

**Muc-Off**



# LUDICROUS

**PRODUCT TESTING DATA**

**LUDICROUS AF RACE LUBE**

**ALL INFORMATION WITHIN THIS DOCUMENT IS STRICTLY UNDER EMBARGO  
UNTIL 16.09.21 10:00 BST**



# BRINGING SPEED

GOING FASTER & FASTER SINCE 2005

We've been bringing speed since 2005 with a total of...

- 10 GRAND TOUR WINS
- 'HOUR RECORD' WITH SIR BRADLEY WIGGINS
- 18 OLYMPIC GOLD MEDALS WITH TEAM GB
- PLUS COUNTLESS OTHER RACE WINS!

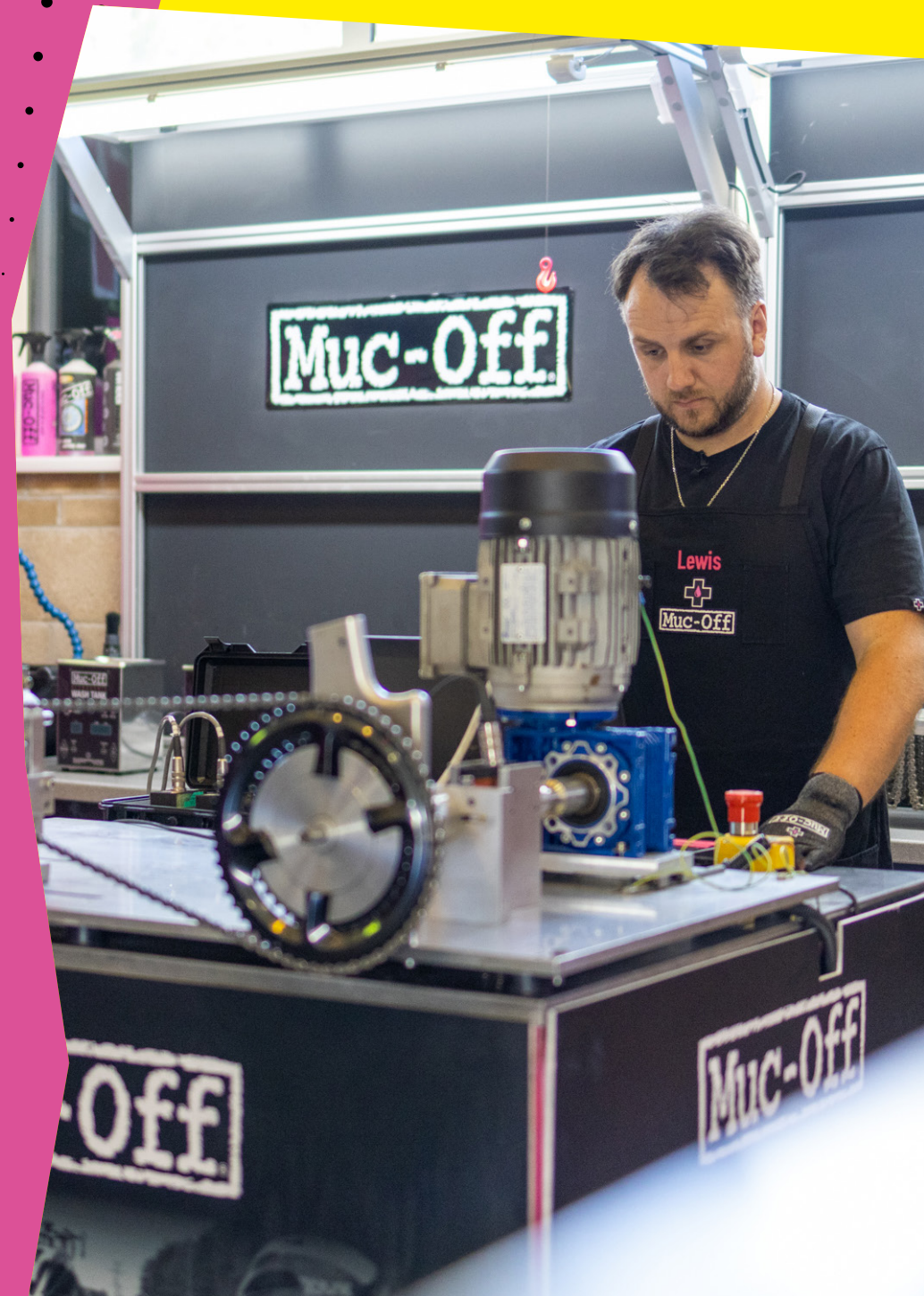


# ***THE NEXT LEVEL***

## ***PUSHING THE BOUNDARIES***

Tested and refined over the last three years in our R&D facility in Poole by the industry's leading tribologists, Ludicrous AF has been pro-peloton-approved for taking chain optimisation to an entirely new level.

- ***3+ years in development***
- ***1000+ hours of machine testing***
- ***10,000+ miles of real-world testing***
- ***Independently tested***
- ***Created with pro-teams***
- ***Industry-leading experts***
- ***State-of-art equipment***



# IT'S LUDICROUS.... AF

## PRODUCT OVERVIEW

### • THE WORLD'S FASTEST RACE LUBE

- **SPEED MEETS SUSTAINABILITY:** Ingredients from renewable sources and readily biodegradable
- **CONSISTENTLY RELIABLE:** Outstanding results from every application
- **SUPER DURABLE:** Performance improves over time
- **SILENT & SMOOTH:** The quietest and silkiest shifting available
- **WINNING BEFORE LAUNCH:** Winners of the Giro d'Italia and 12 Olympic medals in 2021
- **SUPER VERSATILE:** Designed for variable weather and temperature conditions

16TH SEPTEMBER 2021



# TESTING DATA



# 1. INTERNAL TESTING

- **SCREENING OVERVIEW**
- **COEFFICIENT OF FRICTION - DYNAMOMETER**
- **COEFFICIENT OF FRICTION - TRIBO-LAB**
- **WEAR ANALYSIS**



# IN-HOUSE TESTING STAGE 1

## SCREEN TESTING

Ludicrous AF is a stripped back, performance focused race lube. To support our ambition of creating the world's fastest, we screen-tested over 30 race lubes on our in-house dynamometer, the majority of which are currently being used at UCI WorldTeam level.

