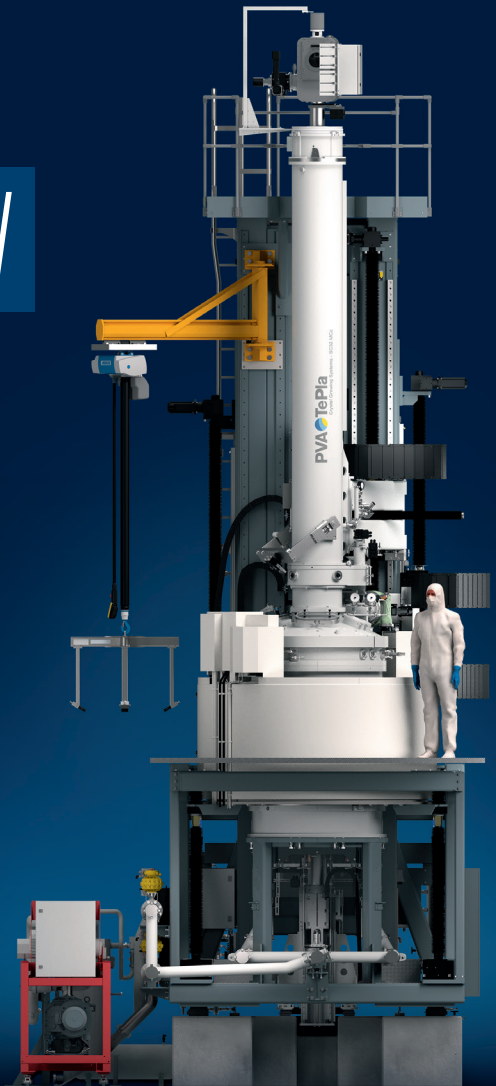


SC-32

PRODUCT OVERVIEW

CZOCHEKRALSKI CRYSTAL GROWING SYSTEM



High-volume crystal growing, precisely controlled: the Czochralski system SC-32 pulls monocrystalline silicon up to 310 mm for 12" wafers. Modular process chambers for 32" crucibles, high automation, proven stability – the best system technology for even better materials.

THE SYSTEM

SC-32

MODULAR BY DESIGN

Every crystal counts: where yield losses get expensive, the SC-32 grows silicon monocrystals up to 310 mm with process stability you can repeat batch after batch.

Our state-of-the-art Czochralski pullers from the SC product line set new standards for the efficient, high-quality production of silicon monocrystals with diameters of up to 310 mm for 12" wafers. The process chambers are designed for crucibles up to 32" and matching graphite components, offering maximum flexibility for your manufacturing needs. With innovative, interactive software solutions, our pullers can be conveniently operated using single or dual camera systems. The modular design enables customized configurations tailored precisely to your requirements, with a strong focus on automation – from charging to crystal removal.

For process chamber handling, you can choose between manual or electromechanically assisted systems. Another highlight: the process chamber is available with either three or five segments, allowing you to perfectly adapt the system to your specific production processes. The SC pullers allow a high degree of automation and thereby an improvement of ROI.



Modular chamber design and system automation

Less manpower, reduced human impact, higher efficiency.



Automatic chamber lifting and swiveling (optional)

Quick cleaning, uniform results, reduced downtime, improved purity.



Superior machine and process stability

Optimized fine-tuning, easy upscaling.



Advanced safety concept for a modern workplace

Secures investment and ensures highest operational work safety.

