Zero Friction Cycling

Single Appliation Longevity - New test protocol as of October 2020 - Much work to be done to re-test existing lubricant test list

ZFC receives many emails from around the world seeking advice on what lubricant for what event. These range from a key road time trial, to 24 hour mtb to cross continent events to stage races.

What lubricant for what event can depend on many factors. Not only from how long does lubricant X last in conditions Y, but a persons budget, race strategty (flag to flag or able to swap to fresh chain/s), mechanical confidence and more.

The new test assess single application longevity for dry road conditions, dry gravel / mtb / cx conditions, and extreme conditions (wet, muddy etc).

The test follows a similar protocol as main lubricant test, alternating between large ring and cogs 4 through six and small chain ring and cogs 1 through 3, with check measures every 150km.

A new chain is used for single each of the 3 Single Application Longevity tests. **The lubricant is applied via immersive application (usually..).** This acts as a double check re initial penetration issues in the main test where the lubricant is applied as per manufacturer instructions.

For each S.A.L test, the chain is given a wear rate allowance of 0.1% (normal recommended chain wear replacment mark is 0.5%, so it is given 20% of the recommended wear replacement mark.

Two key points during the test are noted. The first is noting when (or if) there was a significant change from one wear measure to another. This is noted as the "Jump point" - and most accurately signals when the lubricant treatment has effectively started giving out. The second is when the chain reaches the total test wear allowance. Not all lubricants demonstrate a clear jump point - ie some very long lasting high performing wet lubricants, there is just a very small increase in wear every check measure until reach test wear allowance. Others - typically wax lubricants - can exhibit extremely low / no wear for X check measures followed by a significant jump point when the wax treatment has given out.

As such the JUMP POINT is used to assess a lubricants lifespan. If it gives out at 500km but it takes another X kms to reach wear allowance, effectively we are just now higher friction wearing the chain, in reality we would not want to be riding the lubricant treatment past the point where it clearly gave out, so the treatment longevity rating is given based on km's to jump point - if one is present, and total kms to 0.1% if no jump point present.

There are still issues relating this application longevity testing to real world use. There are numerous factors that impact test result vs what you may experience in real world use. Number 1 - standard protocol is for the lubricant to be applied via immersive application as opposed to drip on. We are isolating out any potential initial penetration issues for this test. However some lubricants will exhibit notably better longevity results if applied via immersive vs if applied normally. A stand out here would be say Silca SS drip, where it is hard to get a heavy coating on via normal application - past about 2 or 3ml, any more will just drip off the chain - whereas say UFO drip you can get about a 10ml application to hold on the chain - Hence Silca's hints and tips around "layering" applications with SS drip. Immersive application with SS drip does yield significantly longer treatment lifespan vs what users will experience applying drip lubricant "normally". The difference between an immersive application for X drip lubricant and "Normal" application will vary from one lubricant to another. This test will show the relative treatment longevity difference from one lubricant vs another applied IMMERSIVE - the performance difference may well vary when applied via drip on application.

