IB STEINER

Leading Competence in Plastics Engineering

Dipl.-Ing. Gottfried Steiner

Innovation Business

A - 8724 Spielberg

Success is Our Service

"Systematic development provides the better product in a shorter time combined with better economics."

Gottfried STEINER, CEO of IB STEINER

Leading Competence in Plastics Engineering

- Market successes by innovations
- Creating next state-of-the-art
- Superior solutions in mass production
- Systematic development with virtual tools
- Light weight solutions made of wood + plastics
- EXJECTION technology for long components
- High productivity by continuous injection moulding

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Poststraße 12
Austria, Europe

- QM system: conform EN 9100 and DIN EN ISO 9001
- CAD system: CATIA V5, DRAFTSIGHT 2016
- Virtual development tools: FEM, AUTODESK SIMULATION MOLDFLOW SYNERGY 2015

- Laboratory: HYBRID COMPOSITE PRODUCTS GmbH
- Foundation: 1995 (IB STEINER) and 2005 (HCP)
- Competence: more than 2.500 projects

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The Market
Increase and Innovations

- **All branches and parts of industries**
- **Countries:** EU, GB, USA, CAN, KOR
- **Customers: 250 +**

  AHT, ATB, ASMA, AVL, BERNDORF, BLUM, BRAUN, DURA, ECONOMOS, ENSINGER, EUROPLAST, GREINER, HENKEL, HIRSCH, HOERBIGER, HONNEN, HTP, ISS, KE KELIT, KNAPP, KOCH KRAUS, KWB, LGE, MACO, METEKA, MIBA, MULTIPLAST, ÖBB, P&G, PAICON, PALFINGER, PEWAG, POLOPLAST, PRAHER, SAG, SAURER, SEFAR, SEZ, SEMPERIT, SIEMENS, SKF, SSI, TACFAST, TSUBAKI, UMDASCH, VA TECH, VSL, WILD, etc.
- **Systems suppliers of AUDI, BMW, DC, FORD, JAGUAR, OPEL, SAAB, VOLVO, VW, etc.**
- **Partner of AIRBUS, BOEING, BOMBARDIER, etc.**

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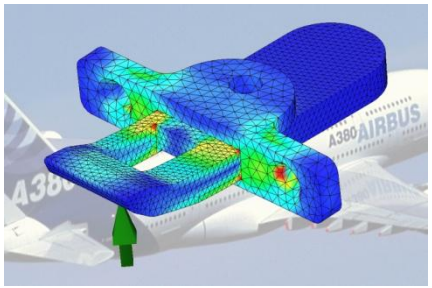
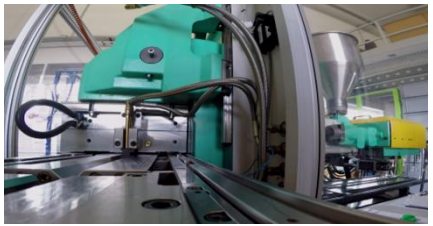
Innovativ Products and Technologies
Superior Solutions for Serial Production





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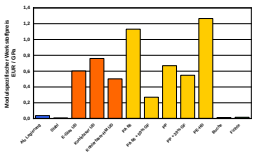
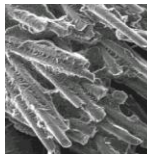
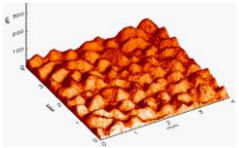
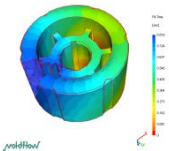
Advanced Position by Active R&D



- **Wood + Plastic / WoodC.A.R.**
  - Functional overmoulding of compact wood (TECHNOFIT, COMET K-Projekt)
- **NELOFITE / ForestValue Strong Composite**
  - Injection moulding parts reinforced with LGF / Cellulose (EU CRAFT, Horizon 2020)
- **Surface structures / Openair® Plasma**
  - Injection moulding parts with functional surfaces (PCCL)
- **Evacuation of moulds**
  - Prevention of thermo-oxidative material degradation
- **EXJECTION / EXMAIR**
  - Production of long parts for aircraft interieurs (FFG, SFG, TAKE OFF)
- **BioVALVE**
  - Hybrid heart valves made of titanium, overmoulded with TPU (M_ERA.NET)







