

# — Company presentation

# Locations



## Key figures of PVS Group:

- 78 Mio € turnover (financial year 2023/2024)
- 480 employees

126 injection molding machines

(Update: 2024/09)

# **PVS Germany**



Location: Niedernhall

Founding: 1976

Number of employees: 265

53 injection molding machines  
from 35 to 1.600 tons

Production area: 15.000 sq m / 162,000 sq ft

IATF 16949

Environmental Management System ISO 14001

Energy Management System ISO 50001

(Update: 2024/04)

# **\_PVS Hungary**



Location: Celldoemoelk

Founding: 1999

Number of employees: 121

32 Injection molding machines  
from 15 to 500 tons

Production area: 4.800 sq m / 52,000 sq ft

IATF 16949

(Update: 2024/04)

# **\_PVS USA | Huber Heights**



Location: Huber Heights, Ohio

Founding: 2004

Number of employees: 65

21 injection molding machines  
from 60 to 1.600 tons

Production area: 7.000 sq m / 75,300 sq ft

IATF 16949

Environmental Management System ISO 14001

(Update: 2024/04)

# **\_PVS USA | Johnson City**



Location: Johnson City, Tennessee

Founding: 2023

Number of employees: 3

4 injection molding machines  
from 180 to 340 tons

Production area: 5.000 sq m / 54,500 sq ft

(Update: 2024/04)

# **PVS China**



Location: Taicang

Founding: 2011, since 2018 at Taicang

Number of employees: 26

16 injection molding machines  
from 40 to 600 tons

Production area: 4.200 sq m / 45,200 sq ft

IATF 16949

(Update: 2024/04)

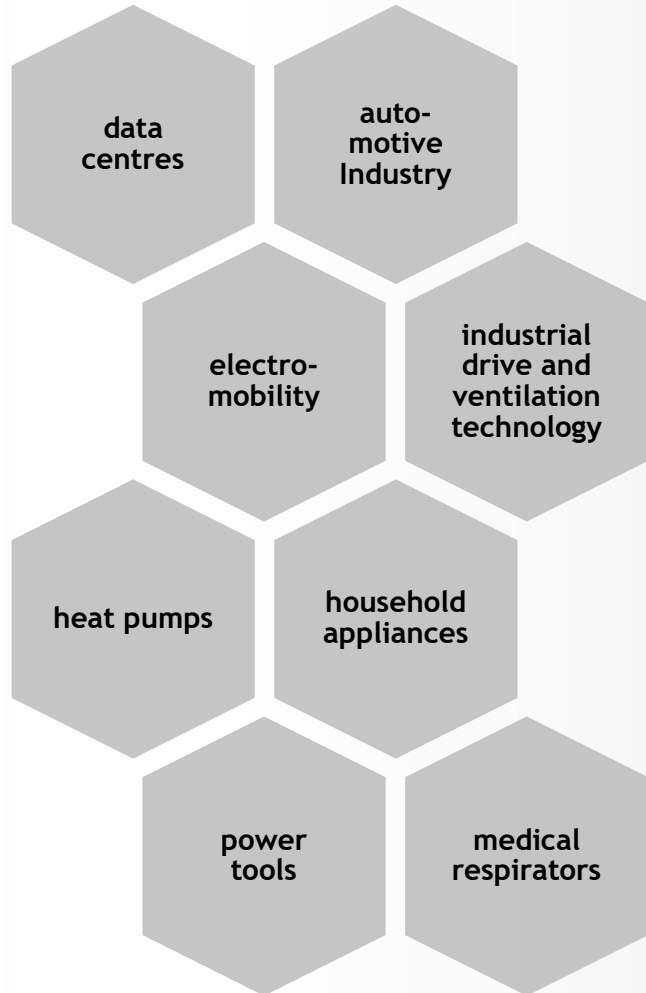
# **Our Business Strategy**

**VISION 2025**

**Co-Creating  
high technology  
for sustainable and eco-friendly  
solutions in plastics  
worldwide.**



# Applications



Every year, the PVS Group produces around 100 million plastic parts that help to make electric motors and blowers more energy-efficient, lighter and quieter.

