



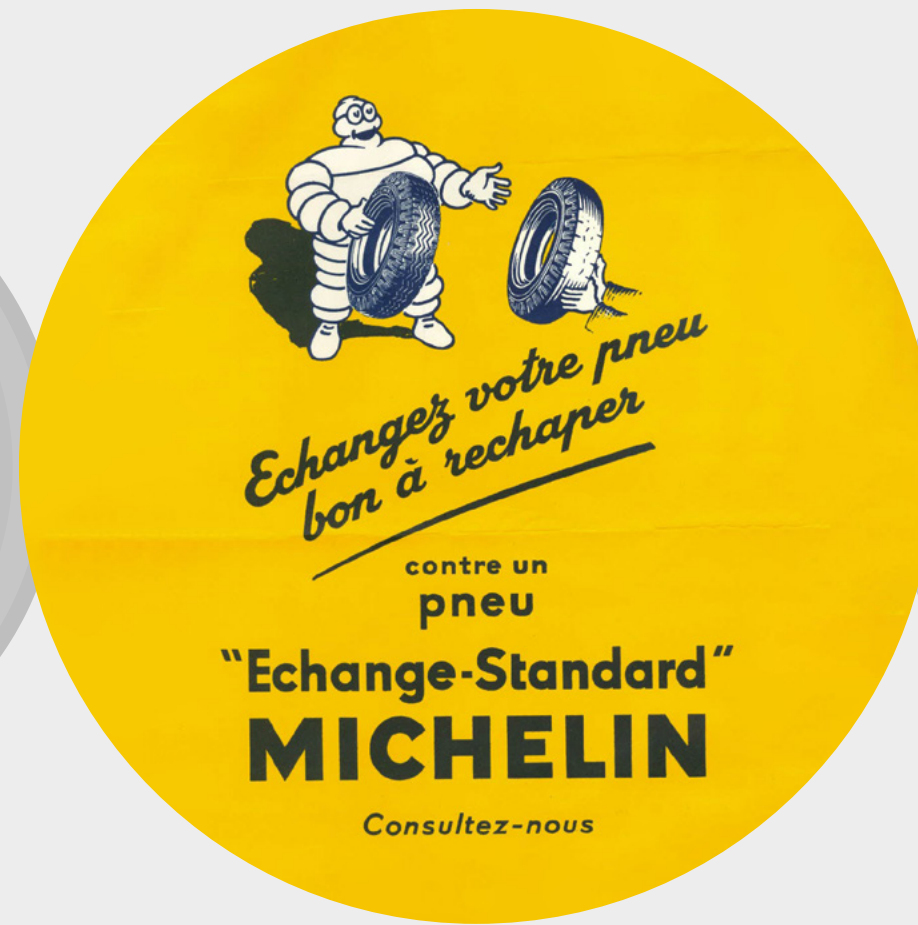
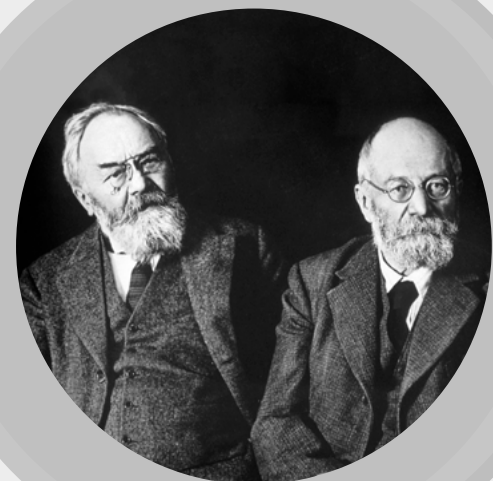
WHITE PAPER

**RETREADING,
*A WINNING CHOICE!***

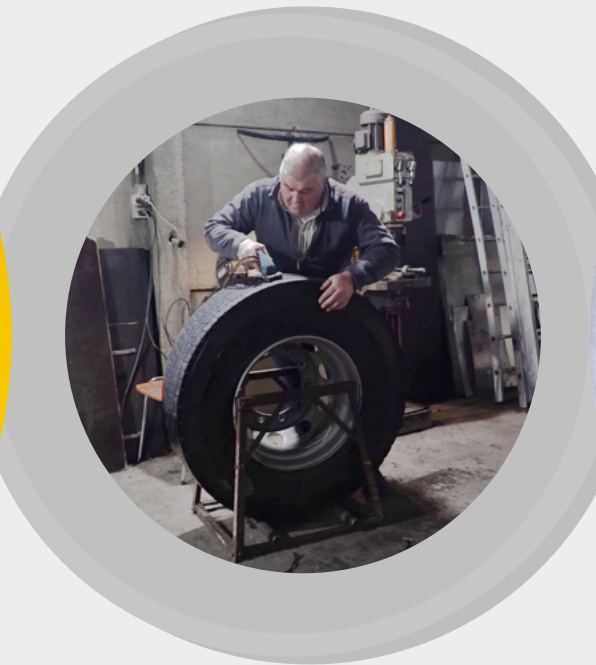
RETREADING TRUCK TYRES: AFTER 100 YEARS MORE RELEVANT NOW THAN EVER!



