Thermo Scientific

HAAKE RheoWin

Version 4.91.0021

Readme and version history

HAAKE RheoWin 4.91.0021 Readme   August 2023

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General information

For more detailed information on the RheoWin 4.91.0021 installation, the supported devices, the supported Windows versions, the computer system requirements, etc, see the www.rheowin.com web-site and the following documents,

- HAAKE RheoWin User guide "Installation and 21 CFR part 11 configuration" (part no. 006-0783),

- HAAKE RheoWin User guide "Camera installation",

which can be downloaded from the RheoWin web-site and are also available on the RheoWin DVD.

Supported devices (Rheometers, Viscometers)

RheoWin 4.91.0021 currently supports the following HAAKE rheometers and viscometers: MARS 60, MARS 40, MARS iQ, MARS iQ Air, MARS III, MARS II, MARS I, RheoStress 6000, RheoStress 3000, RheoStress 600, RheoStress 300, Viscotester iQ, Viscotester iQ Air, Viscotester 550, Viscotester D, Viscotester E, RheoStress 1 and Rotovisco 1.

RheoWin 4.91.0021 does *not* support older instruments like the RheoStress 150, RheoStress 80, RheoStress 75, RheoScope 1, RT20, RS100, RS50, RT10, VT500, VT501, VT6L, VT6R, VT7L, VT7R, VT7L-plus, VT7R-plus and the RV20+RC20/RV30 with CV20, CV100, M5 or M10.

RheoWin 4.91.0021 does *not* support the following older temperature control units: TC80, TC81, TC500 and TC501, however a driver for the TC501 is available on request.

Supported Windows operating systems

RheoWin 4.91.0021 has been tested to run under the following Windows operating systems:
- Windows 7 32-bit and 64-bit
- Windows 8 32-bit and 64-bit
- Windows 8.1 32-bit and 64-bit
- Windows 10 32-bit and 64-bit

RheoWin 4.91.0021 has not been tested and is consequently not supported for use under Windows Vista. It is strongly recommend to use Windows 7 or Windows 10 instead.

RheoWin 4.91.0021 will *not* run and/or is not supported under Windows 3.x, Windows NT3.x, Windows 95, Windows 98, Windows 98 SE, Windows ME, Windows NT 4.0, Windows 2000 and Windows XP.

Computer hardware requirements

For detailed information see the document HAAKE RheoWin User guide "Installation and 21 CFR part 11 configuration".

The RheoWin installation program

The RheoWin installation program is available from two different sources:

- The RheoWin installation program can be downloaded from the www.rheowin.com web-site. After downloading the file `rhw4910021_complete.zip` copy it to a (temporary) directory on the hard drive of the computer on which RheoWin should be installed, then extract the `setup.exe` file and some additional files from the ZIP file using any suitable unzip program.

- The RheoWin installation program can be found in the `Rheowin` directory on the RheoWin DVD (part no. 098-5000)

Note The RheoWin installation program contains a fully executable version of the Thermo Fisher Scientific HAAKE RheoWin software. In order to be able to install RheoWin on your computer you need a RheoWin 4 License Key.

Installation of RheoWin 4.91.0021

RheoWin 4.91.0021 can be installed parallel to an existing RheoWin 3.xx and/or RheoWin 2.xx installation if needed. Please note that RheoWin 4 can read RheoWin 2.xx and 3.xx data, job and page files (backward compatibility), but that RheoWin 2.xx can *not* read RheoWin 3.xx and 4.xx files, also RheoWin 3.xx and can *not* read RheoWin 4.xx files

IMPORTANT RheoWin 2.xx, 3.xx and 4.xx must *always* be installed in different directories.

RheoWin 4.91.0021 can be installed, as an *Upgrade installation,* over an existing installation of RheoWin version 4.20.00xx or newer, that is without deinstalling the older version first. In this case (most of) the settings from the previous installation are automatically used for the new version.

IMPORTANT For older RheoWin versions (version 4.10.00xx and older) the *Upgrade installation* method can not be used, that means that the *New installation* method (see 3b below) must be used, in this case the settings of the previous installation will not be available in the new installation.

❖ **To install HAAKE RheoWin**

1. Read the first chapter (this chapter) of this document *before* starting the installation program.

2. Read the last paragraph of the next chapter of this document, that is the What's new information on RheoWin version 4.91.0021, *before* starting the installation program.

3. Make sure that Windows Administrator privileges are available on the PC on which RheoWin is to be installed.

   IMPORTANT Windows Administrator privileges are mandatory in order to be able to install the RheoWin software.

4. In case of a *New installation* only, that is *not* when performing an *Upgrade installation:* **Deinstall** (remove) any **previous RheoWin 4 version** first (if applicable). Click the Windows Start button, then select Settings, then select Control Panel, in the Control Panel select Add or Remove Programs, in the list of programs select HAAKE RheoWin and then click on the Change/Remove button and follow the instructions.

    > **Note** In this case the settings from a previous installation will be lost (deleted) and are not available for a subsequent new installation.

5. Start the `setup.exe` installation program from

    a. the directory on the harddisk of the PC in which the downloaded rhw4910021_complete.zip was extracted

    or

    b. the `Rheowin` directory on the RheoWin DVD.

6. The RheoWin installation program will guide you through the installation. Please make sure that you have a RheoWin 4 License Key (see below) readily available since the installation program will ask for this.

RheoWin and Windows Users

Windows users with the default Administrator (or PowerUser) privileges will be able to run RheoWin without the need for any modifications to Windows settings.

For Windows users with the default Users privileges an Administrator has to make sure that those users have read access to the RheoWin 4 main directory (by default c:\Program Files\Thermo\RheoWin) and all its subdirectories, as well as read and write (!) access to the following key in the windows registry:

    HKEY_USERS\.DEFAULT\Software\Thermo\RheoWin

and the following two directories and all their subdirectories:

    C:\Documents and Settings\All Users\Application Data\Thermo\RheoWin

    C:\Documents and Settings\All Users\Documents\Thermo\RheoWin.

The names of these directories may be dependent of the actual Windows versions (7, 8.(1) and 10) and the language of the Windows operating system. For more detailed information on this see the HAAKE RheoWin User guide "Installation and 21 CFR part 11 configuration" (part no. 006-0783).

> **Note** Under normal circumstances the RheoWin installation program will automatically set these privileges.

> **Note** Microsoft advices programmers to save application and user data in the above mentioned directories by default, but strange enough does not give Windows users with the default Users privileges *write* access to these directories.

RheoWin 4 Licence Key

In order to be able to install this version of RheoWin on your computer you will need a RheoWin 4 License Key. A Key-Diskette from a previous version of RheoWin (version 2.x) or a RheoWin 3 License Key will *not* enable you to install RheoWin 4.

The keys for RheoWin 4 consist of a company name, serial number and the key code. When you receive the key per e-mail this information will be stored in a *.txt file which can be opened and viewed by using any text-editor (Notepad, Write, Word, etc.)

The key information must either be entered manually (as in previous versions) or loaded from the supplied *.txt file (this is new starting from version 4.40) during the installation process.

In order to be able to install the tools for FDA 21 CFR part 11 compliance, a separate License Key is needed. Separate keys are also needed to install the TTS (Time Temperature Superposition) tool, the Spectra calculation tool, the MWD (Molecular Weight Distribution) tool as well as some other optional software features.

License Keys for RheoWin 4 are available on request only !

Contact Thermo Fisher Scientific

If you have any questions and or suggestions regarding HAAKE RheoWin please send an e-mail to:

support.mc.de@thermofisher.com

What's new

This chapter describes what is new in which RheoWin version.

Version 4.0x.00xx

Version 4.00.0000

(Released 15.07.2008)

Below is a list of things that are new and/or changed in version 4.00.0000 compared with version 3.61.0004 of RheoWin.

Installation

New Keys

- In order to be able to install this version of RheoWin on your computer you will need a *new* RheoWin 4 License Key. A Key-Diskette for RheoWin 2.xx or a RheoWin 3 License Key will *not* enable you to install RheoWin 4.

General

- RheoWin 4.x can be installed and used parallel to RheoWin 3.x on one computer but not at the same time!
- In order to comply with the far more stringent requirements of Windows Vista (relativ to Windows XP) regarding the storage of data and the use of certain parts of the Windows registry, RheoWin 4.x uses different paths for the program files and for data, job, template, page, report, etc. files than RheoWin 3. It also uses a different registry key.
  The program file path, the program data file path, the user data file path and the registry path of RheoWin 4 comply with the Microsoft recommendations for Windows XP and Windows Vista.

Path for program *.exe, *.dll, etc. files

- The RheoWin program is now installed in the following directory and the subdirectories of that directory:

  `C:\Program Files\Thermo\RheoWin`

Path for program data files

- The RheoWin program data files are now installed in the Windows XP (language dependend)

  `C:\Documents and Settings\All Users\Application Data\Thermo\RheoWin`
  `C:\Dokumente und Einstellungen\All Users\Anwendungsdaten\Thermo\RheoWin`

  Windows VISTA and Windows 7

  `C:\ProgramData\Thermo\RheoWin`

  directory and the subdirectories of that directory.
  Program data files are files that are automatically created and modifies by the program without direct user interaction. Under normal circumstances a user does not need to access to these files.

Below is a list with which files are stored where.

In the main RheoWin directory:

Rheowin.log   (the main RheoWin log file, used for debugging only)

In the RheoWin\Elmdll directory:

elmdll.ini   (ini file for the RheoWin elements, used for special options only)

In the RheoWin\Drivers directory:

drivers.flp   (file in which all DeviceManager settings are stored)

drivers.ini   (ini file for the Rheometer drives, used for special options only)

*. log   (communication log files, used for debugging only)

*.err   (communication error files, used for debugging only)

*.msc   (exported MSC table)

*.mtc   (exported MTC table)

In the RheoWin\Autosave directory:

autosave.rwd   (autosave copy of the last job data file)

Drivers_Autosave_x.xx.xx.flp   (autosave copy of the last drivers.flp file)

Drivers_Setup_x.xx.xx.flp   (autosave copy of the installation drivers.flp file)

In the RheoWin\UMS directory:

UMS.mdb   (the UserManagement settings database file)

> **Note** In order to be able the see the directory mentioned above in the Windows Explorer, the option Show hidden files and folder on the View page of the Folder Options dialog in Window Explorer must be active. To open this dialog click on Tools in the Windows Explorers main menu and then select the Folder Options command.

Path for user data files

- The RheoWin user data files are now installed in the Windows XP (language dependend)

```
C:\Documents and Settings\All Users\Shared Documents\Thermo\Rheowin
C:\Dokumente und Einstellungen\All Users\Gemeinsame
```
Dokumente\Thermo\Rheowin

Windows VISTA and Windows 7 (language dependend)

```
C:\Users\Public\Public Documents\Thermo\Rheowin
C:\Benutzer\Öffentlich\Öffentliche Dokumente\Thermo\Rheowin
```

directory and the subdirectories of that directory.

User data files are files that are directly created and modified by the user.

Below is a list with which files are stored where.

In the RheoWin\Data directory:

*.rwd   (data files)

In the RheoWin\Job directory:

*.rwj   (job files)

In the RheoWin\Page directory:

*.rwp   (page files)

In the RheoWin\Report directory:

*.lst   (report template files)

In the RheoWin\Template directory:

*.gds   (graph template files)

*.tds   (table template files)

*.rwt   (job template files)

*.rwl   (page layout template files)

Registry path

- In the Windows registry RheoWin now uses the following main key entry:

```
HKEY_USERS\.DEFAULT\Software\Thermo\Rheowin
```

Font installation

- The font installation has been modified. The message box anouncing the font instalation at the end of the installation has been removed.

Supported rheometers

- Drivers for the RheoStress RS100, 1 Ncm version and 5 Ncm version, as well as the RS50 are <u>not</u> part of the installation anymore. For these instruments RheoWin 3.61 or earlier should be used.

UserManager

User priviliges

- There are new per User(group) definable privileges for the Elements/Job/Template explorer (in JobManager) and the Data/Page/Template explorer (in DataManager) for:

  Opening files
  Moving files and directories and renaming directories
  Deleting files and directories
  Changing the root directory of an explorer tree

Rheometer and auxillary drivers

Drivers for MARS

- There is no lower limit for the accepted value for the set rotational speed anymore. The lowest rpm values achieved with the new CR-control loop and certain samples are in the range of 10^{-7} rpm to 10^{-9} rpm.

Drivers for MARS and Simulator --> Acquiring images

- RheoWin can now acquire and save color images from a suitable camera.

  > **Note** We have tested this with certain USB-Webcams only. Currently we can not guarantee that this will work with other cameras.

- RheoWin is now compatible with the Foculus 323TB camera from the company NET GmbH. This camera is now shipped with the RheoScope module. With this camera exposure times down to 1μs are possible. When using an image size of 512x384 pixels or smaller, a frame rate of up to 58 fps is possible without losing on image quality.
- The method used to save data and images in files was modified. Previously the maximum file size was 4 GB, now the maximum file size 4.295e+09 GB (theoretically...).

Driver for pressure sensor

- The driver now not only the supports the older GMH 3110 but also the new GMH 3111pressure sensor from Greisinger.

DeviceManager

Temperature offset tables

- Temperature offset tables can now be exported and imported. The tables can not be read from the instruments yet.

Editor for Drivers.ini

- By clicking with the right mouse key on one of the three icons on the left side of the DeviceManager dialog the user can launch an editor for modifying the Drivers.ini file.

  > **CAUTION** Do not change any setting in the drivers.ini file unless you know what you are doing.

General

New XML data format

- RheoWin can now save and load data in an XML file format defined by an IUPAC working group. For more information see the following web-page:

  `http://www.nothere.ukshells.co.uk/Iupac/wp%20project%20c.php?id=1`

Configuration (JobManager and DataManager)

Preferences dialog

- In the Device Toolbar / JobExplorer box of the General page of the Preference dialog the user can select whether the new Elements / JobExplorer toolbar (see below) is automatically closed when a Job is started in order to give the JobController window more space on the screen.

Quantities/Units

- There is a *new* quantity -Fn (i.e. the negative value of the normal force) which is useful for certain tack and texture analysis applications.
- This quantity is calculated and saved by the Axial Ramp element only.
- There are two *new* quantities friction force Ff = M / R (with M ist torque, R is radius) and friction coefficient μf = Ff / Fn for use with tribology measuring cell.
- These quantities are calculated and saved by all the rotation elements, i.e. not by the oscillation and axial elements.
- The units cm/s, mm/s and mm/s have been added for the quantity velocity. This quantity is used in the editor of the Axial Ramp Element.
- The unit of the inverse temperature quantity 1/T should be 1/K but was K in previous versions. This has been corrected.

JobManager

Main menu: Editor for Element.ini

- From the Help menu the user can launch an editor for modifying the Element.ini file by selecting the Edit: Element.ini command.

Main menu: Logfile Viewer

- From the Help menu the user can launch a viewer for the different log files that RheoWin creates on demand:

  Rheowin.log : The general RheoWin log-file.
  Rheometer communication log-files: e.g. Mars.log, RS600.log, ...
  The diagnosis-file *.dia saved by the DeviceManager.
  RhwException.log, VISAPI.log, DCAPI.log special log-files for debugging.

> **Note** For normal operation of RheoWin none of the above files are needed.

Standard toolbar

- The icon for the Device Manager has been changed.

Device toolbar

- The Device toolbar now has a button to reset the normal force signal to zero.
- The units for the gap, temperature and normal force display/edit fields are now positioned similarly.

New combined Elements / JobExplorer toolbar

- The separate dialogs for selecting Elements and selecting Jobs have been replaced by a completely new toolbar inside the main JobManager window with three pages; Elements, Job and Templates.
- The Elements page contains the elements for creating a Job by Drag&Drop, just like the Elements dialog in RheoWin 3.

- Both the Jobs page and the Template page contain an explorer tree structure which only displays Job files (*.rwj) resp. Job template files (*.rwt) and sub-directories very much like the Windows Explorer.
- The files and subdirectories displayed in the tree structures are identical to those displayed in the Windows Explorer.

> **Note** Subdirectories *not* containing files of the corresponding type(s) are *not* shown in the tree structure.

- The default root directory of the explorer tree is displayed in the edit field above the explorer tree and can be changed temporarily by clicking on the Select directory button behind the edit field. This functionality can disabled by removing the corresponding privilege in UserManager.

> **Note** The default root directory can only be changed permanently on the Directory page of the Preferences dialog in the Configuration menu.

- Files can moved between subdirectories by Drag&Drop.
  This functionality can disabled by removing the corresponding privilege in UserManager.
- Files can be deleted by choosing Delete from the right-mouse-key popup-menu or by clicking the Delete button at the bottom of the Job page in the toolbar.
  This functionality can disabled by removing the corresponding privilege in UserManager.
- New folders (subdirectories) can be created by choosing New folder from the right-mouse-key popup-menu or by clicking the New folder button at the bottom of the Job page in the toolbar.
  This functionality can disabled by removing the corresponding privilege in UserManager

New Goto-Element

- With the new Goto-Element loops can be "programmed" in a Job sequence. This is useful when creating Job in which a certain element sequence appears multiple times. In the Goto-Element, the element to jump to can be selected from a drop-down list. The elements are identified by a unique ID number (i.e. not by the position number in the Job). The number of repetitions can be set.

> **Note** Currently the evaluation elements can not handle data from measuring elements that are called more then once.

File Load-Element and Reference-Element

- Data in IUPAC XML file format can be imported using the normal File Open dialog and selecting a XML file (which must be in IUPAC format in order to be loaded).

Message-Element

- With the new Repeat sound option on the Sound page of the element editor the user can set the sound playback to be repeated until the Ok button of the screen message text window is clicked.

> **Note** For the sound to be repeated the option Display message during Job sequence must active also, otherwise there wouldn't be an Ok button to stop the sound playback.

Set-Element

- The CR-Mode page in the element editor has been renamed to CR/CD-Mode since the adaptable control loop parameters now also apply to the CD control loop.
- The CR/CD-Mode page for configuring the CR and CD adaptable control loop is now also available for the RheoStress 600 and the RheoStress 6000.

