

## Thermal Analysis

Dear Customer:

By September 12, 2025, all connected products and related services fall under the EU Data Act. The NETZSCH thermal analysis devices belonging to the category 'connected products' are listed in table 1.

Table 1: Thermal analysis – connected products by NETZSCH

Instrument Type	Devices
DSC	DSC 300 <i>Caliris</i> ® (Classic, Select, Supreme), DSC 500 <i>Pegasus</i> ®, DSC 3500 <i>Sirius</i> , STA 509 <i>Jupiter</i> ® (Classic, Select, Supreme), DSC 214 <i>Polyma</i>
TG	TG 309 <i>Libra</i> ® (Classic, Select, Supreme), TG 209 <b>F1/F3</b> , STA 509 <i>Jupiter</i> ® (Classic, Select, Supreme), STA 2500 <i>Regulus</i> ,
STA	STA 509 <i>Jupiter</i> ® (Classic, Select, Supreme), STA 2500 <i>Regulus</i> ®
DIL	DIL 502 <i>Expedis</i> ® (Classic, Select, Supreme), DIL 402 <i>Expedis</i> ® (Classic, Select, Supreme, Supreme HT)
TMA	TMA 402 <b>F1/F3</b> <i>Hyperion</i> ®, TMA 512 <i>Hyperion</i> ® (Select, Supreme)
DMA	DMA 303 <i>Eplexor</i> ®
DEA	DEA 288 <i>Ionic</i>
Adiabatic Calorimetry	ARC 244, ARC 305, MMC 274 <i>Nexus</i> ®

The corresponding *Proteus*® measurement software is a related service.

With the purchase of one of the mentioned NETZSCH instruments incl. software, the new owner gains complete control over the data generated with this device. Only he/she can decide how the data should be handled and with whom it should be shared.

In order to access data (raw data, calculated data, results) also outside the NETZSCH software, the evaluation part of *Proteus*® provides a range of export options in various text and graphic formats.

Table 2: Export formats of the NETZSCH *Proteus*® software

Software	Export formats
<i>Proteus</i> ®	Graphic: emf, png, tif, jpg, bmp, pdf Data: Ergebnisse: csv, txt, Excel, pdf

The measured and evaluated data are not archived in a database, but stored as files. Whether and how measurement files and analysis states can be deleted from the predefined storage locations depends

largely on the local IT requirements and thus on the respective company guidelines and requirements of various regulations that must be complied with.

In addition to the data listed in the following tables 3 to 10, the NETZSCH *Proteus*<sup>®</sup> software also generates so-called log files. They serve as documentation of all operations performed by the device such as starting a measurement, ending a measurement, or in ASC mode\*, (for DSC, TGA and STA) when a sample is inserted into or removed from the furnace. Such log files also record whether a measurement was properly completed or terminated (incl. information about the reason for termination).

Via the >Collect diagnostic data< command within *Proteus*<sup>®</sup> *Analysis*, information from different folders are compiled in one zip file and stored on the local computer under the path C:\NETZSCH\Proteus90\Diagnostic data.zip. Along with the already mentioned log files, this file also contains, information about the instrument configuration. If necessary, this zip file can be sent to the NETZSCH customer service to determine the cause of malfunction.

Your responsible service engineer will be happy to help you monitor further service-relevant data.

\* ASC stands for Automatic Sample Changer

## **Personal Data or Data that Could be Used to Draw Conclusions about the User**

The only personal data record collected by the NETZSCH *Proteus*<sup>®</sup> software and therefore visible within the parameter list of the measurement, is the user name entered. As long as the real name is not required by higher authorities or company guidelines, it can be anonymized (upon internal laboratory agreement), for example, by abbreviations, number combinations or codes that can still be linked to real people internally. The "User name" field is not mandatory and can therefore even be left blank. This prevents third parties from drawing conclusions about the presence of certain persons in the laboratory at certain times by correlating the start of a measurement.

While searching for free updates (within the same software generation) the customer's computer does not transfer any instrument IDs or serial numbers, but only information about the current software version and which instruments ( e.g., DSC 300 *Caliris*<sup>®</sup> *Select*) are connected.

Before sending diagnostic data (zip file, see above) to the NETZSCH customer service, please check that no personal data has been included by mistake (e.g., by wrong clicking when saving files).

