

50 years of F. Morat

Milestones in injection moulding



Generations of pioneers

A family of creative minds and inventors

Franz Morat junior and Oskar Haberstroh senior were already experienced businessmen when they founded F. Morat & Co. GmbH on 10 April 1963 for the production of precision parts from engineered polymers. From this time on, the two cousins dedicated themselves to processing plastic with great commitment and vision in rooms that were unoccupied at the Morat parent company in Eisenbach.

Johann Morat had already founded the original company building 'auf dem Höchst' 100 years earlier and produced revolving chairs, gear chairs, gearwheels and tools. Franz Morat senior, one of his six sons, expanded the range with pressure gauges and counters as well as gearwheels for the watch and clock industry. His son Franz Morat junior – who had inherited the entrepreneurial skills from his ancestors – was born in Eisenbach in 1911. In 1932, just 20 years

old, he made his way to Paris, founded the company Framex there and successfully sold the products of his father's company throughout Europe. The outbreak of war forced him back to the Black Forest, where he took over management of the business. In 1944 he founded the trading company F. Morat & Co. GmbH, which sold machine parts until 1963.

His cousin, Oskar Haberstroh senior, also a grandson of Johann Morat, had already done several jobs by the time the company was founded. Having completed an apprenticeship as a mechanic and working at Johann Morat & Söhne GmbH, he went to Ludwigshafen as a toolmaker in 1923. After studying to become a mechanical engineer, he moved to the company Spittler in Leipzig in 1927, where he was a successful assistant to the Works Manager. But his former training soon drew him home again: at Johann Morat & Söhne GmbH

he was a production engineer from 1928 to 1940 and Managing Director from 1940 to 1958.

Franz Morat junior and Oskar Haberstroh senior started processing plastic using injection moulding at F. Morat & Co. GmbH in 1963. Oskar Haberstroh senior took over management of the company until 1980 and then transferred it, together with his shares, to his son Oskar Haberstroh junior. Meanwhile, co-founder Franz Morat junior had transferred his shares to his children Franz Armin Morat and Gisela Brake-Morat in 1977. Franz Robert Morat and Dr. Daniel Morat, the grandsons of Franz Morat junior, took over ownership of the family company following the retirement of Oskar Haberstroh junior in 2008 and Gisela Brake-Morat in 2011.



The cradle of two companies: F. Morat started injection moulding of plastic in the rooms vacated by the sister company Framo Morat 'auf dem Höchst'.



Franz Morat senior

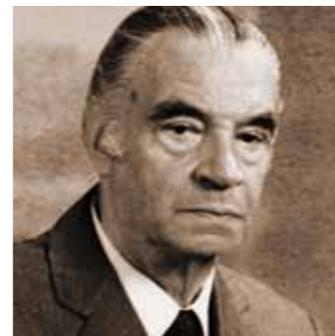
1876 – 1953

Franz Morat senior founded Franz Morat GmbH (now Framo Morat), F. Morat's sister company, in 1912. F. Morat began injection moulding plastics in the rooms vacated after Franz Morat GmbH moved into new buildings in 1963.



Franz Morat junior

1911 – 1986



Oskar Haberstroh senior

1905 – 1990



Gisela Brake-Morat



Oskar Haberstroh junior



**Franz Robert Morat and
Dr. Daniel Morat**

From iron ore to thermoplastics

Eisenbach in step with the times

F. Morat was one of the pioneers of plastic processing 50 years ago, continuing a centuries-old tradition. Because here in Eisenbach, at an altitude of 1,000 metres, the watch and clock industry flourished with the demise of the local brown iron mining industry. And as a mechanical movement permits no inaccuracy or mistakes, precision has always been the top priority here. Most of the current producers of precision engineering, precision turned parts and drives developed from the watch and clock industry in the so-called 'GearValley'.

The typical Black Forest virtues – reliability, attention to detail, pioneering spirit and the desire to achieve perfection – therefore also characterised the history of F. Morat. It was one of the first companies to start using the screw injection moulding machine, invented in 1956, for serial production of precision parts made of plastic. The creativity and inventiveness was stimulated by the properties inherent in the material plastic: the almost unlimited design freedom, its suitability for economical high-volume series, its corrosion-resistance, its insulating effect against electrical current and its low weight. The rapid development in the field of technical thermoplastics gave F. Morat a further boost. The company ensured a decisive competitive advantage through its early involvement in the processing of high-temperature plastics.