The purpose of the screen test is to narrow down the competitive set, for further in-depth analysis.



# IN-HOUSE TESTING STAGE 2

## DYNAMOMETER COEFFICIENT OF FRICTION TEST (MEASURE OF SPEED 1)

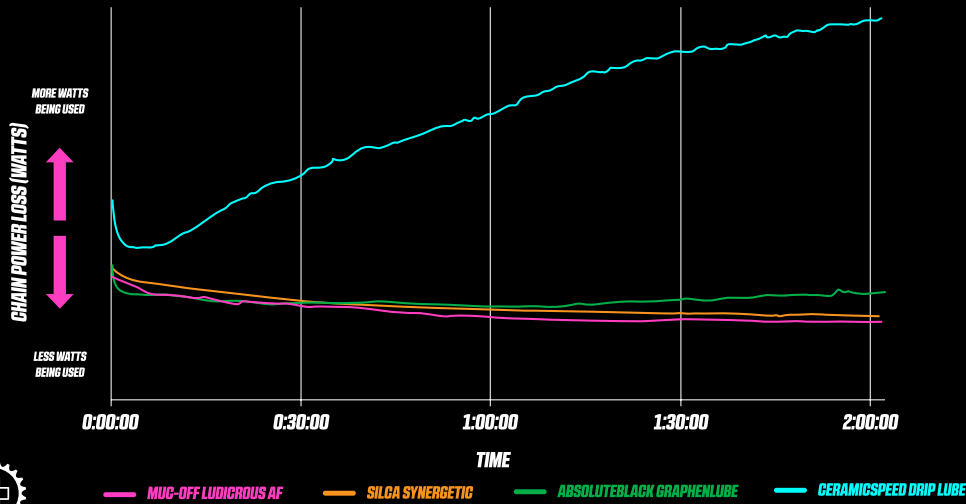
From the screen testing, Ludicrous AF, AbsoluteBLACK GRAPHENLube and Silca Synergetic Drip Lube were taken through to a more in-depth round of testing, on our in-house dynamometer.

We completed two sets of tests: A two-hour test on new chains, and a two-hour test on chains which had been run for 6-hours at 300 watts.

The testing once again concluded that in both scenarios, Ludicrous AF was the fastest.

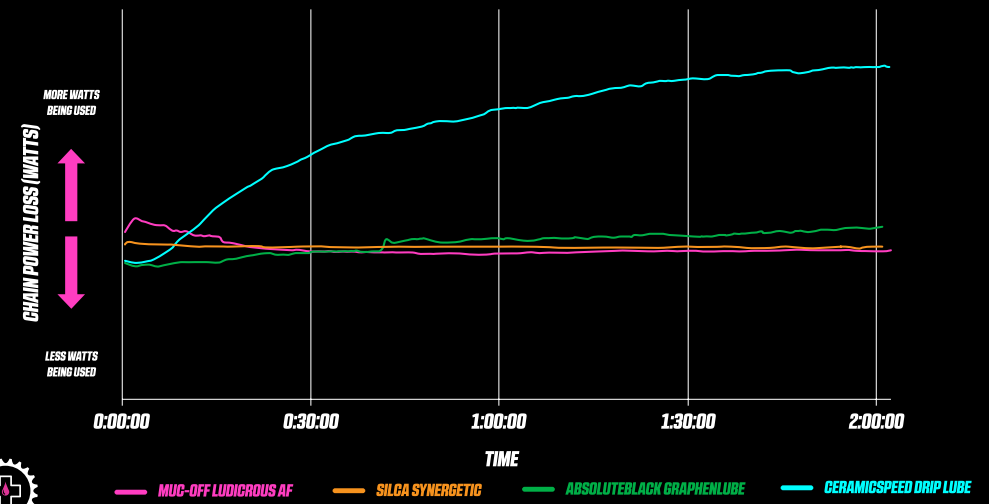
### 2 HOUR TEST ON NEW CHAINS

- 5% MORE POWER REQUIRED IF USING SYNERGETIC OVER LUDICROUS AF
- 18% MORE POWER REQUIRED IF USING ABSOLUTEBLACK OVER LUDICROUS AF
- 195% MORE POWER REQUIRED IF USING CERAMIC SPEED OVER LUDICROUS AF



### 2 HOUR TEST AFTER 6 HOURS AT 300 WATTS

- 3% MORE POWER REQUIRED IF USING SYNERGETIC OVER LUDICROUS AF
- 15% MORE POWER REQUIRED IF USING ABSOLUTEBLACK OVER LUDICROUS AF
- 124% MORE POWER REQUIRED IF USING CERAMIC SPEED OVER LUDICROUS AF