> **Note** The adaptable CD and CR control loops are available in the following rheometer firmware versions (and in newer versions):
> RS600 : RS600-02_17_103-Dsp-10_06_000.h86
> RS6000 : RS6000-02_17_103-Dsp-10_06_000.h86
> MARS   : UPD_MARS_CBOX_12_04_005_Dsp_10_06_307.h86

Temperature-Set-Element

- The temperature page of the element editor has been modified and enhanced. The user can now select that the complete job will be discontinued when the set temperature is not attained within a set tolerance after a set duration.

New for (almost) all Measurement Elements

- On the Break criteria page of the Rotation page of the element editor the user can now select Goto in the Action drop-down list. Once the Goto command is selected a Goto button is displayed under the Action field. By clicking on the Goto button a dialog is displayed from which the user can select an element of the Job to jump to when the break criteria is fulfilled.

> **Note** In this version this functionality is still missing from the Temperature Set Element.

> **Note** This functionality will **not** be available in the MultiStep and Creep-Recovery elements.

All Oscillation Elements (not Multiwave Elements)

- The waiting time can now also be defined in seconds. The time in seconds can be shorter than the duration of one period.
- In the Frequency Sweep element the waiting time in seconds can also be set as a maximum time when the waiting time is set as a number of periods, for example "Wait for 5 periods but not longer than 10 s".
- The oscillation elements have been optimized to achieve a more exact timing of the datapoints.
- The time passed while waiting for the set waiting time to be finished (at the start of the element) is now included in the segment time.
- Previously this time was erroneously added to the time between two segments.
- The time value for a data point is now the time at the end of the last oscillation period that is used for one data point. Previously this was the time in the middle of all oscillation periods used for one data point.
- The format of the oscillation raw data files (*.rwr) has been modified. A *.rwr files now also contains all information neede to calculate the rheological values like G', G'' etc. This new format is used by the modified *.RWR Viewer program (see below).

Osc Time Curve, Osc Frequency Sweep and Osc Amplitude Sweep Elements

- Take from previous can now be used for taking the last set or measured stress or strain value from the previous element as the set value for the current element.

Osc Amplitude Sweep Element

- On the Acquisition page of the Oscillation page of the element editor a fixed duration per step can now be set as an alternative to setting the number of repetitions. During the measurement as many repetitions as will fit in the duration will be measured.

> **Note** The set frequency, i.e. the duration of one oscillation period, and the duration per step must be given compatible values.

Axial Ramp Element

- The default setting on the Rotation page of the element editor is now CS-Mode, the default stress/torque is 0.0.

- The new quantity -Fn (i.e. the negative value of the normal force) which is useful for certain tack and texture analysis applications is now calculated and saved.

DataManager

Main menu: Editor for Element.ini
- From the Help menu the user can launch an editor for modifying the Element.ini file by selecting the Edit: ELEMENT.INI command.

Main menu: Logfile Viewer
- From the Help menu the user can launch a viewer for the different log files that RheoWin creates.

Standard toolbar
- In the standard toolbar there are two new (light green) icons Open last measurement and Add last measurement for quickly opening the data file (*.rwd) of the last measurement in a new page resp. adding the data file of the last measurement to the currently active page.

New XML file import/export
- Data can be exported in the IUPAC XML file format with the *new* Save as (XML-IUPAC) command in the File menu.
- Data in IUPAC XML file format can be imported using the normal Open command in the File menu and selecting a XML file (which must be in IUPAC format in order to be loaded).

New Data/Page/Template toolbar
- Inside the main DataManager window there is a completely *new* toolbar with three pages: Data, Pages and Templates.
- Each of the three pages contains an explorer tree structure which displays Data files (*.rwd), Page files (*.rwp) and Template files (*.gds, *.tds and *.rwl) respectively as well sub-directories and files in subdirectories, very much like the Windows Explorer.
- The files and subdirectories displayed in the tree structures are identical to those displayed in the Windows Explorer.

> **Note** Subdirectories *not* containing files of the corresponding type(s) are *not* shown in the tree structure.

- From the Data explorer tree a Data file can be opened in a new page inside DataManager by double clicking on the file or by selecting Open from the right-mouse-key popup-menu or by clicking on the Open button at the bottom of the page or by dragging&dropping it on empty space inside the DataManager or by dragging&dropping it on the title bar of the DataManager or highlighting the file and pressing the Enter key on the keyboard.
- From the Data explorer tree a Data file can be opened in an already existing (open) page inside DataManager by selecting Add from the right-mouse-key popup-menu or by dragging&dropping it on the title bar of an existing page.
- From the Page explorer tree a Page file can be opened inside DataManager by double clicking on the file or by selecting Open from the right-mouse-key popup-menu or by clicking on the Open button at the bottom of the page or or by dragging&dropping it on empty space inside the DataManager or by dragging&dropping it on the title bar of the DataManager.
- A Page file can not be added to another page.
- The Template explorer tree basically consist of three independend trees: One for graph templates, one for table templates and one for page templates.
- From the Template explorer tree a Template can be applied to an existing (open) page inside DataManager by double clicking on the file or by selecting Open from the right-mouse-key popup-menu.
- A graph template will be applied to the graph only, a table template to the table only and a page template will be applied to complete page of the currently active page inside DataManager.

- The default root directory of an explorer tree is displayed in the edit field above the explorer tree and can be changed temporarily by clicking on the Select directory button behind the edit field. This functionality can disabled by removing the corresponding privilege in UserManager.

  > **Note** The default root directory can only be changed permanently on the Directory page of the Preferences dialog in the Configuration menu.

- Files can moved between subdirectories by Drag&Drop.
  This functionality can disabled by removing the corresponding privilege in UserManager.
- Files can be deleted by choosing Delete from the right-mouse-key popup-menu or by clicking the Delete button at the bottom of the Job page in the toolbar.
  This functionality can disabled by removing the corresponding privilege in UserManager.
- New folders (subdirectories) can be created by choosing New folder from the right-mouse-key popup-menu or by clicking the New folder button at the bottom of the Job page in the toolbar.
  This functionality can disabled by removing the corresponding privilege in UserManager

Graph / Table display

Table display

- All data values are now displayed in a normal font and not in a bold font anymore.

*.RWR Viewer program

- The functionality of the *.rwr Viewer program has been significantly extended.
- The program now also displays the rheological quantities of the sample as numbers.
- In the rheological data graph the program now shows G' and G" as function of frequency, time, stress, strain or temperature depending on the type of the first segment in the data file.
  By clicking on a data point in the rheological data graph the program will show the corresponding raw data information in the other graphs and numerical fields.
- "Walking" through the data points can be done by clicking on the buttons below the numerical value display or by using the keyboard (left/right arrow key, home/end key, page up/down key).
- By clicking on the right Y-axis (with the time on the X-axis) the user can select from a popup menu which quantity to display on the right Y-axis.
- The program now shows the relative value of the 3rd and 5th harmonic of both the stress and strain signal for each data point.
- After clicking on any of the four graphs with the right mouse button a menu will popup which enables the user to print (on the default printer only), copy (to the clipboard) or save (in an *.emf file) the graph.
- The program now shows the AngleRatio which is the ratio of the angle amplitude in the sample and the angle amplitude of the rheometer. This value is a measure for the amount of compliance correction applied. A value close to zero means that the compliance correction is zero or very small. The smaller the value is the more compliance correction is applied.
- The program now shows the TorqueRatio wich is the ratio of the torque "lost" because of instrument inertia and the effective torque applied to the sample.

Version 4.00.0001

Below is a list of things that are new and/or changed in version 4.00.0001 compared with version 4.00.0000 of RheoWin.

Installation

Language selection
- The language selected at the beginning of the installation was not transfered to the language settings of RheoWin. This has been solved.

Rheometer drivers

Drivers for RS1, RO1, RS600 and RS6000
- On certain PCs on which RheoWin 3.xx worked without problems, RheoWin 4.00.0000 produces "character overrun" and "framing error" communication errors. This has been solved.
- Under certain circumstances (in combination with internal Jobs only) there was a problem reading sensor factors from the instrument. This has been solved.

JobManager

Osc Frequency Element
- Under certain circumstances an "Illegal value" error message would popup when closing the Element-Editor. This has been solved.

ROT Step Element
- This element crashed when the T set icon in the JobEditor was used to change the temperature. This has been solved.

ROT MultiStep Element, ROT CreepRecovery Element
- The T set icon functionality in the JobEditor did not work for these elements. This has been solved.

Area Calculation Element
- The area calculation did not work when the manual set data range was larger then the actual range. This has been solved.

Version 4.00.0002

Below is a list of things that are new and/or changed in version 4.00.0002 compared with version 4.00.0001 of RheoWin.

JobManager

Set-Element
- The CR/CD-Mode page for configuring the CR and CD adaptable control loop is now only available after installing RheoWin with a separate installation key. This means that access to the CR and CD adaptable control loop is not part of a standard RheoWin installation.

Version 4.00.0003

Below is a list of things that are new and/or changed in version 4.00.0003 compared with version 4.00.0002 of RheoWin.

General

Help file format
- The help file format has been changed. This means that the help files are now compatible with Windows Vista without needing to install an update from MicroSoft.

Rheometer drivers

Driver for MARS

- The optimize option for the number of repetitions per data points is now available for the MARS.

> **Note** The following MARS firmware (or newer) is needed for this to work:
> `UPD_MARS_CBOX_12_06_002_DSP_10_07_000.h86`

Driver for RV1

- On certain PCs on which RheoWin 3.xx worked without problems, RheoWin 4.00.000x produces "character overrun" and "framing error" communication errors. This has been solved.

Configuration (JobManager and DataManager)

Quantities/Units

- The friction coefficient which was introduced in version 4.00.0000) was given a wrong internal reference number, as a consequence the aT and bT shift-factors were not available anymore. This has been solved.

JobManager

Oscillation Elements

- The optimize option for the number of repetitions per data points is now available for the MARS.

> **Note** The following MARS firmware (or newer) is needed for this to work
> `UPD_MARS_CBOX_12_06_002_DSP_10_07_000.h86`

Reports

New variable for reports

- A new variable VariableMeasureDeviceFullName is now available for display in a report. This variable contains the complete original model name of a rheometer (which can not be modified by a user).

Version 4.00.0004

(Released 19.11.2008)

Below is a list of things that are new and/or changed in version 4.00.0004 compared with version 4.00.0003 of RheoWin.

Rheometer drivers

Driver for F6/N6/F8/N8 circulators

- Setting a temperature for these circulators was not possble when the unit symbol of the temperature was modified in RheoWin. This has been solved.

Driver for RheoStress 3000

- There is a dirver for the new RheoStress 3000 (which is only available in Japan).

JobManager

SetElement

- A special help file is now available for the adapable CR/CD-Mode. The help file is opened by clicking the Help button.

MultiWave Oscillation Elements
- There was a problem with the timing of the MultiWave datapoints (since version 4.0). This has been solved.

Graph / Table display

Table display
- In RheoWin 4 selecting a column in a table by clicking on the column header was not possible anymore (this was possible in RheoWin 3). This functionality has been restored.

Version 4.00.0005

(Released 12.12.2008)

Below is a list of things that are new and/or changed in version 4.00.0005 compared with version 4.00.0004 of RheoWin.

JobManager

SetElement
- The help file for the adapable CR/CD-Mode has been improved. It now offers integrated calculators to calculate the control loop parameters.

SER Element
- The rheological values were not calculated correctly when the SER-tool was used in CS-Mode. This has been corrected.

Interpolation Element
- When using a user defined interpolation width (instead of the Default setting) the software used the wrong equation which in the case of noisy data may lead to slightly wrong results. This has been solved.

Version 4.00.0006

(Released 04.03.2009)

Below is a list of things that are new and/or changed in version 4.00.0006 compared with version 4.00.0005 of RheoWin.

Rheometer/Circulator drivers

All devices
- Under certain circumstances the communication between RheoWin and any rheometers/viscometer was slowed down more or less (depending on which devices were used) when RheoWin was communicating with multiple devices at the same. This was noticeable when using a DC30 or DC50 circulator with any rheometer/viscometer for example.
  This has been solved.

Driver for DC30 and DC50 circulators
- The communication routines for these two instrument have been optimized.

Drivers for MARS, RS6000, RS3000, RS600, RS300, RS1 and RV1
- Under certain circumstances the lift would not reach the set measurement position or the set standby position but stop at a slightly larger or smaller gap. This mainly happened when running measurements at higher temperatures. This has been solved.

DeviceManager

COM ports for DC30 and DC50
- The user can now select COM1 to COM16 (instead of COM1 to COM4) for the communication with a PC.

Solid clamp measuring geometry
- The user can now enter a value for the damping factor (for CR-Mode).

JobManager

Oscillation temperature ramp and temperature step elements
- The settings for the limiting maximum torque (checkbox and value) for CD-mode were not properly saved when editing these elements in the JobEditor. This has been solved.

Version 4.00.0007

(Released 23.06.2009)

Below is a list of things that are new and/or changed in version 4.00.0007 compared with version 4.00.0006 of RheoWin.

DeviceManager

Renaming devices
- In RheoWin 4.00.0006 renaming devices in the RheoWin DeviceManager was not possible because of a bug. This has been solved.

Version 4.1x.00xx

Version 4.10.0000

(Released 25.08.2009)

Below is a list of things that are new and/or changed in version 4.10.0000 compared with version 4.00.0007 of RheoWin.

Installation

Windows 7 compatibility
- The installation program has been modified to be compatible with Windows 7.

Template for spectra calculation
- The path for the default graph template for the spectra graph was set to an incorrect value by the installation program. This has been solved.

New option interfacial rheometry
- In order to be able to use the new quantities and measuring geometries for interfacial rheometry the *new* Interfacial Rheometry option (order no. 098-5057) must be installed.
- This option is automatically installed when using the installation key 098-5019 for all instruments (this key is for Thermo internal use only).

Measuring geometry selection

- By setting the option Manually select the measuring geometries (in the next three windows) as the default option during the installation, the user is now guided to manually selecting which measuring geometries should be installed. This selection is done in three subsequent dialog, one for "standard" parallel plate and cone and plate geometries, one for "standard" cylinder geometries, and for "special" geometries like vanes, double cones, ER-geometries etc.

New measuring geometries

- The new measuring geometries with longer shafts which were developed for the MARS III but who will replace the shorter geometries for all RheoStress and MARS instruments are now part of the installation.

General

Program user interface style

- The program user interface, i.e. the shape and colour of 'controls' (button etc.), has been modernized.

Program startup

- When RheoWin is executed by a Windows user who does not have the rights to write in certain directories (see the readme.doc file), RheoWin will now present the user a clear and understandable error message.

Automatic program lock (for 21 CFR part 11 module)

- On the Security page of the Preferences dialog the RheoWin system administrator can now define the duration of an inactivity (no mouse clicks, no use of the keyboard) interval in which RheoWin was not used. When this time interval is exceeded the control of RheoWin is blocked until the user enters her/his login information again.

  Note This functionality is only available when RheoWin is installed with the 21 CFR Part 11 option

Language

- In RheoWin the word 'sensor' was used for referring to a measuring geometry, this has been changed. The word 'measuring geometry' is now used throughout the software instead.

UserManager

Priviliges

- There are new per User(group) definable privileges for the Elements/Job/Template explorer (in JobManager) and the Data/Page/Template explorer (in DataManager) for: Renaming files

Rheometer/Circulators drivers

MARS II, MARS III

- Some improvement have been made in the TCP/IP communication.
- Several modifications were made to solve some time-out and instability problems.

MARS III

- A *new* driver for the MARS III rheometer is now part of the installation.

MTMC driver

- A *new* driver for the MARS III Temperature Module Controller (MTMC) is now part of the installation. This controller is an integral part of the MARS III.

Rheostress 300, 600, 3000, 6000, MARS II, MARS III

- MultiWave oscillation elements would not run directly after a normal oscillation element. This has been solved.

- Stopping a MultiWave measurement did not work. This has been solved.

Dynamax driver

- A *new* driver for the Dynamax circulator is now part of the installation.

Simulator driver

- The simulator now also supplies a random normal force "signal".

DeviceManager

Thermocontroller devices

- In order to make things clearer the Port, to which thermocontrollers that are *integrated* in a rheometer (which is the case for the RotoVisco 1 and RheoStress 1) are connected, is now called Internal (and not Remote anymore). The Remote connection is now only used for external thermocontrollers that are connected directly to a rheometer (like the UTC).

Brookfield measuring geometries

- The Brookfield L1 to L4 and R1 to R7 measuring geometries can now be selected for use with all RS, RT and MARS rheometers. With these geometries one can only measure the viscosity of newtonian fluids.

> **Note** The values for the shear-rate and shear-stress that are calculated by RheoWin using the supplied A- and M-factors should *not* be used.

Measuring geometry types for interfacial rheometry

- In the dialog Properties of ... of the measuring there are two new options available for the type of measuring geometry; Interfacial ring and Interfacial bicone.
- One new measuring geometry with the name Du Noüy ring is installed when RheoWin is installed with the Interfacial Rheometry option.

> **Note** The user must enter the correct inner and outer diameter of the Du Noüy ring geometry and the fluid container combination before this geometry can be used.

- The A- and M-factors of an Interfacial ring measuring geometry are automatically calculated when the diameter values are entered.

Measuring geometries device list

- In the box below the device list the inertia, compliance and expansion coefficient are now also shown for the selected measuring geometry.

Auxiliary devices

- The drivers for the Greisinger GMH 3110 and GMH 3111 manometers and the Ahlborn ALMEMO 2590-9 (and compatible units) hygrometer are now automatically installed and available in the auxiliary devices list in the DeviceManager.

MSC calibration

- The MSC calibration routine has been optimized.
- The current absolute angle value is now displayed below the graph during the calibration.
- By modifying the line
      ;MSCSpeed=0.01047
  in the drivers.ini file the angular velocity with which the MSC calibration is performed can be modified. This is an experimental function! The value in the above command is the angular speed in rad/s.

Exporting MSC, MTC and TOT files

- The user is now asked to enter a filename when exporting these files.

MARS II and MARS III firmware updater
- Some modifications have been made in order to be able to distinguish the MARS II and MARS III.
- For the MARS III a bootstrapsloader was integrated. This function is for qualified service personal only!

Configuration (JobManager and DataManager)

Elements configuration dialog
- In this dialog the user can select which element icons are displayed on the Elements page of the Elements / JobExplorer toolbar.
- The settings are saved for each RheoWin user individually.

