

## Two innovation leaders, one fastening solution

The TAG Heuer Porsche Formula E Team relies on ABB's Ty-Rap® premium cable ties

### Ty-Rap®

Rapid acceleration, strong centrifugal forces, vibrations and thermal factors place heavy demands on every component.

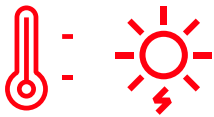
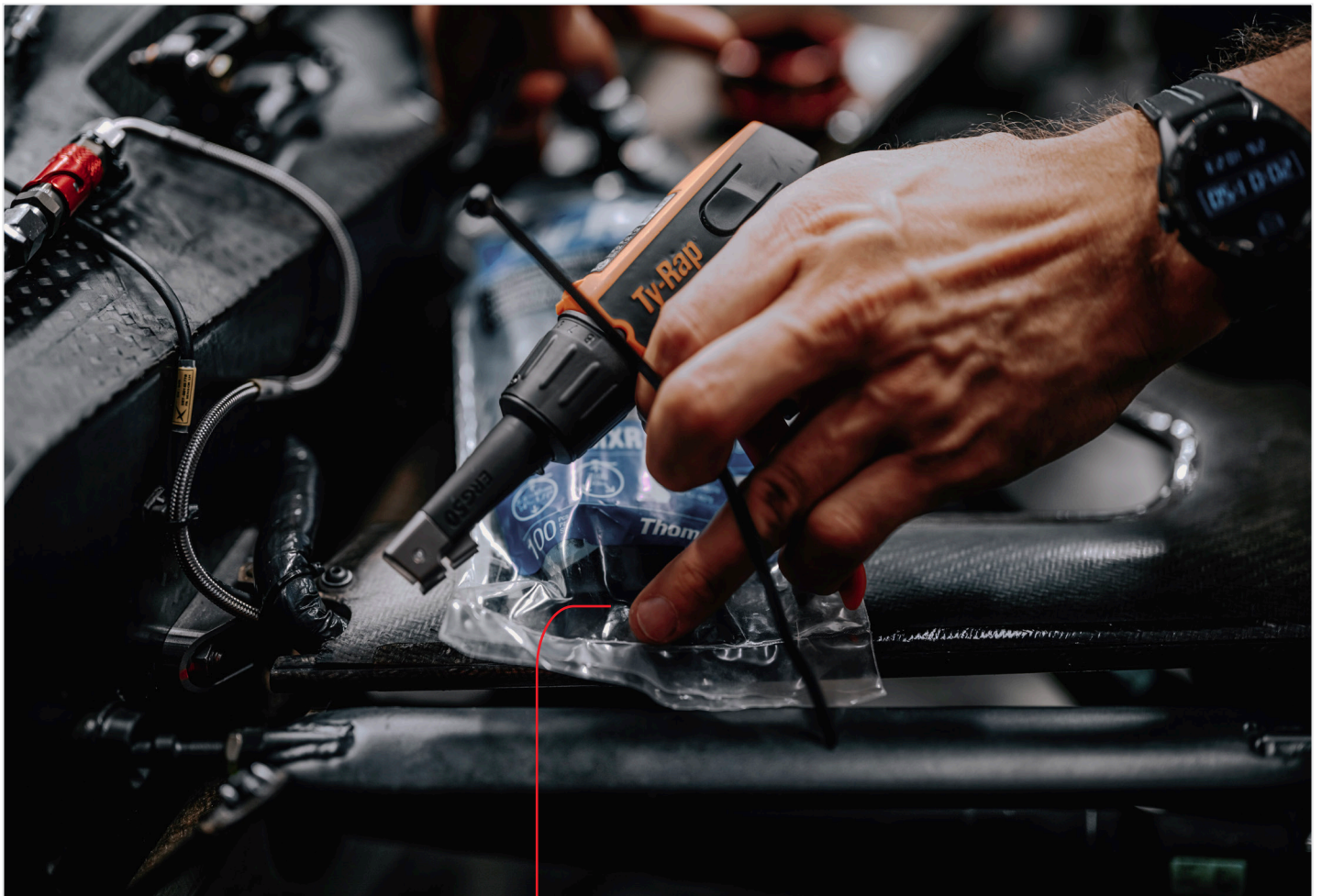
The ABB FIA Formula E World Championship combines the excitement of motor racing with the latest innovations in the field of e-mobility engineering. ABB's Ty-Rap® high-performance cable ties lead the field in every race with the TAG Heuer Porsche Formula E Team.

