TA Instruments
What's New in TRIOS Software

TRIOS Software Overview

TRIOS is TA Instruments' state-of-the-art software package that uses cutting-edge technology for instrument control, data collection, and data analysis for thermal analysis and rheology instruments. The intuitive user interface allows you to simply and effectively program experiments and move easily between processing experiments and viewing and analyzing data. TRIOS software delivers a whole new experiment experience.

- Easy organization and data file management
  - A unique file-naming system allows for effortless organization of data files
  - The History View and File Manager offer simple data file location
- Compatibility with the latest Windows Operating System platforms
- Maximum flexibility
  - Instrument control and data analysis via any networked computer
  - Configurable for multiple monitors
  - Ability to control multiple instruments at once
  - Remote data analysis
- Seamless integration between instrument control and data analysis
- Easy data export in a variety of output formats, including XML, Word, Excel, and PDF
- Simple graph formatting using The Ribbon
- Customization of the display

The TRIOS software is supported by a full range of services, including onsite training, customer service that is only a phone call away, and easy-to-use, easy-to-understand online help. All of these items reflect TA Instruments' commitment to providing thermal analysis and rheology products and related services that deliver maximum value for your investment.

What's New in TRIOS Software V3.1

TRIOS software is now better than ever with increased stabilization and key fixes and enhancements, including User Interface changes that will make your TRIOS experience exceptional. The next generation of instrument control and data collection and analysis, TRIOS V3.1 is more efficient and intuitive, allowing you to work faster and easier.
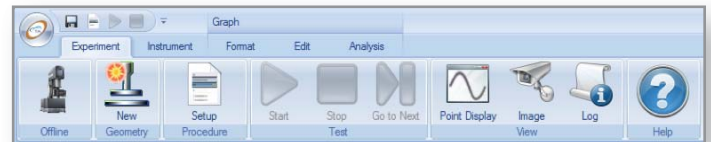
General TRIOS Enhancements

Limited-Bandwidth Download Option
You can now download TRIOS faster than ever by installing a version of TRIOS that does not include TRIOS Online Help.

Ribbon Changes
The Ribbon has been simplified with the Home and View tabs consolidated into a single Experiment tab, removing redundancy and unused functionality.

Previous Home tab

Previous Home tab:
The File Manager button no longer exists. The ability to close the File Manager was removed, and overlay and analysis document creation is now only available from the File Manager right-click menu. New analysis is available from the Analysis tab. The Geometry information is now available from the Experiment tab. When a geometry is attached to the instrument, you can select the installed geometry from the list of geometry files previously created on the system. If your geometry does not appear in the list, clicking Add New Geometry will launch the New Geometry wizard. Editing a geometry can now only be done from the File Manager's Geometries pane or on the geometry Experiment node.
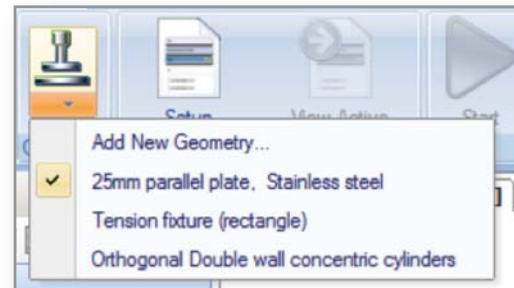

Previous View tab

Previous View tab:
Document Views functionality (creating a new spreadsheet and graph) as well as Layout functionality (saving and loading files) is now located solely in the File Manager. Switch Documents and Views functionality was removed. Access to the Properties panel now only exists from the right-click menu.

New Legend User Interface
Use the Legend menu to make your Legend customizations in one place. With one click of the mouse, you can select the desired Entry Type, choose what items you want to appear in the legend, modify text color and title justification, and turn on/off the Legend title.

