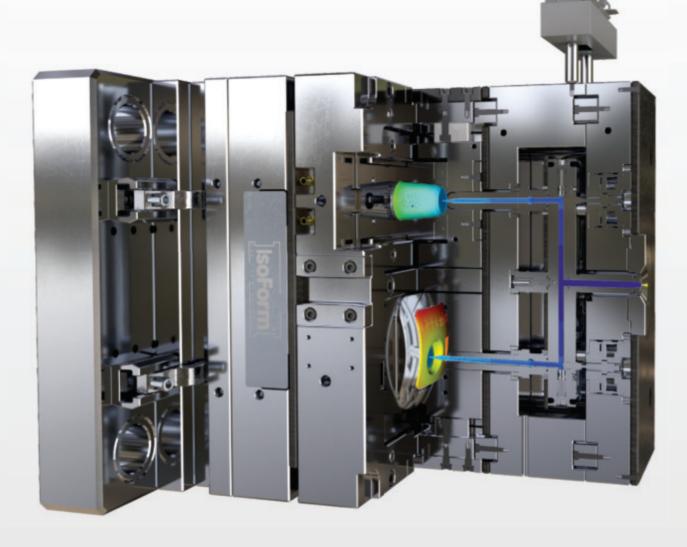
Your product developer

Konstruktionsbüro Hein GmbH



Kb-Hein.de





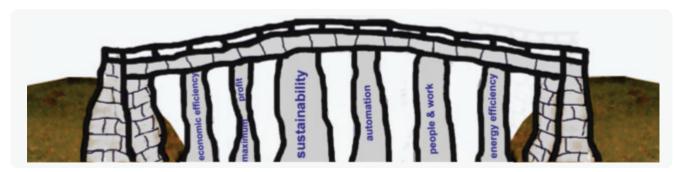
Product Development
Parts Optimisation
Injection Moulding
Simulation
Simulation of Warpage
Shrinkage Data
FEM Analysis
Mould Design
Temperature Regulation
Visualisation
IsoForm® / HeiNo®



Statement: **Bridges to the future**



Regarding road traffic we have gotten used to many construction sites, accidents, dilapidated bridges and other obstacles, and we have accepted them as a sort of necessary evil. The same applies to many avoidable problems in production which often result from previous "economy" measures or accepted customs ("We have always done things this way."). Every subdiscipline (injection moulding machines, temperature control units, software etc.) presents innovations within its field, but overall concepts with proofs of energy efficiency and sustainablity are missing.



More than 80% of the industry acknowledges a scarcity of skilled workers and more than 70% think that the biggest challenges are cost and time pressure. Currently, increased demands regarding quality and process reliability of tools and moulds frequently cannot be met. At the same time, projects with and from plastics need to be conducted in narrow timeframes.

This leads us to a solution called "automation". It has formerly been rated to make jobs redundant but today has to be considered a means to the economy's survival. Due to an increasing scarcity of skilled workers we need to worry if automation has not started, yet.

In schools, it is already an issue but at workplaces "sustainability" is not being sufficiently considered. However, this is of utmost importance if we don't want to repeat past mistakes regarding environmental pollutants and damage to the climate.

With everything we know today, it does no longer make sense to burn the precious fossil resource oil through the chimney or the exhaust or produce environmentally unfriendly products on its base. We rather need to use it for manufacturing light-weight, sustainable and energy-efficient parts.

Beside a few shining examples for innovation, future-oriented developments with sustainable products and sustainable production do not yet prevail.



Imagine that the first benchmark for company targets was sustainability and maximum profit came only in second. This could mean that developments may be planned in the long run again and the "return on investment" is no longer limited to a less than a year - at such short notice an economically efficient rerouting simply isn't possible. In addition, a new line of thinking could mean that people and companies living and promoting verifiable sustainability will be the ones to win recognition and to inspire the industry.

Europe has the chance to lead the way in this context!

Contents



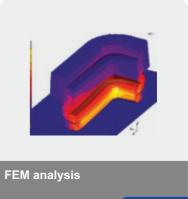
From idea to plastic part / Influences on part quality

page 4f.



Product development / Prototyping

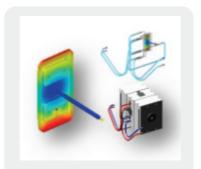
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page 8

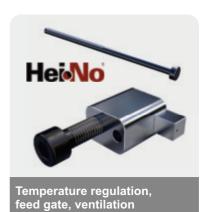
page 14f.





Injection moulding simulation / Parts optimisation

page 10f.





Mould design / IsoForm® tools

page 17ff.



Special technologies
Gas injection / water injection

page 20



Images and animations based on 3D data

page 21



Co-operations Training courses

page 22f.



Avoiding part defects and optimising processes

page 24f.



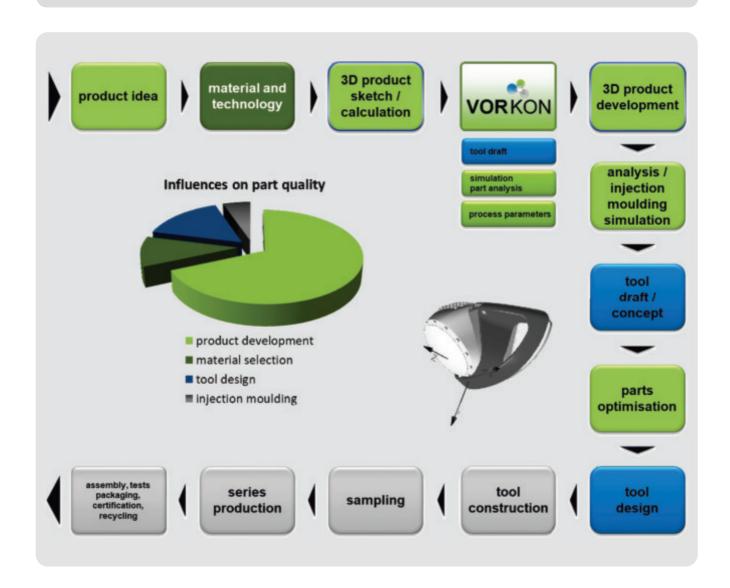
Technology Workshop

page 28

From idea to manufactured plastic part



A maximum influence on the **part quality** is possible during **product development**. It is then the decisions for setting the right course are taken: You might invest slightly more money at the beginning, e.g. for **simulation** and **optimisation**, but you will benefit many times over in the course of the project.



