

*Dental
Implant*



*Contact
Lenses*



*Spinal
Implant*



*Cosmetics
Packaging*



Hip Joint



Knee Joint



Instrumentation



WET CHEMICAL & VACUUM DEPOSITION

for Medical Technology
GMP & FDA Compliance

Wet Chemical & Vacuum Deposition

GMP & FDA Compliance

SINGULUS TECHNOLOGIES focusing on the Medical Technology Market

SINGULUS TECHNOLOGIES built machinery for the Semiconductor, Solar and Optical Disc areas for 20 years, and has satisfied the high-quality requirements of the industry.

The medical industry, now often referred to by the umbrella term life science, is one of the most important growth markets of the future. The company gears its processes to the sophisticated characteristics and functionality expected in medical technology and therefore to the quality of the products and the production and processing methods required. This involves adopting the GMP (**Good Manufacturing Practice**) principles as well as the GAMP (**Good Automated Manufacturing Practice**) guidelines that apply in regulated industries for the validation of computer-based systems. The corresponding quality management system has been installed at SINGULUS TECHNOLOGIES. This serves to guarantee product

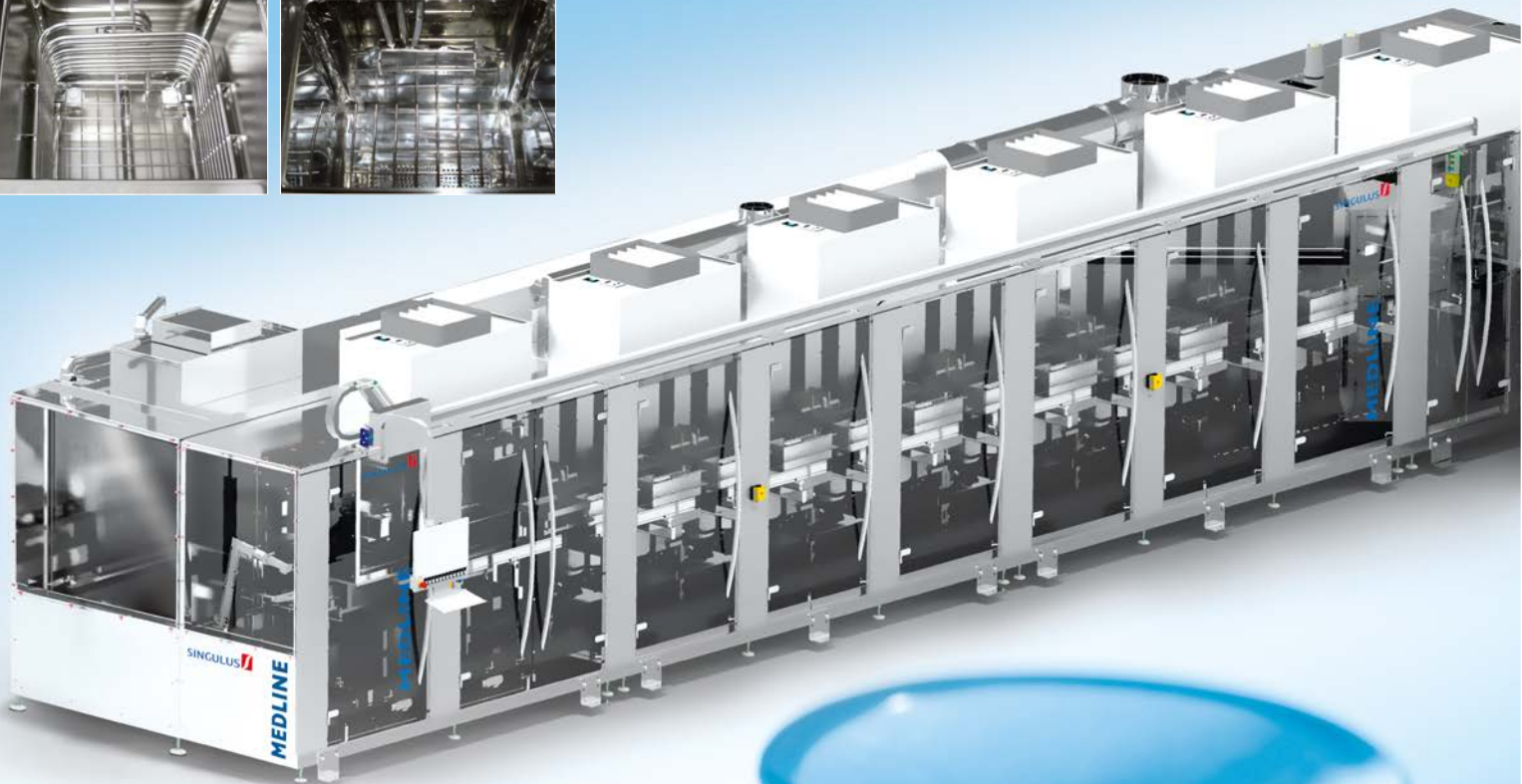
quality and to meet the binding market requirements of health agencies, in particular the rules of the FDA (U.S. Food and Drug Administration) (FDA / 21 CFR),