## A) DSC Instrument Type - Method: Differential Scanning Calorimetry

The data listed in table 3 are recorded and/or calculated by the *Proteus*<sup>®</sup> software for DSC instruments and subsequently stored in the corresponding measurement file.

Table 3: DSC data

Data	Storage Location
<p>General information such as device, laboratory, file name, user name, date, sample ID, sample name, sample mass, reference name, reference mass, crucible type, crucible mass, purge gas, temperature program, used calibration curve; radiation time (UV), light intensity (UV);</p> <p>Recorded and calculated signals such as time, temperature (sample and furnace), DSC signal, DDSC signal (1<sup>st</sup> derivation of the DSC signal versus time), DDDSC signal (2<sup>nd</sup> derivation of the DSC signal versus time), sensitivity, heating rate, atmospheric pressure; position in x-, y-, z-directions to identify vibrations, gas flow rates; heating power, cooling power; reversing and non-reversing DSC curves, (temperature-modulated DSC);</p> <p>In case of coupling to a gas in addition: Gram-Schmidt signal (FT-IR), traces (FT-IR), ion current (MS), QMID signals (MS, QMID = Quasi Multiple Ion Detection);</p> <p>Measurement results such as peak area/enthalpy, extrapolated onset temperature, peak temperature, glass transition temperature, step height, inflection point, extrapolated end temperature, defined x- and y-values, <math>c_p</math> (specific heat capacity), conversion, DSC integral, purity, OIT (oxidation induction time/temperature); subtracted curve(s), mean value curves, superimposed curves;</p> <p>Signatures, signature status, information about the Audit Trail; information about user accounts and user roles;</p>	<p>Locally on the measurement computer or in a (at customer's site) pre-defined server directory</p>

The DSC signal is already calculated.

The time is taken from the measurement computer.

The data listed in table 3 reflect the maximum value in each case. Depending on the configuration of the device and the software, some items may be omitted, for example, the gas flow rates, when no mass flow controller (MFC) is present, or the signatures, if the software is the standard version of *Proteus*<sup>®</sup> and not *Proteus*<sup>®</sup> *Protect*. More information about the exact configuration of the specific device and the software can be found in the corresponding order confirmation.

The extent of the recorded signals (data) depends on the selected data acquisition rate.

External (optional) data source which can be used in combination with DSC instruments:

- UV lamp

## B) TGA Instrument Type - Method: Thermogravimetry

The data listed in table 4 are recorded and/or calculated by the *Proteus*<sup>®</sup> software for thermobalances (thermogravimetric analyzers) or STA\* instruments in TGA mode and subsequently stored in the corresponding measurement file.

\* STA stands for Simultaneous Thermal Analysis

Table 4: TGA Data (TGA devices and STA devices in TGA mode)

Data	Storage Location
<p>General information such as instrument, laboratory, file name, user name, date, sample ID, sample name, sample mass, crucible type, crucible mass, purge gas, temperature program, used calibration curve, information on correction measurement;</p> <p>Recorded and calculated signals such as time, temperature (sample and furnace), mass change (=TGA signal), DTG signal (1<sup>st</sup> derivation of the TGA signal versus time), DDTG signal (2<sup>nd</sup> derivation of the TGA signal versus time), residual mass, c-DTA<sup>®</sup> signal, heating rate, atmospheric pressure/underpressure; position in x-, y-, z-directions to identify vibrations, gas flow rates; heating power;</p> <p>In case of coupling to a gas analyzer in addition: Gram-Schmidt signal (FT-IR), traces (FT-IR), (total) ion current (MS), QMID signals (MS, QMID = Quasi Multiple Ion Detection);</p> <p>Measurement results such as step height (mass change), extrapolated onset temperature, peak temperature, inflection point, extrapolated end temperature, peak area (c-DTA<sup>®</sup>), glass transition temperature, defined x- and y-values, subtracted curve(s), mean value curves, superimposed curves;</p> <p>Signatures, signature status, information about the Audit Trail; information about user accounts and user roles;</p>	<p>Locally on the measurement computer or in a (at customer's site) pre-defined server directory</p>

The time is taken from the measurement computer

The data listed in table 4 reflect the maximum value in each case. Depending on the configuration of the device and the software, some items may be omitted. More information about the exact configuration of the specific device and the software can be found in the corresponding order confirmation.

