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**SULZER**

**Sulzer Metco**

**Cavidur®** high performance coatings for racing engines  
Enhance your performance and extend your components' lifetime

Components that perform better with  
Cavidur® coating

- Camshafts
- Finger followers
- Flat tappets
- Rocker arms
- Rocker arm shafts
- Lash caps
- Valves
- Piston rings
- Pistons
- Piston pins
- Connecting rods
- Oil pump shafts



Cavidur® coating reduces wear on the lobes so the profile and resulting performance will remain unchanged until the end of the race



The low friction coefficient of Cavidur® will eliminate any risk of seizing



Cavidur® coated valves perform more reliably due to improved wear resistance and reduced carbon build-up

In a sport where teamwork is paramount both off the track and on, you couldn't wish for a more dedicated partner behind the scenes than Sulzer. Racing teams in F1, NASCAR, WRC, DTM and F3 have used the Cavidur® coatings successfully for over 10 years. Customers consider Cavidur® the leading product for coating highly loaded engine components because of its high reliability and the one-stop service that Sulzer provides. Cavidur® enhances engine performance in two ways. It reduces friction, while at the same time increasing component lifetime by increasing wear resistance. But, like any ambitious racing team, Sulzer isn't content to rest on its laurels. We work constantly with our customers to research and develop better, more advanced coatings and surface engineering solutions.

Cavidur®, the DLC coating that helps you to take pole position.





### How Cavidur® coatings work to give you a winning advantage

Cavidur® coatings are amorphous DLC films which combine the best properties of diamond and carbon. These properties give Cavidur® very high adhesion and hardness, allied to extremely low friction. The excellent adhesion is achieved through the different DLC deposition technologies which we use. For aluminum parts, we use a process with a maximum temperature of 200°C. For steel, titanium alloys or cast iron, we use a process where the temperature can reach a maximum of 350°C.

These coating processes, which use both Physical Vapor Deposition and Plasma Assisted Chemical Vapor Deposition, take place in clean room conditions which ensure that there is no risk of contamination during the process. Our in-house characterization lab also controls and documents any parameters that may have an impact on quality or performance.

### Cavidur® coatings tailored to your needs

|             | Micro Hardness (Gpa) | Friction coefficient* | Adhesion** Lc (N) | Thickness (µm) | Coating temperature (°C) | Max temperature of use (°C) |
|-------------|----------------------|-----------------------|-------------------|----------------|--------------------------|-----------------------------|
| Cavidur® N  | 30                   | 0.10                  | 32                | 3.0            | 250-350                  | 400                         |
| Cavidur® W  | 35                   | 0.10                  | 32                | 3.0            | 250-350                  | 400                         |
| Cavidur® B  | 24                   | 0.08                  | 18                | 2.5-3.0        | 180-200                  | 400                         |
| Cavidur® BA | 24                   | 0.08                  | 24-26             | 2.5-3.0        | 180-200                  | 400                         |
| CrN         | 23                   | 0.50                  | 38                | 3.0-4.0        | 500                      | 650                         |
| TiN         | 25                   | 0.65                  | 36                | 3.0-4.0        | 400                      | 550                         |
| AlTiN       | 30                   | 0.55                  | 36                | 3.0-4.0        | 500                      | 800                         |

Comparing Cavidur® with other engine component coatings

\* Against steel in dry conditions

\*\* Under constant load

\*\*\* Maximum temperature depends on the design of the components

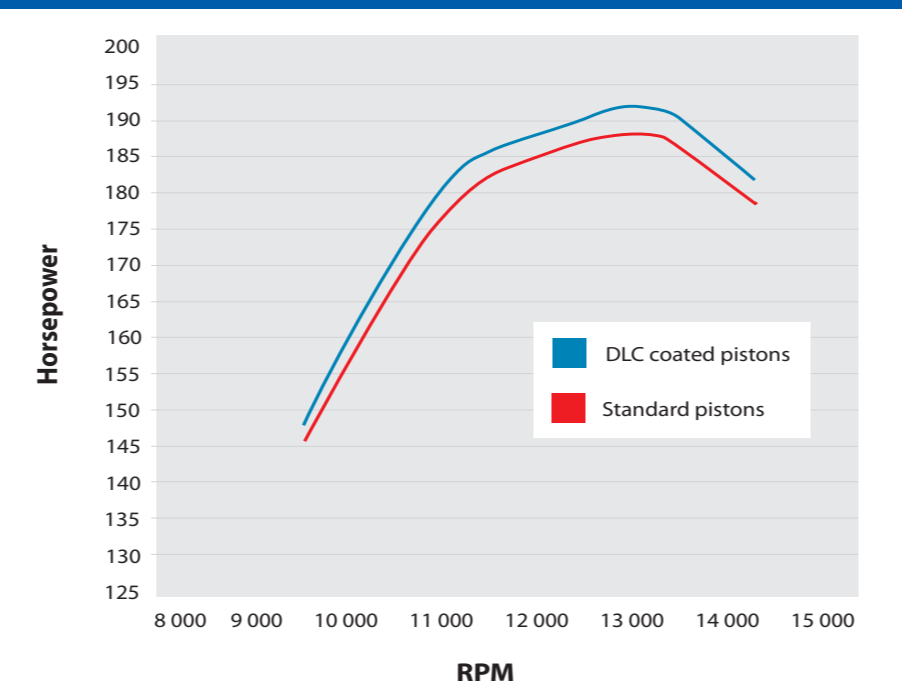
### A Cavidur® coating for every application