# Our Core Competences



ca. 29 Mio. units produced per year

- Stators and Rotors
- Blower Wheels
- Technical Components



ca. 24 Mio. units produced per year

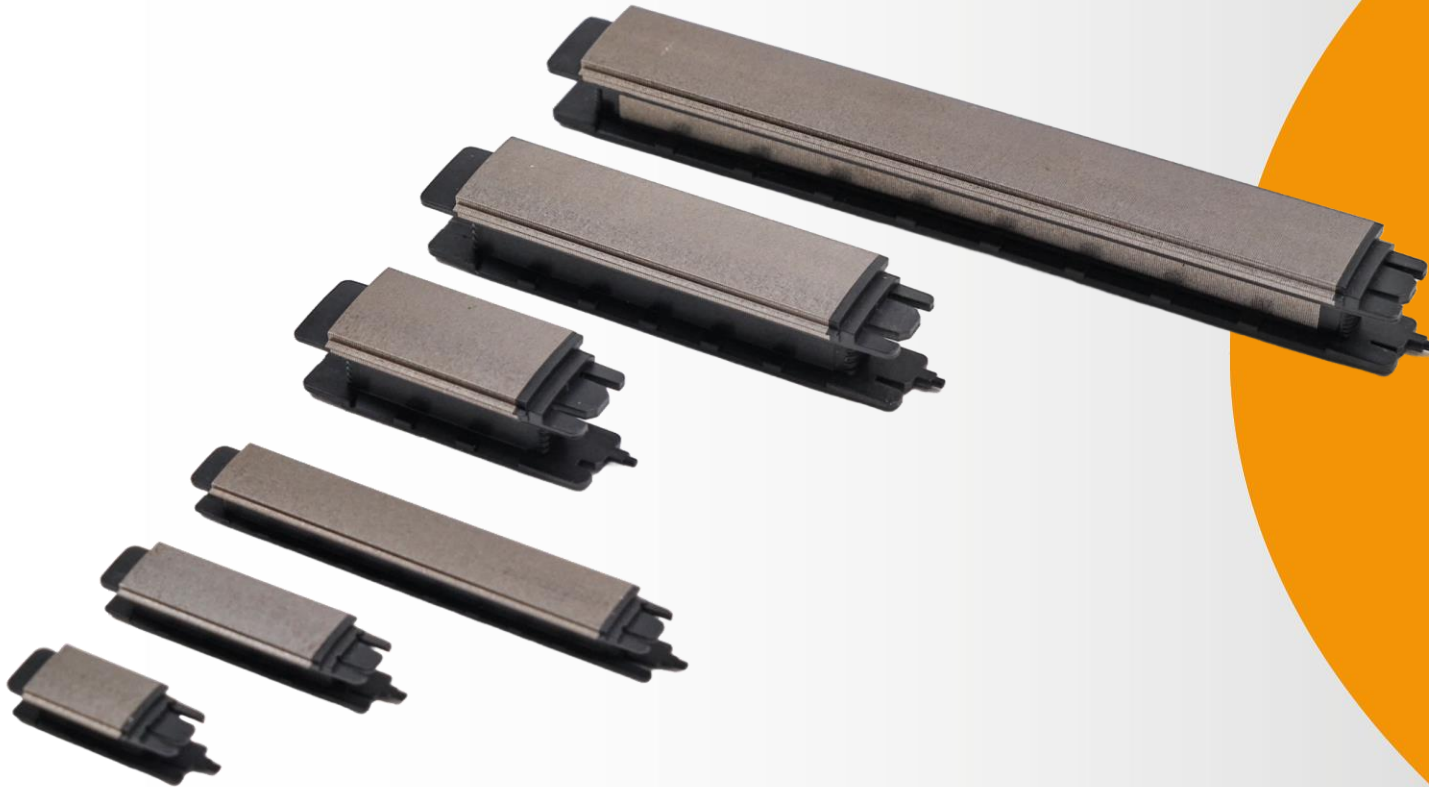


ca. 47 Mio. units produced per year

# — Overmolding Technology



## Stator segment with overmolded plastic insulation



Length: currently up to 200 mm is possible

### Application:

Industrial engines, hybrid automobile technology, wheel hub drives