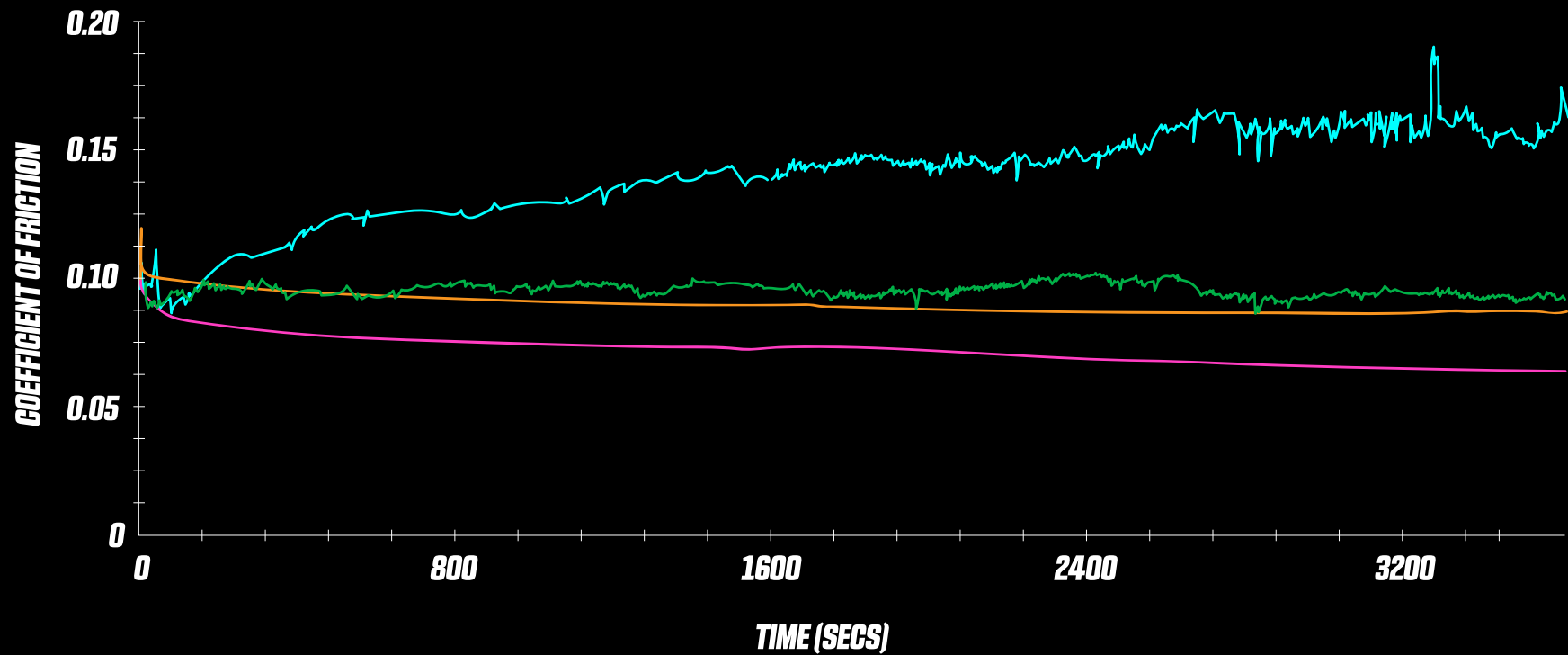
# IN-HOUSE TESTING STAGE 3

## TRIBO-LAB COEFFICIENT OF FRICTION TEST (MEASURE OF SPEED 2)

We also tested the same lubes on our tribo-lab, with all testing conforming to the bicycle specific protocol developed with NPL (National Physical Laboratory).

As with the dynamometer test, Ludicrous AF delivered the best performance, by exhibiting the lowest Coefficient of Friction.

### COEFFICIENT OF FRICTION TRIBO-LAB TESTING DATA



MUC-OFF LUDIGROUS AF

SILCA SYNERGETIC

ABSOLUTEBLACK GRAPHENLUBE

CERAMICSPEED DRIP LUBE

# IN-HOUSE TESTING STAGE 4

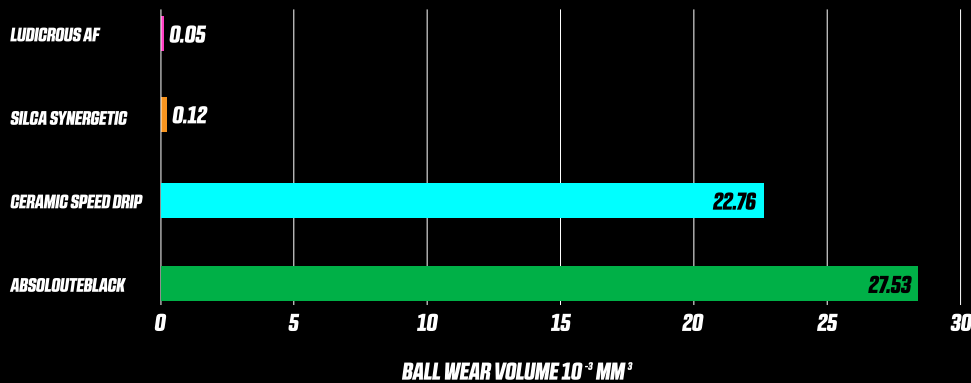
## WEAR VOLUMES (MEASURE OF WEAR)

Understanding how Ludicrous AF performs in terms of wear is also critical, as riders' demand a balance of speed and durability.

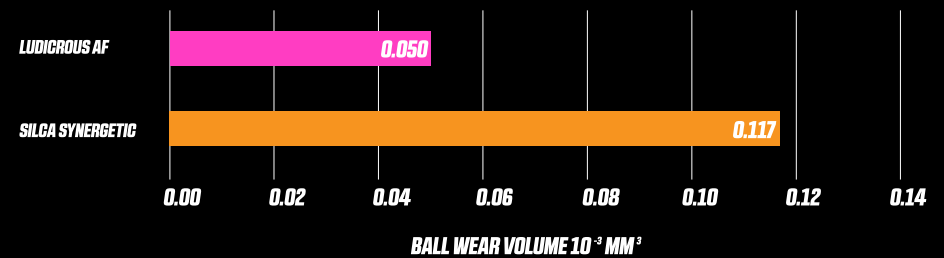
Once again using our in-house tribo-lab, adhering to the ASTM G133 standard testing protocol, we completed wear analysis across our focused competitor set.