We can provide a range of different Cavidur® coatings which cover the differing requirements of the various components in a racing engine's powertrain. What all Cavidur® coatings have in common is that they increase hardness thereby extending component life, and they reduce friction, offering a measurable performance boost. Increased hardness means that some components can be lighter, which allows higher engine speeds. Reduced friction also reduces wear on other parts in contact with the treated component. All this adds up to longer component life and higher reliability, even under racing conditions. Cavidur® DLC coatings can also be applied to a customer's current parts so that they can conduct their own trials and evaluate the benefits.

### How our team becomes part of yours

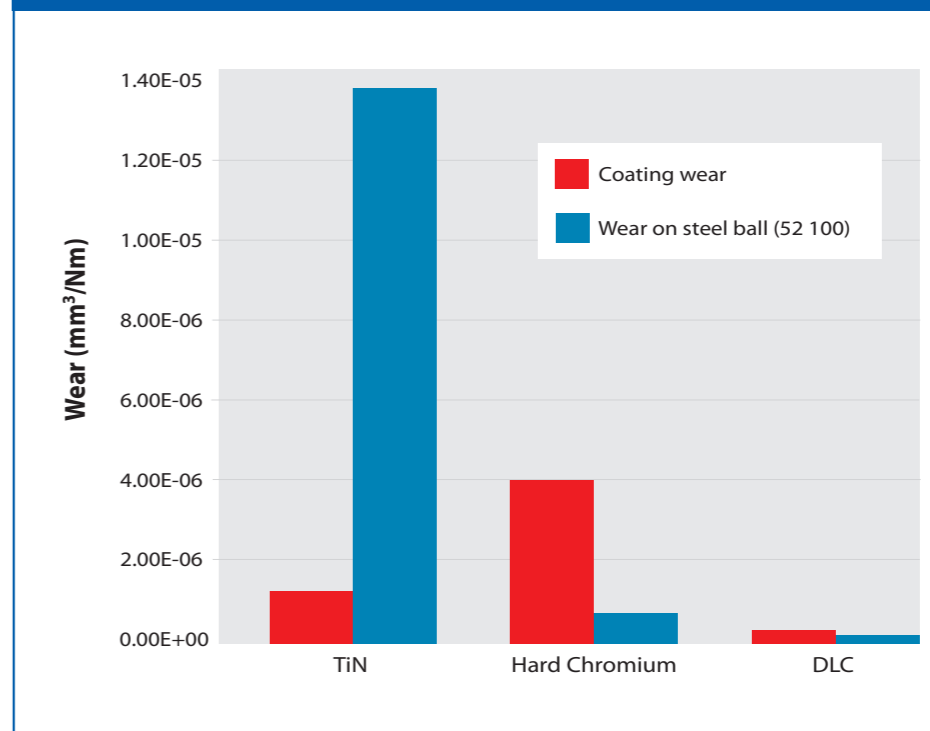
We at Sulzer are totally dedicated to supplying coatings for racing engines. That's why we focus on offering DLC coatings as they've been proven to be technically the best solution for most components in most situations. However, just as in a race where you sometimes need to change strategy, we'll also work with other coatings or develop coatings which offer you the greatest competitive advantage.

### Power output boost with DLC coated pistons



DLC coated pistons significantly improve the power output

### Reduced wear with DLC coatings



The high degree of the coating's hardness protects the coated part. Thanks to the coating's extremely smooth surface, any other parts in contact also don't wear.