Preferences dialog
- On the Directories page of this dialog the user can now define a base directory for the Job, Data, Page and Templates sub-directories
- On the General page of this dialog the user can now set a font size for the text in the Information window. The selected font size is valid for the Information window in both the JobManager and the DataManager.
- The default colour of the splitter has been changed to a light blue for better visibility.

Quantities/Units
- There is a *new* quantity vR, the circumfential velocity at radius R, for use with the tribology measuring cell and other friction related measurements.
- This quantity is calculated and saved by all the rotation elements and by the axial elements (i.e. not by oscillation elements).
- There is a *new* quantity We, the Weissenberg number, which is defined as the quotient of the shear stress and the first normal stress difference. This quantity is calculated and saved by all rotation elements.
- There is a new "quantity" Trigger, which can have the value 0 or 1 depending on whether the trigger output signal is off or on.
- There are two *new* quantities $\Delta h(t) = |\ h\_trigger - h(t)\ |$ and $\Delta\%h(t) = \Delta h(t)\ /\ h\_trigger$ where h_trigger is the gap at the "trigger point" and h(t) the standard rheometer gap. In RheoWin h_trigger is the "current gap" at the moment the first Axial-Ramp Element in a Job is started. This quantity is calculated and saved by the axial ramp element only.
- There are new quantities G'-i, G"-i, G*-i, J'-i, h-i, t-i, etc. with the proper units for interfacial rheometry.
- A new quantity group "Interfacial" has been added, this group contains all the special quantities for interfacial rheometry.

Symbol/Colour master layout dialog
- In this *new* dialog the user can select the symbol and colour for every single quantity for upto 32 data files. These symbol and colour settings are used as the default settings for any graph in RheoWin when the option Use master layout on the Layout page of the Data page of the Graph layout dialog is active.
- By double clicking on a column header above the table (in the new dialog) the symbolproperties (shape, style, size, colour, etc.) for all quantities in one data file can be defined in the Layout dialog.
- By double clicking on a quantity in front of a row (in the new dialog) the symbol properties for that quantity in all files can be defined in the Layout dialog.
- By double clicking on any symbol in the table the properties of that one symbol in on data file can be defined in the Layout dialog.
- The settings made in the dialog can be stored in a (*.layout file) and loaded from such a file.

- Two *.layout file are part of the RheoWin installation:
  In the file Master colour pro file, the files are distinguished by colour and the quantities by symbol.
  In the file Master colour pro quantity, the files are distinguished by symbol and the quantities by colour.
  This is the default setting after the installation.
- When a page which was created with a previous version of RheoWin is loaded (in DataManager), RheoWin will always use the layout setting as defined in that page and not use the colours and symbols defined in the master layout.

JobManager

Help menu in the Main Menu: Logfile-Viewer
- The Logfile-Viewer now also displays the log file from the e-mail program used in the Message-Element.
- The Logfile-Viewer now also displays the *.err files written by the device drivers.

Device toolbar
- In the Device Toolbar the user can now also directly set the temperature when a circulator or temperature control unit is connect to the rheometer or PC and when that unit is selected as the default Thermocontroller on the New job default page of the preferences dialog in the configuration menu.
- Please note that there maybe a delay in opening and activating the Device Toolbar when JobManager starts up because some Thermocontrollers (mainly older circulators) have a slow communication interface.
- The functionality of the "LEDs" in the toolbar has been optimized:
  After clicking the Go to gap or the Find and set zero point button, an orange "LED" will blinking aside from that button until the action is completed, at that point the "LED" will become green. The green "LED" will disappear as soon as another button is clicked.
- The timing of the data-acquisition of the toolbar has been optimized so that it does not disturb the data-acquisition of a Job anymore.

Elements/Jobs/Templates Explorer
- On the Elements page of this toolbar the individual element icons can now be made hidden (i.e. not visible and not accessible) by right-clicking on an element icon and selecting Hide this element from the popup-menu.
- Hidden Element icons can be made visible (and accessible) again using the Elements configuration dialog.
- The Elements configuration dialog is be opened by right-clicking on any element icon and selecting Elements configuration from the popup-menu. The Elements configuration dialog is also accessible from the Configuration menu.
- On the Jobs and Templates pages of this toolbar the job and template file names as well as directory names can now be edited after a "slow double click" or by selecting Rename from the popup-menu (right-click), just like in the Windows Explorer.
  In the RheoWin UserManager each user can be denied to rename files by setting the appropriate user privilege.
- On the Jobs and Templates pages of this toolbar the file and directory names can be sorted forwards and backwards according the alphabet as well according to the date/time of creation of the file by selecting the appropriate option from the Arrange sub-menu on the popup-menu (right-click). The selected sort order is saved and used until it is modified again.

Job-Controller
- The large green Continue arrow with which the user can force the Job-Controller to discontinue the current element and jump to the next element can now be disabled by setting the appropriate user privilege in the RheoWin UserManager.

- Under certain circumstances there were some problems with the display of the current temperature in the JobController window. This has been solved.
- The linear expansion coefficient of a measuring geometry is now always send to the instrument at the beginning of a Job.

Manual control / Monitor

- The manual control window would crash when it was opened in the maximized state. This has been solved.

StartElement

- Messages about errors encountered when initializing the instrument are now more informative.

Set Element

- The axial page in the Set-Element is now also available for all RheoStress 6000 and RheoStress 600 with normal force option.
- The PID parameters of the RheoAdaptive control are now displayed in the JobEditor and in the Information window in the JobController and in DataManager.

Goto-Element

- The *new* Change temperature option can be used to automatically run one more or measuring elements at a number of different temperatures in a comfortable way.

No data saving in certain measurement elements

- In the measuring elements listed below there now is an option *not* to save the data that was acquired by that element.
    ROT time curve, ROT ramp, ROT temperature ramp,
    OSC time curve, OSC temperature ramp,
    Axial time curve, Axial ramp.

This is useful when a feature of a measurement element (like a break-criteria) is needed for meeting pre-test requirement without generating data points that are not needed.

ROT and OSC Temperature Step Elements

- The Set-Temperature value was not correctly saved under certain circumstances. This has been solved.

Rotation Step Element

- The minimum Step duration time for the Step mode option Fixed duration for each step is now 0.1 seconds (instead of 1 second). By using a Step duration time of 0.35 s and an Integration time of 0.15s, the Rotation Step Element can now be used as a non-continuous "Ramp" which gives much better data at low shear rates than the continuous (real) Ramp Element will give.
The total time for this non-continuous Ramp must be calculated manually by multiplying the time per data point (0.5 seconds in this example) by the number of data points. We will offer a better solution for this in the near future.

All Rotation Elements

- The Weissenberg number We, which is defined as the quotient of the shear stress and the first normal stress difference, is now calculated and saved by all rotation elements.
- The new quantity vR, the circumferential velocity at radius R, is now measured and saved by all rotation elements.

All Oscillation Elements

- The functionality of the STOP and NEXT buttons (in the JobController) has been improved.
- The "Take from previous" option for the Auto tension force value (Axial page in Element editors) did not work properly. This has been solved.

Axial Ramp Element

- The end position of the ramp can now be defined as a percental value of the initial position of the ramp.

- The element now measures and saves the two *new* quantities $\Delta h(t)$ and $\Delta\%h(t)$. These quantities can be used for texture analysis measurements.

Axial Ramp Element

- On the Parameters page of the Axial page the dependence between the edit fields for the Gap, Duration and Dh/t was not correct. This has been solved.

Axial Ramp Element & Axial Time Element

- The two quantities friction force Ff = M / R (with M is torque, R is radius) and friction coefficient μf = Ff / Fn are now also measured and saved by the axial elements.
- The *new* quantity vR, the circumferential velocity at radius R, is now measured and saved by the axial elements.
- The axial element now allows the acquisition of images from any compatible camera.

Axial Time Element

- The quantities friction force Ff (CS-Mode) and circumferential velocity vR (CR-Mode) can now be entered as a set value on the Rotation page of the editor of this element.

Curve-Discussion Element

- For a calculated mean value there is a new QC criterium. The operator symbol for this new criterium is ><. When this operator is selected an edit field for a percentual value Y appears right of the operator selection box.
  This criteria determines whether the calculated mean value differs more then Y % from the largest or smallest values in the data range. This criteria can be used to check the amount of noise in a measured signal.

Crossover Evaluation Element

- The crossover element crashed when used in a Job when the measured data did not contain a crossover point. This has been solved.

Yield-Stress Evaluation Element

- The calculation routines have been optimized.

Creep/Recovery Evaluation Element

- The subscript zero has been removed from the symbols for the calculated results.

Thixotropy and Area Evaluation Element

- A mathematical bug in the calculation of the result has been removed.

DataManager

Opening files from the Windows Explorer

- Double clicking on a *.rwd data file or a*.rwp page file will now also open this file in a new page in DataManager when DataManager is already running and already contains pages.
- A *.rwd data file can be added to an existing page by dragging and dropping the file onto the titlebar of that page.

> **Note** Dragging a file on the inside of the page (i.e. on the graph or table) will *not* add the file to the page.

File menu

- With the *new* Save as without images command in the Save submenu a file which originally contained images (from the RheoScope for example) can now be saved without the images.
- In the dialog which appears when clicking the *new* Change file order command the order of the currently loaded files (in a page) can be re-arranged using two arrow buttons.
  The file order is reflected in the graph legend and in the information window in a page.
  The functionality to re-arrange the file order (see above) is also available in the Remove file dialog.

Standard toolbar
- The file order re-arange dialog is also opened by clicking on the *new* Change file order icon in the standard toolbar.

Data/Page/Template Explorer
- File name as well as directory names can now be edited after a "slow double click" or by selecting Rename from the popup-menu (right-click), just ilke in the Windows Explorer.
In the RheoWin UserManager each user can be denied to rename files by setting the appropriate User Privilige.
- File and directory names can be now sorted forwards and backwards according the alphabet as well according to the date/time of creation of the file by selecting the appropriate option from the Arrange sub-menu on the popup-menu (right-click).
The selected sort order is saved and used until it modified again.
- XML files (*.xml) are now listed in the explorer tree on the Date page.

MWD calculation
- A mathematical bug which could lead to problems has been solved.

Graph / Table display

Data select for evaluation using the mouse
- The range of data on which an evaluation will performed can now be selected by marking the first and last data point of the desired range in the graph using the mouse.
- In order to be able to use this *new* function it must enabled first, by either clicking on the new Data select icon on the left-hand side of the status bar of the graph window or by using the new command Range select > Active in the graph context popup-dialog (right mouse click on graph).
- When this function is enabled the user can select a range by pulling-up a rectangle on the graph (press right mouse button and keep it pressed while moving the mouse).
When the mouse button is released two red circles are drawn in the graph to mark the first and last data point of the selected range.
- The range can also be selected by clicking on a datapoint and keep the (right) mouse button down, then waiting for a fraction of a second for a red circle to be drawn around the datapoint and then moving the mouse along the curve to any other data point while keeping the mouse button down (and dragging a second red circle along the curve). When the mouse button is released two red circles are drawn in the graph to mark the first and last data point of the selected range.
- As long as the two red circles are displayed in the graph they can be "grabbed" (with the mouse) and moved along the curve to change the selected range.
- By clicking on any other curve in the same graph, that curve will be selected using the same x-range (the two red circles will mark the corresponding data points).
- By clicking on any other curve in the legend of a graph, that curve will be selected using the same x-range (the two red circles will mark the corresponding data points).
- The range selected by the mouse is of course reflected in the Data select dialog, but *not* (yet?) vice versa.
- The range selected by the mouse is of course reflected in the dialogs of the evaluation elements (but modifications made in the selected range in the elements are *not* transferred back to the graph).
- The selected range can be removed by clicking the Delete range icon on the left-hand side of the status bar of the graph window.
- As long as this function is enabled, zooming in the graph using the mouse is disabled.
- The selected range is saved and restored when the graph is redrawn after opening and closing the graph dialog, after rescaling, after adding/removing files, etc.
- After selecting a data range the user can open a small Calculated values tool window by either right clicking on one of the two range markers and selecting Calculate from the pop-up menu or by clicking on the C button in the status bar of the graph.

- While the Calculated values window is open the user can modify the selected range by moving the range markers with the mouse, the calculated values will then be re-calculated and updated.
- The Calculated values window currently shows the following values: x-range, y-range, the mean y value with its standard deviation, the lin-lin slope, the log-lin slope and the log-log slope.
- Selected calculated values can be transferred to clipboard and then pasted on to the graph.

Graph layout dialog

Graph legend
- The order in which file names are displayed in the graph legend can now be defined by re-arranging the file order, see above.
- The text which is displayed (for a data file) in the graph legend can now be configured, see below.
- On the Legend + text page of the Graph layout dialog the text which is displayed (for a data file) in the graph legend can now be freely configured. The legend text can be a combination of text fields like Filename, Substance name, Sample no, Comment etc. as well a User-defined text.
  The user-defined text is stored in the data file and must be entered in the Identification/Notes dialog which can be accessed from the file menu or the standard toolbar.
- In the Masterlayout box on the Layout page of the Data page of the Graph layout dialog the user can (de-) activate the *new* Use master layout option.
  When this option is active RheoWin will use the colours defined in the "Symbol/Colour master layout" dialog in the Configuration menu and the controls to change symbols will are disabled. In order to manually change any colour and/or symbol this option must be deactivated.

Proportional/Fixed text size
- Changing the text size option from proportional to fixed and vice versa now works correctly on an active page.

Axis context menu
- By right clicking on an axis or the axis labels of an axis and then selecting Unit ... from the popup menu the user can now select another unit for the quantity displayed on the axis.
- When the right-mouse-key context-menu for an axis was used to change the number format of that axis the scaling for the axis was set Autoscale. This has been solved.

Graph layout dialog
- On the Legend + text page of the Graph layout dialog the text which is displayed (for a data file) in the graph legend can now be freely configured. For the legend text the Date and/or Time of the measurement can now be selected also.

Graph display
- Some low level routines of the graph display functionality have been optimized and debugged.

Version 4.10.0001

(Released 30.09.2009)

Below is a list of things that are new and/or changed in version 4.10.0001 compared with version 4.10.0000 of RheoWin.

Installation

MARS III installation
- The RheoAdaptive Control option (order no. 098-5056) is now automatically installed as part of the MARS III installation.

> **Note** This order no. is *not* shown on the installation welcome screen. (Only order no.'s for which the key was manually entered are displayed in that screen.)

Rheometer/Circulators drivers

MARS II, MARS III

- Under certain circumstances (for example when the temperature is not yet constant) the lift would never reach the Standby position (defined in a Lift-Element). This problem has been solved by giving the Standby position a default tolerance of 10 micrometer. The tolerance value can be modified by activating the following line in the drivers.ini file:

```
[MARS2]
;LiftPosTolerance=0.025
```

  The line is activated by removing the leading ";". In the example above the tolerance is set to 25 micrometer.

JobManager

Lift-Element

- Clicking on the green goto next element button in the JobController while the lift was moving to Standby position would end the Job completely. This has been solved.

Curve-Discussion Element

- The QC value for the new >< operator was not displayed when this element was used in a Job. This has been solved.

DataManager

Modifying the identification

- Modifying the Identification properties of a data file (sample name, legend text, etc.) was not possible when the data file was initially loaded as part of a page (*.rwp, page file). This has been solved.

Version 4.10.0002

(Released 09.10.2009)

Below is a list of things that are new and/or changed in version 4.10.0002 compared with version 4.10.0001 of RheoWin.

Rheometer/Circulators drivers

MARS III

- In the manual control window the normal force value was intermittently not displayed under certain circumstances. This has been solved.

DeviceManager

MTMC

- On the right hand side of the MTMC diagnosis window the status of the temperature control (active/not active) is now displayed.
- On the right hand side of the MTMC diagnosis window the status of the flow control valves is now displayed. By opening the diagnosis window while a job (which includes temperature control) is running, the status of the valves can be monitored on-line and in real-time.
- With the slider controls below the flow control valves the status of the valves can be changed manually. Manually controlling the valves with the slider controls will stop the control of the last set temperature.

Version 4.10.0003

(Released 03.11.2009)

Below is a list of things that are new and/or changed in version 4.10.0003 compared with version 4.10.0002 of RheoWin.

JobManager

Job-Editor
- It was possible to start a Job in which no measuring geometry was defined (selected). Under certain circumstances this would result in the software sending a wrong temperature value to the instrument. This has been solved. Starting a Job in which no measuring geometry is defined will now result in an error message, and no commands will be send to the instrument.

Oscillation Time Element
- The timing of the trigger function has been optimized.

Version 4.10.0004

(Released 10.11.2009)

Below is a list of things that are new and/or changed in version 4.10.0004 compared with version 4.10.0003 of RheoWin.

Rheometer/Circulators drivers

RS600
- The RS600 driver which was part of the 4.10.0003 update had a problem regarding oscillation measurements. This has been solved.

Version 4.10.0005

(Released 18.11.2009)

Below is a list of things that are new and/or changed in version 4.10.0005 compared with version 4.10.0004 of RheoWin.

Installation

Masterlayout files
- On deinstallation the Masterlayout settings are now saved. This means that during the installation of the *next new version,* the Masterlayout settings will be restored automatically when the "restore setting from previous version" is selected during the installation.

> **Note** In order to save the Masterlayout files of version 4.10.0004 or earlier you will have to make a copy of these files manually. The *.layout files are by default stored in the following directory:
> `C:\Documents and Settings\All Users\Application Data\Thermo\RheoWin`

DeviceManager

Measuring geometries
- The sample volume values for the following VT550 measuring geometries have been modified: MV1, MV2, MV3, MV-DIN, MV-E, SV-DIN, SV-E, HV1, HV2
  These sample volume values were slightly wrong.
- The sample volume values for the following pressure cell measuring geometries have been modified: PZ35, PZ36, PZ37, PZ38, PZ38 b, PZ39 These sample volume values were slightly wrong.

- Since the sample volume values for the D75/300 Hasteloy pressure cell are slightly different the following new measuring geometry entries have been added to the list PZ36 Ha, PZ38 Ha, PZ39 Ha.

Version 4.10.0006

(Released 30.11.2009)

Below is a list of things that are new and/or changed in version 4.10.0006 compared with version 4.10.0005 of RheoWin.

