We offer equipment and processes for all types of PVD & PaCVD Carbon Coating Technologies:
• RF – Technology
• Pulsed DLC
• Sputtering
• Hybrid Technologies
• Hard Carbon

Based of your applications we select the technology which offers you the best performance and the lowest cost of ownership.
Together with our partner YSIPHYSICS, we offer you the most economical solution (equipment and process) for your application: Most DLC (Diamond-like Carbon) coatings are applied by PeCVD (Plasma Enhanced CVD) or a combination of PVD and PeCVD. The best choice for the technology and the type of equipment depends on the application (coating properties and quantity/geometry/size/material of the parts).

**RF Technology**
- **Coating properties:** high density, high compressive stress, very low friction coefficient
- **Typical applications:** engine parts for racing, plastic molds, watch casings and interior parts, high precision machine components
- **Parts:** small to medium volume, complex geometries
- **Equipment/process:** small vessels with very short cycles, deposition at low temperatures

**Equipment size:**
- **Ref PfC 400RF** Plasma volume = Ø 320 x 380 mm
- **Ref PfC 500RF** Plasma volume = Ø 500 x 500 mm

**Coatings:** High density DLC, SiC, SiOx, SiNx

**Pulsed DC Technology**
- **Coating properties:** lower density, smoothness and hardness; post treatment sometimes required
- **Typical applications:** automotive components, machine-wear components for textile and other machinery
- **Parts:** high volume parts, long parts possible
- **Equipment/process:** larger vessels available, process forgiving to batch loading, very cost-effective process

**Equipment size:**
- **Ref PfC 600 PeCVD** Plasma volume = Ø 600 x 700 mm

**Coating:** DLC, SiC-DLC

**Sputtering or arc combined with PeCVD**
- **Coating properties:** excellent adhesion on wide range of substrates, adjustable to properties of parts
- **Typical applications:** automotive engine components such as tappets and piston pins, aerospace components, machine-wear components, razor blades
- **Parts:** high and low volume
- **Equipment/process:** large vessels available, process allows easy batch loading, equipment more expensive due to magnetrons for sputtering

**Equipment size:**
- **Ref PfC 650 SP/DLC** Plasma volume = Ø 650 x 650 mm
- **Ref PfC 400 SP/DLC** Plasma volume = Ø 400 x 380 mm
- **Ref PfC 450 Ar/DLC** Plasma volume = Ø 450 x 500 mm

**Coatings:** DLC, Cr+DLC, CrN, Cr+CrN+DLC, WCC, WCC+DLC, Cr+WCC, CrN+Ic

**Hard Carbon, H2-free DLC**
- **Coating properties:** thin/tight tolerance, extremely hard (close to 100% sp3), very smooth, high compressive stress, low friction, electrically isolating, excellent adhesion
- **Typical applications:** cutting tools for machining of non-ferrous materials such as Aluminium, Copper, Graphite, Carbon and Glass Fiber Composites
- **Parts:** high performance tooling, micro-tools
- **Equipment/process:** smaller vessel, low temperature

**Equipment size:**
- **Ref PfC 600 Ta:C** Plasma volume = Ø 600 x 250 mm

**Coatings:** H2-free DLC : Ta:C (tetra - amorphous carbon)

**Plasma stripping Technology**
Equipment designed to remove all kinds of DLC coatings including Multilayers.
Coating Properties

<table>
<thead>
<tr>
<th></th>
<th>DLC (amorphous)</th>
<th>CrN + DLC</th>
<th>CrN</th>
<th>Me-DLC</th>
<th>Hard-Carbon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coating Material</td>
<td>A-C:H</td>
<td>CrN + a-C:H:W</td>
<td>CrN</td>
<td>A-C:H:W (WC/C)</td>
<td>Ta-C</td>
</tr>
<tr>
<td>Hardness (HV0.05)</td>
<td>2'500</td>
<td>2'500</td>
<td>2'300</td>
<td>1'650</td>
<td>5'300</td>
</tr>
<tr>
<td>Typical Thickness (µm)</td>
<td>1-5</td>
<td>1-5</td>
<td>1-10</td>
<td>1-4</td>
<td>1-2-5</td>
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<tr>
<td>Increasing of roughness Ra (µm)</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>0.01</td>
</tr>
<tr>
<td>Friction Coefficient against steel</td>
<td>0.15</td>
<td>0.15</td>
<td>0.4</td>
<td>0.15</td>
<td>0.05</td>
</tr>
<tr>
<td>Max Operating Temperature (°C)</td>
<td>350</td>
<td>350</td>
<td>750</td>
<td>300</td>
<td>400</td>
</tr>
<tr>
<td>Technology</td>
<td>RF/dc pulsed</td>
<td>PVD+DC pulsed / PVD+RF</td>
<td>PVD</td>
<td>PVD+DC pulsed</td>
<td>arc</td>
</tr>
</tbody>
</table>

Our equipments

- are user friendly with state of the art communication
- use the best proven high end power supplies and gas and vacuum components (e.g. Fronius, Huettinger, MKS, Edwards)
- have long life high precision stainless steel chambers and carusels
- have optimized processes with high reliability and repeatability
- are built for easy and minimal maintenance
- are offered with process customizing
- are available in various sizes

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