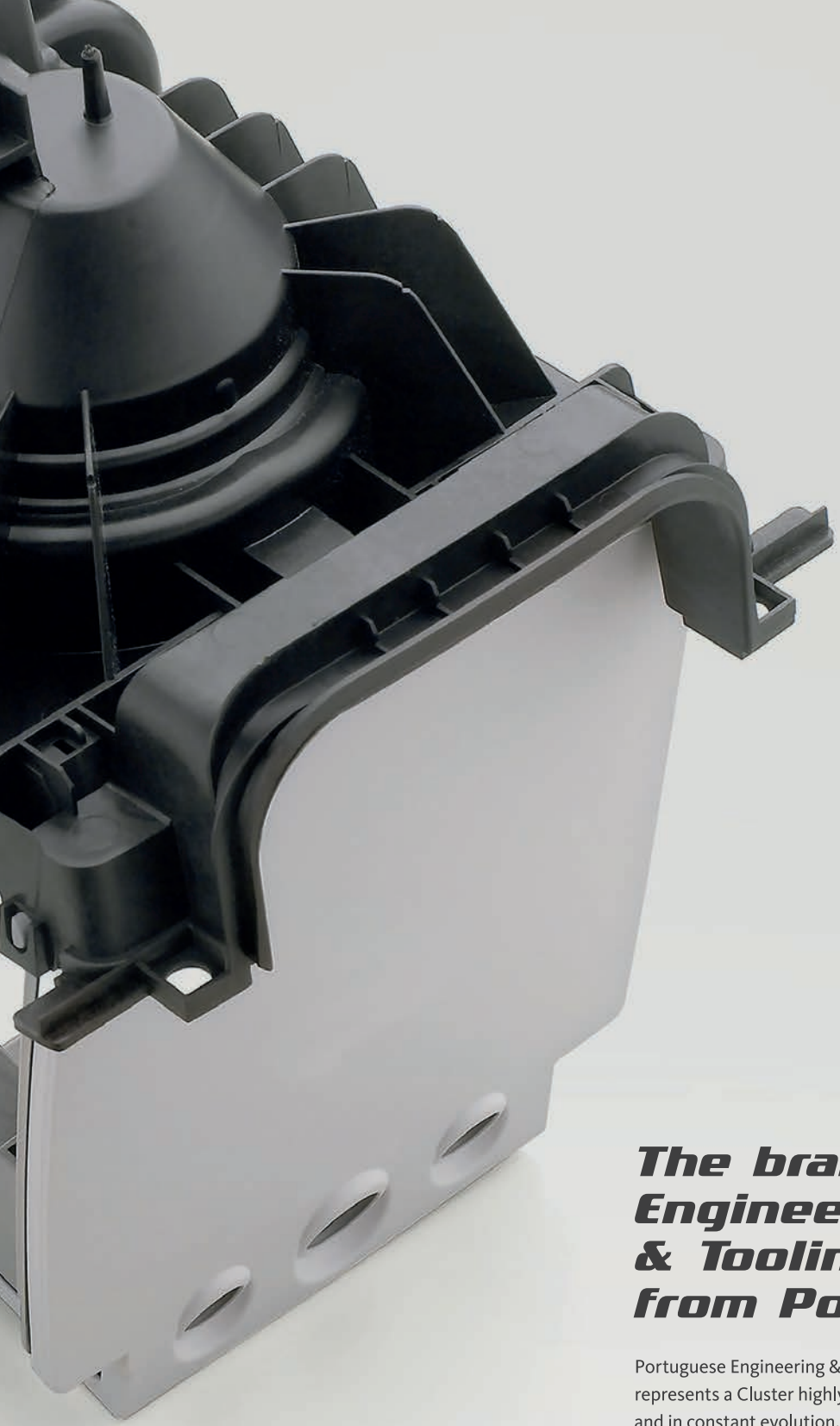

engineering & tooling ®
FROM PORTUGAL



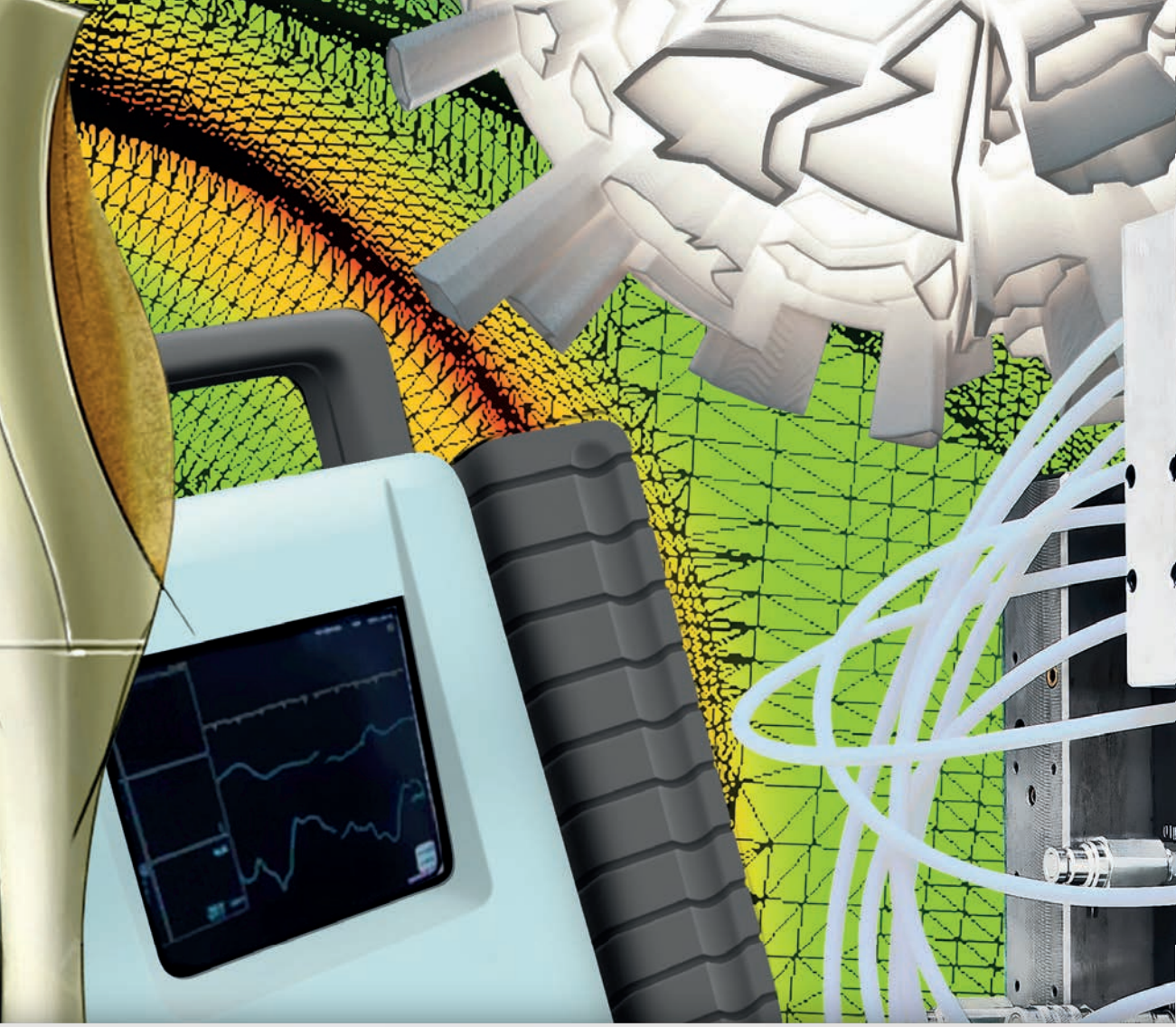
# The brand Engineering & Tooling from Portugal

Portuguese Engineering & Tooling Industry represents a Cluster highly internationalized and in constant evolution, which emerged within the Moulds, Special Tooling and Injection Molding Industry, which is recognized as an Infrastructural and Multidisciplinary Industry considering its positioning within the path of the development of almost all industrial products.

