MAKING THE DIFFERENCE

A member of the HEDRICH Group.

At a glance:

CLAMPING UNITS, MOULDS, MIXING AND DOSING SYSTEMS

made by VOGEL

VOGEL has specialized in clamping units, moulds, mixing and dosing systems as well as customized equipment for the manufacturing of insulation parts made of epoxy resin and liquid silicone rubber (LSR) for the electrical and automotive industry. Since the APG process was invented in the early 1970s, VOGEL has been demonstrating technical capability with view to the respective equipment, e.g. the first equipment for the automatic shielding of composite insulators with liquid silicone rubber (LSR). Nowadays, the machines and systems by VOGEL moulds & machines AG are found at the highest technical level. Almost all large manufacturers of medium and high voltage equipment worldwide are among the range of customers.

ADVANTAGES OF CLAMPING UNITS, MOULDS AND MIXING AND DOSING SYSTEMS

TOP EXPERT SOLUTIONS
Setting the pace in vacuum equipment engineering.

- More than 45 years of experience in developing and manufacturing clamping units and moulds
- Complete equipment (clamping units, moulds and dosing systems) from one source
- Customized competent advice and reliable service
- Comprehensive references of satisfied customers worldwide
- Comprehensive optimized and standard machine and equipment designs
- Development and realization of projects according to customer's specific needs
- Nonstop innovation for the technical benefit of the customers

→ CLAMPING UNITS

■ APG clamping units ■ LSR clamping units

Available in different sizes and designs, the clamping units are well suitable for the manufacturing of small parts and small batches as well as large-scale complex components and high numbers of pieces. All pieces of equipment can be supplied with heating plates in appropriate size. They may be provided either with pressure cylinders centrally behind the mould or with pull cylinders arranged laterally.

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→ MOULDS

VOGEL develops and supplies all types of moulds for the processing of the following materials: cast resin in vacuum casting and APG process as well as liquid silicone rubber for various kinds of insulation of electric components and for insulators of electric systems. Designed according to the special requirements to the product and material, the moulds are characterized by high precision and long service life.

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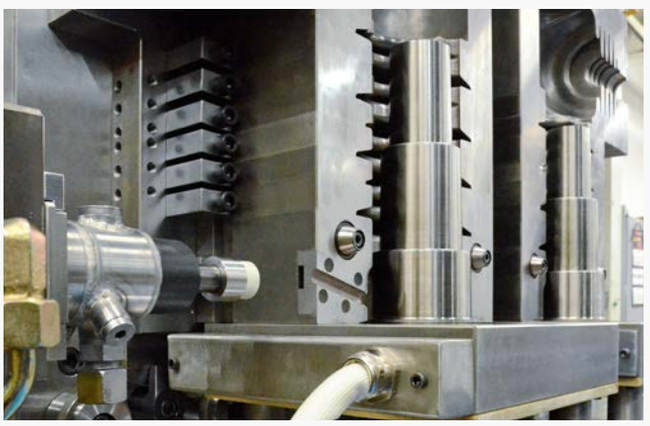

→ LSR-MIXING AND DOSING SYSTEMS

■ Type DosilOne Advanced ■ Type DoskoSil

The systems have been developed for the processing of liquid silicone rubber (LSR), fitting the individual customer and process requirements. Fast filling speeds of even high viscous material, a VOGEL booster system, preheating devices and the on-the-fly degassing are features for optimum performance in material preparation.

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→ SPECIAL EQUIPMENT AND SOLUTIONS FOR AUTOMATION

Based on many years of experience in development, design and manufacturing of moulds, clamping units and mixing and dosing systems, VOGEL also is a competent partner for automated solutions in the APG and silicone process; the spectrum ranging from fully automatic production solutions for cable accessories in LSR to the fully automatic encapsulation of electric motors in APG.

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APG Clamping Units

VOGEL clamping units for the APG process are reliable, extremely sturdy and long-lasting. Each machine has been manufactured with great care and according to the state-of-the-art technology. The versatile and sophisticated functionality as well as extendibility of the machines founds the ideal basis to also meet all future requirements as well as production methods growing more and more complex and fast.