DeviceManager

MTMC

- The message Please select cooling media appeared when trying to set a temperature. This message should only appear when using the TM-EL-P, TM-EL-P + TM-EL-H or TM-EL-C and when no Cooling media was yet selected on the Hardware page of the Properties of MTMC dialog.
- This message should not appear when the TM-PE-P or TM-PE-P + TM-EL-H are used since in this case the cooling media must always be a liquid (e.g. water). This has been solved.

JobManager and DataManager

Printing

- When using the Print command from the File menu in DataManager or the Print element in JobManager, long data tables sometimes were not printed completely (some lines at the end of the table were missing). This has been solved.

Version 4.10.0007

(Released 11.01.2010)

Below is a list of things that are new and/or changed in version 4.10.0007 compared with version 4.10.0006 of RheoWin.

Installation

ART service program

- The ART service program can now optionally be installed when a general RheoWinkey is used for the installation.

> **Note** The ART software is for use by authorized and trained service engineers only.

Rheometer/Circulators drivers

SC, AC and PC circulator

- A *new* driver for the completely new range of Thermo Scientific circulators, consisting of the Standard (SC), Advanced (AC) and Premium (PC) models is now part of the installation.

> **Note** The communication between a PC (i.e. RheoWin) and these new circulators relies on a virtual COM port driver which causes these circulators (which have an USB interface) to appear as devices with a serial COM port. This driver (FTDI USB driver) is available on the RheoWin CD and must be installed separately. Installation manuals are available on the RheoWin CD also.

Version 4.2x.00xx

Version 4.20.0000

(Released 02.07.2010)

Below is a list of things that are new and/or changed in version 4.20.0000 compared with version 4.10.0013 of RheoWin.

Installation

Symbol/color Master layout file

- The three default Symbol/color master layout files Master.layout, Master color pro quantity.layout and Master color pro file.layout are now saved during the deinstallation and restored during the installation when the option to use the settings from the previous version is used.
- Per default the Master color pro quantity.layout file is now used in JobManager and the Master color pro file.layout file is used in DataManager. When the option to use the settings from the previous version is used during the installation, these defaults are overwritten with the settings from the previous version.

Measuring geometries for Peltier cylinder (TM-PE-C)

- The measuring geometries for the Peltier cylinder (TM-PE-C) are now part of the installation.

General

Splash screen

- Some of the images in the RheoWin start-up "splash-screen" have been updated.

Language

- The language.xls file has been completely updated regarding the french and the portugese language.
- A bug in the language.dll (i.e. the part of RheoWin which loads the language specifictext from the language.xls file) was found and solved. Since this functionality is used throughout RheoWin this bug fix may solve some "unexplicable" software problems.

Number format: Decimal symbol

- RheoWin now uses the Windows settings (see the Windows Control Panel) for the decimal symbol consequently throughout the software in all edit fields and for all displayed numbers in graphs, tables, lists, etc. (apart from some export files, see below).
- Depending on the Windows regional settings the decimal symbol may be a point (dot) or a comma.
- For special export files like the *.MSC table files, *.MTC table file, *.TOT table files, *.RWR oscillation raw data files and *.ini files a point (dot) is always used as the decimal symbol for compatibility reasons.

DeviceManager & Rheometer/Circulators drivers

Main dialog

- The images on the buttons on the right hand side of the device list have been updated.

MTC button

- In order to prevent problem arising from incorrect determined MTC tables, the MTC calibration functionality is now hidden for normal users. Only qualified service engineers should use this function.

MSC dialog for MARS III

- The text explaining the three "quality" options for the MSC calibration has been modified. The three options are now named:

    High precision, duration ca. 20 min.
    Standard, duration ca. 10 min
    Fast, duration ca 5 min.

All devices

- When the option Communication log is activated on the Options page of the device property editor in DeviceManager, the user will now be asked whether this option should be switched off or not every time the communication with the instrument is started. This is to prevent that the communication logging is activated all the time.
- When a device was switched off while the communication between RheoWin and the device was still running, it sometimes took a long time to actually stop the "broken communication". The duration for this has been shortened.

All rheometer and viscometer drivers

- All drivers have been further optimized regarding fault tolerance and communication speed.
- Under certain circumstances (for example when the temperature is not yet constant) the lift would never reach the Standby position (defined in a Lift-Element). This problem has been solved by giving the Standby position a default tolerance of 10 micrometer.
    The tolerance value can be modified by activating the following line in the drivers.ini file

    ```
    [rheometer_name]
    ;LiftPosTolerance=0.025
    ```

    Where "rheometer_name" stands for rheometer driver *.dll name, like MARS2, MARS3, RS6000, RS1, etc.
    The line is activated by removing the leading ";". In the example above the tolerance is set to 25 micrometer.

MARS II and MARS III drivers

- After clicking on the new Set IPADR button on the General page of the Properties of MARS dialog the user can now modify the IP adress of the instrument. Currently this functionality is only available when RheoWin is already able to communicate with the instrument. The MAC address dialog which appears when this is not the case is not functional yet.

> **Note** This function should only be used by persons who know what they are doing.

- In most cases only the numbers after the last dot in the IP adress can be changed without making the instrument inaccessible from the current PC! That means that in the default IP address 192.168.2.140 only the number 140 can be changed easily. All other changes will need changes in the network setting of the PC also.
- The warning messages in the dialog in which the IP adress can be modified and in the confirmation message boxes should be taken seriously.
- The above mentioned functionality for modifying the IP adress is also available in the MARS II driver, but in order for this work the bootloader firmware of the MARS needs to be update first. Doing that is not trivial. Documentation for this is available on request.
- The communication between the MARS and the PC has been improved regarding continuity.
- The Scan function (to find a MARS in a Network) has been improved.

Drivers for RT20, RS75, RS80, RS150, RS1, RO1, RS300, RS600, RS3000, RS6000, MARS II and MARS III

- Under certain circumstances the CD-AS mode (AutoStrain) did not work properly and did not reach the set strain value. This has been solved.

Measuring geometries

- The damping value for the solid clamps is now set to 90 per default. With this setting a new CD-mode control loop in the MARS III which is optimized for the solid clamps is activated.

> **Note** MARS III firmware DSP 50.06.000 or higher is need for this.

MTMC and UTMC drivers

- The size of the temperature offset tables is now limited to 10 offset values due to certain limitations in the firmware.

MTMC driver

- The display of the control status in the Diagnosis window has been corrected.
- The message "no cooling media selected" did not always appear when it was appropriate. This has been solved.

CTC (oven)

- The driver name, the type name and the device name of this device have been changed from tc-oven.dll, OTC and TC-Oven to the correct names ctc.dll, CTC and CTC respectively. This means that Jobs in which this device is used must be modified.
- The driver now works correctly with the MARS III.

SC, AC and PC circulator

- A *new* driver for the completely new range of Thermo Scientific circulators, consisting of the Standard (SC), Advanced (AC) and Premium (PC) models is now part of the installation.

> **Note** The communication between a PC (i.e. RheoWin) and these new circulators relies on a virtual COM port driver which causes these circulators (which have an USB interface) to appear as devices with a serial COM port.
> This driver (FTDI USB driver) is available on the RheoWin CD and must be installed separately. Installation manuals are available on the RheoWin CD also.

External thermometer

- With a *new* driver (MultiTemp.dll) the Ahlborn ALMEMO 2590 universal mearuing instrument (and compatible units) can now be used as a four channel thermometer.
- This driver is automatically installed and can be selected as Thermometer (Ahlborn ALMEMO 2590) in the list of Auxiliary devices on the Additional data page of the rheometer device editors in DeviceManager.
- The four measured temperature values are available as the quantities TxMT01, TxMT02, TxMT03 and TxMT04 for display in all graphs and tables.

Configuration (JobManager and DataManager)

Preferences dialog

- The user can now set a default temperature value. This value will be used for any element which is added to a Job in the JobEditor.
- The user can also activated the Take from previous option for the temperature. When this option is active this option will be activated in any element added to a Job.
- Some texts on the Security options page (21 CFR part 11 installation only) have been modified for easier understanding.
- On the General page in the Range select box the user can now select whether the Range select per mouse function is active per default (instead of the Zoom function).
  Both the Range select per mouse and the Zoom function work by select a rectangular area in a graph, so only one of them can be active at the same time.
  On the General page in the Range select box the user can also select a colour for the two Range select markers.

Symbol/Colour master layout dialog
- The user can now select separate Master Layout files for the JobManager and the DataManager in the Configuration menu of each program.

JobManager

Element icons
- All element icons have been modernized. All measurement icons have a blue background, all evaluation elements a green background and all general elements a light-grey background.
- The Goto, Set and Exec element icons have been slightly modified.

JobEditor
- The text behind the icons in the element list is now displayed in a tabulated list which also uses colour.
- The user can switch back to the old style element list display or disable the use of colour by deactivating the corresponding options in the context popup-menu (to open that menu click with the right mouse key on any element icon).
- The user can also change the font size of the element list from the context popup-menu.
- The above mentioned setting are stored and used for all Jobs displayed in the JobEditor.

Manual control / Monitor
- On the Numeric page of the manual control window the gap, normal force and temperature values would sometimes change position. This has been solved.

Automatic periodic saving of dating
- During a measurement (Job) the acquired data is always saved in a temporary file every 2 minutes, apart from in jobs in with images are acquired also. This functionality can now be switched off in the File Save dialog.

Lift element
- In the (slightly modified) editor of the lift element a user definable sample trimming position can now be defined. When this option is activated the lift will stop at the defined distance before the measurement position while the rheometer drive motor is locking the shaft so that the sample can be trimmed without rotating the measuring geometry. A message will be displayed prompting the user to click Ok after finishing the sample trimming.
- The lift element now displays the Triming position (when activated) in the Job-Editor list.
- The lift element now displays Standby position (when activated) in the Job-Editor list.
- The Standby position now has a default tolerance band of 10 micrometer, see above.

Set element
- The zero point for the relative gap Δh and Δ%h can now be set. This is useful for texture analysis type of measurements.
- Setting a certain absolute angle has been made more accurate.

All measurement elements
- All elements have been further optimized regarding fault tolerance.
- The icons on the set-parameter and data-acquisition-parameter pages have been removed.
- Some changes in internal data calculations have been made to prevent strange unmotivated crashes.

Rotation ramp element
- On the Parameter page of the Rotation page in the element editor the user can now choose between Continous and Stepwise for the ramp type.
- In the case of a Continous ramp the shear-rate (CR-Mode) or shear-stress (CS-Mode) is ramped up continously as smoothly as technically possible.
- In the case of the *new* Stepwise ramp the shear-rate (CR-Mode) or shear-stress (CS-Mode) is ramped up in discrete small steps.

- In the case of a Stepwise ramp the data collected during the first half (but maximally 1 s) of the step duration is discarded.
- On the Acquisition page of the Rotation page in the element editor the user can now enter a Integration time. This is the time during which raw data is collected. The mean value of this raw data is used to calculate the actual data points.

Oscillation time element
- The *new* FastOsc (Fast Oscillation) option is now accessible in the Osc Time Element dialog when the firmware of the instrument (MARS III only) supports this option.
- Please note: MARS III Firmware version 50.06.000 or newer is needed for this.
- When FastOsc in CS-Mode the torque can be defined using a table of torque = f(time) values. This table can be calculated using a selection of functions and by comparing the shape of the function with the result of a preliminary measurement which was performed at constant torque value.
- The table can also be created manually (with an external editor) and loaded into the Osc time element.

Report element
- When selecting a report template from the element editor the file open dialog will now open the default report template directory unless the currently selected template was loaded from a different directory. In that case the file open dialog will open that directory.

Curve-Fit element
- Some potential division by zero cases have been removed.

*.RWR Viewer program
- The *.rwr viewer program now contains two range bar indicators for the torque and angle.
- The *.rwr viewer program can now read *.rwr files from FastOsc measurements.
- The command Save continous sine wave data from the File menu can be used to combine and save the individual sinewaves (1 period each) of all rheological measurement points of a FastcOsc measurement into one file containing a continuous sinewave signal.

> **Note** This (currently) only gives the correct result when the highest possible data acquisition-rate of 2 ms per data point is used in FastOsc.

Graph / Table display

New table function
- The table has been completely replaced by a modern up-to-date version.
- Tables can now be exported in Excel format directly (from the table context menu). Excel files are saved with the *.xml extension and in the "Microsoft Office (Excel) XML format". This format is compatible with Excel XP (or Excel 2002), Excel 2003 and Excel 2007.

DataManager

Loading data files
- The loading time for data *.rwd and page *.rwp files has been improved.

Add text dialog
- The edit field for the text in the Add Text dialog has been increased in height from two to four lines of text.

Data select for evaluation using the mouse
- The two (rather small) red circles who marked the selected range in the previous version have been replaced by much larger markers which make it easier to move these markers by clicking on them and dragging them to the desired position.

Data select for evaluation using the data select dialog
- Selecting the data range (data-file, quantity, X-axis range) for any evaluation routine has been been made more comfortable.
- The data from the first loaded file and the first quantity found on the first Y-axis and the first quantity found on the X-axis of the currently active graph (page) are now automatically set a the selected data range.
- The file selected in the result tree on the left hand side of a evalution dialog is now automatically selected in the Data Select dialog also.
- In the Data Select dialog below the segment list, there are a now an All segments and a No segments button.

Version 4.20.0001

(Released 26.07.2010)

Below is a list of things that are new and/or changed in version 4.20.0001 compared with version 4.20.0000 of RheoWin.

DeviceManager & Rheometer/Circulators drivers

RS300, RS600, RS3000 and RS6000
- Certain additionally measured temperature signals from the UTMC were not saved when the UTMC was connected directly to the rheometer (remote interface). This has been solved.

Universal Temperature Controller (UTC)
- The remote communication with MARS and RSxxxx rheometers has been optimized.

Ahlborn ALMEMO thermometer
- On certain localized Windows versions (e.g. Japanese) the driver (MultiTemp.dll) for the Ahlborn ALMEMO 2590 universal measuring device did not work properly. This has been solved.

JobManager

All Rot elements
- Certain internal calculations needed to convert raw data to rheological could lead to crashes under very special circumstances. This has been solved.

Rot-Time, Rot-Multistep and SER element
- The automatic integration time in these elements did not work as intended. The integration time duration was not calculated correctly. This has been solved.
- When the integration time is set to automatic (in CR-Mode only!) the integration time is calculated according to the following equation:
    "Integration time" = 0.002 sec / Omega
Here Omega is the angular velocity in rad/s. The resulting (automatic) integration time is limited to 100 s.

Osc-Time element
- When switching forth and back between the different modes the edit field for the max. torque was not always enabled/disabled correctly. This has been solved.

DataManager

TTS module
- The TTS module in version 4.20.000 does not give correct results! This is caused by a small omission (in this module) regarding the transition to using the Windows settings for the decimal symbol. This has been solved.
- The dialog of this module has been modernized. Some text items have been changed.

- The new DataManager pages for the Shift factors, Shifted data and Master curve that are created by the module to display the TTS results now have the corresponding titles in the title bar of the page windows (instead of titles like Page 2, Page 3 etc.).

Spectrum module

- The Spectrum module in version 4.20.000 does not give correct results! This is caused by a small omission (in this module) regarding the transition to using the Windows settings for the decimal symbol. This has been solved.
- The dialog of this module has been modernized. Some text items have been changed.
- The new DataManager page for the Spectrum that is created by the module to display the Spectrum results now has a corresponding title in the title bar of the page window.

MWD module

- The new DataManager page for the MWD that is created by the module to display the MWD results now has a corresponding title in the title bar of the page window.

Graph / Table display

New table function

- Under certain circumstances rows of data would not be displayed in the table during a measurement (Job). This has been solved.
- When a value was deleted from a table using the Del key on the keyboard the corresponding graph was not automatically updated. This has been solved.
- During a measurement (Job) the size of the table was not automatically adapted to the size of the window when the window size was modified. This has been solved.
- When exporting to Excel the data index was not exported correctly (it started at 2 instead of 1). This has been solved.
- Under Windows Vista and Windows 7 an exported ASCII or Excel file was not saved in the correct directory. This has been solved.

Version 4.20.0002

(Released 28.07.2010)

Below is a list of things that are new and/or changed in version 4.20.0002 compared with version 4.20.0001 of RheoWin.

DeviceManager

Inertia determination

- The inertia determination function did not work in version 4.20.0001. This has been solved.

JobManager and DataManager

Loading files under japanese Windows

- When loading files under a japanese version of Windows, RheoWin 4.20.0000 "copied" the data from the first file and used that for all subsequent loaded files when the path name contained japanese characters. This has been solved.

Version 4.20.0003

(Released 24.08.2010)

Below is a list of things that are new and/or changed in version 4.20.0003 compared with version 4.20.0002 of RheoWin.

DeviceManager & Rheometer/Circulators drivers

RS1, RO1, RS300, RS600, RS3000, RS6000, MARS II and MARS III
- The file name format of the *.msc file which is automatically saved at the end of the MSC calibration measurement was not uniform. This has been changed.
- The file name now always contains the (short) name of the instrument plus the date and time.

Phoenix and Dynamax circulators
- The drivers for these circulators crashed when used in remote mode. This has been solved.

Auxiliary devices
- When an Auxiliary device was selected on the Additional data page of the Properties of ... dialog of a rheometer and when that auxiliary device was not operational RheoWin would show wrong values for certain extra data channels like Hood-temperature etc. This has been solved.

Image acquisition
- When an older version of the Matrox-Imaging-Library was installed on the PC (MIL version <= 5) RheoWin would crash, this has been solved.

Exporting *.msc files
- The number format of an exported measuring geometry MSC file was not correct. This has been solved.

Graph / Table display

Changing the quantity for a table columns
- Under certain circumstances changing the quantity for a certain column in a table did not give the expected result: The quantity of another column as the selected colum was changed. This has been solved.

Version 4.20.0004

(Released 19.10.2010)

Below is a list of things that are new and/or changed in version 4.20.0004 compared with version 4.20.0003 of RheoWin.

JobManager

Timing problem with data acquisition
- In RheoWin 4.20.0002 and 4.20.0003 when a very high dasta acquisition rate was used, data points would not get the correct time value. This has been solved.

Saving as ASCII
- In RheoWin 4.20.000x saving as ASCII from a Job did not work. This has been solved.

Version 4.20.0005

(Released 18.11.2010)

Below is a list of things that are new and/or changed in version 4.20.0005 compared with version 4.20.0004 of RheoWin.