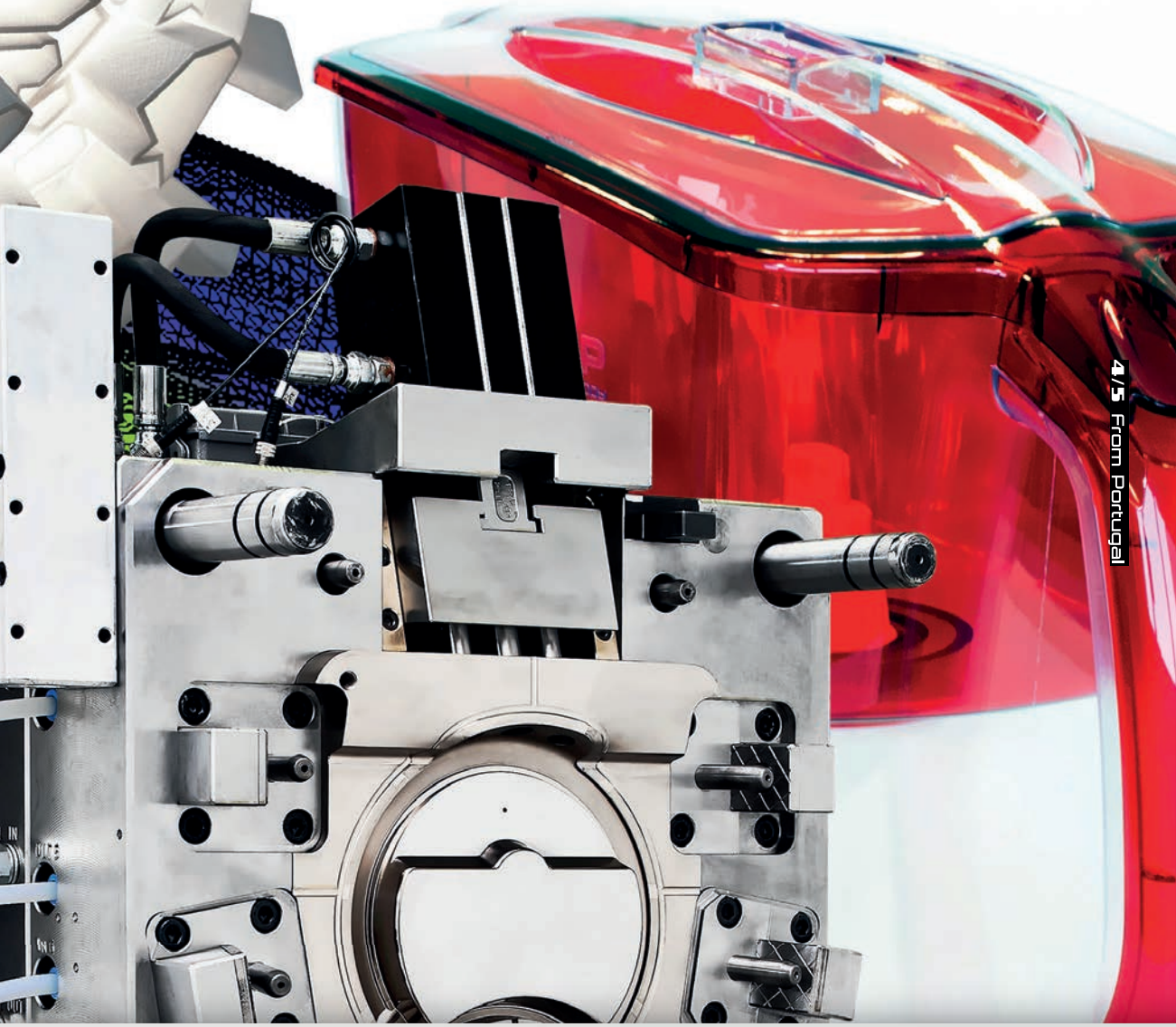
Take a look on the following pages to find out why world product leaders came to Portugal

engineering & tooling ®
FROM PORTUGAL

# Contents




engineering & tooling ®
FROM PORTUGAL



The **Portuguese Engineering & Tooling Cluster** integration capabilities, promotes expertise in design, engineering and prototyping, manufacturing of moulds and special tools, injection and assembling products and components, closing the loop from design to final product.

Portuguese Engineering & Tooling Cluster is represented by POOL-NET – Portuguese Tooling Network (www.toolingportugal.com), includes a wide range of stakeholders, from business, science and technology areas, and was officially recognized as a legal entity by the Portuguese Government in October 2008 as the Engineering & Tooling Cluster.

This is a Business, Science and Technology open Community, which is assumed as a partner of public decision makers in the country's development by encouraging the entry of new partners in POOL-NET, which will strengthen the competitiveness of Portuguese Engineering & Tooling Industry.

The Portuguese Engineering & Tooling Cluster streamlines and monitors the implementation of the Strategic Plan settled for this industry on a medium and long term vision and is targeting for the next 10 years to support six main markets, namely, Automotive, Aeronautics, Medical Devices, Energy & Environment, Electronics and Packaging.

This is one of the most promissory industrial and scientific Clusters, acting at a global level, exporting more than 90% of the national production, mostly for the Automotive Industry supported on innovative technologies and processes, and promoting worldwide the brand "Engineering & Tooling from Portugal" and portuguese engineering competences.

"Engineering & Tooling from Portugal" brand sets its strengths on accumulated know-how, innovation and technology, quality and reliability, networking, competitiveness and social sustainability, all of them core competencies of Portuguese Engineering and Tooling Industry.

# What brings world product leaders to Portugal?

At a first glance most people look at Portugal as a country of sun, beaches and great golf resorts, but that's not the reason why leading companies like General Motors, Embraer or Nokia came to Portugal.

They came repeatedly because they know they can find here high reliable business partners' from design & engineering to tooling and final assembled products, helping them to speed up their time-to-market.

The skills learned by generations of Portuguese mould makers have contributed to a fund of expertise that processors can tap into both upstream and downstream of the mould-making operation itself. But it is what the industry offers in addition to its high-precision tools that makes the difference.

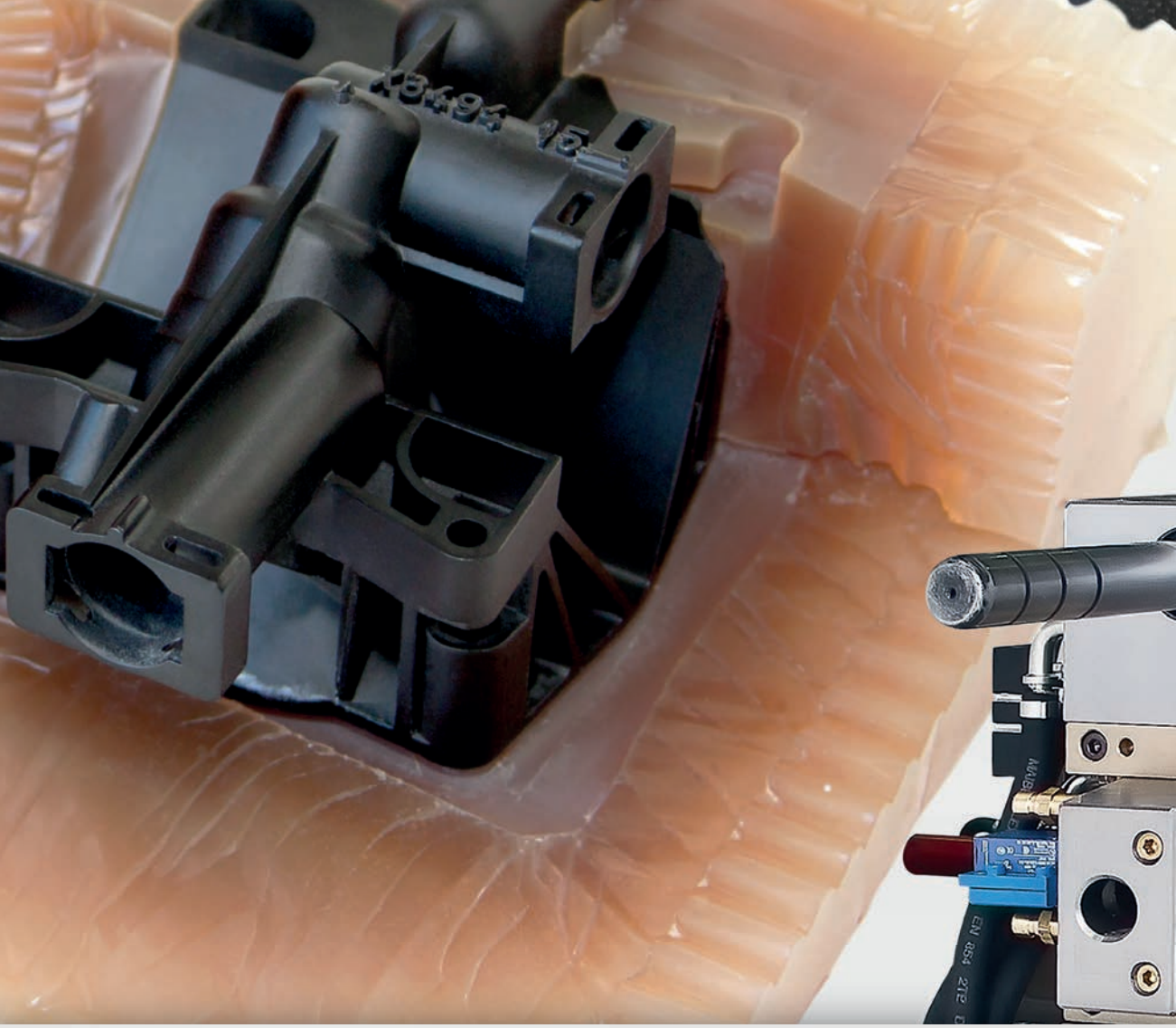
Portuguese companies were among the first to see the market is looking not just for moulds, but for complete, integrated solutions (parts & components and final products).

Portuguese firms see themselves not just as simple suppliers of moulds, but as partners who provide an integrated service, supporting innovation and the creation of new products from conception and design to manufacture.

Over many years, the country's engineering and tooling industry has established a reputation for making quality moulds, a skill attested to by leading multinational companies from Volkswagen  to Hewlett Packard.

The industry helps companies turn ideas into quality products that can be efficiently manufactured.