ADVANTAGES OF APG CLAMPING UNITS

- Modular extendibility (tilting around 1 or 2 axes, core pullers, etc.)
- Highest stability, precision and long service life
- Best accessibility from both sides
- Clear intuitive control
- Special equipment as vacuum chamber, slide, quick-clamp system
- All components made by renowned manufacturers – worldwide availability of spare parts
- Fixed, inside-arranged piping and wiring as well as attached hydraulics
- Easy and fast setting-up as well as start-up
- Positioning of all axes via linear encoder systems
- Free programming directly in the control

→ MODULAR EXTENDIBLE

The modular arrangement of the machines allows to adapt the equipment exactly to the customer's needs. For example, the core pullers (top, bottom, lateral) and the tilting of the machine around one or two axes can be integrated as option or installed later. It is also possible to provide the unit with a quick-clamp system for fast and easy mould change.

→ STABLE AND PRECISE

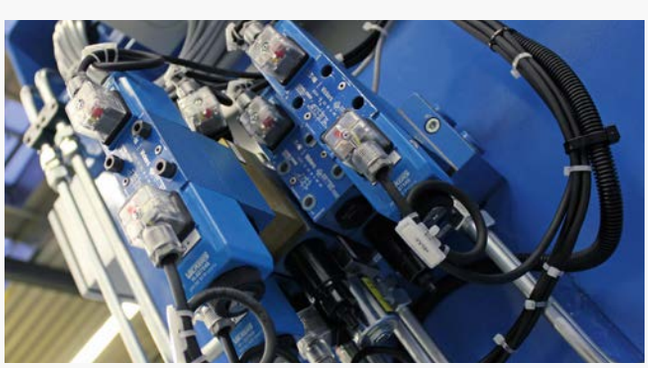
All machines are provided with a very sturdy and warp resistant machine frame, which is optimized for the occurring changes in load. The massive moving carriage suspends from precision guidances, ensuring absolute parallel closing as well as clean and smooth opening of the sensitive clamped casting moulds.

→ VERSATILE AND INTUITIVE

Thanks to the modern and intuitive control, just one click is necessary to change the screen and edit parameters quickly. Functions such as cylinder positions, heating parameters (temperatures and PID values) and hydraulic pressures are clearly visible. All process-relevant steps can be selected from a library and stored as program along with the other parameters.