More than a race, the Formula E World Championship stands for sustainability and innovation.



Formula E is the world's first all-electric international single-seater championship; it is rapidly gaining worldwide popularity as each season sees new developments, such as last season's introduction of the lighter, smaller, faster and more sustainable GEN3 car, which provides thrills aplenty on the track. As for ABB, Formula E's title partnership since 2018, the championship is more than a race. It's a testbed





Ty-Rap® cable ties provide maximum  
**performance**  
in all weathers and wherever installed



for innovative technologies, which will ultimately help our society optimize, electrify and decarbonize, while emphasizing the vital importance of sustainability in our daily lives. In 2020, Porsche and ABB announced an exclusive partnership designed to promote electromobility.

The aim is for TAG Heuer Porsche Formula E Team and ABB to push performance efficiency to its limits through sophisticated engineering. Electric motor racing will raise energy management and energy conversion to an entirely new level. The cars are designed for maximum energy saving and conversion (in regenerative mode). Compared to the previous generation, the new Porsche 99X Electric models are even more efficient because energy is now recuperated from both the front and rear drives. The cars are now lighter and more aerodynamic, too. All of this contributes to a top speed of over 320 kph. Porsche 99X electric cars have been developed with maximum sustainability in mind. All suppliers work to the highest international standards to help to reduce the environmental footprint of the manufacturing process (ISO 14001); they are also certified to the highest level of FIA environmental accreditation.

Their innovative design and highly-developed materials also make Ty-Rap® cable ties the ideal fastening solution where performance really is the decisive factor. Ty-Rap® cable ties have often been copied but never equalled. For more than 65 years, they have performed superbly wherever they have been employed. Originally developed for bundling miles of cabling in the industry,