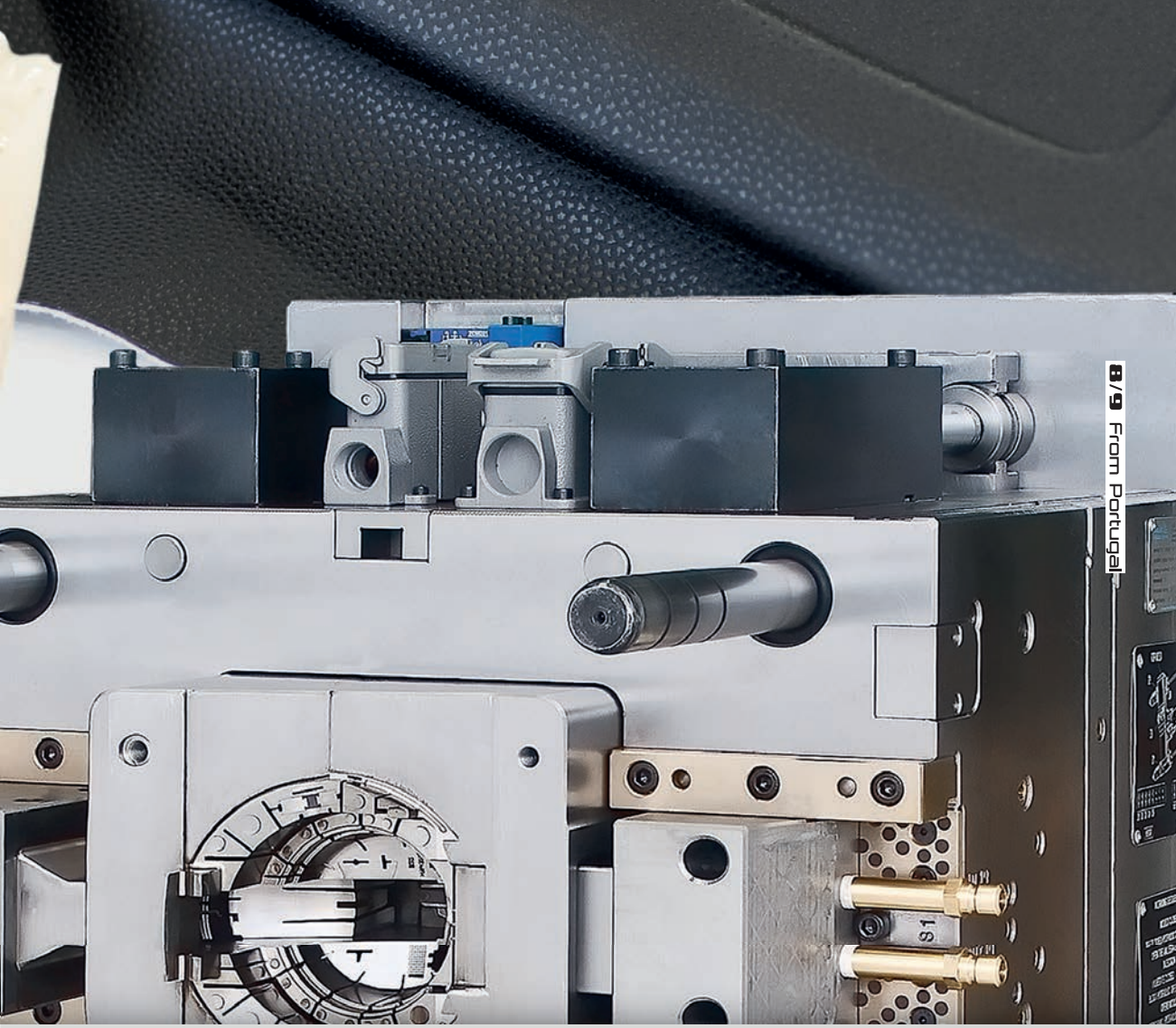
engineering & tooling ®
FROM PORTUGAL



## Integrating processes

"**Our strength lies in integrating processes**," says the managing director of a Portuguese mould-making company. Drawing on decades of accumulated know-how, Portuguese companies today provide a fully integrated service that covers:

engineering & tooling ®
FROM PORTUGAL



## The concept and design of new products

Marshalling the expertise garnered from decades of precision mould-making to ensure quality products can be manufactured to maximum standards in terms of “mould-ability”, cost-effectiveness and quality.

## Product engineering and development

Adapting details in the development stage can produce big advantages for manufacturer, from more efficient moulds and shorter injection cycles to lower material costs and reduced maintenance requirements.

## Prototyping

Using the latest developments from additive manufacturing technologies to high-speed machining means manufacturers can rapidly test and assess real products. This significantly cuts time-to-market.

## Material selection

Plastics engineers working with Portugal’s companies are finely attuned to the benefits that can be obtained by choosing exactly the right material for each product.

## Mould production

The Portuguese industry invests more heavily in technology and training than most of its competitors. Companies are fully equipped to cut the most demanding precision moulds to the highest standards - particularly tools involving multiple cavities, inserts and interchangeable parts. Portuguese firms are also pioneers in using technology that enables, for example the use of in-mould labeling and decoration or products multi-component injection moulding combining different materials, such as hard and rubberized plastic, or components of different colors from a single tool, or the use of “smart tools” incorporating a wide range of electronic sensors, is also a actual added value given to the international customers by the Portuguese Engineering & Tooling Industry.


## Testing and manufacturing services

Portuguese firms offer their customers a complete service. They have invested in the capacity to test and perfect moulds thoroughly before they are assembled for the manufacturer and keep themselves fully conversant with the latest developments in injection technology. They also provide full assembly, maintenance and support services throughout the manufacturing lifetime of the tools they supply.

"We don't take the view that our service is finished when a mould is delivered", says one commercial director.

Portugal's engineering & tooling companies have gained international recognition for their skill in interpreting their customers' requirements, building a reputation as versatile, technologically advanced and offering an excellent price/quality ratio.

Working partnerships to which Portuguese companies bring their engineering & tooling experience offer big advantages to manufacturers.

## Competitive Advantages

Key advantages based on know-how, high levels of investment in technology and training, and an integrated problem-solving approach, give the Portuguese Engineering & Tooling Industry a strong competitive edge over mould-makers in more low-cost countries.

When competition comes down to cost-to-benefit ratios, Portuguese companies hold the upper hand.

The list of manufacturers who have found partners in Portuguese Engineering & Tooling companies reads like a 'Who's Who' of leading corporations.
They include: **Electrolux, Samsonite, General Electric, Delphi, Visteon, Jonhson Controls, Thermos, IBM, Rubbermaid, General Motors, Opel, Volkswagen, Renault, Nokia, BMW, Mercedes, Tupperware, PSA Peugeot Citroen, Nissan, Hewlett Packard, Ascom**, and many others. Companies like these benefit daily from the expertise and integrated services Portuguese tooling firms provide. The advantages that result from such partnerships include:

- Reduced time-to-market.
- Reduced costs.
- Innovative Solutions.
- Products designed for maximum manufacturing efficiency.
- Optimum material selection for reliability, cost and quality.
- Trouble-free, cost-efficient injection over long periods.
- Supportive partnerships from product design to the end of a manufacturing run.

# Networking

The productive relationships Portuguese firms develop with their clients reflect the interaction and cooperation that characterize the country's Engineering & Tooling Industry as a whole. This collaborative spirit is an important competitive advantage.

Portugal's mould-making industry began in the 18th century when Marinha Grande and Oliveira de Azeméis, two towns less than 150 kilometers apart, grew into important glass-making centers. Mould-making for glass evolved into mould-making for plastics in the 1940's.

The long history of mould-making in Portugal has led to the natural development of a "horizontal cluster", involving co-operation and networking between companies, research institutions and training facilities. The flow of workers between firms helps spread qualifications, skills and knowledge acquired from companies or specialized institutions throughout the sector.

Innovation and technology spills over from company to company, building up a research and development network as firms, institutions and universities exchange skills and know-how. The cluster has even extended beyond Portugal's boundaries through the pioneering use of technology. As a result, Portugal's Engineering & Tooling Industry enjoys an outstanding competitive position in today's global tooling industry.

