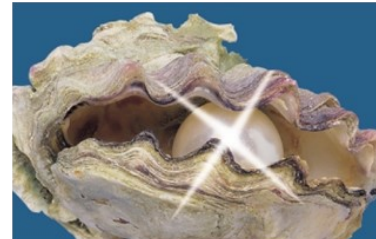
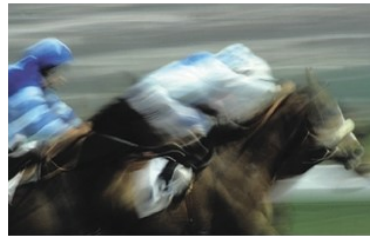
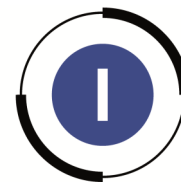


## IMPETUS - Systematic product development



**360° around your mission**

ENGINEERING  
SIMULATION  
CONSULTING



**impetus**

# Company

## We realize components from the idea to the final product

**IMPETUS** Plastics Engineering is a highly specialized engineering company providing product development services in the plastics sector. We develop products in an integrated manner across all industries. In addition to the wide experience from numerous projects, a high degree of creativity for innovative ideas is key to our success. If desired by our customer, we can lead the products directly into our production.

When developing technically and economically successful products the key thing is not only the necessary plastics and design engineering expertise, but also a corresponding degree of creativity. Our employees have both - many years of experience from numerous projects in the most diverse industry segments on the one hand and innovative ideas on the other hand.

We also deal with unusual and complex issues according to your time targets. Of course we provide you with a reliable costs/benefits breakdown to support you in the decision for or against the defined project. Our clients honour that general transparency in our work and reward us with trustful business relationships over many years.



**1999**  
**Foundation**

**25**  
**Employees**

**2**  
**Sites**

We look forward to develop  
innovative plastic solutions for you

# Product development with experienced specialists



## We develop cost-optimized products

The manufacturing costs for a product are largely determined within the planning, design and development stage.

We know the limits of the materials, draw up designs based on functional requirements and take the potential of the major manufacturing processes and modern moulds into account. We offer a comprehensive development package that reduces your development costs by offering the most efficient solutions to your needs. We design your product with processing in mind. Careful analysis and intensive work in the early stages of development save time, money and effort when scaling up to mass production. You can launch your product on the market earlier and thus reap the rewards sooner. At the same time you transform your fixed costs into variable and transparent project costs.

**We only adopt approaches that benefit you**

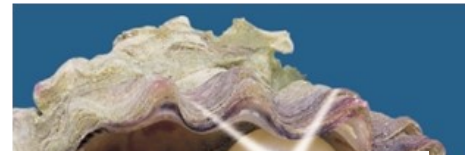


## You gain robust solutions quickly and safe

We cut development time by carefully tailoring our work to suit your specific requirements. Our projects are ideally integrated into your development schedule – no matter how complex the task.

Our controlling department monitors all project deadlines and delivery dates and keeps you up to date with progress. We offer all the services required for the entire product development process chain from one single source, so no time is lost due to interface problems.

We offer creative ideas, implement them with care and expertise and use the latest technologies. The result is optimum products which reinforce your good reputation.



## We act efficiently and target-minded

Quality is a synthesis of experience, technical expertise and good communication. Quality is a process of constant further development.

We are plastics specialists with expertise in various branches of industry. Our development experts also look beyond pure plastics solutions, sometimes combining plastics with metal components to obtain the ideal product. We use the latest "tools" – up-to-the-minute CAD technologies and innovative simulation software – within all stages of the development process.



## You are free to focus on your day-to-day business

Your time can be scheduled only once. Our clients benefit from a transparent project management as well as from purchasing all development services from only one single supplier. So you are in the position to focus on your core competence and your strategy.

Especially in case of exceptional tasks and challenges the needed costs and times will exceed the regular dimensions because of missing routine and training. When working with IMPETUS as an expert in developing plastics products you are able to comply with cost and time limits also in extraordinary projects and further more will profit from gain in knowledge for the future.



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# Ideas and conceptual designs

## Creativity and system

**Good ideas and innovative conceptual designs are the essence and important impetus for new products. IMPETUS is the right partner for generating ideas and transferring them into concepts. Although idea generation is characterized by a good amount of creativity a structured approach is always needed to achieve the optimal result.**

A fundamental question to be considered within that environment is, how to balance creative work and systematical approach.

Based on a vast experience in the development of different products for different industries IMPETUS has designed its own product development process which combines both creative and systematic elements in order to achieve the ideal result.

We are not only able to create innovative and new conceptual designs, but also to evaluate and compare them by using individual and adequate criteria. The IMPETUS Concept-Navi is a helpful tool for the breakdown and discussion of the different conceptual designs.



