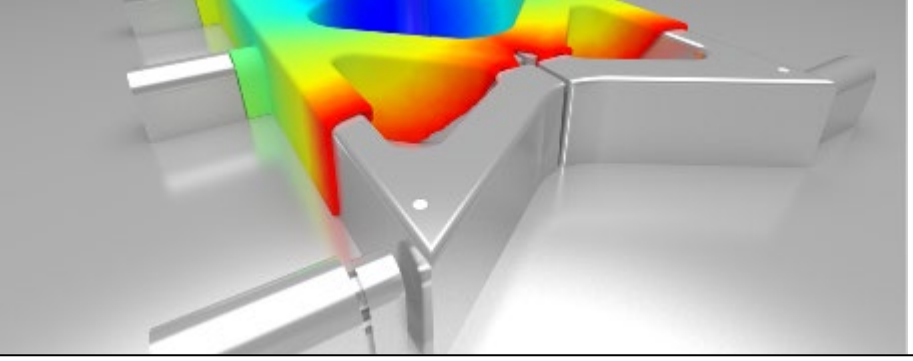

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Moldflow Level II – Design Fundamentals

Fundamentals and Interpretation Workshop

Main aspects:	• Methodic rules for part design and tool construction – visualized and interpreted with examples of process simulation • Autodesk Simulation Moldflow – Result Interpretation - correlation between simulation result and quality features - correlation between simulation result and practice relevant decisions
Main focus:	• Improvement in comprehension of simulation • Check of the reliability of results • Coming to specific decisions • Safety in daily practice • Open discussions in small groups
Target group:	• Moldflow beginners and Moldflow users • Project leaders / Decision makers • Part designers and tool constructors • Tool makers and tool setters
Condition:	• Moldflow Level I – Base Overview
Location:	• In coordination with the customer
Duration:	• 2 days (net time: ca. 6 - 7 h / day)
Group capacity:	• Limited to a maximum of 10 participants
Documents:	• Training handouts with interpretation support and explanations of the individual simulation result plots • Injection molded samples
Process:	• Introduction of design aspects via PowerPoint presentations • Questions to the group (Expectations? Backgrounds? ...) • Explanation of rheological and technical shrinkage phenomena via live-simulations • Discussions about facts and background in the group

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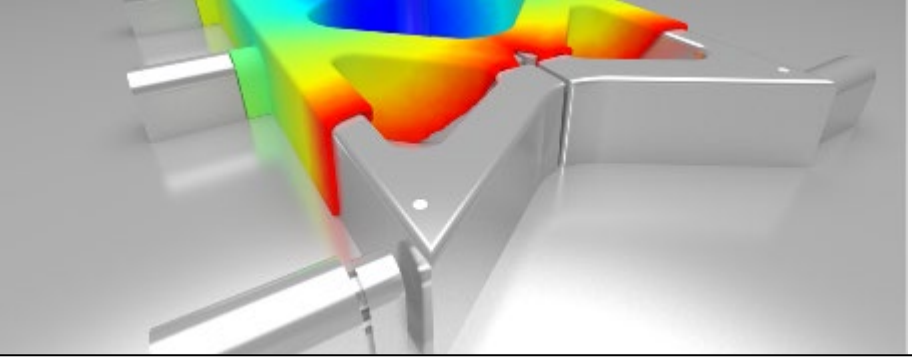

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Agenda: Topics Day 1

Fundamentals – Systematic part and mold design		
Block - 1	**GL_01: Influence of design and injection point on the filling behavior** • wall thickness differences, grill structure, rib thickness, opposite draft angles, film hinges, clip slots, wall thickness minimization, wall thickness differences in visible surface (Day/Night-Design) e.g., influence of gate positions, … • evaluation of the general filling capability, process safety / process window as well as quality aspects and technical tool aspects, such as weld line positions and weld line lengths, air inclusions, air venting points …	90 Min.*
Block - 2	**GL_02: Pressure losses in gating systems, flow length / thickness ratio runner balance** • comparison of different gating systems – as cold sprues, open hot runner nozzles, needle-valved nozzles, externally vs. internally heated nozzles • wall thickness / flow paths / pressure limits / quantity of injection point • rheological balanced of gating systems, cold runner vs. hot runner	60 Min.*
Block - 3	**GL_03: Influence of design and gating point on shrinkage and warpage behavior** • causes for shrinkage and warpage effects • basic rules and phenomena on training examples / practice transfer via case studies • source variables, filling behavior, wall thickness differences, ribs, fiber orientation , film hinges, influences from cooling system	90 Min.*

** time frames within training sessions may differ*

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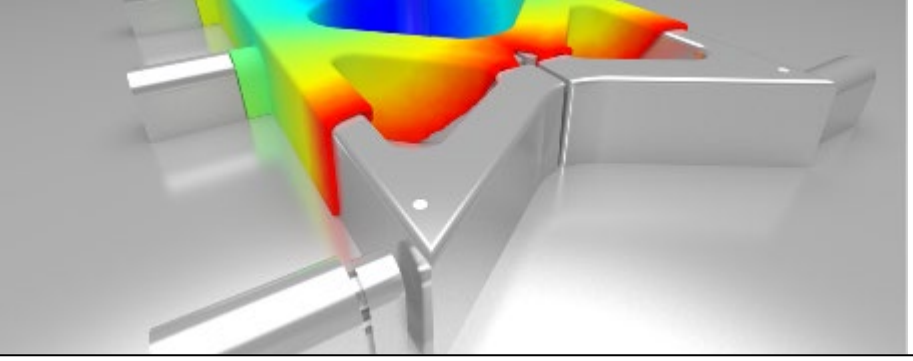

