

## **Trainings Tsetinis Tooling GmbH**

### **Plastics engineering:**

- Plastics engineering and injection moulding technology for purchaser (1 day)
- Plastics engineering and injection moulding technology for constructors and developers (2 days)
- Snap connections within plastic parts (1 day)\*\*
- Injection moulding with special procedure(1 day)\*
- Design guidelines for injection moulding parts (1-3 days)\*\*
- Project management for the product development of plastic parts (1 day)\*
- Overview of different plastic processing techniques (1 day)\*
- Different producing techniques of plastic parts (foaming, SMC, extrusion, rubber processing) (1-3 days)\*\*
- Finite element analyses and mould filling simulations (Basics) (1 day)\* \*\*
- Basics of the connection technology (overview) (1 day)\* \*\*
- Chemistry of plastics (1 day)\* \*\*
- Basics of the material testing of plastics and components (1 day)\*\*
- Simultaneous Engineering (1 day)\*

### **Tool technique:**

- Basics of injection moulding tools for technological purchasers (1 day)
- Basics of pre calculations of injection moulding tools for technological purchasers (1 day)
- Design guidelines for injection moulding tools (1-3 Days)\*\*
- Construction of plastic and injection moulding tools with CATIA V5 (3-Days)
- Production of prototypes and small batch tools (1 day)\*
- Calculate tools successful - overview (1 day)\*
- Die casting tools basics (1 day)\* \*\*
- Cut-, swage- and bend tools ,basics (2 Days)\* \*\*
- Calculation of cut-, swage- and bend tools – workshop (1 day)\* \*\*
- Tools for the production of door seal systems (1 day)\*
- Forming processes overview (1 day)\*

\* Suitable for technological purchasers, engineers, project manager or decision makers

\*\* Suitable for constructors or technicians

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### Examples with clarifications:

⇒ Numerous trainings can be combined with tool technique workshops.

#### ➤ **Basic training plastic engineering:**

**1 Day**

- Plastic basics
- Basics of different producing techniques (overview)
- Injection moulding technology basics (machines, installation engineering)
- Specific methods designing plastic components

#### ➤ **Basic training injection moulding components:**

**1 Day**

- Basic construction of tools
- Analysis of injection moulding tools
- Technologies of the tool production
- Considerations of injection moulding special technologies the implementation on tools

#### ➤ **Basic training cut-, swage- and bend tools**

**2 Days**

- Overview metal processing
- Description of basic method processes
- Overview of the tools
- Structure of the different tool groups
- Description of the different pool groups and the evaluation

## **Individual training modules:**

### **Basics structure of plastics, Part I (45 min)**

- Important values of plastic components for constructive use

### **Basics structures of plastics, Part II (90 min)**

- Basis information from the plastic chemistry
- Specific properties of plastics
- Influences on the dynamic of thermoplastics
- Deformation mechanisms

### **Plastic values of plastics – especially for constructors (45 min)**

- Usage of databases for the investigation of key figures
- EDV-usage for example „campus data „company specific data

### **Injection moulding basics, Part I and II (90 min)**

- Structure machines, description of the processing
- Injection mould procedure
- Problems with the processing
- Structure of injection mould tools, features and specifics regarding individual parts

### **The construction process / project management, Part I + II (90 min)**

- Generation of requirement performances
- QFD and FMEA

### **Practical construction, Part I + II (120 min)**

- Introduction in the construction process
- Different approaches within the construction of injection moulding components
- Modern helping tools for the construction
- Description of construction helping tools

### **Material load dimensioning (90 min) with construction examples, Part I + II**

- Tendency reduction
- Calculation example

**Producing suitable dimensioning of plastic components, Part I + II  
(120 min)**

- Knit lines
- Optimisation of corners, and edges
- Avoidance of delay through constructive measures
- Flow behaviour
- Draft angles

**Snap coupling, Part I (60 min)**

- Coupling systems (Basics and differentiations)
- Advantages and disadvantages of coupling systems
- Snap coupling and snap hook
- Spring elements
- Film hinges

**Snap coupling, Part II (60 min)**

- Examples of coupling methods
- Calculation of snap couplings

**Accounting possibilities for FINITE-element (90 min)**

- Finite-element-methods examples
- Consistence calculation of plastic components
- Linear consideration possibilities and examples

**Mould filling simulation (90 min)**

- Form filling simulation
- Component filling analysis with analysis tools
- Injection point establishing
- Shrinkage and delay