Current device design
(new design from Q2 2022)

VESevo: **V**iscoelasticity **E**valuation **S**ystem **evol**ved

The idea of the device was born to satisfy the necessity to comprehend the mechanical behaviour of Motorsport Tires, usually protected by testing limitations due to their confidentiality

First customers came from F1 and MotoGP categories, where now we have respectively 6 and 3 teams using VESevo

Formula 1

MotoGP

The main target that the device aimed to get, since its first steps, was the <u>non destructive</u> evaluation of tread compound properties

VESevo: technology innovation level
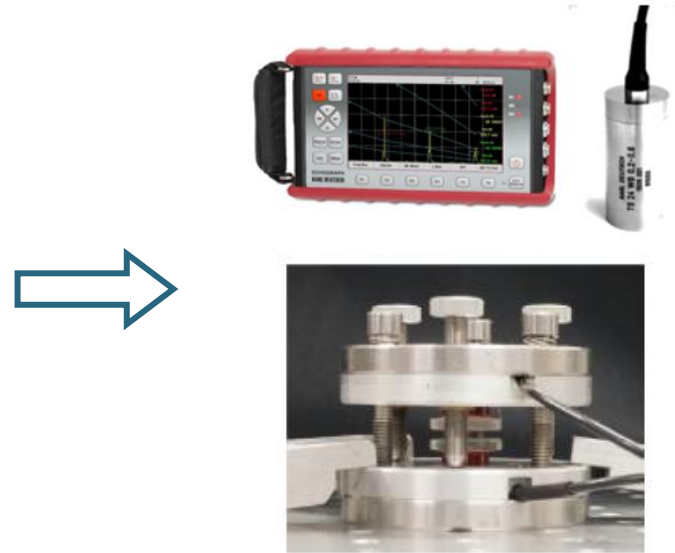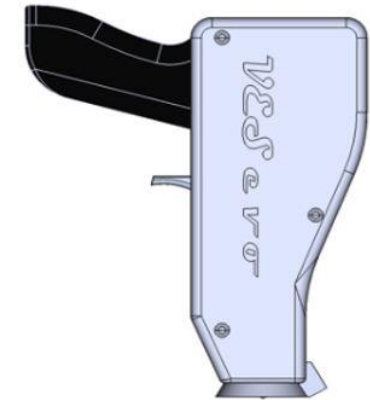
COMMON RUBBER ANALYSIS

- DESTRUCTIVE (SPECIFIC SAMPLES)
- LABORATORIAL
- EXPENSIVE EQUIPMENT (> 100K$)

ALTERNATIVE METHODOLOGIES

- STILL REQUIRING SPECIFIC SAMPLES
- LABORATORIAL
- LESS EXPENSIVE THAN DMA

AN INNOVATIVE APPROACH: VESevo

- NON-DESTRUCTIVE METHODOLOGY
- IN-SITU SMART AND REAL-TIME ANALYSIS
- INNOVATIVE & PATENTED TECHNOLOGY
- SIGNIFICANT COST REDUCTION

VESevo: main features

PATENTED INNOVATIVE DEVICE
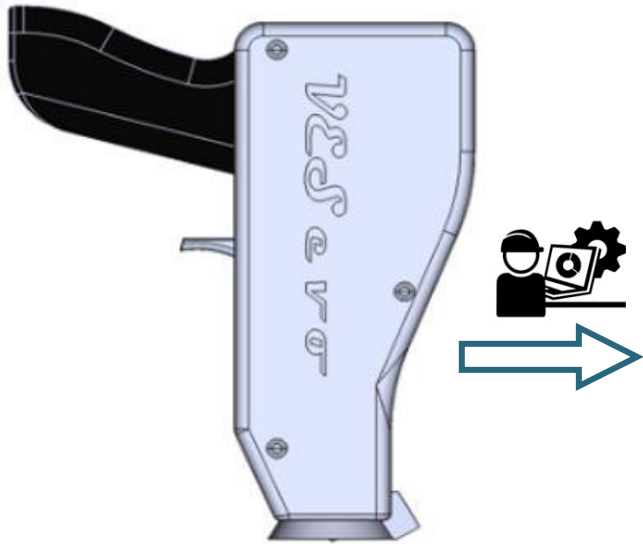
The VESevo has been developed in order to have:

- Complete viscoelasticity characterization (E' and Tan δ) through non-destructive procedure

- Smart data acquisition for real-time and in situ analysis

- Constructive simplicity and high ergonomics

- High precision measurements

- High repeatability by means of patented technology

VESevo: main features

Compact and ergonomics technology

One device for complete viscoelasticity characterization

Totally non-invasive procedure

Smart data acquisition for real-time and in situ analysis

Easy-to-use
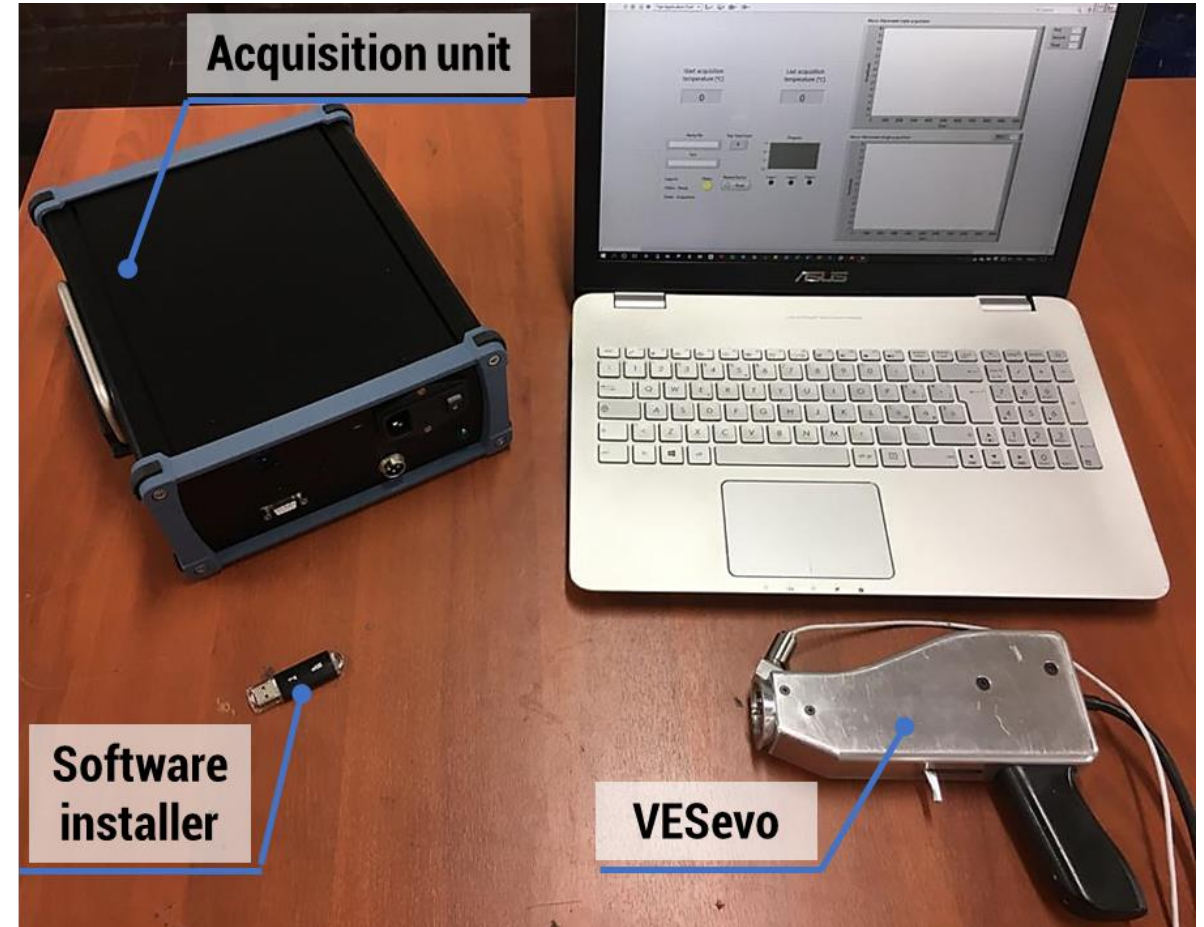
Current device design
(new design and embedded electronics from Q2 2022)

VESevo: device description

Optical Sensor

IR Temperature Sensor

Semi-Spherical Indenter

- A semi-automatic drop system allows high repeatability

- The optical sensor, having a sampling rate of 100 kHz, guarantees high reliability and sensibility of measurements

- The temperature of each test is measured in real time by means of an IR Temperature integrate sensor

