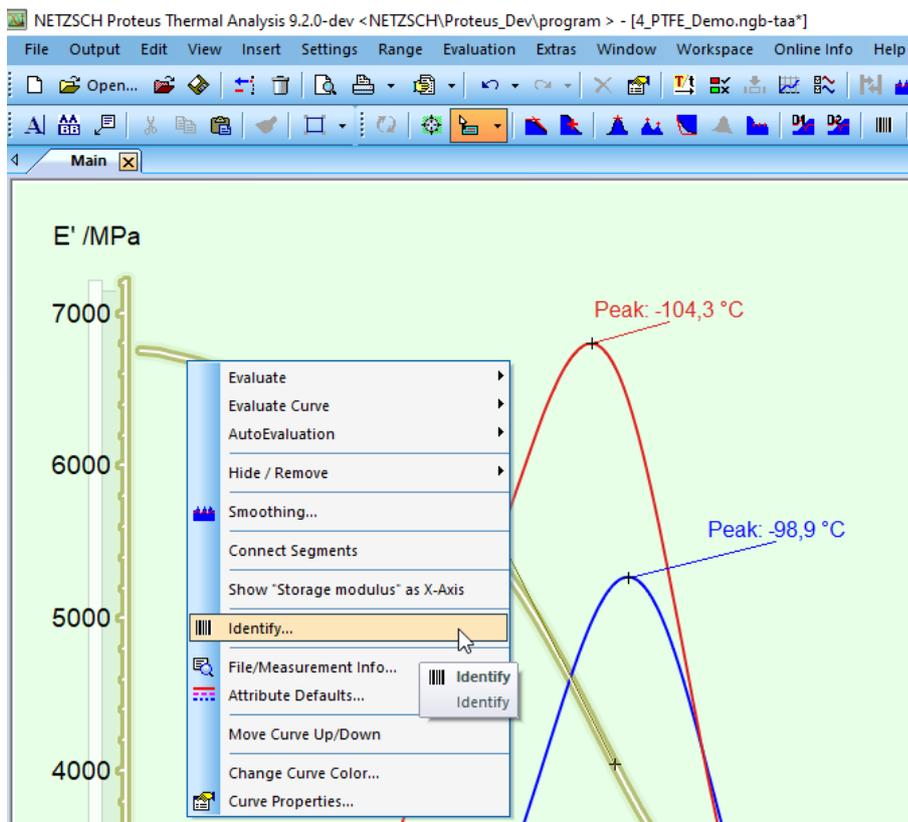


## Identify for DMA Signals

Dr. Alexander Schindler

As of *Proteus*® version 9.2, *Identify* also incorporates DMA signals ( $E'$ ,  $E''$  and  $\tan \delta$ ). The basic philosophy of *Identify* is that a user can always access the entire database with all functionalities, especially all NETZSCH libraries for all signal types supported. Further, curves from the same or different signal types can be overlaid.

*Identify* for DMA signals can be accessed in *Proteus*® analysis via right mouse click on the DMA curve ( $E'$ ,  $E''$  or  $\tan \delta$ ) as shown in figure 1, via the Evaluation menu, or via the corresponding toolbar icon.



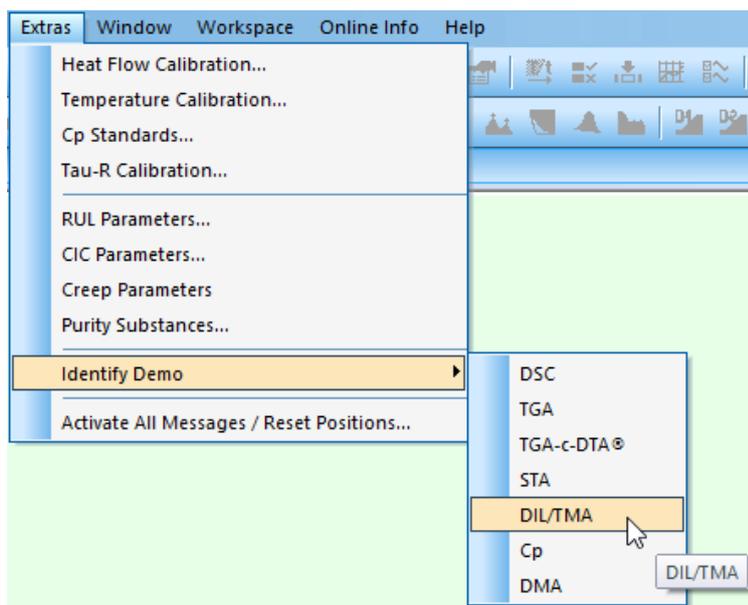
1 Accessing *Identify* via right mouse click on a DMA curve.