YOUR GOALS = OUR GOALS

- ✓ high part quality
- √ high process reliability
- √ high rentability
- √ high customer satisfaction
- √ high sustainability
- √ high degree of innovation
- ✓ high degree of automation



headlight (WWS GmbH)

VORKON - The simulated PRE-concept

At an early stage of product development and/or for a first calculation, VORKON provides important details and pre-concepts within a few days. This results in a competitive advantage for quotations thanks to increased information and many benefits for the course of the project.

VORKON may form the basis for a subsequent elaborate simulation incl. parts optimisation and the costs of a max. of 1000 € may partially be considered.

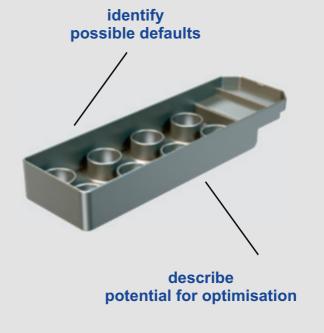
Requirements:

- 3D data of the part
- exact material name
- details on prerequisites or considerations
- sample parts, no. of cavities, tool draft, technology to be used, if applicable

OUR OFFER

- details regarding filling behaviour, fibre orientation, reasonable wall thicknesses, weld lines, air traps, hot spots, undercuts, potential for optimisation
- first simplified concepts for injection, filling, ejection, separation







- detect potential for optimisation early on
- ✓ avoid part defects early on
- calculate quotations and projects more accurately
- ✓ make processes more efficient

Product development



OUR OFFER

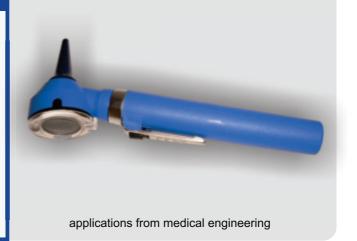
- design
- product development
- parts optimisation
- injection moulding simulation
- FEM analysis
- FMEA
- prototyping
- material selection (e.g. metal substit.)

In product development, we will assist you with our entire range of services, consulting and training with regard to innovative ideas, choice of materials (incl. metal substitution), procedures and technologies up to the implementation of a production ensuring process reliability.

The properties of the workpiece will be designed optimally according to your specifications using **FEM analysis** and **injection moulding simulation**. Product development for plastic parts is done **plastics-oriented with mean tolerances, draft angles and optimum wall thicknesses**. An FMEA may be used to critically analyse and verify developments.



- reduced costs for tool making
- ✓ reduced cycle times
- ✓ improved part quality
- ✓ reduced project time
- ✓ reduce possible defects
- experiences from medical engineering, electronics, automotive, aerospace, sports, agriculture etc.



Product development

Tasks that today are frequently done during tool design or production planning will need to be transferred to product development in the future in order to be able to avoid additional costs during tool construction and to identify and prevent possible difficulties for injection moulding early on.

These tasks include, for example, parts optimisation and the first draft tool concepts.

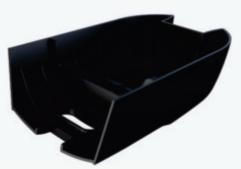
The product developer thus becomes the decisive co-ordinator for sustainable planning and definitely needs to enhance his or her knowledge at short notice.

The aforementioned course of action also forms the optimum basis for automation.

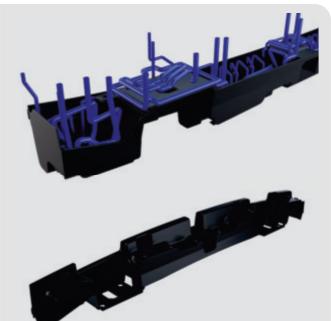
OUR OFFER

- sustainable product development
- early pre-concepts
- material consultancy
- parts optimisation
- tool concept
- geometry reconstruction from scanned data





part: housing vacuum cleaner



part: bumper



PROTOTYPING

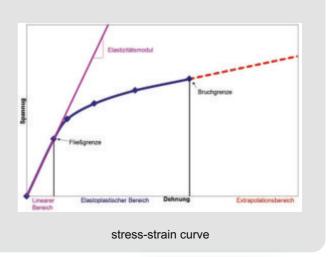
- prototype construction or test series at nearby pilot plant
- sophisticated prototypes for testing the functionalities and for further fine-tuning
- ✓ list of properties and parameters for strength (e-modulus) for each material on demand

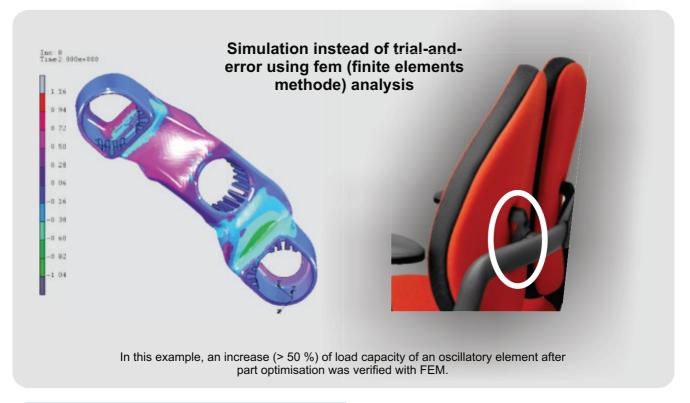
FEM analysis for strength - acoustics - dynamics