- Temperature measures range from -30°C up to 130°C

- Speed of execution: 2.5 seconds for each acquisition

VESevo: software and data processing

Data Aquisition

GUI for data acquisition

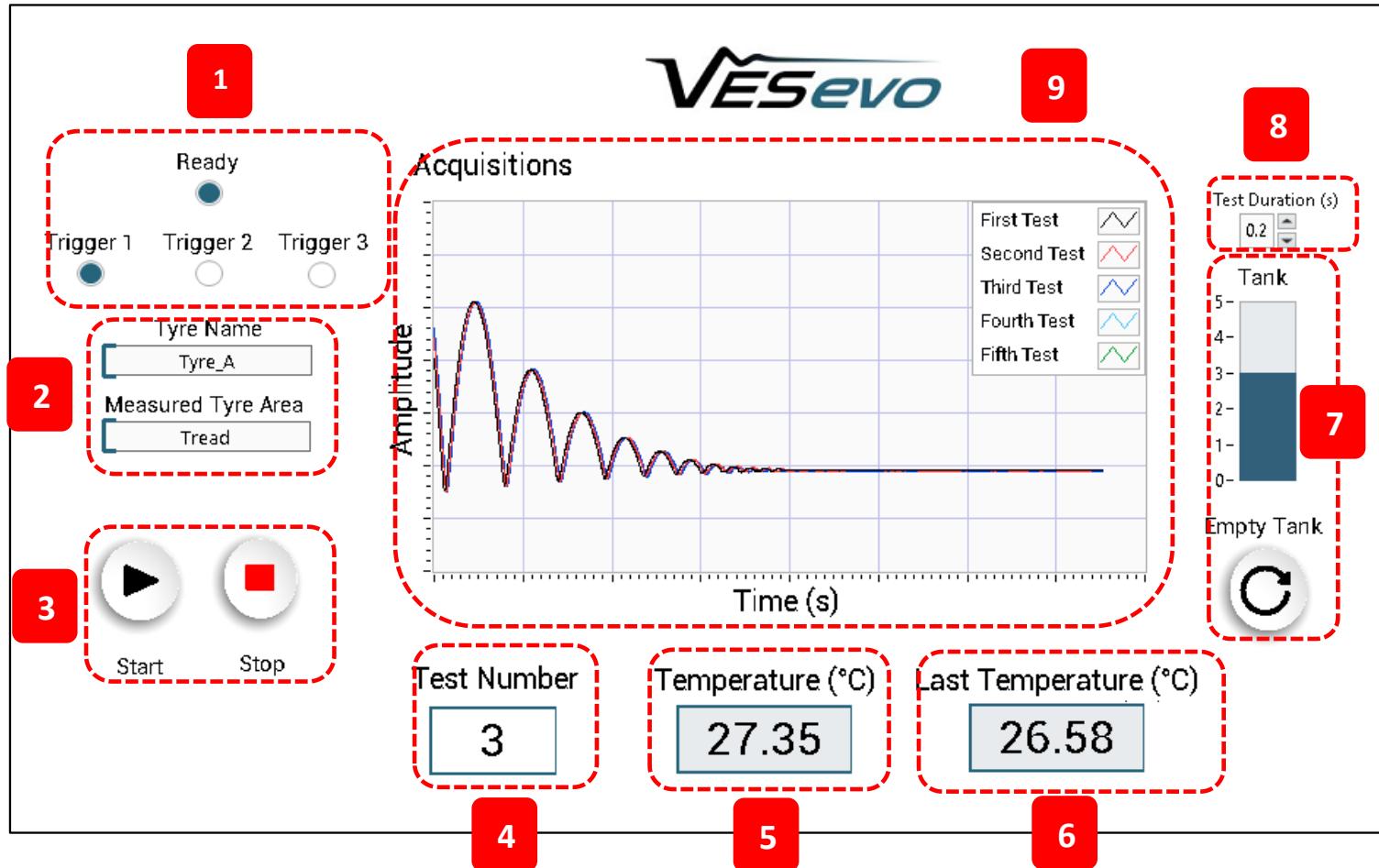|	
1	Sequence of acquisition triggers
2	Tyre name (or file name) & measured area name
3	Start & Stop acquisition buttons
4	Tests total number
5	Measured Temperature pre-quintuplette
6	Last temperature acquired
7	Quintuplet progress tank & reset tank button
8	Duration of single acquisition
9	Acquired signals time plot

VESevo: measurements and validation

SW A - TEMPERATURE SWEEP CHARACTERIZATION
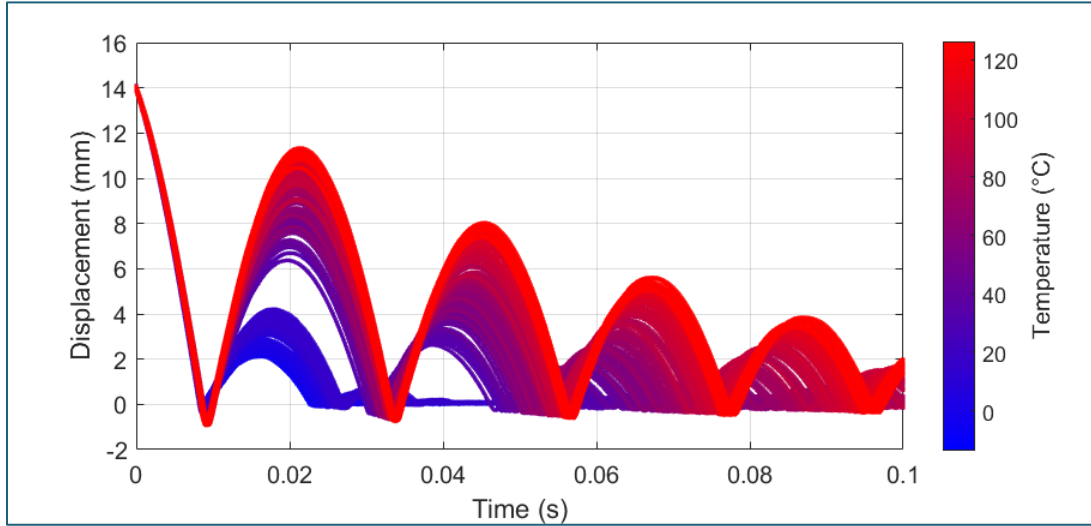
Temperature Sweep processing algorithm

- Data filtering

- Features extrapolation

- Viscoelastic properties evaluation

VESevo: software and data processing
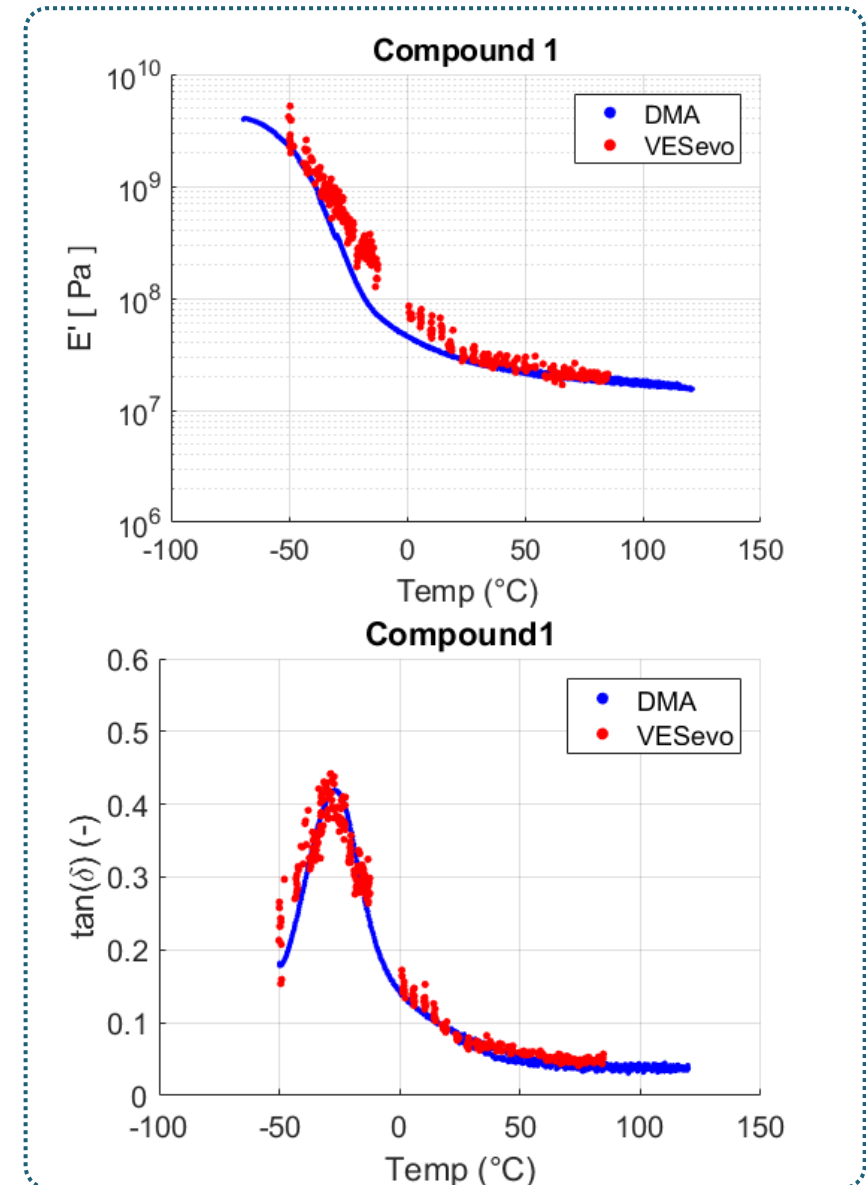
SW B - VISCOELASTIC INDEXES FAST EVALUATION