Officially certified entrepreneurial spirit

10 April 1963: F. Morat & Co. GmbH is founded for the production of precision parts made of engineered polymers. Partner Oskar Haberstroh senior was appointed the first Managing Director.

Inherited passion

Oskar Haberstroh junior at the company's first injection moulding machine.



Innovations are created from experience and curiosity

Masses of class

Precision injection moulded parts as a stimulus for the consumer society

Oskar Haberstroh senior began processing plastics with a second-hand injection moulding machine in 1963. Right from the start this single machine, initially all the assets of the still-young company, was operated in two-shift operation. A second machine had to be purchased during the company's very first year in order to be able to meet the booming demand for injection-moulded technical parts in the 1960s.

Not unlike now, many parts stayed 'in the family'. Because the sister company Framo Morat increasingly needed the highly accurate components made of thermoplastics for its gears and assemblies. The automotive industry was another important customer right from the start. The accurate parts from F. Morat were principally used in windscreen wiper systems and power window actuators.

Daily office work was also greatly simplified thanks to products from F. Morat. Countless gearing components were supplied to the United Kingdom and the Netherlands as long ago as 1968, and were used in the first automatic photocopiers. Things were also running smoothly in the children's rooms. Thus drive elements from the first unscrewing moulds got a huge variety of model cars moving in 1969.



Drive wheels for water meters

Thermoplastics do not rust and are cheaper than brass. The first injection moulded parts from F. Morat were drive wheels for use in water meters.



Gearwheels for windscreen wipers

The automotive industry quickly developed into one of F. Morat's most important partners. The first car part was a gearwheel for the windscreen wipers of the legendary Opel Kapitän A in 1965.



Parts for photocopiers

Copying with original parts from the Black Forest. F. Morat had a hand in the office revolution. Numerous small mechanical parts were delivered to England and the Netherlands from 1968.



Geared parts for model construction

An untiring speedster. Model cars raced on circuits in numerous children's rooms in the 1960s and 1970s thanks to F. Morat.



1912
Founding of Franz Morat GmbH, now Framo Morat GmbH & Co. KG, by Franz Morat senior



1963
Start of plastics processing at F. Morat & Co. GmbH, founded in 1944. Oskar Haberstroh senior takes over management



1970
First fully electronically controlled injection moulding machine



1971 - 1972
Construction of a 1,500 m² production hall



1977
Retirement of Franz Morat junior. His daughter Gisela Brake-Morat becomes a partner



1980
Retirement of Oskar Haberstroh senior. Oskar Haberstroh junior takes over his shares and becomes Managing Director

High temperatures and complete assemblies

Thermoplastics open up new opportunities

A new, enormously strong, highly temperature-resistant thermoplastic material came onto the market in the early 1980s – polyether ether ketone, or PEEK™ for short. Even if it was initially almost exclusively used in medical instruments, F. Morat quickly recognised the almost unlimited possibilities offered by this new material: the company produced the first geared parts made of PEEK™ in 1983, for use in mechanically highly stressed electric chainsaws.

F. Morat's development was, however, also made easier as a result of the customers' demand for inexpensive mass-produced articles. Instead of die-cast housings, producers now required housings made of lighter, more economical plastic. Gearwheels that in the past had required complicated turning and hobbing in machining processes could now be produced at one-second intervals with the injection moulding machine. But F. Morat was not only able to deliver millions of individual parts. Thanks to the firm's precision competence, complete assemblies and customer-specific gears made of plastic and metal components could now be supplied from Eisenbach for delivery all over the world.



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PEEK™ drive parts

Tough as nails. 13,000 rpm in a chainsaw makes maximum demands of plastic parts. F. Morat was one of the first companies to meet these demands with components made of PEEK™.



Control valve actuators for radiators

Saving energy is a question of adjustment. F. Morat has been producing control valve actuators for radiators, refrigerators and air conditioners since 1989 – more than 3 million units so far.



Assembly modules for district heating pipe networks

F. Morat has already produced more than 100 variants for control valve actuators due to their huge versatility – for the most varied of travel ranges, actuating powers, speeds and operating voltages.