These graphs show Ludicrous AF providing the lowest volume of wear, preserving the life of both the chain and groupset. The left hand graph shows the full set of results, but due to the wide spread of data, we have included a focused view to show the visible comparison between Ludicrous AF vs Silca Synergetic Drip Lube.

### ASTM G133 WEAR VOLUMES



### ASTM G133 WEAR VOLUMES - FOCUSED VIEW



# 2. INDEPENDENT TESTING

BY NEW MOTION LABS: HIGH ACCURACY, MULTI-TORQUE TRANSMISSION EFFICIENCY LABORATORY

- **OVERALL WATTAGE EFFICIENCY**
- **WATTAGE EFFICIENCY BY BRAND**
- **WATTAGE EFFICIENCY BY BRAND AT COMPETITION LEVELS**



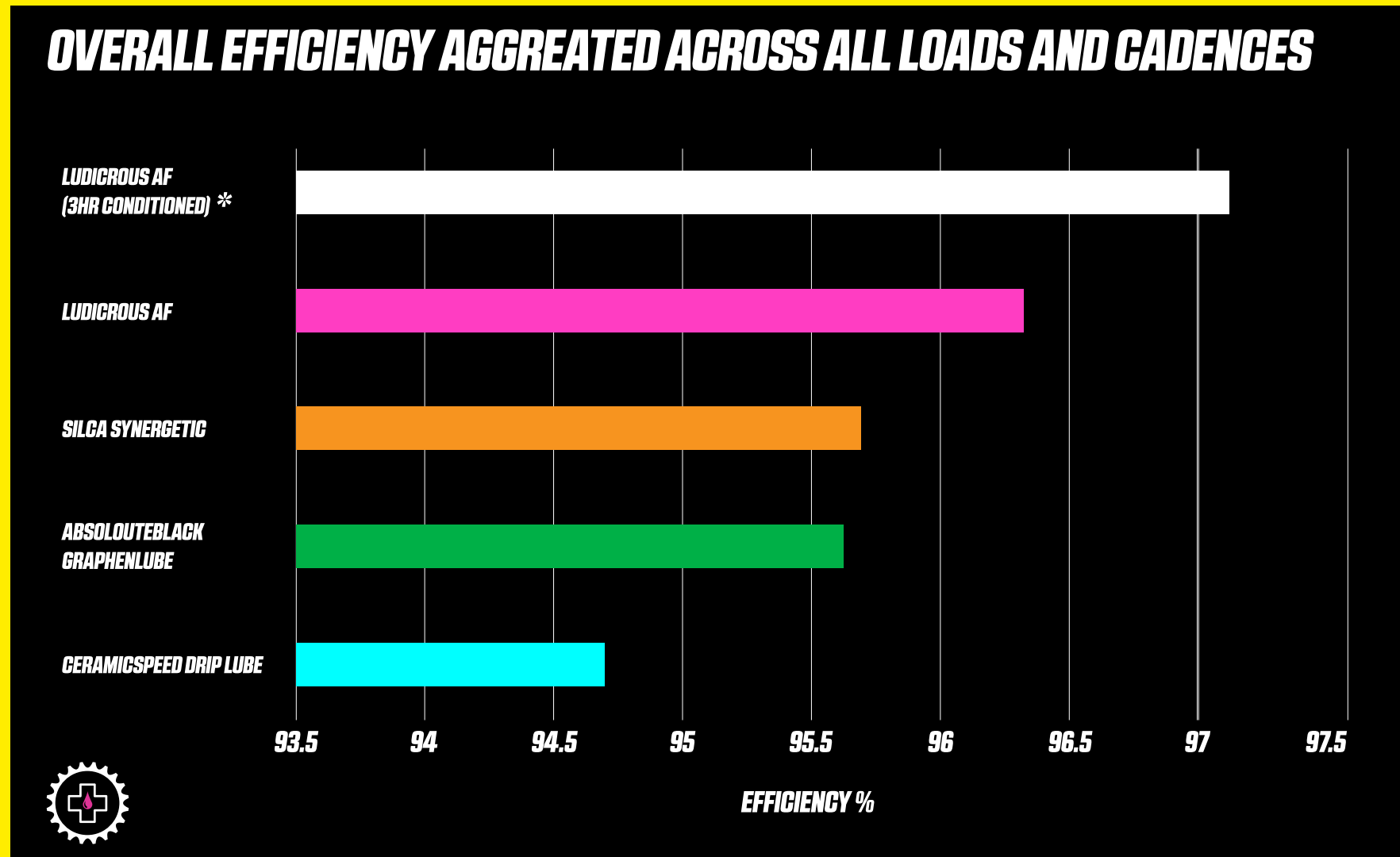
# INDEPENDENT TESTING

## OVERALL WATTAGE EFFICIENCY

Following all our in-house testing, we sought out independent testing to provide a broad set of objective results.

The independent laboratory ran tests to measure overall efficiency. They ran an absorbing power test across a range of loads (100 – 1100 watts) and cadences (60 – 140rpm). The chart shows that Ludicrous AF was the most efficient (fastest) across all loads and cadences.

We are showing the Ludicrous AF 3-hour conditioned data, to highlight positive impact of chain conditioning.



