



## **Garlock's innovative POWERPACK packing solutions: The problem solver in Molten Salt applications of solar power plants.**

*For operators of solar power plants, leakages and failures, as well as particularly short service lives of stuffing box packings, especially in the tower, are a frequent concern. Two recent cases studies show that Garlock POWERPACK, as a solution optimally tailored to the requirements, can provide a remedy quickly.*

The supply of renewable energies, such as solar energy, is becoming more important every year as "green" energies play an increasingly important role in the supply of electricity and heat.

Concentrated Solar Power (CSP) plants generate energy by heating a medium with mirrors. The heated medium can store the energy so that the power plant can convert this heat into electricity day and night. Molten salt is often used as the heat transfer medium to make this process efficient, but this presents a sealing challenge. Depending on the system, the working temperature can be in two ranges: the lower temperature is approximately 400 °C and the higher temperature can be as high as 585 °C.

POWERPACK 1220 MS (Molten Salt) is designed for use at lower temperatures in solar power plants up to 450 °C. The packing set combines high temperature resistant Synthepack fibers and a THERMa-PUR® insulation ring.

POWERPACK 9020 HMS as well as POWERPACK 9021 HMS (Hot Molten Salt) are designed for applications in solar power plants with higher temperatures up to 585°C. The packing design combines cup & cone sets with high performance valve stem packing rings and THERMa-PUR® insulation rings.

Two case studies from the field show that Garlock POWERPACK meets the high demands of solar power plants and is the solution to the problems faced by operators:

The first case study is a solar power plant of an engineering and technology group with radiation concentrating in the central tower, heliostats and salt receiver technology with a gross production capacity of 150 MW, and a storage capacity of 7.5 production hours. Molten salts are used as the heat transfer fluid (HTF). Any problems with the valves in the HTF piping have a direct impact on the plant's performance and yield. The original OEM packings in the valves had constant problems with leaks since the plant was commissioned. This required weekly



tightening, and replacement of the packings every few weeks. After consulting with Garlock, the customer installed Garlock's POWERPACK 9021-HMS sets in globe valves and butterfly valves (motorized and manual) in the hot salt melt circuit leading from the tower to the hot salt tank. POWERPACK 1220-MS sets were installed in globe valves and butterfly valves (motorized and controlled) in the circuit of the "cold" molten salt. The customer replaced the competitor packings in all butterfly valves of this plant with POWERPACK sets from Garlock. During 12 months of continuous operation with the POWERPACK sets, there were no more leaks in the molten salt lines, and the "cold" and "hot" circuits no longer had to be shut down due to valve leakage problems.

The second case study involves a valve manufacturer for solar power plants. The customer was experiencing problems with a stuffing box packing. The service life of the packing was very short, especially when used at the top of the tower. In addition, the supplier's support did not meet the customer's expectations. Therefore, an alternative packing with a longer service life, and a supplier with better customer support was sought. The customer contacted Garlock to discuss their problems with the expert team. POWERPACK 9020-HMS, 9021-HMS and 1220-MS from Garlock were presented as the best solutions. In addition, FLEXSEAL® spiral wound seals with THERMa-PUR® were offered to withstand extremely high temperatures. After ensuring that all specific requirements could be met, the Garlock solutions were implemented in the application. Currently, after 2 years, the sets are still in use and were set as the standard for the application.

Case studies of these solutions:

[https://www.garlock.info/wp-content/uploads/2022/09/Garlock\\_Case-Study\\_Powerpack\\_Solar\\_EN-EU.pdf](https://www.garlock.info/wp-content/uploads/2022/09/Garlock_Case-Study_Powerpack_Solar_EN-EU.pdf)

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**Contact:**

Garlock GmbH  
Falkenweg 1  
41468 Neuss  
Germany

Phone: +49 2131 349-0  
[garlockgmbh@garlock.com](mailto:garlockgmbh@garlock.com)  
[www.garlock.com](http://www.garlock.com)

**Press contact:**

Stephanie Bursch

# Garlock®

+49 2131 349-119  
Stephanie.Bursch@garlock.com

## About Garlock:

Garlock, an Enpro company, is a global manufacturer of high-performance sealing solutions and other innovative products with a relentless focus on safety, environmental protection, durability, and productivity. With a history dating back over 130 years, Garlock today maintains a global presence of design, manufacturing and distribution facilities satisfying customers' needs with responsiveness and ingenuity.



Caption: POWERPACK 1220 MS (Molten Salt)  
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Caption: POWERPACK 9020 HMS (Hot Molten Salt)  
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Caption: POWERPACK 9021 HMS (Hot Molten Salt)  
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