Additionally, when editing the Legend directly from the graph, use the Quick Format option for editing text that automatically displays when you select an item in the Legend. From the Quick Format box, you can change the font face, size, and style.
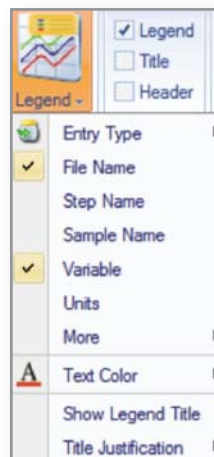

New Legend User Interface
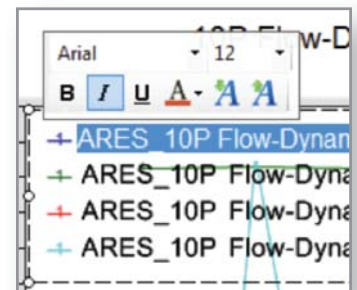
Quick Format option

New Curves User Interface

Formatting curves on a graph is now easier and more intuitive with the introduction of the Curves Format dialog box.

- •Choose to format your curves Automatically or Manually. Use the Automatic Formatting option to apply your customizations based on the file, step, and/or variable, or use the Manual Formatting option to apply your customizations per curve.
- •Use the palette to specify the order of the colors, symbols, line styles, and extra symbols used on your curves.
- •Additional formatting options include setting the line thickness, symbol size, and symbol density, and adding extra symbols to the curve
- •Set the style selection with the use of Quick Styles so that you can easily and quickly apply previously defined formatting to your curves
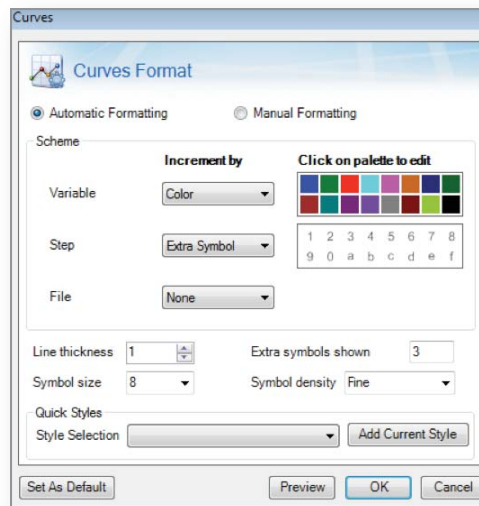
RHEOLOGY

ARES-G2 Enhancements

Orthogonal Superposition (OSP) Feature

The Orthogonal Superposition (OSP) feature was added for the ARES-G2. In the OSP mode, the normal force transducer operates as an actuator applying a small sinusoidal linear deformation to the sample while recording the force at the same time. Instead of holding the transducer shaft at a fixed position, the shaft can now be periodically oscillated in the vertical direction at small amplitudes.

The major applications of the OSP mode include:
- •The superposition of a small strain oscillatory deformation normal to the direction of steady shear flow (Orthogonal Superposition)
- •Oscillation testing in the two orthogonal directions at the same frequency (2D-SAOS)

A new group of test modes has been created for Orthogonal oscillation. These test modes are only available for the Orthogonal double wall concentric cylinder, Parallel plate, and Orthogonal torsion fixture.

This feature requires an ARES-G2 with Serial Number 4010-0383 or higher or an earlier version that has been upgraded together with appropriate geometries.

DMA Mode

The ARES-G2 DMA feature is designed to allow geometries such as tension/compression and bending to be used with the instrument. DMA testing uses the standard oscillation test modes; when one of these geometries **(Three point bending, Mixed bending, Clamped bending, or Linear tension)** is selected, the mode of deformation is changed from shear to linear, with the appropriate set of variables. This feature is limited to oscillation tests only since that is the only motor mode available.

This feature requires an ARES-G2 with Serial Number 4010-0383 or higher or an earlier version that has been upgraded together with appropriate geometries.

Curves User Interface
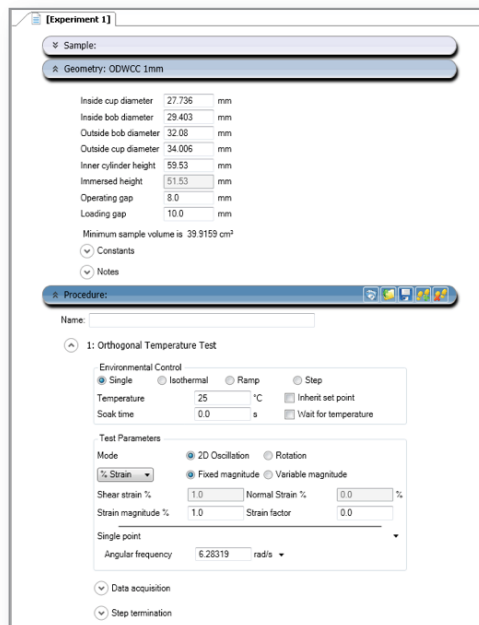
Orthogonal Superposition (OSP) Feature