\*Chain conditioned by running in process on dynamometer @ 300 watts for 3 hours

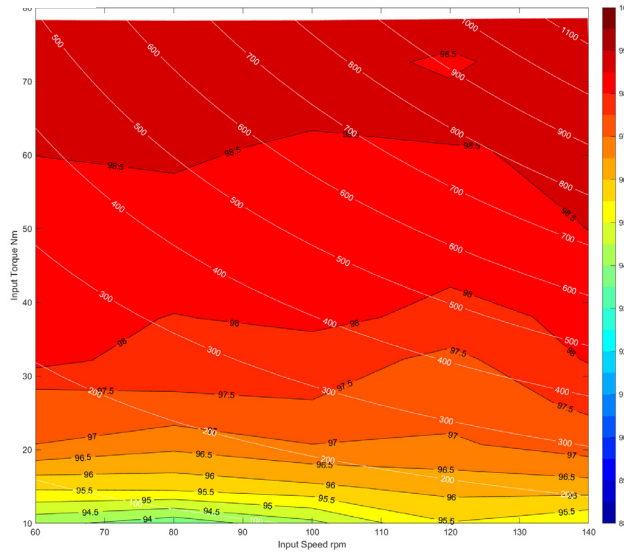
# INDEPENDENT TESTING

## WATTAGE EFFICIENCY BY BRAND

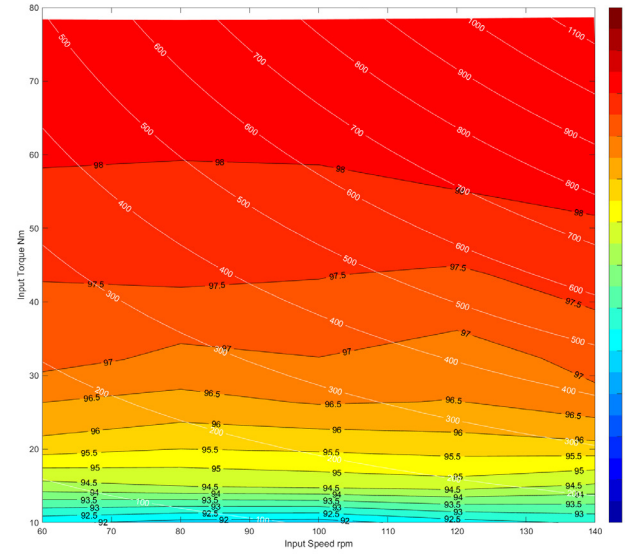
The individual heatmaps show this data at brand level – The darker the colour the higher the efficiency, ranging from blue, low efficiency to dark red, high efficiency. Larger regions of red = A more efficient chain.

The associated power input is represented by the curved lines.

