Alternative-energy applications like wind turbines need seals that withstand a wide temperature range and attack by UV and ozone. They must be low-maintenance due to the remote location of many wind and solar installations.

plasmas, acids, and solvents.
Stages of the semiconductor process have unique temperature and chemical requirements, and components must not generate particulates or volatile gases. Severe processing regimens require sealing materials like FFKM that can resist both high temperatures and toxic chemicals. Fluorocarbons may be suitable for less aggressive chemical environments, while perfluoroelastomers resist chemical attack at lower temperatures.
During semiconductor manufacturing, wafers often enter processing chambers, undergo an operation, and then exit. The chamber doors open and close using slit valves sealed with bonded gates. Through a customized manufacturing process, Simrit bonds FFKM, fluorocarbons, perfluoroelastomers, and other materials directly to process chamber gates. The seals' engineered profiles allow for less movement, ensure position, reduce installation problems, and extend service life.
The seals' unique cross-sections cushion metal-to-metal contact and eliminate rolling, twisting, and abrasion that can lead to substrate-metal particle contamination. The bonded-seal gates also prevent seal "pop-out" when the gate is actuated to transfer product.
In another example of extreme semiconductor sealing, magnetic-fluid vacuum seals use magnetic force to keep a fluid in a specific position around a shaft. The suspended fluid acts as a high-performance, low-friction, rotary seal for fluids and gases that resists high temperatures and minimizes contamination.

Sealing up energy production

Innovation today often centers around alternative energy capture and use. From wind turbines to photovoltaics to solar-to-steam modules, sealing is critical to keeping systems up and running.
In addition to sealing large mechanical components—such as the giant rotating blades of wind power plants—seals for the drive systems, bearings, and hydraulic braking and pitch-adjustment systems have to work over a wide temperature range and resist ozone, humidity, salt spray, and hydraulic oils. Uncompromising functional reliability is essential in preventing costly unplanned maintenance at isolated turbine sites.
Sealing components play a critical role in the new arena of solar "smart" energy conversion systems, such as thermal collectors and photovoltaic modules. These applications demand tough sealing components that resist exposure to weather and extreme temperatures.
Thermal energy boxes at the heart of heat-collection systems usually have a lid with a seal and a lower enclosure that houses connections. The seal must keep out moisture, dust, and other undesirable elements, while also meeting production tolerances for the lid and enclosure.
Simrit engineers designed a custom, multi-lip, radial seal using liquid silicone rubber that resists the elements, is thermally stable, and is slow to age. The unique seal shape was optimized via finite-element-analysis (FEA) computer simulations. Thermal-energy box customers also had the option to injection mold the silicone seal onto the thermoplastic lid material in a single production step, joining the parts permanently. In addition to meeting the needs of the application, the final one-part seal design simplified customers' assembly, logistics, and installation.

Solar water heating

One renewable energy company's solar water heater uses evacuated tube collectors. The design has a vacuum space inside an evacuated tube to improve energy efficiency with higher operating temperatures and pressures.
Sealing the connection between the round tubes and the connector housing proved to be technically challenging. The project called for a new sealing design that could keep out water at temperatures over 200°C and pressures of up to 8 bar while being easy to install. The circumferential seal had to keep air from the heat transfer medium. Simrit's material and seal specialists, along with customer engineers, developed a patent-pending sealing system using Simrit 70 EPDM 291 elastomer material. The material has very low relaxation even after thousands of hours in water at 200°C, good thermal stability, low long-term compression set, and resists high-pressure, ozone, and UV attack.

Simrit continues to deliver new products

Simrit has expanded its line of silicone tape with new offerings for aerospace and other applications. In addition, Simrit now offers quality metal seals

High-temperature silicone tape

Simrit's high-temperature self-fusing silicone tape has proven itself for weather resistance where excellent dielectric strength is required. It has excellent ozone/UV resistance, high and low temperature (–55°C to +260°C) stability and moisture resistance. It is now available as a sinusoidal fiberglass-reinforced tape which controls amount of stretch for consistent thickness and dielectrics, and also offers greatly improved tear and abrasion resistance.
The tape is produced from specially formulated silicone rubber that starts to tack within seconds, and permanently fuses to itself within 24 hours. The fused tape becomes an impermeable barrier against contaminating fluid and environmental ingress. The tape has no adhesive, which makes for clean installation and re-entry. A special fluorosilicone self-fusing tape is available where direct fuel and harsh chemical contact can occur. Additionally, Simrit has developed flame-retardant materials that offer the added advantage of being self-extinguishing in case of fire. And beyond this, Simrit has recently introduced a version that is compliant as Fire Resistant and Fireproof (5mins/15mins resp.) to ISO 2685/AC20-135.
Typical uses include applications requiring protection from environmental effects (UV/Ozone, etc.), fluid splash, chafing, dielectric, high and low temperatures, and flame and fire. These tapes also perform well for supporting/sealing hot and cold air ducting, wire harness wrapping, and wire bundling.

In brief

- Simrit's silicone tape is ozone and UV resistant with a temperature range of –55 to +260°C
- Self-fusing silicone becomes a permanent barrier against fluids and contamination
- Simrit now supplies metal seals as static, radial, and mechanical face seals

Any questions or suggestions? Please contact Todd Blair at todd.blair@simrit.us

Metal seals can take the heat

Elastomeric seals are a staple in sealing technology but have limitations when it comes to extremes in heat, pressure and chemical resistance. To address these issues, Simrit is now offering a complete line of metal seals which will handle the most extreme sealing applications.
Simrit's partner company, EKK Eagle Industry Co. Ltd, has supplied metal seals to the Asian market for over ten years. This successful history is now being extended to customers in Europe and the Americas through Simrit.
The metal seal product line includes static, radial, and mechanical face seals which are ideal for jet engines, rocket engines, and gas and steam turbines. Metal bellows, formed cases and welded assemblies are also available for use in satellites and space stations. These metal seals are well-suited to seal LOX, LH2, GHe, and hot gas applications where elastomeric seals would not survive.

Fireproof self-fusing silicone tape