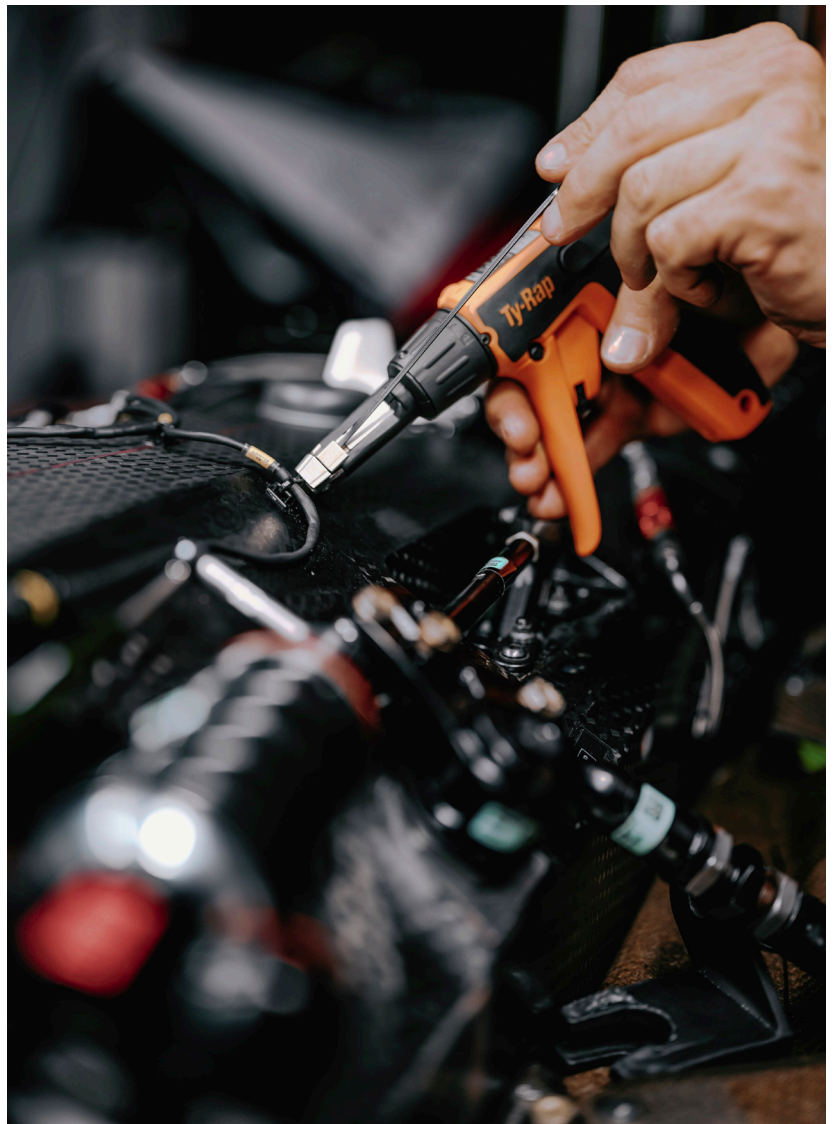
## Precision and reliability in the pit

are hallmarks of the TAG Heuer Porsche  
Formula E Team – thanks also to Ty-Rap® cable ties

Ty-Rap® cable ties can now be found virtually everywhere. From professional motorsport series like Formula E to the Mars Rover, they are self-locking and enjoy an extremely long service life even in the most demanding applications.

The Ty-Rap® cable ties' ground-breaking design and high quality can be attributed to their extraordinary characteristics. The corrosion-resistant, non-magnetic, stainless-steel locking system attains high tensile strength values; it is also completely adjustable. The upward bend in the endpiece makes lifting easy when wearing gloves, and the grip surface at its end makes light work of tightening the cable tie even in the most difficult conditions.

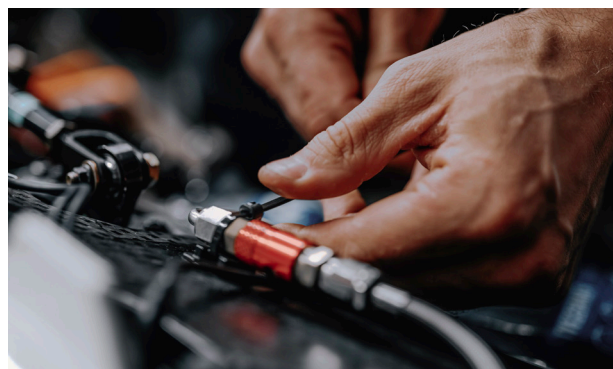
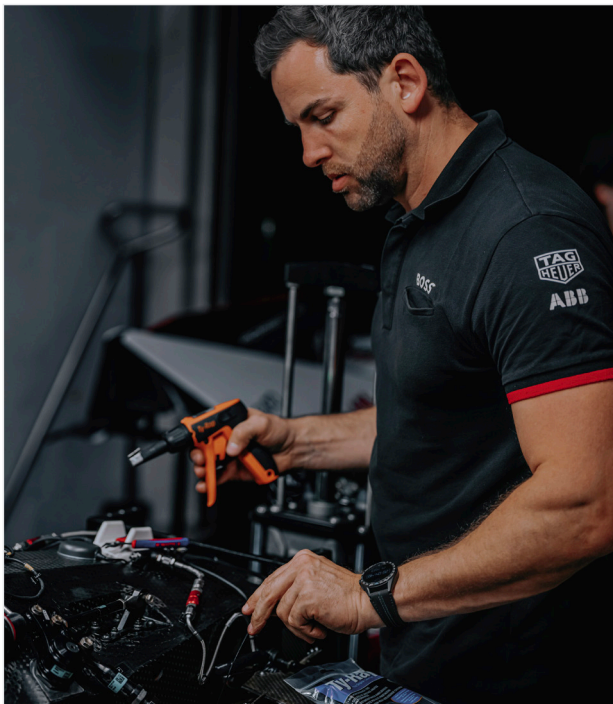
Porsche's race cars are innovative high-tech products, meeting the most exacting requirements when it comes to performance and reliability. That's why such high technical demands are made on the







