



## PAM - Paderborn Material Database

The Paderborn Material Database – PAM – is a software tool for the management and assessment of material data in the field of plastics engineering that has been developed at the KTP Institute of Plastics Engineering. In everyday industrial practice, it is customary to assess viscosity, for example, on the basis of MFR values that can be established both rapidly and easily. These characteristics, determined from single-point measurements, however, do not provide a sufficient basis for simulation calculations. The latter require characteristic values that are far more difficult to determine (e.g. power law parameters or parameters from the Carreau formulation). PAM can be used to establish these characteristic values in a rapid and straightforward manner.

With standard commercial databases, users have to work with the data that is made available and have no possibility of adding new data or assessing their own data. When using PAM, by contrast, it is possible to compile, evaluate and compare material data sets.

### An overview of the features in PAM

- Administration of material data
- Import and export of material and mixing data
- Import of measured values or manual entry of these
- Evaluation of measured data via different regression functions
- Searching for and comparing different polymers

### Administration of material data

All the characteristic values that go with a material, such as thermodynamic data, density and rheological data, etc. are administered in PAM under the corresponding headings (see Figs. 1a and 1b).

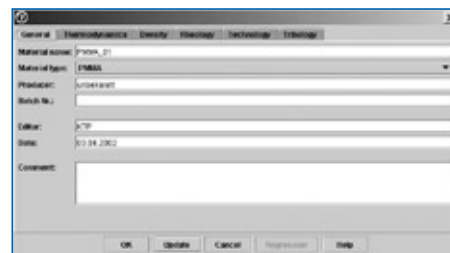


Fig. 1a: General material data

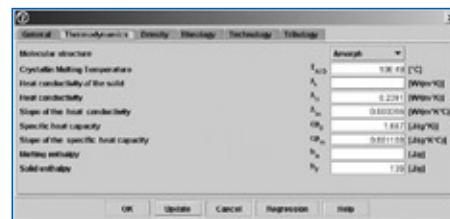


Fig. 1b: Thermodynamic material data

In addition to this, each material can have measurement series for viscosity, density and thermal conductivity, etc., allocated to it, which are shown as data points in the corresponding diagrams (see Fig. 2).

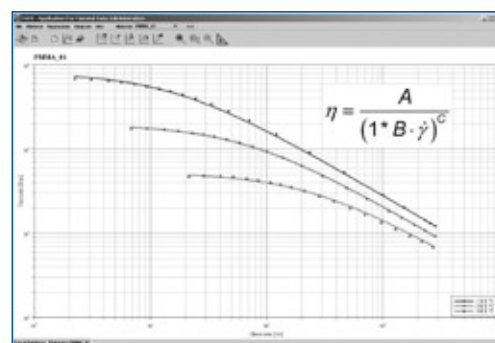


Fig. 2: Viscosity curve



### Data evaluation

PAM is used not only to administer data but also to evaluate this data, such as for purposes of a simulation calculation. The software can conduct a regression on the basis of a measuring series and thus establish the Carreau coefficients of a viscosity curve (see Fig. 2).

### Import and export

Material data and measurement series can either be input manually or imported from programs such as REX, SIGMA, PaDiCAD or Microsoft Excel. The data entered into PAM and processed by it can then, in turn, be exported and made available to the simulation programs, REX and SIGMA.

### Searches

By entering different parameters, such as specific types of material or zero viscosities, it is possible to search the database for materials that fulfil these criteria (see Fig. 3).

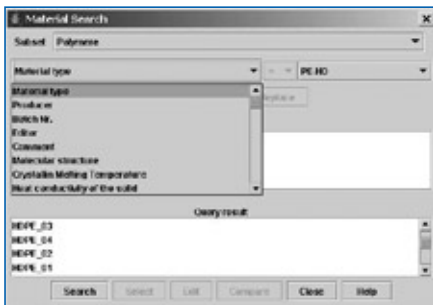


Fig. 3:  
Searching the  
database

### Comparing data sets

PAM can be used to compare up to five different data sets. This can be done in both tabular form (see Fig. 4) and graphic form (see Fig. 5).

	PP_03	PP_06	PP_06	PP_07	PP_07
Molecular structure					
Crystalline Melting Temperature	137.0	143.7	145.85	141.75	141.75 [°C]
Heat conductivity of the solid	0.24				0.2 [W/m·K]
Heat conductivity	0.250				0.200 [W/m·K]
Factor of the heat conductivity	1.05	1.05	2.25	1.05	1.0 [W/m·K]
Specific heat capacity	0.904758	0.9044	0.904752	0.90475	0.90475 [kJ/m³·K]
Factor of the specific heat capacity	1.0	0.97	0.95	1.05	1.0 [kJ/m³·K]
Molding shrinkage	22.5	20.21	20.97	20.57	20.7 [mm]
Solid shrinkage					

Fig. 4: Tabular comparison of material data for different polymers

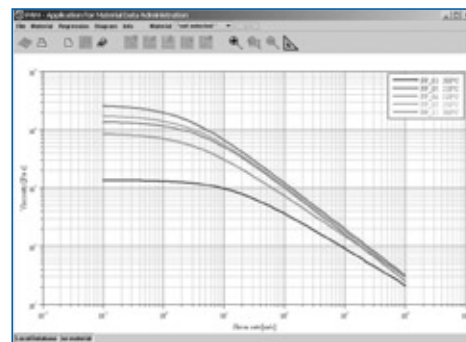


Fig. 5:  
Comparison  
of the viscosity  
curves of  
different  
polypropylenes  
(PP) at a  
temperature  
of 200°C