DeviceManager & Rheometer/Circulators drivers

MARS III
- For the RheoScope module a lens with a magnification of 2.5x can now be selected.

JobManager

Data Export Element
- Under certain circumstances using the Data Export element would lead to a software crash. This has been solved.

Curve-Fit Element
- Two *new* curve-fit equations have been added to the list of mathematical models. Slope log(y)=f(x) and Slope log(y)=f(log(x)). These curve fit equations can be used to calculate the log slope and log-log slope of (parts) of a curve. The slope is calculated by means of a linear curve fit according to y = a + b*x through linearized data. As a result only b, that is the Slope value, is returned.

DataManager

Saving as Excel from a table
- Saving as Excel was very slow. So slow that users got the expression that RheoWin was not working anymore when data was saved in an Excel file. This has been solved.

Calculation popup dialog
- Under certain circumstances (with negative values on the x-axis and after changing the selected range to include negativ x-values) the log(y)=f(x) slope and log(y)=f(log(x)) slope were not calculated correctly. This has been solved.

Version 4.3x.00xx

Version 4.30.0000

(Released 9.12.2010)

Below is a list of things that are new and/or changed in version 4.30.0000 compared with version 4.20.0005 of RheoWin.

Installation

Language file
- The Polish language column in the language file has been updated completely.

Drivers and element for the Rheonaut module
- A *new* driver for the Rheonaut module is now part of the installation.
- A *new* driver for a FTIR spectrometer is now part of the installation.
- A *new* element for controlling the Rheonaut module and a FTIR spectrometer is now part of the installation.

Driver for the Viscotester D and Viscotester E
- Two *new* drivers for the Viscotester D and Viscotester E are now part of the installation.

DeviceManager

Missing device drivers
- When an instrument is listed in the devicemanger but the corresponding driver *.dll is not installed, a clear message is now displayed in the box below the device list. The message is in red colour and shows exactly which driver is missing in which directory.

Driver for MARS III
- In the editor of the MARS III driver a 2nd MTC table (for the new low-torque mode) can now be downloaded from the instrument.

Driver for the Viscotester D and Viscotester E
- Two *new* drivers for the Viscotester D and Viscotester E are now part of the installation.

Driver for the Rheonaut module
- The *new* driver for the Rheonaut module is listed as thermocontroller in the RheoWin DeviceManager.
- Using this driver RheoWin can control the temperature of the Rheonaut module and control the axial position of the complete module relative to the rheometer drive motor axis.

Driver for FTIR spectrometer
- A *new* driver for a FTIR Spectrometer is listed as an auxilliary device in the RheoWin DeviceManager. Using this driver RheoWin can communicate with the FTIR spectrometer software. The driver is currently compatible with the Bruker Opus software. In the near future it will also be compatible with the Thermo (Nicolet) spectrometer software.

Driver for SC, AC and PC circulators
- A communication problems between these circulator and RheoWin was solved.

> **Note** For the communication to work without problems the circulator firmware version 1.103 or newer is needed

- The internal temperature ramp function of the AC and PC circulators does not work when initiated using software commands. Because of that temperature ramps are now controlled by RheoWin, just like with the SC circulator.

JobManager

Element icons
- Some of the General-Element icons have been modernized.

Elements configuration dialog
- The display of the element icons in this dialog was not correct. This has been solved.

Job controller
- Error messages which come from devices (rheometer, viscometer, temperature controller, circulator, AUX-devices) are no longer displayed in a messagebox (which stopped the job sequence until it was closed) but in a new Events page in the Job controller window. This page is only shown when there are messages to be displayed.
  The page is automatically put in the foreground (this functionality can be deactivated).
- The events that occurred during a measurement are saved in the *.rwd data file.

Identification Element
- When in the identification element an item was marked as Disabled and Mandatory at the same time AND that item is blank at run-time a Job containing this element would not continue at this point. This has been solved, the Job can now be cancelled using the Stop button in the Job-Controller.

Goto Element
- In all previous RheoWin version the maximum number of elements in on Job was limited to 499. This limit has been removed. The maximum number data segments per data file was limited to 1024. That limit was removed also. As a consequence the number of elements and resulting data segments is now virtually unlimited.

> **Note** Due to a certain structural overhead in the element definitions a Job with a very high number of elements needs a relative high amount of memory.

Lift-Element
- The Trimming position option did not work properly when there was a Temperature set element in the job sequence before the lift element. This has been solved.
- The Trimming position option did not work properly when the Thermo gap option was active. This has been solved.

Set-Element and Temperatur-Set Element
- At the start of these elements any lift-control (i.e. normal force control or position control) is now explicitly stopped in order to prevent problems with lift-control functions set in previous elements.

New FTIRSpectrum Element
- A new element for setting the parameters of the FTIR spectrometer software and for setting the radial position of the Rheonaut module is now available.

All non-MultiWave Osc Elements
- On the Parameters page of the editors of these elements the *new* Low torque option can now be activated. When this option is active the torque resolution at very low torques (< 100 nNm) is improved even further (the maximum torque is currently limited to 3 Ncm when this option is active). This option is available for the MARS III only.

> **Note** For the Low torque mode to work MARS III firmware version 50.09.00x or newer are needed.

> **Note** The full effect of the Low torque improvements is only achieved with instruments which were delivered with firmware versions 50.09.00x or newer from the factory.

Rot Time, Rot Stat. Flow Curve and Osc Time Elements
- These elements can now communicate with the Bruker Opus FTIR software in order to simultaneously measure rheological data and FTIR spectra.

Osc Temperature Ramp Element
- The FastOsc option (MARS III only) is now also available in the Osc temperature ramp element.
- Under certain circumstances this element would not continue due to very rare data format problems. This has been solved.

Osc Time Element
- Due to a problem with the data transfer from a Rheometer to RheoWin this element could crash under certain circumstances. This has been solved for all rheometers.

All MultiWave Elements
- The display of the torque and angle "sine-wave" (raw-data) was not correct. This has been solved.
- The multi-wave raw-data is now saved in the same format (*.rwr) as the normal oscillation data.

> **Note** currently *.rwr files containing multiwave data can not be loaded in the *.RWR Viewer, we are working on a solution.

MultiWave Temperature Ramp Element
- Due to a problem with the data transfer from a Rheometer to RheoWin this element could crash under certain circumstances. This has been solved for all rheometers which offer the MultiWave functionality.

Curve-Fit Element
- Some potential causes for crashes (division bei zero) have been eliminated.

DataManager

Import of CaBER ASCII data

- When a *.cbr CaBER ASCII data file contains normal force data, this data is now imported also.
- A corresponding graph template is now part of the installation.

*.RWR Viewer

Sine wave data export

- Using the *new* command Export current datapoint sine wave data and Export all datapoints sine wave data in the File menu, the sine wave data of one selected rheological data point or the sine wave data of all rheological data point can be exported to a separate ASCII file for each rheological data point.

Version 4.30.0001

(Released 15.02.2011)

Below is a list of things that are new and/or changed in version 4.30.0001 compared with version 4.30.0000 of RheoWin.

DeviceManager

Driver for MARS III

- The timing for the trigger signal in FastOsc mode was improved and is more accurate now.
- The data acquisition routines have been improved. When using very high data aquisition rates the data display in RheoWin lagged under certain circumstances. This has been solved.
- In FastOsc mode and Rot mode (but not yet in normal Osc mode!) the trigger function can now provide a level signal or a pulsed signal.
- The Trigger mode can be set on the Options page of the Properties of MARS III dialog in the RheoWin Devicemanager.

Driver for the Viscotester D

- Some bugs in the driver for the Viscotester D have been removed.

Driver for the Rheonaut module

- The Rheonaut module driver now also works in Remote mode.
  In the device editor the Temperature Alarm settings have been disabled until further notice.
- The axial positioning control has been optimized.
- In the Diagnosis dialog there now is a button for finding the zero point of the axial positioning.

MSC for measuring geometries

- When exporting the MSC table of a measuring geometry to a *.msc file, the selected path was ignored. This has been solved.
- Optimizing the MSC table of measuring geometry by running the MSC routine a 2nd time using the Test of calibration option did not have any effect on the MSC table. This has been solved (for the instruments that support this function).

JobManager

Graph display settings

- When a job was loaded which was created using an older RheoWin version which did not yet support the Master-Layout option, a *manually* defined graph definition was overwritten. This has been modified, the graph definition is now retained.

Version 4.30.0002

(Released 01.03.2011)

Below is a list of things that are new and/or changed in version 4.30.0002 compared with version 4.30.0001 of RheoWin.

DeviceManager

Driver for MARS III
- The handling of certain error messages coming from the instrument was not correct. This has been solved.
- Under certain circumstances (for example after a lift-element) time values generated by an oscillation element were wrong. This has been solved.

Driver for MTMC (MARS III internal temperature controller)
- The handling of certain error messages coming from the instrument (error 34 amongst others) was not correct. This has been solved.

Driver for SC AC and PC circulators
- The temperature offset value defined for these circulators were not used when sending a set-temperature value to the circulator. This has been solved.
- Please note: As is the case with all other circulators that can be controlled by RheoWin the offset value is added to set-value, this means that on the circulator display the user will see the "modified" set value and the not the set value itself.
  An example: When the set temperature value in RheoWin is 20.0 °C and the offset value at that temperature 0.1 °C, the user will see 20.1 °C as the set value on the circulator display.

JobManager

Axial ramp element
- When the start value of an axial ramp was set as "current gap" (i.e. not as a predefined gap value) and the ramp speed was defined as the set parameter (instead of the ramp duration), the set speed was ignored and the ramp duration was used instead. This has been solved.

Version 4.30.0004

(Released 14.03.2011)

Below is a list of things that are new and/or changed in version 4.30.0004 compared with version 4.30.0002 of RheoWin.

DeviceManager

Driver for RS150
- The inertia determination in RheoWin 4.30.000x did not work. This has been solved.

Driver for RS300, RS600, RS3000
- The drivers for these instruments now recognize whether the lift is in a position where only manual movement is allowed (for security reasons).
- Please note: The user will only notice this when the latest firmware is used.

JobManager

End element
- The error handling at the end of a job has been improved.

DataManager

Use layout from file

- The implementation of the Layout out of file when loading option on the General page of the Preferences dialog (in the Configuration menu) has been optimized. When data which is saved by a Job using the Last segment only option (of the Segments page of the Save data file element dialog) is loaded in DataManager, the last layout defined before that segment will now be used (instead of the last layout defined in the job).

Reports

Report printout

- Under certain circumstances the graph in a report was printed using a very low resolution. This has been solved.

Version 4.30.0005

(Released 28.03.2011)

Below is a list of things that are new and/or changed in version 4.30.0005 compared with version 4.30.0004 of RheoWin.

Installation

New option FTIR spectroscopy (Rheonaut)

- In order to be able to use the Rheonaut module and a FTIR spectrometer in combination with a MARS II oder MARS III the *new* FTIR Spectroscopy tool option (order no. 098-5061) must be installed.
- This option is automatically installed when using the installation key 098-5019 for all instruments (this key is for Thermo internal use only).

DeviceManager

Driver for MARS III and Simulator

- Under certain circumstances the type of a selected auxiliary device was not detected correctly. This has been solved.

Version 4.30.0007

(Released 18.04.2011)

Below is a list of things that are new and/or changed in version 4.30.0007 compared with version 4.30.0005 of RheoWin.

DeviceManager

Driver for Rheonaut

- The status information in the manual control dialog and the diagnosis dialog has been extended.

Driver for IR Spectrometer

- RheoWin can now also communicate with the Thermo Scientific Nicolet Omnic software which comes with Thermo Scientific Nicolet FTIR spectrometers.
- The spectrometer software is automatically started as soon as the MARS driver communicates with the MARS instrument. This means that when the RheoWin device toolbar is active when RheoWin starts up, the spectrometer software will be started also. When the device toolbar is not active the spectrometer software will be started when a Job is started, the manual control window is opened or when the diagnosis window is opened.

> **Note** RheoWin will never close the spectrometer software.

JobManager

Device Toolbar

- When a communication problem between the device toolbar and the rheometer occurs the device toolbar will be now be closed automatically. This prevents problems with the subsequent start of a Job or the manual control window.

Manual control window

- The radial positioning of the Rheonaut module can be controlled manually from the manual control window by clicking on the FTIR icon in the lower right corner of that window.

> **Note** In order for RheoWin to be able to control the Rheonaut module the Rheonaut module controller must be set to Remote control (this is done on the front panel of the controller).

FTIR spectrum element

- The part of the element dialog which allows the user to set the radial position of the Rheonaut module has been improved. The radial position can be defined relative to the rim of the measuring geometry selected for the Job or relative to the center of the of the measuring geometry.
- Alternatively the user can now select that a manual control window for setting the radial position of the Rheonaut module will be shown during Job run.

> **Note** In order for RheoWin to be able to control the Rheonaut module the Rheonaut module controller must be set to Remote control (this is done on the front panel of the controller).

Version 4.30.0008

(Released 20.04.2011)

Below is a list of things that are new and/or changed in version 4.30.0008 compared with version 4.30.0007 of RheoWin.

DeviceManager

Drivers for RT20, RS75, RS80 and RS150

- A time-out in the communication with Remote connected devices (e.g. circulators) was not handled correctly. This has been solved.

JobManager

Device Toolbar

- In version 4.30.0007 the Device Toolbar closed automatically directly after it was opened when the correct default temperature control unit was selected . This has been solved.

Version 4.30.0009

(Released 02.05.2011)

Below is a list of things that are new and/or changed in version 4.30.0009 compared with version 4.30.0008 of RheoWin.

DeviceManager

Driver for Rheonaut module
- Some bugs regarding the radial positioning of the Rheonaut module have been solved.

JobManager

FTIR spectrum element
- Some cosmetical changes have been made in the element dialog.

Version 4.30.0010

(Released 12.05.2011)

Below is a list of things that are new and/or changed in version 4.30.0010 compared with version 4.30.0009 of RheoWin.

DeviceManager

Driver for FTIR spectrometer
- The automatically generated names for the spectra data files were not correct on a PC with an english version of the Windows operating system. This has been solved.

Driver for RS300, RS600, RS3000, RS6000
- The T_Pt100 temperature signal was not measured correctly. This has been solved.

JobManager

Yield-Stress Evaluation element
- By adding the line
  [SPECIAL]
  YieldStressCheckEndSlope=on

to the elements.ini file, the automatic algorithm will work better with data which has a sharp bend near the end of the curve. Normally this feature is not needed

Version 4.30.0011

(Released 30.06.2011)

Below is a list of things that are new and/or changed in version 4.30.0011 compared with version 4.30.0010 of RheoWin.

Installation

Driver for the Viscotester D and Viscotester E
- The installation program did not use the correct key numbers for the Viscotester D and Viscotester E. This has been solved.

DeviceManager

Driver for RS6000
- Some modifications were made in the lift control. These modifications only have effect when using firmware version 03.01.000 or newer.

Driver for cameras (MARS II, MARS III and simulator only)
- RheoWin is now compatible with the following Foculus cameras from the company NET GmbH (http://www.net-gmbh.com):

    Foculus 323TB (monochrome camera)

    Foculus 323TC (colour camera)

    Foculus 432TB (monochrome camera, upto 1280x960 pixel resolution only, i.e. the max. camera resolution of 1388x1044 is NOT supported)
- The format of the saved TIFF images has been (slightly) modified and should now be compatible with all graphic software.

Version 4.30.0012

(Released 08.08.2011)

Below is a list of things that are new and/or changed in version 4.30.0012 compared with version 4.30.0011 of RheoWin.

Installation & DeviceManager

Driver for the SC and AC circulators
- Due to the fact that the new PC xxx circulators are not compatible with the driver for the SC and AC circulators, the PC circulator is not listed anymore.

    Note RheoWin currently does not support the PCxxx circulators.

Language file
- In the Japanese language column the text for the element names was not correct. This has been corrected.

JobManager

Lift element
- ThermoGap can now also be activated for the Standby position. When ThermoGap is activated for the Standby position moving to that position maybe slower and the position will be set without any tolerance.

FTIR spectrum element
- The radial position of the Rheonaut module was not always stored correctly in the data files. This has been solved.

Axial ramp element
- When an axial ramp element in which the lift speed is used as the set variable was copied, the lift speed value was not copied. This has been solved.

Version 4.30.0013

(Released 19.08.2011)

Below is a list of things that are new and/or changed in version 4.30.0013 compared with version 4.30.0012 of RheoWin.

DeviceManager

Driver for MARS III, MARS II, RS6000, RS3000, RS600, RS300, RS1, RO1
- In certain situations the current gap value of the rheometer was not transfered correctly from the driver to the measurement elements. This could lead to spurious effects in the set shear rate value and deformation values. This has been solved.

Driver for Rheonaut module
- Running temperature ramps did not work with the Rheonaut module. This has been solved.

Version 4.30.0014

(Released 21.09.2011)

Below is a list of things that are new and/or changed in version 4.30.0014 compared with version 4.30.0013 of RheoWin.

DeviceManager

Driver for RS6000, RS3000, RS600, RS300, RS1, RO1, RV1
- In version 4.30.0013 the value of the geometry gap was not displayed correctly in the information window. This error was only in the displayed value in the information window, i.e. the measured data as well as the gap value in the data are ok! This has been solved.
- In certain situations using the log distribution in the ROT Ramp element would lead to spurious communication problems. This has been solved.

Version 4.30.0015

(Released 10.11.2011)

Below is a list of things that are new and/or changed in version 4.30.0015 compared with version 4.30.0014 of RheoWin.

DeviceManager

Driver for SCxxx and AC xxx circulators
- The driver for the SCxxx and ACxxx circulators is now compatible with both the old style firmware (version numbers 1.10x) and the new style firmware (version number 095441.2B or newer).

> **Note** Circulator firmware version 095441.2A is NOT compatible with RheoWin. When this firmware is detected by RheoWin a message will inform the user to update the firmware. Updating the circulator firmware should be done by qualified personal only.

Driver for MTMC (MARS III integrated temperature controller)
- RheoWin reported an error when trying to download the MTMC temperature offset values when a TM-LI-C or TM-LI-P was connected to the MARS (MTMC). This has been solved. RheoWin now reports that for these two modules temperature offset value are not available. Explanation: All TM-xx-x temperature offset values are write (set) offset values, since the TM-LI-C and TM-LI-P are passive modules, the actual temperature control is performed by a circulator, so there are no write (set) offset values for the TM-LI-x.