new software for users' independent data management
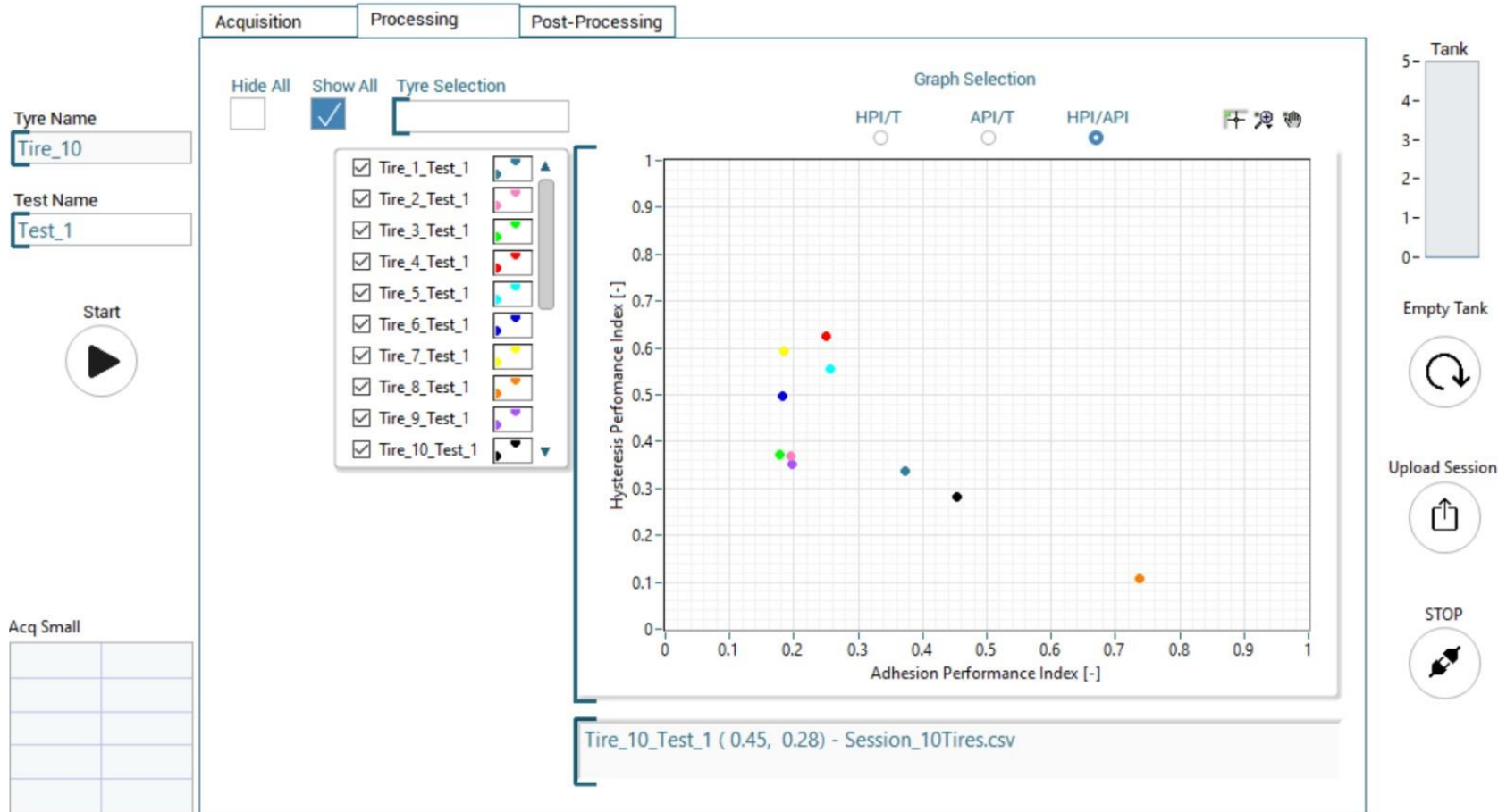
VESevo for Motorsport: advantages and main scenarios of use

QUALITY CHECK

COMPOUNDS CHARACTERIZATION

CURING EFFECTS

BRAND NEW TIRES:

WORKING TIRES:

CORRELATION WITH VEHICLE DATA ENERGY

PROGRESSIVE WEAR EFFECTS

RUN DISTANCE
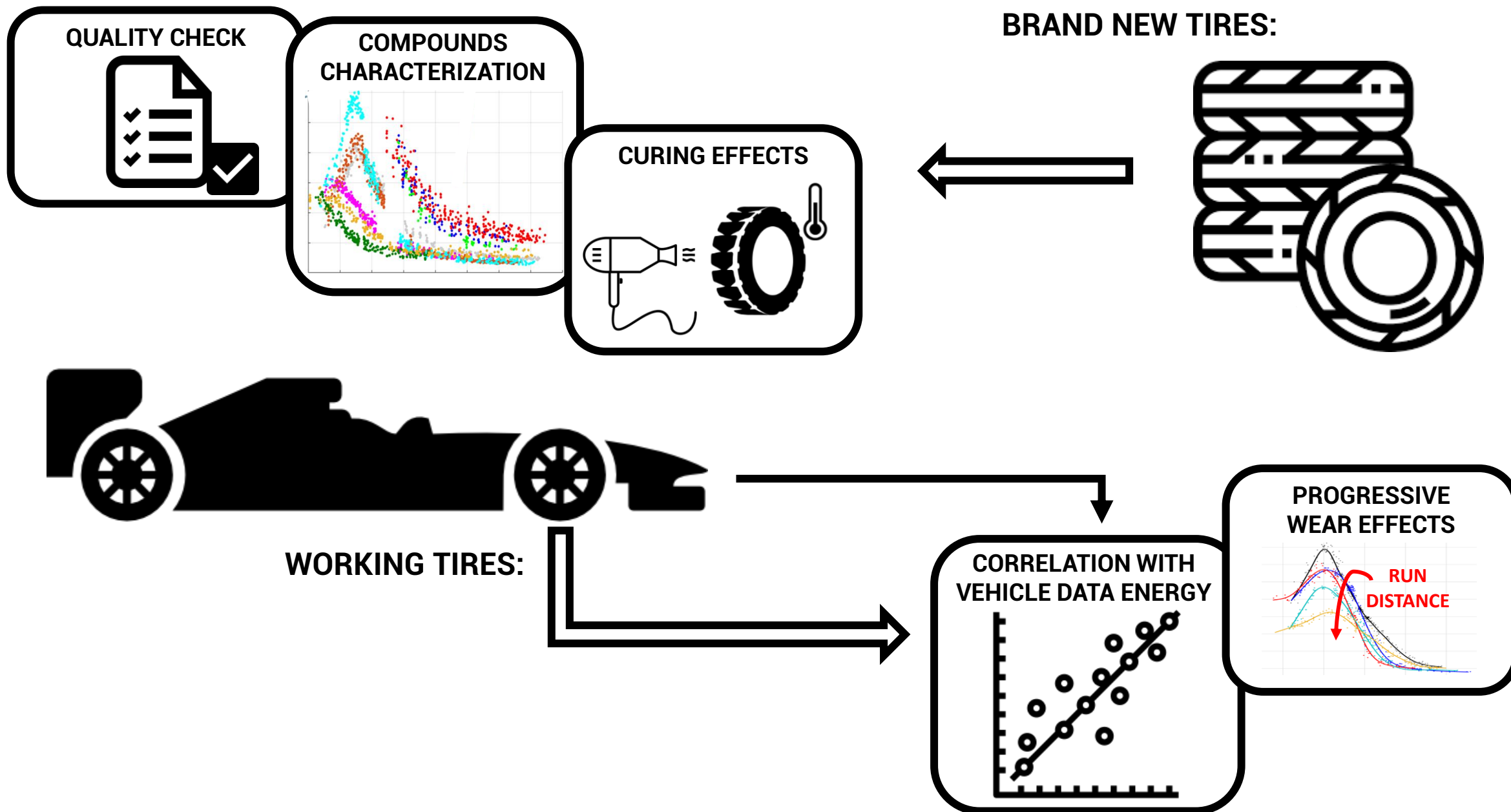
VESevo for Motorsport: tires compound performance comparison