Michelin innovations have been revolutionising the road transport sector for over a century. The design and technology of our tyres have made truck mobility safer, faster and more efficient.



What was the Michelin brothers' initial goal? To reduce tyres' cost-in-use while at the same time ensuring outstanding safety and longevity. This was the idea behind introducing tyre retreading in the company's commercial documents for the first time in 1923.



Retreading consists in reusing a tyre's casing but replacing the worn tread by a new one. Naturally, for this process to work, MICHELIN tyres are designed from the outset to be retreadable, with a sufficiently robust casing to withstand several service lives.

An exceptionally modern technique that is still current, even 100 years later!

SAFE, COST-EFFECTIVE, SUSTAINABLE,
OPTING FOR RETREADING IS A NO-BRAINER!



MICHELIN

MICHELIN TRUCK TYRES

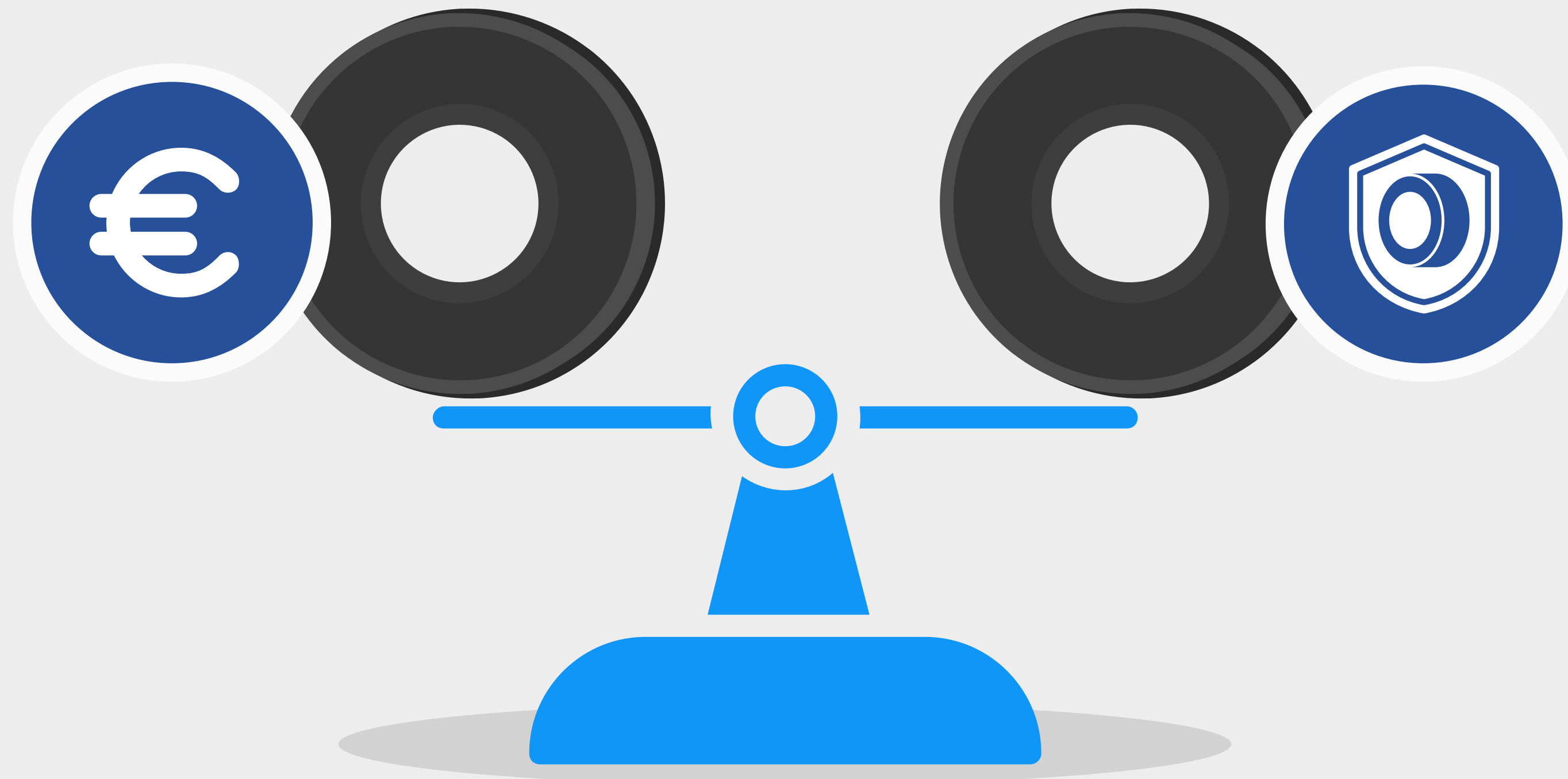
RETREADABLE SINCE 1923

100 YEARS
1923 - 2023

SAFE, HARD-WEARING, ECONOMICAL

COST SAVINGS* OR *SAFETY?

WITH RETREADING, CHOOSE BOTH!



RETREADED TYRES DELIVER THE SAME LEVELS OF SAFETY AND PERFORMANCE AS NEW TYRES.