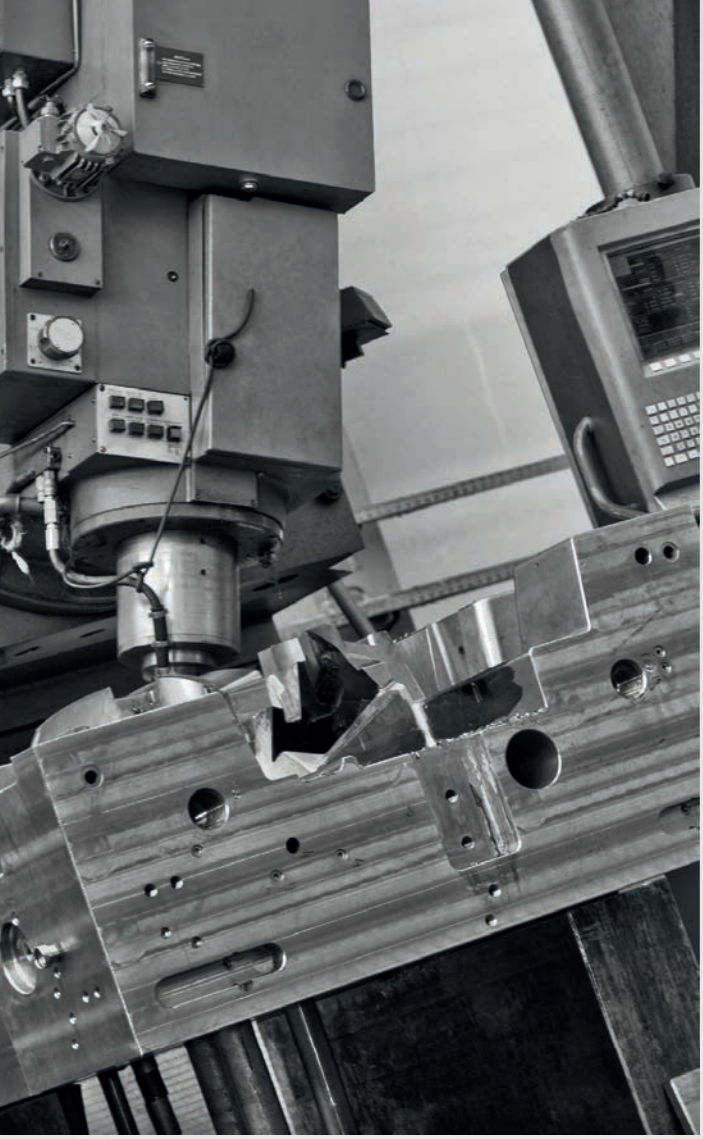
engineering & tooling ®
FROM PORTUGAL

## Productive interaction

Portugal is one of the world's leading suppliers of tools for the plastics industry. Overseas customers account for about 90 percent of total sales. The main markets for Portugal's Engineering & Tooling skills are Germany, the USA, France, Spain, the UK and Scandinavia.

Portugal supplies tools for the leading producers of automotive and household goods, telecommunications and office equipment electrical appliances, cosmetics, pharmaceuticals, and packaging. Since the early 1990's, the automotive industry has increasingly shown a preference for Portuguese engineering and today accounts for about 70 percent of total sales.

Because of their focus on exports, Portuguese firms developed a service approach from an early stage. The Portuguese, travellers and explorers throughout their history, are also proficient in languages, making for easy and productive interaction with their customers.



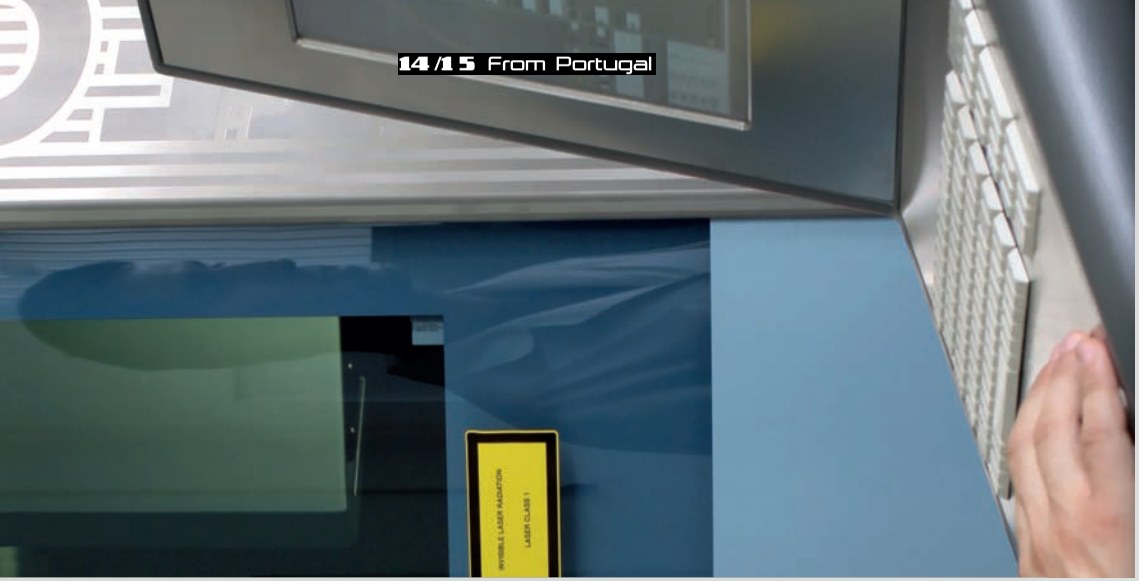
# High investment levels

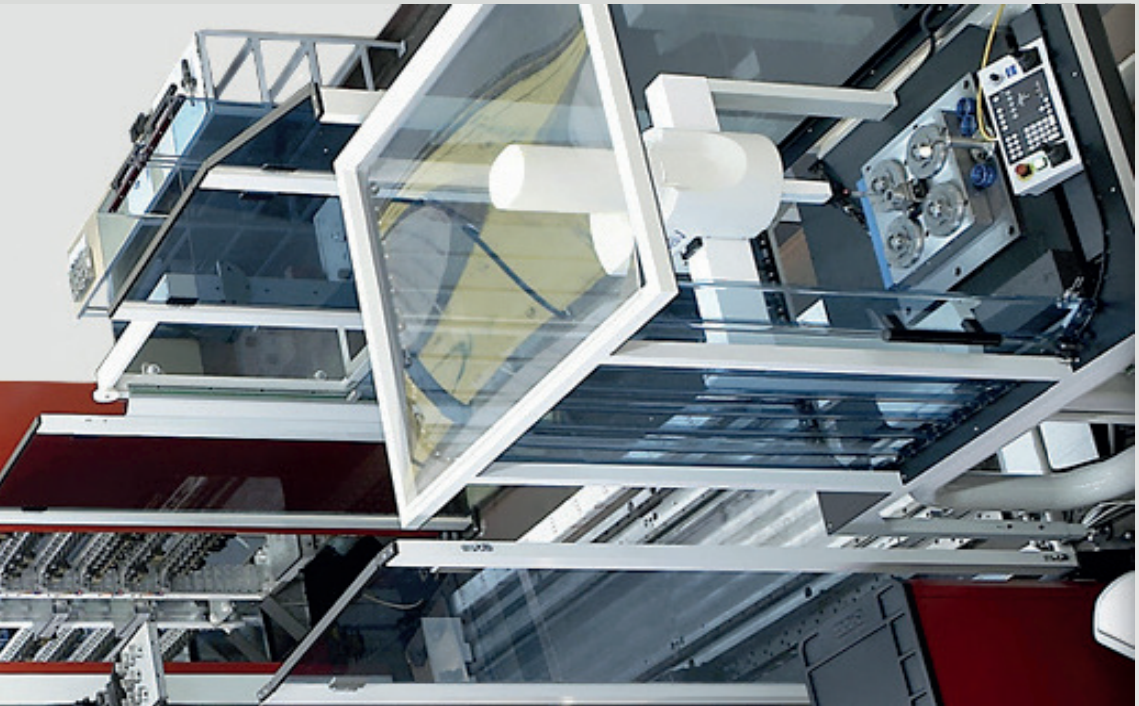
In the 1980's, Portuguese firms transformed themselves from labor-intensive to capital-intensive, focusing their efforts on high investments in the latest technology and machinery (towards the digitizing of the Industry - INDUSTRY 4.0).

They have kept up this momentum ever since, consistently reinvesting an high rate of sales revenue in technology over the past three decades, a bigger percentage than the Engineering & Tooling Industry in any other country.
The technological revolution began with pioneering investments in computer-aided design/computer-aided engineering/computer-aided manufacturing (CAD/CAE/CAM) systems. High investment levels keep Portuguese firms at the cutting edge of technological developments, providing them with the capacity to design, engineer and produce the most complex and demanding moulds. Nowadays *state-of-the-art* technologies, like high speed machining in 5 axis and also in 9 axis, are widely spread in conjunction with most updated CAD/CAE/CAM systems.

Portuguese mould-making industry was also the first tooling industry worldwide setting up the automation cell concept on the shop floor. The industry also has a large capacity in size and volume, regularly producing molds weighing more than 80 tonnes and handling single orders for dozens of tools.