Storage Modulus

Loss Factor

Different optimal temperature working conditions among the tires.
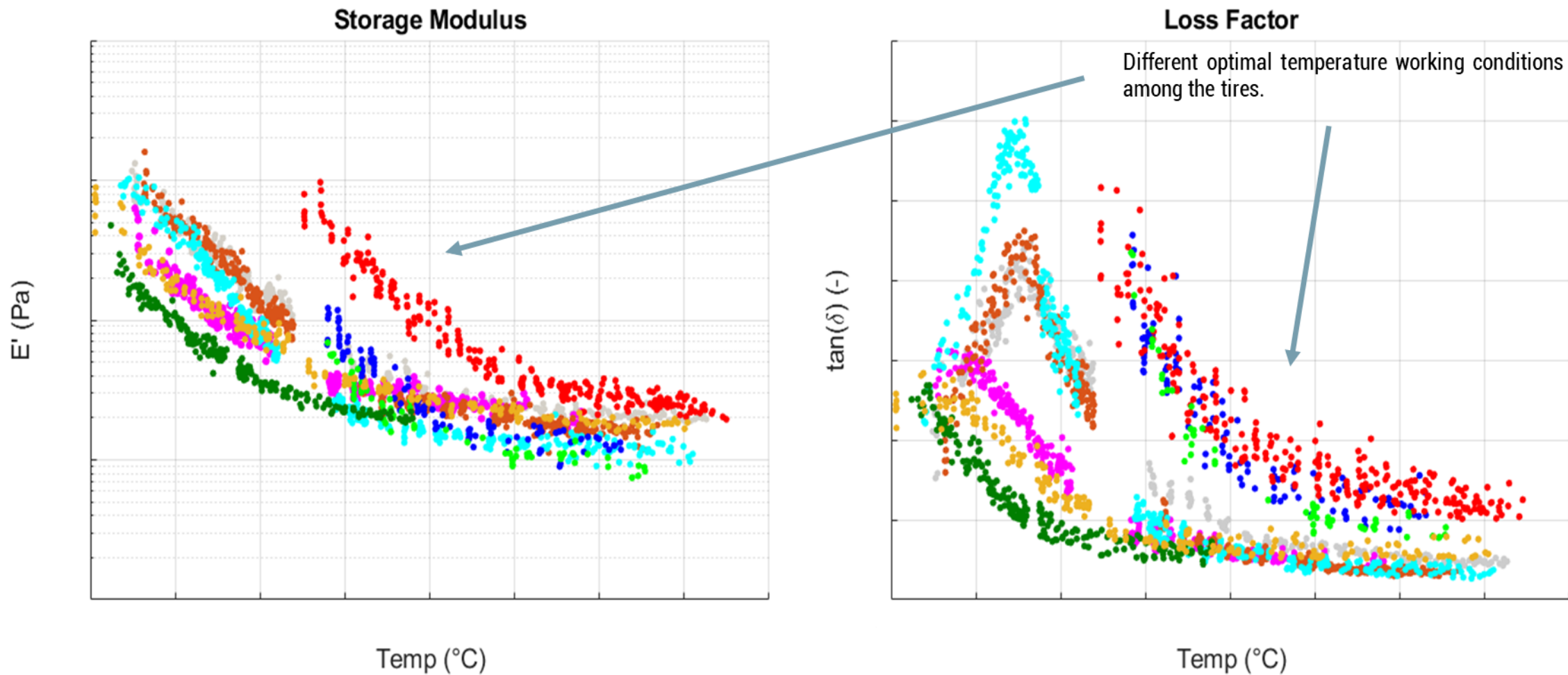
VESevo for Motorsport: tires performance analysis

Storage Modulus

New Tires (- RL -- RR)
Used Tires (- RL -- RR)
Bad performing used tire (RL)
Middle mileage tire (RL)

Log$_{10}$(E$_1$) (Pa)

Shifted Temperature (°C)

Loss Factor

New Tires (- RL -- RR)
Used Tires (- RL -- RR)
Bad performing used tire (RL)
Middle mileage tire (RL)

tan(δ) (-)