### Advantages:

- High coil density
- Compensation of stack tolerances from 0.8 mm before the insulation to 0.05 mm after insulation
- Ensuring the air gaps and creepage distances in the joint area of the individual segments

## Stator segment: overmolded, wound, encapsulated



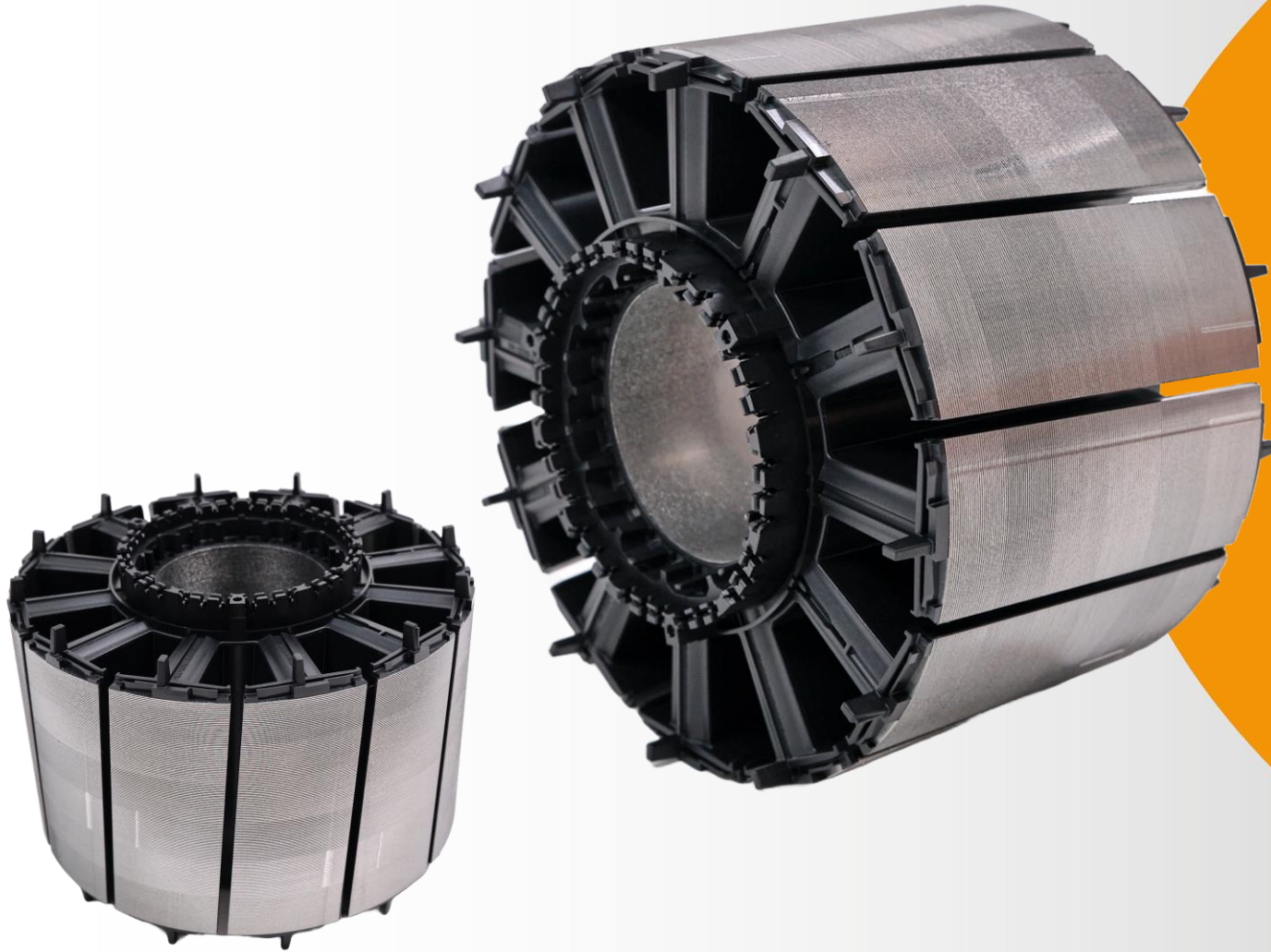
stack height = installation height = 105 mm  
(stator composed of 30 segments / Ø 290 mm)