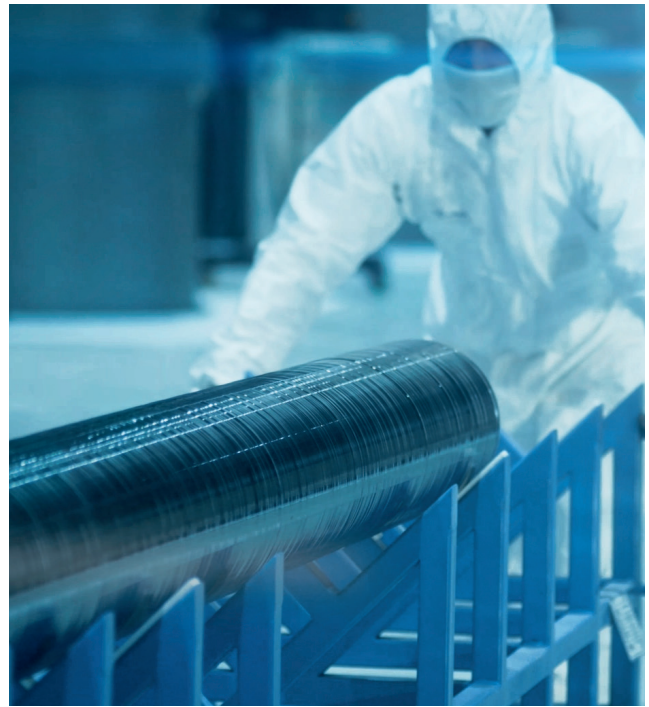


TECHNOLOGY

THE CZ PROCESS CONTROLLED GROWTH

The Czochralski process (Cz) is also known as “crystal pulling” or “pulling from the melt”. In this process, silicon (Si) is first melted and then allowed to freeze into a crystalline state in a controlled manner. The advantage of this method is that it is fast and highly controllable.

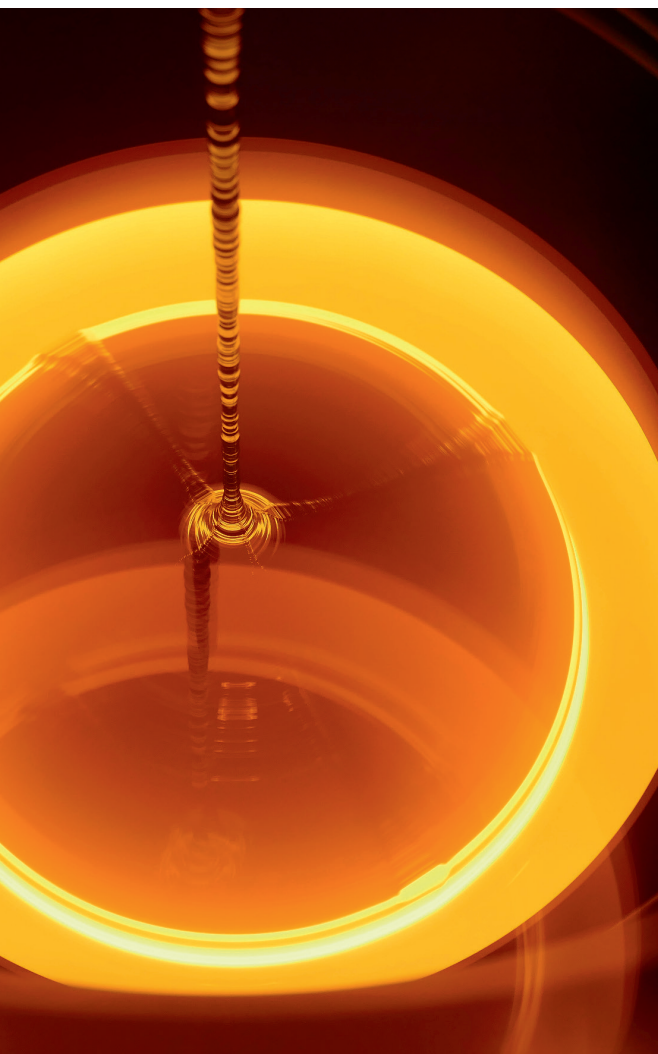
The industrial production of high-purity monocrystalline silicon crystals using the Cz process has become well established primarily for the solar and semiconductor industries (in the computer industry for integrated circuits and in microsystem technology). You benefit from the high effectiveness and quality of the grown crystals.



FROM MELT TO MONOCRYSTAL

To begin with, high-purity polycrystalline silicon is placed into the silica crucible of a single crystal pulling system and then melted in a controlled atmosphere (argon) using a resistance heater. Once the temperature of the melt has stabilized (the melting point is around $1,412^{\circ}\text{C}$), a rotating monocrystalline silicon seed crystal is dipped into the melt. A slight temperature drop initiates the crystallization of silicon on the seed crystal.

