

Auto Evaluations and Validation

Many applications of thermal analysis have today become routine investigations, for example in quality control or quality assurance. Here, a particular property of the samples is usually investigated, compared with

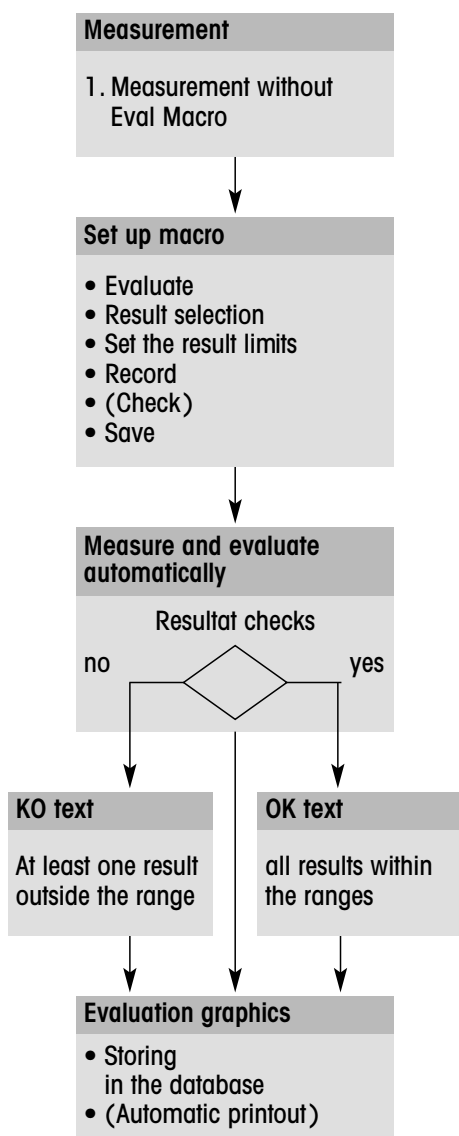
an internal standard and rated as good or poor. For instance, in the determination of melting points, the oxidative stability or in purity analysis. You can automate and simplify this time-intensive, manual evaluation procedure and the "good/poor assessment" with a so-called "Eval Macro". This Eval Macro contains:

- Automatic evaluation of one or more effects
- Automatic selection of appropriate evaluation limits (within a defined range)
- Results validation with display of a selectable text
- Automatic printout

In conjunction with a sample changer, 24-hour operation of your TA station is thus assured. With this setup you can prepare, measure and automatically evaluate up to 34 samples. At the end of a measurement series you will then find 34 measurements evaluated in accordance with your requirements.

The possibility to have the evaluation limits set automatically always guarantees a correct evaluation even with effects which vary greatly, such as the oxidative stability of polyolefins.

Depending on whether the results lie within or outside the tolerance range you have specified, a text defined by you (OK or KO text) appears in the evaluation.



Instructions for an Eval Macro

Content of the Eval Macro used for measurements of a roller bearing cage (PEEK Eval Macro). All information is documented in accordance with GLP:

Eval Macro: PEEK check based on temperature

Glass transition

- Autolimit from 119 bis 165 °C
- Result mode: sample temperature
- Conformity check

Mean value: between 140 und 150 °C

Integral

- Autolimit from 144 bis 240 °C
- Result mode: sample temperature
- Conformity check

normalized: between 0 und 4 J/g

OK text: Sample is within the specifications!

Tg 140 – 150 °C, Integral < 4 J/g

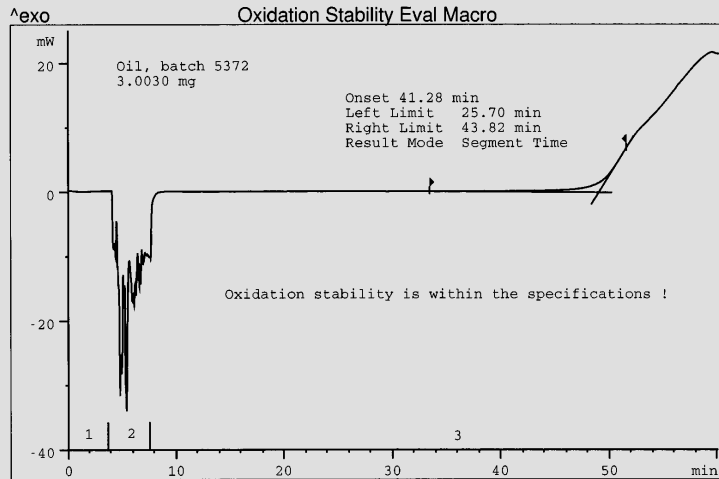
KO text: Sample is not within the specifications!

All evaluations which are based on an experimental curve can be linked in an Eval Macro!

Application example

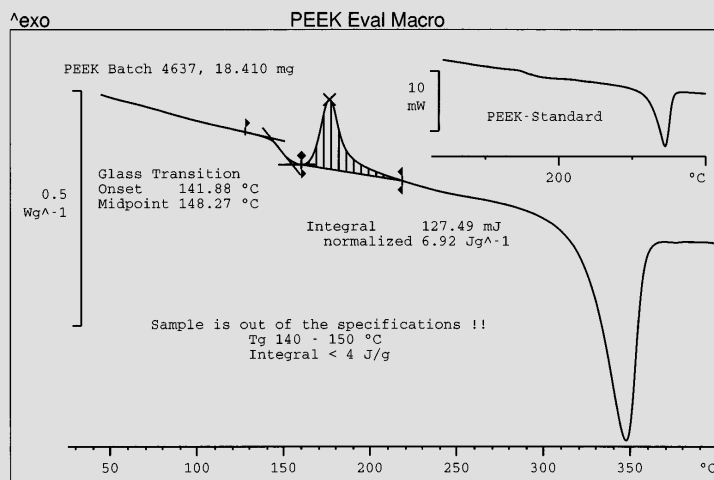
Oxidative stability of oils

The oxidative stability is a parameter which is important for the characterization of many materials. It is frequently measured using specified standards and plays an important role in the assessment of polyolefins, fats, oils and lubricating substances.



The example of an oil shows such a measurement result. The measurement was recorded in the DSC27 HP under an oxygen atmosphere and a pressure of 3.5 MPa. The measurement program comprises three segments, an isothermal one at 30 °C (1), a dynamic one from 30 to 175 °C at a heating rate of 40 K/min (2) and an isothermal one at 175 °C (3). Only the onset, in other words the start of oxidation in the third segment at 175 °C, is used here as a quality criterion for the oil.

The Eval Macro evaluates this onset automatically and classifies the sample as poor or good (oxidative stability is within the specifications).



Dimensional stability of a material

Polymers are used as materials in many technical fields today. For example, in the fabrication of roller bearing cages, which can be manufactured from, e. g. PEEK (polyether ketone). The requirements made on such a material include the resistance to high and low temperatures and the dimensional stability. DSC measurements have shown that workpieces do not meet these requirements if their crystallinity is too low (and hence their amorphous content too high).

A DSC measurement provides information on whether the amorphous fraction is too high. As part of the quality

control, a measurement method was thus designed and linked with an Eval Macro (PEEK check, see 1st page). In addition to the glass transition, this evaluates the cold crystallization peak. If this is too large, as in the example opposite, the KO text is superposed. This allows a quick decision on whether this product meets the specified requirements (see superimposed measurement PEEK standard).

Thanks to a combination of automation and result assessment, this option provides you with reproducible results independent of the user. In addition to saving an enormous amount of time, the reproducibility is improved.