



MATERIA

Advanced Cleaning
of Silicon

MATERIA PCE – Poly Chunk Etch

MATERIA OCC – Off Cut Cleaning



For crystalline solar cells SINGULUS TECHNOLOGIES offers:

- Production of PERC Solar Cells
 - Single side polish etch with LINEA II
 - Rear side passivation with SINGULAR XP
 - PERCEUS Production Package for PERC solar cells
- Other process applications improving cell performance
 - LINEA II parasitic emitter etching and edge isolation
 - LINEA II isotexture or PSG removal
 - Wet process equipment for poly silicon chunk etching, cleaning & drying – MATERIA
 - ICP-PECVD coating equipment – SINGULAR
 - IPA-free wet process equipment – SILEX
 - Evaporator for metallization of high-efficiency solar cells
 - Low-cost and high-efficient cleaning process (Upgrade SILEX with Ozone)
 - Complete production lines – SOLARE

SINGULUS TECHNOLOGIES

Developer, Enabler and Supplier for the PV Market

SINGULUS TECHNOLOGIES is a supplier of manufacturing solutions and production equipment for the markets Optical Disc, Semiconductor and Solar. With new machine concepts and manufacturing processes in the crystalline and thin-film solar technology, SINGULUS TECHNOLOGIES establishes itself as development partner and equipment supplier for investments in new high performance solar cell concepts. As market leader for Optical Disc production systems, we have gained extensive know-how in vacuum coating, automation, and process integration.

MATERIA PCE & OCC

With the MATERIA platforms, SINGULUS launches its new product for raw material preparation. The MATERIA is a batch system for chemical etching, cleaning, and drying of mono & multi silicon chunks and Ingot Off Cuts. The system is adapted to the high purity demand in silicon production.

Simultaneously, lowest possible total cost of ownership has been a key driver in the development of this machine. The MATERIA is a fully automated system for high throughput industrial production. It relies strongly on the SILEX product line for cell fabrication which can look back on a worldwide installed base of over 100 machines.

Main Features

- Proven, highly integrated design based on the SILEX wet processing machine
- For poly silicon (electronic, solar or UMG grade)
- Chunk sizes between 10 and 180 mm (other formats upon request)
- Throughput: from 500 tons p.a. to 2500 tons p.a. (other upon request)
- Built for non-stop utilization: 24/7, 365 days/year
- High availability (uptime > 95 %)
- Compliance with international safety regulations
- Flexible coupling to adjacent processes
- carrier return and management system

Controlled, Precise, Intelligent

Real-time Siemens S7-300 plc control of wet bench

- State-of-the-art full graphic user interface
- Prepared for connection to Manufacturing Execution System (MES), e.g. via OPC, XML, or SECS/GEM
- Network communication support
- Carrier tracking and data logging
- Electronic weighing of chunk load
- Chemical concentration monitoring
- Highly accurate chemical dosing

High Flexibility in Process Design

- Acidic etching process, alkaline etching process, or combined process and/or multiple cleaning combinations, i.e. Ozone cleaning, Ultrasonic cleaning, High Pressure Spray
- Multi-recipe management via graphical user interface or MES
- Process support available

By Using Optimized Process Baskets

- Short drying time
- Minimized carry-over of water and acid

Low Cost-of-Ownership

- Minimized fresh water consumption
- Minimized chemical consumption
- Continuous tracking of consumption data





Headquarters

SINGULUS TECHNOLOGIES AG
Hanauer Landstrasse 103
D - 63796 Kahl, Germany
Tel. +49 6188 440-0
Fax +49 6188 440-1130
sales@singulus.de
www.singulus.de

Production Site for Wet Processing Systems

SINGULUS TECHNOLOGIES AG
Branch Office Fuerstenfeldbruck
Fraunhoferstr. 9
82256 Fuerstenfeldbruck, Germany
Tel. +49 8141 3600-0
Fax +49 8141 3600-2100
sales@singulus.de

Subsidiaries

China

**SINGULUS TECHNOLOGIES
CHINA**
Room B412-413,
No. 1400 Jiangchang Road,
Jingan District, Shanghai, China
Zip Code: 200072
Tel. +86 13916990710

Contact: Greens Pan
Tel. +86 13822138376
greens.pan@singulus.com.cn

Contact: Michael Han
Tel. +86 13917382315
michael.han@singulus.de

France

**SINGULUS TECHNOLOGIES
FRANCE S.A.R.L.**
Tel. +33 3 8931111-29
singulus@club-internet.fr

Latin America

**SINGULUS TECHNOLOGIES
LATIN AMERICA LTDA.**
Tel. +55 1121 6524-10
sales@singulus.com.br

Singapore

**SINGULUS TECHNOLOGIES
ASIA PACIFIC PTE LTD.**
Tel. +65 674 119-12
sales@singulus.com.sg

Taiwan

**SINGULUS TECHNOLOGIES
TAIWAN LTD.**
Tel. +886 2 8692-6996
sales@singulus.com.tw

United States, Mexico and Canada

SINGULUS TECHNOLOGIES INC.
Tel. +1 860 68380-00
sales@singulus.com

THIN FILM
DEPOSITION

SURFACE
ENGINEERING

THERMAL
PROCESSING

WET
CHEMICAL

SINGULUS TECHNOLOGIES – Innovations for New Technologies

SINGULUS TECHNOLOGIES develops and assembles innovative machines and systems for efficient and resource-saving production processes, which are used worldwide in the solar, semiconductor, medical technology, consumer goods and data storage.

The company's core competencies include various processes of coating technology, surface treatment and wet-chemical and thermal production processes.