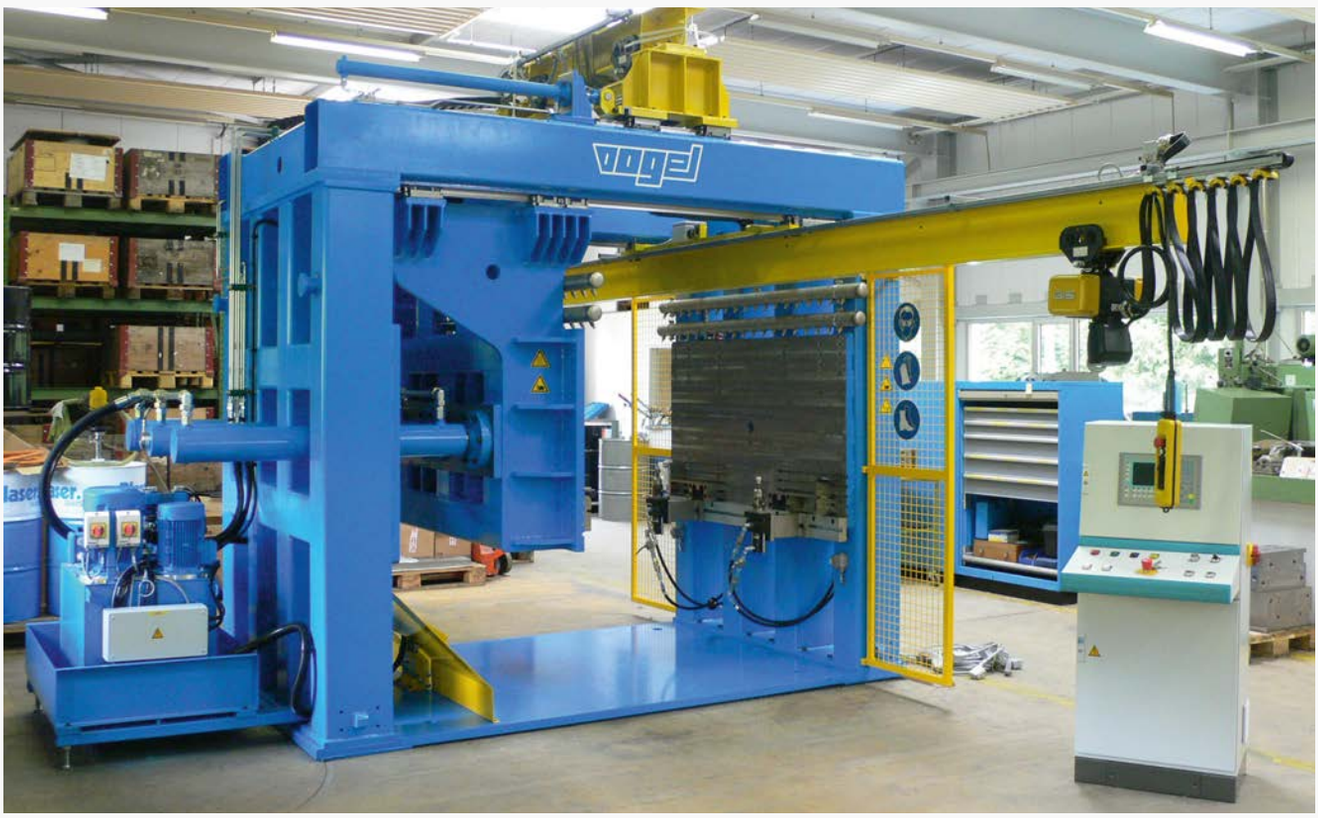
→ MINIMUM SERVICE REQUIRED

The simple and modern mechanical machine arrangement minimizes the necessity for maintenance and repair. No components are used that are subject to excessive wear. Therefore, the down times per year as well as costs arising for maintenance and service are very low.



APPLICATIONS

- Current and voltage transformers
- Switch housings with and without integrated vacuum tube
- Insulating parts for medium and high voltage switch gears
- Switching rods
- Insulating tubes
- Bushings of all kinds



LSR Clamping Units

VOGEL clamping units for the casting of liquid silicone rubber (LSR) are based on the proven principle of the APG clamping units. Therefore, they are in the same way reliable, sturdy and built for maximum clamping force. Each machine is designed so that it can take up even huge moulds up to several tons without any problem. The intelligent principle and free accessibility from both sides allow to manufacture insulators with lengths that exceed the machine width by a multitude. The machines can be loaded by means of simple, manual crane systems or most advanced fully automatic handling systems to put in the several meters-long insulators and rods and mount even moulds weighing tons easily and safe.

ADVANTAGES OF LSR CLAMPING UNITS

TOP EXPERT SOLUTIONS
Setting the pace in vacuum equipment engineering.

- Highest stability, precision and long service life
- Best accessibility from both sides
- Modular extendibility (fully automatic handling units, mould crane and crane for parts handling)
- Clear intuitive control, freely programmable
- Pour-in systems for individual or multiple casting
- Special equipment such as hydraulic quick-clamp systems and vacuum chambers for the arrester production
- Heating of the moulds – electrically and by means of heating/cooling units
- All components made by renowned manufacturers – worldwide availability of spare parts

→ POWERFUL AND SENSITIVE

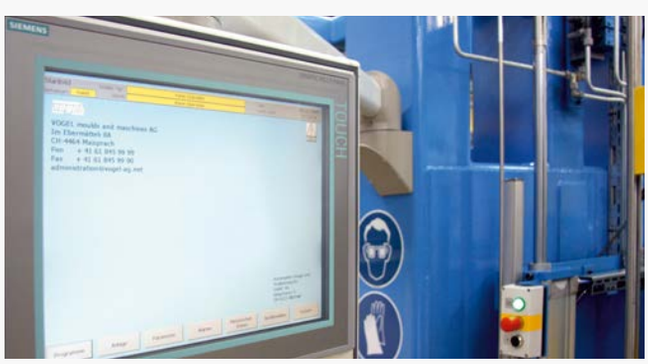
All machines have a generously dimensioned rigid machine frame, which is optimized for taking-up tools up to 8 tons per mould half. The massive moving carriage suspends from reinforced precision guidances and can be adjusted according to the weight. This allows parallel closing as well as clean and smooth opening of the clamped moulds.

→ COMFORTABLE AND SAFE

Employing modern safety switch devices allows to operate the machine without any disturbing protective fences. This ensures easy and uncomplicated charging of the moulds with the composite tubes and rods, which can be up to 20 m long.

→ QUALITY BY PRESSING A BUTTON

Just one click on a button is necessary for the modern, intuitive control to change a screen and edit parameters quickly. All functions as cylinder positions, heating parameters (temperatures and PID values) and hydraulic pressures are clearly split up. The process-relevant steps can be selected from a library and stored as program along with the other parameters.