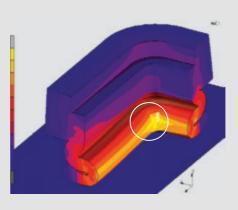
OUR OFFER

- for almost any material (e.g. metal, glass, plastics)
- analysing sealing behaviour, acoustics, thermal insulation, dynamic deformation, strength, unwinding behaviour





- ✓ parts characteristics can already be analysed before part is actually being manufactured
- collision observations are ensured using work movement
- verification using computer tomography possible



membrane seal for printed circuit board: functionality of sealing verified with fem

Determine product shrinkage

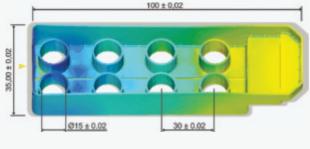
"Is your production rolling or are you still rolling the dice?" SHRINKAGE EXPERT METHOD



OUR OFFER

- methodical measurement of shrinkage
- references for more accurate shrinkage and warpage forecasts
- data for your simulation system
- support with setting up your specific database for shrinkage and warpage

The effects of fibre orientation will also be determined by measurement in the injected test geometries. The results may be used as a reference for shrinkage determination or for simulation purposes.



volume shrinkage (grey)

supply of material



production of test geometries

6 wall thicknesses 2 injection points for anisotropic materials

measurement



your data set



course of action



volume contraction of non-reinforced polypropylene (PP) can be up to 20%

- determine shrinkage at a high precision
- determine shrinkage allowance for your tool
- establish company-specific databases for shrinkage and warpage

Injection moulding simulation ACTUAL state



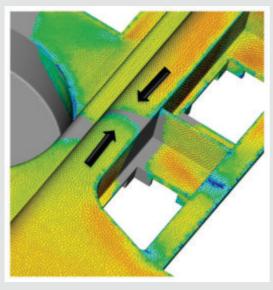
WE SIMULATE

- filling
- shrinkage and warpage
- tool temperature regulation
- feed situation
- · packing pressure profile
- thermoplastics / silicone / 2C
- process parameters
- definition of different media and materials
- · inserts / overmoulding

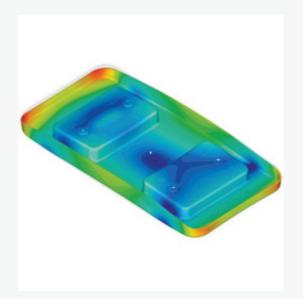
An injection moulding simulation shows filling and cooling (thermoplastics) or cross-linking (silicone / rubber) while including the influence of the tool (e.g. temperature regulation and feed situation) – before the tool has actually been designed.

Qualified simulation and expert interpretation of results allow for recognising possible defects of the moulded part and/or of the mould tool at an early stage thus providing the basis for parts optimisation.

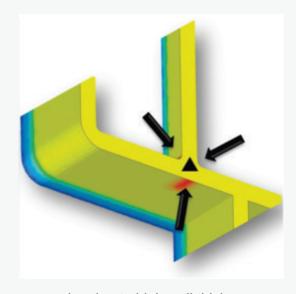
Our additional report analyses individual results in more detail.



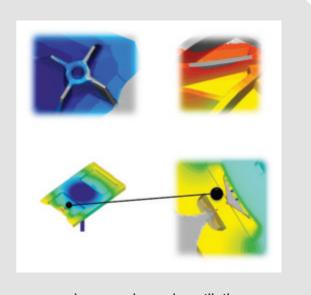
weld lines in visible and functional areas



shrinkage and warpage



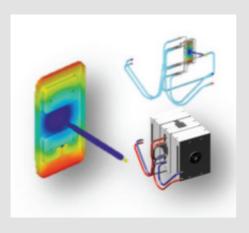
vacuoles due to high wall thicknesses



burn marks and ventilation

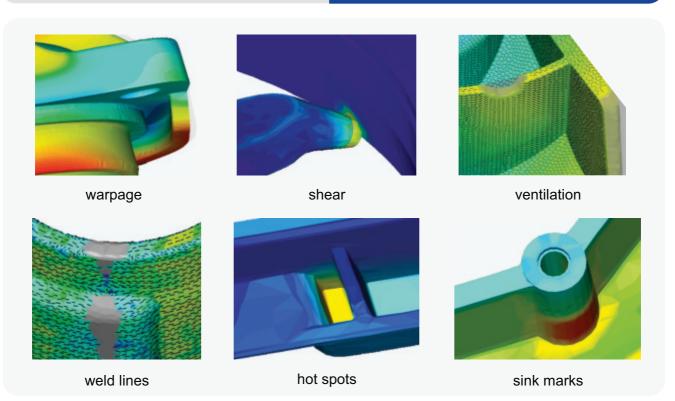


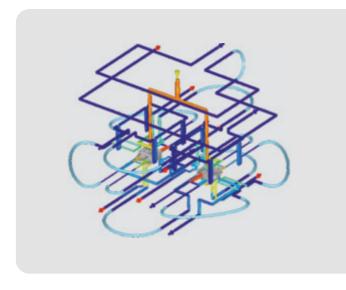
Simulation - potential for optimisation



WE ANALYSE

- ✓ warpage
- cycle time
- ✓ clamping force
- part defects such as weld lines and trapped air
- √ injection pressure on core(s)
- identifiable potential for optimisation
- ✓ planning and calculation







Our additional report analyses individual results in more detail.

