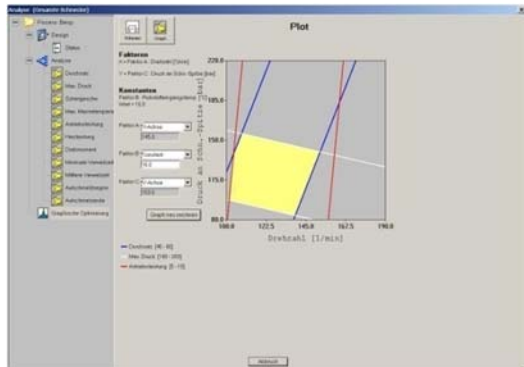


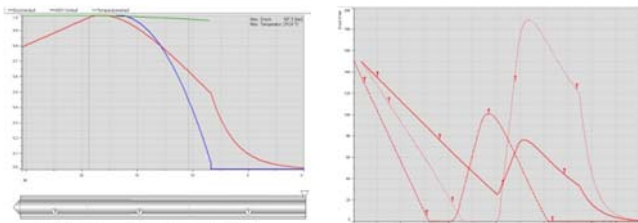
Range of functions and technical details

The software is characterised by a variety of functions which allow to the user to flexibly design the process and to gain absolutely reliable results. These functions are for example:

- Modular design of the screw from an extensive element-library, including various mixing and shear elements
- Inputting of barrier screws
- Flexible design of the heating zones
- Grooved- (axial and spiral) and smooth bushes
- Material administration with own material database PAM
- Variation module
- Scale-Up/ Scale Down function
- Statistical design of experiments
- User-defined functions
- Various reporting options



Graphical evaluation of the calculated design of experiment



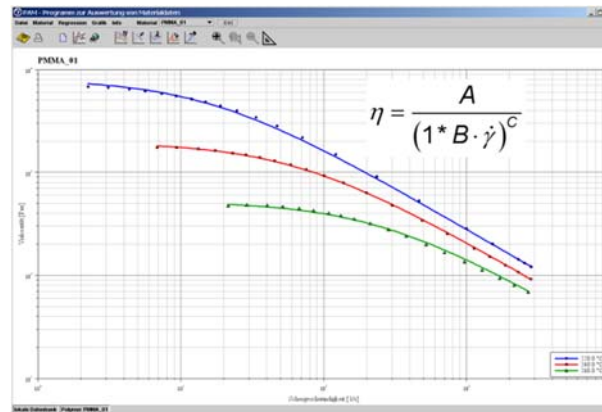
Comparison of the results of various parameters and various screws



The **Paderborn Material database - PAM** - is a software tool used to administer and evaluate material data in the field of polymer engineering. PAM was developed at the professorship for polymer engineering of the University of Paderborn (KTP). With the aid of PAM, the material data is made available for a PSI simulation.

Overview of the features in PAM

- Administration of material data
- Import and export of material and mixing data
- Import of measured values or their manual input
- Evaluation of measurement data with various regression functions
- Search for and compare various polymers



Viscosity graph

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Paderborner Spritzgießsimulation Injection Moulding Simulation



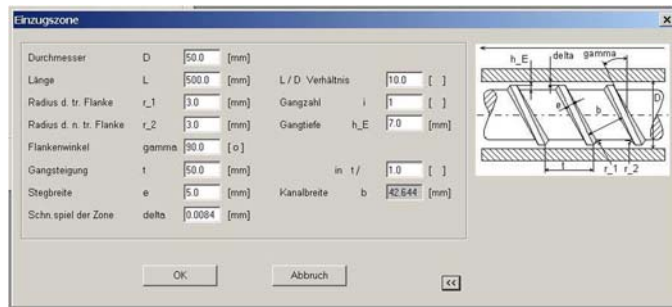
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Please find
further information at
www.KTPweb.de

PSI is a joint research project involving various leading industrial companies and the professorship for polymer engineering of the University of Paderborn. Its aim is to develop a software tool which simulates manufacturing processes which use single screw plasticising units. The simulation's requirements are to rapidly evaluate the machine's global behaviour and to optimise both the barrel and screw configurations as well as the process parameters. This is achieved by primarily implementing analytical and closed form equations. Computer-intensive numerical processes are mainly omitted.