***TO ACHIEVE THIS OPTIMAL OUTCOME,
HOWEVER, RETREADING MUST MEET
STRICT CONDITIONS:***



**CASING
QUALITY**



**RETREADER'S
EXPERIENCE**



**POINTS
OF INSPECTION**

MICHELIN Remix® retreaded tyres use the same patented rubber compounds and tread patterns as new MICHELIN tyres, thereby guaranteeing an identical level of performance.



The **casing** must be **very good quality**, hard-wearing and designed to **withstand several lifetimes**.



The retreader must have **excellent professional** experience and top-quality materials.

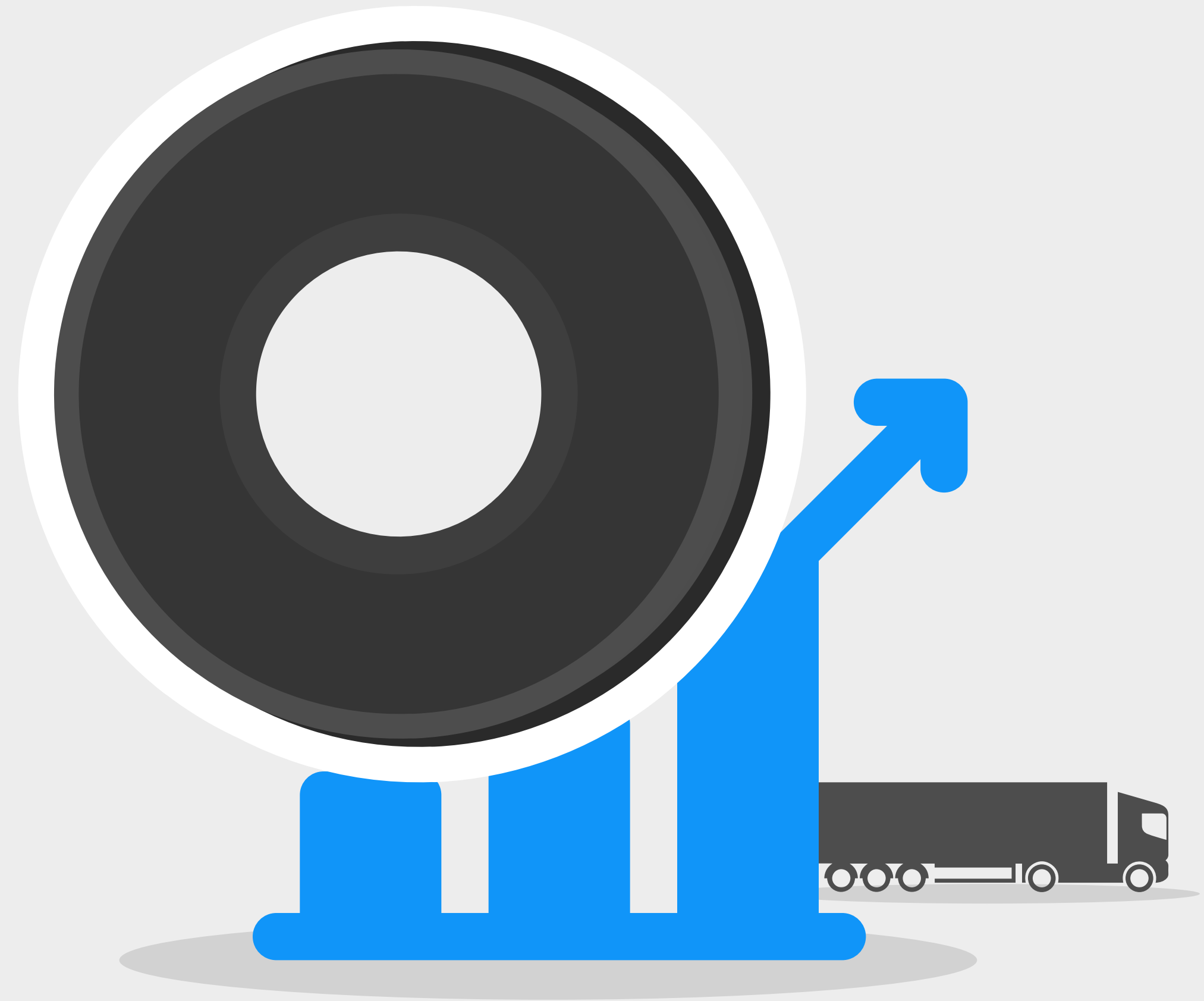


86 points of inspection!

The hand-crafted expertise of retreading operators is crucial to the selection, inspection, repair, and preparation of casings and for ensuring finished products' quality and reliability.

MICHELIN Remix® retreaded tyres use the same patented rubber compounds and tread patterns as new MICHELIN tyres, thereby guaranteeing an identical level of performance.

OPTING FOR
PROFITABILITY
IS ***ALWAYS***
A WINNING
CHOICE!