Demanding comfort

Travelling in the luxury class

The company
2000 - 2013

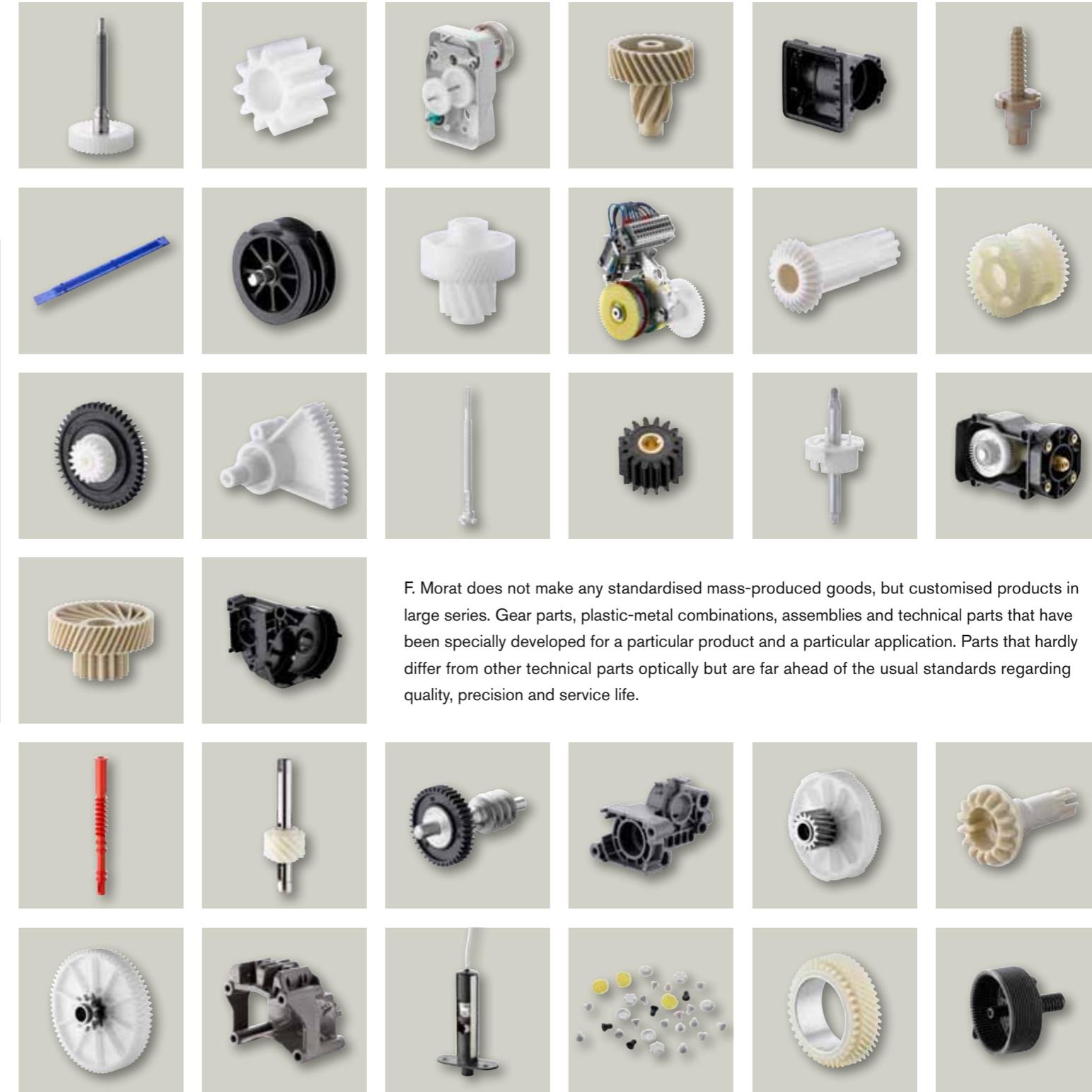
Even if you cannot see it – almost every car on our roads has parts from F. Morat providing reliable service. This starts under the hood with parts for the electric starter and ranges up to drive elements on the radiator-side air intake or direct in the intake passage near the engine, providing greater performance with reduced consumption.

In addition, parts from F. Morat play a decisive role in travelling comfort. From the power window actuator to seat adjustment and auxiliary heaters – everything must function almost soundlessly at the press of a button. Parts from F. Morat are most often involved when the boot closes elegantly and quietly, sun visors ascend and descend automatically, safety belts are comfortably fed out, and mirrors fold reliably. Because the miniature bearings, housing parts, gears and ventilation fans made of thermoplastics are daily and tirelessly in use in the drives and electric motors.



Power window actuators and seat adjustments

Up or down, backwards or forwards – comfort drives from F. Morat make driving a relaxing pleasure.



F. Morat does not make any standardised mass-produced goods, but customised products in large series. Gear parts, plastic-metal combinations, assemblies and technical parts that have been specially developed for a particular product and a particular application. Parts that hardly differ from other technical parts optically but are far ahead of the usual standards regarding quality, precision and service life.