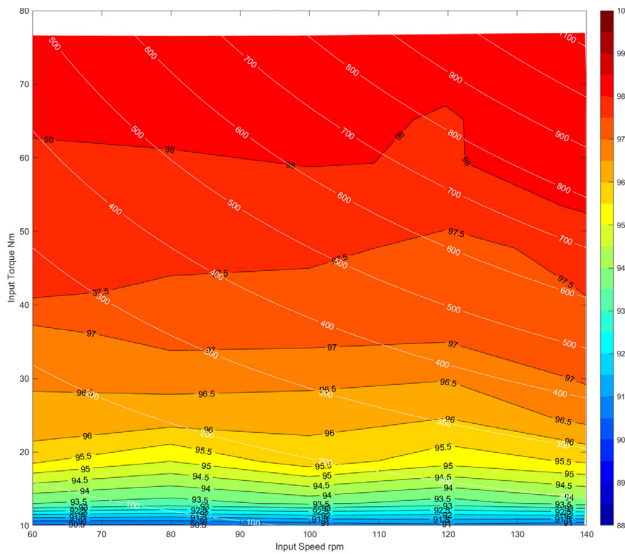
### LUDIGROUS AF 3-HOUR CONDITIONED



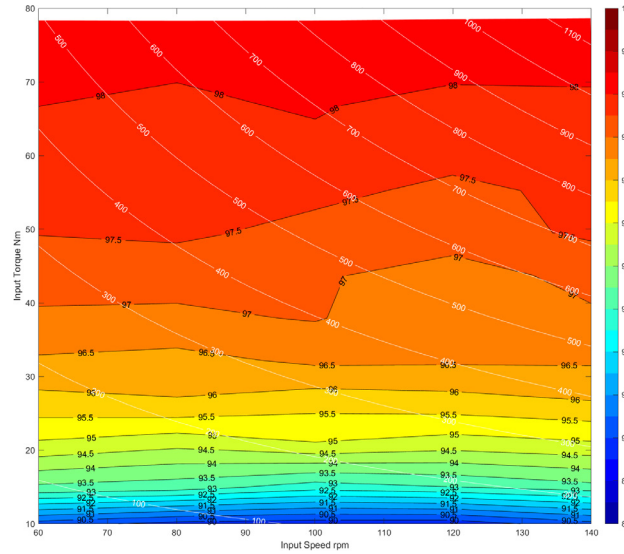
### LUDIGROUS AF



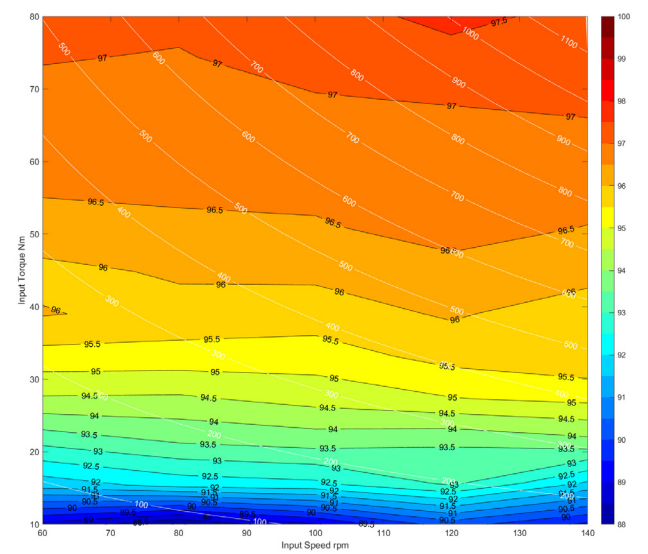
### SILCA SYNERGETIC DRIP LUBE



### ABSOLUTE BLACK GRAPHENLUBE



### CERAMIC SPEED UFO DRIP



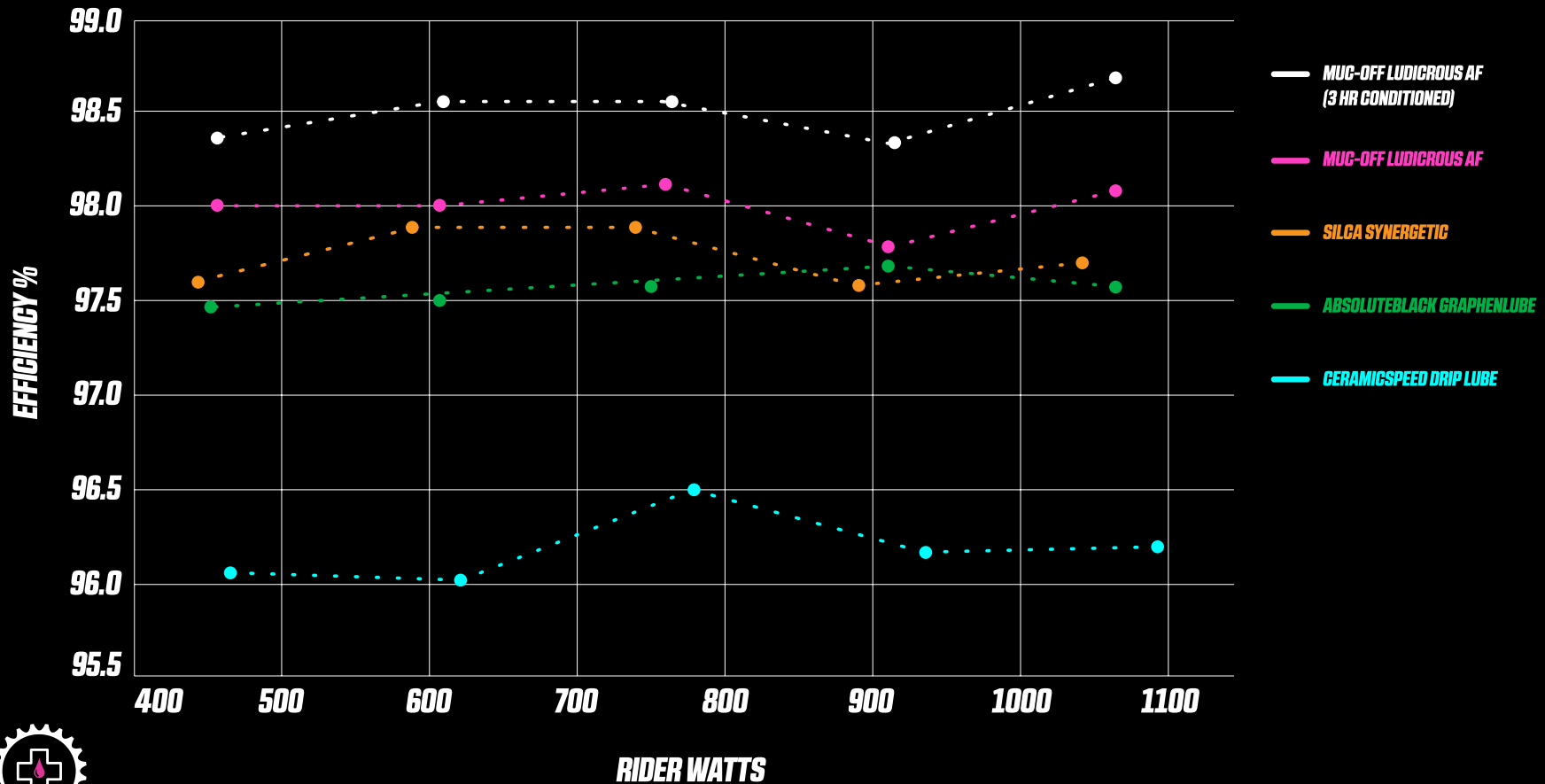
# INDEPENDENT TESTING

## EFFICIENCY COMPARISON AT HIGH WATTAGES

The graph shows that at higher wattages and torques, Ludicrous AF has high levels of performance.

This analysis is rarely seen but gives an insight to the benefits to be considered by an athlete demanding ultimate levels of performance, when drivetrains are being subjected to the power created at the pinnacle of the sport, such as track cyclists and pro athletes.