A MULTITUDE OF FACTORS INFLUENCE YOUR TYRES' SERVICE LIFE



**THEIR
ROBUSTNESS**

**THEIR
MANUFACTURING
QUALITY**

**ADAPTATION
TO YOUR
PURPOSES**

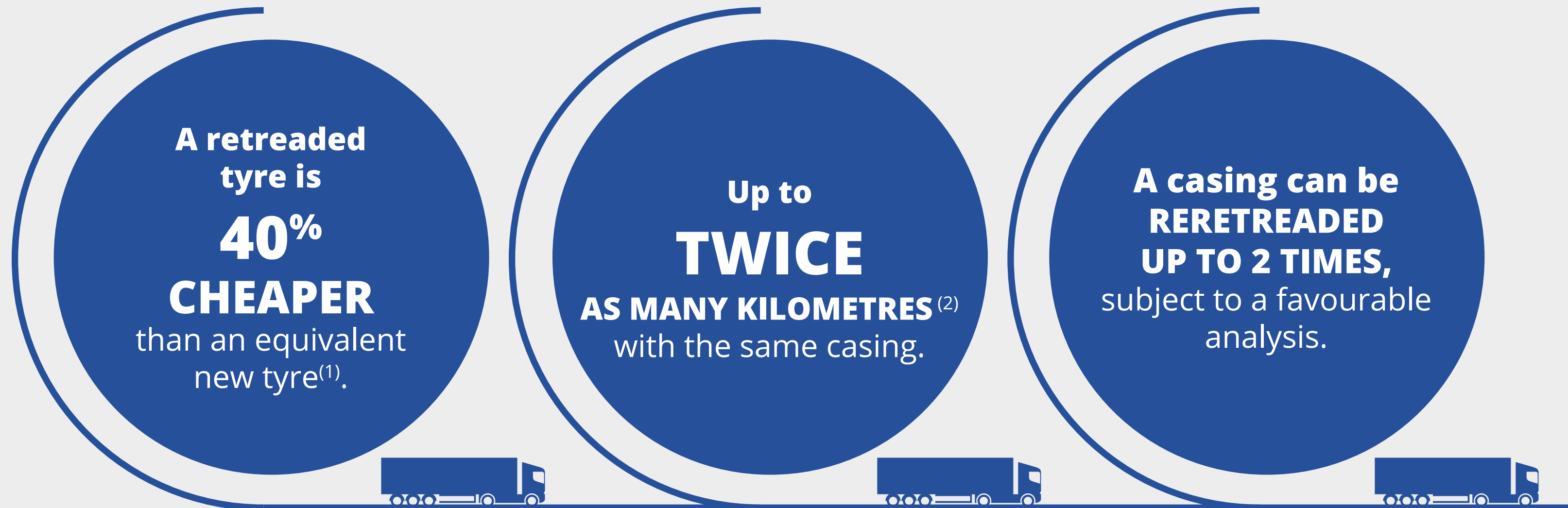
**THEIR
INFLATION
PRESSURE**

**THE AXLES'
PAYLOAD**

**THE
VEHICLE'S
MECHANICAL
CONDITION**

**THE DRIVER'S
DRIVING STYLE**

3 WAYS RETREADING WILL REDUCE YOUR TYRE BUDGET



BOOST YOUR OPERATIONAL FLEXIBILITY BY ADAPTING YOUR VEHICLES' TYRES TO THEIR DIFFERENT USES

When you have your tyres retreaded, you can choose the tread pattern best suited to your operations and boost both flexibility and productivity.

(1) Michelin Internal study performed in 2022 by Competitiveness analysis tool performed on Europe perimeter comparing MICHELIN brand new tyre vs. MICHELIN Remix®.