Identify can also be accessed without having to load a measurement into Proteus® analysis. This can be done via Identify Demo, where the user can select a demo measurement of the signal type DSC, TGA, TGA-c-DTA®, STA, DIL/TMA,  $c_p$  or DMA (see figure 2).

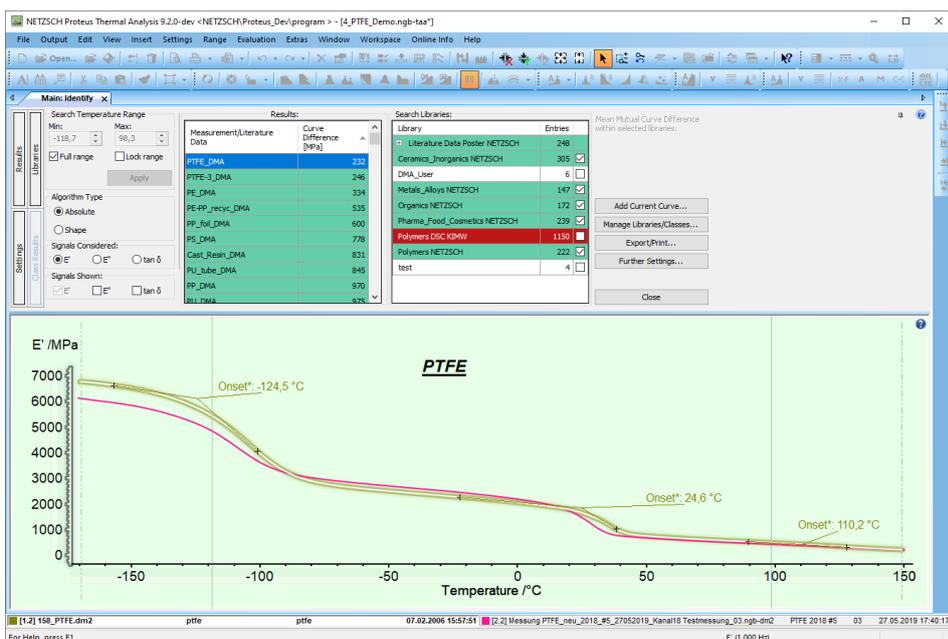
absolute curve difference in a search temperature range that can be selected by the user. The “Shape” algorithm type can be used to search, for example, for similar peaks in  $E''$  or  $\tan \delta$ .

In our previous example (see figure 1), the curve recognition with Identify revealed that the input DMA measurement is most similar to a measurement on PTFE found in the database as shown in figure 3. Identification of the measurement curve is, in this case, where the “Absolute” algorithm type was selected by default, based on the mean

From the user interface of Identify, shown in the upper left part of figure 3, it is furthermore possible to select the “Signal Considered”, e.g., if  $E'$ ,  $E''$  or  $\tan \delta$  should be used for identification. For better clarity, one can also hide signal types using the checkboxes at “Signals Shown”. In the example depicted in figure 3, only  $E'$  is shown.