engineering & tooling ®
FROM PORTUGAL


INVISIBLE LASER RADIATION
LASER CLASS 1



# Focus on training

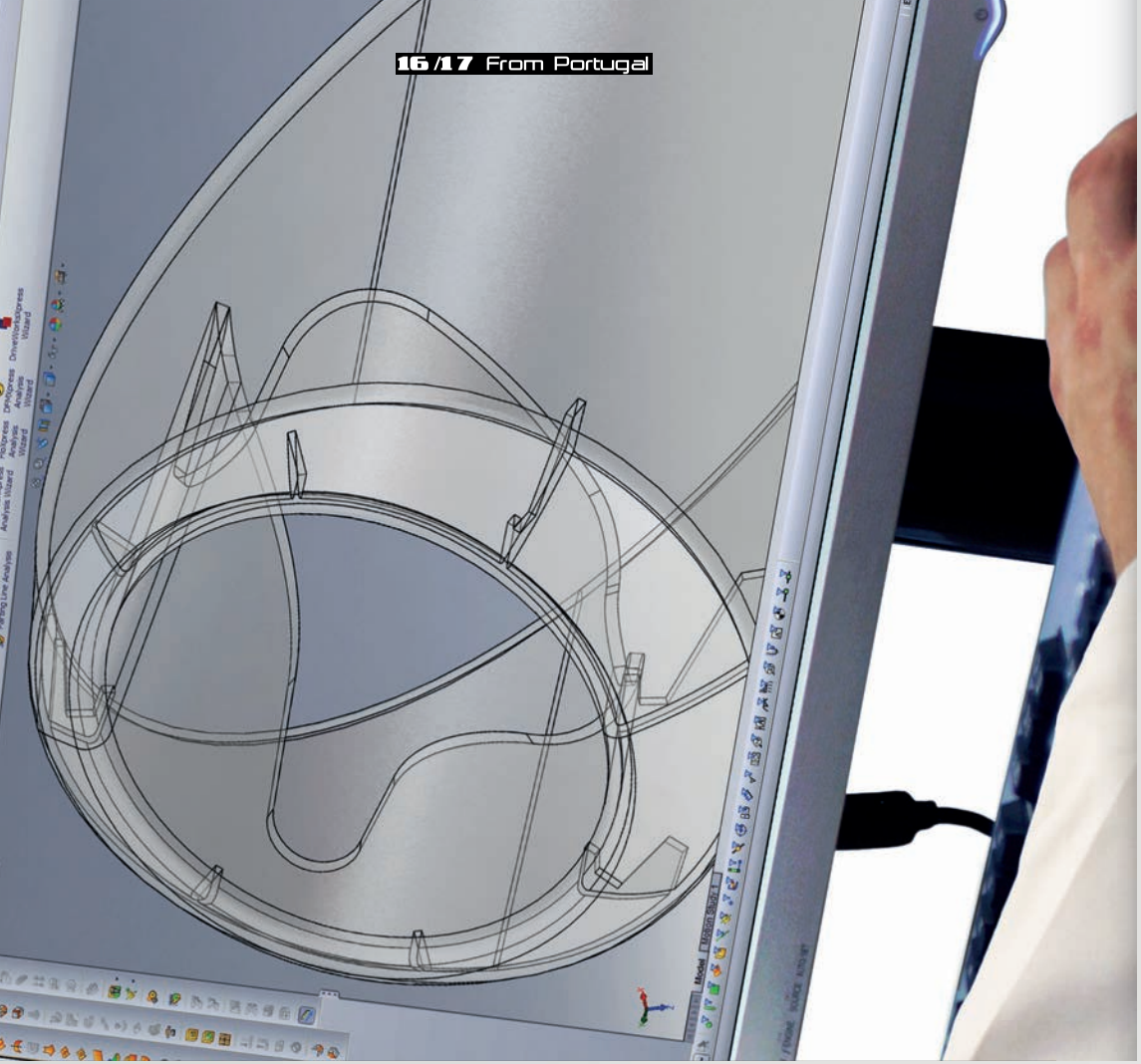
Portugal's Engineering & Tooling Cluster is unmatched in the priority it gives to training and education. Each year hundreds of teenage school children are given hands-on experience of the industry in a fun and entertaining environment. The program, known as *Pense Indústria* (Think Industry), helps attract a constant flow of bright young people to the cluster, rejuvenating the industry's human resources and ensuring that its accumulated know-how is passed on to coming generations.

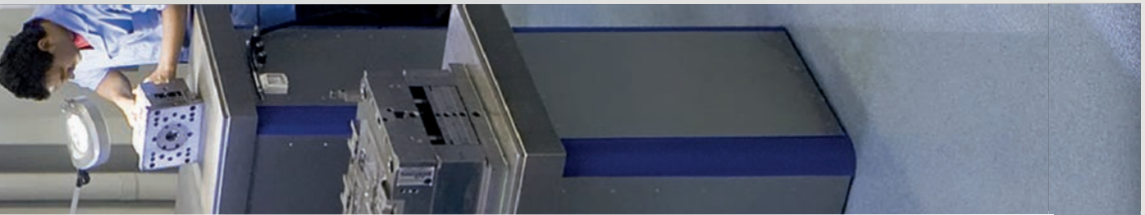
The industry maintains especially close ties with universities and research centers at national and international levels. As an example, Master Degrees on Product Development and Polymers Engineering has been organized near the industry. That was a European pilot experience with great success and Industry participation in a close cooperation with University of Minho in Portugal. Overall, more than 20 R&D institutes and universities participate in research projects aimed at engineering & tooling and related technologies.

Centimfe, the country's technological centre for the mould-making, special tooling and plastic industries, acts as an interface between companies and the scientific and technological community. It also provides a wide range of services, including R&D, training, technological development, quality and dimension control as well as calibration laboratory, rapid prototyping, innovation watch and information technology facilities and coordinate the European Tooling Platform.

Another important aspect of Portugal's Engineering & Tooling Industry is the unparalleled support companies receive from industry bodies and other entities.

engineering & tooling ®
FROM PORTUGAL





# WE ARE YOUR GLOBAL PARTNERS.

# Fostering collaboration

The Portuguese Engineering & Tooling Cluster is represented by Pool-Net Association since 2008. POOL-NET – Portuguese Tooling & Plastics Network (www.toolingportugal.com), include as principal stakeholders private companies, universities, training and research and technological centers. It's a private association, that represents an industrial value chain with specialized skills & competences, from design & engineering to tooling and plastic products.

POOL-NET fosters firms to change through the development and promotion of international brand "**Engineering & Tooling from Portugal**", stimulating the diversification of market sectors, promoting co-operation between the scientific and industrial communities resulting on investments in innovation.

Portuguese Engineering & Tooling Cluster has also an ongoing series of complementary projects, aiming to promote the brand "**Engineering & Tooling from Portugal**", prospection and market research, innovation and organizational reengineering (LEAN organization), production cells and sustainability, optimization of surfaces and tools, micro-technology processes, rapid prototyping for large parts, engineering solutions for large plastic parts in small series.

The brand "**Engineering & Tooling from Portugal**", embodies Know-How, Technology and Innovation, Quality and Reliability, Networking, Competitiveness, Social Responsibility, main attributes that characterize the Portuguese Engineering & Tooling Industry.

Cefamol, the Portuguese Mould Industry Association, is a non-profit making organization that works to develop the country's mould industry and its sub-sectors. Since its foundation, Cefamol has contributed significantly to the industry's progress, particularly in facilitating communication between member companies and fostering the collaborative spirit of the sector in Portugal.

Cefamol represents the industry in negotiations with the government and other official organizations. Its sphere of operation includes promotion of the industry internationalization and the corporative representation of the industry. Cefamol promotes also mould industry meetings and the Mould Industry Congress. As an example of cooperation, Cefamol together with Centimfe, developed a new Business Innovation Centre known as OPEN.

## “We don´t just sell moulds, we sell concepts.”

This is how the managing partner of one of Portugal’s leading engineering & tooling groups describes the growth of the industry from simple mould building to the provision of an integrated package of related competences, from design, engineering and prototyping, manufacturing of moulds and tools, injection and assembling products and components, closing the loop from design to final product.

Industrial design is an important component of this combination of skills. “**To save their customers time and money, Portuguese companies offer an integrated package from design all the way through to assembly and trail injection runs**,” says the director of a Marinha Grande-based firm.

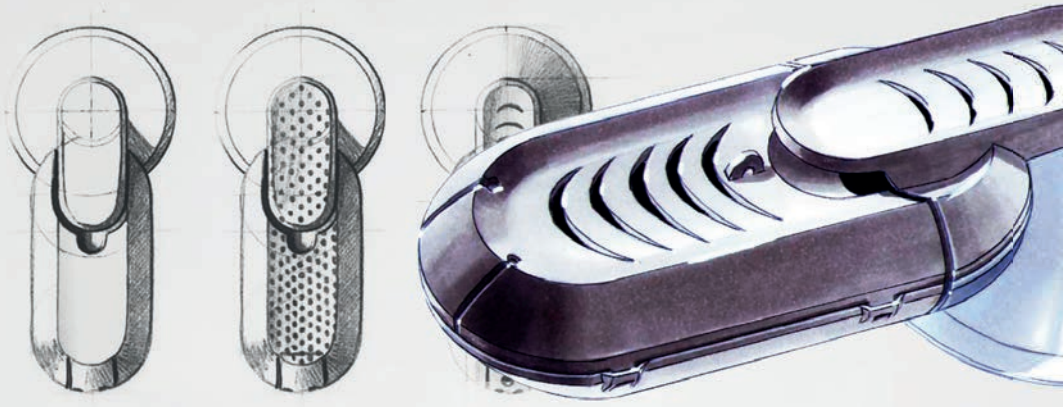
The key design advantage offered by the Cluster is its accumulated expertise in tool building. Applying this know-how to the conception and design of products manufactured by the plastics processing industry provides a guarantee that:

- The product has been designed so that it can be successfully and efficiently injected.
- Unnecessarily complex or expensive tool cutting requirements have been eliminated.
- Manufacturing will run smoothly.
- The product has been designed to meet maximum quality standards at minimum cost.

# Design
# Imagining the Idea
Innovating together



## Working together to achieve maximum efficiency at minimum cost.



"Designing a part and designing a mould are two very different things," says a Portuguese engineer. "By inputting our mould-making skills into the equation, we ensure that products are designed to guarantee maximum efficiency and minimum cost through all the subsequent stages, from mould engineering to injection."