Shifted Temperature (°C)
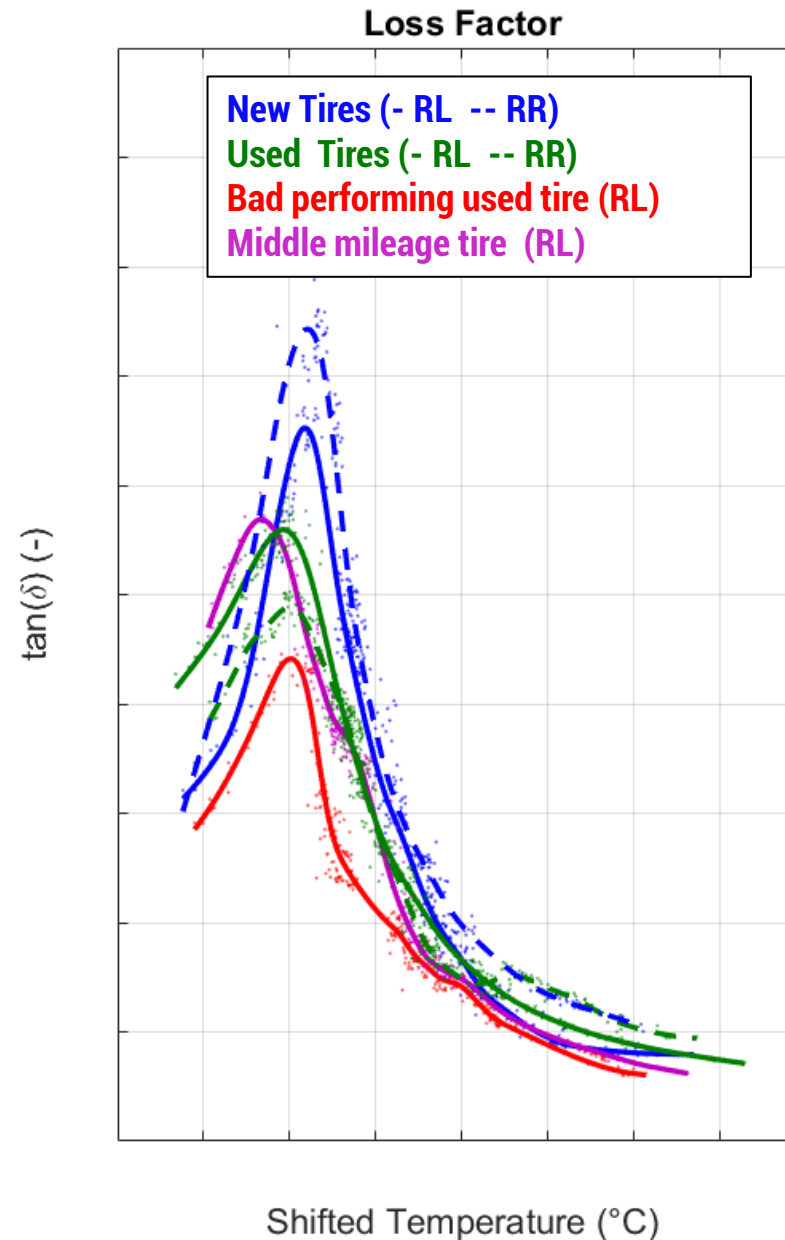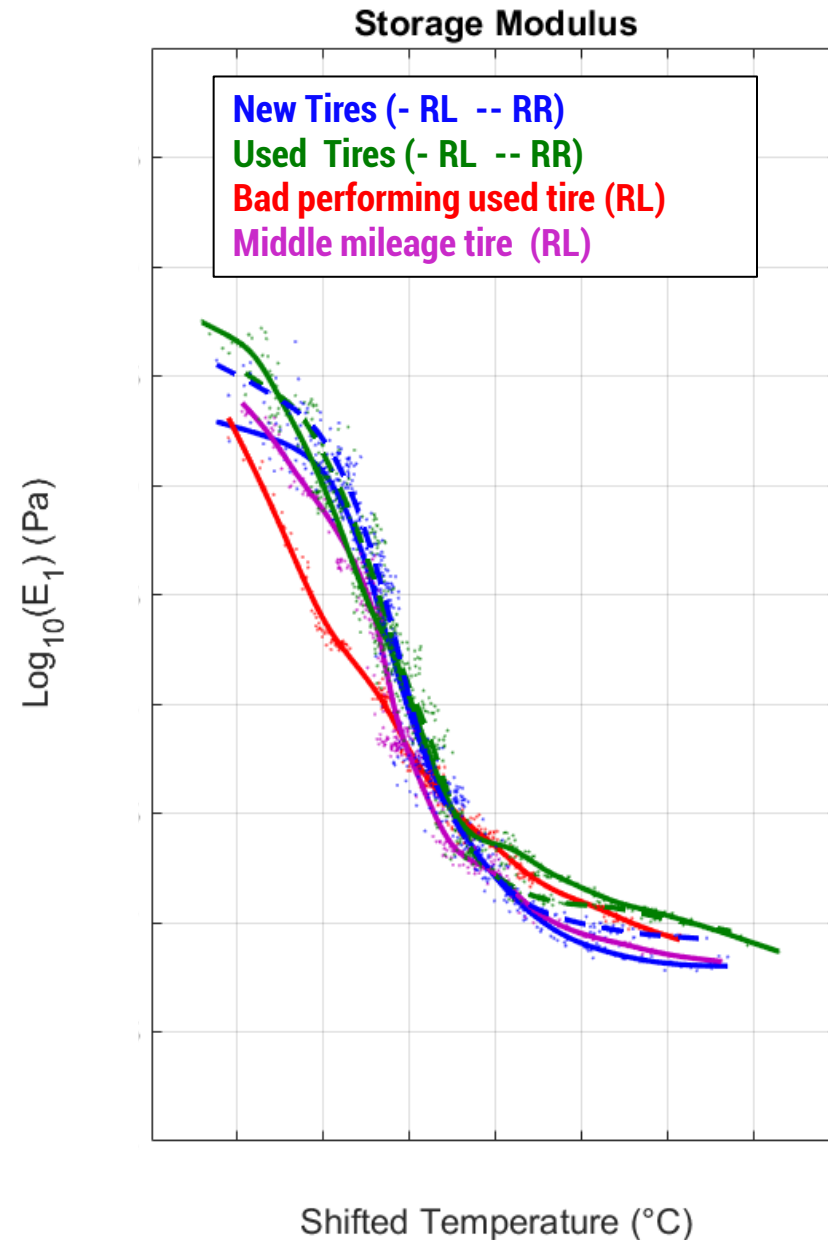
VESevo for Motorsport: wear effects
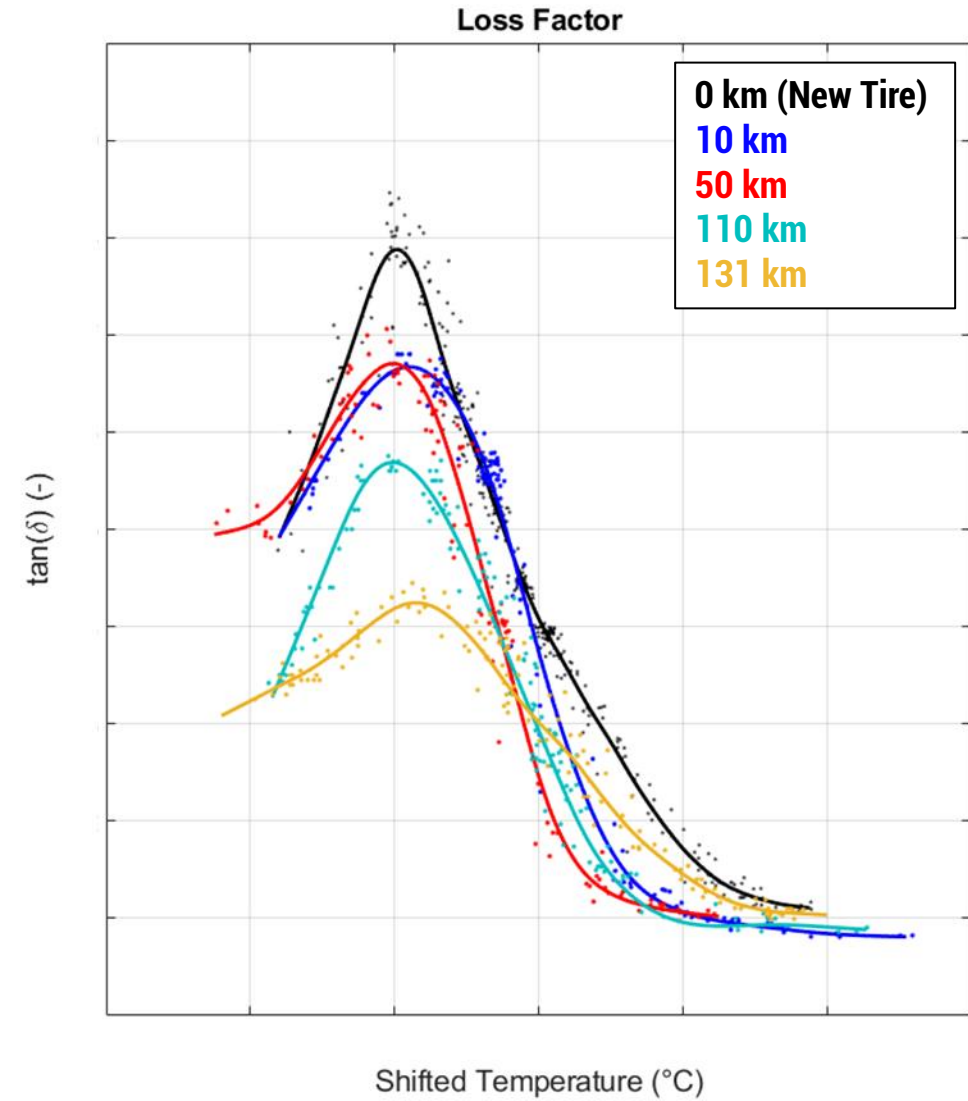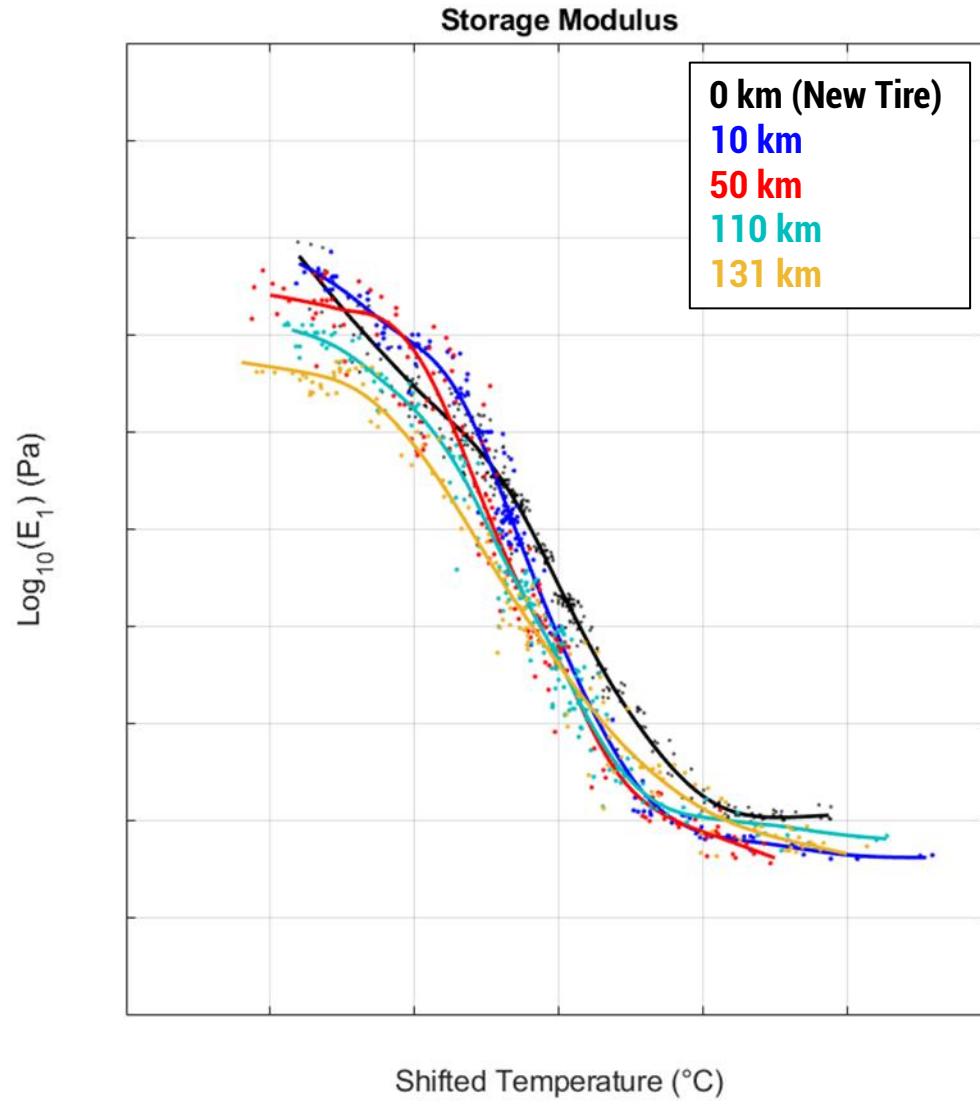
VESevo for Motorsport: curing effects