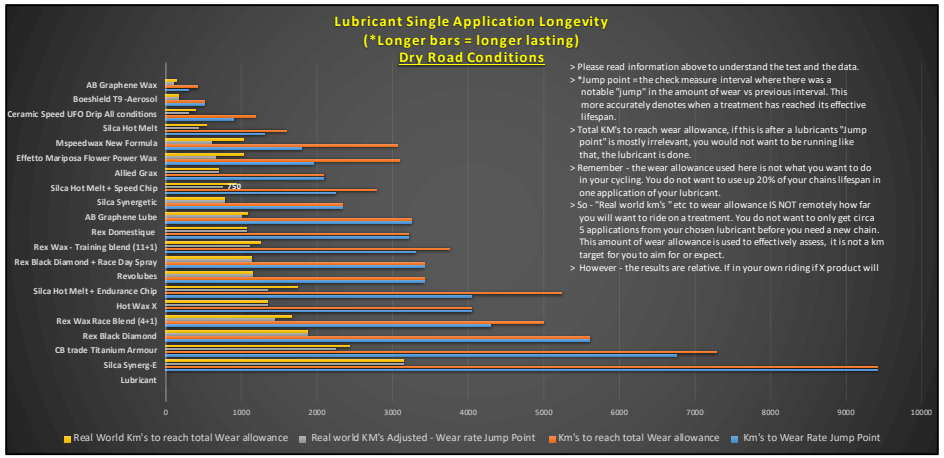
*Issue number 2 is that it is not normal to use up 20% of your chains wear life in a single lubricant application. Ie in general you would not expect your chain to be worn out after just 5 applications of your chosen lubricant. For the test I need to run the chain and treatment long enough to assess its treatment longevity, either by finding a clear jump point in wear, or simply how long a wet lubricant takes to use up the wear allowance. Hence showing how many kms the "treatment lasted" to get to test wear allowance has been often mis-understood and incorrectly used or referenced - Ie some media has referred to Silca Synerg-E lasting 9000km on a single treatment. It will not - a) machine KM's are not the same as pedalled km's - hence the "real world" relating where this is divided by 3 to more realistically relate, but also again you should not be running a treatment for that much wear per treatment. You should not be re lubricating such that your chain is worn out after 5 applications, this will mean that for much of the time on any application, you are riding with undesirably high friction and wear. As a very general guide (depending on lubricant application longevity, contamination it gathers per application based on lubricant properties, your riding, your maintenance etc) - typically one should expect really anywhere from 20 to 50 applications of their chosen lubricant before a chain reaches its wear allowance, there should be say circa 2 to 5% use of your chains lifespan per application - **NOT 20% .***

Depending on the lubricant, it may demonstrate very different performance results in from one test type to another. Some will excell in dry contamination resistance but fall over in wet, or vice versa. This will be key to helping you decide what to prep for your personal event based on length and expected conditions, and if you need to have a back up in case the conditions are different to what you expected.

TO THE DATA!

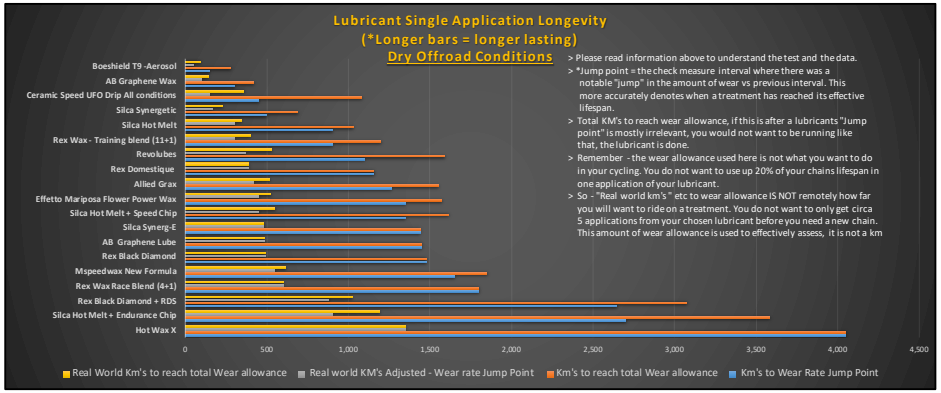
Single Application Longevity - Dry road conditions test

