

**\*\* The above statement is now outdated, many extremely efficient lubricants now have the tech behind them to remain extremely efficient outside the lab – the above was early days – but the situation for factory grease and contamination has not changed. Whilst FG was not tested in the above test – the above test is relevant to show what easily happens with lubricants that are not good at resisting absorbing contamination, of which, obviously, Factory grease falls into that category.**

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*(\*Pls note before you run out and buy some candles – it is worth reading latest ZFC news below re top waxes vs DIY waxing – candles – hardware store paraffin is not what was used in this test, 99% of DIY waxing attempts use shite wax and subsequently get a shite result). - <https://zerofrictioncycling.com.au/latest-zero-friction-cycling-news-lubricant-matrix/>*

Right – back to me / ZFC. So, from the above, especially if your ride off road, obviously the already very poor performance of Factory Grease vs top lubricants – that performance gap is going to become much wider very quickly. **And what will be behind that widening gap of many watts will be watts of energy GOING DIRECTLY into eating through your chain and drivetrain that much faster.**

### Has Factory Grease performance improved since Friction Facts days?

Yes it has, probably most notably with Shimano – their F.G is much faster now than the old days – I don't have the exact figure from CS as it is not cleared for publication yet, but lets call it about 1.5w faster. Sram's Factory Glue is less glue like on some of their chains vs the old days, but still really slow and sticky vs shimano.

Shimano F.G is obviously still multiple watts slower than top known lubricants of which we have a number now in the sub 4w loss range, even down close the mid 3's and even 3w (I hope to get a green light to publish a table soon of all lubricants CS have tested since Friction Facts buy up, but in the super fast category are UFO drip, UFO chains, absoluteBlack Graphenlube (NOT THEIR WAX), Silca hot melt, silca ss drip, Mspeedwax, Silca synergetic, Squirt, Smoove. It may be worth noting there is currently ONE non wax based lubricant in top end of town (more testing results hopefully to be released

soon and some other lubricants may be able to be mentioned in the top end of the league table, as always stay tuned to low friction news).

So, yes – F.G has improved vs the old days, but – in tandem with that, so have our top lubricant choice options, so the outright performance gap between top known lubricants and FG has remained similar re outright efficiency, BUT WIDENED EVEN FURTHER OVERALL DUE TO TOP LUBRICANT OPTIONS OUTSTANDING PERFORMANCE IN CONTAMINATION RESISTANCE.

Manufacturers stepping into the lubricant space and who genuinely invested heavily in R&D to deliver truly exceptional lubricants – designed for the extreme challenge of retaining exceptional performance outside of a clean lab and where the lubricants will actually be ridden, truly have delivered to us lubricant choices that are simply outstanding. Things have come a long way since the Friction Facts days. Such manufacturers have understood the development challenge – again what makes a great bicycle chain lubricant is one that STAYS low friction outside the lab by having very high contamination resistance.

**This is NOT the case with Factory Grease.**

If you have any kind of logic circuit running, it will hopefully compute ok that dust is going to stick on contact with a factory grease, but largely bounce off lubricants that set to a solid chain coating type lubricant or at least a semi solid (like squirt / Smoove) that are sufficiently dry to have most dry contamination not stick on contact and become part of the lubricant.

So, Factory Grease starts with a significant efficiency gap vs top known lubricants, and again this gap will simply quickly widen once actually ridden outside. Dramatically so if you ride off road.

## Okay, time for some ZFC data!

So, when to my great surprise and dismay I saw and heard that Factory Grease as being numero uno option started being pushed by high profile media due to a drive by heavy weight industry players like Shimano and KMC, an area of chain lubrication knowledge that I thought was well established and largely beyond dispute has suddenly become in dispute again, and even more so than pre Friction Facts testing and knowledge.

To me it really feels like a zombie risen from the dead. Aside from it already being pretty obvious to most way back then, Friction Facts really nailed the coffin lid shut.

Now the coffin has been pried open and the drivetrain eating zombie is out again and running for President.

Hence part of the reason I have had to sadly take a couple of head shots in this review. Head shots have proven to be the only way to kill zombies in the movies. Maybe it will help slow down this drive train eating zombie, and eventually, put it back underground.