Further information at Kb-Hein.de

Parts optimisation



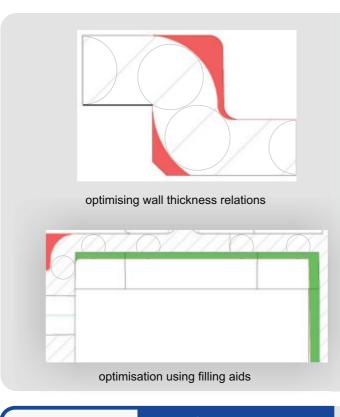
OUR OFFER

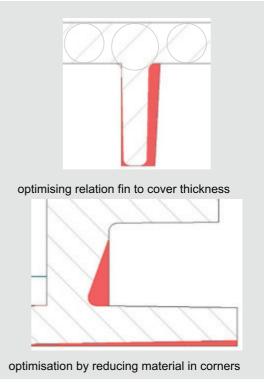
- process optimisation
- optimisation of geometry, material, flow behaviour, feed, packing pressure etc.
- temperature regulation close to the contour
- separate inserts against hot spots
- separations/modules for ventilation
- negative correction
- alternative production technologies

On the basis of the results from the injection moulding simulation of the ACTUAL state, the part can now be optimised.

Using sectional views and illustrations we devise suggestions for parts optimisation, feed gate design and temperature regulation. Those will then be implemented in different ways and verified using further simulations or FEM analysis.

Qualified optimisation will result in quality products!





- ✓ reduced cycle time
- √ better part quality
- √ faster project cycle
- ✓ larger process window
- ✓ reduced warpage, improved compensation of shrinkage and wall thickness relations
- √ fewer part defects



results simulation - overview

Simulation of optimisation

The results from parts optimisation will be verified using further simulations or FEM analysis.

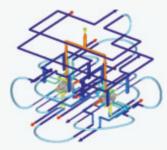
There may also be a calculated negative correction or a determined allowance for components reinforced with glass fibres. Using the Shrinkage Expert Method an early negative correction becomes possible.

Thus, the best possible result for the part's geometry may be obtained.

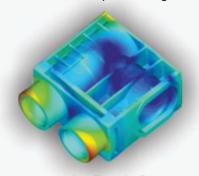
At this point, all parameters regarding feeding, temperature regulation, heating times (e.g. for rubber) and separations are available and tool design can be done very quickly and on a solid basis.

OUR OFFER

- simulation of results from parts optimisation
- calculated negative correction, if applicable
- determined allowance for parts reinforced with glass fibres
- compilation of tool concepts as a basis for the simulation



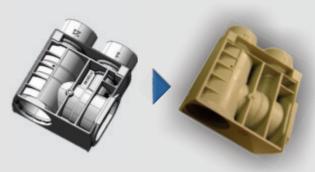
simulation incl. temperature regulation



project "housing": warpage considerably reduced **after** optimisation

After optimisation, the following results could be obtained in co-operation with the customer:

warpage reduced by 71 % weight reduced by 15 % cycle time reduced by 70 %



optimised 3D part

part from series

Isoform

pictures by Festo GmbH & Co. KG

YOUR BENEFIT

- √ high process reliability
- improved part quality
- ✓ avoiding revisions
- optimum preparation of tool design
- when implementing results into IsoForm® tool design good parts frequently at first sample run

Further information at Kb-Hein.de

Tool temperature regulation



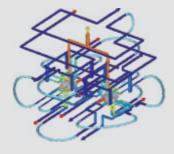
OUR OFFER

- simulation of regulation
- design of temperature regulation
- close-to-the-contour, cycledependent and/or variothermic temperature regulation
- different media: air, water (up to 220°C), oil, coolant (CO₂) etc.
- HeiNo® redirection elements

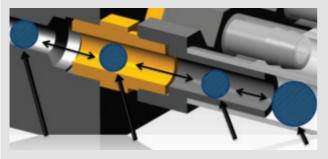
For obtaining a good part quality, any plastic material needs its own determined mould wall surface temperature that should be attained homogeneously or individually and cycle-dependent.

In an injection moulding simulation, the temperature regulation is already being dimensioned before the tool itself has been designed. The simulation informs about the heat exchange on the tool's surfaces and about its influences on the product during injection moulding.

The temperature regulation system is designed close to the contour or cycle-dependently using either drilling, laser melting, vacuum brazing or special materials. Holes for temperature regulation should always be round and connected for forced circulation.



simulate temperatures for optimum design



holes + connecting nipples + coupling + tube: homogeneous round sections are important!

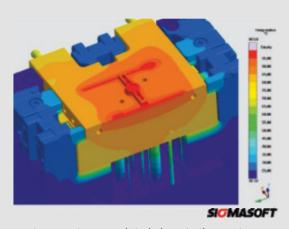


HeiNo® redirection element ensures round section of holes for temperature regulation.



animation with media flow

- ✓ reduced cycle time
- √ high surface quality
- ✓ less wear at the tool
- √ process-reliable production
- √ high quality of moulded part



temperature regulated close to the contour with exchangeable IsoForm® tool

Concepts for feeding and ventilation

Depending on the material, feeding needs to be designed for low pressure and shear, with controlled shear, dead runner, balancing etc. in order to ensure a process-reliable production without part defects. Frequently, the formation of streaks, vacuoles or air traps and an inadequate surface structure of the part are pre-determined at this point.

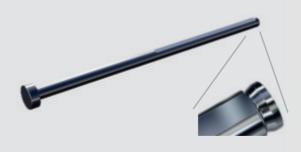
For the past couple of years, new additives in plastic materials have called for comprehensive ventilation in injection moulding tools. HeiNo® geometries for ventilation feature a comprehensive ventilation of the mould inside of as well as around the cavity. This improves the quality of weld lines and allows for a controlled ventilation of both the part and the feed area.

