



# MAXIMUM EFFICIENCY IN THE POWERTRAIN

---

High-performance coating for improved efficiency  
and reliability in electric race-car powertrains.



# SUCCESSFUL USE OF SUCASLIDE® AT UNIVERSITY RACING EINDHOVEN

University Racing Eindhoven (URE) has been one of the dedicated teams in Formula Student for many years – an internationally renowned competition originating from Formula SAE, founded in 1981 in Texas. In this environment, students around the world design innovative, Formula-1-like race cars each year. The competition focuses not only on speed and performance but also on engineering expertise, problem-solving, cost efficiency, and teamwork. URE focuses on electric race cars, whose drivetrain technologies require extremely high precision and reliability.

## Initial situation: High loads in the electric racing powertrain

In the team's electric race car, the focus was primarily on the highly stressed gears made of 1.6587 (18CrNiMo7-6), which serve as central components in the drivetrain. During previous racing seasons, significant wear had become evident: in addition to abrasive wear, there were also plastic deformations and irreversible damage such as cracks, pitting, and even component failures. All of these issues endangered not only the performance but also the operational safety of the entire system. The team, therefore, looked for a solution that would significantly delay wear, improve reliability, and at the same time increase the efficiency of the electric drive.



Fig. 1: The team of University Racing Eindhoven

## The choice: SUCASLIDE® as a coating for the highest demands

During discussions at the Technishow in Utrecht, a promising collaboration with eifeler quickly emerged. The final choice was the SUCASLIDE® DLC coating, which appeared particularly suitable due to its excellent tribological properties. SUCASLIDE® offers significantly improved sliding behavior compared to conventional PVD coatings and sustainably reduces friction in the contact area. The coating supports both running-in behavior and process reliability thanks to its stable and uniform layer structure. With a hardness of 1,000 HV, a layer thickness of approx. 1.5 µm, and a low coefficient of friction between 0.05 and 0.10, SUCASLIDE® provides ideal conditions for high-demand gearbox components.

Of particular value to URE was the coating's high load capacity at temperatures up to 400 °C and its emergency-running properties, which ensure component functionality even in the event of temporary lubrication failure.



Fig. 2: Small planet gears coated with SUCASLIDE®

The team coated four different gear types – large and small planet gears, the ring gear, and the sun gear – with SUCASLIDE®. The goal was to significantly reduce friction in order to minimize wear and achieve performance gains through reduced power losses. The coating delivered convincing results. In real racing conditions, the drivetrain exhibited noticeably reduced friction and improved reliability. Gearbox power losses were significantly reduced, directly benefiting the electric motor's efficiency. Additionally, the component lifetime increased noticeably, as typical wear mechanisms occurred much later. Particularly important for the team was the fact that even during temporary dry-running conditions, all essential drive functions were maintained and no critical failures occurred.



Fig. 3: Small and large planet gear coated with SUCASLIDE®

## The URE team's conclusion

Overall, the SUCASLIDE® coating made a key contribution to ensuring that the URE vehicle's drivetrain operated reliably and powerfully. The combination of reduced friction, increased service life, and high functional reliability under extreme conditions demonstrates the value of modern coating technologies in the Formula Student environment. The successful collaboration between URE and eifeler highlights the decisive impact that precise materials technology can have in motorsport – and how it helps student innovation projects reach the next technological level.



## Locations

**Germany**  
**voestalpine eifeler**  
**Coating GmbH**

**Werk Düsseldorf**  
Duderstädter Straße 14  
40595 Düsseldorf  
T. +49 / 211 / 970 76-0  
duesseldorf@eifeler.com

**Werk Ettlingen**  
Englerstraße 18a  
76275 Ettlingen  
T. +49 / 7243 / 57 78-0  
ettlingen@eifeler.com

**Werk Schnaittach**  
Kirschenleite 10–12  
91220 Schnaittach  
T. +49 / 9153 / 92 27-0  
schnaittach@eifeler.com

**Werk Salzgitter**  
Gottfried-Linke-Straße 205  
38239 Salzgitter  
T. +49 / 5341 / 22 32-0  
salzgitter@eifeler.com

**voestalpine eifeler**  
**Vacotec GmbH**

**Düsseldorf**  
Hansaallee 321  
40549 Düsseldorf  
T. +49 / 211 / 522-2400  
info@eifeler-vacotec.com

**USA**  
**voestalpine High**  
**Performance Metals LLC**

**Illinois**  
2475 Millennium Drive  
Elgin, IL 60124  
T. +1 (630) 587-1220  
sales.usa@eifeler.com

**California**  
20492 Carrey Road  
Walnut, CA 91789  
T. +1 (909) 594-5751  
sales.usa@eifeler.com

**Michigan**  
2222 Spikes Lane  
Lansing, MI 48906  
T. +1 (517) 708-7945  
sales.usa@eifeler.com

**Mississippi**  
11175 MS 178  
Olive Branch, MS 38654  
T. +1 (662) 932-8094  
sales.usa@eifeler.com

**Ohio**  
18687B Sheldon Road  
Middleburg Heights, OH 44130  
T. +1 (216) 658-3870  
sales.usa@eifeler.com

**Tennessee**  
3450 Old Tasso Road NE  
Cleveland, TN 37312  
T. +1 (423) 790-7382  
sales.usa@eifeler.com

**More coating centers**  
**worldwide:**

Canada, China, Denmark,  
France, Hungary, India, Mexico,  
Poland, Switzerland and Taiwan.

[www.eifeler.com](http://www.eifeler.com)

Serving with care.  
Coating with excellence.



**voestalpine eifeler Unternehmensgruppe**  
Duderstädter Str. 14  
40595 Düsseldorf, Germany  
T. +49 / 211 / 970 76-0  
www.eifeler.com

**voestalpine**

ONE STEP AHEAD.