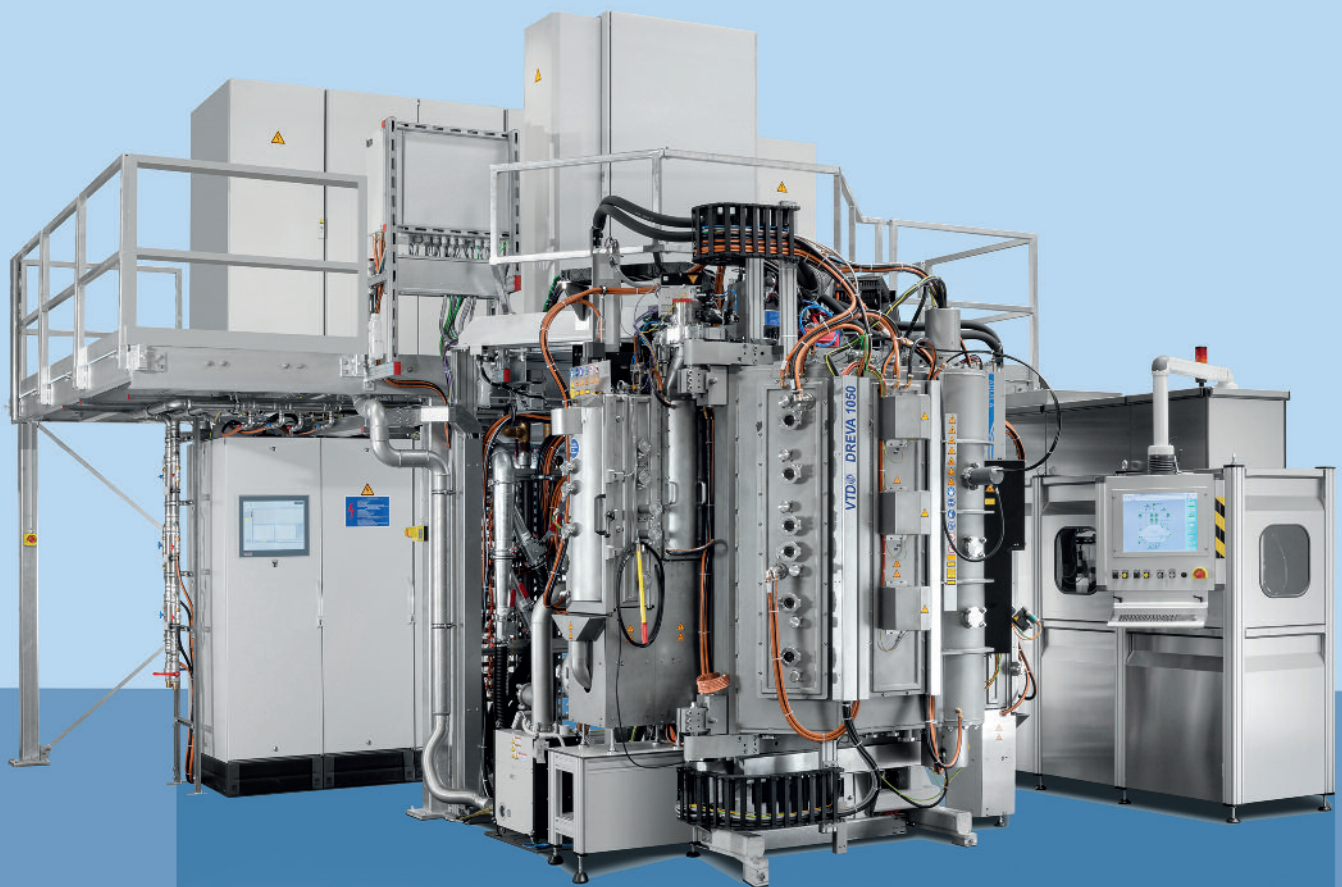


# ta-C Coating System

## ta-C 涂层系统

### **DREVA 1050 LAM**



## Main Features

- Field proven, reliable and refined equipment concept
- Laser-ARC-Modul (LAM) for ta-C deposition optional with macroparticle filter
- ARC evaporation sources for base coatings
- Option: magnetrons for sputtering (planar and tubular), including HIPIMS
- Hollow cathode for plasma pre-treatment
- Segmented substrate heating unit
- Usable coating volume:  $\varnothing$  1,050 mm x 1,100 mm
- High capacity combined with high productivity
- Adjustable substrate carrier: dedicated holding fixtures for various tool and component designs
- Fully automated control system and data logging