When the seed crystal is slowly pulled upward, a cylindrical silicon monocrystal hanging on the seed crystal starts to form. The pulling rate and temperature are regulated in such a way that a silicon monocrystal – whose orientation and structure is identical to those of the seed crystal – can be pulled with a constant diameter.



TECHNICAL DATA

SPECIFICATIONS

SPECIFICATIONS	
PULLER	
Receiving chamber type	Tube
Weight	approx. 30,000 kg w/o magnet
Isolation valve, inner diameter	450 mm
Crystal, Diameter Removable length	up to 310 mm for 12" wafers up to 3,600 mm
Charge capacity	up to 500 kg (Customer HZ) / 420 kg (PVA HZ)
Hotzone, Process chambers	Five or three segments with an inner Ø 1,250 mm, height approx. 2,120 mm
Hotzone, Crucible diameter	up to Ø 812 mm (32") + insulation
FACILITY REQUIREMENTS	
Main line Voltage ² Frequency ² Load ¹	3/PE AC 400 V ± 5 % 50 Hz ± 1 % approx. 280 kVA
Cooling water flow ¹	approx. 300 l/min
CRUCIBLE DRIVE UNIT (SHAFT TYPE)	
Lifting speed ³ Rotation speed ³	0.05–200 mm/min 0.1–20 rpm
Lift stroke	up to 900 mm
Load capacity	up to 700 kg
CRYSTAL DRIVE UNIT (CABLE ROTATION HEAD TYPE)	
Pulling speed ³ Rotation speed ³	0.05–560 mm/min 0.1–20 rpm
CONFIGURATION	
PVA Hotzone Set	It consists of 32" crucible and graphite parts, Active Crystal Cooling device, Tool Set, Stereo camera system and corresponding Software. It is only available in combination with a separate HZ license.
Power Supply with AFE for heaters	Included
Concrete base / Pedestal	Excluded
Connectivity	OPC UA®
Handling systems, Process chambers	Choice of manual and electro motor assisted swiveling and clamping systems
Available Options	■ Handling systems, Crucible and hot zone ■ Platform for service at cable rotation head ■ SiO Filter System ■ Vacuum Pumping Unit
Optional Magnet	Transversal or CUSP (up to 0.4 T) with max. permissible weight up to 16,000 kg and max. permissible dimensions outer Ø ≤ 2,050 mm, inner Ø ≥ 1,450 mm
Optional Equipment	Crucible charging cart Central feeder as recharging unit Ingot removal cart
Optional Services	■ Advanced process support ■ Advanced technology training, crystal ■ Remote access / support via VPN ■ Basic training of operators & service technicians

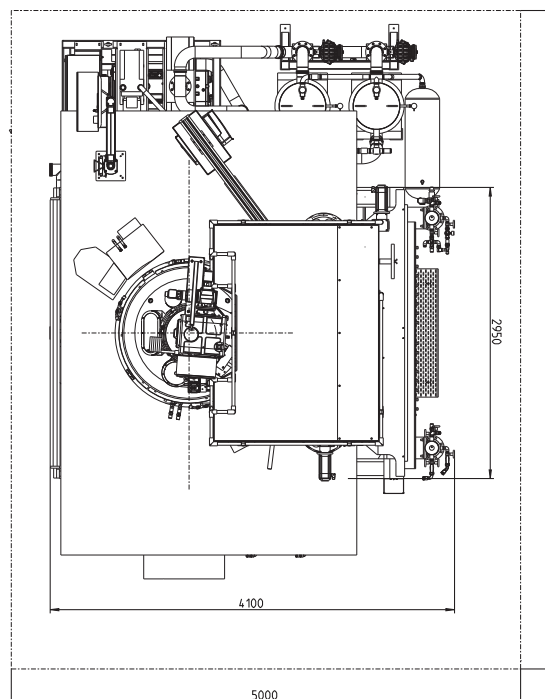
¹ Depends on actual configuration

² Others on request

³ Stepless / Continuously adjustable

⁴ Stepless / Continuously adjustable

DIMENSIONS

[illegible]



PVA TePla AG | Crystal Growing Systems
Im Westpark 10-12 | 35435 Wetzlar

+49 (0)641 686 90-0
cgs@pvatepla.com
www.pvatepla.com

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