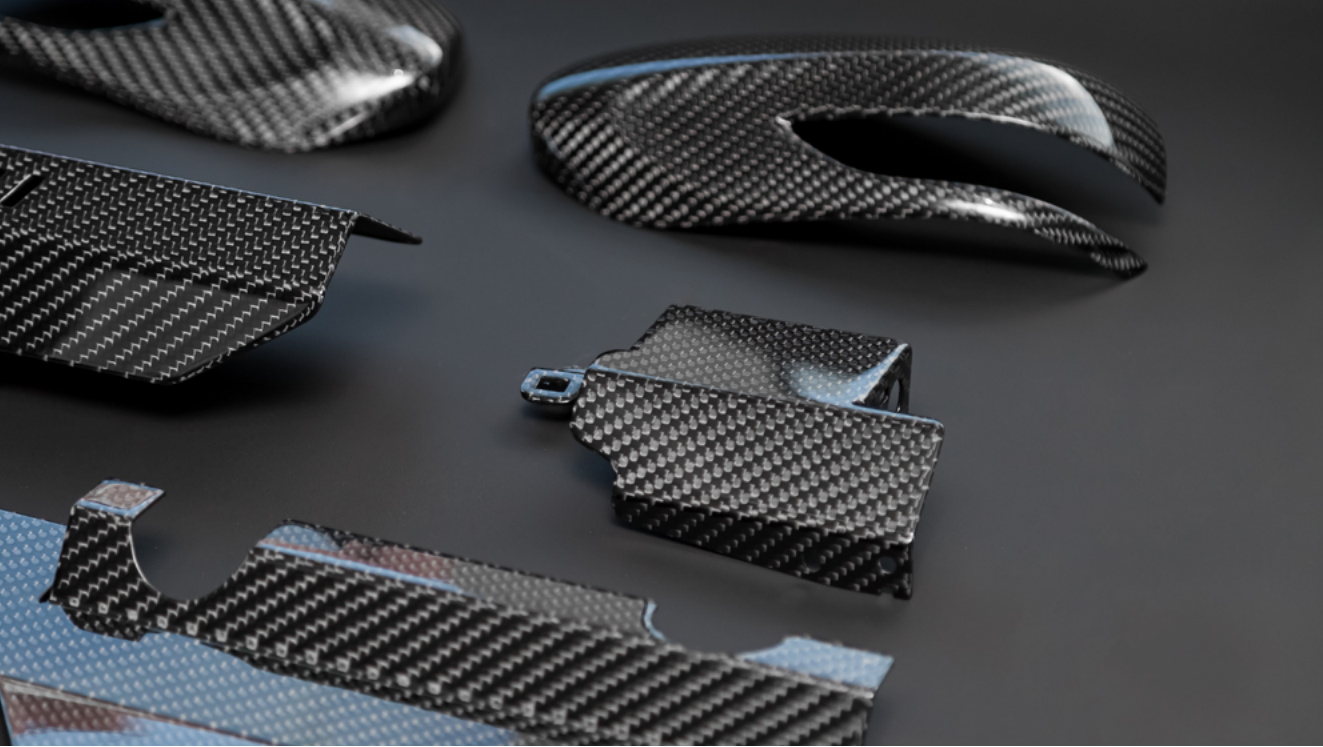




Vacuum Expertise for Composites Production

Efficient processes with
dedicated vacuum solutions







Unique Vacuum Solutions for varied processes and applications

Leybold provides a complete range of vacuum solutions to fit the unique needs of those manufacturing and utilizing composites. Our innovation, expertise and technical know-how ensure you will receive the best vacuum solution. Our range of standard and customizable solutions offer the following:

- Compact designs
- Lowest noise levels
- Supreme technical standards
- Outstanding energy efficiency
- Best-in-class reliability
- Smart vacuum solutions

At Leybold, we will tailor products to fit your specific requirements. Our ability to modify performance, dimensions, system integration and central parameters provides you with a competitive advantage in this demanding marketplace. Optimized power consumption and footprint further help to reduce your cost of ownership, increase your uptime and yield and accelerate time to market. We are here to enable your success.

Our application specialists are backed by over 170 years of vacuum expertise and have a thorough knowledge and understanding of the various processes within the composite industry. Whether you are planning a new installation or upgrading an existing system, we can provide the solution that is right for you.