Proportional Axial Force Control

Axial force control on an ARES-G2 now has the ability to adjust the commanded force level to follow changes in sample stiffness. Typically this is used to decrease the axial force on a sample as it softens to avoid issues with samples being squashed or stretched too much as they soften. This is done by taking a reference value for the sample stiffness at the start of the test, and using the ratio of the reference stiffness and the current sample stiffness to adjust the commanded axial force.

This option is enabled by selecting **Compensate for stiffness changes.**

The compensation scaling factor is a value between 0.0 and 1.0 which controls the relationship between the changes in stiffness and the axial force changes. A value of 0.0 results in a constant force, and a value of 1.0 result in the axial force being a linear function of the stiffness ratio.

Compensate for stiffness changes

Motor Control Panel

The ARES-G2 motor control panel and Real time variable signal list were updated to allow for better control of sample displacement and strain by using relative rather than absolute positioning.

There are now separate signals for motor position (angular offset relative to encoder home position), and displacement (a running change in displacement since a tare in the DSP). The reported strain signal is now based on the geometry strain constant and the measured displacement.

Button changes:
- **Zero displacement:** Used to zero the displacement signal
- **Go to home position:** Goes to the encoder zero position
- **Move to orientation angle:** Moves to the geometry alignment angle. Enabled only if the active geometry has an alignment angle (i.e. ARES-G2 DMA fixture)

NOTE: The **Move to orientation angle** has been added to allow the correct positioning of the bending and the tension fixtures for DMA testing after installing the geometry. The orientation angle is calibrated for every geometry and stored with the geometry parameters.

Motor Control Panel

ARES-G2 Phase Calibration

The phase angle calibration code has been updated to use a hermite spline rather than a polynomial fit to the phase error. This new phase angle correction provides a better fit at lower frequencies than the polynomial fit.

When the analysis code is invoked, it checks the instrument firmware to see if the hermite spline correction is supported. If supported, it uses the new analysis. If this correction is not supported, it reverts back to the older polynomial implementation.

The new form shows the user-adjustable number of terms used in the spline, as well as the correction coefficients between the measured data and the corrected data for both the phase and amplitude corrections. It also shows the agreement between the calibration data and the spline coefficients that are currently loaded in the instrument. An overlay can be created to show this graphically, if desired, by looking at the "Source data" and "Interpolated data" zones.

ARES-G2 Phase Calibration

ARES-G2 Procedure Change

In order to repeat the same step in a procedure, the step has to be entered multiple times. With the new repeat function, a single step can be repeated multiple times. In addition some key test parameters can be changed during the repeat runs; for example the temperature can be incremented by a certain value at each repeat run.

ARES-G2 Motor Boost

TRIOS V3.1 now supports a second power amplifier to double the motor power output. This feature allows applying larger strains on high viscosity materials such as rubber compounds. No user interface changes are associated with this feature. TRIOS automatically recognizes when a second power amplifier is connected and configures itself.

Electro Rheology Conditioning Block

The electro rheology conditioning block was updated to allow for voltage ramps and disconnection of the power amplifier for a better "zero voltage" point.

Three different types of voltage ramps are available:
- A simple ramp from an initial voltage from a final voltage
- A ramp and hold profile where the voltage is ramped from an initial value to a final value, and the final value is maintained for specified period of time
- A double ramp where the voltage is ramped from an initial value to a final value, then back to the initial value

The zero voltage mode sets what happens when a zero voltage level is commanded: **Command zero volts** uses the function generator to commanded a zero volt level into the power amplifier, **Disable amplifier** uses the ARES-G2 enable relay to open the HV circuit.