**Good ideas by using appropriate methodology**



**Decision-making is supported by the IMPETUS Concept-Navi tool.**

**From ideas to solutions**

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**IMPETUS center for conceptual designs and pre-development**

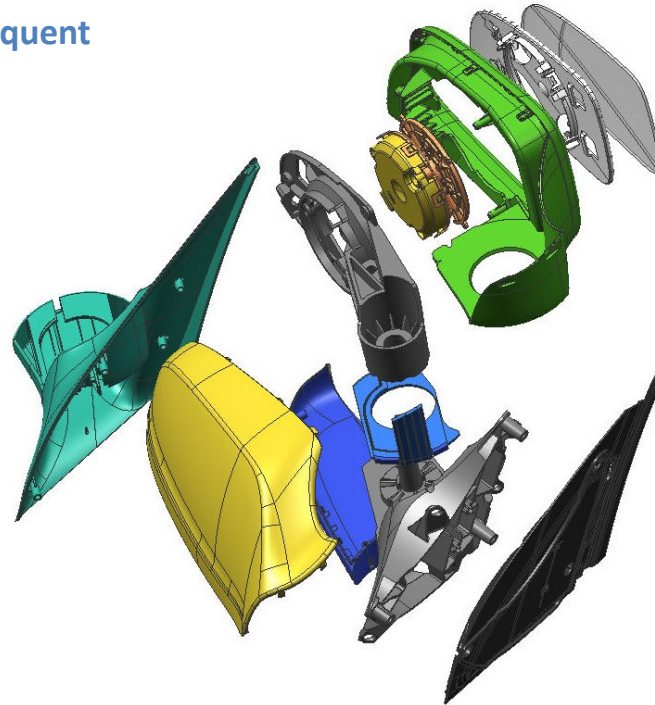
## 3D design

**Design always appropriate for chosen material and without subsequent adjustment**

**The design process during process product development projects not only has to fulfil the technical requirements. It is also a matter of timelines and cost targets.**

**Using modern CAD-systems IMPETUS is able to generate 3D-data of high quality in the most efficient way.**

We are able to provide 3D-data with the needed level of detail according to the development stage.



From early stages of the product up to initiation of moulding the data can be used for the then required tasks.

Material is a driver for the product design. In cooperation with the IMPETUS center for simulation we are able to consider manufacturing issues as well as the relevant loads and stresses from the very beginning.

In our team there are experts for all relevant CAD-systems to adapt to your system landscape.

**Best process efficiency and accuracy**

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**IMPETUS design**





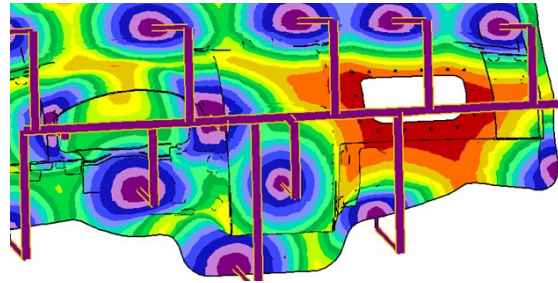
# Simulation of process and tool

## IMPETUS simulation center

Today simulation is a very strong tool during product development, especially regarding cost and time related issues.

With our integrated simulation center we have expertise in rheological, mechanical and thermal analysis of parts and molds.

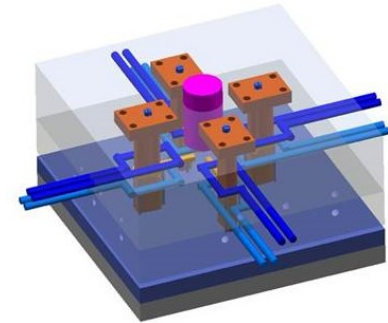
By using simulation it is possible to identify problematic aspects of the design at early project stages. Therefore design changes can be executed with low effort reasoned by being still virtual.



Typical tasks of simulation are the identification of structural weaknesses such as joint lines or blow holes or defining the ideal position and type of gating for the injection. A typical topic is also minimizing the warpage of extensive and thin-walled parts which is done by simulation of alternative geometries.

With 3D-Simulation also thick-walled parts or parts with extreme changes in wall thickness can be evaluated.

Perfect part and tool by  
simulative anticipation



Another aspect of simulation is the review of tool concepts. Especially when optimizing the thermal characteristics of a tool design by simulation, quality and cycle time can be influenced.