### Big savings

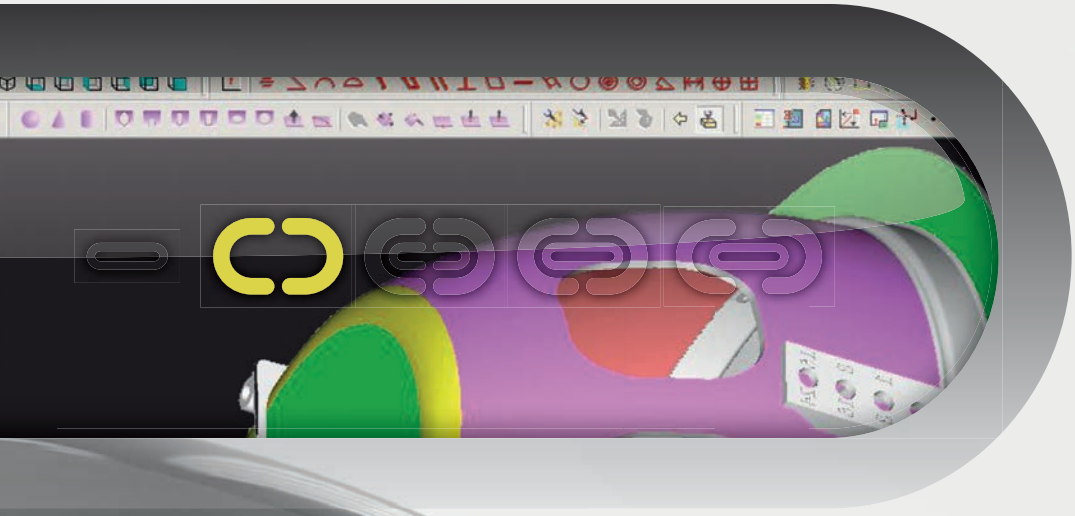
The Portuguese Engineering & Tooling Industry has built up highly-qualified in-house design teams to work in partnership with manufacturers. In addition to creating outstanding product designs, they work to avert mould-making and injection problems before they arise. "Our aim is to innovate together;" says a Portuguese designer. "Small adaptations to a concept often result in big savings."

Recent design successes by Portugal's Engineering & Tooling Industry include for example:

- Aeronautic components for Embraer aircrafts.
- Aluminium wheels for the BMW Mini Cooper.
- Auto parts, including bumpers, air vents, interior and exterior door handle assemblies, radio bezels, ignition housings, interior trim assemblies for a variety of leading carmakers.
- Cell phone housings, lens, keypads, loud speakers, phone cases for major brands.
- Wireless equipments for Ascom.
- Stylish coffee makers and kettles for Philips.
- State-of-the-art dialing equipment for Habimat.

In-house design teams use cutting-edge CAD/CAM/CAE systems to project, develop and size product components. "Our objective is to optimize mass production at the highest quality for the lowest cost," says one company owner. The advanced design competences and skills of the Portuguese industry include:

- Graphic computation /CAx.
- Concept research and definition.
- Styling and product design.
- 3D modeling using *state-of-the-art* computer-aided systems .
- Visualization and realistic imaging.
- Renderings and product graphics.
- Solid and surface modeling.
- Advanced three-dimensional computer-aided project development.
- Rapid Prototyping and Rapid Tooling technologies.
- Technology watch and intelligence.
- Innovation and prospect.
- Information technologies.
- Reverse engineering from physical models to 3D CAD for fast, accurate digitalization's of geometric models or complex surfaces.



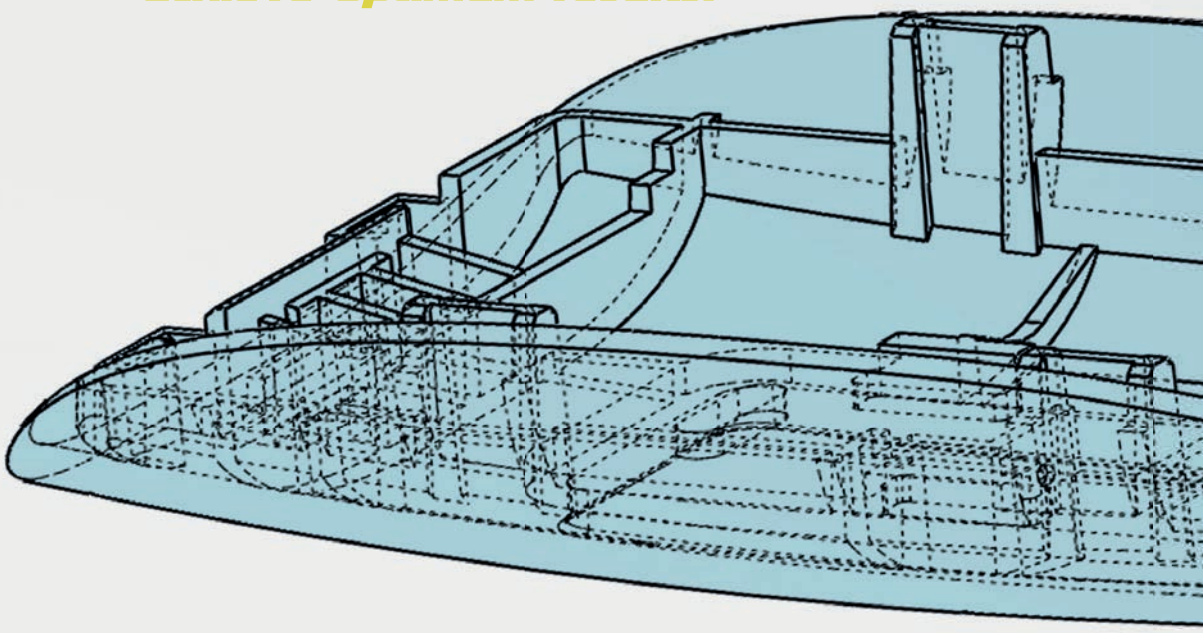
## Developing ideas

Product development and engineering is a crucial stage on the way to creating successful products.

It is in this phase of what Portugal's Engineering & Tooling industry sees as its "mould-making value added chain" that the industry's problem solving skills come to the fore.

# Engineering
# Developing the Idea
Finding solutions

## Applying problem-solving skills to achieve optimum results.



### Collaborative technology

The engineering & tooling industry also significantly speeds product development, cuts mould delivery times and averts reworks through the use of advanced collaborative engineering software.

This integrates the whole product development process - from initial design to the final approval of manufactured parts - in a single database.

Mould makers, product designers, marketing executives and other workers involved in developing and engineering the product all consult and contribute to the same database.

Any changes in part design made by any of the contributors are immediately used to update all the other related data, such as design or machining paths.

Prototypes are made rapidly from the designs engineered in the database so actual parts can be fully tested and adapted before the tools are built. While these machined parts under go testing, work on the production mould begins. Any changes determined by production development engineers during the testing phase are immediately incorporated into the tool design.

"The simultaneous engineering techniques used in Portugal save a great deal of time and money that would otherwise be spent in making alterations after production tools have been built," says one engineer.

Some Portuguese companies have invested in developing their own software to provide for the full integration of the various production and design steps in a common database. The system can cut the time between concept and manufacture in half.

Customers that have already benefited from the collaborative information technology used in Portugal include aircraft manufacturing Embraer, medical devices producer Johnson&Johnson, micro-components for the leading name in luxury watches Rolex, France's phone and electronics giant Alcatel, power-tool supplier Skill, and carmakers Mercedes, Porsche and Volkswagen.

"I´m always amazed by what people see when they have a working model in their hands."

## Hands-on technology

This comment by the chairman of one of Portugal's leading engineering & tooling groups indicates the extent to which rapid prototyping and rapid tooling can eliminate problems and defects before the mould-building stage, significantly cutting costs and time-to market.

The Portuguese industry is among the most advanced in the world in the use of rapid prototyping and rapid tooling technology, a priority area for the sector in terms of investment, research and training.

This is reflected in the country's National Rapid Prototyping Network, which uses information technology to link companies, research institutes, universities and technological centers across Portugal.

The network, aimed at creating the world's leading rapid prototyping and rapid tooling resource, makes the wide range of additive manufacturing technologies and equipment available in Portugal accessible to engineers in any of the participating companies.

This pooling of advanced technological resources and sharing of know-how is an outstanding example of the collaborative spirit that characterizes the Portuguese Engineering & Tooling Industry.

engineering & tooling ®
FROM PORTUGAL

# Prototyping
# Experiencing the Idea
Building reliability

## Ensuring everything works as planned to reducing time-to-market.

It is also a key element in the mould-making value chain through which Portuguese firms support the plastics processing industry from product design to manufacturing.

Additive Manufacturing involves using one of several different technologies to create physical models directly from a CAD database. Depending on the purpose, prototypes can be fully functional, non-working or both functionally and aesthetically complete.

The prototypes are used to test a product's technical feasibility, functional aspects, physical qualities and consumer appeal.

### Reducing time-to-market

Because additive manufacturing technologies enables physical models to be produced within hours or days, rather than weeks, time-to-market is accelerated and costly retooling after the mould-building stage avoided.

Metal Metal additive manufacturing is used to produce moulds from which short runs of the final product can be injection moulded. This enables the rapid testing of mould design, mould flow and the injection process so that corrections can be made before the production mould is built.

Different additive manufacturing technologies are combined to produce the best results for each project. One Portuguese firm applied three different prototyping methods to a single Samsonite suitcase, using different systems for the hard shells, handles, and hardware components and mould inserts.