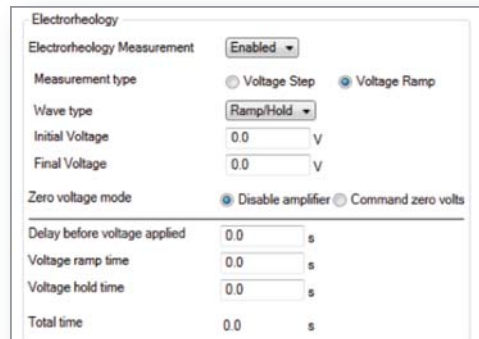## ARES-G2 and RSA-G2 Enhancements

Geometry Calibrations

ARES-G2/RSA-G2 geometry calibrations were updated to match the method used by DHR/AR rheometers. Previously, geometry-specific calibrations where performed by using the Calibration pane in the TRIOS File Manager, and then applying the resulting calibration parameters to the active geometry. The update includes a Calibrations tab that was added to the geometry document, which shows the current calibration value and the date the calibration was performed, as well as hosts a control panel that can be used to run the geometry calibration in place.
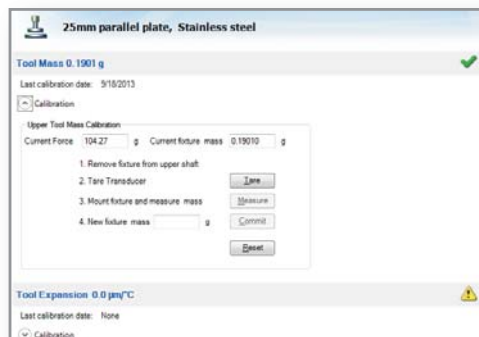
The Calibration panels displayed depend on the specifics of the geometry.
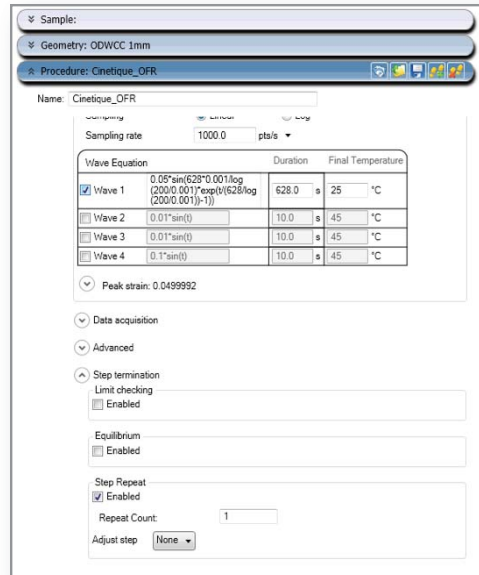
ARES-G2 Procedure Change

ARES-G2 Procedure Change

Geometry Calibrations

ARES-G2 and DHR Enhancements

Tribo-Rheometry Accessory for ARES-G2 and DHR

The Tribo-rheometry option for the ARES-G2 and DHR is now available. Tribology test procedures are used to measure the friction coefficient, CoF, as a function of the sliding speed under dry and lubricated conditions between any two substrates in contact. Applications range from biological, personal products like creams and lotions, to automotive components and lubrication in machinery design.

Tribology tests can only be used with the special Tribo-rheometry geometries. The tribo-rheometry geometry is supported in the following test modes:
- Flow Sweep, which is converted to a "Tribology Sweep" when executed.
- Transient flow steps (Step Rate, Flow Rate, Flow Temperature ramp), which are converted to Tribology Steps when executing.

Procedure templates for common Tribology tests can be loaded from the template folder.

The modular Tribo-Rheometry Accessory can be configured with 4 different geometries (Ring on Plate, Ball on Three Plates, Three Balls on Plate, and Ball on Three Balls), offering a range of contact profiles that are compatible with ARES-G2 FCO and APS or the DHR ETC and Stepped Disposable Peltier Plate.
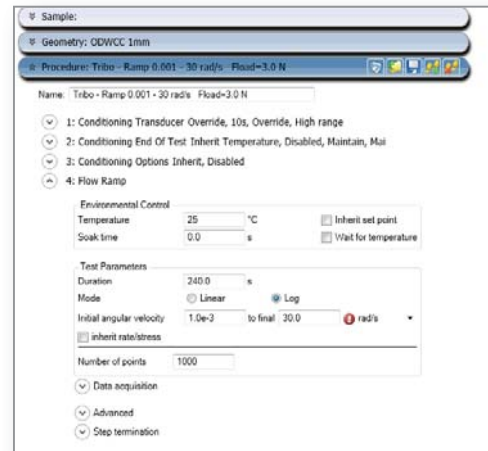
DHR/AR Enhancements