### EFFICIENCY GAINS AT COMPETITION PERFORMANCE LEVELS WHEN USING LUDICROUS AF (TORQUE 110NM)



# 3. REAL WORLD TESTING

- **RIDE-OUT DATA**
- **PRO-TEAM REPEATABILITY**
- **BENEFITS OF CHAIN OPTIMISATION**

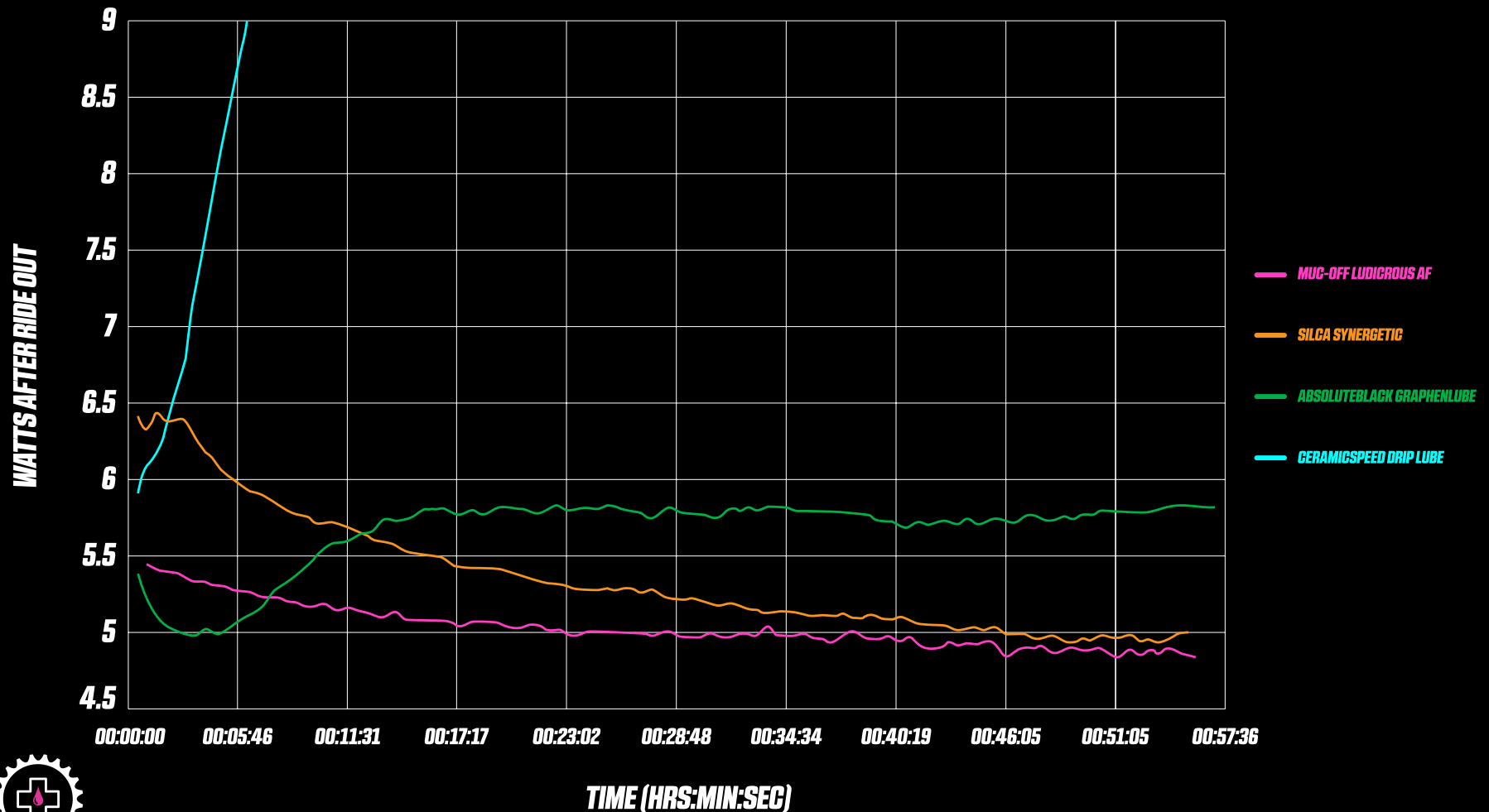


# REAL WORLD TESTING 1

## RIDE-OUT DATA

Beyond all of the lab testing, ride out data was completed to further understand performance. Route, weather and componentry remained consistent for each ride out.

### PERFORMANCE AFTER 3 HOUR ROAD RIDE (DRY WEATHER CONDITIONS)





# REAL WORLD TESTING 2

## WORLD TOUR RACE DATA\*

The charts here show wattage loss from world tour race chains #994 and #997. Both show three rounds of chain optimisation on two different riders and chains.

The shape of the charts highlight two things: First, the benefit of repeated chain optimisation, but secondly, the repeatability and consistency Ludicrous AF delivers.

The two sets of data are virtually identical, meaning the lube and therefore the chain, delivers predictable and consistent results. This is crucial for the pro-teams chasing marginal gains – being able to accurately predict the performance of a lube time and time again gives the riders and the team confidence that they can rely on the product; allowing them to focus solely on delivering a great performance on the road irrespective of weather and temperature conditions.

### WORLD TOUR RACE DATA #994: WATTAGE LOSS DATA FOR THREE ROUNDS OF CHAIN OPTIMISATION

RETURN FROM THE BENELUX TOUR  
2021



TREATED CHAIN



RETURN FROM TOUR DE ROMANDIE  
2021



CHAIN RETREATED



### WORLD TOUR RACE DATA #997: WATTAGE LOSS DATA FOR THREE ROUNDS OF CHAIN OPTIMISATION

RETURN FROM THE BENELUX TOUR  
2021



TREATED CHAIN



RETURN FROM TOUR DE ROMANDIE  
2021



CHAIN RETREATED



\*Teams and riders are not identified due to competitive confidentiality.

