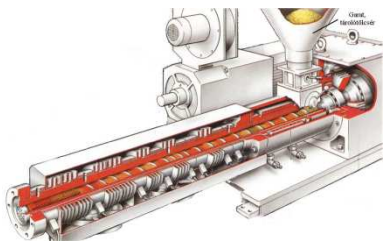




# Plastic Industrial Engineering Ltd.



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## Consultancy and technical expertise on application technique and processing plastic

### Developing new technology and products

Product development

Design, drawing, and model preparation

Technological design

Selecting the materials, technology, starting the production

### Tooling management

Design, construction, installation, master adjustment

### Investment planning, implementation

Carrying out feasibility studies, investment proposal and implementation.

Selection of new and used machinery and installation

Training on the new technology, starting the production of a „0” run

### Expert report preparation and valuation

For tenders, borrowing and lease

### Production optimisation

Screening of manufacturing processes, proposals for modification

To improve quality, productivity and unit cost

Examining the conformance of the applied resources, discovering the weak link

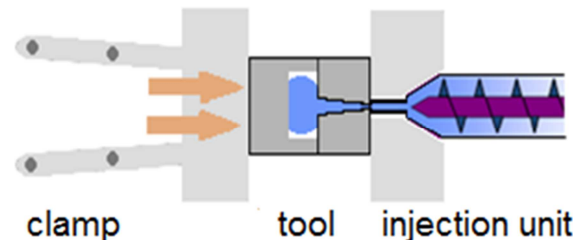
Bringing into line materials, machinery, tools, technology and people

### Assessment and expansion of plastic-related knowledge

Assessment of plastic-related knowledge

Organization of education and trainings

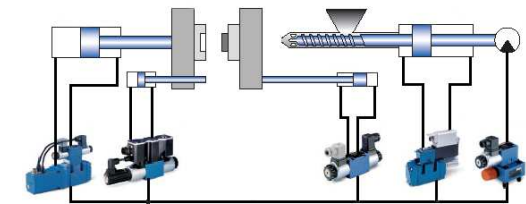
Specialised training on injection moulding and extrusion



## Moulding Concepts

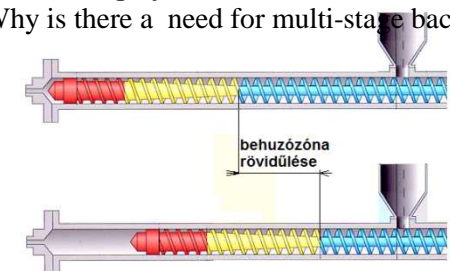
### Injection Moulding Machine Operation

Injection-, closing-unit operation, controls varieties



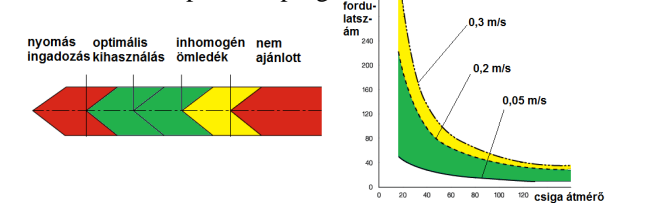
### Plasticizing system, screw shortening

Why is there a need for multi-stage back pressure



### Shot setting

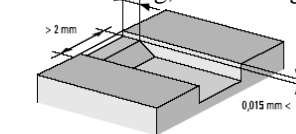
HUT time, temperature program, shear rate



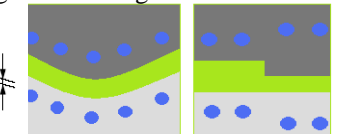
### Screw speed and diameter

### Self-cleaning venting

Mould filling, form fixing with cooling



### Cooling, heat removal

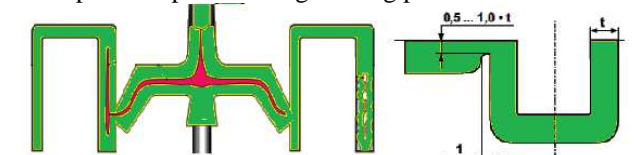


### Gate location

and

### scaling

Compression phase during holding pressure



## Education, training

Nowadays the optimal utilisation and the handling of production tools and high-performance injection moulding machinery affect how economical are the production plants.