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Aircraft Interior Systems
QMS According to EN 9100

BOEING

WINDOW ASSY
- A330/340
- A380
- BA Challenger 300
- B717 (MD 95)
- DO728

AIRBUS

OHSC LATCH ASSY
- A320
- A350
- A380

BOMBARDIER AEROSPACE

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Functional Aircraft Interior Assemblies

Duration of Product Development for Window Assies

1995|Foundation IB STEINER

1997| B717 Window Assy
Implementation **20 months**

2004| A380 Window Assy
Implementation **12 months**

2005| A330/340 Window Assy
Implementation **7 months**

2007| CL300 Window Assy
Implementation **5 months**

- Implementation from the first design draft to release for production including construction of moulds (FAI = First Article Inspection)
- Reduction of development time by systematic development with virtual tools

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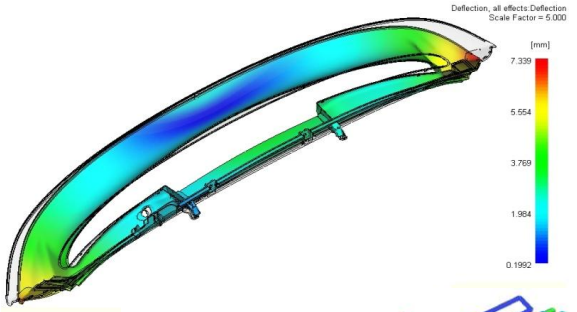
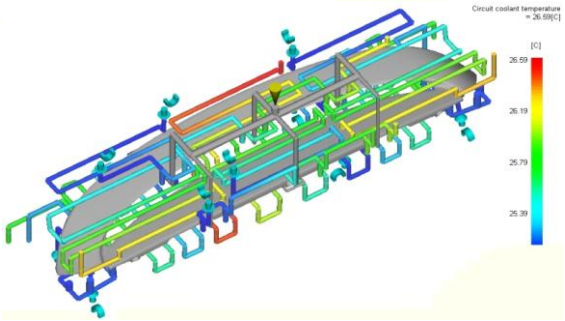
Rear Roof Spoiler VOLVO C30

Calculation of Shrinkage and Warpage





- **Part design: 2 shells welded together**
  - Part length of 990 mm
- **Injection moulding material: PC/ABS unfilled**
  - Type CYCOLY C1100HF painted
- **Simulation software: MOLDFLOW MPI**

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PALFINGER PALcom P7

Radio Remote Control for Loader Crane Operation

- **By crane professionals for crane professionals**
- **Setting new standards**
  - Design
  - Safety
  - Operator-friendliness
  - Working efficiency
- **IB STEINER scope of services**
  - Virtual development
  - Construction of assembly
  - Process development
  - Plastic part design

PALFINGER

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MEDINOXX Modular Medication System with 2C Sealed Cups

Systematic R&D for New Smart Solutions

- **The system components**
  - Medi Cups 10 ml and 15 ml, each in rows of 7
    - Patented separation of the sealing function from the opening function
    - Medi-Cups are liquid-tight and re-sealable
  - Blister software, printer with foils and labels
  - Medi Trays 7x4 and 7x6 with EasyClick Base Plate
  - One Click locking aid and MULTIVAC Heat Sealing Unit
- **Development process as Stage-Gate™ process**
  - Current status analysis, patent research and FFG Feasibility Study
  - Main development with 2C injection moulding tests
  - Series implementation with development of the system components
- **MEDINOXX reduces plastic waste by up to 90 % compared to existing blister systems**

MEDINOXX
MODULAR MEDICATION SYSTEM

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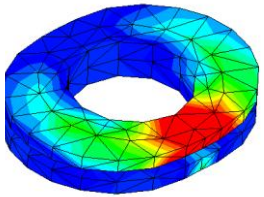
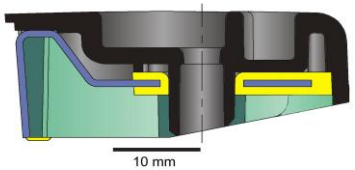
MCDS Technology
Integrated Sliding Window Module for VW