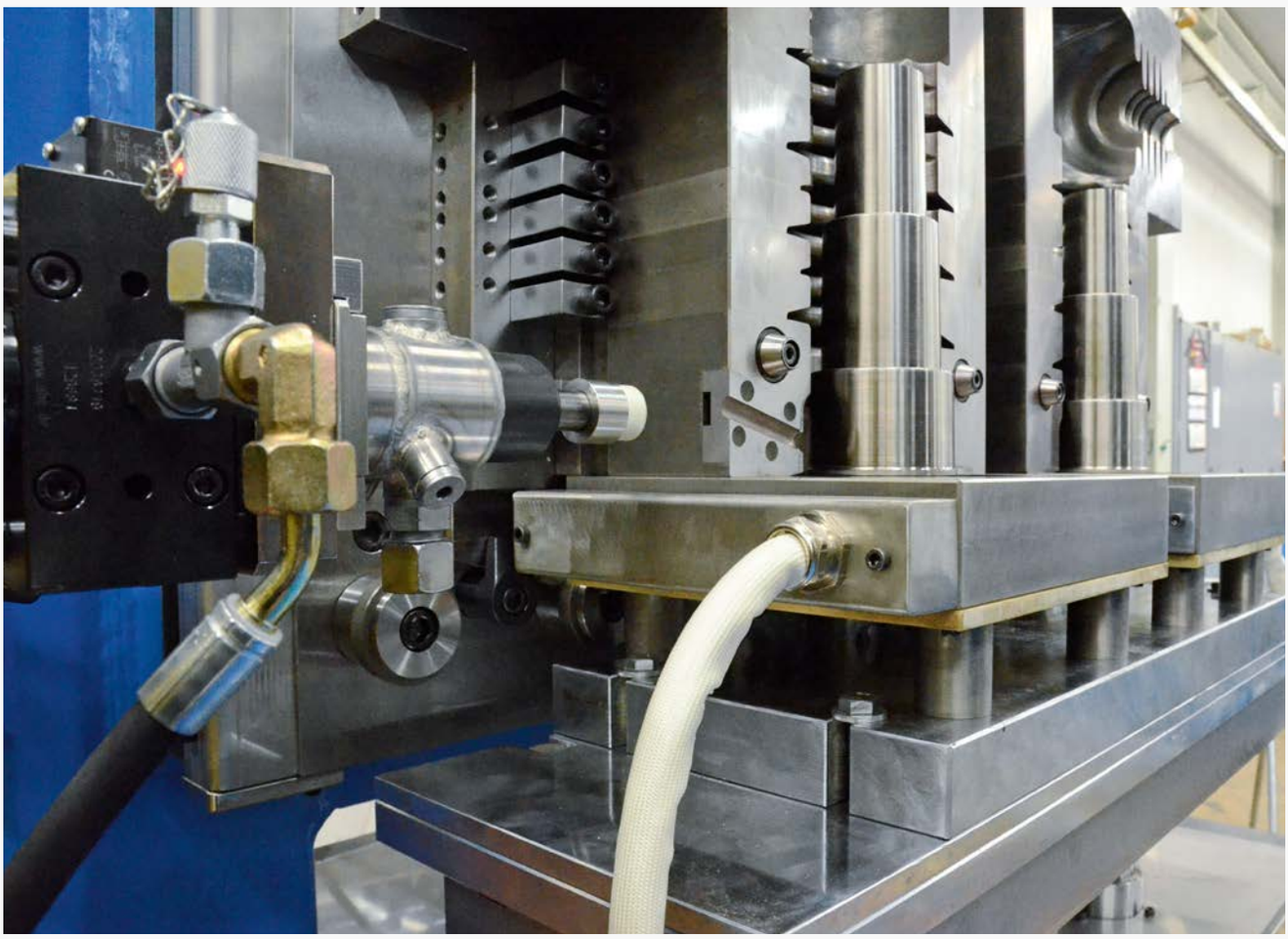


→ LESS WEAR – LESS COSTS

Thanks to the simple, modern mechanical arrangement, maintenance and service is minimized. No components are used that are subject to excessive wear. Therefore, the maintenance and down times per year as well as costs arising for maintenance and service are very low.