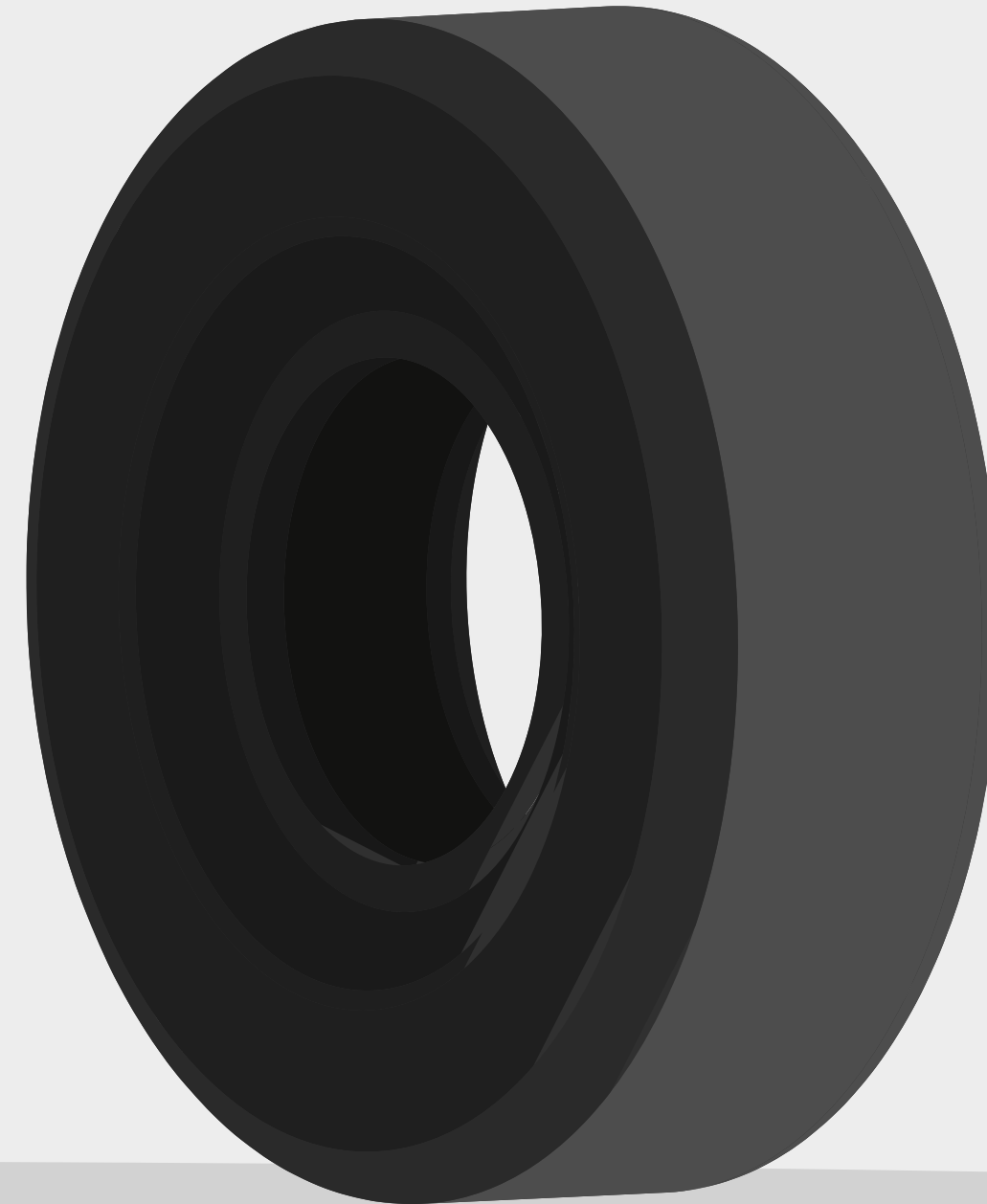
(2) The tread compound and pattern of the MICHELIN Remix® tyres are largely the same as those used for new MICHELIN tyres. 90% of the range of MICHELIN Remix® tyres uses the same mould and the same materials as new MICHELIN tyres which may lead to up to equivalent performance between MICHELIN Remix® tyres and new MICHELIN tyres. Internal evaluations carried out by the Michelin Research and Technology Center based on customer testimonials collected in Europe since 2015.



WHEN COMBINED WITH REGROOVING, THE BENEFITS TO BE GAINED ARE EVEN MORE REMARKABLE!

MORE MILEAGE⁽¹⁾

1st regroove ► 1st retread up to ► 2nd regroove
+25% **+100%** **+25%**



FUEL SAVINGS⁽²⁾

1st regroove ► 2nd regroove
+5% **+ 5%**



(1) Regrooving allows users to cover 25% more miles. Compared to a worn MICHELIN tyre, that has not been regrooved. For an average regrooving depth of 4 mm. Information based on TNPf recommendations dating from 2013 explaining that regrooving can, when the tyre reaches the end of its wear limit, increase the tyre's longevity by using all the available rubber. Retreading allows users to cover up to 100% more miles. The tread mix and tread pattern of MICHELIN Remix® tyres are largely the same as those for new MICHELIN tyres. 90% of the tyres in the MICHELIN Remix® range are manufactured from the same mould and the same materials as new MICHELIN tyres and therefore perform equally as well. According to internal tests conducted by the Michelin Research and Technology centre and testimonials collected in Europe since 2015.

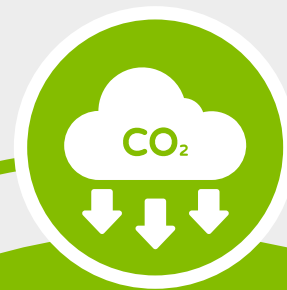
(2) 5.6% saved in fuel consumption: internal study conducted at Ladoux (France) in May 2021, under the supervision of DEKRA, comparing new MICHELIN X® LINE™ ENERGY™ Z2 and D2 tyres (315/70 R 22.5) to regrooved tyres (R5 mm).

A GOOD CHOICE FOR
THE PLANET



3 WAYS YOU CAN PROTECT THE ENVIRONMENT BY RETREADING

A MULTITUDE OF FACTORS INFLUENCE YOUR TYRES' SERVICE LIFE



REDUCED CO₂ EMISSIONS

For every 100 tyres retreaded, you prevent over 11,6 tonnes⁽¹⁾ of CO₂ from being released into the atmosphere.



REDUCED CONSUMPTION OF MATERIAL

1 retread = 50 kilos⁽¹⁾ of raw materials less than the amount required to manufacture a new tyre



REDUCED WASTE
Each retreaded tyre is one less tyre to recycle!