MCDS: Multi-component Damping System

System supplier: DURA Automotive Body & Glass Systems GmbH



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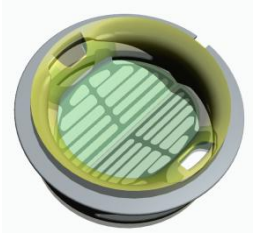
The Material Competence

- **Full competence over the entire plastic materials sector**
  - Thermoplastics, elastomeres, duroplastics
  - Adhesives, lacquers
  - Fibres, textiles
- **Experience with high temperature thermoplastics (PEI, PPS, PPSU, PPA, aromatic PA, PEEK, ...)**
- **Multi-component thermoplastic composite parts**
- **Use of material combinations/hybrid technologies**
  - Wood + thermoplastic composite solutions
  - Ceramic + metal + plastic combinations
  - Composites + thermoplastic hybrids

Project bioVALVE: Development of Polymer Heart Valves
INLET VALVE and OUTLET VALVE



- **Polymer heart valves are a composite construction made of polycarbonaturethan (PCU) and a thin-walled net reinforcement made of titanium**
  - Hybrid injection moulding of polymer components with inserts made of metal (titanium)
- **Innovative flow design creates conditions in heart that were improved by use of polymer component**
- **Much better bio compatibility is main advantage of hybrid heart valves developed**
- **The M_ERA.NET project bioVALVE was funded by the Austrian Research Promotion Agency (FFG)**

ReligaHeart®

Research cooperation of IB STEINER and partners from Austria and Poland:
JOANNEUM RESEARCH Forschungsgesellschaft mbH.
Foundation of Cardiac Surgery Development
Institute of Metallurgy and Materials Science, Polish Academy of Sciences

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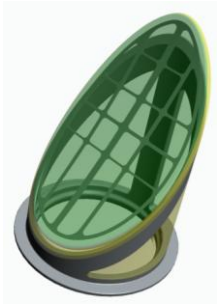
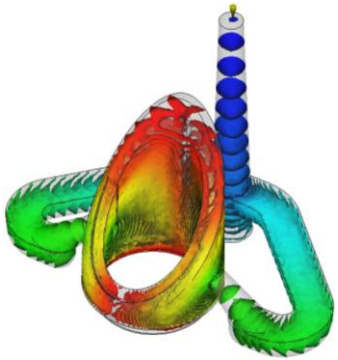
Project bioVALVE: Development of Polymer Heart Valves

Process Simulation for Hybrid Injection Moulding

- Interpretation and simulation of the injection moulding process in hybrid construction for the manufacturer of the heart valves
- The component geometry was developed virtually in several iterative steps
- Interactions between part properties and moulding conditions need to be considered during optimization of flow design
- Process simulation was used for mould design including cavities and runner system
- Rheological mould design was verified with moulding trials
- Position and fixation of titanium mesh inserts were in focus of virtual development
- Trial mould was developed and used for production of hybrid trial parts





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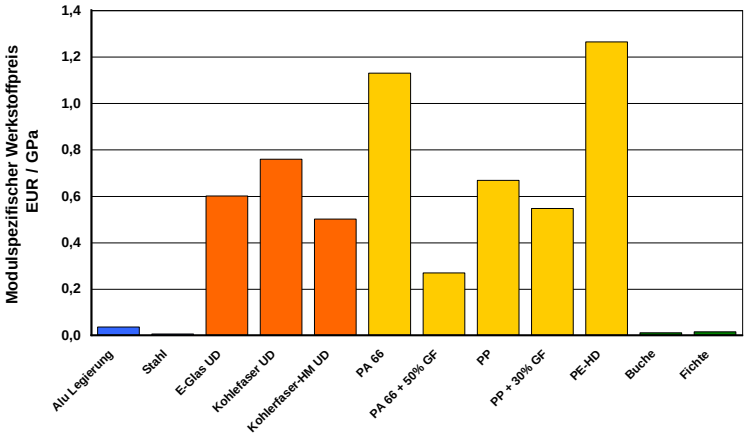
Wood + Plastic