Reports
- A small change was made in the information transfer between RheoWin and the List&Label report tool.

Version 4.30.0016

(Released 29.03.2012)

Below is a list of things that are new and/or changed in version 4.30.0016 compared with version 4.30.0015 of RheoWin.

DeviceManager

Driver for MARS III

- The lowest frequency which can be used for the FastOsc mode is now 1e-5 Hz.
- The MARS III firmware has been modified in such a way that the lift can now always be operated from RheoWin or the instrument front panel by clicking a lift control button or a single button on the instrument front panel. This means that the lift message Manual movement only will not popup anymore when the lift is in a "safety range". This increase in control comfort has been realized by reducing the lift speed under certain special circumstances, for example in the case of a MARS III with a mounted CTC while using a TM-xx-x module.
- This new firmware also solves some other very special lift issues.

> **Note** The following MARS III firmware versions are needed for this to take effect.
> μP1 (RC-Box microcontroller) 50.13.000
> μP2 (RC-Box DSP) 50.12.000
> μP3 (M-BoxTC microcontroller) 50.13.000

JobManager

Lift element

- The maximum value for the Standby position is now 120 mm.

Axial ramp element

- When defining the Current gap as the start value for a ramp, the resulting End gap can get a negative value during run-time. Since the Rheometer firmware does not accept negative gap values this would lead to unexpected behaviour. This has been solved, when the final gap value will be negative an error message will now popup during Job run to inform the operator.

Curve-Fit Element

- The data segment selection as part of Job definition has been optimized.

Version 4.30.0020

(Released 24.05.2012)

Below is a list of things that are new and/or changed in version 4.30.0020 compared with version 4.30.0016 of RheoWin.

JobManager

ThermoGap

- It was possbile to activate the ThermoGap function during a Job run by opening the Manual Control window in a 2nd Job-Editor. Since this can have an undesired impact on the running Job, this possibility has been disabled.

DeviceManager

Measuring geometries

- The default values of the torque correction values are now all set to 0.0
- The PZ DG 38 Ti geometry (double gap for pressure cell) has been added.

Driver for MARS III

- When the option Prompt message when finished on the Parameters page of the Axial page of the Lift Element was activated the message was NOT displayed during the Job run and the Job would not continue at this point. This has been solved.

Driver for F/N 6/8 circulators
- Under certain circumstances the temperature values read from a F/N 6/8 circulator were not correct. This has been solved.

Reports

Display of Thixotropy element results
- In RheoWin version 4.30.0016 and 4.30.0015 the results of the Thixotropy analysis routine were not correctly displayed in a report. This has been solved.

Version 4.30.0021

(Released 26.06.2012)
- Below is a list of things that are new and/or changed in version 4.30.0021 compared with version 4.30.0020 of RheoWin.

JobManager

Lift-Element
- Moving to Trim Position did not work properly with RV1, RS1 and RO1. This has been solved.

DataManager

Graph layout dialog
- There was a problem on the Segments page of the Data page of the Graph layout dialog. The segment selection was mixed up after switching to another page and back. This has been solved.

Version 4.30.0022

(Released 24.08.2012)

Below is a list of things that are new and/or changed in version 4.30.0022 compared with version 4.30.0021 of RheoWin.

DeviceManager

Driver for Rheonaut
- Some smaller modifications and bug-fixes were made in the Rheonaut driver.

JobManager

ROT and OSC temperature ramp elements
- These elements can now communicate with the FTIR software in order to simultaneously measure rheological data and FTIR spectra.

Data Export element
- Exported ASCII files now do not contain empty lines at the end of the file anymore.

DataManager

Graph function
- The positioning of text on a graph has been improved.

Version 4.30.0023

(Released 11.10.2012)

Below is a list of things that are new and/or changed in version 4.30.0023 compared with version 4.30.0022 of RheoWin.

DeviceManager

Driver for MARS III
- New functionality for the new separate trigger box has been implemented.

Driver for MTMC
- Under certain circumstances the set temperature value was not correctly send to the MTMC. This has been solved.

Driver for RS6000
- The MSC calibration routine is now identical to that of the MARS III. That means that the MSC calibration can now be performed using one of 3 quality levels. The results of a Test of Calibration run are now used to optimize the MSC calibration. A a result the low torque performance of the RS6000 can be improved.

Driver for Rheonaut module
- The temperature limits of the Rheonaut modules have been changed to 0 °C - 120 °C for the Peltier version and 20 °C - 400 °C for the electrical version.

JobManager

Identifikation element
- This element now "remembers" the text entries for the Substance Name and Sample No. These entries can be selected from the edit fields drop down lists.

Set element
- New functionality for the new separate trigger box has been implemented.

Version 4.30.0024

(Released 12.11.2012)

Below is a list of things that are new and/or changed in version 4.30.0024 compared with version 4.30.0023 of RheoWin.

DeviceManager

Driver for RS600
- A compatibility issue with the MSC table in an older firmware version was solved.

JobManager

End of job
- Under certain special circumstances a job could "hang" at the end of the job after saving the data. This has been solved.

Monitor window
- After a time-out error message the monitor window could not be closed. This has been solved.

Curve fit element
- There was a problem with the Arrhenius_TTS_Lin curve-fit model. This has been solved.

Version 4.30.0025

(Released 30.11.2012)

Below is a list of things that are new and/or changed in version 4.30.0025 compared with version 4.30.0024 of RheoWin.

JobManager

Monitor window
- The bug fixing in version 4.30.0024 introduced a new problem. This has been solved.

Version 4.4x.00xx

Version 4.40.0003

(Released 25.01.2013)

Below is a list of things that are new and/or changed in version 4.40.0003 compared with version 4.30.0025 of RheoWin.

Installation

Upgrade installation or new installation
- The RheoWin installation program can now be run as an upgrade installation, that is without de-installing the previously installed version first, or as new installation. In the last case a previously installed version must be de-installed first.

Upgrade installation
- When the settings of the previous installation are to be used for the new installation, the installation should be run as an upgrade installation, that is without de-installing the previous version first.

> **Note** The 'upgrade installation' method can only be used for an existing RheoWin 4.20.00xx or RheoWin 4.30.00xx installation.

> **Note** For older RheoWin versions (version 4.10.00xx and older) the 'Upgrade installation' method can *not* be used, that means that the 'New installation' method (see below) must be used, in this case the settings of the previous installation will *not* be available in the new installation.

New installation
- When the settings of the previous installation should *not* be used for the new installation, the installation should be run as a new installation, in this case a previous version *must* be de-installed first. When there is no previous version installed, the installation is of course automatically a new installation.

> **Note** When deinstalling the previous version the settings of that version are deleted too and can not be retrieved.

Entering installation key information
- Using copy and paste the complete key-code can you now be entered into the key dialog in one action by selecting the first edit field and pasting the key-code into that field. The 4 blocks of the key-code are then automatically entered into the corresponding edit field.
- The complete key information (name, serial number and code) can now also be entered by loading the *.txt key file using the Load Key button in the key dialog.

Installation program
- A new version of the Installshield program is now used for the installation.

General

New development tool
- A new version of the development tool (compiler) is now used for creating RheoWin. This will allow us to use modern Windows user interface controls, dialogs etc.in future versions. The new compiler solves some minor cosmetic problems in the previous versions that occured when running RheoWin under Windows Vista, Windows 7 or Windows 8.

DeviceManager

All devices
- In a *new* date/time data channel with the name t_clock the date and time for each data point is now saved. Currently this channel can only displayed in a table, that is not in a graph.

VTx measuring geometries
- The measuring geometries for the VTx are now split up into four Type categories named:
  Spindle L, R (Disc, cylinder),   [Geometries: L1 to L4 and R1 to R7]
  Spindle T (Bar, Helipath),   [Geometries: PA to PF]
  Spindle TL, TR (Cylinder, Small Sample Adapter)   [Geometries: TL5 to TL7 and TR8 to TR11]
  Spindle LCP (Cylinder, Low Viscosity Adapter)   [Geometries: LCP]
  This in order to be able to display the matching geometry information only.

  > **Note** The geometry types are not updated when the upgrade installation method is used

  > **Note** The user can manually select the correct new Type for each geometry on the General page of the Properties of the geometry dialog in the RheoWin DeviceManager.

Plate and plate geometries
- The following plate and plate geometries have been added to the list of geometries: P8 Ti L, P10 Ti L, P25 Ti L, P40 TI L, P50 Ti L.

CCxxDIN Ti geometries
- The values for the axial gap were not correct, this has been corrected. The correct values are:
  CC10 DIN Ti   2.113 mm
  CC16 DIN Ti   3.318 mm
  CC25 DIN Ti   5.300 mm

  > **Note** These value are not updated when the upgrade installation method is used. The user can manually enter the correct Distance values on the Geometry page of the Properties of the geometry dialog in the RheoWin DeviceManager.

CC27DG Ti geometry
- The value for the sample volume was not correct, this has been corrected.

  > **Note** This value is not updated when the upgrade installation method is used.

JobManager

Device Toolbar
- The device toolbar now contains a small new control which opens the New Job default page of the Preferences dialog directly.

Elements, Jobs and Templates explorer
- The Elements, Jobs and Template explorer is now based on the windows Panel Group Control instead of on the Page control for a more modern look.
- In previous RheoWin versions the complete file structure starting from the default Jobs and Templates directories was scanned for RheoWin Jobs and Template files at the startup of the program. When these default directories contained many files and/or were located on network directory, this scanning could take a rather long time. This has been solved, now only those directories of the file structure are scanned which are currently opened in the Job and Templates file explorer.

Load File Element
- After activating the line

      ;LoadToFirstEvalHandleOnly = On

(remove the ; in front of the line)
in the [ELMLOAD] section of the element.ini file, the Load File Element can now be used to load multiple files (one after the other) in a looped Job which uses the GoTo-Element. An example Job is part of the RheoWin installation.

> **Note** For normal use of the Load File Element this option must ***not*** be activated.

Lift Element
- When the Go to measurement postition option in the Measurement position group box is selected, the operator can now select the *new* Use current gap option (in the Lift Element dialog). When this option is selected for a lift element which is placed "in the middle" of a Job sequence, the lift will stay at the, at that time, current postion. This can be used to activate the Thermo Gap option at a certain point in a Job.

ROT Step Element (Stationary Flow Curve element)
- On the Options page of the element editor there is a *new* option Step duration + integration time in rev. When this option is activated the values for Step duration and Integration time on the Acquisition page of the Rotation page can be entered as a number of revolutions.
  The value for the Step duration must be larger as the value for the Integration time, the two values can be set to 1.1 and 1.0 respectively for example.
  The minimum step duration time and the minimum integration time are set to 10 s and 5 s per default. As a consequence for angular velocities above 6.0 rpm (6.0 rpm is 6 revolution in 60 s, that is one revolution in 10 s) the step duration will always be 10 s and the integration time 5 s as long as these two minimum values are not modified.

> **Note** Allowing a too short step duration will result in spurious measurement data.

> **Note** This new option is only available for CR mode, with the Fixed duration for each step option as well as the Integration time option selected (on the Acquisition page).

- On the Options page of the element editor there is a *new* option Save raw data. This option is only available when the option Oscillation raw data on the Options page of the Properties of "....." dialog for the selected rheometer is activated. When the Save raw data option is activated an ASCII file with the extension *.rwr and the same name as the *.rwd data file will be saved. The *.rwr contains the time, angle, angular velocity and torque values measured during the duration of this element as well the rheological data for each data point.
  The *.rwr file can be viewed with *.RWR Viewer.
- The option Show N1 has been moved to the Options page of the element editor.

OSC Frequency Sweep Element

- For the number of Freq/Decade (frequencies pro decade) the user can now can select the additional (higher) values 14, 19, 39, 49 and 99.

Creep Analyis Element

- In the *new* Numerical group box on the Layout page of the element editor the user can now select which numerical values will be included in the result information text.
- There are four *new* result values available: The maximum strain and compliance values as well as the non-recoverable strain and compliance values, both as absolute and as percentual values.
- The result values are now displayed using the currently selected units.

Graph / Table display

Display of t_clock channel in tables

- For the *new* t_clock date/time data channel the format in which the date/time is displayed in a table can be selected from the Format drop-down list on the Columns page of the Layout dialog.
- For the display of the data/time data several formats which include both the date and the time (like dd:mm:yyyy hh:mm:ss) as well as some formats which include the time only (hh:mm:ss) are available.

Display of t and t_seg channel in tables

- For the display of the measurement time channels t and t_seg several formats like hh:mm:ss can now be selected from the Format drop-down list on the Columns page of the Layout dialog.

Resizing a table column width

- After resizing the width of a column, the table would always scroll down to the end of the table instead of not scrolling at all. This has been solved.

DataManager

Data, Pages and Templates file explorer

- The Data, Pages and Template explorer is now based on the windows Panel Group Control instead of on the Page control for a more modern look.
- In previous RheoWin versions the complete file structure starting from the default Data, Pages and Templates directories was scanned for RheoWin data, pages and template files at the startup of the program. When these default directories contained many files and/or were located on network directory, this scanning could take a rather long time. This has been solved, now only those directories of the file structure are scanned which are currently opened in the Data, Pages and Templates file explorer.

*.RWR Viewer

- The *.rwr viewer can now load a *.rwr file saved by the ROT Step Element and display the data in a graph.
- The graph can be zoomed by drawing up a (green) rectangle, starting with the upper left corner (!) of the rectangle, with the mouse (and while keeping the left mouse keypressed). After releasing the left mouse button the graph will zoom to the selected range.
- The graph scale can be restored by drawing up a (green) rectangle, starting with the lower right corner (!) of the rectangle, with the mouse (and while keeping the left mouse key pressed). After releasing the left mouse button the graph scaling will be restored.
- The graph can be panned (scrolled) by clicking (with the *right* mouse key) in the graph and moving the mouse while keeping the *right* mouse key pressed. This function is especially useful after having zoomed the graph first.

RangeCalculator

- With the completely *new* RangeCalculator the user can comfortably display and check the theoretical measurement range of any (technically possible) combination of rheometer or viscometer plus measuring geometry.

> **Note** The calculated and displayed range is the *theoretical* measurement range which is defined by the torque and angular speed range of the rheometer and the geometry factors of the measuring geometry. The practically useable measurement range will, in many cases, be smaller due to all kind of limiting factors like gap setting accuracy, sample filling issues, sample properties.

> **Note** Currently the measurement range is only available for rotation mode, i.e. not for oscillation mode.

- The measurement range can be displayed as a graph of the viscosity as a function of the shear-rate, as a graph of the shear-stress as a function of the shear-rate and as numerical values.
- By entering a value for the Viscosity in the Reference sample group box the (theoretically) useable range for this viscosity is displayed both graphically (a red line in the graphs) and numerically (red values).
- By clicking the Save as *.rwd button the calculated range values can be exported as a RheoWin *.rwd data file. The *.rwd file contains the data points used to create the two graphs mentioned above.
- By right clicking on any of the graphs, the graph can be printed (on the default printer), copied (to the windows clipboard) or saved (as an .emf image file).
- By right clicking on the the numerical information text, the text can be printed (on the default printer), copied (to the windows clipboard) or saved (as an .rtf text file).
- The RangeCalculator can be started in four different ways:
  1) From the JobEditor by clicking the icon in the upper left corner of the editor window. In this case the rheometer and measuring geometry selected for the current job are automatically used for the range calculation.
  2) From the DeviceManager by clicking the Range calculator button. In this case either the selected rheometer or the selected measuring geometry in combination with the default rheometer is used for the range calculation.
  3) From the Programs menu in both JobManager and DataManager. In this case the default rheometer and measuring geometry are used for the range calculation.
  4) Using the Windows Explorer and starting the program RHWRangeCalc.exe. In this case the default rheometer and measuring geometry are used for the range calculation.

Version 4.41.0000

(Released 02.08.2013)

Below is a list of things that are new and/or changed in version 4.41.0000 compared with version 4.40.0003 of RheoWin.

Installation

Version 4.40.0003 bugs
- The installation program of version 4.40.0003 contained a few smaller bugs, which showed up under certain circumstances only. This has been solved.

DeviceManager

MARS II and MARS III

- Under certain circumstances during a Job-run (measurement) the Temperature Set Element would stop working an bring the Job to a halt when the Device Toolbar was active during the Job-run. This has been solved.

MARS III

- Under certain special circumstances the network scan function (for finding a MARS III connected to the PC), would bring up an unreadable error message (when no MARS III could be found). This has been solved.

MTMC (MARS III build-in temperature control unit)

- In the Offsets box on the Temperature page of the Properties of 'MTMC (MARSIII)' dialog the user can now select between the default Automatic and three User defined temperature offset tables.
- **Please note**: The following MARS III or UTMC firmware version or newer are needed for this to work.
  MTMC (MARS III) : MBOXTC 50.13.121
  UTMC : (FW is under construction)
- When the Automatic option is selected, the MTMC firmware will automatically use the correct temperature offset table for the TM-xx-x which is connected to the MARS III.
  The table values, which are stored in the MTMC (MARS III) firmware for each TM-xx-x, will be displayed in the table after clicking the Load from instrument button. (This is identical to the functionality in previous RheoWin versions.)
- When one of the three User defined temperature offset tables is selected, the MTMC firmware will use that temperature offset table for any TM-xx-x which is connected to the MARS III. The three User defined temperature offset tables are stored in the MTMC (MARS III) firmware. The table values (of the currently selected User defined table) will be displayed in the table after clicking the Load from instrument button.
- The User defined temperature offset tables are designed to be used for TM-xx-x setups that are NOT automatically recognized by the firmware. One example of such a setup is the TMPxx adapter in combination with the TM-PE-C (Peltier Cylinder). For this setup the (standard) temperature offset table of the TM-PE-C (for concentric cylinder geometries) is not adequate.
- In order to be able to effectively use the User defined temperature offset tables a new (second) instance of the MTMC should be created in the list of devices in the RheoWin DeviceManager. After renaming this new instance to MTMC (TM-PE-C + TMPxx), for example, this new MTMC instance can be selected for and saved as part of a Job file. When this Job is then used, the User defined temperature offset table selected for the MTMC instance used for this Job, will automatically be used.

