

# Liquid Precursor Delivery for Next-Generation Solar Cells

The CHEM'BOT supplies precursor chemicals to bubblers, vaporizers, direct liquid injectors, or onboard buffer containers of deposition tools from all OEMs.

## Continuous Supply

**CHEM'BOT PRO** is a professional dual-container liquid delivery system designed to ensure seamless precursor supply. The system operates with two vessels - one active and one in standby - enabling automatic switchover as soon as the source tank is depleted. This guarantees uninterrupted operation and continuous 24/7 supply to your process tools.

## Designed for the Solar Industry

**PRO SOLAR** has been specifically developed for advanced solar cell manufacturing. It delivers ultra-high purity precursors for thin-film deposition processes such as Atomic Layer Deposition (ALD) and Chemical Vapor Deposition (CVD). The system fully complies with the most stringent safety standards for handling pyrophoric, toxic, and corrosive chemicals.

### Typical precursor chemistries include:

- **TMAI** for  $\text{Al}_2\text{O}_3$  films as rear surface passivation
- **TDMASn / DEZ** for  $\text{SnO}_2/\text{ZnO}$  films as TCO layer in perovskite solar cells
- **Water** as oxidizing agent in ALD processes
- **TDMATi** for TiN or  $\text{TiO}_2$  layers in ALD growth control
- **TEOS** for oxide growth
- Other metal-organic precursors (e.g.  $\text{TiCl}_4$ , Zr/Hf-based) for passivation and optical coatings

## Customized to Your Needs

PRO SOLAR can be tailored precisely to customer requirements. Precursor types, vessel sizes, and integration options can be configured individually, ensuring seamless compatibility with current and future solar technologies.



## PRO SOLAR Features

- **Continuous, automatic precursor supply** with a dual-vessel setup
- **Safe handling** of pyrophoric and toxic precursors
- **Modular and customizable design** for flexible integration
- **SEMPA quality promise** – ultra-high purity and maximum safety

## Safety by Design

With extensive experience in handling pyrophoric and toxic substances, **SEMPA** applies industry-leading best practices in safety engineering and operation.

- **Spill prevention** through welded connections, dip tubes, and automatic pressure relief
- **Active monitoring** with smoke and UV/IR flame sensors
- **Passive protection** using spill collection pans and absorbent materials
- **Fully automated workflows** for continuous supply and safe tank exchange

For customized configurations of the CHEM'BOT PRO SOLAR, please contact us. Visit us at [www.sempa.de](http://www.sempa.de) or reach out via [sales@sempa.de](mailto:sales@sempa.de).

## Technical Data

Dimension:  
1800 (w) x 2250 (h) x 600 (d)

Capacity:  
Two vessels up to 28 gallons (~160 kg precursor equivalent)

Weight:  
~250 kg

Electrical:  
1 x 110 - 240 V-AC, 50/60 Hz

Inlets:  
1 x 1/4" VCR purge gas (1-6 bar)  
1 x 1/4" VCR push gas (1-6 bar)  
1 x 1/4" Swagelok pneumatic air (4-7 bar)  
1 x 1/2" G sprinkler (2-3 bar)

Outlets:  
1 x 1/4" male VCR process line  
1 x 1/2" male VCR vacuum  
1 x KF25 exhaust