- Configured for your process
- Low carbon footprint
- Lower utility costs
- Robust, corrosion-free operation

Best-In-Class Vacuum Solutions

to assist you in each step of composite production

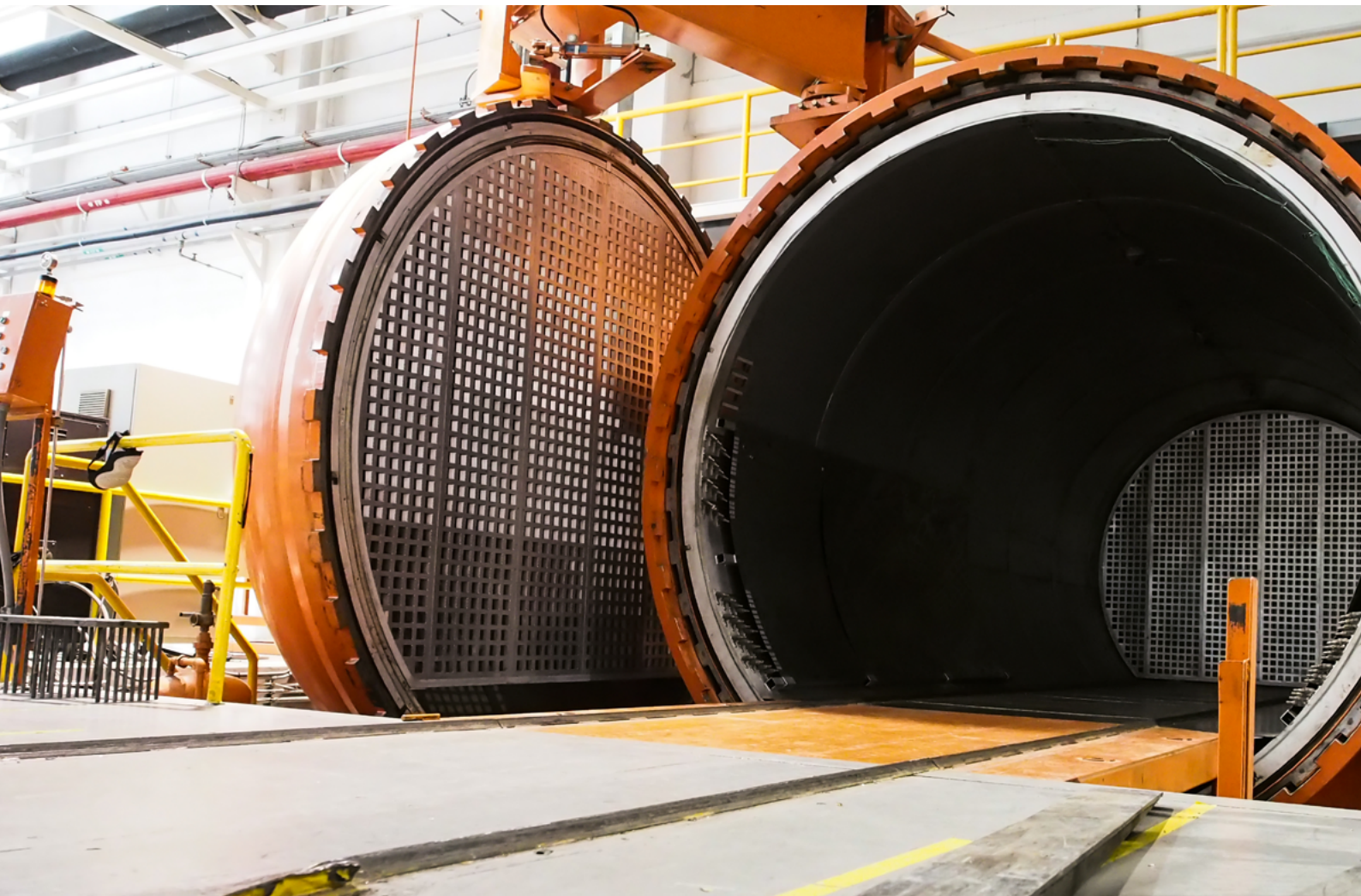
Whatever is your process or application within the composite industry, we offer the perfect vacuum solution to support you in reaching process efficiency. Vacuum improves your process and product quality:

Vacuum Bag Molding / Autoclaves

The mechanical properties of open-mold laminates can be significantly improved with vacuum bagging. By applying vacuum, atmospheric pressure pushes out entrapped air and excess resin, which leads to a significantly better result and quality of the composite material.