Rainer Mühlhäuser, the TAG Heuer Porsche Formula E Team's logistics and infrastructure manager can carry out repairs quickly and without fuss thanks to Ty-Rap® cable ties

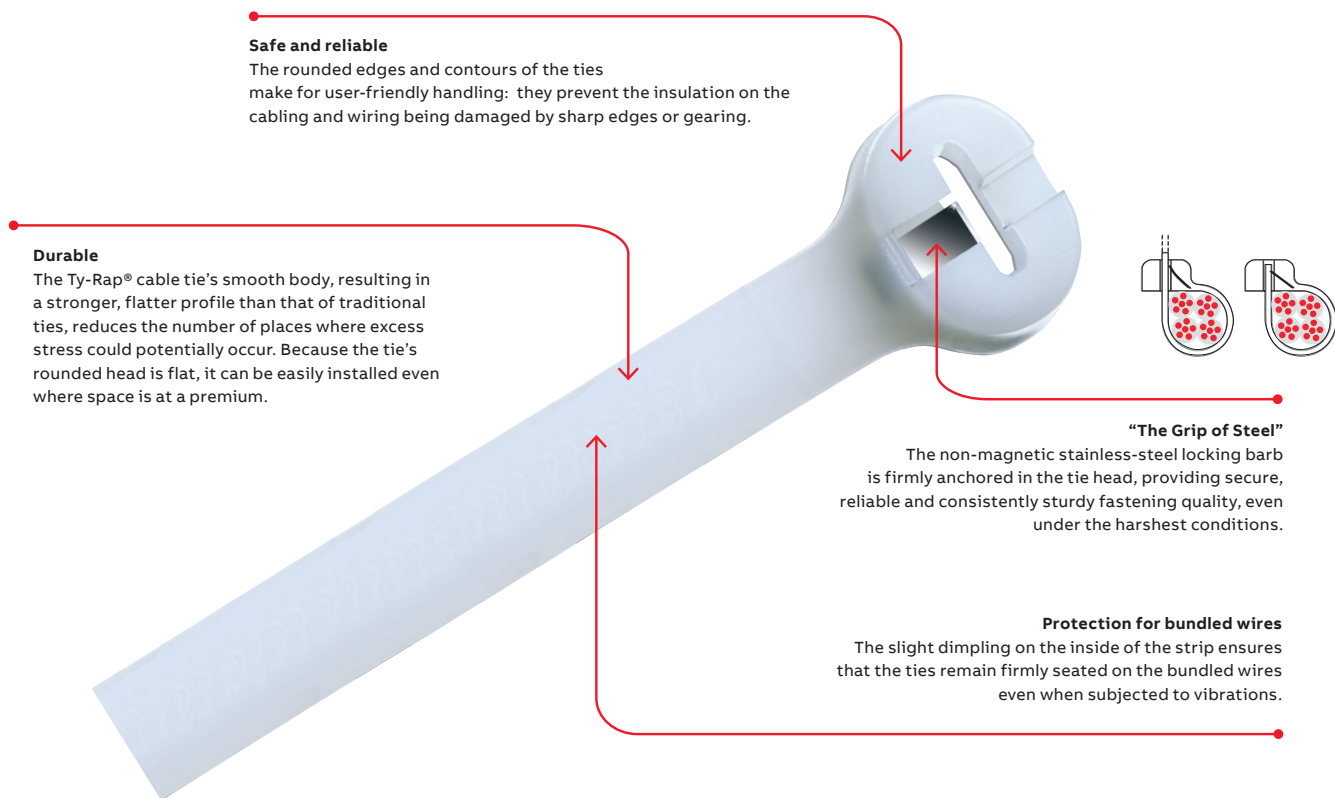


components installed in the new Porsche 99X electric car. It's vital that the components in Porsche's race cars function one hundred percent. Control arms, brake lines and cooling hoses and entire wiring harnesses in the chassis need to be firmly seated without the risk of chafing even when subject to extreme stress. Safety has top priority. Rainer Mühlhäuser, the logistics and infrastructure manager of the TAG Heuer Porsche Formula E Team, knows only too well that in motor racing speed is king – and that applies to the Porsche pit too. Everything needs to happen quickly, accurately and reliably. Every movement must be spot-on and team members must all be able to rely on each other. Occasionally, that can mean having to improvise – and in those situations cable ties can be easily and quickly put to use.

## The severe stresses endured during races demand ultra-high performance materials

As Rainer Mühlhäuser stated: "Rapid acceleration, strong centrifugal forces, vibrations, the effects of heat and extremely limited space are critical factors that are highly taxing both for the components and the workshop team. The weight of the race car, too, is a critical factor for success in racing and we need to keep an eye on it. We even weigh the cable ties we install. Ty-Rap cable ties allow us to carry out repairs quickly and without fuss.

As Ty-Rap® cable ties are easy to fit, we can replace components quickly and safely without wasting



**Safe and reliable**

The rounded edges and contours of the ties make for user-friendly handling: they prevent the insulation on the cabling and wiring being damaged by sharp edges or gearing.

**Durable**

The Ty-Rap® cable tie's smooth body, resulting in a stronger, flatter profile than that of traditional ties, reduces the number of places where excess stress could potentially occur. Because the tie's rounded head is flat, it can be easily installed even where space is at a premium.

**"The Grip of Steel"**

The non-magnetic stainless-steel locking barb is firmly anchored in the tie head, providing secure, reliable and consistently sturdy fastening quality, even under the harshest conditions.