# REAL WORLD TESTING 3

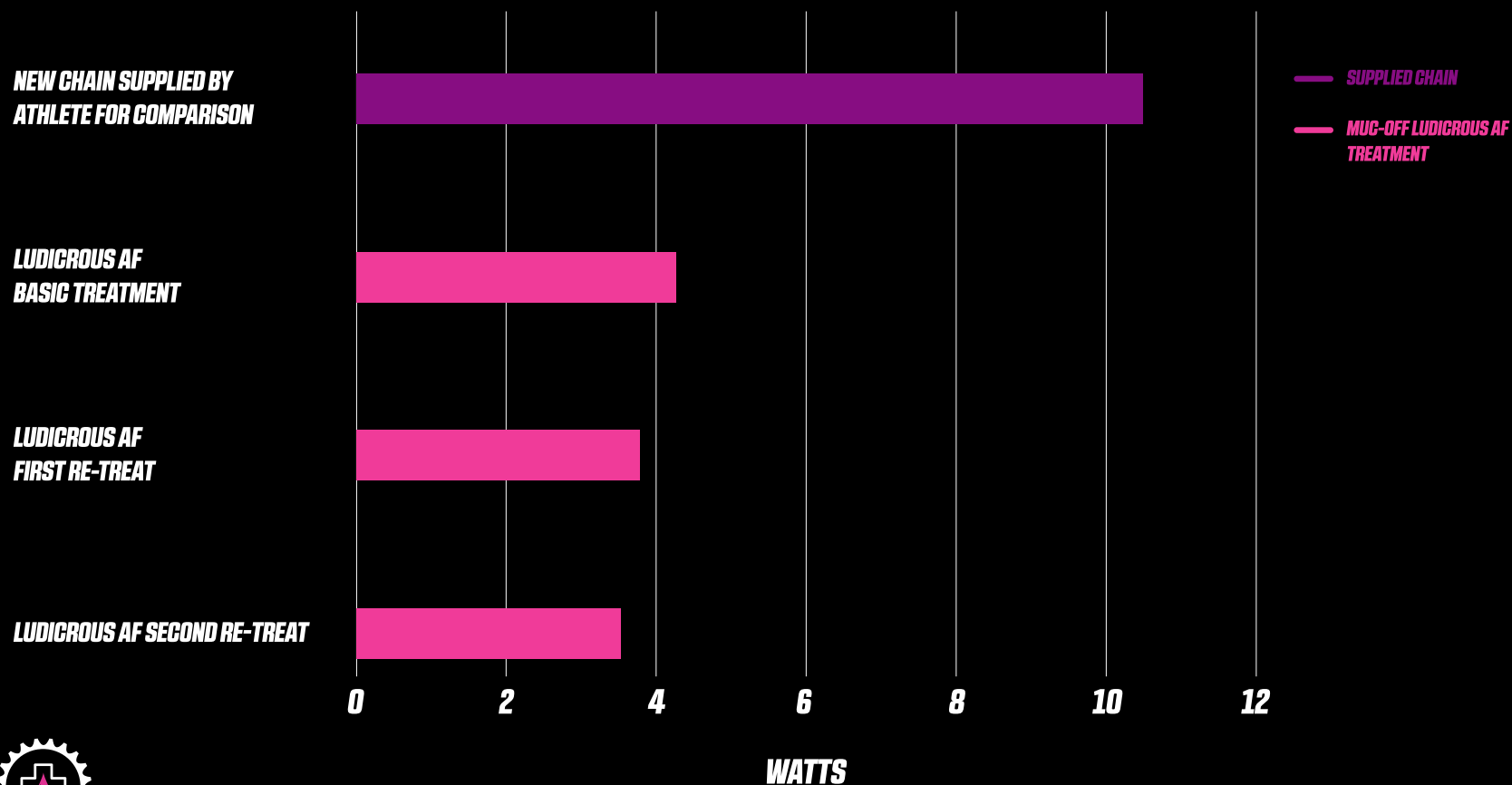
## PRO-TRIATHLETE RACE DATA

When competing at the highest level, drivetrain optimisation is an essential part of the winning formula.

This graph shows chain power-loss data from a pro-triathlete through time. The original chain was assessed to create a baseline of data and a new chain was supplied and given a base treatment. Following subsequent races and Ludicrous AF treatments, we were able to reduce wattage loss each time.

From this we're able to conclude that the compound effect of repeating the optimisation process, leads to the chain getting faster every time.

### PRO-TRIATHLETE CHAIN WATTAGE LOSS DATA FOR THREE ROUNDS OF CHAIN OPTIMISATION



# WE NEED YOU!

During the development of Ludicrous AF we have worked to combine robust, in-house testing methods on state-of-the-art equipment, with independent and real-world testing data, to enable us to be as confident as possible in our product claims.

As you may know, there is currently no agreed industry standard for testing lubricants. We'd like to see that change.

So, over the coming months, we'll be reaching out to other companies and experts in this field, to join forces and work to create a standardised industry testing protocol for us all to follow. We hope that this will lead to greater innovation in the market, and ultimately give riders' more transparency and understanding of the products they're putting on their bikes.

If you're interested in being part of the discussion, please get in touch via: [independent-testing@muc-off.com](mailto:independent-testing@muc-off.com) – We welcome your input.



# ***WHERE WE'RE HEADING***

## ***THE ULTIMATE DRIVETRAIN OPTIMISATION PROGRAMME***

Ludicrous AF is part of our wider chain optimisation innovation project, this is the result of thousands of man-hours, testing & innovation to ensure we create a prepped chain for speed!

Performance Hub launching with Ludicrous AF – The new home for all things 'Muc-Off Performance'. Read the full development story and get super-detailed information about the pro-level products we produce.

In the spirit of filtering down pro-level tech, we're working on making ultrasonic chain optimisation available for all riders. We plan to launch in the autumn – more details to follow nearer the time.

# **PRESS**

## **INFORMATION**

- **Embargo lifted 16.09.2021 10:00 BST**
- **Find links to all press resources within the press pack email including:**
  - **Link to high resolution product and lifestyle photography**
  - **Link to official launch video**
  - **Preview link to Performance Hub (See email for password)**
- **Official Hashtag #LudicrousAF**



***THANKYOU***

**LOVE**