(1) The CO₂ saving associated with the retreading operation is calculated from the associated material saving. In terms of material saving, a MICHELIN Remix® retreaded tyre covers up to 100% of the mileage of a new MICHELIN tyre (the tread mix and tread pattern of MICHELIN Remix® tyres are largely the same as those for new Michelin tyres; 90% of tyres in the MICHELIN Remix® range are made from the same mould and the same materials as new Michelin tyres and therefore perform equally as well; according to internal tests conducted by the Michelin Research and Technology centre and customer testimonials collected in Europe since 2015). A new tyre weighs 70 kg on average. A new tyre ready to be retreaded weighs 50 kg on average. The CO₂ impact of a retreaded tyre is linked to the material saving, or 115 kg of CO₂ representing 50 kg of raw material savings, at a rate of 2.3 kg of CO₂* per kg of raw materials. * Equivalence between CO₂ and a litre of fuel or kilogram of raw material is calculated in this way: The emissions factor of 3.24 kg of CO₂ for 1 litre of diesel comes from the life cycle assessment conducted by ADEME for pure diesel. It includes emissions during the diesel production stages (17%) and during its combustion (83%). Source: ADEME, Study «Well to wheel - JEC», v4, july 2014. The emissions factor of 2.3 kg of CO₂ for 1 kg of tyre comes from the life cycle assessment calculations for production of a tyre cradle to gate, conducted internally by Michelin using the calculation rules developed by the tyre manufacturing profession (TIP). It includes stages including extraction of raw materials, transportation, manufacturing, and distribution. Source: UL Environment Standard, «Product Category Rules for preparing an Environmental Product Declaration for the product category: Tyres», v3.05, february 2022.

