The Laser-Arc® Module (LAM) is a modular plasma source for the large scale and high volume deposition of tetrahedral amorphous carbon (ta-C) thin film coatings in industrial physical vapor deposition machines. Such ta-C coatings are extremely hard and have a low coefficient of friction, which make them ideally suited for wear resistance applications. Ta-C is also biocompatible making it an excellent coating material for medical device applications.

The German engineered Laser-Arc® plasma source can be installed on production machines from various coating equipment suppliers. It is available in new machine installations and also as a retrofit solution for existing coating machines.

The process deposits highly sp3 bonded amorphous carbon films (ta-C) of extreme hardness and durability. The temperature impact on the substrate is minimized allowing for a deposition temperature well below 100°C. Typical film thicknesses range from nanometers to tens of micrometers, depending on the application requirements. The modular design of the Laser-Arc® technology allows for customized implementations.
Our engineering team offers retrofit solutions and complete coating machines with Laser-Arc® technology. Engineering services include system and coating demonstrations, application and coating process development, support during coating and equipment selection, installation and start-up. We offer all services necessary to successfully transfer the technology to our customers.

**Ta-C Applications**

The high hardness and low friction of ta-C coatings in conjunction with biocompatibility and chemical resistance are particularly suitable for:

- Components and parts in automotive and mechanical engineering, e.g. piston pins and rings, pump components, etc.
- Cutting and forming tools
- Components for packaging, food processing and textile machinery that do not tolerate liquid lubrication
- Implants, components, devices for the pharmaceutical and biomedical industry
- Protective coatings for temperature sensitive materials (e.g. plastics and foils)

**Ta-C Coating Properties**

- Hardness: 40 – 60 GPa
- Young’s modulus: 400 - 600 GPa
- Coefficient of friction: 0.1 (dry); < 0.05 (lubricated)
- Thermal stability: 400°C (air); 650°C (vacuum)

**Laser-Arc® System Components**

- Laser-Arc® Module plasma chamber with adapter to connect to coating machine flange
- Computer controlled system
- Pulsed high current arc power supply
- Optional: Pulse-synchronized power supply for substrate bias
- Optional: Plasma filter for particle minimization