**Protection for bundled wires**

The slight dimpling on the inside of the strip ensures that the ties remain firmly seated on the bundled wires even when subjected to vibrations.

time having to use screws and screwdrivers. Thanks to Ty-Rap® cable ties, brake lines and cooling hoses as well as a range of cabling harnesses can be quickly and safely fitted in our race cars. Temperatures on the race circuits and during transportation by sea and air freight round the globe can vary greatly. These high-quality Ty-Rap® cable ties have proven to be reliable under all ambient conditions. To prevent entire cabling harnesses chafing in transit or when racing, we use cable ties to fasten them to the vehicle chassis. What's more, whether we're racing in Tokyo, London or Portland, Ty-Rap® cable ties of consistently high quality are available on the spot worldwide."

**For installation engineers and switch cabinet assemblers too**

Ty-Rap® cable ties aren't just used in the ABB FIA Formula E World Championship. Installation engineers, control panel assemblers and other specialists also rely on Ty-Rap® cable ties to tie cables together, and to bundle and manage them. The cable ties are quick and easy to install where the low profile head and oval shape facilitate pulling cable bundles through openings. Due to their patented design, ABB's Ty-Rap® cable ties have a long service life. In addition, their firm grip prevents shifting in the event of vibration.

**ABB and the TAG Heuer Porsche Formula E Team**

Our jointly-held ambition to shape the future of e-mobility forms the foundation of ABB's and TAG Heuer Porsche Formula E Team's shared values. The expertise of these two leading technology companies will produce further developments in electric vehicle charging methods, paving the way to an emissions-free mobility and driving progress in the race for the energy transition. This partnership also creates a visible and practical link between ABB's engagement with Formula E and leading e-mobility solutions throughout the world. It demonstrates the ability to offer partners tailor-made solutions and, at the same time, confirms ABB's position as a driving force in the technological development of the world championship.

[Link to ABB Formula E](#)

[Link to Porsche Formula E](#)

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