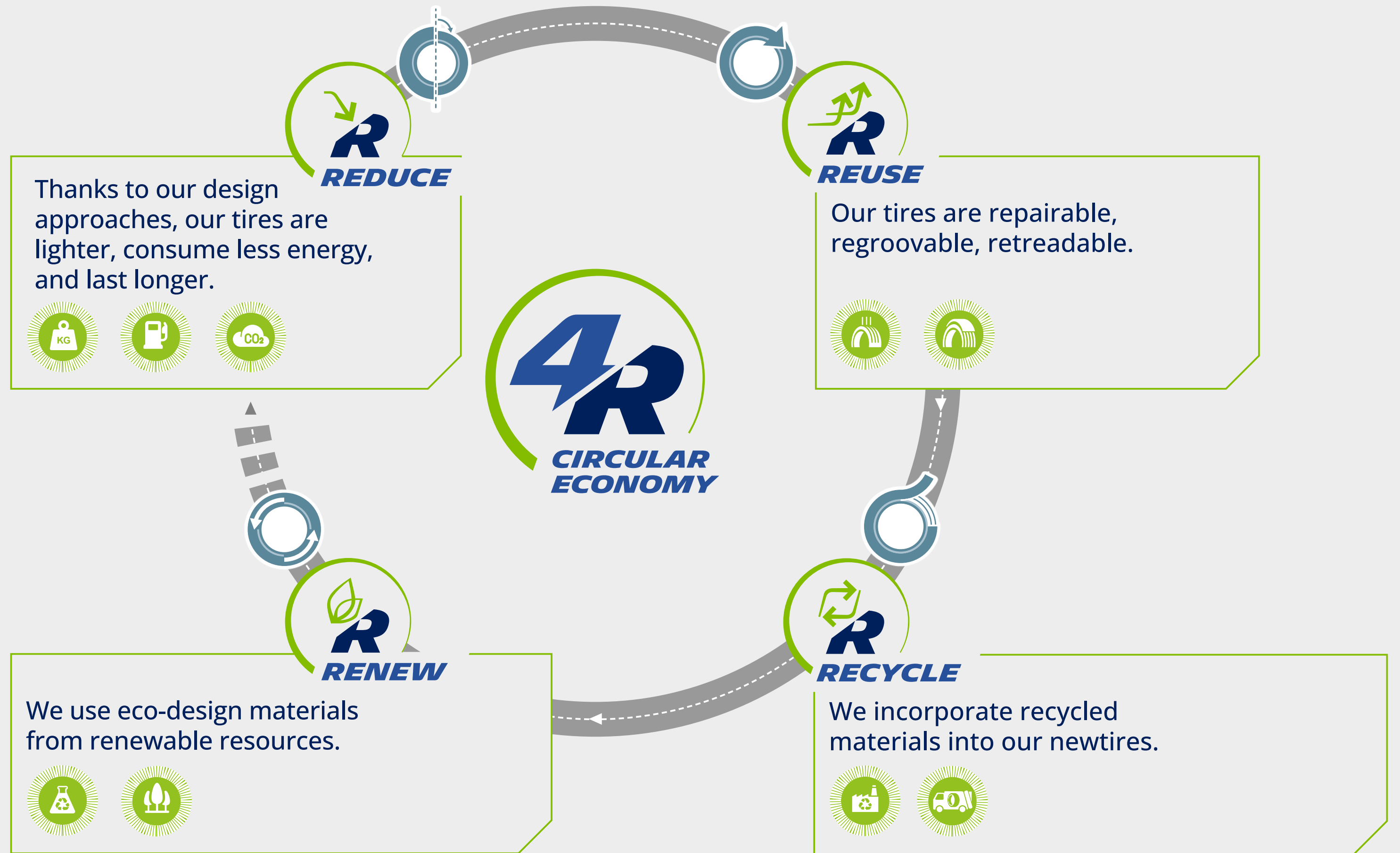
RETREADING IS CONSISTENT WITH THE CIRCULAR ECONOMY'S 4R APPROACH

REDUCTION
OF MATERIALS
CONSUMPTION

REUSE
OF THE CASINGS

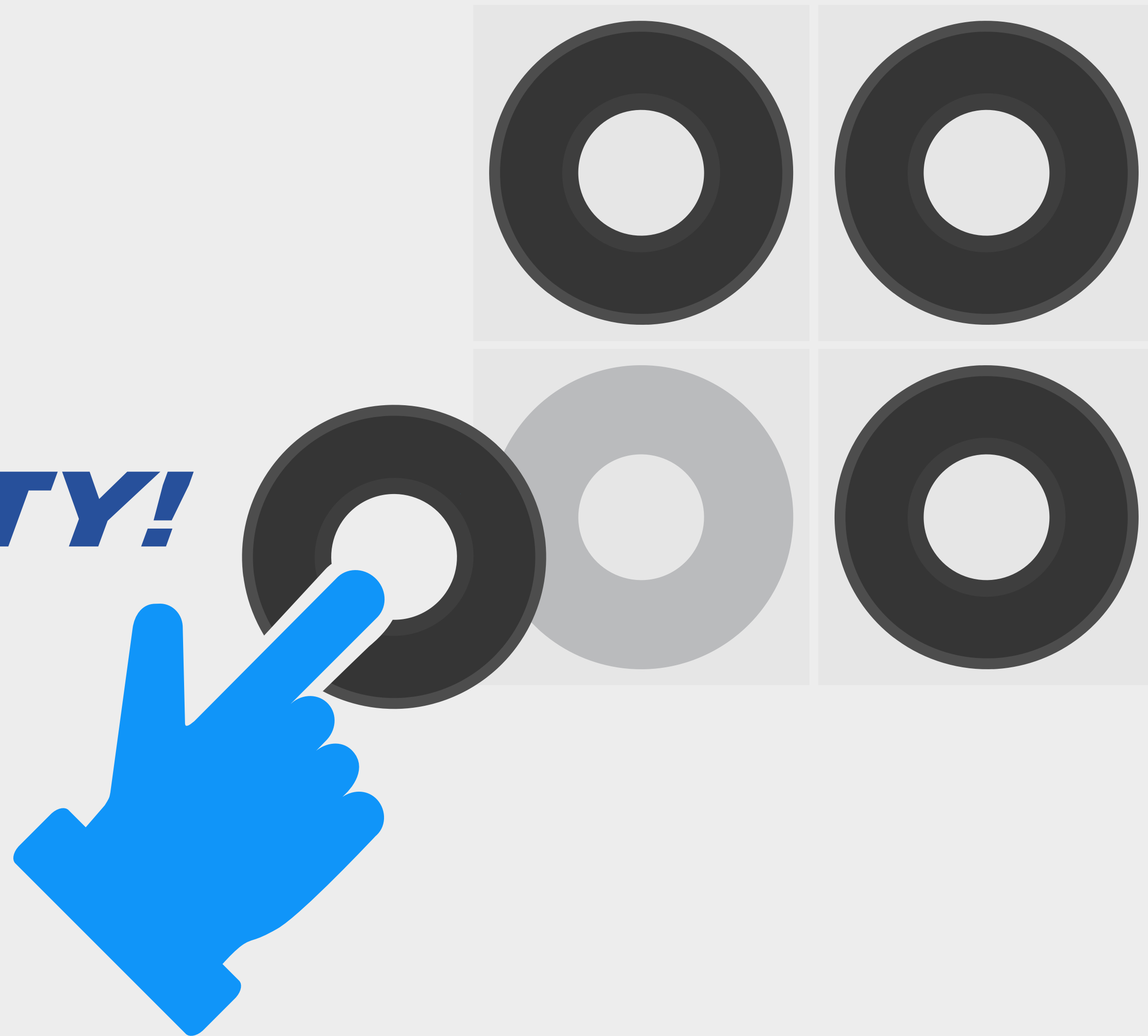
RECYCLING
OF END-OF-LIFE TYRES

TO BOOST THE CIRCULAR ECONOMY IN EUROPE, ALL WORN TYRES ARE RECYCLED⁽¹⁾.
Synthetic turf, playground surfaces, shoe soles or roller wheels: numerous products are already being made from end-of-life tyres and new applications are yet to come.



(1) Directive 31 / EC of 26 April 1999 prohibits the dumping of used tires in landfills.

OPT FOR
SIMPLICITY!