**Application:**  
Hybrid drive passenger car (Plug-In),  
power: 80 kW

### **Advantages:**

- Stack, overmolding, winding and encapsulation from one supplier
- High coil packing density with small dimensions
  - Contour for placing the winding wire is integrated in the part
    - Sealing of the winding wire without damage of isolation
  - Additional fixing of the winding by encapsulation

## Skewed external rotor stator with overmolded plastic insulation



Diameter: 150 mm

Installation height: up to 85 mm

Helix angle: 6°

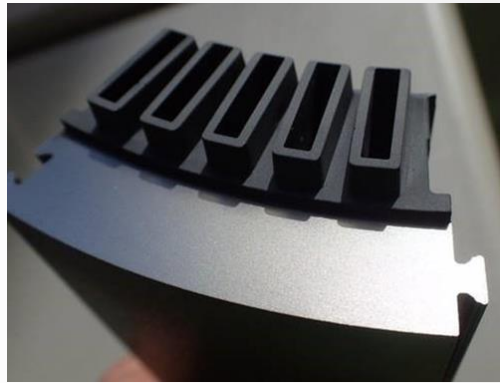
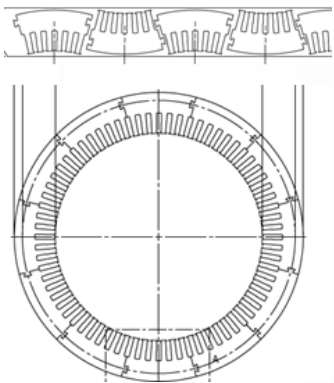
**Application:**

Powerful industrial engines

**Advantages:**

- Reduction of the detent torque
  - Use of loose laminations
  - Stacks need no welding
    - Reduction of noise
- Insulation displacement contacting integrated in the geometry

## \_Segmented EV stator | prototype



Outer Ø: 220 mm  
Inner Ø: 157 mm  
Height: 160 mm

Key facts:

- Tailor made material selection for punching  
eg. Stator material: NO30-16  
Rotor material: M800-50A
- Maximum material utilization
- Insulation thickness 0,3 mm
- Improved thermal conductivity
- One-Piece insulation by overmolding  
→ improved creep-distance  
in comparison to end cap designs