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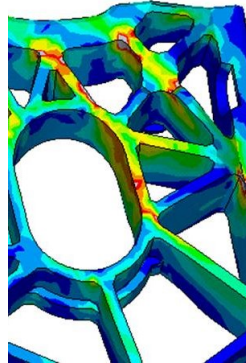
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IMPETUS center for simulation

# FE-Analysis

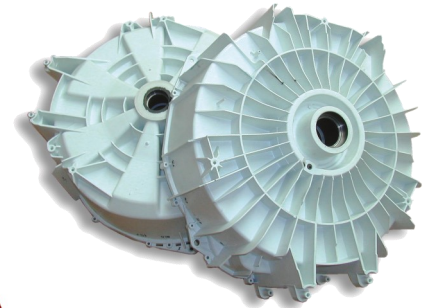
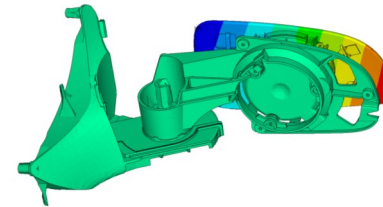
## Dimensioning according to loads for reliable investments.

When dealing with dimensioning of loaded parts - either statically, dynamically or even with crash-conditions - FEA is often an efficient instrument. Our IMPE-TUS simulation center engineers he are experienced in facing the individual challenges of the development with FEA.



Beside standard tasks like load conditions, demolding and failure we have the expertise and instruments to solve your individual challenges like anisotropy or time-dependent factors.

## Correct interpretation of loads



By dynamical analysis it is possible to predict oscillation and to economize the efforts of physical trials.

FEA is a strong instrument to achieve satisfying results when dealing with conflicting requirements. Having relevant experience in optimizing the dimensioning of parts we are able to efficiently transfer the information taken from FEA into actions.

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# Prototyping

## Design evaluation, functional and assembly testing

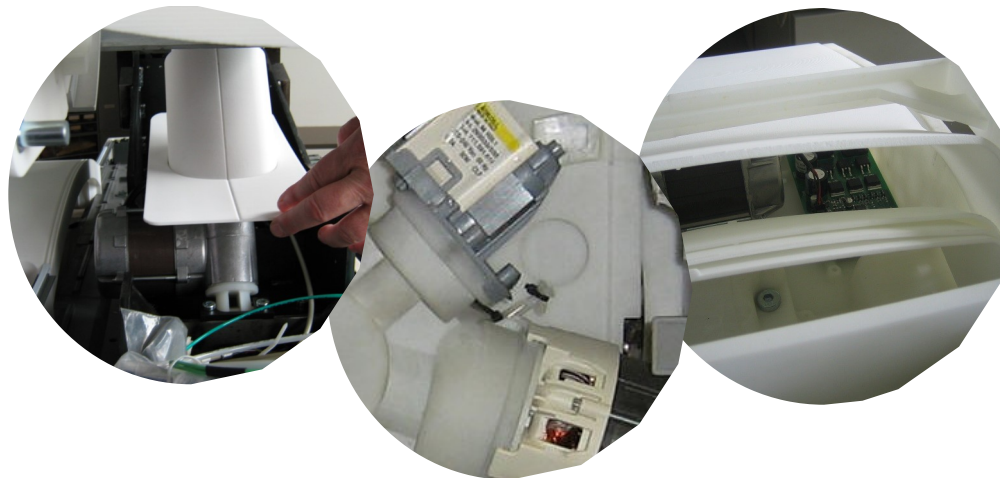
The use of prototypes often is advisable to review the design regarding possible weak points e.g. in usability or to test functionality and assembly.

In accordance to the defined purpose and design state we find the adequate material and method for prototyping using our experience and cooperating with partners from our network. Our clients appreciate the conscious use of prototypes as a helpful instrument to support decision-making during for a cost-effective and time-saving product development.

## Acceleration and support of product development

### Our services in prototyping include

- | Selection of adequate prototyping method (e.g. stereolithography, laser sintering, LOM, FDM)
- | Selection of adequate material according to purpose
- | Duplicating
- | Assembly of complex prototypes
- | Providing of prototypes ready for defined testing



# Testing

## Planning of test stands and test objects, organization and execution of testing

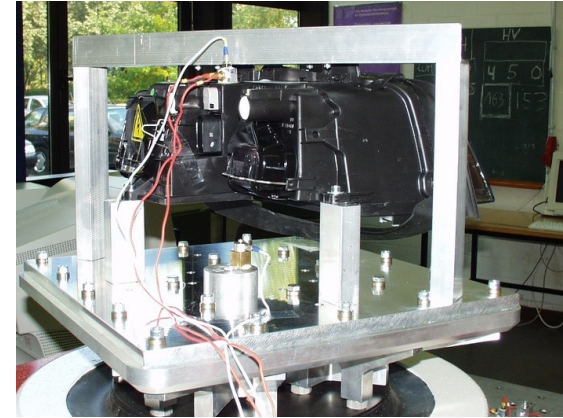
Plastic components are subjected to various types of stresses in the course of their product life – mechanical stress, heat as well as exposure to media. IMPETUS plans appropriate trial procedures and test rigs, designs these if necessary and organizes material and component tests.