2007

Complete transfer of shares to the Morat family



2008

Mr Gökhan Balkis takes over as Managing Director



2011

Franz Robert and Dr. Daniel Morat each hold 50% of the shares when Gisela Brake-Morat retires

2012/2013

Founding of the Franz Morat Group, consisting of the sister companies F. Morat and Framo Morat

50 Years F. Morat
Plastics at their best 1963 - 2013

2004

Annual production exceeds 100,000,000 parts

2006

Expansion of production area to 5,000 m²

Everything revolves around the customers – in future too

Each user-specific project is teamwork

Whether in modern building services engineering, in the household, in the automotive industry or in medical instruments – the small parts from F. Morat provide great performance. And with rising demands regarding safety, comfort and the environment, the demands on us and our components, assemblies and drives also increase. We are ideally equipped for the demands of the future as a powerful single-source supplier in an alliance with our sister company Framo Morat under the aegis of the Franz Morat Group. Because as part of this Group we can always offer our customers the best solutions. Whether made of plastic, metal, or a combination of both materials – uniting the advantages of metal and plastic.

We do not know what the future holds for us. But we know that we can react to the changing conditions of the markets with our

long tradition and our growing capacities. The energy transition, for example, makes decentralised power supply and storage systems essential, and creates new challenges for energy and building services technology. Our actuators can contribute towards ensuring that the energy transition succeeds and energy is saved whilst comfort is increased. Demographic change will alter our society and bring about new ways of life as well as new modes of working and living. Stair lifts, for which we produce components, help those in need to master their everyday tasks autonomously and safely. Highly precise and particularly quiet drive elements meet the high demands in use near patients in medical equipment and rehabilitation devices.

We will not do anything fundamentally different in future either: we always look, and will look, for the best solutions for our customers.

Office and building services technology

The desire for energy savings and comfort ensures that the most varied of drive parts from F. Morat are also used in the office. Whether in refrigerators and air-conditioning, in the form of actuators for heating systems or district heating, in shredders and desk height adjustment systems, or for drinks from the coffee machine.

The company's
future



Medical equipment

There are no compromises when health is involved. In electromechanical pipette and infusion systems, therefore, trust is placed in the precision of parts from F. Morat, as in this component mixer for dentists' practices.



Communications

Even the modern world of communications needs parts from F. Morat. Our drive elements, for example, track mobile phone frequencies non-stop and adapt them to individual user behaviour or network density.

The best of both worlds

Metal or plastic? Customers of the Franz Morat Group do not need to wrestle with this decision. Discuss the task with a company contact and the team will work out the right solution. Whether metal, plastic, or both.



Space to grow

F. Morat and Framo Morat will work together under one roof in a planned new company building, where production and logistics are to be expanded.

Franz Morat Group

“It was great!”

The early years were times of trial and error and improvisation

The plastics industry was still in its infancy in 1963. The company founders were repeatedly forced to start again from the beginning in the search for new methods and solutions. Luckily they found a good teacher in Engelbert Fehrenbach. Oskar Haberstroh senior had already worked with the young machine fitter on a plastic injection moulding machine at the company of his friend Wilhelm Fischer. Both were totally enthusiastic about the potential of this new material.

Oskar Haberstroh senior, Engelbert Fehrenbach and this injection moulding machine – that was the entire company that moved into the free space at the Morat parent company in April 1963. The company initially profited enormously from the great success of the circular knitting machines from Hellige Morat & Co., founded by Franz Morat junior, because it needed a lot of very accurate injection moulded parts. Oskar Haberstroh junior joined the firm in 1964 and, with new orders, the machine park grew and more personnel were employed.

These not only learnt how to handle injection moulding machines, but also the art of improvisation. The first lathe was only acquired after four years. Until then one had to go over to Franz Morat and hope that a lathe was free there. And, because the young company still did not have a drying furnace, one also went to the neighbour and carried the dried granulate back to the machine in thermos flasks (without airtight caps the material would have taken up moisture again). One knew how to cope in every situation thanks to the proverbial Black Forest inventiveness.