Additive manufacturing technologies are often used in conjunction with collaborative engineering software, optimizing and speeding up the product creation cycle from concept to injection moulding.

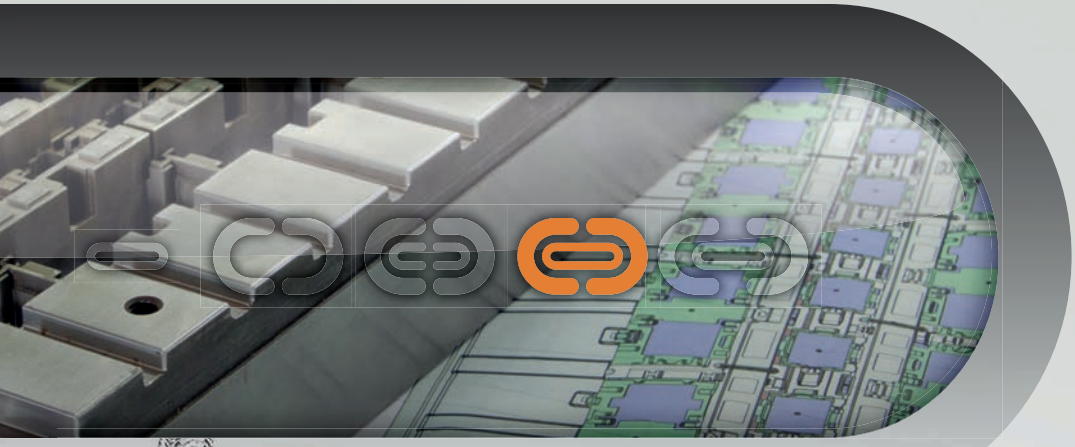
The quality of these fully functional parts, machined from a solid block of resin, was sufficient to allow the vacuum cleaner to be completely assembled, with all the electrical connections inserted, and to be tested in operation.

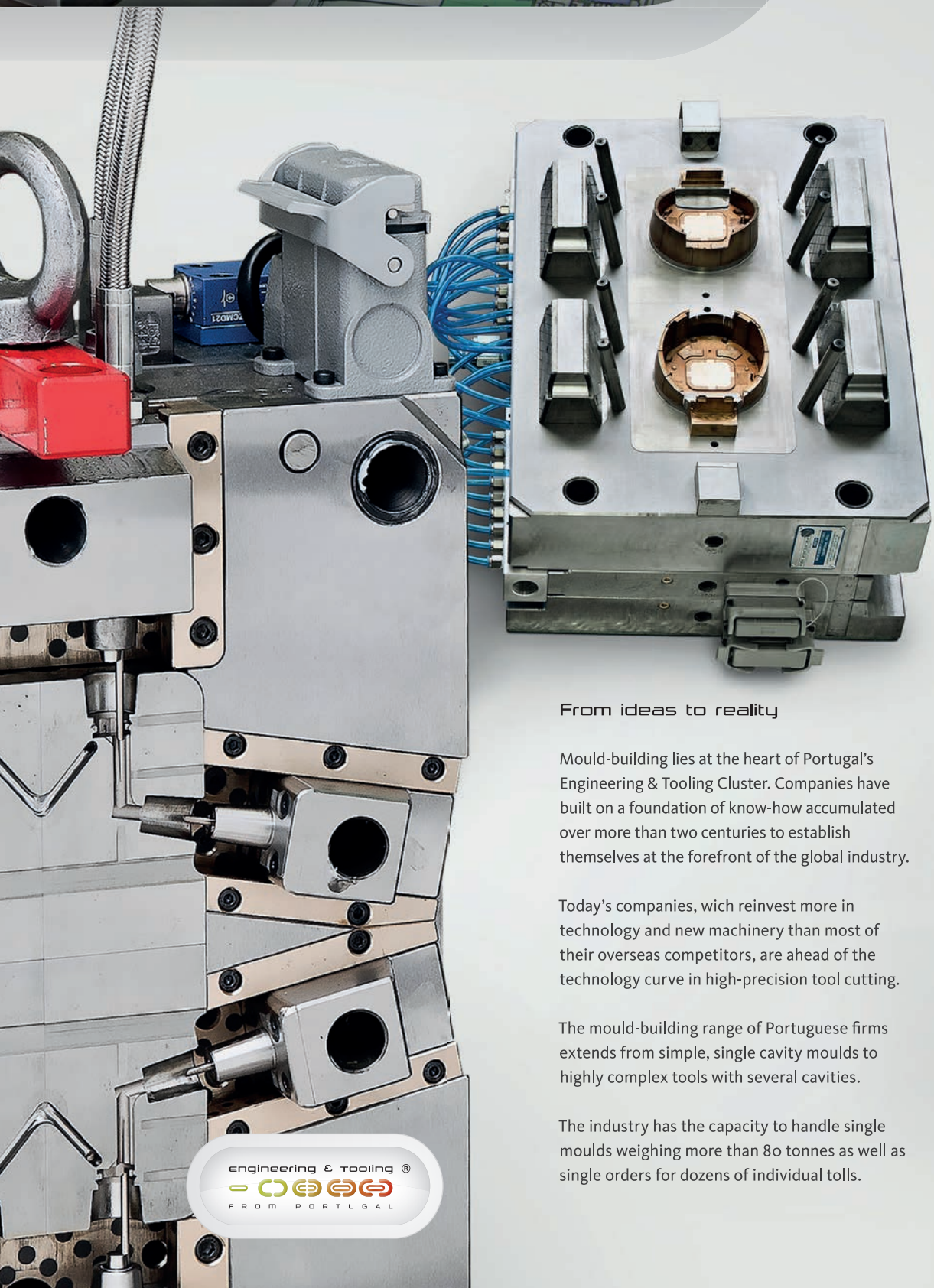
### Eliminating defects

Prototypes such as these also enable the customer's product development, marketing, financial, and manufacturing specialists to examine a working model at a crucial point in the cycle and often lead to major redesigns before a costly tool has been completed. "Many potential defects can be eliminated by generating realistic computer models, but nothing is better than a part that exactly replicates the dimensions of the final component," says a Portuguese engineer.

Using a physical model of a telephone produced by additive manufacturing technologies in Portugal, engineers from France's Alcatel were able to test the placement of the wires and put the phone in operation.

In another example, Electrolux engineers placed the prototype of a fan frame for a large industrial vacuum cleaner in a wind tunnel to check the rib alignment. "There is practically no limit to the complexity of engineered prototypes that can be generated by Portuguese firms" says a company chairman.





## From ideas to reality

Mould-building lies at the heart of Portugal's Engineering & Tooling Cluster. Companies have built on a foundation of know-how accumulated over more than two centuries to establish themselves at the forefront of the global industry.

Today's companies, wich reinvest more in technology and new machinery than most of their overseas competitors, are ahead of the technology curve in high-precision tool cutting.

The mould-building range of Portuguese firms extends from simple, single cavity moulds to highly complex tools with several cavities.

The industry has the capacity to handle single moulds weighing more than 80 tonnes as well as single orders for dozens of individual tolls.

engineering & tooling ®
FROM PORTUGAL

# Mould production
# Perceive the Idea
Effectiveness and singularity

## Using accumulated know-how to engineer the right tool for the job.

### Leading the world

In the area of highly complex, multiple cavity moulds for precision components and advanced tools that take injection moulding to new levels, the Portuguese Engineering & Tooling Industry leads the world.

"Mould-makers have to manage random factors. Every mould is different" says a Marinha Grande-based company director.
"The Portuguese excel in this industry because they have a special gift for improvising in an organized way."

Portuguese firms also marshal cutting-edge technology and specialized training. Moulds are built using computerized numerical control (CNC) milling machines, high speed milling centers, wire electrical discharge machining (EDM) and grinding centers.

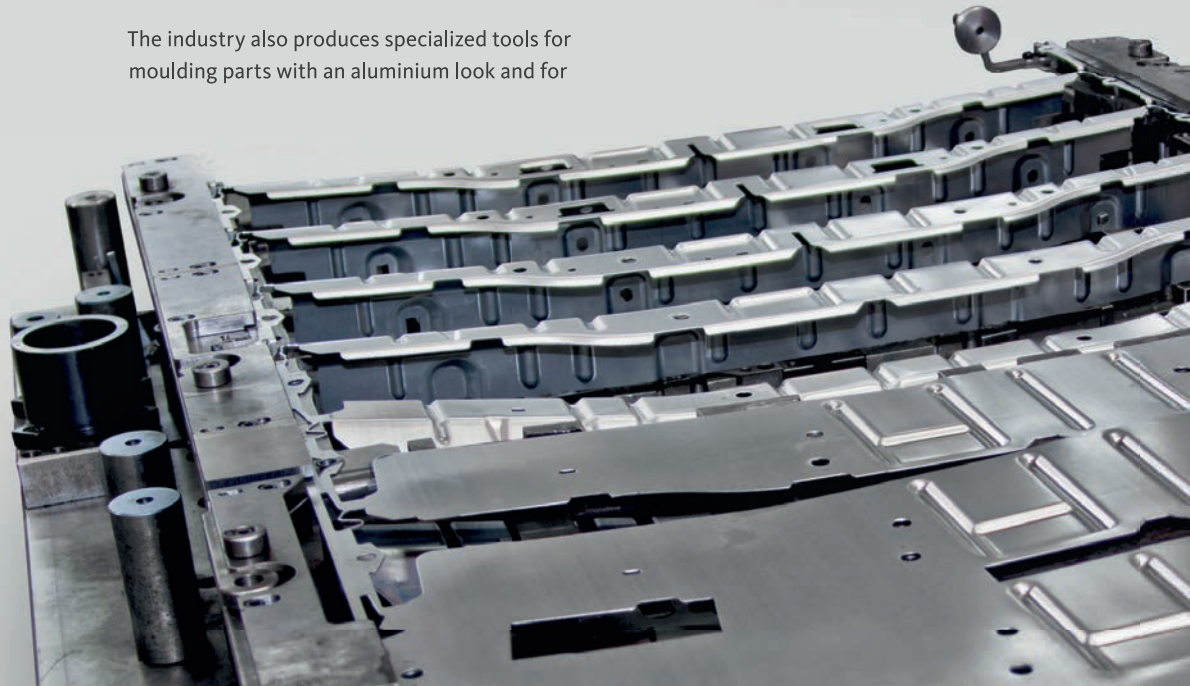
Geometrical and dimensional conformity is assured using a wide range of measurement state-of-the-art equipment including 3D CMM measuring machines and video measuring machines.