APPLICATIONS

- Hollow insulators up to 1,100 kV
- Long-rod insulators up to 400 kV
- Arresters
- Encapsulation of cable sleeves up to 500 kV
- Direct shielding of bushings
- Manufacturing of cable sleeves and accessories



Moulds for APG AND LSR

VOGEL moulds – either for APG process or silicone applications (LSR) – are dedicated to highest precision and reliability. Every single mould has exactly been adapted to the machine, granting high-quality components from the beginning. The moulds are designed and developed by means of technically most advanced 3D CAD systems. They meet the requirements on production, which are growing more and more complex and fast.

ADVANTAGES OF MOULDS FOR APG AND LSR

- Manufactured for highest precision and extremely long service lives
- Designed and developed in close cooperation with the customer resp. engineer of the component to be manufactured
- Maintenance and user friendly setup
- Easy assembly and handling
- On request, modular arrangement to allow different parts to be manufactured with one mould
- Electric heating, heating/cooling and cooling integrated into the mould
- Intelligent pour-in and vent systems

→ LONG SERVICE LIFE AND PRECISION

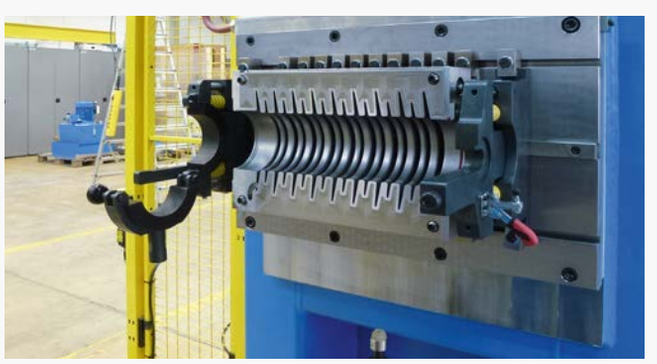
With the modern mould arrangement it is possible to manufacture faultless dimensionally stable parts from the first shot. Each mould exactly fits the customer's requests and provides a convenient, easy handling in perfect correlation with the clamping unit. Thanks to high-quality materials and high-tech thermal treatment, the moulds' service life is very long.

→ MODULAR AND EXTENDIBLE

If requested, different – even complex – components can be manufactured with just one mould. The flexible APG moulds employ exchange inserts or variable mould bricks. Every mould can have one or several independently moving core pullers. The modern block arrangement of the LSR moulds allows a short, easy change-over of insulators of various lengths.

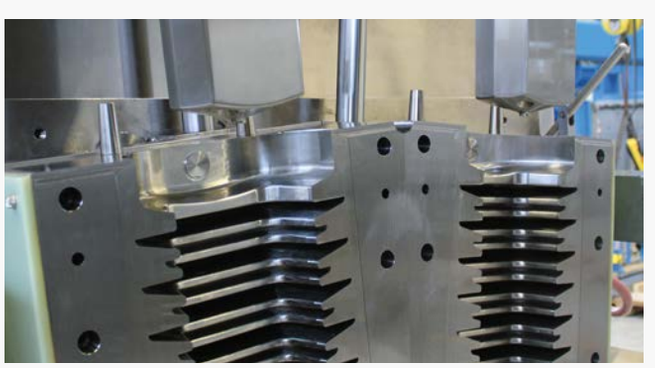
→ DIRECTLY OR INDIRECTLY

All moulds – both for APG and LSR – can be equipped with direct heating or be heated indirectly via the heating plates of the machine. The moulds for LSR can either be brought to the required temperature electrically via heating cartridges or by means of heat/cool channels via external heating/cooling units.



→ TECHNICALLY MATURED

The applied materials and high surface quality result in a considerable reduction of the maintenance and cleaning efforts when changing the mould. In order to increase productivity, a mould may have up to eight cavities. As a matter of course we consider sophisticated pour-in systems as well as fully automatic demoulding and moulding systems.



APPLICATIONS

- Current and voltage transformers, bushings and post insulators
- Arresters
- Switch housings with and without integrated vacuum tube
- Insulating parts for medium and high voltage switch gears
- Hollow insulators up to 1'100 kV; long-rod insulators up to 400 kV
- Manufacturing as well as encapsulation of cable sleeves up to 500 kV

LSR Mixing and Dosing System Type DosilOne Advanced

The VOGEL mixing & dosing system type DosilOne Advanced processes liquid silicone rubber (LSR) with a shot volume of up to 140 l and a filling speed up to 70 l/min. The components are filled into the mould by means of two independent hydraulically powered cylinders through a static mixer. The integrated dosing quality supervision system avoids the production of waste – by checking before filling.

