

SUPRACOAT coatings

You are familiar with our DUROCOAT DC77 coatings, oxide ceramic coatings that prevent the passage of electricity, as well as DUROCOAT DLC and our other high-end coatings that represent the current state of the art. With our DUROLUB products, polymer lubrication, as well as numerous special solutions for rolling bearing lubrication, we significantly increase the service life of many demanding applications

In close international cooperation, a completely new, patented coating was developed, which can be produced on an industrial scale for the first time. This far exceeds the technical standards and all current mechanical and tribological performance limits.

We refer to these revolutionary coatings as **SUPRACOAT**, in distinction to our DUROCOAT coatings.

In the coming weeks, the first variant, **SUPRACOAT SC26**, will be gradually launched on the market. In this layer variant, the raceways and rolling elements are completely coated.

We have tested **SUPRACOAT** coatings internally and externally on test benches and summarize the results as follows:

- Hardness of at least 850 to 900 HV, compared to the average 680 to 700 HV of hardened bearing rings.
- Exceptional abrasive wear resistance of the **SUPRACOAT** coating under test conditions (ball on disc tests with alumina balls), comparable to high-strength hard chrome coatings. **SUPRACOAT** coated roller bearings have no metal-to-metal contact during start-up and under heavy loads.
- Non-stick property: The surface energy of the **SUPRACOAT** layers is very low. This makes it very difficult to wet the layer with liquids, greases, oils or other adhesive materials.
- Self-lubricating properties: Already from the start of the operation, the friction coefficients are around 50% lower than with conventional wear protection coatings, whereby the friction of **SUPRACOAT** is further reduced during operation.
- No adhesive wear on contact partners with similar bonding properties, for example in the case of rolling bearings with metal - metal contact, → no scuffing and slippage damage

- No tribooxidation, no chemical reaction in an oxygen atmosphere under mechanical load, → no formation of intermediate layers, no fretting grate
- **SUPRACOAT** can be used in the temperature range from minus 200 °C to plus 850 °C with almost identical properties. No other substance with tribological properties even comes close to covering this temperature range.
- No permanent deformations or flaking of the **SUPRACOAT** coating at the maximum surface pressure of 4600 MPa (standard definition of the static load rating) that is common in rolling bearings.
- **SUPRACOAT** is harmless and has no toxic properties
- Rolling bearing materials such as 100Cr6, 100CrMo7-3, AISI440C, Cronidur 30, 42CrMo4, silicon nitride Si3N4 as well as plastics, including PEEK, can be easily coated
- **SUPRACOAT** coatings are exceptionally thin and are also suitable for the post-processing of already manufactured bearings of various makes. Short lead times for testing and series production.

Currently, a **SUPRACOAT** coating of rolling and plain bearings with an outer diameter of up to 150 millimeters is possible within a period of 3-4 weeks. From the summer of 2026, the coating can already be offered in larger quantities. The expansion of the diameter to greater than 150 millimeters is planned by the end of 2026.

Examples from the experimental setups:

6211C3 – NSK / 650 ^{rpm-1} / 4.5 kN load / dry run

The raceway temperature initially rises and reaches 30°C before dropping to room temperature plus 1°C. With continued endurance running, no changes occur. With pure oil lubrication without coating, the operating temperatures on the raceway are around 4-5°C higher.

Differentiation from the state of the art: The test speed, which by no means represents the achievable speed limit, was six times higher than with cages made of graphite/MoS2 and ten times higher than with compound bearings. Lubrication is possible up to 850 °C, as opposed to a maximum of 350 °C for conventional bearings, and no measurable wear on **SUPRACOAT** was detected during the test.

6211C3 – NSK / 650 rpm-1 / 4.5 kN load / dry run, at starting temperature of minus 5 °C, iced

The bearing has the same characteristics as described above; Ice and water are displaced from the camp immediately after launch.

Differentiation from the state of the art: Rolling elements in **SUPRACOAT** coated bearings do not tend to cause the rolling elements to get stuck at low temperatures, caused by highly viscous grease / oil. **SUPRACOAT** coated bearings work with the same low friction in the low-temperature range. Reliable lubrication is also guaranteed in the cryogenic area. Any icing, condensation or similar phenomena do not lead to premature failure of the bearings.

SUPRACOAT coatings have the highest potential in the following areas:

- High-temperature applications above 200 °C that can no longer be permanently lubricated with greases or oils. Current dry lubrication solutions limit both speed and service life.

Compound materials and cages or cage segments made of graphite/MoS₂ are loss lubrications, and the lubricant is consumed during operation. As soon as the solid lubricant is no longer in contact with the friction partners, the bearing fails.

- Combined low-high-temperature applications – from the oven to the deep-freeze warehouse

- Applications in the wild with condensation due to temperature fluctuations (day / night)

- Applications in technical vacuum or aerospace. **SUPRACOAT** does not outgas or contaminate the environment. Even after longer downtimes, **SUPRACOAT** coated rolling and plain bearings start up without any problems.

- Applications that make relubrication difficult or impossible, such as subsea and tidal power plants, cranes, cable cars and the like.

- Slow-rotating or oscillating applications, to avoid mixed or limit friction as well as under high impact loads. All applications in which full lubrication (EHD – elastohydrodynamic lubrication) cannot be guaranteed.

- Bearings that have to start up reliably again after a long standstill, e.g. in deep space applications such as satellites

- Applications with active, direct cooling of the bearings, such as in machine tool axes and spindles, thermal expansion is reduced, higher operating speeds are possible.

- Applications where leaking lubricants can lead to contamination of the manufactured products, for example in the food and pharmaceutical industries.
- Applications in which bearings or lubricants react with the environment, for example in the chemical industry.
- Track and support rollers whose outer ring runs directly on metal

The decisive advantage of **SUPRACOAT** is the reduction of friction and the avoidance or reduction of the amount of mineral and synthetic lubricants used. By reducing the energy required for the operation of plants and minimizing lubricant consumption during operation, **SUPRACOAT** actively contributes to cost reduction and environmental protection.

Studies by a German manufacturer of rolling bearings have shown that around 420 TWh of energy losses are caused by friction caused by the new rolling bearings installed worldwide every year. This is hardly less than the entire annual electricity consumption in Germany.

We cooperate with universities that carry out comprehensive theoretical and scientific investigations. These studies are wide-ranging, cover other areas of application and require a considerable amount of time.

In view of the promising results, we have decided to carry out field trials together with interested customers. Our goal is to document applications with the results and savings achieved and thus accelerate the implementation of **SUPRACOAT** coatings in practice.

We invite interested companies to test our products, share their experiences with us and achieve a significant technological advance in the performance of their products.

SUPRACOAT coatings for rotary applications will be available exclusively from THB in various versions in the future.

As usual, customers can either select the desired bearing brands themselves or purchase complete bearings.

For the production of complete bearing solutions, we have manufacturing partners in Europe and Asia at our disposal.