2 Accessing Identify Demo for different signal types available.

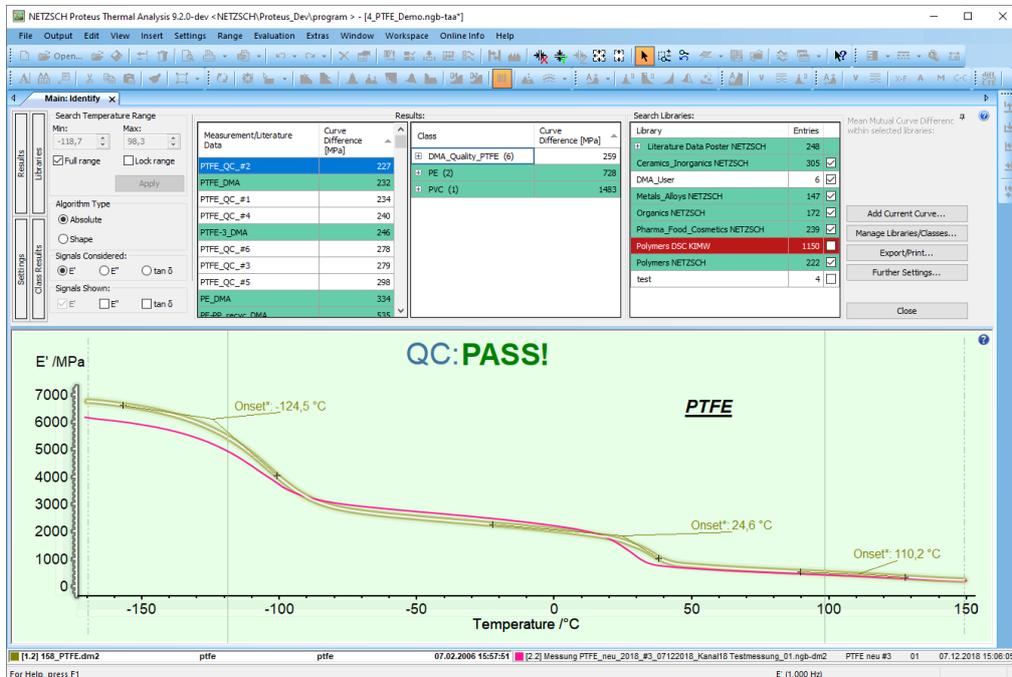


3 User interface of Identify when a DMA input measurement is used.

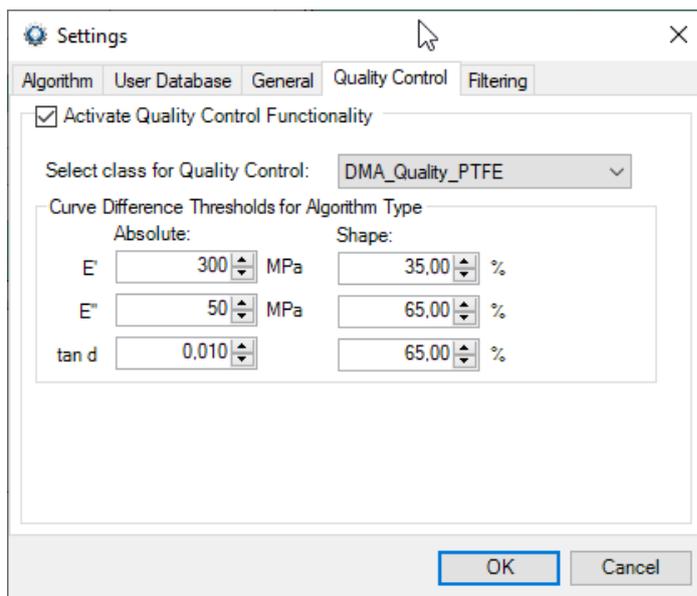
NGB · Software Innovation 010 · EN · 0823 · Technical specifications are subject to change.

Identify can generally also be used for quality control (QC). This is illustrated in figure 4, where the input measurement is compared with a so-called quality control class; in this case, a group of six measurements on PTFE (named "DMA Quality PTFE") stored in a library named "DMA User". Since

the quality criteria are met, the message "QC: PASS!" is displayed. In more detail, the quality criteria are user-defined threshold values for the mean curve difference between the input measurement and the quality control class, as can be seen in figure 5.