OUR OFFER

- feed area design
- temperature regulation of gate
- low or controlled shear, dead runner, flow speed reduction etc. on demand
- comprehensive and controlled ventilation inside of as well as around the cavity



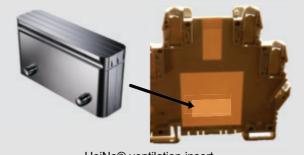
HeiNo® tunnel gate for low shear



HeiNo® ventilated ejector



HeiNo® tunnel gate with overflow ventilation



HeiNo® ventilation insert



HeiNo® tunnel gate with flow reduction and ventilated ejector

- ✓ high part quality
- ✓ reduced cycle time
- ✓ maximum packing effect
- ✓ less part defects
- ✓ lower energy demand
- ✓ process-reliable production
- customised

Focus: Avoiding weld lines



OUR OFFER

- mould flow simulation for identifying weld lines
- definition of overflow area (for reorientation of glass fibres, if applicable)
- specification for optimum installation of HeiNo® overflow ventilation insert

The protected HeiNo® overflow ventilation insert improves the quality of weld lines and allows for a controlled ventilation of the part area thanks to special ventilated HeiNo® ejectors.

The intense ventilation takes effect up to the end of filling and also guarantees the discharge of substrates preceding the flow front. The overflow area will ideally be defined using an injection moulding simulation in order to obtain a good weld line quality and resilience by re-orienting the glass fibre in the weld line. The weld line should close by definition before the overflow cavity of the overflow ventilation insert is filled. The filled overflow cavity will then be separated and removed like a tunnel gate.



HeiNo® tunnel gate with overflow ventilation insert

against weld lines



against Diesel effect



parts optimisation thanks to overflow ventilation



BEFORE without overflow ventilation insert



AFTER with overflow ventilation insert

- controlled ventilation of part and feed gate areas
- high weld line quality
- ✓ increased resilience
- √ comprehensive ventilation



animation of HeiNo® overflow ventilation

Mould design

We also offer tool design for the following special technologies:

- multi-component
- sandwich
- foaming
- tandem solutions
- collapsible cores
- unscrewing solutions
- transfer moulding
- gas: injection, cooling, counter-pressure, external gas moulding
- film back injection moulding

OUR OFFER

- injection moulding tools for thermoplastics
- hot press tools for thermosets
- pressure moulding tools for zinc and aluminium
- elastomer moulds for rubber and silicones
- special tools for hybrid applications



IsoForm® tool for rubber processing



IsoForm® exchangeable tool



Historic project: tool "contact socket" - no burrs on the inside despite filigree separations

YOUR BENEFIT

- ✓ state of the art
- ✓ long tool life
- √ process reliability
- optimum ventilation (e.g. using vacuum forming)
- ✓ high precision

Further information at Kb-Hein.de

Standard elements for mould tools IsoForm®



OUR OFFER

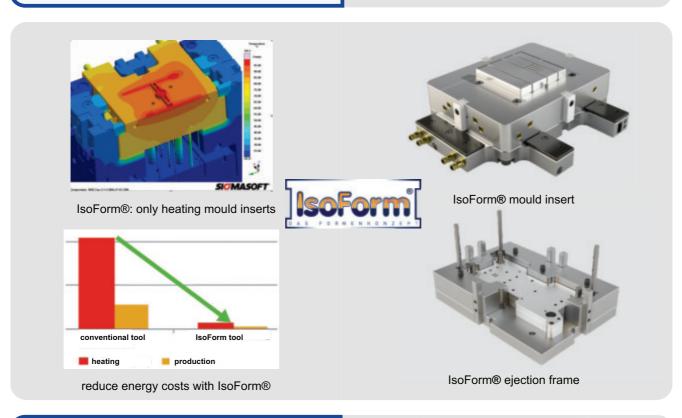
- thermal separation
- consistent hub-centring
- innovative ejection frame
- can be combined with almost any application and system
- tool change systems

Developed using the **TRIZ method**, the isolated tool concept IsoForm®, together with HeiNo® standard elements for gates, ventilation and temperature ventilation, forms the basis for a holistic approach to tool design with the subsequent advantages for process reliability and efficiency with regard to quality, costs, time and energy requirements.

IsoForm® and HeiNo® standard elements are distributed by Nonnenmann GmbH.



Please order our "IsoForm®" and "HeiNo®" brochures or get current information from **Kb-Hein.de**

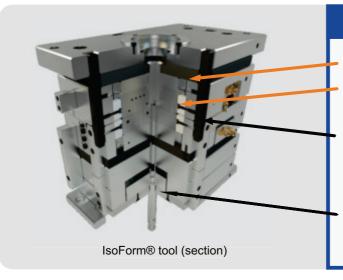


- high process reliability and energy efficiency
- √ for any kind of temperature regulation
- high precision due to hubcentring
- √ reduced deflexion
- √ reduced follow-up costs
- ✓ perfect for automation, change of inserts and tools



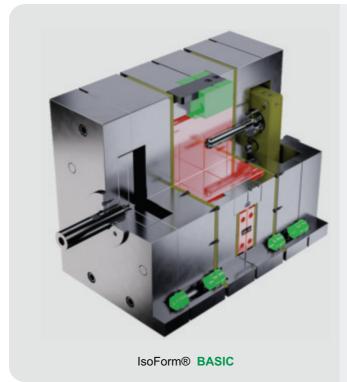
further information on IsoForm® in our IsoForm® brochure

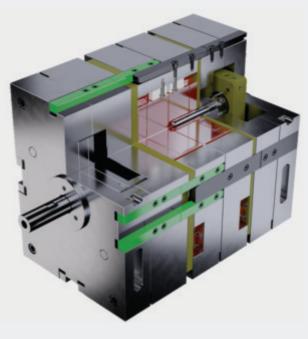
What is an IsoForm®tool?