SINGULUS TECHNOLOGIES is a globally active company certified to DIN EN ISO 9001, DIN EN ISO 50001:2011 – certification for medical technology to DIN EN ISO13485 has been prepared.

Wet Processing Systems Batch & Inline Systems as well as Customized Solutions

GMP & FDA Compliance

SINGULUS TECHNOLOGIES delivers wet chemical equipment for different applications and industry segments. The spectrum ranges from manually loaded wet chemical tools for cleaning applications to fully automated platforms for cleaning, conditioning, coating or etching for high volume mass production in demanding technologies.



Typical Examples for Wet Chemical Applications:

- Washing and pre-cleaning
- Cleaning
- Ultra- or megasonic cleaning
- Surface conditioning
- Etching
- Surface modification
- Coating
- Electrochemical etching

The approved SINGULUS TECHNOLOGIES wet bench equipment is available for applications for a wide range of different materials. Flat substrates in large dimensions can be processed but also small three-dimensional and thin parts are typical for high volume production equipment as well as customized tools for special applications.

Vacuum Deposition Technology

PVD: Sputtering

PECVD: Plasma Enhanced Chemical Vapor Deposition

GMP & FDA Compliance

SINGULUS TECHNOLOGIES has delivered far more than 8,000 vacuum coating machines since its foundation in 1995. The spectrum of vacuum deposition methods includes physical vapor deposition (PVD, sputtering) as well as plasma enhanced chemical vapor deposition (PECVD). In addition, non-vacuum deposition methods like CVD or aerosol assisted CVD (AACVD) are used. Applications like plasma cleaning and plasma surface conditioning complete the portfolio.

Application Examples for Medical Devices

- Antibacterial coatings
- Dense barrier layers
- Gradient layers
- Antireflection coatings, hard coatings and clean coatings
- Adhesion promoting layers
- Plasma functionalization
- Plasma cleaning, plasma sterilization
- Decorative coatings

A variety of deposition materials, e.g. the wide range of metals, metal alloys and ceramics, is available for the respective application. Flat substrates can be processed but also 3-dimensional parts by either simultaneous deposition from different directions or part rotation during deposition. Our production systems typically feature single substrate/parts tracking, in-line quality control, closed loop process stabilization and are fully automated to reduce logistical efforts and personnel intensity.



*Inline Sputtering System
with Horizontal Substrate Transport for Flat Substrates*



*POLYCOATER
Inline Sputtering System for 3D Parts*



*Dedicated All-Electric Injection Molding Machine
for Thin-Wall Medical Parts*



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THIN FILM
DEPOSITION

SURFACE
ENGINEERING

THERMAL
PROCESSING

WET
CHEMICAL

SINGULUS TECHNOLOGIES – Innovations for New Technologies

SINGULUS TECHNOLOGIES has built equipment for the Semiconductor, Solar, Optical Disc, Decorative Coatings, and Medical Technology industries for more than 20 years, satisfying the high-quality requirements of each industry. The core competencies of SINGULUS TECHNOLOGIES include vacuum coating, surface processing, wet-chemical and thermal production processes. SINGULUS TECHNOLOGIES' machines incorporate the latest technological developments and follow the guiding principles of industry 4.0, the current trend of automation and data exchange in manufacturing technologies.

SINGULUS TECHNOLOGIES builds innovative machines and systems for efficient and resource-friendly production processes. For all of its machines, processes and applications, SINGULUS TECHNOLOGIES demonstrates its automation and process technology expertise with quick, substantial return on investment.