The industry also produces specialized tools for moulding parts with an aluminium look and for making auto parts that can be directly moulded onto upholstery coverings.

Other advanced mould technologies in which Portuguese firms specialize include:

- In-Mould Labelling (IML).
- In-Mould Decoration (IMD).
- Gas-Assisted Moulding.
- Multi-Material Moulding.
- Co-Injection Moulding.
- Overmoulding (tissues, metal inserts).
- Micro-Moulding.
- In-Mould Assembly Applications.
- Liquid Silicone Rubber/Liquid Injection Molding.
- Water Injection Technology.

Portuguese mould-makers place a strong emphasis on quality control practices, investing energy and resources in ISO certification. Support bodies such as Cefamol and Centimfe play an important role in this area, providing technical support and training as well as added value services such as calibration and dimensional control laboratories.



## “We live with the moulds we produce.”

### A permanent relationship

The Portuguese industry’s commitment to its customers is encapsulated in this comment by a Portuguese mould-maker.

Testing, maintenance and other post-installation services are a key element in the integrated package of solutions that Portugal’s Engineering & Tooling industry offers the plastics processing industry.

The shipping of a completed tool is seen not as the end of a mould-maker’s commitment to a manufacturer, but as the beginning of a new and equally important phase of their relationship.

Portuguese tool builders pride themselves on delivering on time and to a guaranteed standard of excellence. The precision moulds they produce are ready to produce complex components within targeted cycle times straight out of the crate.

Most leading Portuguese firms run their own injection machines so that moulds can be fully tested and modified when necessary before shipping. Taking advantage of the strong communication, technical and integration skills,

# Production services
# Delivering the Idea
## Trust and commitment

## Providing permanent support as part of a committed partnership.

Portuguese Engineering & Tooling Industry follows their worldwide customer´s needs, setting up in the last two decades state-of-the art injection moulding and assembling facilities, closing this way the loop from design to final product, helping their international customers to speed up their time-to-market.

### The customer's point of view

"The experience of moulding parts in a production situation helps us see potential problems from the customer's point of view. It helps us anticipate difficulties before they arise," says the director of a Portuguese engineering group.

Injecting test runs provides mould-makers with immediate feedback on the quality of their tools, significantly enhancing the reliability of the moulds they supply to their customers.

Test injecting from their own moulds is also spurring Portugal's special tooling companies to make important innovations.

There is a set of companies that support the production of parts and final assembled products at a global scale, integrated in the Portuguese Engineering & Tooling Cluster.

Using infrared photography to test mould temperatures has also resulted in important advantages for manufacturers.

From their origins in mould-building, Portuguese companies have built multi-tiered companies, ranging from design to mould testing, to satisfy the customer´s demand for integrated solutions.

As part of this service, Portuguese companies have built on their strong communication skills, providing customers with Internet-based password protected accounts where they can monitor the progress of their projects.

One engineer usually holds overall responsibility for project management, providing a single point of contact for the customer.

Collaborative engineering technology, as well as digital photos and videos, also helps provide an interactive interface for the working partnership between customer and supplier.

### A warm welcome

There is no better way to grasp the capabilities of Portugal's Engineering & Tooling industry than a personal visit.

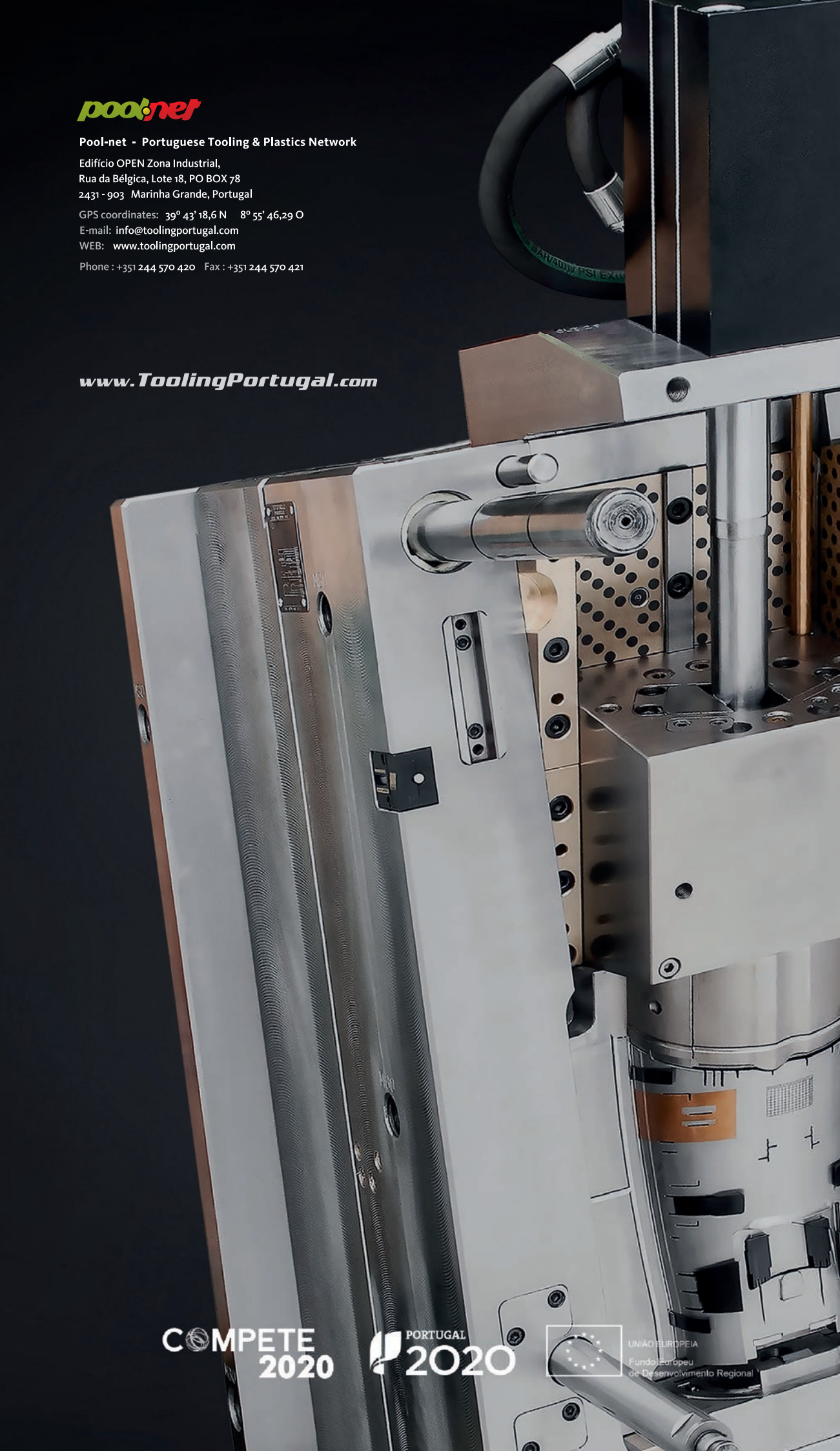
Companies and technical organizations such as Pool-Net, Cefamol and Centimfe - the Portuguese Technological Center for the Mouldmaking, Special Tooling and Plastic Industry - extend a warm and permanent welcome to all those interested in getting to know the cluster better.

## We are your partners

Portuguese Engineering & Tooling Cluster integrates a full set of solution providers streamlining innovation, helping customers to find solutions, building reliability, precision & efficiency, highlighting trust & commitment as core values.

engineering & tooling ®
FROM PORTUGAL


0776
20



**Pool-net - Portuguese Tooling & Plastics Network**

Edifício OPEN Zona Industrial,
Rua da Bélgica, Lote 18, PO BOX 78
2431 - 903 Marinha Grande, Portugal

GPS coordinates: 39° 43' 18,6 N 8° 55' 46,29 O
E-mail: info@toolingportugal.com
WEB: www.toolingportugal.com

Phone : +351 244 570 420 Fax : +351 244 570 421

**www.ToolingPortugal.com**

COMPETE 2020 PORTUGAL 2020 UNIÃO EUROPEIA Fundo Europeu de Desenvolvimento Regional