**Anyhoo, data;**

### ZFC test Block 1 – No contamination

- **Average wear rate for the top 5 lubricants tested by ZFC in clean block 1 = 0.5%.**
- **Average wear rate for the top 10 lubricants tested by ZFC in clean block 1 = 4.4%**
- **Wear rate recorded for Shimano Factory Grease in clean block 1 = 10.9%**

This is not a great start. Clean block 1 is where factory grease should have nailed a very low result if it was to have any chance at all vs other top lubricant choices. It obviously will have no penetration issues going through the lubrication process at the factory. There is a too often touted misconception that one of the reasons factory grease is the best is because this factory bath is the only time or only way that full lubricant penetration for the chain can occur.

This is very incorrect. Whilst some lubricants have demonstrated significant initial penetration issues, many lubricants do not. If they did have penetration issues, after chain was stripped clean of factory grease and then lubricant applied as per mfg instructions, the top 5 lubricants would not record a basically 0% wear result (and some of those in the top 5 were at 0.00% wear). Derailleur chains have a sufficient amount of play and tolerance between parts that as long as penetration is

accounted for in the development of the lubricant, it will penetrate perfectly fine. Some lubricants advise if need to apply via immersive (ie absoluteBlack Graphenlube).

So if Factory Grease is showing over 20x the wear rate vs top 5 lubricants tested to date, in the test block that where it has the best chance to try to match top lubricants – a test block that is run in extremely clean conditions – I am calling that not a great start to the claims for Factory Grease. Again.

#### Block 2 – Dry contamination block.

- **Average wear rate for the top 5 lubricants tested by ZFC in dry contamination block 2 = 1.7%.**
- **Average wear rate for the top 10 lubricants tested by ZFC in dry contamination block 2 = 7.1%**
- **Wear rate recorded for Shimano Factory Grease in dry contamination block 2 = 20.8%**

So once contamination is added, the wear rate doubled. By the end of block 2, the total wear for the top 5 lubricants tested is averaging 2.2% of the 0.5% chain wear allowance, shimano Factory Grease chain is now at total wear of 31.7%.

So we have a basically 15x worse wear rate result overall vs top known lubricants at the end of block 2. This may seem counter to previous info that the gap will widen once exposed to contamination and 15x is less than the 20x+ result for



clean block 1, just take into account the numbers – the wear rate results were basically zero for top lubricants in block one, so any physical increase on that is going to be a big multiplier vs its own near zero result.

The key fact is that Factory grease being circa 15 times WORSE wear rate performance vs top known lubricants is hopefully pretty darn convincing that it is not even a remotely close contest.

It is obviously, and frankly ridiculous to advocate that Factory Grease is the way to go vs removing and choosing to run a proven top known aftermarket lubricant option.

I had to stop the test at this point as factory grease treatment was definitely at its limits, and I cannot re lubricate the chain with more factory grease.

As such a direct comparison of factory grease vs top known lubricants may be viewed as a little bit tricky, as for the testing the lubricants I test have specific points where re lubrication occurs, but I cannot re lubricate with more factory grease.

That being the case really the best thing would be to take the block one result for factory grease – where the FG treatment does have no trouble lasting through that clean test block, and then we can instead look to add other often referenced lubricant test results on top.

So one could look through the test results for the lubricants tested by ZFC, and add the results of another lubricant from block 2 onwards onto the 10.9% block 1 result for FG etc (assuming one cleaned chain and went with that lubricant, if added directly on top it may well perform a bit worse or lot worse depending on lubricant).

It is actually quite interesting that vs many of the wet lubricants tested, in the dry contamination block – Factory grease actually performed pretty favourably. It was beaten by Silca Synergetic, but other wet lubricants tested to date performed worse!

So is this a good counter to my attack (well not attack – that's a bit too strong, lets call it a pleading recommendation against) using FG?

No, as already stated – running a wet lubricant choice if your ride off road is frankly nuts. It is a complete mismatch of lubricant choice to purpose. Factory grease, especially after having already having been run for 1000km in clean block 1, was less attractant re contamination vs if it had been taken straight into block 2 for testing. With it being more dry than it was when started, not only does less contamination stick, but there is a more difficult transport path for contamination to move from outside chain to inside chain. But make no mistake the FG was absolutely dead and DONE by end of block 2, lubrication with something would have had to be done to continue, and then we run into the other issues that wet lubricants have in off road use.