A VERY BROAD RANGE OF RETREADED AND RETREADABLE TYRES MEETS ALL OF CARRIERS' NEEDS

***WHEN IT COMES TO CHOOSING YOUR TYRES, JUST MAKE
SURE THAT THEIR CASINGS HAVE BEEN PURPOSE-DESIGNED
FROM THE OUTSET FOR OPTIMAL RETREADING.***



For the past 100 years, Michelin truck **tyre casings** have been designed to have several lifetimes



Michelin owns several **retreading factories** in Europe

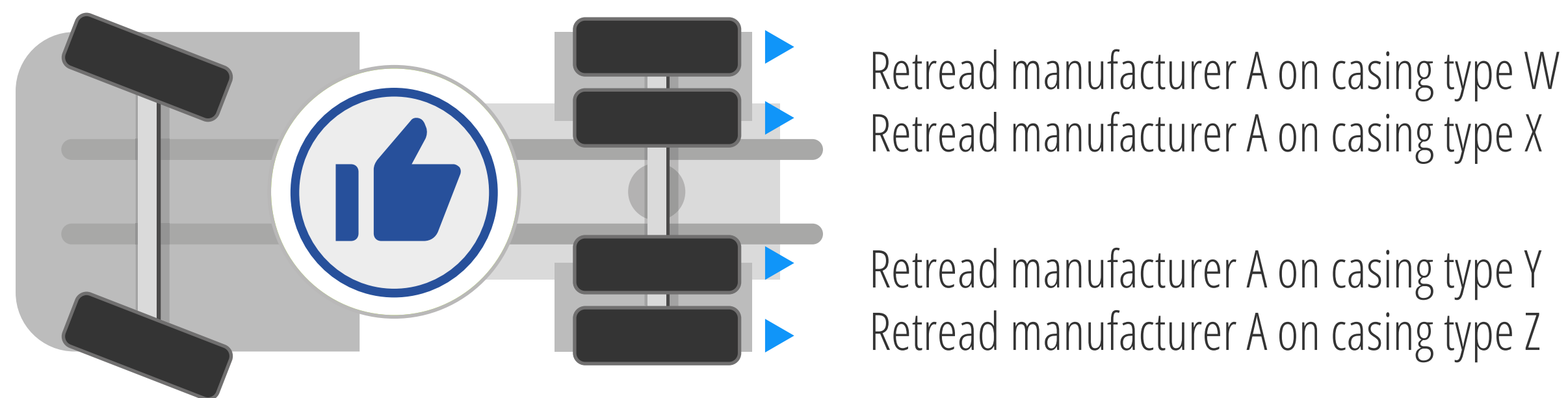
A RETREADED TYRE CAN TAKE THE PLACE OF A NEW TYRE



All retreaded tyres on the same axle must have the same specifications*.

In particular, tyres of the same manufacturer (e.g. MICHELIN Remix® and LAURENT® Retread belong to the same manufacturer).

Diagram of authorised axles with permitted uniform retread mounting



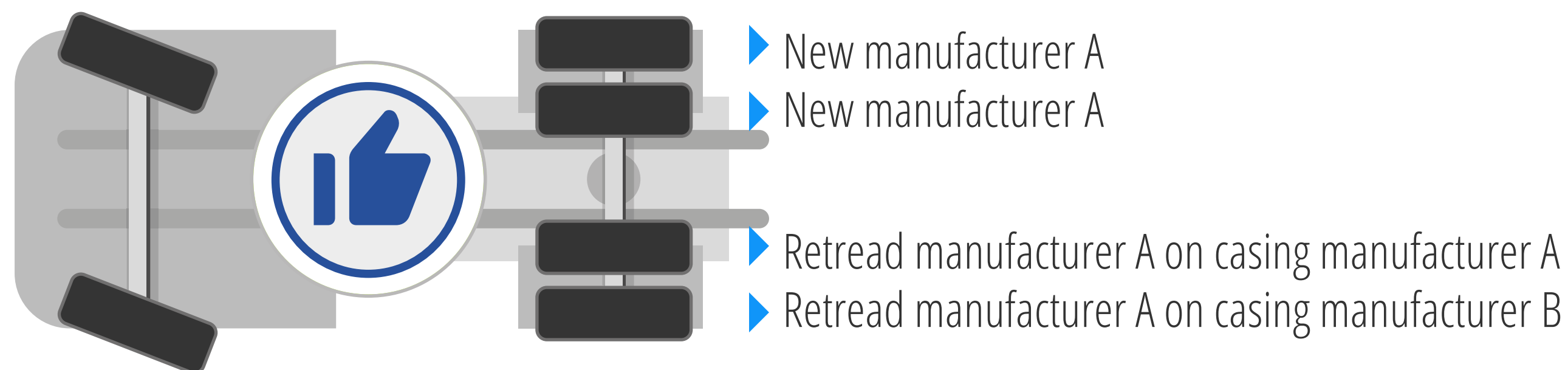
A RETREADED TYRE CAN BE COMBINED WITH A NEW TYRE



New tyres and retreaded tyres can be mixed on the same axle if they have the same specifications*.

In particular, tyres of the same manufacturer (e.g. MICHELIN Remix® and LAURENT® Retread belong to the same manufacturer).

Diagram of authorised axles with new - retreaded combination





**TYRES CAN BE MIXED ON THE SAME AXLE
IF THEY HAVE THE SAME SPECIFICATIONS**



Same
**RETREADER⁽¹⁾
BRAND**

Same
SIZE

Same
**SERVICE
CATEGORY⁽²⁾**

Same
**STRUCTURE
(RADIAL OR
CROSS-PLY)**

Same
SPEED RATING

Same
LOAD INDEX

(1) In accordance with local legislation. (2) Road, special-purpose or snow tyres with M+S marking. What matters is the tyre's service category, not its tread pattern.



RETREADING TRUCK TYRES

100 YEARS

more relevant now than ever