ADVANTAGES OF LSR MIXING AND DOSING SYSTEM TYPE DOSILONE ADVANCED

TOP EXPERT SOLUTIONS
Setting the pace in vacuum equipment engineering.

- ↗ High precision of the mixing ratio of component A and B
- ↗ Compact and space-saving arrangement
- ↗ Minor installation effort
- ↗ Easy and quick exchange of barrels
- ↗ Venting of the follow-up plates and pumps after barrel exchange
- ↗ Administration of up to 30 filling profiles
- ↗ Easy disassembly and cleaning of the static mixer
- ↗ Low remaining quantities in the barrels
- ↗ High precision of the absolute filling amount
- ↗ Switching-off via pressure sensor in the mould possible
- ↗ Energy efficient due to standby mode of the hydraulic system
- ↗ Remote access and remote maintenance possible
- ↗ Little maintenance effort

→ ALWAYS DOSED PRECISELY

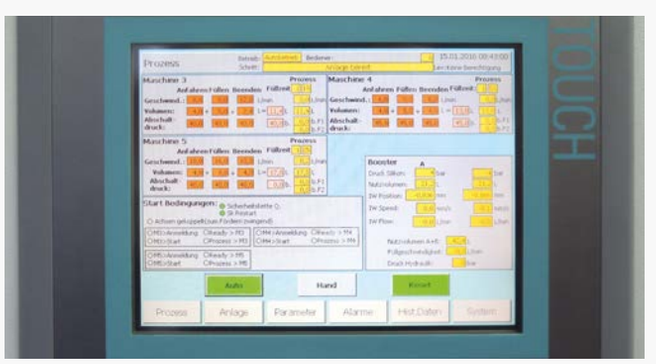
Via the integrated dosing quality supervision system, the independent hydraulically powered dosing cylinders check before every filling process that the material is filled completely and excluding air. Any occurring faults are solved automatically. Before releasing for dosing, the entire system is pressurized to a predefined pressure level, granting a uniform start of both dosing cylinders.

→ FAST AND FORCEFUL

The VOGEL booster system can fill moulds in one shot with up to 70 l/min and 140 l. Components of large volumes up to 140 l can be filled into a highly heated mould before the vulcanization process starts, within 2-3 min, thus shortening process times enormously and minimizing cooling-down and heating-up times.

→ FLEXIBLE CONTROL

Specially developed VOGEL controls and software provide highest flexibility in selecting the filling profiles. Up to 30 different processes can be filed. Via several interfaces of the integrated control, up to four consumers can be operated at the same time.