Lubricant	Km's to Wear Rate Jump Point	Km's to reach total Wear allowance	Real world KM's Adjusted - Wear rate Jump Point	Real World Km's to reach total Wear allowance	Treatment Longevity rating
Silca Synerg-E	9,412	9412	3,138	3138	10.0
CB trade Titanium Armour	6,750	7287	2,250	2429	10.0
Rex Black Diamond	5,602	5602	1,867	1867	9.3
Rex Wax Race Blend (4+1)	4,300	5000	1,433	1667	8.3
Hot Wax X	4,050	4050	1,350	1350	6.8
Silca Hot Melt + Endurance Chip	4,050	5238	1,350	1746	8.7
Revolubes	3,416	3416	1,139	1139	5.7
Rex Black Diamond + Race Day Spray	3,415	3415	1,138	1138	5.7
Rex Wax - Training blend (11+1)	3,300	3750	1,100	1250	6.3
Rex Domestique	3,210	3210	1,067	1067	5.3
AB Graphene Lube	3,254	3254	1,000	1085	5.4
Silca Synergetic	2,333	2333	778	778	3.9
Silca Hot Melt + Speed Chip	2,250	2783	750	928	
Allied Grax	2,089	2089	696	696	3.5
Effetto Mariposa Flower Power Wax	1,950	3088	650	1029	5.1
Mspeedwax New Formula	1,800	3063	600	1021	5.1
Silca Hot Melt	1,300	1595	433	531	2.7
Ceramic Speed UFO Drip All conditions	900	1182	300	394	2.0
Boeshield T9 -Aerosol	513	513	171	171	0.9
AB Graphene Wax	300	420	100	140	0.7



Single Application Longevity - Dry Gravel / Mtb / CX

Lubricant	Km's to Wear Rate Jump Point	Km's to reach total Wear allowance	Real world KM's Adjusted - Wear rate Jump Point	Real World Km's to reach total Wear allowance	Treatment Longevity rating
Hot Wax X	4,050	4050	1,350	1350	10
Silca Hot Melt + Endurance Chip	2,700	3580	900	1193	9.0
Rex Black Diamond + RDS	2,642	3071	880	1023	8.8
Rex Wax Race Blend (4+1)	1,800	1800	600	600	6.0
Mspeedwax New Formula	1,650	1848	550	616	5.5
Rex Black Diamond	1,476	1476	489	489	4.9
AB Graphene Lube	1,449	1449	483	483	4.8
Silca Synerg-E	1,440	1440	480	480	4.8
Silca Hot Melt + Speed Chip	1,350	1615	450	550	
Effetto Mariposa Flower Power Wax	1,350	1571	450	524	4.5
Allied Grax	1,265	1551	421	517	4.2
Rex Domestique	1,154	1154	385	385	3.9
Revolubes	1,100	1588	367	529	3.7
Rex Wax - Training blend (11+1)	900	1200	300	400	3.0
Silca Hot Melt	900	1030	300	343	3.0
Silca Synergetic	500	690	167	230	1.7
Ceramic Speed UFO Drip All conditions	450	1078	150	360	1.5
AB Graphene Wax	300	420	100	140	1.0
Boeshield T9 -Aerosol	150	279	50	93	0.5



Single Application Longevity - Extreme Conditions

Lubricant	Km's to Wear Rate Jump Point	Km's to reach total Wear allowance	Real world KM's Adjusted - Wear rate Jump Point	Real World Km's to reach total Wear allowance	Treatment Longevity rating
AB Graphene Lube	600	807	200	269	10.0
Silca Hot Melt + Endurance Chip	600	741	200	247	10.0
Silca Synergetic	500	690	167	230	8.4
Hot Wax X	450	450	150	150	7.5
Silca Hot Melt + Speed Chip	300	410	100	137	
Silca Hot Melt	300	637	100	212	5.0
Rex Wax - Training blend (11+1)	300	604	100	201	5.0
Mspeedwax New Formula	300	588	100	196	5.0
Rex Black Diamond	300	538	100	179	5.0
Rex Black Diamond + RDS	300	525	100	175	5.0
Effetto Mariposa Flower Power Wax	300	480	100	160	5.0
Allied Grax	300	450	100	150	5.0
Rex Wax Race Blend (4+1)	300	450	100	150	5.0
Rex Domestique	300	427	100	142	5.0
AB Graphene Wax	200	344	66	115	3.3
Ceramic Speed UFO Drip All conditions	150	357	50	119	2.5
Silca Synerg-E	150	330	50	110	2.5
Revolubes	150	300	50	100	2.5
Ceramic Speed Wet Conditions	150	262	50	87	2.5
Boeshield T9 -Aerosol	150	193	50	64	2.5