With wet drip lubricants aside from contamination attraction in general, contamination is dragged from outside the chain to inside the chain where it causes wear on key parts of chain on re-lubrication. There are simple tricks to help prevent

this but they are rarely used *(best easy tip is to spray microfibre cloth with some methylated spirits / denatured alcohol / isopropyl alcohol and wipe outside of chain, this will lift surface contamination off chain. Then wipe dry with dry part of cloth. This will have much less surface dust imported deep into chain with the lubricant on re-lube).*

So on the one hand, FG was not terrible vs many wet lubricants. On the other hand, it was around 15 times worse vs top known lubricant choices.

And if we look at now some top WET lubricant choices for dry road use which is a very large demographic - I am hoping by this point I have convinced you that you SHOULD ABSOLUTELY AVOID FACTORY GREASE / WET LUBE / FACTORY GREASE + WET LUBE – if you ride off road) – it is still well, well behind top known lubricants now.

le Silca Synergetic Recorded a 0.0% wear rate in block 1, vs 10.9% for Factory Grease. Yet to be updated on main table as testing is still ongoing with both Rex and Revolubes but their products were also extremely low wear in block 1. And there will no doubt be many other top wet lubricant choices that I simply have not had the time to test yet – a majority of my testing focus has not been on wet lubricants as ZFC key drive has been to find the genuine best products that will deliver the genuine lowest friction and wear for the greatest number of cyclists – and those lubricant choices to date have been more likely to come from top chain coating type lubricant choices simply due to the nature of the lubrication challenge for ones bicycle chain that is completely exposed.

But, there are some brilliant wet lubricant options out there – really still in my view the main demographic for this is reserved really for cyclists who mostly ride in dry road conditions where contamination is not as big of an issue, I cannot

see yet how a wet lubricant will ever come close to matching solid chain coating type lubricants for off road use – dust sticks to things that wet, I cannot see anyway past this simple law of physics yet.

So, you can still enjoy easily 5 to 10 times lower wear rate, and start 2 to 5w lower efficiency vs factory grease with top wet lubricant choice vs Factory Grease, again an efficiency and wear performance gap that will continue to widen as the miles clock up as the top wet lubricant options way outperform Factory Grease in regards to remaining low friction in dry road conditions following mfg instructions on re lubrication intervals.

Yes you can add wet lubricants over the top of Factory Grease, but know that if you take a brilliant product and mix it with a far inferior product, overall you have a much lesser end product vs if you cleaned off the Factory Grease and just ran with a brilliant product. That should hopefully make obvious sense to everyone.

So the advice of “Everything works”, and that for wet lubricants all is well to just add over top of factory grease – again I can only hope that by this point in this document you understand that this is really, really, really poor advice, and considering the source of the advice – this is a really disappointing situation, and one I hope that will improve over time. It is time for people in such powerful positions to get up to date, and do better job for the sake of countless cyclists drivetrain wear rates and costs.

Depending on when you read this document, hopefully further data updates on main data page with some recent great wet lubricant tests will be up, if not – it should not be far away, just wrapping up some testing for these manufacturers

now and all is looking like greenlight for public release of data, and I hope to have time to get to testing more possible great wet lubricant options in 2022.

I get a lot of requests from around the world to test X lubricant as their particular user experience has been excellent. Unfortunately as ZFC test is very time resource intensive with a test protocol that runs for thousands of km's with a lot of intervention, and obviously there is a full reset of new components and calibrations prior to each test – I am very limited re just how many tests for curiosity I can complete in a given year, especially with the private test workload booked in for manufacturers.

My best advice is - if you are riding in road and mostly dry conditions and you attain at least 8,000km – preferably 10,000km+, to a genuine 0.5% wear on a reliable chain wear check tool (unfortunately not as many of those exist as one would like, I really depend mostly on results from shimano TL-CN-42 chain wear checker as this is high quality steel that is laser cut vs cast and finished – many brands tools vary too much from one tool to another and every 0.1mm of accuracy is extremely important. Refer to ZFC you tube video chain wear checking).

This km's attained is also with no cleaning maintenance. Most lubricants (not all, some really are horrendous) can attain impressive results if they are very well maintained with flush clean resets.

For constant wet riding / offroad riding there are far too many variables to give any sort of definitive distance figure from how wet, what type of contamination is brought in, how much power you put out, how much you may or may not be pushing treatment lifespans riding in such conditions etc – but if you attain a genuinely surprisingly much longer lifespan

for a new wet lubricant you try vs what you were previously on, and you have some accurate km data for this lubricant vs previous, then pls feel free to email in the detail.