Curing effect analysis (1 Hour)
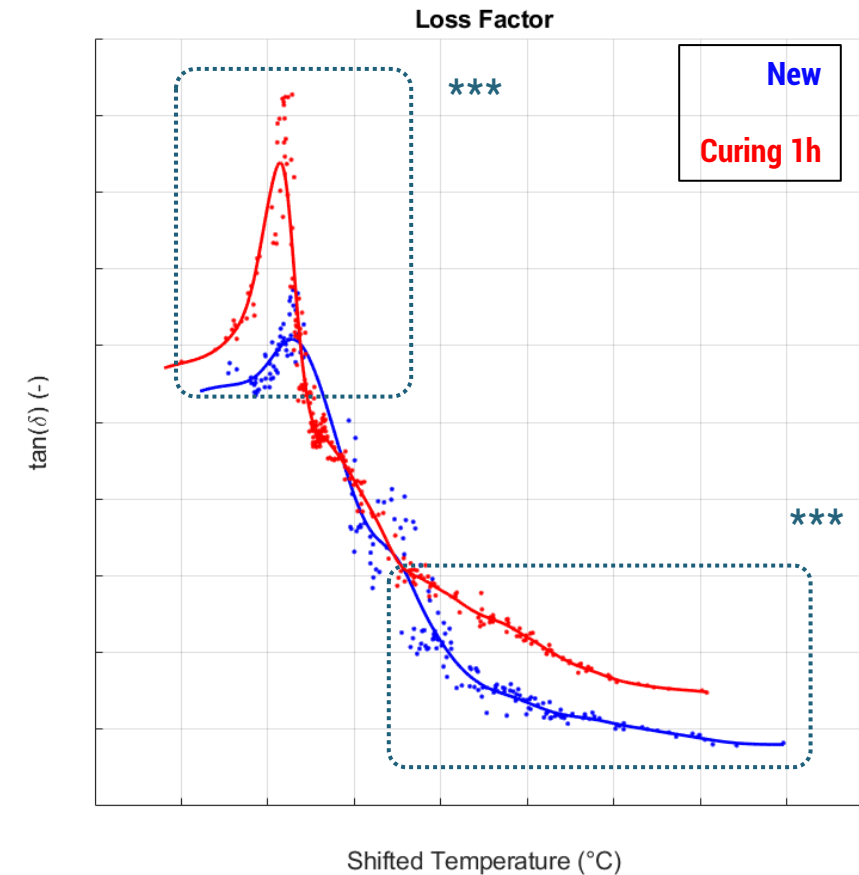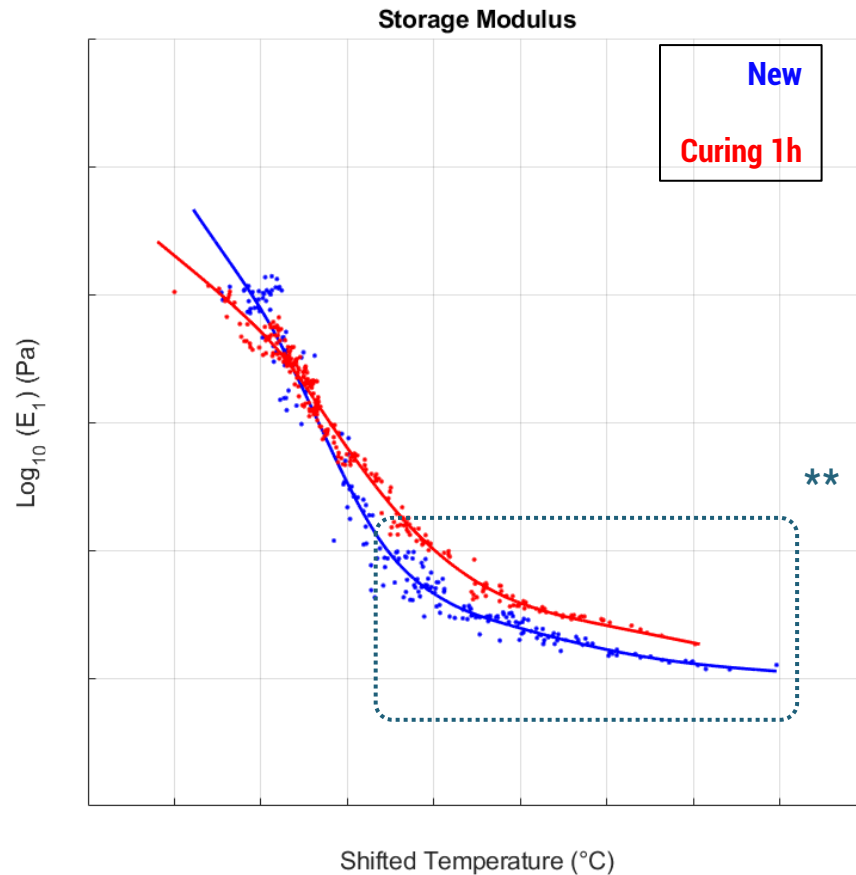
The 1h curing produces the following effects:

** Significant increase of the tire tread hardness (linked to the storage modulus) and reduction of the adhesive effect in the contact patch;

*** Increase of the tire tread tandelta, affecting hysteretic grip, in high temperature zone.

VESevo for Motorsport: curing effects

Curing effect analysis (4 Hours)
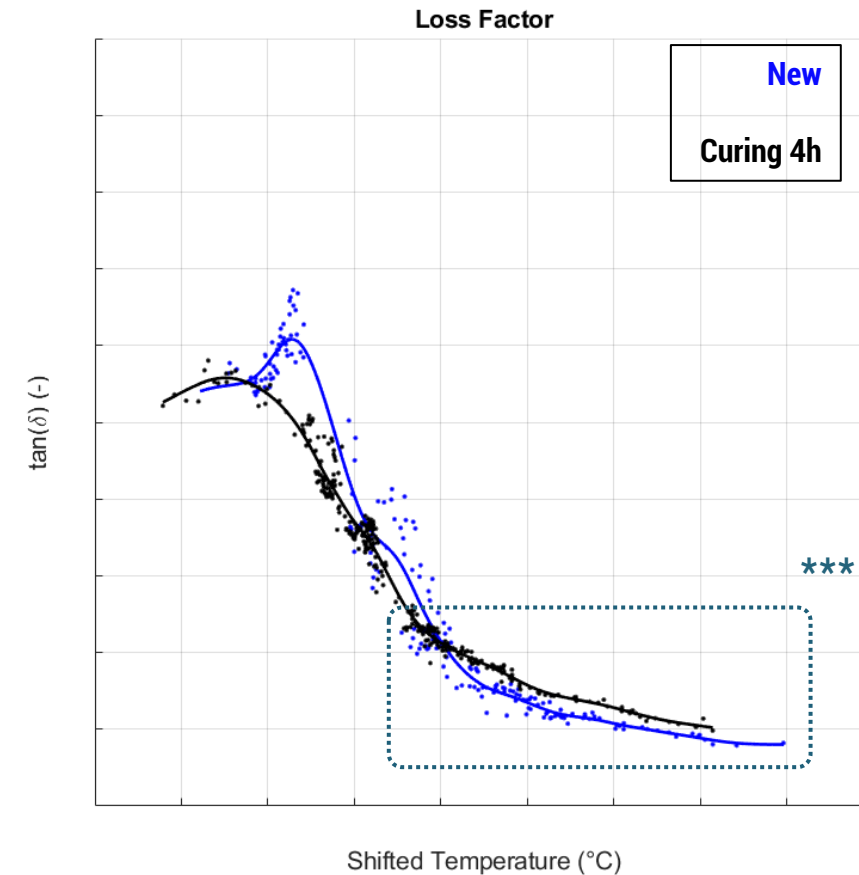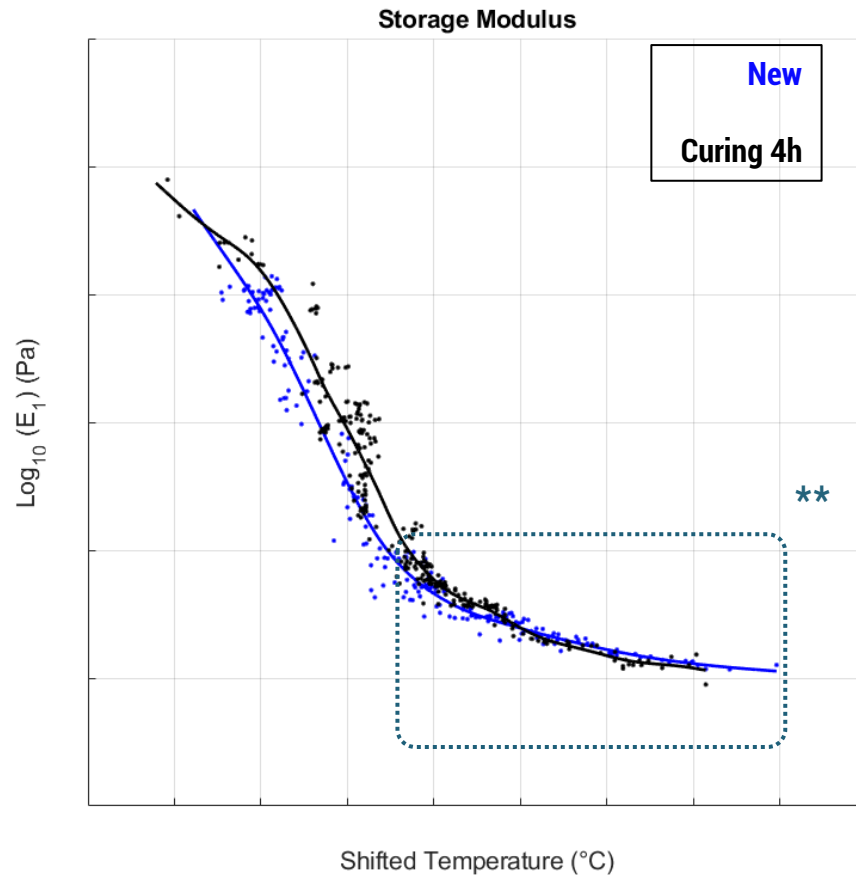
The 4h curing produces the following effects:

** Restore of the fresh tire hardness in the working temperatures range (linked to the storage modulus), with positive effects on adhesive grip

