

Application Note

Innovative Vacuum Solutions for Solar Module Lamination

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The lamination of solar modules is one step during the solar panel production process. Solar cells need to be protected from ambient influences (e.g. weather) by means of stable protection films. These protection films are created of polymers, typically EVA (Ethylene-Vinyl-Acetate) and laminated by use of heat and vacuum. Vacuum is required in this process for degassing and the production of a perfect surface to enhance quality, durability and lifetime of the solar modules.

A harsh process requiring a sturdy vacuum pump

Polymers like EVA degas and enter the vacuum pump. Using traditional oil-sealed vacuum pumps, layers and deposits are created by polymerization and lead to required high maintenance and expense related to increased down-times, frequent pump oil changes, oil and filter disposal and complete overhaul.

Therefore, the ideal vacuum pump must be able to handle these process conditions with a high degree of reliability, resulting in a maximum system uptime - without special endeavours or extra costs.



Application Note

The perfect vacuum solution proven in demanding process conditions like solar module lamination.

Dry compressing SCREWLINE vacuum pumps



Vacuum pumps used in solar module lamination processes must operate under extreme conditions.

Simultaneously, these pumps must avoid to build-up layers created by the pumped media and must be insensitive against those layers.

Continuous process operation with a high production throughput at a low rejection rate must be guaranteed.

SCREWLINE vacuum pumps by Oerlikon Leybold Vacuum fulfill this requirement. They have been well-proven in long-term, continuous (24/7) solar module lamination processes.

Standard series SCREWLINE vacuum pumps along with accessories such as gas ballast, purge gas and pump monitoring device are employed.

For increased pumping speeds, roots boosters may be conveniently close-coupled to SCREWLINE, optionally with frames.

Features at a Glance

- High system availability and reliability
- High vapor tolerance and particle compatibility
- Easy on-site cleaning on demand and minimized risk for bearing failures due to the cantilevered design
- Low operating costs
- Modular concept and accessories for process optimization
- Minimum maintenance complexity with long service intervals

Low Maintenance Concept

Maintenance on ScrewLine pumps will usually be limited to a regular visual inspection of the pump and the annual change of gear oil and oil filter.

Hence the build-up of layers is nearly completely avoided, on-site cleaning is rarely needed, so that an annual cleaning is sufficient.

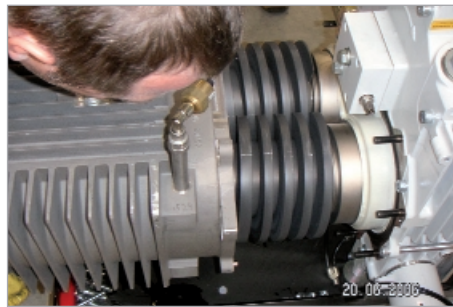
Field Experience and Benefits in using SCREWLINE pumps

- Continuous (24/7), long-term and trouble-free operation
- No wear visible, either at the inner pump body, rotors or shaft seals
- No pump-stop or maintenance required within 12 months
- Nearly no layers visible

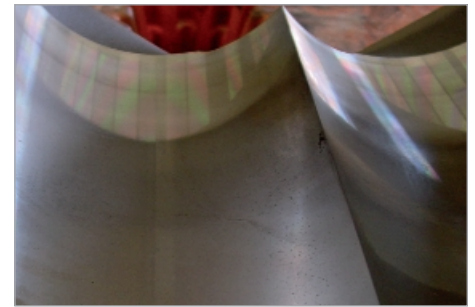
Equipment details

SCREWLINE SP630 and SP250 with

- Gas ballast
- Purge gas option
- SP-Guard monitoring system
- Exhaust silencer



Inspection of the inner pump body and rotors after some months of continuous operation in a solar module lamination process - absolutely no wear and no layers visible (SCREWLINE SP630).



Pump chamber detail after several months of continuous operation in a solar module lamination process - no wear or deposits visible (SCREWLINE SP250).

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