## Overmolded stator and rotor



Diameter of stator: 120 mm

Diameter of rotor: 84 mm

Installation height: 14,5 mm

### Application:

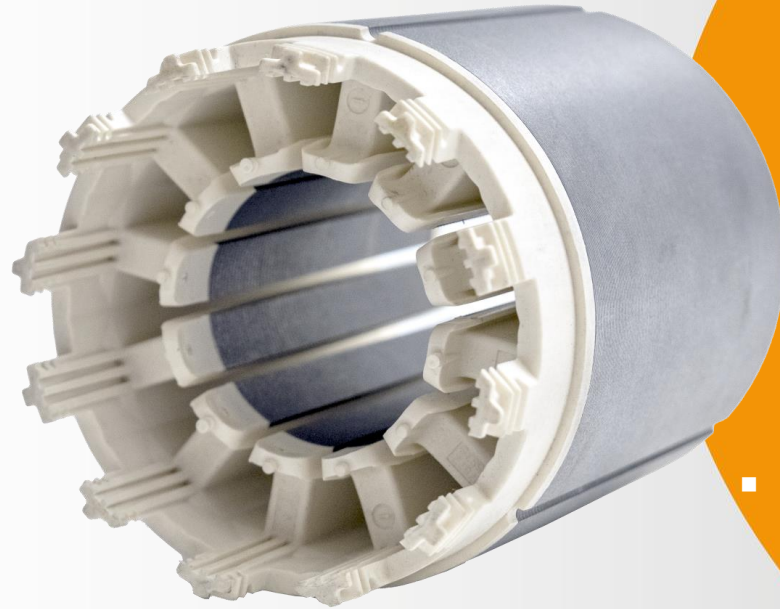
Fan for engine cooling consisting of overmolded stator and overmolded rotor with magnetized and preassembled magnets

### Advantages:

- Weight and space savings
- High temperature applications
- Subsequent magnetization not necessary



## — Stator with overmolded plastic insulation



Diameter of stator: 69 mm

Diameter of rotor: 35 mm

Installation height: 75 mm

### Application:

Brushless, linear server motor for transport systems

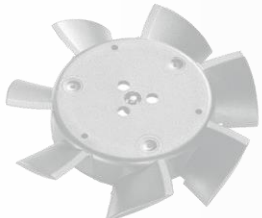
### Advantages:

- Weight and installation space savings
- Plug pockets for insulation displacement technology are molded in
- Separate channels for wire guidance are molded
  - Compact design

# **— Ventilation Technology**



## \_mini axial impeller



Diameter: 15 to 36 mm  
Balancing value: 0.12 gmm  
Axial runout: 0.1 mm  
Radial runout: 0.05 mm

### Application:

Car seat ventilation, IT

### Advantages:

- No subsequent balancing necessary
  - Very smooth running
  - No reworking steps
- Metal parts - shaft and flux ring - are inserted into the injection mold and overmolded, thus very high concentricity

## \_maxi axial imepller



Diameter: 950 mm

### Application:

Supply air, exhaust air, refrigeration and air conditioning technology in industrial buildings

### Advantages:

- Lighter than metal wheels
- Little or no rework required
- Very low impact values with constant quality

## **\_Fanblade**



Diameter: 360 mm

Balancing value: 10 gmm

Axial runout: 1.5 mm

Radial runout: 1.5 mm

**Application:**

Automobil engine cooling

**Advantages:**

- Economical production due to a 2-cavity mold
  - Variable balancing, thus little to no subsequent balancing processes at the customer's location

## Radial blower wheel



Diameter: 147 mm

Balancing value: 4.0 gmm

Axial runout: 0.5 mm

Radial runout: 0.5 mm

**Application:**

Automotive air conditioning

**Advantages:**

- Variable balancing, thus little to no subsequent balancing processes at the customer's location

## Double side radial blower wheel



Diameter: 97 mm

Balancing value: 2 gmm

Axial runout: 0.4 mm

Radial runout: 0.4 mm

### Application:

Air-conditioning and ventilation systems  
in automobiles and home appliances

### Advantages:

- Pressing on „smooth“ hub shaft
  - No rebalancing required  
at the customer´s location

## Compact blower wheel



Diameter: 133 to 630 mm  
Optimized balancing values  
Low axial and radial runouts

### **Application:**

Ventilation and air conditioning technology

### **Advantages:**

- One-piece blower wheel
- No assembly or welding work necessary
  - Lowest noise emissions
  - Aerodynamically optimized design
- Improved fluidic degree of efficiency
  - Automated balancing possible due to modified plastic geometry