Graphical user interface

Calculation possibilities

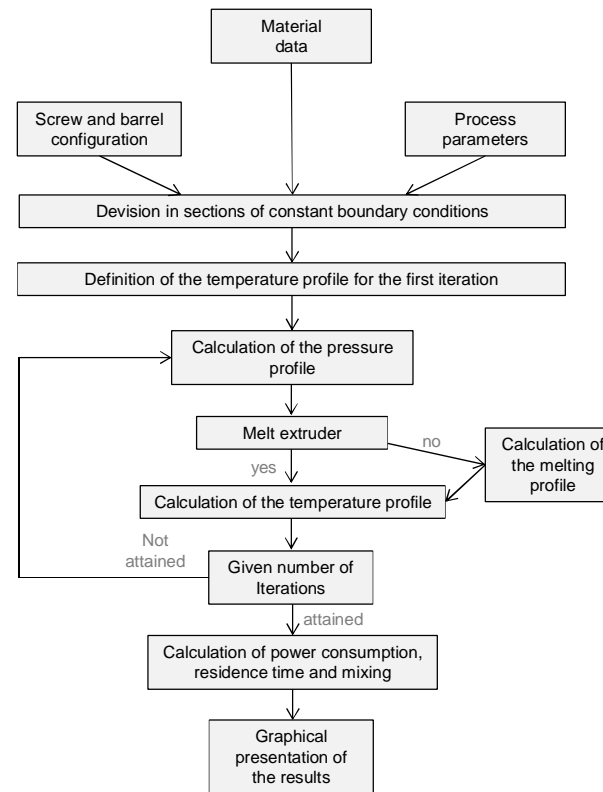
Using PSI the following calculations are currently possible:

- pressure and throughput,
- melting,
- temperature profile,
- power consumption,
- residence times,
- granulate feed behaviour,
- mixing parameter

In addition to the calculation for "pure" polymers, PSI implements models for estimating the behaviour of polymer blends and of polymer-filler-compounds.

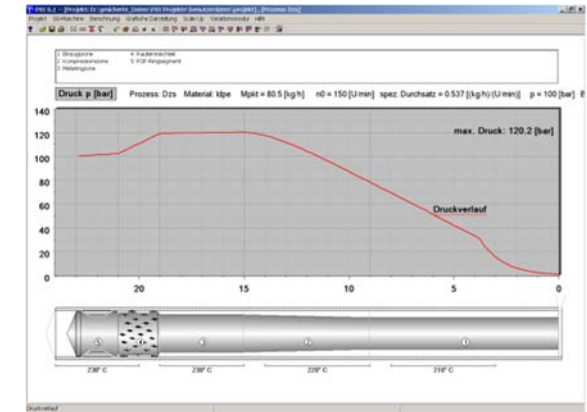
Calculation procedure

The calculation procedure is shown in the figure below. The central elements of a simulation are the pressure-throughput, the melting and the temperature calculations. Based on these calculations, all other essential parameters can be computed to evaluate and optimise the screw configuration.



Calculation procedure

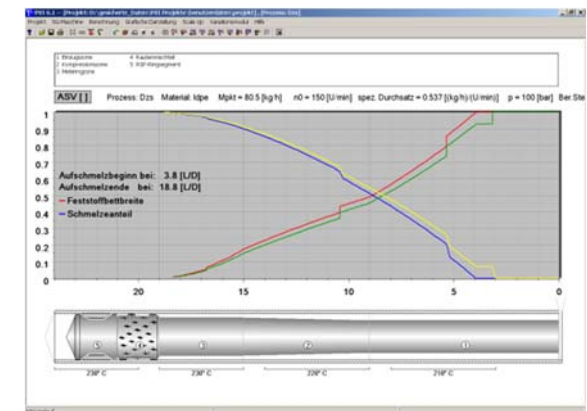
Simulation results



Pressure profile (red) along the screw length

The results of the simulation calculations can be depicted in tables of data as well as graphically in the form of diagrams along the screw length. By plotting the data in this way, it is possible to evaluate the single screw's zones and, if necessary, thereby easily modify the screw design.

To compare and evaluate the effect of various influencing parameters, a so-called variation module is implemented in PSI. All variations of the processes can be computed and be subsequently depicted as a multiple graph.



Melting profile (red: solid bed width, blue: melt amount)