

SELENIUS

Inline Evaporation System
for CIGS Thin-Film Solar

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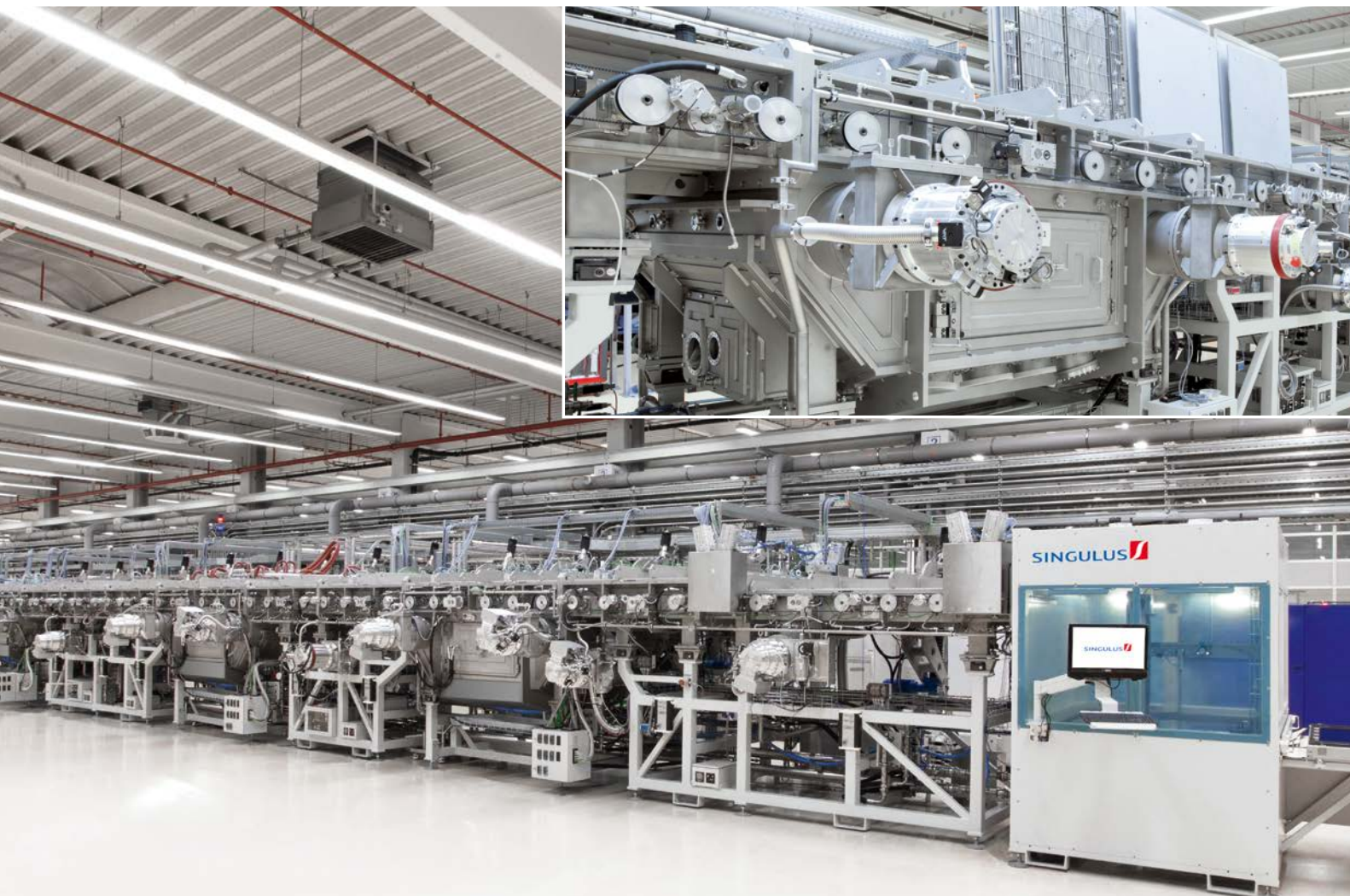
Processing Systems for Evaporation of CIGS Thin-Film Solar Cells

SELENIUS Evaporation System for Thin-Film Solar

The inline co-evaporation tool is based on the thermal evaporation of all CIGS-related precursor materials. It is dedicated to the deposition of copper-indium-gallium-selenium layers for the purpose to form optimum precursor layers in the application of CIGS-thin-film solar cells.

The evaporation system consists of a handling station, multiple heating/cooling stations and deposition-chambers.

The inline evaporation system is offering proven thermal deposition technology, that delivers a high material utilization and excellent layer uniformity. In combination with a high uptime and mechanical yield, the system leads to a highly optimized and flexible production platform.



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Technical Data

Material	Copper, Indium, Gallium and Selenium deposition on glass substrates
Substrate Dimensions	max. 1200 x 1600 mm ² (other substrate sizes on request)
Substrate Thickness	2-3 mm
Footprint	depending on requested throughput
Cycle Time	depending on process requirements and requested throughput
Uptime (SEMI E10)	85 %
Main Voltage	400 V 3 AC/PE 50/60 Hz
Other Required Utilities	Cooling water, compressed air, process gases

Main Features

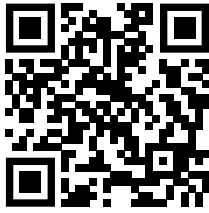
- Inline evaporation tool with high throughput capability
- Modular chamber design supports a flexible layout conception to meet the production requests of the customer
- Optimized evaporation source utilization through unique chamber design (minimized wall deposition)
- High deposition speed and repeatability
- Excellent flux uniformity
- Easy and fast source refilling/replacement due to user-friendly source positioning
- Optimized maintenance concept for maximum machine availability/uptime
- High deposition speed
- Excellent temperature uniformity during process sequence
- Substrate pre-heating
- In-situ monitoring of flux and temperature
- Proven safety concept based on solid risk management and safety engineering

Key Components

The evaporation system consists of the following key components:

- Handling section
Transport of the substrates between the fab-automation and the evaporation system, including load-/unload of the process carriers
- Process section
Entrance load lock and pre-heating chamber provide the necessary vacuum level and apply an initial temperature profile for the consecutive process steps
- Deposition Chambers
Integrated multiple chamber system with heating – deposition – cooling capability. Chambers designed for excellent temperature uniformity and excellent deposition of different materials by optimized deposition-speed and geometry to achieve high repeatable precursor layers
- Cooling Chamber and Exit Chamber
Substrate cooling and exit on pre-defined temperature
- Periphery
Handling system
Vacuum system
Cold Traps (in front of TMPs)
Metrology





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THIN FILM
DEPOSITION

SURFACE
ENGINEERING

THERMAL
PROCESSING

WET
CHEMICAL

SINGULUS TECHNOLOGIES - Thin-Film Coating and Surface Treatment

SINGULUS TECHNOLOGIES develops and assembles innovative machines and systems for efficient thin-film coating and surface treatment processes, which are used worldwide in the Photovoltaics, Semiconductor, Medical Technology, Packaging, Glass & Automotive as well as Battery & Hydrogen markets. The company's core competencies include various processes of coating technology, surface treatment as well as wet-chemical and thermal production processes. SINGULUS TECHNOLOGIES sees sustainability as an opportunity to position itself with innovative products. In the focus are:

- Environmental awareness
- Efficient use of resources
- Avoidance of unnecessary CO₂ pollution

SINGULUS TECHNOLOGIES attaches great importance to responsible and sustainable corporate governance.