## Diagonal impeller



Diameter: 116 mm

Axial runout: 0.2 mm

Radial runout: 0.3 mm

### Application:

Automotive and IT ventilation

### Advantages:

- Low-noise optimized impeller design by using a special tool technology
  - Automated balancing possible due to the plastic geometry
    - No rework required

## **\_Turbine**



Diameter: 72 mm

Balancing values: less than 3 gmm

Axial runout: 0.2 mm

Radial runout: 0.2 mm

**Application:**

Powertools

**Advantages:**

- Realization of complex blade geometries in plastic, rework-free
  - Lowest imbalance values for speeds up to 30,000 rpm
  - Variable balancing

## Complete fan frame



**Application:**  
Cooling Fan Module

**Information:**

- Production of the axial wheels and the frame
- Assembly and balancing of the module by PVS
  - Production according to demand and delivery to an OEM

## Steam condenser with blower



**Application:**  
Dishwasher

**Information:**

- Development and patent of the heat exchanger unit by PVS
- Design of the blower unit in cooperation with the motor supplier
- Tailored production and assembly of components and the blower at PVS

## 2-Component air intake



**Application:**  
Automotive air intakes

- Information:**
- Integration of a flexible seal in a component made of polyamide
  - Made on a 2-component machine with rotary disk

## Wall ring



### Application:

Touch protection for external rotor motors

### Information:

- Integrated engine mount
- Interchangeable inserts for different engine versions

# Intellectual Property (IP)



„The value of an idea  
lies in the using of it.“

Thomas Alva Edison

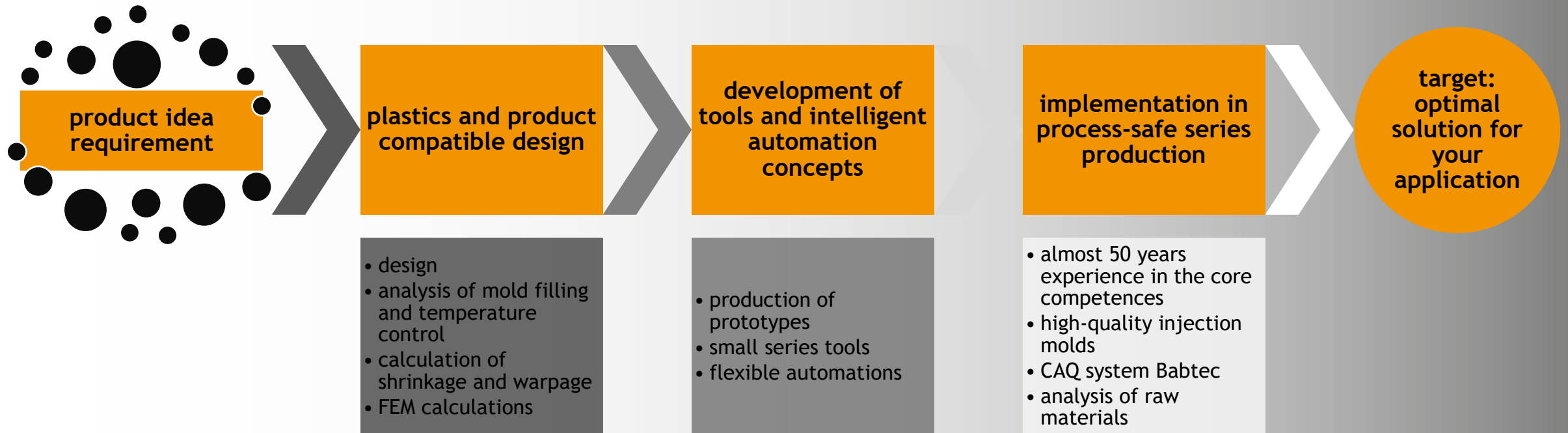
PVS property right:

▪ **EP3871323**

Stator/rotor device for electric motors  
and a method for producing a plastic coating  
of a stator/rotor device

