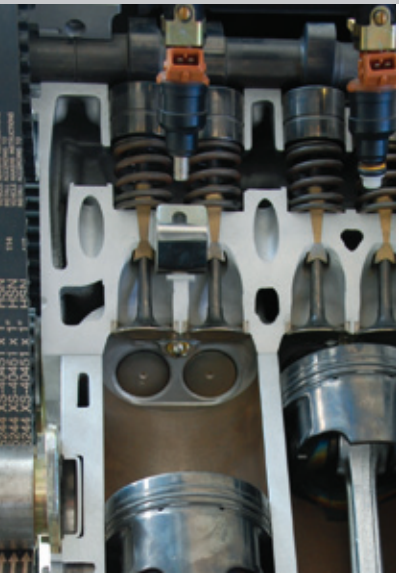
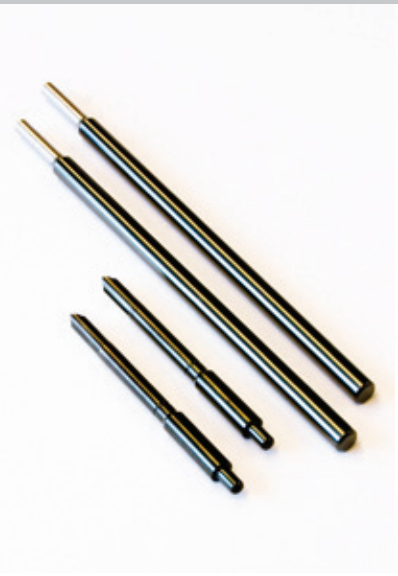
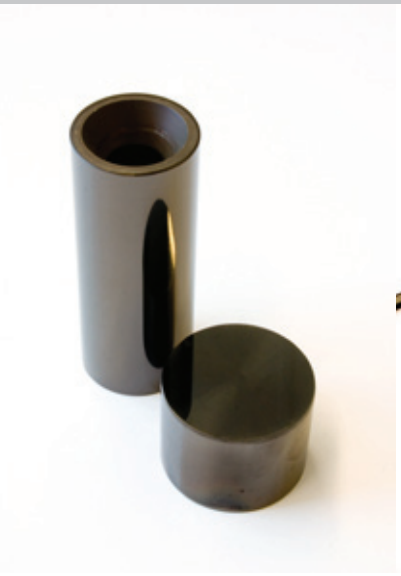
Hauzer® TECHNO COATING
PVD / PACVD TECHNOLOGY

Tribological Coatings

Wear Resistance & Friction Reduction


Applications:

- Turbo diesel injection
- Piston rings
- Valve train components
- Piston pins
- Roller / sliding bearings
- Gears
- Machine components
- Textile industry

Advantages:

- PVD coatings improve engine performance by reduction of friction and wear
- Increased engine & component life
- Improved fuel economy
- Lower CO_2 emissions

Profitable Partnership for

Job Coaters and Component Manufacturers

Tribological coatings are used to reduce wear and friction between interacting surfaces in relative motion and are therefore attractive to component makers in the automotive industry. The specifications for engine components increase every year due to manufacturer requirements and the ever stricter European emission norm, which is relevant on a world-wide scale. One way to comply with the regulations and improve the performance of the engine, is the use of PVD (Physical Vapour Deposition) coatings and PACVD (Plasma Assisted Chemical Vapour Deposition) coatings on engine components.

Leading Technology

PVD coated components were successfully introduced in the automotive industry at the end of the last century for high pressure diesel fuel injection systems. Hauzer was part of this development and has been a supplier of leading technology for tribological coatings ever since. Wear resistance and friction reduction have become important characteristics offered by PVD coatings. In a normal car 10-15 percent of energy use is wasted on friction losses. Due to a tribological Diamond Like Carbon (DLC) coating on e.g. valve train components, a friction reduction of 40 percent can be achieved, resulting in a better fuel economy and 1-2 percent less CO_2 emission. Nowadays many more components are coated with PVD and PACVD coatings, specifically tailored to components and their lubrication. With Competence Centres in The Netherlands, China and Japan, and a broad sales network to complete a strong worldwide presence, customer support is local and accessible.

Flexicoat® Equipment

The coating process of automotive components is real mass production. Hauzer offers a range of coating equipment which is flexible and fast and gives a choice in capacity.
To be ready for the reality of today and flexible for the future, hybrid equipment such as the Hauzer Flexicoat® series brings important advantages. All Hauzer Flexicoat® machines can combine several technologies in one system, e.g. arc evaporation can be combined with (reactive) sputtering and PACVD. Because development of tribological coatings for automotive engine components is ongoing, new technologies and solutions remain the focus for component manufacturers who want to stay ahead in their market. With the Hauzer Flexicoat® machine upgrading with new technologies is guaranteed possible.

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	Carbon-based Coatings					Nitrides
	Metal-doped DLC Me-DLC (WC-C:H)	Amorphous Hydrogenated DLC (a-C:H)	Silicon-doped DLC (a-C:H-Si)	Sputtered DLC (a-C)	Hydrogen-free DLC (ta-C)	Chrome Nitride (CrN)
Method	PVD/PACVD	PACVD	PACVD	PVD	PVD	PVD
Hardness (HV 0.05)	800-2200	1500-3500	1500-2500	2000-4000	3000-7000	2000-2200
Coefficient of friction	0.1-0.2	0.05-0.15	0.05-0.1	0.05-0.1	0.02-0.1	0.4
Internal stress (Gpa/µm)	0.1-1.5	1-3	1-3	2-6	1-3	0.1-1
Thickness (µm)	1-10	1-10	1-10	1-3	1-3	1-40
Industrial use	+++	+++	+++	+++	+++	+++
Mass production	+++	+++	++	+++	+++	+++

Flexicoat® 1500, mass production equipment for component makers and job coaters

Figure 1: Features of tribological PVD and PACVD coatings

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