FEATURES

- consistent isolation of the contour-forming area
- consistent hub-centring of all inserts, mould plates and mould halves with regards to one another
- maximum support thanks to ejection frame





IsoForm® PREMIUM

IsoForm® BASIC IsoForm® PREMIUM

- cost-optimised standard
- includes basic isolation and centering
- may be upgraded with ceramic centring elements at any time
- costs comparable to conventional mould units
- optimum solution for all advantages
- highest degree of isolation
- consistent hub-centring
- ceramic centring elements

Further information at Kb-Hein.de

Gas injection GIT - WIT water injection



Gas injection - GIT

- ✓ controlled packing pressure
- tension-free and low-distortion part
- for different wall thicknesses within the part
- ✓ better cooling effect
- √ low closing pressure
- ✓ reliable process at high quality

With the aid of cross-sections the gas is guided to the relevant areas where it compensates volume contraction.

Thus, the gas assumes the role of the packing pressure at a constant level for the entire workpiece.

Polarisation films on the overhead projector (see upper picture at the centre left) expose the lower potential for tensions in the workpiece with GIT.



low tension in GIT part



Partner project GRIFF (companies Stieler und Hein): In this special WIT process, the part is partially filled with water which is then pressed, at high pressure, into the blind hole that has been formed. The water is then extracted well-controlled from the part in order that the part leaves the tool almost dry.



gas injection technology



Water injection - WIT

- ✓ short cycle times for appropriate geometries (only round geometries, such as pipes for the passage of media, can be manufactured with relatively constant wall thickness)
- With mass clusters, a shrinkage of the volume cannot be compensated as easily as when gas injection is used.

For water injection, the excellent thermal conductivity of water is used to achieve a favourable cycle. Different procedures such as partial filling or auxiliary cavities can be applied.

The picture on the right depicts the small inlet

and outlet orifice for water injection with a blind hole.

The picture at the centre-right of this page shows the homogeneous wall thicknesses that are produced.



Images and animations based on 3D data

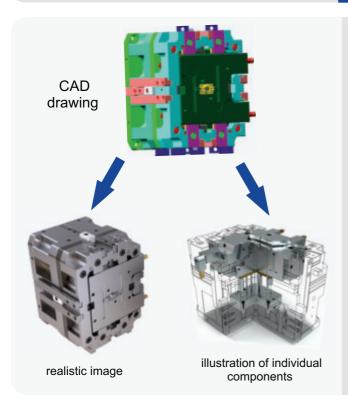
You would like to present your ideas, design visions or concepts to your supervisors, customers or colleagues at an early stage - using photo-realistic images of the product, the production process or the mould tool?

Using rendering we turn your 3D data into realistic images and animation which visualise parts, tools and prototypes.

According to your specifications the functionality of your product or the injection moulding process may be shown as film clips - before the part has been produced or the tool has been manufactured.

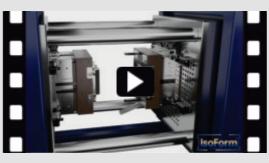
OUR OFFER

- realistic product and/or tool visualisation using rendered images
- part demonstration before start of series production
- animations of product functionalities and/or production processes

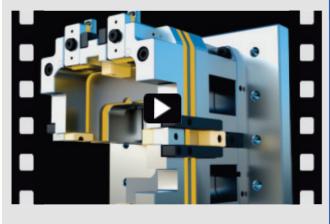




animation visualising the ejection process



animation exchangeable tool



animation isolation

- photo-realistic demonstrations for presentations (up to 4K)
- vivid documentation of the progress of a project
- early animations of functionalities or processes to help decision making

Fair co-operations / strong partners



Co-operation projects

- IsoForm® projects "espresso cup", "HeiNo® redirection element" and "cover"
- project "Shrinkage Expert Method": co-operation project for methodically measured shrinkage with Simcon kunststofftechnische Software und KB Hein (see p. 9)

"Thanks to our long and close co-operation with Konstruktionsbüro Hein we are always able to identify difficult areas on the most different parts quickly and flexibly and to then come up with suggestions for optimisation together.

This means that we can always offer competent solutions to our end-customer that will result in an improved final product."



(Benedikt Ostermann, Josef Mawick Kunststoff- Spritzgusswerk GmbH & Co. KG)



Partners "espresso cup": Konstruktionsbüro Hein, Nonnenmann, BARLOG plastics, Günther Heisskanaltechnik, Simcon, Werkzeugbau Wollenburg and Wittmann Battenfeld





Partners "redirection element": Konstruktionsbüro Hein, Nonnenmann, Sigma Engineering and Wittmann Battenfeld



technology partners

- prototype construction or test series at nearby pilot plant
- tool testing, e. g. with Wittmann Battenfeld
- co-operation with research institutes and universities



Training courses

Our courses and training programmes are always **adapted specifically** to the participants' requirements (company course).

According to our motto "From idea to series production" in plastics technology we are able to establish a training concept that meets your needs.

Frequently, trainings are held at our customers' premises in order to integrate current projects and difficulties easily into the training process.

In co-operation with the German expert associations WIP Kunststoffe e.V. and SKZ (Peine) we also offer trainings and workshops in the fields of product development, injection moulding, tool design, parts optimisation etc.

OUR OFFER

- project training
- injection moulding for its users (basics, product development, tool design and construction)
- special processes
- training "part failure"
- expert lectures





www.wip-kunststoffe.de

YOUR BENEFIT

- ✓ close to practice (examples from over 30 years of KB Hein)
- ✓ project-oriented / inhouse
- ✓ with regard to the participants (e.g. for product developers, design engineers, toolmakers, injection moulders, heads of production, business people)
- ✓ co-operation with partners

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Your task ... our solutions



OUR OFFER

- interpretation of defects
- implementation of parts optimisation
- drafting of constructive solutions
- verification of solutions using simulations
- trouble shooting
- CT for reducing sample runs

We interpret defects and work out constructive solutions in order to eliminate them.

Our injection moulding simulations ensure that problems with ventilation won't arise or we devise new solutions for ventilation together with our customer.

When the part fails we optimise the part using fem analysis and injection moulding simulation. By subsequently developing constructive modifications of the part and optimisations of the tool (e.g. for the gate) we find ways to ensure that the part meets the requirements in the future.