Smart Combination of Material Properties

- **Wood as load resisting component**
  - High specific rigidity for light weight solutions
  - Low material costs with regard to stiffness
- **Functionality by use of plastics**
  - Freedom of design in geometry and surface
  - Efficient production of integrated functions



COMET K-Research Project WoodC.A.R.
Computer Aided Research with Wood

WoodC.A.R.
COMPUTER AIDED RESEARCH

- **Vision of WoodC.A.R.**
  - Use of customized wood materials for technical components and products
    - EWPs (Engineered Wood Products)
    - EWCs (Engineered Wood Components)
- **Wood as a structural component in vehicle construction**
  - Use of advantageous lightweight construction properties of wood for higher stiffness
  - Advantages in energy absorption (crash), vibrations
- **Optimization of simulation tools in CAE**
  - Evaluation and optimization of existing material models of wood
  - Validation of the material models in use cases

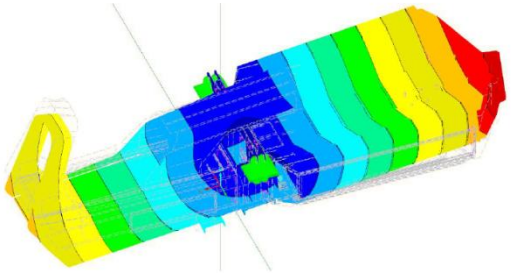


Photo: Mattro

Source and partners see www.woodcar.eu

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COMET K-Research Project WoodC.A.R.
Virtual Engineering and Eco Design

WoodC.A.R.
COMPUTER AIDED RESEARCH

- **Virtual engineering**
  - Investigations of material behavior
  - Material variability
  - Material selection
- **Cross-Innovation-Approach analysis**
- **Evaluation of**
  - Joining technologies (IB STEINER)
  - Production technologies (IB STEINER)
  - Adhesive technologies
- **Precociously implemented eco design**
  - Principle of sustainability
  - Life cycle assessments (LCA)

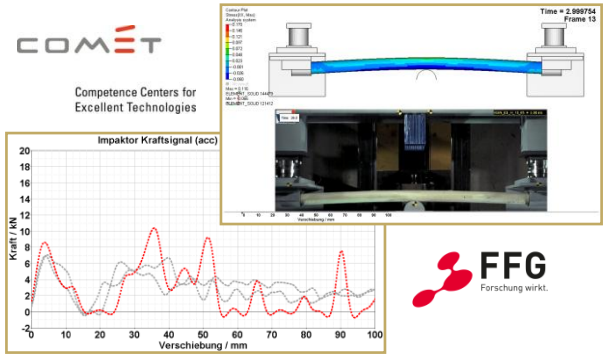

Photo: MAGNA

Funded by BMVIT, BMDW and the federal states Styria and Tyrol. The COMET program is managed by the Austrian Research Promotion Agency (FFG).

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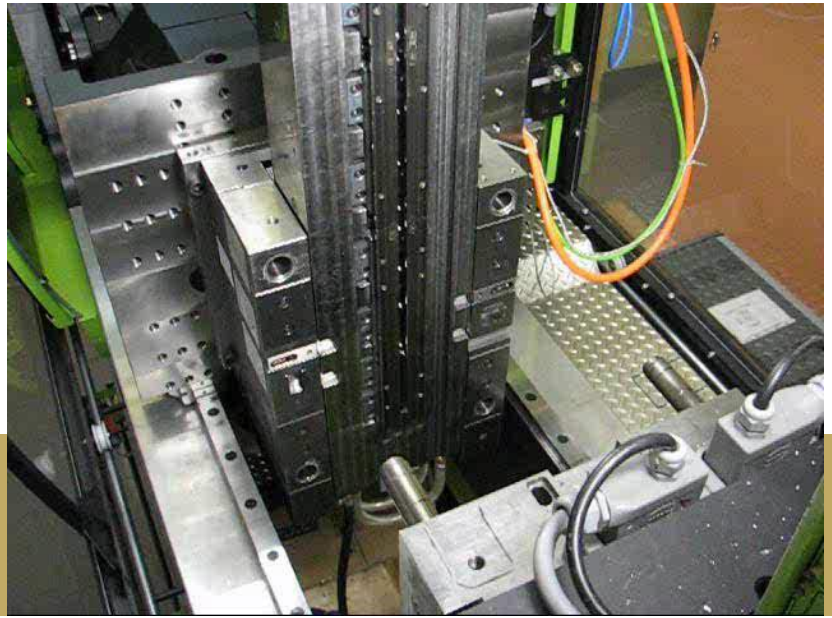
Mould in Motion: EXJECTION
National Award Consulting 2009