## Applications

- ta-C deposition in combination with subsequent polishing step for tribological systems
- Macroparticle filtered ta-C deposition for thin layers on 2D & 3D substrates

## Process Benefits

- Low friction coefficient of polished ta-C down to  $\mu < 0.01$ , supra lubricity verified
- Indentation acc. to ISO 14577: E-modulus 300 – 600 GPa / hardness 40 – 80 GPa
- ta-C layer properties:  $sp^3/sp^2$  up to 80%, H-content  $< 0.1$  at % (at detection limit of NRA)
- Thermal stability of layer properties in use:  $< 400^\circ\text{C}$  ( $\Delta < 750^\circ\text{F}$ )
- Low deposition temperature:  $< 180^\circ\text{C}$  ( $\Delta < 360^\circ\text{F}$ )
- Many substrate materials: steel, hard metals, Si, Al, Ti-alloys, glass, polymers
- Certified ta-C adhesion to substrate material in tribological applications
- Layer thickness: up to  $30\ \mu\text{m}$  in use
- Thick ta-C coatings  $> 3\ \mu\text{m}$  can be polished to achieve a very smooth surface
- Production proven & effective deposition rate on substrates: up to  $1\ \mu\text{m}/\text{h}$  on surface area of about  $8\ \text{m}^2$  per batch (macroparticle filtered ta-C deposition: up to  $0.3\ \mu\text{m}/\text{h}$ )

## Customer Benefits

- Superior wear protection of up to  $30\ \mu\text{m}$  thick ta-C layers with outstanding properties
- Deposition rate at the maximum physical limit shortens process time to a competitive advantage
- Production proven technology, equipment concept and layer properties

## Range of Coatings:

- Standard layer stack: Cr / ta-C
- Optional base coatings: Cr, Ti, CrN, WC, other hard coatings on request

## 特性

- 经实践证明, 设备运行可靠、品质优良
- ta-C 沉积用 Laser-ARC-Modul (LAM), 另可配置多孔大粒子过滤器
- 基础涂层用电弧蒸发源
- 可选: 磁控溅射 (平面和管状), 包括 HiPIMS (高功率脉冲磁控溅射)
- 等离子体刻蚀用空心阴极
- 分段产品加热装置
- 有效涂层区域:  $\varnothing 1,050 \text{ mm} \times 1,100 \text{ mm}$
- 高产能、高产率
- 可调节的产品转架系统: 专用夹紧装置, 满足不同刀具和零部件的设计需求
- 全自动控制系统和数据采集

## 用途

- ta-C 沉积与摩擦学系统的后续抛光步骤结合
- 经多孔大粒子过滤的 ta-C 沉积, 适用于 2D 和 3D 产品的薄涂层

## 工艺特点

- 打磨后的 ta-C 摩擦系数较低,  $\mu < 0.01$ , 其润滑性得到验证
- 压痕符合 ISO 14577 标准要求: 弹性模量 300-600 GPa / 硬度 40-80 GPa
- ta-C 层特性:  $\text{sp}^3/\text{sp}^2$  可达 80%, H 含量小于 0.1 at % (NRA 的检出限)
- 涂层的热稳定性:  $< 400^\circ\text{C}$  ( $\Delta < 750^\circ\text{F}$ )
- 低沉积温度:  $< 180^\circ\text{C}$  ( $\Delta < 360^\circ\text{F}$ )
- 多种打底材质: 钢、硬质材料、Si、Al、Ti 合金、玻璃、聚合物
- 在摩擦应用中, ta-C 与基体材料的结合力得到验证
- 涂层厚度: 可达到  $30 \mu\text{m}$
- 可对超过  $3 \mu\text{m}$  厚度的 ta-C 涂层进行打磨, 使其表面光滑
- 经生产实践验证的基体有效沉积率: 每批次大约  $8 \text{ m}^2$  的表面上可达到  $1 \mu\text{m}/\text{h}$  (经多孔大粒子过滤的 ta-C 沉积: 达  $0.3 \mu\text{m}/\text{h}$ )

## 客户利益

- $30 \mu\text{m}$  厚的完整 ta-C 层具有优异的耐磨防护性
- 沉积率如能实现最大化, 可缩短加工时间, 使其优势更加突出
- 工艺技术、设备设计和涂层特性都经过生产实践验证

## 涂层类别

- 标准叠层: Cr / ta-C
- 其它可选用的打底层: Cr, Ti, CrN, WC, 如有要求可提供其它硬质涂层

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