Similarly for off road but also with off road and 12spd there is a complication that some chains (sram x01 / xx1) have such an extraordinary wear resistance lifespan vs other 12spd chains, and also XTR 12 is much longer lasting than DA 11 and campy 12 / ybn 12 – it is too many variables to provide a guide. I can say that my xx1 training chains frequently re-waxed with mspeedwax or hot melt will basically take me circa 3 to 5 years of hard training to wear anywhere near recommended replacement mark. Same chain on a meh wet lubricant may still last an avid mtb rider a year whereas previous chain (say GX) may have lasted them only 3 months. KMC 12 wear out pretty much whilst you look at them even on best lubricants. YBN 12 and campy 12 are similar to DA 11, but much less than XTR 12 and xx1 / x01 and so on. So it is tricky.

Just know that if you are running higher end groupsets like x01, xx1, XT, XTR, AXS 12 road – the cost of the components and the environment you are riding in – the cost to run difference between top lubricant choices and average lubricant choices is ENORMOUS.

Dismiss as all will be similar at your own peril. You decide what you would rather spend your hard earned money on – new shoes / helmet / kit / jacket / glasses etc – or on a new chain and cassette (and possible ring/s) that could have lasted easily another year , or more, with a better lubricant choice.

Alrighty that will do. I hope. I will be getting to covering this topic and document on you tube vid hopefully next film day, but as a quick wrap – I would like to point out that I don't have issue with media like velonews for that content nor other articles up on various media sites that I believe have genuinely tried to provide great content and accurate content for their listeners / readers.

I think it is perfectly logical for them that as shimano do not have an aftermarket lubricant product in the game, that obtaining overall great information for their customers from the head chain tech guy at Shimano would be an excellent way to ensure a great outcome for the article / podcast and their audience. Again I don't believe they would have believed they needed to question the accuracy of the advice and information given to them, so I am resting the responsibility for the really not great advice on this front on Nick / Shimano – I will hope I haven't built up a massive defensive wall with Nick, and that one day I can have a good open chat about this.

GMBN & KMC – I place more responsibility on GMBN here – I am willing to accept I am wrong, and they can definitely reach out and explain to me how wrong I am, but at this time my personal belief is that as mtb focussed content and tech presenter again of huge experience – it just beggars belief that factory grease as best option, in fact that removing factory grease is the number one mistake you can make – I believe that was taking sponsorship \$\$ and presenting whatever the sponsor wanted – outcome for their audience drivetrain be damned. I think it unlikely this was truly Doddy's personal belief, and that it was directed from above. Again, happy for GMBN to send me a big angry email telling me how wrong I am, and I can update this document. Or maybe they can check some proven robust independent data for future video's.

We shall see what direction this area goes over the coming year or so – but, also remember I cannot kill this Factory Grease Zombie on my own, not even close – without cyclists all around the world demanding a better standard of content and holding terrible advice to account – there will be zero change, and countless tens of thousands of drivetrains every year will meet a very early, and entirely preventable – early death by abrasion.

Over to you all.

If you made it to here, woohoo, well done and thank you for making it through one of my always not concise documents, but..... whilst concise is not my strong point – accuracy and integrity of the information is. It is the reason I started Zero Friction Cycling, and I want to accomplish as much positive change whilst I can before I get too tired and retire. I want to move on to just playing with hobbies around home and riding / racing knowing myself / ZFC gave this little focus area in cycling that can have such a big impact the very best shot, and moving everything in right direction, that I could. But I sure do need your help. Don't underestimate your impact when you hold media to account re their information (again – I stress respectfully – defensive walls are oh so easily thrown up and manned with archers!. And boiling oil!)

[https://soundcloud.com/velonews/tech-podcast-the-great-chain-explainer?utm\\_source=www.velonews.com&utm\\_campaign=wtshare&utm\\_medium=widget&utm\\_content=https%253A%252F%252Fsoundcloud.com%252Fvelonews%252Ftech-podcast-the-great-chain-explainer](https://soundcloud.com/velonews/tech-podcast-the-great-chain-explainer?utm_source=www.velonews.com&utm_campaign=wtshare&utm_medium=widget&utm_content=https%253A%252F%252Fsoundcloud.com%252Fvelonews%252Ftech-podcast-the-great-chain-explainer)