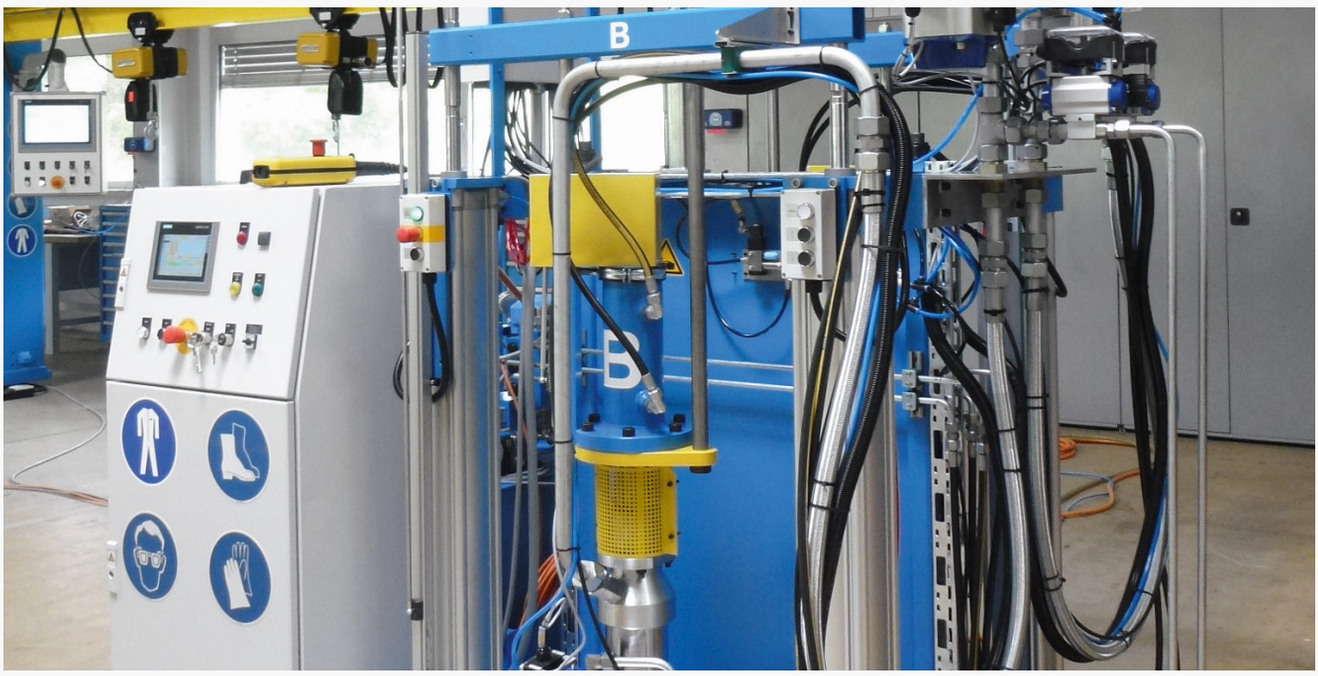
→ ERGONOMIC DESIGN

The compact, space-saving and ergonomic arrangement of the DosilOne allows easy and comfortable operation as well as an easy and safe handling when exchanging the barrel of the filling station. All piping and wiring is integrated into the equipment, and external supply connections are accessible so as to ensure that the equipment is ready for use at any location within the shortest possible time without major assembling.

APPLICATIONS

Mixing and dosing of liquid silicone rubber (LSR) for the:

- Manufacturing of hollow insulators
- Manufacturing of long-rod insulators
- Manufacturing of cable sleeves
- Direct shielding of bushings



LSR Mixing and Dosing System Type DoskoSil

The VOGEL mixing & dosing system type DoskoSil for the continuous mixing and dosing of liquid silicone rubber (LSR), 2K adhesive materials and 2K epoxy systems processes even abrasive materials up to a viscosity of 500,000 mPas. As standard, the equipment is capable of feeding the material from 20 l and 200 l barrels. The components are filled into the mould by means of two independent hydraulically powered double-acting plunger pumps through a static mixer.

ADVANTAGES OF LSR MIXING AND DOSING SYSTEM TYPE DOSKOSIL

TOP EXPERT SOLUTIONS
Setting the pace in vacuum equipment engineering.

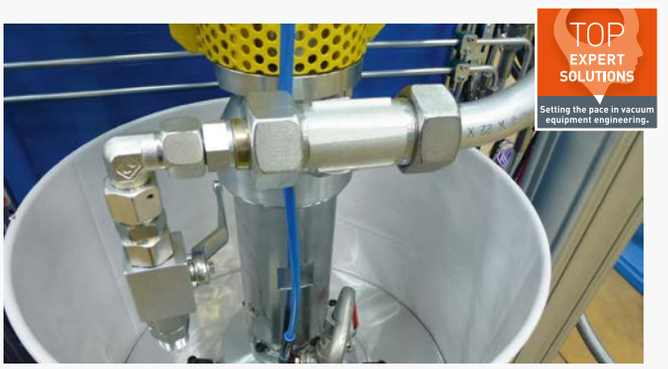
- Dynamic degassing system for highest efficiency
- High precision even at different viscosities
- Corresponding to the machine directive 2006/42/E
- Compact and space-saving arrangement
- Venting of the follow-up plates and pumps after barrel exchange
- Administration of up to 30 filling profiles
- Easy disassembly and cleaning of the static mixer
- Low remaining quantities in the barrels
- High precision of the mixing ratio of component A and B
- High precision of the absolute filling amount
- Switching-off via pressure sensor in the mould possible
- Energy efficient due to standby mode of the hydraulic system
- Remote access and remote maintenance possible
- Minor maintenance effort

→ DYNAMICALLY PREPARED

The dynamic material degassing unit is the optimum solution for the degassing of low, medium and highly viscous liquid silicone rubbers (LSR). The special design allows the material to distribute on thin, permanently renewing layers. This technology ensures – especially when manufacturing high voltage components – an efficient and high-quality material preparation.

→ INDEPENDENT OF VISCOSITY

The VOGEL LSR mixing and dosing system type DoskoSil contains hydraulically powered double-acting plunger pumps to ensure a uniform material flow, constant mixing ratio as well as precise filling speeds and filling volumes for highly viscous materials and components with different viscosity.