Despite the use of the best technique, if the adjusted parameters are not optimised the productivity will drop, and there will be more reject.

### **On the trainings and courses we are focusing on the presentation of typical problems for example:**

- During the adjustment of the screw if we do not take into account the screw diameter, the shear force will cause material damage and the production of gas melt.
- The use of one back pressure even in the case of a bigger shot, ignoring the stroke capacity, the cycle time and the melt temperature inhomogeneity caused by the screw shortening.
- The use of one injection velocity during the mould filling, which is the principle cause of the free jetting and the gate rigidity.
- Avoid the errors caused by switching to holding pressure, and the stress which comes from over injection moulding.
- The adjustment of a similar holding pressure run in amorphous (ABS) and semi-crystalline (PA) plastics.
- Among all the factors taking into account only the tool temperature in the preservation of the form and size performed with heat sink.

The main goal of the courses is the invitation to a conscious and deliberate work. Its steps are the following:

#### **1. Error analysis**

*e.g.: Sink mark on the ribs.*

#### **2. Think through the possible techniques for correction.**

*Is it caused by gate freezing or bad holding pressure parameters?*

#### **3. Interference to make the correction**

*Parameter changing (rates, pressures)*

#### **4. Double check, documentation**

*The modified parameter's effect on the other parameters, transferring the modifications through the technology.*

### **We recommend the participation in the courses for the following people:**

Project and QS engineers, shift managers, group leaders, machine adjusters, moulding technologists, tool makers, maintenance staff.

## Course on injection moulding

### **Production of plastic products**

Product requirements

Material selection, product manufacturing

### **The theoretical basis of injection moulding**

Material characteristics that influence the processing

Plastication questions, thermal load capacity

Flows, material and form fixation

### **Raw material**

Description of plastics, material characteristics

Material examination, raw material management, preparation

Garbage management, environmental protection

### **Injection moulding machine**

Its types, units, controls

Machinery handling, startup, shutdown, maintenance

Operation, safety at the workplace, safety technology

### **Moulding tool**

Sprue and channel systems

Ejection systems

Cooling and heating systems

### **The functioning of moulding tools**

The connection between the moulding machine and the tool

The structure of the tools, operating principles

### **Tool changing**

Clamping pressure need and optimisation dwell

Tool installation and removal. wiring, adjustments

Maintenance, storage

### **Injection moulding technology**

Parameters' effects on product quality

Melt preparation

*Shot, temperature, plastication adjustment.*

Mould filling, change-over point

*Pressure and rate adjustment.*

Material and form fixation

*With afterpressure, cooling time and cooling rate.*

### **The most common errors**

The errors' physical forms, causes and how to avert them

Quality, economy and thrift-related questions

Productivity, costs

### **Consultation, examination, evaluation**

References: ADS, AMB, Electrolux, Festo, Flextronics, Grana, KnorrBremse, Kunplast-Karsai, Mikropakk, Nolato, Pepperl+Fuchs, SFS Intec, SMR, Sews, Shinwa, Thomas&Bettes, Wolf Plastics, stb.

## Extrusion course

### **Characteristics of the products manufactured by extrusion**

Product requirements

Material selection criteria

Elements of product manufacturing

### **The theoretical basis of extrusion**

Material properties that affect the processing

Reflow questions, flows

Shape and size fixing questions

### **Extrusion materials**

Material properties, material testing

Material handling, preparation

Waste Management, environmental protection

### **Extrusion machinery**

Types (profile, plate, foil, etc.).

Mechanical units

(screw types, rewinders, cutters, etc.).

Controls, the types of regulation

### **Machinery operation**

Startup, shutdown, maintenance

Operation, safety at the workplace, safety technology

### **Tool and caliber replacement**

Tool installation and removal

Wiring, adjustments, maintenance, storage

### **Extruder tool types**

Profiles, plates, sheets

Cooling and calibrating equipment's

### **Extruder tool handling**

Temperatures

Speeds

### **Additional procedures on extrusion products**

Calibrations

Punches, punching, etc.

Cutting to size

Confection

### **The most common errors**

Error manifestations, causes, troubleshoot

Productivity, quality, costs

### **Consultation, examination, evaluation**

References: HelioPlast Kft. ILPEA ProExt. Kft, Karsai Műanyag-technika Holding, SET PROM COM, Szivaplast, Tredegar Kft.