MARS III, MARS II, RS6000, RS3000, RS600, RS300, RS1 drivers

- The CD-AutoStrain control for the Frequency-Sweep element has been optimized (modified). Under certain circumstances the data of non-stationary sine-waves was used for calculating the rheological datapoint. This has been solved. Please note that as a result of this, the time needed to measure one data point maybe longer than with previous RheoWin versions, as a result the time needed to complete a Frequency-Sweep element may be longer than before, this may especially be the case when the Frequency-Sweep runs from a lower to a higher frequency.

Rheonaut, FTIR data-acquisition

- The control of the FTIR data-acquisition has been optimized.
- By activating the new Send information option on the Options page of the Properties of 'FTIR Spectrometer' dialog (in the RheoWin DeviceManager) messages from the Omnic software are now displayed in the JobController status box.

- When the Stop button in the Job-Controller is clicked a StopCollect command is now send to the Omnic software in order to allow for a controlled stop of the Job.

Driver for RS6000

- The driver for the RS6000 is now compatible with the updated version of the RS6000 (which is internally, see the diagnosis window, called RS6001).

Interfacial rheometry

- The inertia and compliance values for the DuNoüy ring geometry have been added.
- The calculated value for M-factor of the DuNouy was not correct. This has been solved.

Greisinger manometer drivers

- In previous RheoWin 4.40.00xx versions the driver for the Greisinger manometer did not work. This has been solved.

JobManager

Closing JobManager

- When the normal methods to close the JobManager do not work, the JobManager can now be closed by clicking with the right mouse key in the empty area of the standard toolbar (below the menu bar) while holding down the Ctrl + the Alt keys on the keyboard at the same time.
- Please note that under normal operation this new emergency stop method is not needed!

Closing/stopping a running Job

- A running Job can now be stopped by closing the Job-Editor window from which the Job was started. After clicking on the [x] button in the upper right window of the Job-Editor, a message-box with the text Job running! Close anyway will appear. When selecting Yes in the message-box and after saving the data, the running Job will be stopped and the Job windows closed.
  When the Stop button in the Job-Controller does not react on a normal click on the button, a Job can now be stopped by clicking holding down the Ctrl + the Alt keys on the keyboard and clicking the Stop button at the same time.
- Please note that under normal operation these new emergency stop methods are not needed!

Identification / Notes Element

- On the Substance page of the element editor the stored entries for the Name and Sample no can now be deleted by right clicking (with the mouse keys) anywhere in the dialog (but not on any dialog text or edit field) and selecting the appropriate item from the popup menu.

Save Element

- In version 4.40.0003 the generation of an automatic file name (for a data file) according to certain rules did not work properly. This has been solved.

Camera Element

- The controls for the RheoScope module are now only displayed when the RheoScope module is actually connected to the MARS. When this is not the case, i.e. when a camera is used without the RheoScope module, these controls are not displayed.

All measurement Elements

- The RangeCalculator can now also be opened by right clicking (with the mouse keys) anywhere in an element editor dialog (but not on any dialog text or edit field) and selecting the Information item from the popup menu.

ROT Time Element

- In the *new* In case of gap change box on the Options page of the element editor, the user can can now select between the *new* options Keep angular velocity constant and Keep shear rate constant. When using a parallel plate measuring geometry, and with the option Keep shear rate constant active, the angular velocity will automatically be adapted, when the gap changes, in order to keep the shear constant. The default setting is Keep angular velocity constant, since this method was used in all previous RheoWin versions.

> **Note** This is available for the MARS II and MARS III only.

OSC Frequency Sweep element

- The CD-AutoStrain control for the Frequency-Sweep element has been optimized (modified). See above for more details.

MultiStep Element

- In the MultiStep Element upto 60 different steps can now be defined.

> **Note** The following MARS II or MARS III firmware versions or newer are needed for this to work.
> MARS II : CBOX 13.01.004 DSP 10.10.008
> MARS III : RCBOX1 50.14.017 DSP 50.13.002

- Multiple steps can now be selected for Copy, Paste and Delete by using the left mouse key in combination with the Ctrl and Shift keys on the keyboard.
- With the *new* Copy and Paste buttons one or multiple steps can now be copied and pasted in to the list of steps at any position.
- With the Delete button multiple steps can now be deleted at the same time.
- With the *new* Copy last 2 steps and insert 9x button the last two steps are copied and inserted 9 times at the end of the list. This function is meant to be used for quickly creating a job for the so-called MSCR (Multiple Stress Creep Recovery) experiment which consists of 40 or 60 steps in total.
- When clicking on the Duration and # data point step table headers a *new* dialog will open in which the duration and the number of data points for all even and all odd steps, or for all steps can be changed at the same time.

Axial Ramp Element

- When the value zero was entered in the $\Delta h/t$ edit field on the Parameter page of the Axial page of the element editor, the editor would crash. This has been solved.

JobManager and DataManager

Viewing the new.doc and readme.doc documents

- The new.doc (that is this document) and the readme.doc documents can now be opened directly from within RheoWin using the Readme command in the Help menu.

Creep-Analyis Element

- The settings of the items in the Numerical group box on the Layout page of the element editor (which were introduced in version 4.40.0003) can now be saved by clicking the *new* Save button. The saved default settings are used in both the JobManager and the DataManager for every new Creep-Analysis calculation.

Cross-Over Element

- In the *new* Numerical group box on the Layout page of the element editor the user can now select which numerical values (G', G", f, etc.) will be included in the result information text.
- There are four *new* result values available: The complex viscosity (eta*) and the complex modulus (G*) as well as both viscosity values (eta' and eta").

- The result values are displayed using the currently selected units.
- The settings of the items in the Numerical group box can be saved by clicking the *new* Save button. The saved default settings are used in both the JobManager and the DataManager for every new Cross-Over calculation.

Curve-Fit Element

- In the *new* Numerical group box on the Layout page of the element editor the user can now configure the result information text:
  The user can select whether the model name, the equation, the physical units of the calculated model parameters, the value of chi2, the value of the regression coefficient r and the physical units of the X- and Y- axis quantities should be displayed as part of the result text or not.
- For the display of the physical units of the calculated model parameters, the currently selected units are used (i.e. the same unit as used for the axis scaling).
- The settings of the items in the Numerical group box can be saved by clicking the *new* Save button. The saved default settings are used in both the JobManager and the DataManager for every new Curve-Fit calculation.

Curve Discussion Element

- Under certain circumstances this element would show error messages. This has been solved by a temporary bug fix.

Graph / Table display

Axis scaling

- Under certain circumstances the axis scaling routines would not work properly, under very special circumstances this could lead to RheoWin crashing. This has been solved.

Display of axis titles

- Under certain circumstances the position of the axis titles was not correct (i.e. not centered). This has been solved.
- Under certain circumstances vertical axis titles were unreadable when running under Windows 7. This has been solved.

Moving the legend

- When the legend was moved on the graph (using the mouse), the box indicating the size of the legend during the moving jumped to a slightly different position after releasing the mouse button. This has been solved.

Size of a table

- Under certain circumstances a table would not fill out its assigned space. This has been solved.

Display of t_clock channel in tables

- The time value in the t_clock channel was wrong by exactly two hours. This has been solved.

Version 4.41.0006

(Released 18.12.2013)

Below is a list of things that are new and/or changed in version 4.41.0006 compared with version 4.41.0000 of RheoWin.

Installation

Installation key dialog

- Under certain circumstances the cursor would move by itself. This has been solved.

DeviceManager

Simulator
- The reset time function in the simulator driver did not work correctly. This has been solved.

Measuring geometries

- In the editor for the measuring geometries some edit fields were too short. This has been solved.

MSC calibration
- There was a problem when saving the MSC values at the end of the MSC calibration. This has been solved.

Inertia, MSC and MTC calibration
- The animated status display graphic did not work correctly. This has been solved.

JobManager

Screensaver
- During any Job in which FTIR spectra are collected the Windows Screensaver is now disabled.
- The Windows Screensaver can be manually disabled by clicking on the RheoWin JobManager's main-window status-bar with the right mouse key.

Manual control
- The manual control dialog has been optimized to prevent it from crashing/stop working.

JobController
- Under certain circumstances the error message "falsche Beschreiberklasse" would pop-up. This has been solved.

Export Element
- In the Element Editor the pathes for the Excel and PDF report templates were not set to the default RheoWin pathes. This has been solved.
- In the File select dialog that is opened when selecting a new template, the path to the currently selected template is set as the initial path.

All measuring Elements with a second raw data graph
- There was a scaling problem in the second graph (for the raw data). This has been solved.

Curve Fit Element
- Under certain circumstances a curve fit would crash. This has been solved by increasing the calculation accuracy.
- The Polynom and Tscheussner models have been optimized.

Curve Discussion Element
- Under certain circumstances a maxiumum would not be calculated correctly. This has been solved been increasing the calculation accuracy.

JobManager/DataManager

Saving camera images
- Under certain circumstances there were problems when saving LWF, TIFF or AVI files. This has been solved.

Graph / Table display

Table -> graph interaction during a measurement
- When a value in the table is entered/changed during a measurement (Job run or Manual control), the graphic display of the data will now be updated automatically accordingly.

Layout / Save dialogs
- Layout and save dialogs are now always opened on top of all other dialog.
- Layout and save dialogs do not appear in the windows taskbar anymore.

Marker lines
- Under certain circumstances error messages would pop-up when marker lines were drawn. This has been solved.

Version 4.41.0019

(Released 16.04.2014)

Below is a list of things that are new and/or changed in version 4.41.0019 compared with version 4.41.0006 of RheoWin.

Installation

Viscotester iQ
- The installation program now allows the installation of RheoWin for the *new* Viscotester iQ rheometer.

DeviceManager

Drivers for Viscotester iQ
- There are two *new* drivers for the *new* Viscotester iQ:
  The VTiQ.dll driver for controlling the Viscotester iQ itself and
  the VTiQT.dll driver for controlling the Viscotester iQ integrated electronics for the optional TM-PE-C (Peltier Cylinder) temperature control module.

Driver for RS3000
- The driver for the RS3000 is now compatible with the updated version of the RS3000 (which is internally, see the diagnosis window, called RS3001).

MSC calibration RS3000
- There was a problem when saving the MSC values at the end of the MSC calibration. This has been solved.

JobManager

JobController
- When a Job is canceled during the initialisation phase (before any data was acquired), the File Save dialog will not popup any more.

All measurement elements and the temperature set element
- The temperature set values are now checked against the allowed min/max temperature values at the start of Job (and not only during the editing of a Job). When the allowed min/max temperatures are exceeded a message will popup and the Job will be canceled.

ROT Ramp Element Editor
- When the edit field for the ramp duration was empty (during editing) the editor would crash. This has been solved.

All OSC Elements
- The logic for saving images in relation to the rheological data points of OSC elements has been changed.

Graph / Table display

Layout dialog
- Under certain circumstances the Graph and the Table layout dialogs would cause crashes. This has been solved.

Saving a graph as a bitmap
- Under certain circumstances saving a graph as a bitmap file did not work. This has been solved.

Version 4.5x.00xx

Version 4.50.0003

(Released 24.07.2014)

Below is a list of things that are new and/or changed in version 4.50.0003 compared with version 4.41.0019 of RheoWin.

Installation & RheoWin Startup window

Viscotester iQ
- The image of the Viscotester 550 in the installation routine dialogs and in the RheoWin startup window (splashscreen) has been replaced by that of the new Viscotester iQ.

DeviceManager

Driver for RheoScope 1
- There was a problem with the microscope's radial position and focus values. This has been solved.

Drivers for Viscotester iQ
- The driver for the Viscotester iQ is now compatible with the upcoming Viscotester iQ oscillation mode.

Driver for FOculus cameras
- RheoWin is now also compatible with the new FGControl software and drivers for the (RheoScope) FOculus 323TB and 323TC cameras.
- With the new FGControl software and drivers the FOculus cameras can now be used with RheoWin under the Windows 7 32-bit and 64-bit operating system.
- **Please note**: See the separate "HAAKE RheoWin - Camera driver installation" instructions on how to properly install the FGControl software and drivers for Windows 32-bit and 64-bit operating systems.

Driver for Sony camera
- In order for the Sony XCD-X710 camera to work with RheoWin a small update needs to be performed after installing RheoWin. The driver for the Sony camera is only compatible with Windows XP 32-bit.
- **Please note**: See the separate "HAAKE RheoWin - Camera driver installation" instructions on how to apply this update.

Many rheometer and temperature control device drivers
- The Apply button on the Temperature pages of the "Properties of ..." device dialog is now active when changes were made on these pages.

JobManager

Device toolbar

- The device tool bar caused problems with the image acquisition (e.g. RheoScope module) when it was active during a Job (measurement). This has been solved.

Manual control / Monitor

- The button for the camera control in the Manual Control / Monitor window is now only active when the initialization process of the instrument is completely finished.

All measurement elements

- There is a *new* quantity or data channel t_meas in which the time measured starting from the start of the first measurement element is saved.
- There is a *new* quantity or data channel User defined in which the value of a special user defined quantity can be stored. This quantity can be given any symbol (or name) and any unit.

Show data window Element

- The Show data window element now has an *new* editor dialog in which the following settings can be made:
  - Show large (green arrow) next button in JobController
  When this option is activated a large button with a green arrow and the text Next on it is displayed in the JobController. After Clicking the next button the Job will continue with the next element.
  - Deactivate time reset in device at job start
  When this option is activated the time measured by the device (rheometer) will NOT be reset at the start of the Job. This option should only be activated when running several Jobs in parallel with one device. In that case the option must be activated for all Jobs apart from the Job that is started first.
  - Deactivate communication with device at start of this element
  When this option is activated the communication between RheoWin and the device (rheometer) is deactivated at the start of the element. This allows another Job to communicate with the device while this Job is pausing.
  - Show edit field for User defined variable in JobController
  When this option is activated an edit field for entering the value of the User defined variabele is displayed in the JobController.
  - Reactivate communication with device at end of this element
  When this option is activated the communication between RheoWin and the device (rheometer) is reactivated at the end of the element, that is after clicking the small or large (green arrow) Next button.

ROT Step Element (Stationary Flow Curve element)

- On the Options page of the element editor there is a *new* option Step duration + integration time as inverse of shear-rate. When this option is activated the values for the Step duration and the Integration time on the Acquisition page of the Rotation page are defined as a multiple value of the inverse value of the shear rate.
  For example: At a shear of 0.1 1/s the step duration will be 10 s when the multiplication factor is set to 1.0 and 30 s when the multiplication factor is set to 3.
- Since the integration time is part of the step duration, the value for the Step duration must be larger than the value for the Integration time.
- When the resulting step duration and integration time values are smaller than the values defined or the minimum step duration time and the minimum integration time, these minimum values are used.
  For example: At a shear rate of 10 1/s the inverse value (which is 0.1 s) is smaller than the minimum step duration, therefore the step duration will be set to 1 s.
- The default values for the minimum step duration time and the minimum integration time are set to 1 s and 0.5 s, which are also the smallest allowed values.

> **Note** Allowing for a too short step duration will result in spurious measurement data.

> **Note** This new option is only available for the CR mode, with the Fixed duration for each step option as well as the Integration time option selected (on the Acquisition page).

Curve Discussion Element
- In the *new* Numerical box on the Layout page of the element editor the user can now select whether the value of the standard deviation (Std. dev. or SD) and/or the relative standard deviation (Rel. std. dev. or RSD) is to be displayed as part of the result of the calculation of the mean value.
- On the Curve discussion page of the element editor the user can now select the multiplication factor for the displayed value of the (relative) standard deviation.
- The calculated value of the (relative) standard deviation is displayed in the information box of a data page.

Interpolation Element
- Under certain very special circumstances the Interpolation Element would crash. This has been solved.

Graph / Table display

Entering/changing a value in a table
- When entering a value in a table and hitting the Enter key, the new or modfied value is now immediately displayed/updated in the corresponding graph. This is valid for both the JobManager (that is during a job run) and the DataManager.

RangeCalculator
- There was a problem showing the range for a Viscotester iQ measuring geometry that was automatically detected by the instrument and RheoWin. This has been solved.

Version 4.50.0010

(Released 27.10.2014)

Below is a list of things that are new and/or changed in version 4.50.0010 compared with version 4.50.00003 of RheoWin.

Installation

MARS I
- The installation program now allows the installation of RheoWin for the *new* MARS I rheometer.
- The *new* Temperature calibration tool, accessible from the JobManager Programs menu, is now part of the installation. A special installation key is needed to install this tool.

DeviceManager

All drivers
- When running RheoWin in certain network configurations the message "Socket error while receiving", which had nothing to do with RheoWin or the communication with any device, could popup. This has been solved.

Enabling/disabling LAN adapter for Connect Assist
- In order to prevent RheoWin from listening to LAN broadcast messages from the wrong rheometer, LAN adapters can now be enabled/disable in the Select Lan Adapter dialog. This dialog is accessible by right clicking on the large rheometer button in the DeviceManager and selecting the Select LAN adapter for Connect Assist command from the popup-menu.

Driver for MARS 1
- There is a new driver for the *new* MARS I.
- The MARS firmware updater now also supports the MARS I.

Drivers for Viscotester iQ
- The inertia determination has been disabled for the Viscotester iQ. When an inertia value is needed it is read from the geometry tag using Connect Assist.
- The Viscotester iQ firmware updater now also allows updating the Viscotester iQ user interface (i.e. languages and graphics, etc.). See the Viscotester iQ instruction manual for more information
- The *new* 48 mm concentric cylinder temperature module (TM-LI-C48) and the matching measuring geometries are now supported.

Drivers for Viscotester 550
- Under certain circumstances there was a problem with the gap value and the result M-factor for parallel plate geometries. This has been solved.

Drivers for communication with FTIR spectrometer
- When running in simulation mode the driver will now also generate file names with time stamps.

Driver for Foculus FO323TC and FO323TB cameras
- There was a problem with saving the images as part of the RheoWin *.rwd file for the FO323TC colour camera. This has been solved.
- The camera selection options (any) and (smart selection), on the Additional data page of the Properties of ... dialog (in DeviceManager) of the rheometer with which the camera can be used, currently do not work (this will be fixed in the next version of RheoWin).

JobManager

Information/Protocoll window
- The version number of the firmware for the 2nd microcontroller in the Viscotester iQ is now displayed also.