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Agenda: Topics Day 1

Autodesk Moldflow Insight – Result Interpretation		
Block - 4	**IP_01: Material Data** • polymers / decoration materials and part inserts / mold steel and mold inserts / fillers (short vs. long glass fiber, beads, carbon fibers …) • required coefficients / process settings / quality criteria / MQI / failure potential due to material errors / …	40 Min.*
Block - 5	**IP_02: Numerical Models** • midplane / DualDomain / 3D / Adviser vs. Insight • applications / limitations / result plots	20 Min.*
Block - 6	**IP_03: Filling and Packing Phase (Part)** • results plots and und conclusions to practice • fill time, weld lines, air traps & ventilations, in-mold pressure and clamp forces , temperature distribution at flow front and within walls, shear impact and shear stresses, cooling time, packing pressure supply, molten layer history, volumetric shrinkage and fiber orientation • inserts, in-mold decoration, 2C-overmolding, core shift …	60 Min.*

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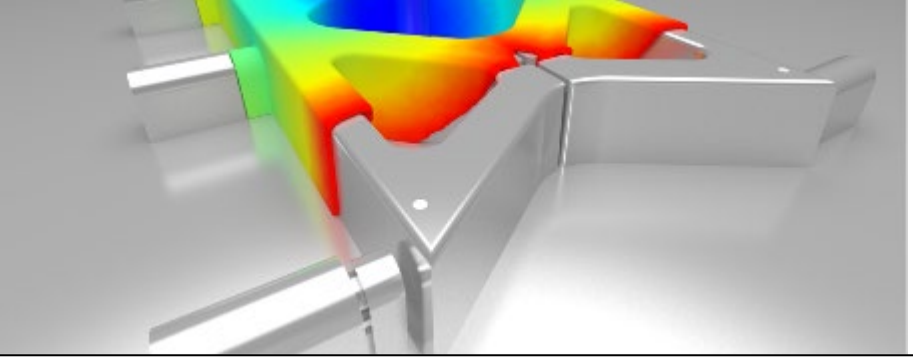

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Agenda: Topics Day 2

Autodesk Moldflow Insight – Result Interpretation		
Block – 7	**IP_04: Filling and Packing Phase (gating systems and mold aspects)** • results plots and und conclusions to practice • dimensions, runner balance, shears impact in gates, thermal impact in runner systems, freezing point , melt flipper, nozzle heads vs. full runner systems … • conventional hot runners vs. sequential filling (cascade – valve gates) acceleration and hesitation effects / pressure marks / air ventilation … • use of side cavities for incorporation of air or impacted melt – gate side	60 Min.*
Block – 8	**IP_05: Cooling Analysis (mold)** • results plots and und conclusions to practice • temperature, pressure and flow conditions within cooling lines • mold contact temperatures, thermal camera plot, hot spots, core heating • mold influence on part warpage and cycle time • current potentials of cooling analysis (BEM, 3D FEM, CFD)	60 Min.*
Block – 9	**IP_06: Shrinkage and Warpage Calculation (part)** • results plots and und conclusions to practice • causes and reasons on warpage effects: wall thickness, polymer grade, fillers, glass fiber orientation, gate position, packing pressure supply, cooling system, part inserts, 2C overmolding … • special evaluations (planarity, roundness, angles, warpage prevention, export of warpage results …)	60 Min.*

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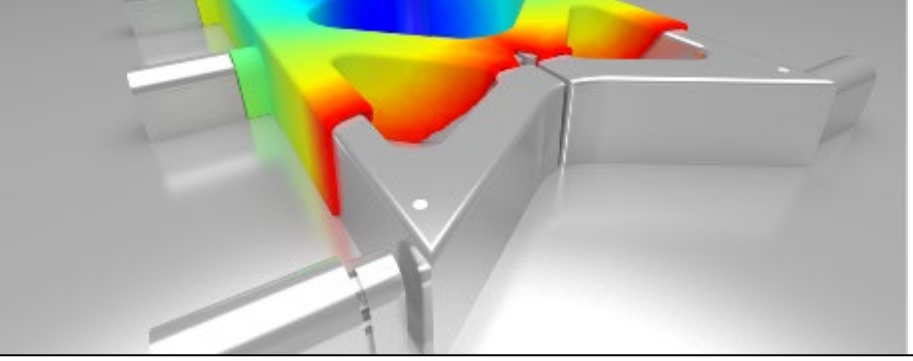

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Agenda: Topics Day 2

Autodesk Moldflow Insight – Result Interpretation		
Block – 10	**IP_07: Case Studies from practice** • increase of practice transfer via in depth discussion of customer projects (→ selection of projects in close cooperation with the customer) • discussion of current project examples of training participants (PowerPoint Reports, Moldflow Study-Files, Moldflow Communicator Files)	180 Min.*
Block – 11	**IP_08: Check List for Simulations & Requirements for Specification Sheets** • contents of a reliable simulation report? • quick quality check of simulation reports and simulation runs? • input requirements of specification sheets	30 Min. *
Block – 12	**Final Discussions / Feedback**	30 Min.*

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