Make use of our experience for problem solving!

Part defects that can be avoided



weld line



ventilation



streaks



rib relation



sink marks



warpage

- suggestions for optimisation verified by simulation and fem analysis
- ✓ elimination of part defects
- √ fewer sample runs
- avoiding potential sources of defects in the future



part failure

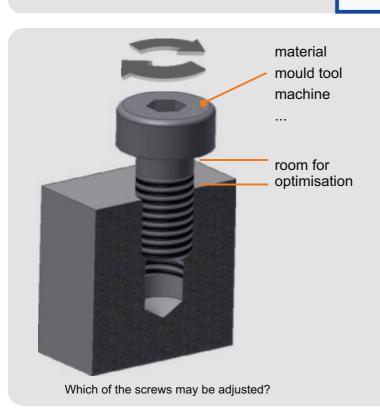
We optimise your process (on site)

If potential for optimisation detected at an early stage is used, e. g. to improve wall thickness relations, weld lines, air traps and temperature regulation, the process capability will be increased while cycle time and maintenance effort will be reduced.

Together with you and your team we will devise sustainable measures for optimisation.

OUR OFFER

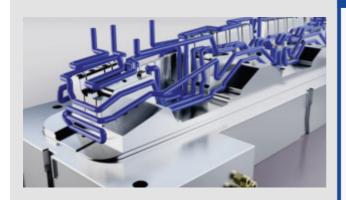
- · competence expert on site
- · process check on site
- evaluation and suggestions
- optimisation on site
- project training







- ✓ reduced project time and lower costs if optimisation has started early
- ✓ increased process reliability
- improved effect of temperature regulation
- ✓ increased part quality



simulation with temperature regulation

Press review



TOOLING



Standard Elements, Reconsidering mold ventilation, gate design, and temperature regulation will lead to a production without unnecessary maintenance or cleaning breaks and thus to considerable savings regarding production time and energy-

Let Off Some Air!

-

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Translated Year Carestraffs 11,(2011, pp. 65-66)
Article on PDS Size or wave by minutelly

detom that already takes into account the enticked temperature regulation of the mold using a prelaminary trails concept. The small of the simulation will then be expert accurate.

No Process Safety without Specified Ventilation

when the comy is filled the plants methmed is not the an form values for control. If the six surface the element of the consequence of the control of the consequence of the control of the control

and way in involved.

For the past comple of years, new address to plants, materials, e. g. flame retailment, have called for an appropriate we ularison of injection models, by to an esemillation scan mostly limited to varieties the flame of the flow position from the condition of the flow position of the condition of the co

coduces the lifeteness of the moid and inproper the formation of burns. When high everyor-term contests who in 1979, and 1979, and procured aggressive by prodlicits that deposits in the detect close to the costs. Thus some destroying the moid error term. The geometries for workfullows presented here further a comprehensive



Eq. 1. Surrepped air mitt have much. The optiable contribution of importion modes present dilects of the moliting on send on decreages to and period of the moliting on send on decreages to and

contilation of the model model of as well as pround the cavity and may be implemented early and at low costs. Exacutating the cavity is also a good solution that can be implemented with trile investment with loof very reside. TECHNICAL ESSAYS

Determine shrinkage data to the expert method

a compension of the Tells Tellsrodogy Workshop, the "SHRINKAGE EXPERT METHOD a compension project of Stream installation between the Stream and Konstrukturoskop, Many — any presented for the first time. With shrinkage measured methodically and was page called a coordingly, a considerably increased as course of towards of war page and scopage becomes persible. The data by succession of successor persible, the special stream and company appeals of abstracts for shrinkage and warpage may be structured on the basis of the provided shrinkage data.



1/ "It your production college or any un-

In order to meet a g. toterance in consumeration of +0.00 mm for sequencements of +0.00 mm for sequencements of +0.00 mm for sequencements of the consumeration of the consumerat

ETMM THE NO

is crucial that this afformation is not based on the manusceners of plates or tensile bars that are encongrues with the actual appecation. Otherwise, it doesn't comas a surprise that the first sample nut cannot give good parts within the properties. Scrivetimus it seems on the con-

dometimes it seems as if, with a little luck, a dice could deliver the correct shrinkage values factor.

Strinkage needs to be determined during product development

who sture, shrestage special are studied and seed to be determined discing product development. We are supported to the studied and seed as the seed of the studied and seed as stands at the very beginning of all causes for shrestage and studied and seed as the seed of t

Food Producted

Food Strategy

Food

27 The DIVERNICADE EXPERT METHO Problems: Konstrumentation Many

contributing their knowledge to an optimum result. But where do they get their shrinkage data?

Methodical measurement allows for establishing shrinked databases

The "SHEINKAGE EXPERT METHOD", a cooperation project of stimot, a cooperation project of stimot, and St Men.
Otherwises sherikage results by
methodically impairing nationtic parts with a representative
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to geometry and different wall
to geometry and deferent wall
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method of the conformatio

THE RESIDENCE PROPERTY.

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October 2017 Product Gallery with single presented at Fakuma

Energy officient factor account

Faster process at cons and reduced energy in

R. Her

Gitten, only a few mudifications of the standard procedupundent process related and accommission feasible. New you of creasimatedie materials may then appear by in registrate of creasimated part design, special procedures for vertilation are hallow spirit up to control for any continue. A reliable process hallow spirit up to control for any control and control to control and actionation, which aroun to become inflagmentable changes and the positioning on the world market.

1 Introduction

In the near future, automation will become mendatory for all fields of plastes, come mendatory for all fields of plastes, coming – from product development to food draign right up to the actual production of plastic parts including their assembly. This will also affect modium-sized orthopoles at a graving rate. If the roune is not set in good time it will be difficult toget on board later as.