→ EFFICIENTLY VENTED

Fully automatic venting of the follow-up plates and fully automatic purging of the double-acting plunger pumps grant thorough venting after a barrel exchange with minimum material consumption and without impacts due to operator faults. So, both error rate and material waste are reduced.

→ FREELY PROGRAMMABLE

The purpose-developed DoskoSil control and software provide highest flexibility in selecting the filling profiles. Up to 30 predefined filling profiles are freely programmable and can supply up to four consumers at the same time. Communication with the clamping unit or the mould carrier is effected via several interfaces of the integrated control.

APPLICATIONS

- Manufacturing of hollow insulators
- Manufacturing of long-rod insulators
- Manufacturing of cable sleeves
- Manufacturing of components for cable sets
- Direct shielding of bushings
- Encapsulation of electric components

Special Equipment and Solutions for Automation

Our experience in machine, mould and equipment engineering as well as the process technique for the manufacturing of components according to the APG process or silicone process are the basis for innovative and practicable automation solutions. Our philosophy is "from specialists – from one source – from the start". Yet when designing the product, VOGEL is available to you with great experience in order to gain best conditions for an efficient production launch-out with high quality manufacturing later.

ADVANTAGES OF SPECIAL EQUIPMENT AND SOLUTIONS FOR AUTOMATION FROM VOGEL

TOP EXPERT SOLUTIONS
Setting the pace in vacuum equipment engineering.

- Many standard and proven solutions available for automation
- Corresponding to the machine directive 2006/42/E
- Own long-term experience in machine, mould and equipment engineering
- Experience in process technique for APG and silicone process
- From development, manufacturing, start-up to service – all from one source

→ TIME-OPTIMIZED MANUFACTURING

For the manufacturing of cable sleeves up to 500 kV, VOGEL provides a fully automatic production equipment. The applied moulds hold integrated pressure and temperature sensors to monitor an optimum filling and vulcanization process and are swiveled as necessary for optimum filling. This equipment reduces the manufacturing time by 50 % compared with other commonly available processes.

→ FULLY AUTOMATIC MANUFACTURING

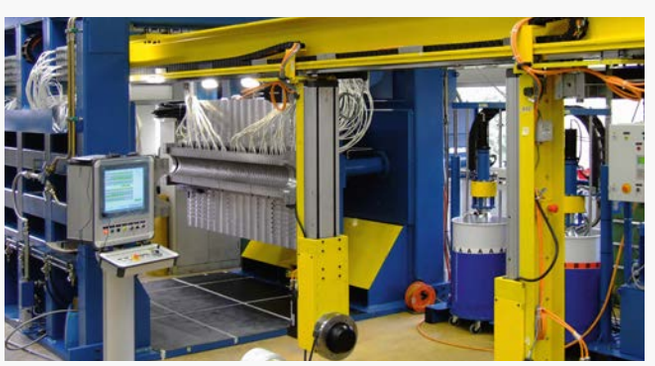
For manufacturing electric drives, VOGEL has developed a fully automatic system that loads and unloads as well as preheats components, casts them and finally post-cures. The modular arrangement allows an extension in steps as well as mixing production of several types.

→ CONSTANT MIXING AND DOSING

VOGEL always grants a homogeneous mixing ratio for highly viscous filled materials (e.g. 2K adhesive materials) as well as at very different viscosities of the components. The permanent circulation under vacuum excludes sedimentation, and a steadily proper mixing quality of the components is ensured.

→ AUTOMATION OF PROCESSES ON STANDARD CLAMPING UNITS

To optimize processes, VOGEL provides a great number of automation solutions for the standard clamping units – such as handling systems for loading and positioning the GFK pipes when manufacturing composite insulators in multi-shot process, loading slides for loading and unloading and automations with robots for mould cleaning and parts handling.



APPLICATIONS

- Automatic casting of electric drives
- Manufacturing of high voltage cable accessories up to 500 kV
- Robot-based automation solutions
- Parts handling for shielding of hollow insulators
- Dosing and mixing of highly viscous and abrasive materials (adhesive material, epoxies, etc.)

VOGEL MOULDS AND MACHINES AG
Landstrasse 71 I 4303 Kaiseraugst I Switzerland
T + 41 61 845 99 99 I F + 41 61 845 99 90 I info@vogel-ag.net

Further information
→ **www.vogel-ag.net**

A member of the HEDRICH Group.