- Further utility model applications  
are in the approval phase

# Development of product and process



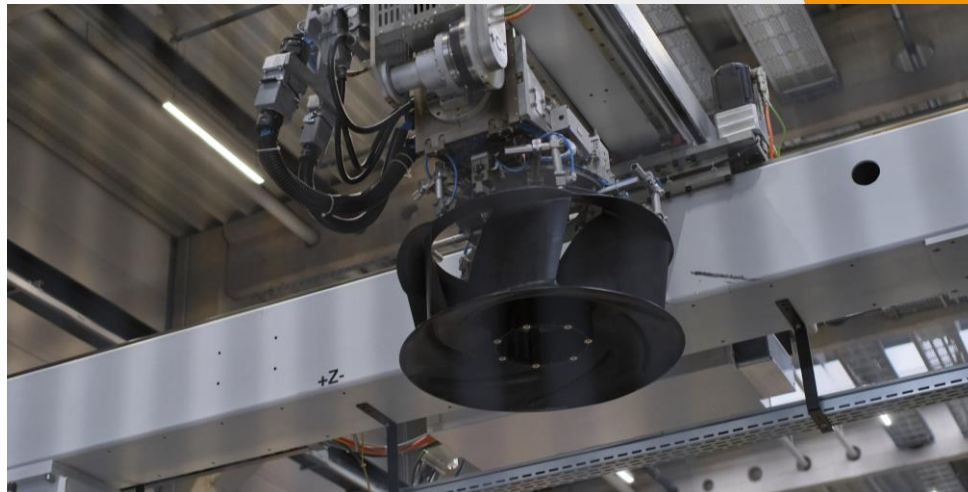
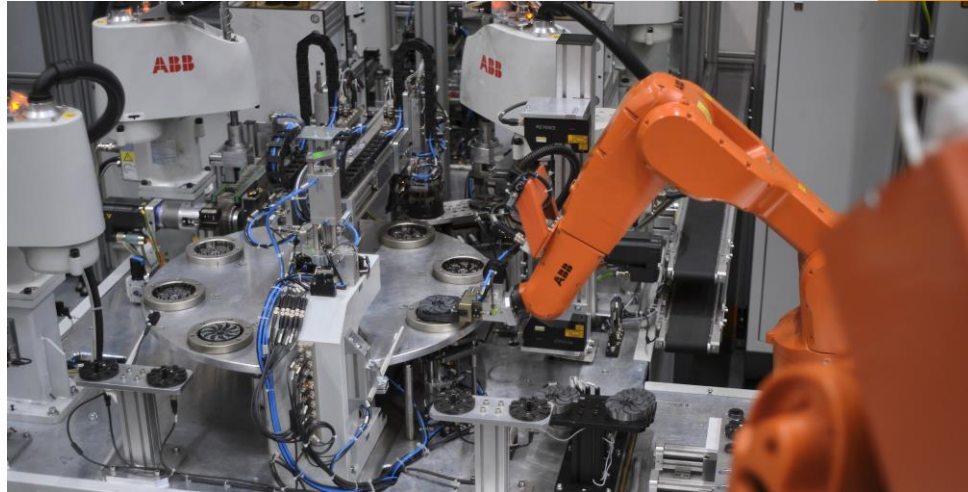


## \_Tool making



- 40 % of our injection molds are manufactured in our own tool shop.
- In particular molds required for overmolding stators and rotors.