The extent of the recorded signals (data) depends on the data acquisition rate selected.

External (optional) data source which can be used in combination with STA instruments:

- Humidity generator
- Water vapor generator

## C) STA Instrument Type - Method: Simultaneous Thermal Analysis

STA usually describes a combination of thermogravimetry (see B) and DSC/DTA (see A).

The data listed in table 5 are recorded and/or calculated by the *Proteus*<sup>®</sup> software for STA instruments in TGA/DSC or TGA/DTA mode and subsequently stored in the corresponding measurement file.

Table 5: STA data (in TGA/DSC or TGA/DTA mode)

Data	Storage Location
<p>General information such as instrument, laboratory, file name, user name, date, sample ID, sample name, sample mass, reference name, reference mass, crucible type, crucible mass, purge gas, temperature program, used calibration curves, information on correction measurement;</p> <p>Recorded and calculated signals such as time, temperature (sample and furnace), mass change (=TGA signal), DTG signal (1<sup>st</sup> derivation of the TGA signal versus time), DDTG signal (2<sup>nd</sup> derivation of the TGA signal versus time), residual mass, c-DTA<sup>®</sup> signal, DSC signal, DDSC signal (1<sup>st</sup> derivation of the DSC signal versus time), DDDSC signal (2<sup>nd</sup> derivation of the DSC signal versus time), sensitivity, heating rate, atmospheric pressure/underpressure; position in x-, y-, z-direction to identify vibrations; gas flow rates; cooling power; heating power; reversing and non-reversing DSC curves (temperature modulation);</p> <p>In case of coupling to a gas analyzer in addition: Gram-Schmidt signal (FT-IR), traces (FT-IR), (total) ion current (MS), QMID signals (MS, QMID = Quasi Multiple Ion Detection);</p> <p>Measurement results such as step height (mass change), extrapolated onset temperature, peak temperature, inflection point, extrapolated end temperature, peak area/enthalpy, defined x- and y-values; <math>c_p</math> (specific heat capacity), conversion, DSC integral, subtracted curve(s), mean value curves, superimposed curves;</p> <p>Signatures, signature status, information about the Audit Trail; information about user accounts and user roles;</p>	<p>Locally on the measurement computer or in a (at customer's site) pre-defined server directory</p>

The DSC signal is already calculated.  
The time is taken from the measurement computer.

The data listed in table 5 reflect the maximum value in each case. Depending on the configuration of the device and the software, some items may be omitted. More information about the exact configuration of the specific device and the software can be found in the corresponding order confirmation.

The extent of the recorded signals (data) depends on the data acquisition rate selected.

#### D) DIL Instrument Type - Method: Dilatometry (Length Change Determination)

The data listed in table 6 are recorded and/or calculated by the *Proteus*<sup>®</sup> software for dilatometers and subsequently stored in the corresponding measurement file.

The data listed in table 6 reflect the maximum value in each case. Depending on the configuration of the device and the software, some items may be omitted. More information about the exact configuration of the specific device and the software can be found in the corresponding order confirmation.

Table 6: Dilatometer data

Data	Storage Location
<p>General information such as instrument, laboratory, file name, user name, date, sample ID, sample name. Sample length, name of the reference/calibration sample, length of the reference sample/calibration sample, measuring mode, sample holder type/material, purge gas, temperature program, temperature calibration, information on correction measurement;</p> <p>Recorded and calculated signals such as time, temperature, force, length change (dL), relative length change (dL/L<sub>0</sub>), dL/dt (1<sup>st</sup> derivation of the length change signal versus time), 2<sup>nd</sup> derivation of the length change signal versus time, c-DTA<sup>®</sup> signal; gas flow rates; furnace temperature, heating power, cooling power; reversing and non-reversing dL, reversing and non-reversing CTE*, amplitude and phase (temperature-modulation);</p> <p>In case of coupling to a gas analyzer in addition: Gram-Schmidt signal (FT-IR), traces (FT-IR), (total) ion current (MS), QMID signals (MS, QMID = Quasi Multiple Ion Detection); pressure;</p> <p>Measurement results such as mean (average) linear coefficient of expansion (<math>\alpha</math> or CTE), differential coefficient of expansion, sintering step, density, extrapolated onset temperature, peak temperature, inflection point, extrapolated end temperature, defined x- and y-values; storage modulus, loss modulus, loss factor (force modulation);</p>	<p>Locally on the measurement computer or in a (at customer's site) pre-defined server directory</p>

The time is taken from the measurement computer

\* CTE stands for Coefficient of Thermal Expansion (equivalent to  $\alpha$ )

The extent of the recorded signals (data) depends on the data acquisition rate selected.