The curing process of pre-pregs in autoclaves is enhanced by the force of vacuum. Inside the autoclave, the applied heat, vacuum and external pressure lead to an efficient polymerization process.

Benefit from the exceptional reliability of our SOGEVAC pumps that handle the process requirements and challenges of vacuum bag molding and autoclaves. For an even lower service and maintenance effort, choose our VARODRY and forget about oil.



Vacuum Infusion Processing

The vacuum infusion process uses vacuum to drive the resin into the laminate. By applying vacuum, the resin is dispersed evenly and void-free into the laminate. The vacuum pump is connected to the mold and helps to effectively migrate the resin through the fibers.

Benefit from our SOGEVAC B for highest reliability combined with the best cost-performance ratio for de-centralized or centralized vacuum installations. For even lower maintenance needs, choose our VARODRY and go for 100% oil free technology.

Light Resin Transfer Molding

In Light-RTM processes, vacuum is used to draw the resin into the mold. For this process, two vacuum levels are needed: one for closing the mold, the other for adjusting the pressure for the resin injection. We offer tailored solutions that effectively provide two vacuum levels with just one vacuum pump.

Take advantage of our VACUBE or SOGEVAC CVS with two adjustable pressure levels for a maximum level of convenience. Save space and money with choosing just one tailored vacuum solution that brings your process to highest efficiency.

Resin Degassing

To remove air and volatile components from the resin, vacuum is applied during the resin mixing process. By applying vacuum, the resin is degassed, which enhances the resin quality significantly. During the degassing process, resin vapor may enter the vacuum pump, which can be a challenge. We offer robust and low-maintenance solutions for this challenging process.

Benefit from our SOGEVAC Neo D for exceptional performance with more than 99.99% vacuum and a much longer lifetime in challenging processes. With our VARODRY, you can secure the highest uptime because the oil-free design guides resin vapor through the pump without any harm.

Vacuum Assembly and Holding

In the final steps of the composite manufacturing process, vacuum is used for assembly, holding and lifting. In the assembly, vacuum is applied between the heated tools to finally bring two composite parts together. During the baking process, high temperatures are reached, which the vacuum pump needs to withstand. For the holding of big composite parts such as windmill blades or for holding parts on machining centers (CNC routers), vacuum is mostly the only effective solution. Vacuum lifting devices offer a safe and reliable holding method.

Choose our CLAWVAC and CLAWVAC systems with unique advantages in rough vacuum applications such as holding and assembly. For mobile installations, profit from the robustness and reliability of our VARODRY.



High-Performance Vacuum Solutions

to meet your diverse needs

Benefit from our extensive experience, delivered by our high-performance vacuum solutions:

SOGEVAC – the best-in-class rotary vane pump

- **Low maintenance:** profit from high reliability even in challenging composite processes
- **Low operating temperature:** avoid concerns about what comes out of your process, as low temperatures decrease the risk of resin polymerization inside the pump
- **High oil capacity:** save time with fewer oil changes and less sensitivity to process pollution
- **ATEX variants available:** be on the safe side when working with hazardous resins

SOGEVAC pumps are engineered with reliable state-of-the-art technology. For infusion and resin injection processes, the recommended SOGEVAC types are the following:

- SOGEVAC B
 - ▶ Best-in-class rotary vane pumps
- SOGEVAC Central Vacuum Systems
 - ▶ A compact, space-saving system with an electrical control board and one power supply
 - ▶ Continuous pump operation of the SOGEVAC B possible under most favorable conditions for the unit
 - ▶ 6 connection pieces for the ease of connection to the mold
 - ▶ Ready-to-go system and mobile variants (valid for small types like CV2-60/1 SV40 B or CV2-60/1 SV65 B)

For degassing applications, SOGEVAC NEO D offers exceptional performance compared to existing double-stage rotary vane pumps:

- Rugged industrial design with oil filter and integrated exhaust demister for highest reliability in your process
- Less sensitivity to pollution due to the high oil volume
- No oil loss at exhaust that ensures a clean and safe working environment and safe operating conditions for maximum reliability
- No external exhaust filter is required, which allows you to save money on additional accessories
- Different oil types available depending on your specific process conditions
- Low ultimate pressure allows the efficient degassing of new high tech and advanced resins



VARODRY – install and forget

Dry pumps are the more robust choice for composite processes. Be on the safe side with our oil-free VARODRY for longest uptime.