# Automation technology



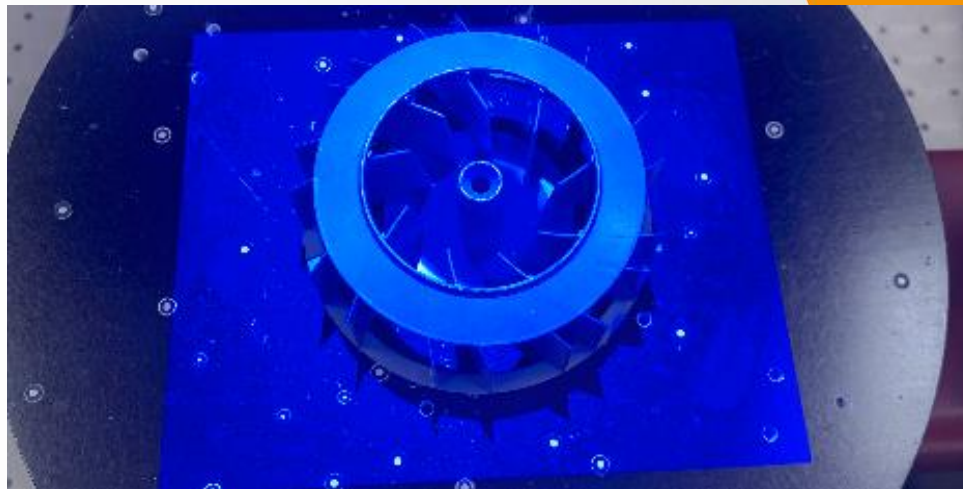
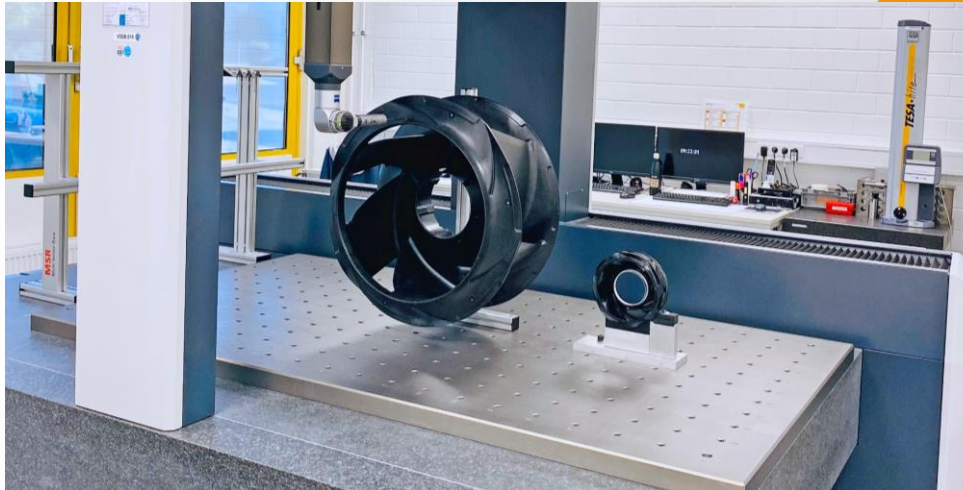
- Innovative automation solutions
- Economically sustainable systems for each application
- Complex production facilities enable a full-automated inserting and overmolding of metal parts for electronic motor components

# Lean production



- Modern and partially linked production lines
- Unit weight up to max. 8 kg
- Injection molding machines with clamping forces up to 16,000 kN
  - Production of modules
- Continuous improvement processes
  - SMED workshops

# Production-supporting quality assurance




- Material testing upon arrival and MFR/MVR testing of plastics
  - Tactile and non-contact measuring systems from Zeiss
    - CAQ System
  - 10 balancing machines
    - High-voltage testers

# Quality Management

Quality management means for us:

- The fulfilment of all normative requirements and customer specifications.
  - A QM system that is actively practised, with process owners and the endeavour to continuously optimise all processes.
    - The use of IT to support process and document control.
    - An internal monitoring system as part of our annual audit programme.
    - Our Q-Max programme for suggestions for improvement.

A hand in a grey sweater sleeve is shown holding a yellow star. The hand is positioned on the right side of a large orange semi-circle that contains five yellow stars in a row. The background is a light grey gradient.

**„ Quality is the fulfilment  
of expectation.“**

Georg-Wilhelm Exler



**Thank you for taking  
the time for us.**