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Wear protection coatings for Diesel injection systems

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The reduction of CO₂ emissions is one of the global challenges our modern industrialized society faces. Therefore the automotive industry has to develop more energy and fuel efficient technologies. Because of their higher efficiency relative to gasoline-operated engines, Diesel-operated engines play a key role. Efficient combustion of Diesel fuel is achieved using high-pressure fuel-injection technology. Today this technology injects Diesel fuel into the combustion chamber at pressures around 2500bar. Due to the high pressures and requirements of the size and weight of the components, the stresses are concentrated on very small contact areas where contact temperatures can exceed 300°C. Nevertheless the amount of injected Diesel fuel must be controlled with high precision and low drift over the entire lifetime.

For wear protection, coatings are applied on these highly loaded parts. Diamond-like carbon coatings (a-C:H and ta-C) play a special role here due to their superior tribological properties, such as high wear resistance and low wear of the counterbody in contact with the coated component.

The presentation will give an overview of coated machine elements in Diesel injection systems as well as with their requirements for coatings with focus on wear resistance and adhesion.

Keywords

Wear Protection