- Support for DHR Optics Plate Accessory, Building Material Cell, and Bayonet Peltier Plate
- DHR Pressure Cell
  - Support for vane and starch rotor added
  - Calibration page correctly reflects mapping status
  - Resetting of geometry gap fixed
  - Map only applied during test to avoid over speed error when magnetic coupling not engaged
- DHR Gap Compensation Calibration: Now allows calibrations to be performed from high to low temperatures
- DHR zero gap: Deceleration added to existing standard and axial force modes
- DHR Flow Sweep: Scaled time average option fixed
- Concentric cylinder
  - The end effect field can be changed in a results file which will force a recalculation of the data
  - Rheology Advantage files now load with the end effect set to 1
  - Rheology Advantage files measured with ver.1 Double Gap load with the correct immersed height
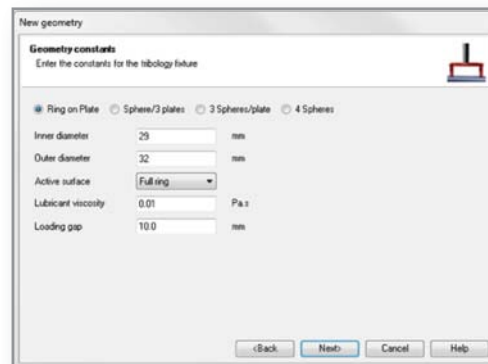
Rheology Analysis

- Spriggs and Oldroyd models for oscillation data that were previously available in Rheology Advantage are now available in TRIOS V3.1
- Carreau-Yasuda model for flow data added
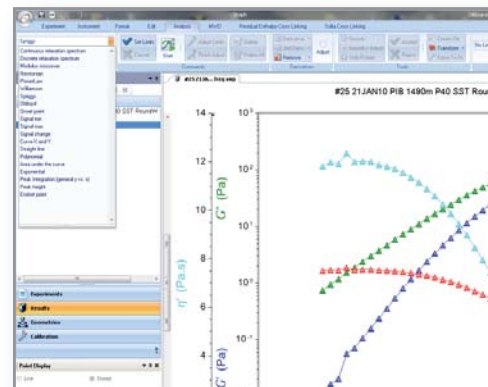- Arrhenius model improved with better starting conditions

Template folder

Procedure template

New geometry

Rheology Analysis

TA Instruments
What's New in TRIOS Software

THERMAL ANALYSIS

Discovery TGA Enhancements

Modulated TGA (MTGA) Support

Modulated TGA (MTGA) is now supported by TRIOS software V3.1. This option, used with the Discovery TGA, is used to study the same decomposition or volatilization transitions as conventional TGA, plus provides new information that permits unique insights into the behavior of the weight loss reaction — specifically, obtaining kinetic information about one or more weight losses, in a shorter period of time than the multiple heating rate approach. MTGA also provides continuous measured values for activation energy throughout the weight loss reaction, not just at specific reaction levels.

Modulated TGA experiments can be run as either Standard or High Resolution procedures.

Discovery DSC Enhancements

• To ensure the safety of the user, the Gas 1 selection for the Discovery DSC can now be used for Nitrogen only.

INSTALLING TRIOS SOFTWARE

For instructions on installing TRIOS software, refer to the Installing TRIOS Software instructions.

ADDITIONAL RESOURCES

A number of additional resources are available to you. For assistance with the TRIOS software, first consult the Online Help.

For immediate assistance contact the TA Instruments Hotline at +1 302-427-4000 from 8:00 am to 4:30 pm EST.

For email support, please send your question to one of the following:
thermalsupport@tainstruments.com
rheologysupport@tainstruments.com
microcalorimetersupport@tainstruments.com

PREVIOUS WHAT'S NEW DOCUMENTS

For Previous What's New in TRIOS Software documents, click here.

TA INSTRUMENTS OFFICES

For information on our latest products, contact information, and more, see our web site at:
http://www.tainstruments.com

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