## E) TMA Instrument Type - Method: Thermomechanical Analysis

Dilatometry (cf. D) and Thermomechanical Analysis are closely related. Both methods serve for length change determination of samples and the corresponding instruments are available in a horizontal (dilatometer) or vertical (thermomechanical analyzer, dilatometer) arrangement.

A thermomechanical analyzer (TMA) determines dimensional changes of solids, liquids and pastry materials as a function of temperature and/or time under a defined mechanical load, while a dilatometer measures the length change of samples under negligible force.

Dilatometers are usually used in the high-temperature range for measuring glasses, ceramics, metals or building materials; TMA devices more often employed in the low-temperature range for investigating, for example, plastics, elastomers, compounds or adhesives. However, TMA measurements on metals or ceramics are also possible.

The data listed in table 7 are recorded and/or calculated by the *Proteus*<sup>®</sup> software for thermomechanical analyzers and subsequently stored in the corresponding measurement file.

Table 7: TMA data

Data	Storage Location
<p>General information such as instrument, laboratory, file name, user name, date, sample ID, sample name, sample length, name of the reference sample/calibration sample, length of the reference sample/calibration sample, measuring mode, sample holder type/ material, purge gas, temperature program, temperature calibration, information on correction measurement;</p> <p>Recorded and calculated signals such as time, temperature (sample and furnace), force, length change (dL)/deformation, relative length change (dL/L<sub>0</sub>), dL/dt (1<sup>st</sup> derivation of the length change signal versus time), 2<sup>nd</sup> derivation of the length change signal versus time, cDTA<sup>®</sup> signal, atmospheric pressure/underpressure; position in x-, y- and z-directions to identify vibrations; gas flow rates; heating power, cooling power, relative humidity; reversing and non-reversing dL, reversing and non-reversing CTE*, amplitude and phase (temperature modulation);</p> <p>In case of coupling to a gas analyzer in addition: Gram-Schmidt signal (FT-IR), traces (FT-IR), (total) ion current (MS), QMID signals (MS, QMID = Quasi Multiple Ion Detection);</p> <p>Measuring results such as mean linear coefficient of expansion (CTE, curve or values), differential coefficient of expansion (curve or values), sintering step, density, extrapolated onset temperature, peak temperature, inflection point, extrapolated end temperature, softening point, defined x- and y-values; storage modulus, loss modulus, loss factor (force modulation);</p>	<p>Locally on the measurement computer or in a (at customer's site) pre-defined server directory</p>

The time is taken from the measurement computer

\* CTE stands for Coefficient of Thermal Expansion

The data listed reflect the maximum value in each case. Depending on the configuration of the device and the software, some items may be omitted. More information about the exact configuration of the specific device and the software can be found in the corresponding order confirmation.

The extent of the recorded signals (data) depends on the data acquisition rate selected.

External (optional) data source which can be used in combination with TMA 512 instruments:

- Water vapor generator
- Humidity generator

## F) DMA Instrument Type - Method: Dynamic-Mechanical Analysis

The data listed in table 8 are recorded and/or calculated by the *Proteus*<sup>®</sup> software during measurements with the DMA 303 and subsequently stored in the corresponding measurement file.

The data given reflect the maximum value in each case. Depending on the configuration of the device and the software, some items may be omitted, for example, the gas flow rate when no mass flow controller (MFC) is present. More information about the exact configuration of the specific device and the software can be found in the corresponding order confirmation.

The extent of the recorded signals (data) depends on the data acquisition rate selected.