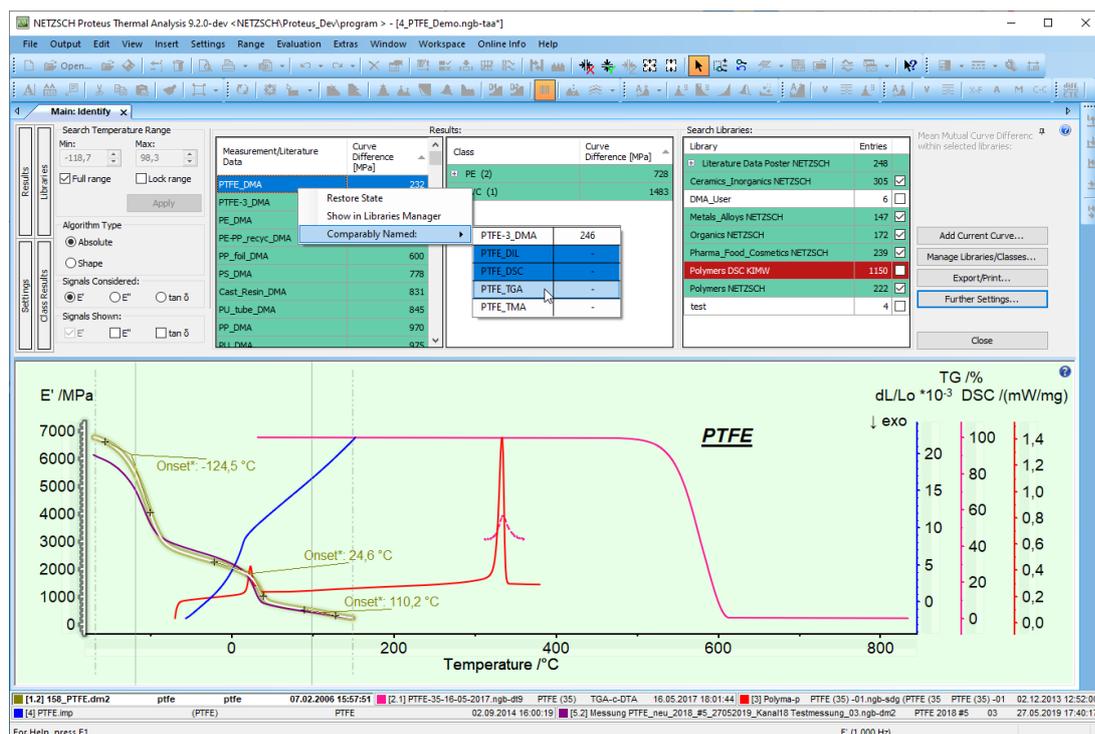
4 Identify used for quality control (QC), showing that the input curve meets the user-defined quality criteria. This elicits the message "QC:PASS!".



5 Setting for quality control (QC) accessible via "Further settings ...".

As mentioned above, the user can always access all database entries available, especially the entire collection of NETZSCH libraries containing currently about 1,300 measurements and literature data from the application fields of polymers, pharma, foods and cosmetics, organics, ceramics, inorganics, and metals and alloys. This is demonstrated in figure 6 where the DMA input measurement (only E' is displayed for better clarity) is overlaid with another

DMA measurement on PTFE as well as with PTFE measurements of DIL, DSC, and TGA-c-DTA® signal types that were all found in the NETZSCH polymer library. In this case, the function of showing comparably named database entries was used, which automatically opened a pop-up list with all database entries that contained "PTFE" in their name. The user can select from among those (with the CTRL-key pressed).



6 Overlay of DMA, DIL, DSC and TGA-c-DTA® measurements on PTFE stored in the NETZSCH polymer library, which is always included in *Identify*.

Such curve comparisons serve for better interpretation of effects, but also for selection of measurement conditions. It is, for example, helpful to see that the melting of PTFE starts at about 300°C (visible as a DSC peak above this temperature) and that the decomposition of PTFE begins at about 500°C, where the TGA curve decreases. The measurement conditions of each individual database measurement can be easily accessed (via "Restore State"), which is useful for the preparation of a measurement of one's own on such a material.

For further information about the curve recognition and database system *Identify*, please note the following blog article:

[Smart Thermal Analysis: Measurements Wanted? – NETZSCH Analyzing & Testing](#)

...and the related links to earlier publications therein.