*** Reduction of the tan(δ) respect to 1h curing, but anyway higher than in fresh tires, with benefits in hysteretic grip

tan δ:Mean(μ)
All Ribs and All Sectors

Rib 1   Rib 2   Rib 3   Rib 4   Rib 5   − − Mean
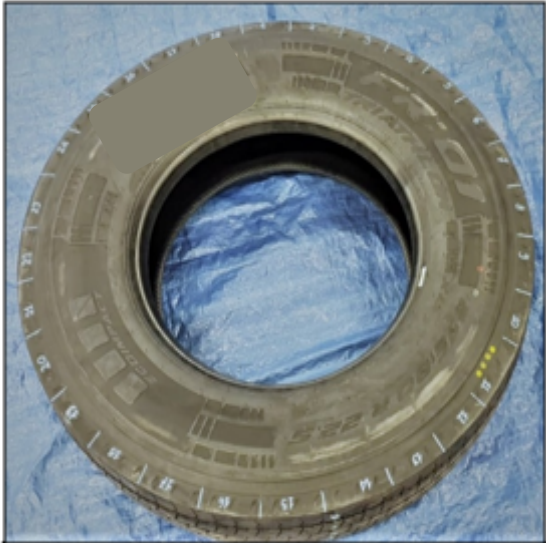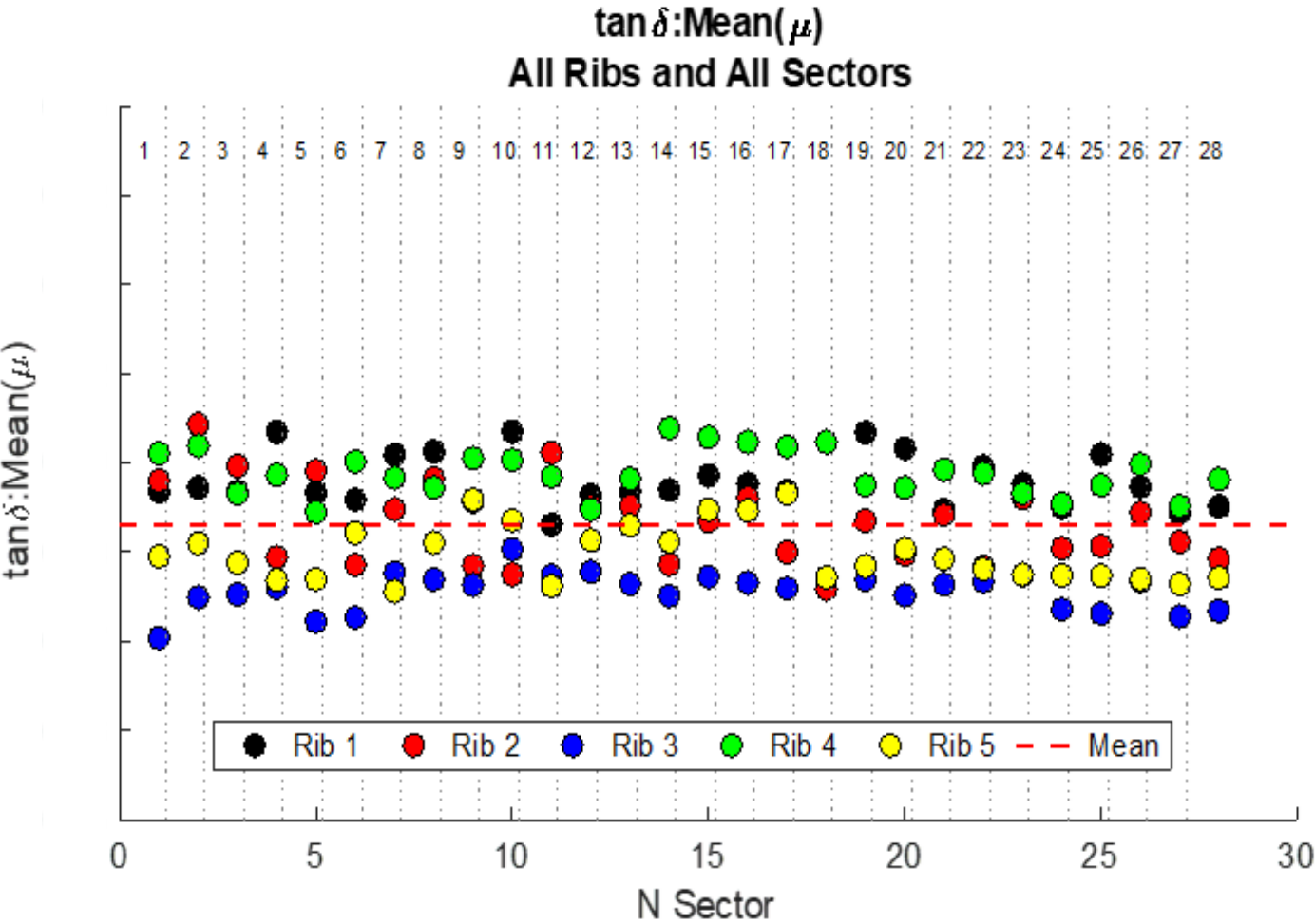
N Sector

Full Tread
Viscoelasticity Analysis

5 Ribs
x
28 Sectors

Mean Value Rib	
Rib 1	0,1881
Rib 2	0,1833
Rib 3	0,1757
Rib 4	0,1886
Rib 5	0,1798

**VISCOELASTIC PROPERTIES MONITORING
IN THE TIRE LIFE**

Glass Transition Temperature variations due to ageing effect
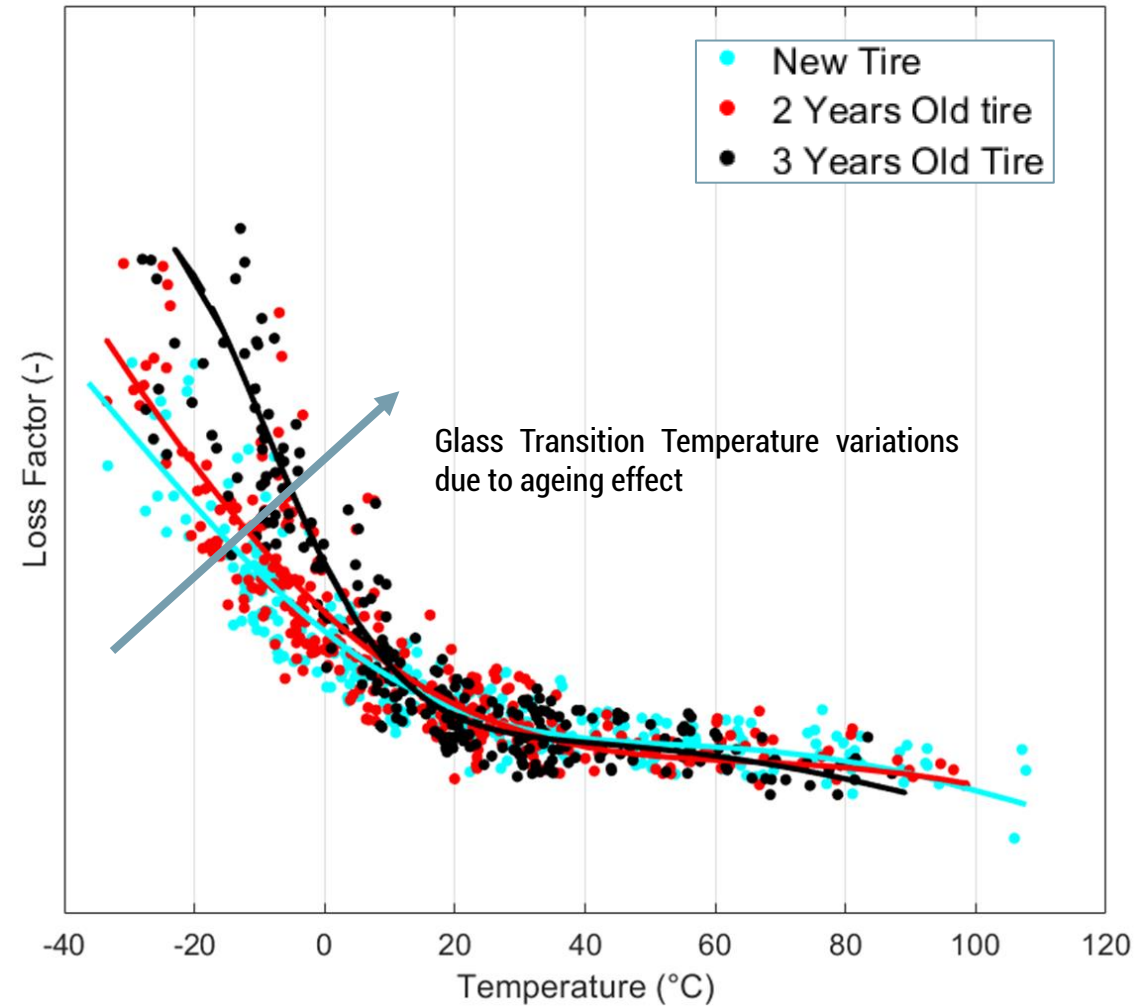
TyrePlex

News Car Tyres Bike Tyres Scooter Tyres

Search For MRF Tyres, CEAT Tyres, JK Tyres

VESevo Gun Is Helping Teams Master 2021 F1 Tyres

motorsport.com S'ABONNER CONTENU PREMIUM FORMULE 1

Formule 1 News Photos Vidéos Calendrier Résultats

Le mystérieux pistolet qui aide les écuries F1 à maîtriser les pneus

Par : Franco Nugnes Co-auteur : Jonathan Noble 15 mars 2021 à 15:01

Les équipes de F1 ont utilisé un "pistolet" italien novateur lors des essais de Bahreïn dans ce qui pourrait être une nouvelle tendance pour maîtriser les pneus 2021.

motorsport.com SUBSCRIBE PRIME CONTENT FORMULA 1

Formula 1 News Photos Videos Schedule Results

FORMULA 1 / BAHRAIN MARCH TESTING / BREAKING NEWS

The mysterious gun helping teams master F1's 2021 tyres

By: Franco Nugnes Co-author: Jonathan Noble Mar 15, 2021, 1:33 PM

Formula 1 teams have been spotted using an innovative Italian 'gun' in testing in what could be the latest move to get on top of the new 2021 tyres.

motorsport.com FÓRMULA 1 MOTO GP MONOPLAZAS

Fórmula 1 Noticias Fotos Videos Calendario

FÓRMULA 1 / TEST BAHRÉIN / NOTICIAS

¿Qué es ese extraño 'martillo' para los neumáticos de F1?