External (optional) data source which can be used in combination with DMA 303 instruments:

- UV lamp
- Humidity generator
- Camera

Table 8: DMA 303 *Eplexor*<sup>®</sup> data

Data	Storage Location
<p>General information such as instrument, laboratory, file name, user name, date, project, material, sample name, sample dimensions, sample holder (defines measuring mode), type of measurement (temperature sweep, frequency sweep, ...) used calibrations;</p> <p>Recorded and calculated signals such as time, temperature, frequency, initial sample length, current length, length change (dL), deformation/amplitude, static force, dynamic force; contact force, static strain, static stress, dynamic stress, dynamic strain; relative humidity;</p> <p>Measurement results such as the amount of the complex modulus, storage modulus, loss modulus, loss factor (<math>\tan \delta</math>), amount of the complex stiffness, stiffness (real and imaginary part), 1<sup>st</sup> derivation of the loss factor, extrapolated onset temperature, peak temperature, extrapolated end temperature, defined x- and y-values, WLF master curve; Cole-Cole plot, Arrhenius plot, stress-strain curves; 3D presentation;</p>	<p>Locally on the measurement computer or in a (at customer's site) pre-defined server directory</p>

The time is taken from the measurement computer

## G) DEA Instrument Type - Method: Dielectric Analysis

The data listed in table 9 are recorded and/or calculated by the *Proteus*<sup>®</sup> software during measurements with the DEA 288 and subsequently stored in the corresponding measurement file.

The data given reflects the maximum value in each case. Depending on the configuration of the device and the software, some items may be omitted, for example, irradiation time and light intensity when the DEA is not equipped with the accessory for UV measurements. More information about the exact configuration of the specific device and the software can be found in the corresponding order confirmation.

The extent of the recorded signals (data) depends on the data acquisition rate selected.

External (optional) data source which can be used in combination with DEA 288 instruments:

- Cooling device
- Humidity generator
- UV lamp
- Furnace
- Press

Table 9: DEA data

Data	Storage Location
<p>General information such as instrument, type of measurement, date, laboratory, project, file name, user name, sample ID, sample name, material, channel, sensor type, sensor characteristics; cable length; light intensity (UV);</p> <p>Recorded and calculated signals such as time, temperature, voltage, current; phase, loss factor tan delta, frequency; delta step;</p> <p>Measuring results and derived information such as ion viscosity, ion conductivity, dielectric loss factor, permittivity, electrical impedance, 1<sup>st</sup> derivation of curves, extrapolated onset temperature, peak temperature, inflection point, extrapolated end temperature, defined x- and y-values; degree of cure, percent cure, conversion curve;</p>	<p>Locally on the measurement computer or in a (at customer's site) pre-defined server directory</p>

The time is taken from the measurement computer

## H) ARC and MMC Instrument Types - Method: Adiabatic Calorimetry

Adiabatic Calorimetry is a method which refers to two instruments within the NETZSCH portfolio: the Accelerating Rate Calorimeter (ARC<sup>®</sup>) and the Multi Module Calorimeter (MMC). The MMC can be equipped with various modules for different operating modes. Currently, an ARC module, a scanning module and a coin cell module are available.

The mentioned coin cell module has a DSC-like twin design and was developed especially for the investigation of batteries.

Table 10: ARC and MMC data

Data	Storage Location
<p>General information such as instrument, laboratory, user name, file name, date, sample name, sample mass, specific heat capacity of the sample, density of the sample, reference name, reference mass, measuring mode, container material, specific heat capacity of the container, temperature program, temperature calibration, used corrections;</p> <p>Recorded signals such as time, temperature determined by the sample thermocouple, temperature(s) of the various heaters, heating power (of the various heaters), pressure;</p> <p>Calculated signals such as rate of change in temperature, rate of change in pressure, heat flux, 1<sup>st</sup> derivation of the pressure, 1<sup>st</sup> derivation of the heating power;</p> <p>Measuring results such as Time-to-maximum-rate (TMR), extrapolated onset temperature, peak temperature, inflection point, extrapolated end temperature, defined x- and y-values, enthalpy;</p>	<p>Locally on the measurement computer or in a (at customer's site) pre-defined server directory</p>

The time is taken from the measurement computer

Concerning adiabatic calorimeters, the data listed in table 10 are recorded and/or calculated by the *Proteus*<sup>®</sup> software and subsequently stored in the corresponding measurement file. The data reflect the maximum value in each case and, especially for MMC, depend on the module used (see above). More information about the exact configuration of the specific device and the software can be found in the corresponding order confirmation.

The extent of the recorded signals (data) depends on the data acquisition rate selected.

**Disclaimer of liability:**

The information has been compiled to the best of our knowledge. Despite careful review, NETZSCH Gerätebau does not guarantee that the content is up to date, accurate, or complete.