Test objects can be both, parts from original material and manufacturing or prototypes, especially in order to evaluate functionality during early development stages.

Especially when combining testing and simulation during development, shorter development times can be achieved.

### Our services include:

- | Selection of adequate test procedures
- | Design of Experiments (DoE)
- | Construction and assembly of test stands
- | Testing (materials and parts)



### Evaluation and documentation of testing

Our test center allows us to execute different kind of testing for our clients including measurement of pressure loss, optimization of noise, as well as endurance tests.

**Find weaknesses during early stages of development**

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**IMPETUS test center**

# Approach and methodology

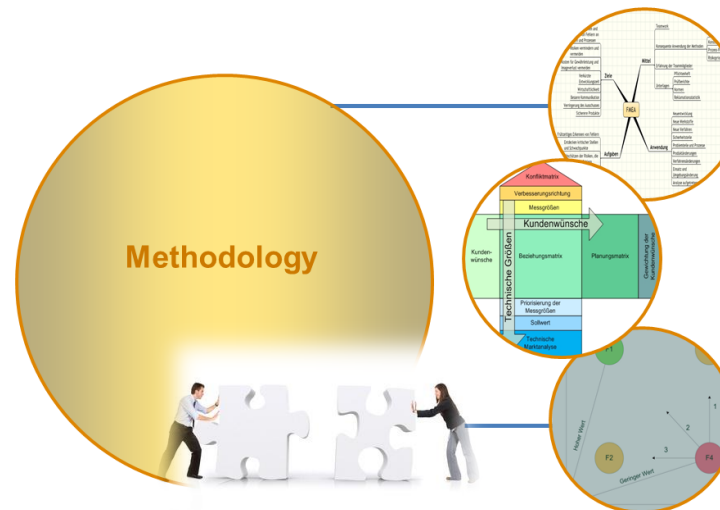
## Technical consulting

As development times are decreasing, but products become more complex at the same time, a systematic approach and quality management is required to achieve the set goals.

Excessive cost of -in particular- production means can be reasoned by design weaknesses not being detected during the development.

Therefore risk assessment from the very beginning is a natural impetus.

In a collaborate effort, we can custom tailor a development process to your companies needs and train you and your experts in systematic development methodology.



**FMEA –**  
systematic and important  
technique for failure analysis

**QFD - Quality function  
deployment:** a method to  
transform qualitative user  
demands into quantitative  
parameters

**Value analysis –**  
identifying the concept with  
the greatest chance of  
success

High quality,  
no follow-up cost

## Work with us



**We are reliable, flexible and innovative**

### Individual development packages

#### In The Lead

Taking charge of an entire product/assembly development, including project management, coordination of partners and supply of the product.

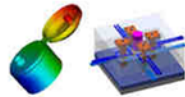
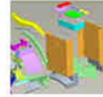
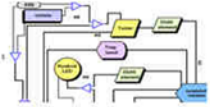
#### Temporary men power

Project work directly on customer site with optional access to IMPETUS back office



# Overview service range

| Concepts | CAD-design | Mechanics | Layout of parts & tools | Prototypes & tests | Realization of serial production



## Predevelopment

- Problem analysis
- Feasibility study
- Development of ideas
- Morphology
- Evaluation of concepts
- QFD/ value analysis
- FMEA of the system

## Prototyping

- Prototyping of parts
- Assembly

## Testing

- Definition of test method
- Planning & installation of equipment
- Testing & evaluation

## Serial development

- 3D-CAD-design
- Tolerance analysis
- FMEA of the design
- Material selection
- Selection of process
- Tool layout
- Support of tooling
- Project management

## Simulation

- Simulation of process
- FE-analysis
- Simulation of lifetime
- Simulation of tool

## Production

- Tooling
- Tool maintenance
- Production
- Assembly & finishing

## Consulting

- Plastics technology
- Value analysis
- Project management methods
- Inhouse consulting

Engineering

Production

Consulting

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[www.impetus-plastics.de](http://www.impetus-plastics.de)

# References

## Extracts from our customers

[www.impetus-plastics.de/  
de/home/referenzen/](http://www.impetus-plastics.de/de/home/referenzen/)



## Industries

automotive

domestic appliances

medical technology

pharmaceuticals industry

telecommunications

sanitary/heating/air conditioning

packaging

electrical engineering/

electronics

measuring instruments

optics



**Product development  
works across  
industries**

## Sites



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