2 Are products and mould tools ready for automation?

The key to addressing the resulting posiloma is unifor as the current production purcesses. He read a significant improve cross. He read a significant improving of the plants parts quality. Although this or common knowledge or in not crosslessely part siste practice. Therefore, we are describing an old prudes that in tackfeld the only a few companies. But ever then it is not theroughly by implemental from the final data in a not the production. This applies to the processing production. This applies to the processing of rather and informer she in combination with metals (Fig. 1) and thereoplastics as well as in other area.

Substition of a Williams

Konsinglituralsjins been Debilj. Streetedt am Sübrekerge, German Empressity, foresting only on cost centres to an and comprehensity solutions from the idea on to senial production that have a soul cost.

not viral proteins in that most products as not opiously developed in regard to material and opiouslate operation. Dies not consider all the opiouslate operations. Dies not consider a rings subsequent costs, people are still bus pinning shard in receive the chapper price for the tool, institud of deficing an optimum design for product and tood that will always are fill during production. For amaliller gazanties, the production of the still and present on a state of a state of the still and the state of the still and the state of the

2.1 Freduct development

Institute of a complex design we will need for the future a robust design including all reducts angles and mean tolerances. Note that significant means tolerances, the regard to automated production see will need to a shift these tables that have been local-of within tool design until one to product of within tool design until one to product of within tool design until one to trought cardy on a finit tool concept with repeated and the specific seed of the specific se

or cycle dependent and class to-contour are becoming increasingly in portant, also more contour elements with the produced using additions manufacturing vacuum braiding or diffusion welding. The toolmader's task in to manufacture a precision and low-west test with a good temperature regulation in line with the specification.

2.3 Tool construction today and

Be programming networked machining renters and measuring devices the industrial production of high-quality injection moulding tools has become possible and profitable flower days. Unfortunately, very fiow compation make use of this seem of the compation make use of this seem of the compa-

Also, for smaller mould makers the final step towards the fallow will be an administration approach, including the planning and gramming of one or more manufacturing quemaing of one or more manufacturing untils for the contour-furning area that an internamental the rollo. The respective natrainable and modular mould test consequent placety from external partners. Manufacturing the placety from external partners, Manufacturing having and programming processes will then mainted by knowledge distributions will see mainted by knowledge distributions and an high level of training will be required for the remaining patter 1 a small market due to demographic changes — or ode to sitestify protested errors are not seen to sitestify protested errors.

Onto the year 2000, we articipate the for lawing developments in mould construction for the development of plantic ports, mould and machine technology, as emphase with a plantic on extension or maximum process reliability. For high wage countries suit as Elemanty this tendency offers opportunities for the charmony this tendency offers opportunities for the factor global market. In previous ties for the factor global market. In previous

Security Day

TOPICS MARKETS SUPPLIERS EVENTS USED MACHINES

Here's fractional Sectionary Day will take place on 17 february 2017 in these test an indicate primary Here's Care many. The processors in the management entered event for professionals in the placetics and state of the delicate paid.

Registration to attand this owner and further information in evaluate at Jacksteing Day 2011

executes at Inchmission Like 2017.

And opposite the product high-quality and opposite the tool opposite the plane.

In order that the temperature control acts yet where to july temperature for crosslessing cropsive, the mound standars in bullium tools in smaller allows the control-comming points. Thus, the size similar ball will be thorough affected in considerably was bethorough affected in considerably was betracted as the size of the control of the trace with standard both. The size in believe takes place within the tool and size takes place within the tool and takes the size of the control of the formation of the control of the formation of the control of the tool of the control of the points of the control of the points of the formation of formation of the formation of f

Due to the indiction of the temperaturecontrolled contour area before tools offer an improved basis for any application using chalument, thereoplantics, theretoeth, die conting and multiple-component appli-

Certic-depression of the consequence is contact under the contour that preferably only contacts the temperature of small masses (mould contact arcel 0%, 9).

duction - mainly because of the mane adyuntages of significantly higher process to Subside

5.1 Implementation with Isoform tool

The individual concept fast standard elements that goes with the half one tool concept entires a wide range of constellations possible: beam size capity in an isolated mould insent to many small carefies in our or numerous would marris with specific solations for dishors and ejections.

The applicability might be species, our thermal isolation from the surrounding tool and the consistent hub-combing remain and the consistent hub-combing remain and d 5.2 holum tool change spitems

Certainle, multiple use also offers as interesting perspective for the curvest land to make discovering with small questions. For extrain sizes/section, with dislove or filters only out maked encoded structure is inquired for several applications. The balloring approximate the section of streedwid program includes variations of streedwid of program includes variations of streedwid demands for enablingle use, in which the local demands for enablingle use, in which the local demands for enabling the sequention.





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Partner for solutions

We are a team of specialists with professional backgrounds in practice. As a family-owned company, we have been striving for innovations, challenges and fair co-operation since 1986.



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We are looking forward to seeing you



location:
Brandboxx Hannover
30855 Langenhagen
GERMANY

>90 exhibitors

15 expert lectures

500+ participants

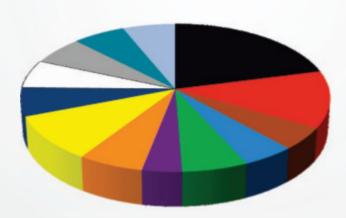


The 20th edition of the ... renowned event for professionals in the plastics and tool and mould-making industry, the Hein Technology day, did not disappoint. The event attracted 550 visitors on 19 February. The various presentations on a diverse range of topics including hot runners, materials, injection moulding, design, additive manufacturing and many more completed the program.

ETMM 2016-03-02



structure of exhibitors



- standard elements
- hot runner
- temperature regulation
- injection moulding machines
- universities / institutions / fairs
- surface / coating
- CT / measuring / sensors
- additive manufacturing / prototypes
- materials / additives / filler material
- tool construction / injection moulders
- software / services
- cleaning / maintenance
- machines / devices







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