Assessment of
expert jury:

„EXJECTION technology
is most innovative
injection moulding
technology
for a long time.“



EXJECTION

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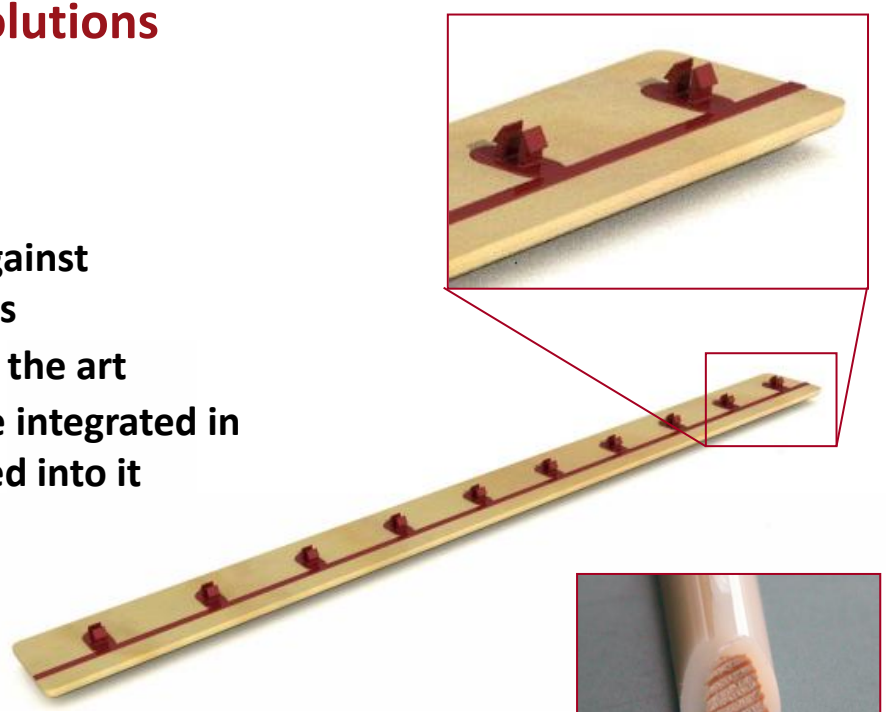
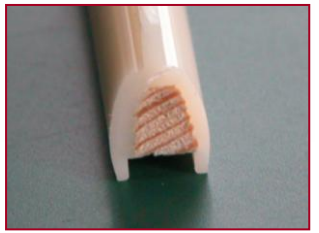
EXJECTION for Composite Solutions
Functionalisation of Wood

- **Rails and ledges are often made of wood**
- **Fixing composites with nails and screws is against design rules and create stress concentrations**
- **Fixing elements made of plastics are state of the art**
- **Runner system for injection moulding can be integrated in the wood component, e.g. by a groove milled into it**
- **Functionalisation of wooden parts with EXJECTION**
  - Snap-fits, bayonet connection
  - Adjustment and fastening elements
  - Integrated fixings
  - Screw bosses





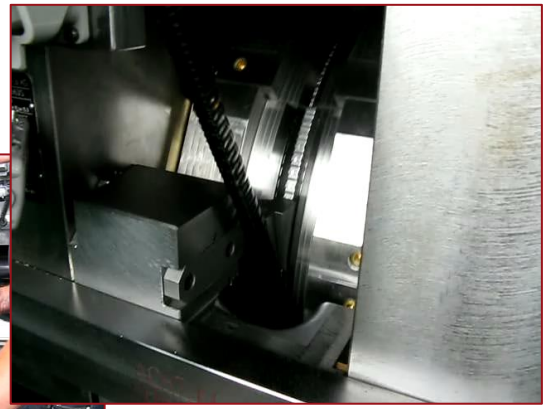
LED Lamp Optics by VOSSLOH SCHWABE
Development Partnership with Exclusivity