- **Oil-free pumping system:** benefit from maximum uptime without any oil issues
- **Air-cooled pump:** secure highest flexibility for mobile installations
- **Perfect temperature:** gain highest process efficiency from temperature that is warm enough to prevent condensation inside the pump and cold enough to avoid coating formation
- **Minimized life cycle cost:** save money by choosing the best economical solution



VACUBE – one solution for special needs

Our VACUBE is suited for central vacuum systems and the perfect solution for Light RTM processes.

- **Pump equipped with a switch panel and a pressure sensor for pressure regulation:** extra convenience with an all-in-one product and no additional costs for accessories
- **Electrical cabinet** for a ready-to-go solution

Use the VACUBE in combination with the remote pressure sensor and an electrically controlled valve as the perfect solution for Light RTM processes with two pressure levels:

- Two pressure levels can easily be defined via setpoints of the two pressure sensors
- Self-regulation of the VACUBE based on the pressure
- One pump to fulfill the elevated needs in Light RTM processes with two process pressure levels



CLAWVAC – rough vacuum at its best

For rough vacuum applications such as vacuum holding (CNC router application), our CLAWVAC pumps and CLAWVAC systems are perfectly suited:

- **Requirements according to CNC router applications:** benefit from optimal pump properties developed for CNC routing
- **Segregated gearbox design avoids oil contamination of the process:** secure highest process safety for the longest uptime
- **Durable and dependable components such as a corrosion-resistant pumping chamber for extended lifetime:** save money with lowest CoO due to a robust design
- **Cooled and designed to guarantee long service intervals for highest uptime in composite manufacturing**
- **Wear-free and fast and simple cleanability of the pump chamber and claws:** don't waste time cleaning and maintaining the pump chamber



Technical Data

Product portfolio for composites

| Vacuum solutions Range name | CVS Central vacuum stations with SOGEVAC | SOGEVAC | SOGEVAC NEO D | VACUBE | CLAWVAC | VARODRY |
|---------------------------------|--|---------------------------|---------------------------|---------------------------|--------------------------------------|-----------|
| Technology | Oil-sealed rotary vane | Oil-sealed rotary vane | Oil-sealed rotary vane | Oil-sealed rotary vane | Dry compressing claw-type | Dry screw |
| Ultimate pressure (mbar) | 0.5 | 0.5 | 0.01 | 0.35 | 50 ¹⁾ / 140 ²⁾ | 0.01 |
| Vacuum Bag Molding / Autoclaves | ★ | ★ | | | | ★ |
| Vacuum Infusion Processing | ★ | ★ | | | | ★ |
| Light Resin Transfer Molding | ★ | | | ★ | | |
| Resin Degassing | | | ★ | | | ★ |
| Vacuum Assembly and Holding | ★ | | | ★ | ★ | ★ |

1) CP 65 and CP 150
2) CP 300

Leybold Service

Expert and reliable partner

Maintaining your uptime and reducing the risk of production downtime are critical. Wherever you are, Leybold is there to support you as your vacuum service partner. Our Field Service team and our fully equipped Service Technology Centers are at your disposal.

Your expectations:

- Continuously running production
- Reliable vacuum performance
- Longer lifetime for your vacuum pumps

Our solutions:

- Complete portfolio of service products to ensure your vacuum pumps are regularly maintained
- Long-lasting partnership solutions to fully take care of your vacuum system
- Unrivalled vacuum expertise by highly trained vacuum specialists
- Professionally equipped Service Technology Centers that are able to handle even pumps from contaminated processes
- Laboratories that can perform gauge calibration and measurement instruments with the highest accuracy and precision



Pioneering products. Passionately applied.