AUTOSPORT Subscribe FORMULA 1

The tech gun helping teams to master F1's 2021 tyres

motorsport.com FORMULE 1 MAX VERSTAPPEN

Formule 1 Nieuws Foto's Video's

Uitgelegd: F1-teams gebruiken mysterieus pistool voor bandenanalyse

motorsport.com FORMEL 1 MOTOGP LIVE

Alle Rennserien News Fotos Vide

Diese "Pistole" soll die Reifenanalyse in der Formel 1 revolutionieren

motorsport.com FORMA-1 TECHZÓNA

TECHZÓNA Hírek Videók

A titokzatos pisztoly, ami segíthet az F1-es csapatoknak megérteni a 2021-es gumikat

Forrás: Böllos István-Ákos, Szerkesztő 2021. márc. 15. 17:xb

motorsport.com FORMULA 1 Haberler

Formula 1 Haberler

F1 takımları lastik analizi için gizemli bir çözüm kullanıyor: VESevo Tabancası

Editör: Franco Nugnes Yardımcı Editör: Jonathan Noble Çeviren: Batini Aker 15 Mar 2021 17:10

Formula 1 takımları, lastikler hakkındaki bilgilerini pekiştirmek amacıyla, gizemli bir yardımcı tabanca kullanmaya başladılar.

MOTORSPORT TOTAL.COM powered by motorsport.com

Diese "Pistole" soll die Reifenanalyse in der Formel 1 revolutionieren

Der technische Fortschritt in der Formel 1 geht immer weiter, ein italienisches Start-up könnte nun das heikle Thema Reifen revolutionieren

motorsport.com F1 MOTOGP

F1 ニュース 写真

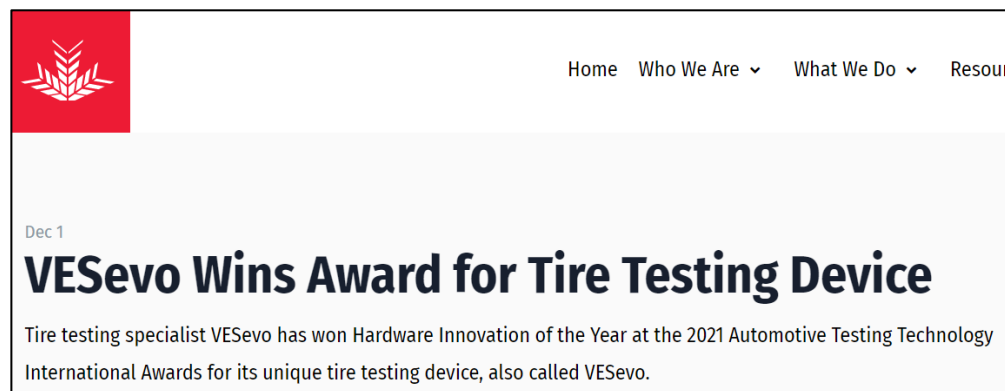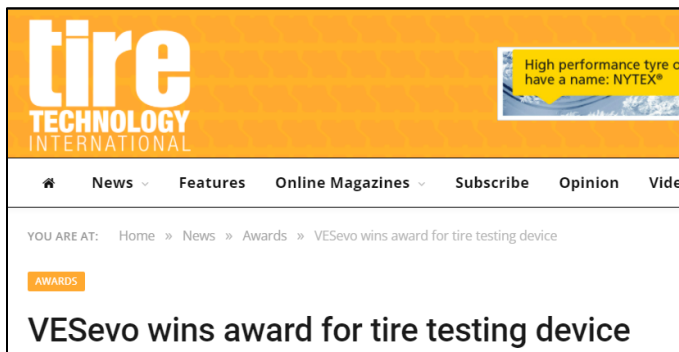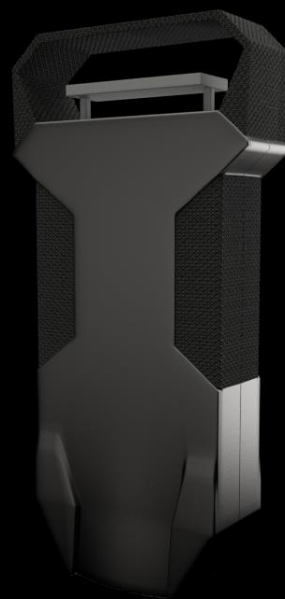F1 / BAHRAIN MARCH TESTING / 速報ニュース

タイヤを理解するためのカギ？ F1テストに登場した秘密兵器"銃"の正体

VESevo

IN LESS THAN 1 YEAR OVER 30 CUSTOMERS IN:

F1 motoGP FORMULA E WEC WRC FIA WORLD RALLY CHAMPIONSHIP

NASCAR F2 FIA FORMULA 2 CHAMPIONSHIP F3 FIA FORMULA 3 CHAMPIONSHIP

Automotive Testing Award 2021
Hardware Innovation of the Year

VESevo

---

tire TECHNOLOGY INTERNATIONAL

High performance tyre oil have a name: NYTEX®

News Features Online Magazines Subscribe Opinion Video

YOU ARE AT: Home » News » Awards » VESevo wins award for tire testing device

AWARDS

VESevo wins award for tire testing device

---

l'A tyrepress
The website for tyre and wheel professionals

NEWS | DATA | FEATURES | BUSINESS DIRECTORY | JOBS | CLASSIFIEDS | MAGAZINE | SHOP

Home / News / Company News / Vesevo tyre analysis system wins Automotive Testing Technology Inte...

Vesevo tyre analysis system wins Automotive Testing Technology International award

---

AUTO E MOTORI

Martedì, 30 novembre 2021

La start-up italiana Vesevo si aggiudica l'Automotive Testing Technology 2021

L'azienda si è aggiudicata uno dei premi più ambiti del settore automotive grazie all' hardware che consente di analizzare nel dettaglio la qualità delle gomme

---

QUATTRORUOTE F1 2021

News Calendario Risultati Piloti | Scuderie Classifiche Diretta Live

SPORT

Innovazione

Un premio per l'analisi dei pneumatici della startup VESevo

FORMULA 1 ULTIME NOTIZIE

VESevo la start-up premiata dopo essere arrivata al vertice della F1

30 nov 2021, 16:49

Il dispositivo, nato dalle ricerche del gruppo Vehicle Dynamics del Dipartimento di Ingegneria Industriale della Federico II e della partnership con MegaRide, è stato premiato con l'Automotive Testing Tecnology Internationl Award nella sezione Hardware Innovation of Year che è uno dei riconoscimenti più ambiti del settore automotive.

Home Who We Are ⌄ What We Do ⌄ Resource

Dec 1

VESevo Wins Award for Tire Testing Device

Tire testing specialist VESevo has won Hardware Innovation of the Year at the 2021 Automotive Testing Technology International Awards for its unique tire testing device, also called VESevo.

---

testing technology international awards '21

Simply the best

Shortlisted:
• AB Dynamics – Guided Soft Target 120
• CSM – HV Breakout Module 3.3
• Messring – M-Sled Modular
• Volvo – Ultimate Driving Simulator

automotive testing technology international awards '21
Hardware Innovation of the Year

Hardware Innovation of the Year

Winner: Viscoelasticity Evaluation System Evolved (VESevo)

MEGARIDE HOME ABOUT ⌄ PRODUCTS ⌄ PROJECTS ⌄ REFERENCES ⌄

HOME > PRESS & NEWS > THE VESEVO SYSTEM FOR TIRE ANALYSIS WINS THE PRESTIGIOUS AUTOMOTIVE TESTING TECHNOLOGY INTERNATIONAL AWARD

The VESevo system for tire analysis wins the prestigious Automotive Testing Technology International Award

- New ergonomic and aesthetic design (Q2 2022)

- Embedded electronics (Q2 2022)

- Device available for purchase (Q2 2022)

- 2 new software for compounds characterization and fast performance comparison (Q4 2021)