

A photograph of a modern, white house with a large, dark-framed glass facade and a roof covered in solar panels. The house is set against a blue sky with scattered white clouds. In the foreground, there is a paved area and some greenery. The image is framed by a dark, textured border with a white diagonal line.

CASE STUDY

**COMPLETELY TIGHT,
FIRM AND FLEXIBLE**

**JÄGER GROUP SEALS CONDUCTOR
RAILS THANKS TO AN OPTIMAL
MATERIAL-FORM-MIX**



SAFE AND AT THE SAME TIME FLEXIBLE SEAL SOUGHT

The large-scale inverter of a photovoltaic plant is a highly complex system: many components are precisely linked in it so that the direct current obtained can be converted into alternating current. Only one thing is absolutely out of place inside the control cabinet: moisture. Therefore, the transition of the conductor rails from the entry area of the power cables near the floor to the interior is a special challenge.

SMA Solar Technology AG's question is: How can the transition of each individual conductor rail through the baseplates be kept tight against moisture and still be flexible for all dimensional tolerances of the affected components?

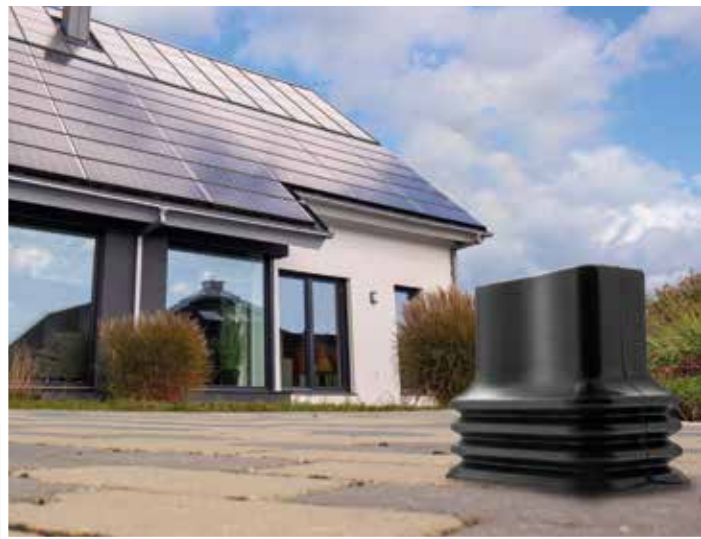
The method used by the customer so far has proven to be far too complex and expensive: An alternative is therefore being sought for manually sealing (using a silicone cartridge) the openings in the plastic plates through which the conductor rails are passed. Series production in this way is not economical and is out of the question.

SMA has designed a new mountable seal, but needs support in the concrete design of the series parts. In this way, the quality of the product can be ensured while simultaneously reducing costs.

EXACT REQUIREMENT PROFILE

The experts of Jäger Gummi und Kunststoff work together with SMA technicians to create the precise requirements profile for the new grommet. Where are these parts used? What specific conditions prevail between -40 and +110 degrees Celsius for a desired suitability in usage? What are the requirements for the planned installation of the grommets? Together with the tool-maker, Jäger employees develop a strategy for the mold design.

The grommet is produced in Transfer Molding (TM). In order to avoid possible errors in advance, the experts of both companies, after careful coordination, jointly subjected their ideas to extensive drawing tests. This development time was necessary and sensible: The feed-through grommet is successfully used in the current inverter model.





SUFFICIENT PRESSURE DESPITE VARIOUS TOLERANCES?

The design of the grommet, which the experts ultimately decided on, meets the high demands on tightness. The bellows on the feed-through grommet compensates for the tolerances that arise during the installation of the conductor rails as well as those to the adjacent components.

This also applies to the adjustment of the conductor rails. Inside the grommet, the engineers therefore also design position domes on both sides and a circumferential sealing bead that positions the seal on the conductor rails.

Snapping the positioning domes into the holes in the rail ensures that the seal exerts sufficient pressure on the base plates, this guarantees tightness. Like the other silicone seals used in the inverter, this version also complies with the internationally required UL 94 HB fire standard. This means that SMA can also supply these inverters to the USA, for example, or facilitate UL certification of the system.



LEAK TIGHTNESS IN THE TEST

Together the designers involved develop a production tool for prototypes. For this purpose, they define optimum separation areas on the tool so that any burrs on the seal are not placed in sealing areas. The test run results in optimum sealing: The prototype of the grommet leaves nothing to be desired in terms of sealing and assembly.

This meant that nothing more stood in the way of completing the development phase. From the test-mold, Jäger can produce the first seals and deliver them to SMA for the start of production. At the same time, the manufacture of the tool for series production begins. In the future, Jäger will supply the annual requirement of 100,000 grommets for the conductor rails in

the inverter of the future - in reliable quality at significantly reduced costs.

Your contact person for these grommets is Robert Gurka from the Hanover location



Contact:

Jäger Gummi und Kunststoff GmbH
Bissendorfer Straße 6
30625 Hannover
Phone +49-511 5358-0
e-mail: info@jaeger-gk.de

Interested in solar technology?
Also visit our customer: www.SMA.de