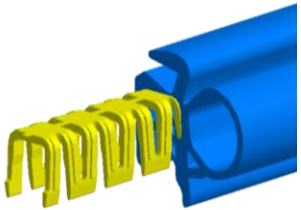
LIGHTING SOLUTIONS

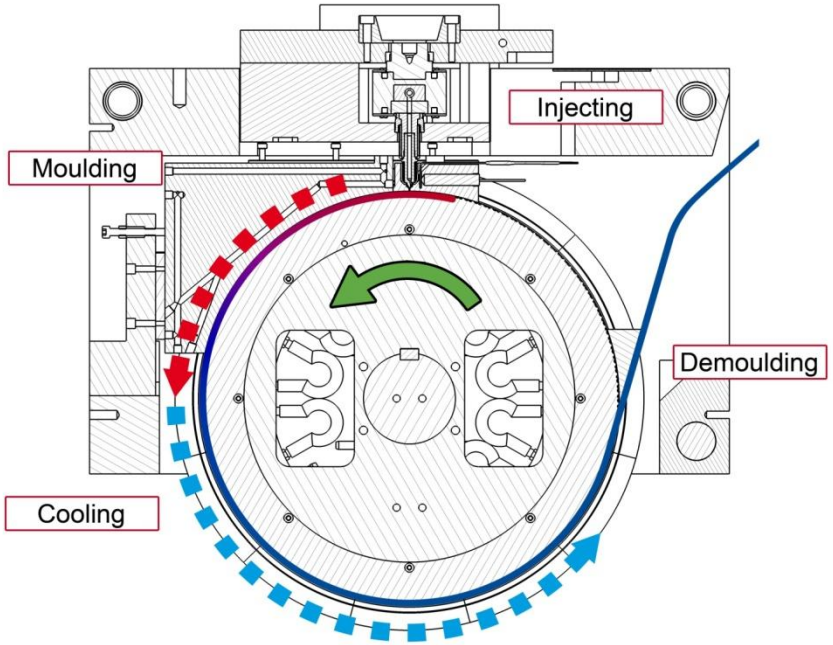
Video by VOSSLOH SCHWABE: https://www.youtube.com/watch?v=UV0w79IeGaA

Continuous Injection Moulding
EXJECTION Endless Concept and Real Process

SAARGUMMI
Sealing the future







EXJECTION

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Continuous Injection Moulding by EXJECTION

Endless Success in Mass Production

- **Production of a real three-dimensional geometry of profile**
  - Freedom in design like injection moulding
- **Overmoulding of endless tapes**
  - Endless production of hybrid profiles
- **Production of small parts lined up in row**
  - Centrally positioned and well aligned
  - Simple feeding of automatic assembly unit
- **Increasing of capacity**
  - No idle times of the machine
  - Simultaneously dosing, injecting, cooling and removal

Photo: ENGEL AUSTRIA

EXJECTION Project Settlement

Development and Implementation into Mass Production

- **Customer request**
  - Basic assessment of the feasibility
  - Clarification of licensing
- **Feasibility study**
  - Estimation of the technological realization
  - Estimation of project costs and economics
  - Estimation of implementation period
- **Predevelopment (concept study)**
  - Optimization of the part geometry
  - Establishment of a mould concept, process simulation
- **Start of main development stage and series implementation**
  - Design freeze: Component geometry and material selection
  - Mould design, mould construction, EXJECTION facility

Our Services for Your Best Drive

Rapid Support and Long-term Development Partnerships

- **State-of-the-art analyses and diversification**
- **Solution finding and feasibility studies**
- **Development of components and products from the design stage to mass production**
- **Development of new technologies**
  - EXJECTION technology, continuous injection moulding
- **Smart components made of hybrid materials**
  - Wood + plastic for functional light weight solutions
- **Technical and economic redesign**
- **Virtual prototypes and numerical simulation**
- **Know-how transfer and development of skills**

Contact

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www.twintee.at

www.exjection.com

www.gottfriedsteiner.com

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www.hcp0.com