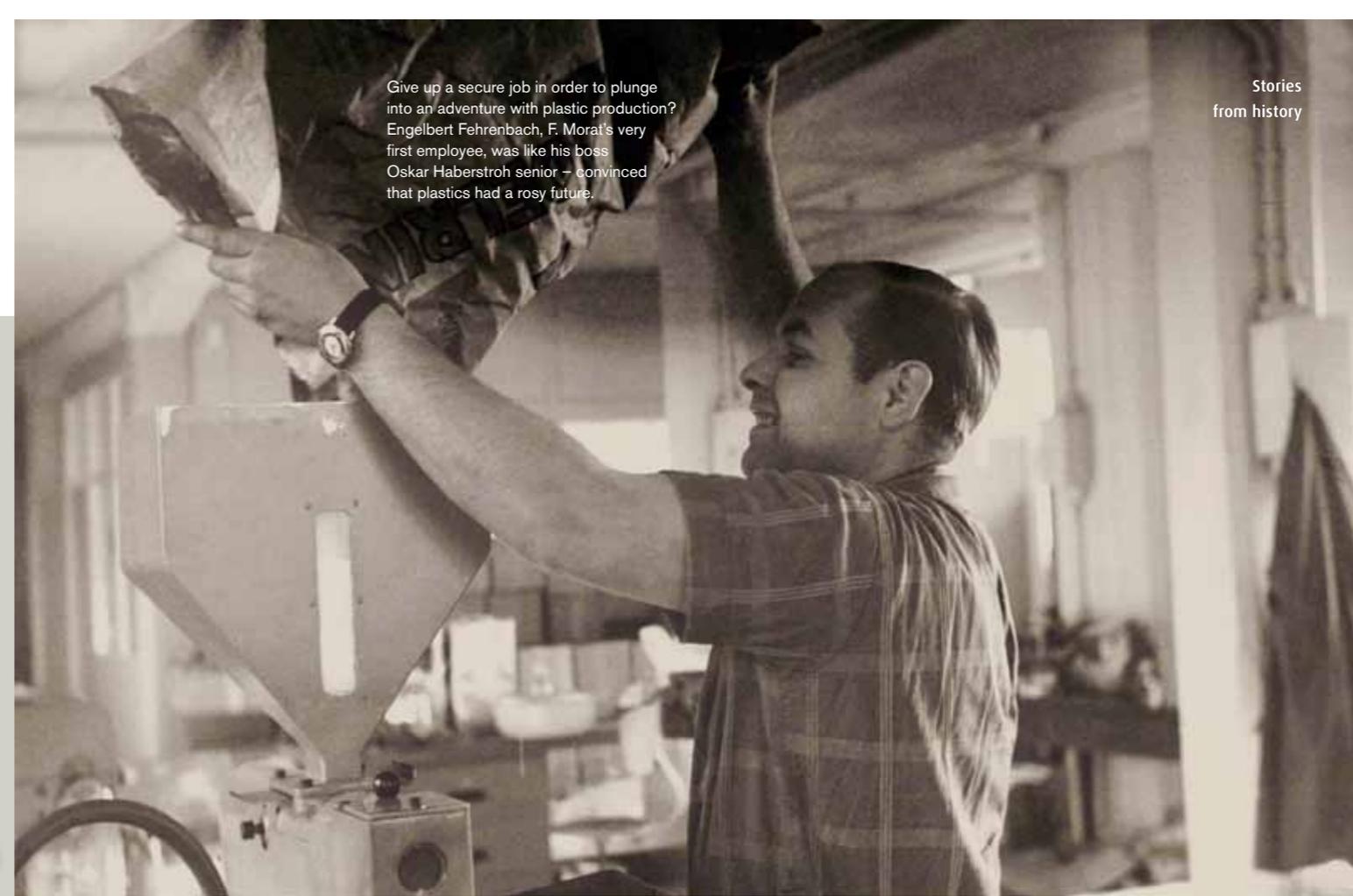
No economic miracle, just hard work

The working hours and overtime meticulously noted in Engelbert Fehrenbach's logbook demonstrate the special commitment and ambition of the early years.



Give up a secure job in order to plunge into an adventure with plastic production? Engelbert Fehrenbach, F. Morat's very first employee, was like his boss Oskar Haberstroh senior – convinced that plastics had a rosy future.

Stories from history



Engelbert Fehrenbach, Production

At the company from 1963 – 1997

“At the beginning there was only Oskar Haberstroh senior and me in the company. When the injection moulding machine had to be run we worked alternately in two shifts around the clock. And later, when there were more people there, Haberstroh senior often helped keep the machine going during my lunch break.”



Erika Schwär, Production

At the company from 1969 – 2000

“Oskar Haberstroh senior also lent a hand. When none of my colleagues had the time, he would come to the production area and help me with the injection moulding machine. Even when he was very old, when he had already passed on the management to his son Oskar Haberstroh junior, he looked in at the works almost every day. We always knew when he was there – from the smell of his beloved cigars.”

Winfried Fischer, Production and Sales

At the company from 1967 – 2003

“We were one of the first companies in the Black Forest to produce plastic parts. During the early years I delivered everything myself, using my private car, a VW Beetle.”



Gerda Pfaff, Production

At the company from 1967 – 2003

“The company used to close down for two weeks in summer for our holidays. On the last day before the holiday we gave the company a thorough cleaning. Production, the stores, offices – everywhere was tidied up and cleaned. Afterwards, as a reward, we all went to the pool at Bubenbach to cool down. We always enjoyed the good company and how we got on so well with one another outside working hours too.”

They keep the wheels rolling

Employees

The people
behind the technology



Analysing plastics, creating CAD drawings, producing moulds, operating machines, purchasing materials, collecting quotations – the employees at F. Morat are involved in the most varied of activities. They have something in common though: they enjoy their work. Enjoyment that can be expressed in figures. 100% of all trainees stay at the company on completion of their training; it is not unusual for personnel to stay at the company for 30 or even 40 years. Others can only dream of the loyalty of our personnel – our staff turnover rate is below one per cent!

Smooth processes

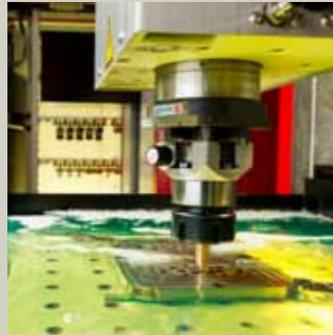
Step-by-step to the finished product

The wheels
that mean the world



Development and design

After an all-round analysis of requirements, the geometry of the part is optimised, for example, or special gear toothings is calculated for the specific application. It is vital, very early on, to set the course for the subsequent trouble-free injection moulding process.



Tool construction

Following the cross-departmental design discussions, the crucial mould components are produced in-house, mostly using die-sinking or wire erosion (electrical discharge machining). A major advantage of the whole in-house process chain, for example, is the rapid reaction times in the sample production stages and in the case of modifications.



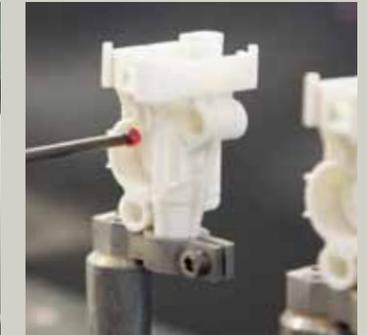
Production of injection moulded parts

Now comes the injection moulding process, for which we have machines with a closing force of 250 to 4,000 kN. The range of production equipment also includes fully automatic handling systems for inserts, or assembly steps directly integrated in the process. The complex requirements of the most varied of sectors are met: from batch tracking as standard, to complete logging of production parameters for safety-relevant components.



Assembly and further processing

F. Morat also takes on the assembly and further processing of the parts, considerably shortening the throughput time and exploiting all our expertise throughout the complete process chain for the benefit of our customers. This ranges from individual assembly activities such as pressing, ultrasonic welding and soldering up to complete drive units that are individually subjected to final inspections and packed ready for sale.



Quality

Each process step is subject to quality assurance. Thus thin-walled injection moulded parts are 100% inspected by camera. Further processes include, for example, gear-wheel contact rolling tests using a master gear as well as optical and 3D-coordinate measuring machines.

An ideal product can only be created when all the processes interact coherently with one another like the dovetailing of two gearwheels. So before a part goes into serial production it goes through a multi-level process at F. Morat. This starts with the first project discussions, during which the product-specific properties are defined in collaboration with the customers. Production and assembly of the component takes place after the mould has been created and set up. Anything is possible, from a small plug contact, through complex housings with internal gears, to complete drive units. We achieve maximum process reliability and quality as a result of the quality assurance inspections that accompany production processes. We will soon be certified with ISO/TS 16949 in order to meet the growing demands for documentation, transparency and efficiency.



GEARVALLEY 

The gearwheel is invented over and over in Eisenbach, because this former centre for the watch and clock industry has been characterised by the precision mechanics industry for centuries. Since then gearwheels, precision turned parts, drives and valves have been developed and produced in the heights of the Black Forest.

50 Years *F. Morat*
Plastics at their best 1963 - 2013

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