Stopping a Job
- On the General page of the Configuration - > Preferences dialog there is a new option Confirm stop job. When this option is activated the operator will be shown a yes/no dialog asking whether the job should be really stopped.

Camera Element
- Under certain circumstances loading and using saved camera setting did not work. This has been solved.

Set Element
- The checkboxes for resetting the normal force and for activating the nano-torque offset are now disabled/hidden for the Viscotester iQ.

Temperature Set Element
- The set normal force value was not displayed in the JobEditor and DataManager anymore. This has been solved.

Rotation Ramp Element
- Using the break criteria with a Viscostester iQ did not work properly. This has been solved.

Rotation Stepped Ramp Element (Stationary Flow Curve Element)

- The timing of the data acquisition for fixed duration steps, when acquiring FTIR spectra simultaneously, has been corrected.

All Oscillation Elements

- The time-stamp (t_clock data channel) for FTIR spectra data has been corrected/optimized. The time stamp of a FTIR spectra data file and its corresponding value in the the t_clock data channel are now close to identical.

Automatic temperature calibration tool

- The *new* Temperature calibration tool, is now accessible from the JobManager Programs menu. With this new tool the temperature calibration of any temperature modules can be performed completely automatical. See the separate manual for a description of this tool.

Version 4.50.0011

(Released 03.11.2014)

Below is a list of things that are new and/or changed in version 4.50.0011 compared with version 4.50.0010 of RheoWin.

DeviceManager

Driver for Viscotester iQ

- The driver is now compatible with the new gap setting routine, as introduced in firmware version 1.03.000, for parallel plate and cone and plate geometries.
- The driver now supplies correct integration time values when the option Rotation > Acquisition > Use automatic integration time was selected in the editor of the Rotation time element.

Driver for Almemo devices (thermometer)

- The driver for the Ahlborn ALMEMO 2590 universal measuring instrument (and compatible units) now also works when the Almemo device is connect to the computer using the special Almemo USB cable and USB driver software.

Version 4.50.0012

(Released 13.11.2014)

Below is a list of things that are new and/or changed in version 4.50.0012 compared with version 4.50.0011 of RheoWin.

General

Operating systems

- RheoWin version 4.50.0011 did not run under Windows XP, this has been solved.

DeviceManager

Geometries for Viscotester iQ

- In RheoWin version 4.50.0011 there was a problem with Connect Assist, the automatic geometry recognition, this has been solved.
- The name for the geometries CC27 DG/Ti and CC41 DG/Ti each contained a space character too many, which causes problems with Connect Assist. This has been solved.
- The cone and plate geometries C35 2°/Ti, C60 2°/Ti, C35 3°/Ti, C60 3°/Ti, C35 4°/Ti, C60 4°/Ti have been added.

Viscotester iQ firmware updater

- When the Viscotester iQ firmware update can not be launched from the DeviceManagers Properties of Viscotester iQ dialog, a message will now be displayed which tell the operator to run the VTiQUpdate.exe from the c:\Program Files\Thermo\RheoWin\Drivers directory.

MARS firmware updater

- In RheoWin version 4.50.0011 the MARS firmware updater did not work. This has been solved.

Graph / Table display

Axis scaling

- The scaling of the X-Axis has been improved.

Version 4.50.0013

(Released 19.12.2014)

Below is a list of things that are new and/or changed in version 4.50.0013 compared with version 4.50.0012 of RheoWin.

DeviceManager

Temperature signal for Viscotester iQ

- When no TM-xx-x module or Pt100 sensor is connected to the Viscotester iQ the temperature value in RheoWin would show an arbitrary (very high) value. This has been solved.

MARS and camera (for RheoScope)

- Various bugs with the image acquisition during oscillation measurements have been solved.
- For the image type JPG and PNG can now be selected.
- The automatic exposure time function has been made quicker.

JobManager

JobExplorer list

- When using the Save as ... command to save a Job in a directroy with a larger number of files it could take a very long time to complete the action. This has been solved.
- When a folder icon is selected, there is a new command Edit all in the JobExplorer context popup menu. Selecting this command will open a dialog in which the Rheometer and/or Measuring geometry and/or Temperature controller for all Job files can be changes at the same time. This should be used with care!

All Oscillation Elements with a Viscotester iQ

- In the oscillation elements the CS and CD mode were named FastCS and FastCD in previous versions. This has been changed into CS and CD.

DataManager

Saving images

- Camera images can now additionally be saved in JPG, PNG and GIF format.

Version 4.50.0017

(Released 19.02.2015)

Below is a list of things that are new and/or changed in version 4.50.0017 compared with version 4.50.0013 of RheoWin.

DeviceManager

Viscotester iQ

- The service/calibration date is now only checked for firmware versions 01.04.020 and higher because it caused problems with earlier firmware versions.
- The temperature value displayed in the Device toolbar was not correct during oscillation measurements. This has been solved.

Image acquisition

- Under certain circumstances there were problems with the image acquisition routines when testing the camera before setting the camera properties in the DeviceManager. This has been solved.

JobManager

Snapshot

- There was a problem when running a Snapshot test. This has been solved.

Show data and wait Element

- In the Show data and wait element the communication with a temperature control unit is now deactivated also when the communication with the device is deactivated.

All OSC Elements

- Under certain circumstances the editors of these elements could crash. This has been solved.

Curvefit Element

- Under certain circumstances the parameter values displayed in the information window were not correct when the physical unit of the parameters were displayed together with the parameters. This has been solved.
- In the Numerical group box on the Layout page of the element editor there are three new entries Y value at X = with which the Y value of the curve-fit model can be calculated for three X values. The result is displayed in the information window.

Crossover Element

- The time t, the segment time t_seg and the temperature T are now available as QC criteria.

DataManager

Saving images

- Camera images can now additionally be saved as a video file in the WMV format by right clicking on the image area and selecting the Save as video command.

Version 4.6x.00xx

Version 4.60.0000

(Released 23.07.2015)

Below is a list of things that are new and/or changed in version 4.60.0000 compared with version 4.50.0017 of RheoWin.

Installation

MARS 40 and MARS 60

- The installation program now allows the installation of RheoWin for the *new* MARS 40 and the *new* MARS 60 rheometer.

Media files
- A set of *new* Media files (images, small videos, application notes, short instructions, etc.) is now part of the installation. These media files are used in the new Job example files and can of course be used in any other job as well.
- Among the media files are videos and images which show how to apply the sample, how to trim the sample, how to mount/dismount a measuring geometry etc.
- The media files are installed in the following default directory (that is parallel to the Jobs, Data, Page, Template and Report directories):

  `C:\Users\Public\Documents\Thermo\RheoWin\Media.`

Example and template files
- There is no possibility anymore to select which example and template files are to be installed.
- All example Job, Data and Page files as well all templates files are now always installed automatically.
- The set of example Job, Data and Page files has been completely **renewed** and extended.
- The Job example files are installed in the Job\# Examples directory and lower level sub-directories.
- The Data example files are installed in the Data\# Examples directory and lower level sub-directories.
- The Page example files are installed in the Page\# Examples directory and lower level sub-directories.

> **Note** It is strongly recommended to have a close look at the new example files.

> **Note** After modifying an example Job is should NOT be saved in the Job\# Examples directory or any lower level sub-directory of that directory, to prevent the modified Job from being deleted at the next update.

Spectra and MWD calculation tools
- Due to licence issues the Spectra and MWD calculation tools are NOT installed anymore when RheoWin is installed using the 098-5019 All instruments installatio key.
- In order to be able to install the new versions of the Spectra and MWD calculation tools new installation keys with new order numbers are needed.
- The new Spectra calculation tool installation key order number is 098-5066.
- The new MWD calculation tool installation key order number is 098-5067.

General

- The general look of both JobManager and DataManager has been modernized.

DeviceManager

MARS 40 and MARS 60 rheometers
- There are two *new* drivers for the *new* MARS 40 and MARS 60.
- The value of the air-pressure for the air-bearing is stored as part of the measured data.

VTiQ and all MARS rheometers
- There was a communication time-out problem when running multiple Jobs, with instruments using TCP/IP communication, at the same time. This has been solved.

Rheonaut module
- The Rheonaut module can now be used with the TM-EL-H electrically heated hood for an improved sample temperature control.

- In order for this to work the following MARS firmware versions are needed:
  MARS 40 and MARS 60
  - µP1 (Box microcontroller)   version 50.17.000
  - µP2 (Box DSP)   version 50.17.000
  - µP3 (Stand microcontroller) version 60.01.000
  MARS I and MARS III
  - µP1 (Box microcontroller)   version 50.17.000
  - µP2 (Box DSP)   version 50.17.000
  - µP3 (Stand microcontroller) version 50.21.000

SC-AC-PC circulators

- The temperature-offset table in the driver for these circulators can now be accessed by the TempOffset calibration program.

Almemo Multitemp

- The driver of this auxilliarily device now retrieves and saves the device serial number.

Connect Assist rotors (for MARS 40 and 60)

- The MSC calibration routine can (of course) also be used for Connect Assist rotors (when use with a MARS 40 or MARS 60).
- The resulting MSC (torque-mapping) values for these rotors are stored in RheoWin (device.flp).

MSC calibration

- Under certain circumstances the MSC calibration did not work properly. This has been solved.

JobManager

Main menu toolbar icons

- The main toolbar icons have been modernized.

Job Elements list

- All Job Element icons have been modernized.
- The General and Measurement Job Elements are now divided up into subgroups.

Jobs and Templates file explorer

- The file explorer icons have been modernized.

Updating and adding example and template files

- Thermo Fisher Scientific will supply updates for the example and template file on a regular basis.
- These updates will be distributed in the form of ZIP files that can be downloaded from the RheoWin page on the www.rheowin.com website.
- The contents of such a ZIP file can be applied to an existing RheoWin installation using the *new* Update example and template files dialog accessible from the Help > Internet/Update > Update > Update example and template files menu.
- By using the Replace command the operator can install a new version of the *complete set* of Job, Data, and Page example files as well as all Media and Template files. By doing so all current files in the Jobs\# Examples, Data\# Examples and Page\# Example directories and lower level sub-directories will be deleted and replaced by new files and directories.

  > **Note** This command will (of course) *not* delete file in other directories.

- By using the Add command the operator can add a single new example file or a few new example files including media files to the current set of example files. This command is meant to be used for supplying customers with specific examples on request.

Job-Editor

- The icons in the Job-Editor dialog have been modernized.

- When the 21 CFR part 11 tools are installed, signature status information is now displayed in the *new* Job-Editor status bar.
- Both the Application information area and the Devices area can be collapsed/expanded regarding their height to have more space for the actual Job Element sequence.
- There is a *new* Application information area in the Job-Editor dialog with three button and a text field.
- The text field is designated to display a short (one-line) text describing the Job
- A click on the information i-button will show a window with is designated to display a long (multi-line) text describing the Job in more detail. The text description can be accompanied by an image or a video. (For more information on this see below in the Message Element paragraph.)
- A click on the PDF document button will open a PDF file that is linked to the Job. This functionality can be used to link a SOP document or an application note etc. directly to the Job for quick and easy access.
- A click on the Edit button will open a dialog in which the short and the long text can be edited, and file names for an image, video and PDF file name can be selected.
- When no long text is defined, the information button is not displayed.
- When no document file name is specified, the PDF document button is not displayed.
- In the new example Job files that are part of the installation many examples for the use of the new Application information functionality can be found.

Message Element

- In the Message Element editor an image and video file can now be selected for display in the Message window during a Job run.
- During Job run either the image or the video can be displayed, that is not both at the same time.
- The image or video will be scaled to a maximum width of 400 pixels and a maximum height of 300 pixels.
- It is recommend to only use images or videos that already have the maximum width and/or height.
- It is recommended to store the images and videos in the default Media directory, but any other directory can be used as well.
- It is important to understand that the image and/or video is *not* stored in the Job file, only the path to the image and/or video file is stored in the Job file.
- When the Message Element is only used to comment the Job Element sequence in the Job-Editor, the text behind the element icon is displayed in a grey colour.

Lift Element

- In the Message Element editor image and video files for each of the lift actions can now be selected for display in the Message window during a Job run. (For more information on this see above in the Message Element paragraph.)
- The Lift Element dialog can be collapsed/expanded regarding its width. When the dialog is collapsed the message edit areas are not visible.
- Moving the lift to Standby position (after finding the zero point) is now an optional, integral part of the Zero point lift action.
- For the MARS 40 and MARS 60 there is a *new* option Eject rotor (if possible) in the Lift apart action. When this option is selected the rotor will automatically ejected from the drive motor shaft before the instrument head (lift) moves upward. For all concentric cylinder geometries this always possible. For cone and plate and parallel plate geometries this is only possible when the sample is not too low viscous. For most special, non standard, geometries this is not possible. The rheometer firmware automatically decides whether ejecting the rotor is possible or not.

OSC Temperature Ramp and OSC Temperature Step Elements

- In the editors of these elements there is a new page Extern on which the Trigger function can be activated. The Trigger functionality is the same as that in the OSC Time Curve Element.

Curvefit Element

- Under certain circumstances there was a problem with the Herschel-Bulkley model. This has been solved.

DataManager

Main menu toolbar icons

- The main toolbar icons have been modernized.

Evaluation menu toolbar icons

- The evaluation toolbar icons have been modernized and enlarged.

Data, Pages and Templates file explorer

- The file explorer icons have been modernized.

Saving images

- DataManager would crash when saving an image, that was stored in the Lurawave format, as a Bitmap file. This has been solved.

Spectra calculation tool

- The Spectra calculation tool has been completely reprogrammed and now produces more accurate results.

MWD calculation tool

- The MWD calculation tool has been completely reprogrammed and now produces more accurate results.

> **Note** The new MWD calculation tool needs a spectrum, calculated by the new Spectra calculation tool, as input data. This means that the MWD calculation tool can not be used without the Spectra calculation tool.

Graph / Table display

Table

- The DataManager would crash when a file with a very long file name was loaded and the mouse pointer was moved over the table header. This has been solved.
- When a table was exported to an Excel file the degree sign in the header of a data column containing the phase angle. This has been solved.

Graph

- It was not posible change the filled/unfilled property of all curves of one data file at the same time. This has been solved.

RangeCalculator

- Some smaller bugs in the Range Calculator program have been solved.

Version 4.60.0001

(Released 31.07.2015)

Below is a list of things that are new and/or changed in version 4.60.0001 compared with version 4.60.0000 of RheoWin.

DeviceManager

Connect Assist geometries for VTiQ, MARS 40 and MARS 60 rheometers

- The Torque correction page in the Properties of a geometry dialog can now also be used in the case of Connect Assist geometries.

JobManager

Job-Editor

- In the measurement element editors the range value limits (for the shear rate, shear stress, etc.) are immediately updated when a Connect Assist geometry was detected.

DataManager

MWD calculation tools

- On the Substance page of the MWD dialog the edit field and table column for GN0 have been removed because the value for GN0 is calculated (and not needed as input).

Version 4.61.0000

(Released 27.11.2015)

Below is a list of things that are new and/or changed in version 4.61.0000 compared with version 4.60.0001 of RheoWin.

Installation

Installation of example and template files

- Some of the example job files contained wrong pathes to media files. This has been solved.
- On some PC's the installation of the example and template files does not work and is quitted with an error message and a dialog box. In case this happens close the dialog box by clicking the Close button. The installation will then continue but the example and template files will not be installed. In this case the example files should be installed manually using the Help > Internet / Update > Update > Update example and template files command. See the What's new information of version 4.60.0000 for more information on this.

> **Note** We are of course working on a solution for this problem.

- The zip file (RheoWin_Example_Files.zip) which contains all example and template files is now installed in the Thermo > RheoWin folder in the Windows Public documents folder.

ART service program

- The ART service program is now always installed but can only be used without needing to enter a password when the installation was performed using the General Key (098-5019). The ART service program is for use by qualified service engineers only!

DeviceManager

MARS 40 and MARS 60

- When running the inertia determination routine for the instrument alone (that is not for a geometry) the new inertia value was not saved correctly. This has been solved.
- With the newest firmware the lift control buttons and the eject button on the control panel (on the front of the instrument itself) are now disabled during a measurement. These buttons were not enabled again at the end the of the inertia and MSC determination routines. This has been solved. An erroneous update message would appear when a Connect Assist Adapter was attached to the instruments drive motor shaft. This has been solved, the message is not displayed anymore.

MTMC and UTMC

- The maximum number of temperature offset values in a temperature offset table is now limited to 9 since the firmware can not handle more.

FTIR spectrometer

- In the drivers.ini file, the temporary directory in which the FTIR spectra data is saved can now be modified by adding an entry like:

```
[IRSPECTRO]
SpectraTempPath=C:\SpectraTemp\
```

> **Note** The above path is just an example. The last character of the path string must be a "\".

- In the drivers.ini file, the use of DDE commands for use with the Omnic software can activated by adding the following entry:

```
[IRSPECTRO]
Raman=1
```

This is used for the commands CollectSample and CollectBackground.

SER tool with Connect Assist

- The SER tool with Connect Assist was not correctly handled and not entered in the list of geometries after it was recognized by the instrument. This has been solved.

Jobrun.exe

Launch Job from Windows destop or Windows explorer

- When running a Job from the Windows desktop or from the Windows explorer an error message would appear at the very end of the Job. This has been solved.

JobManager

RheoWizard

- The RheoWizard would produce a non-functional Job when selecting Chocolate from the List of subtances.This has been solved.

Lift control icons

- The Lift control icons in the Device toolbar and in the Manual control window are now different fo rheometers in which the table moves up/down compared with those rheometer where the measuring head moves up/down.

New Fill Assist element

- There is a *new* Fill Assist element which allows the use of the Fill Assist tool in a RheoWin job in combination with the Viscotester iQ. For more information on the Fill Assist tool see the HAAKE Viscotester iQ reference manual version 1.6 or higher.

Version 4.61.0003

(Released 04.02.2016)

Below is a list of things that are new and/or changed in version 4.61.0003 compared with version 4.61.0000 of RheoWin.

DeviceManager

MARS I, MARS III, MARS 40 and MARS 60

- The lowest allowed value for the oscillation frequency is now 10^{-6} Hz.

Viscotester iQ

- The Diagnosis Save function will now write more information in the diagnosis file.

FTIR spectrometer

- Some smaller bugs were removed.

JobManager

Jobrun
- Under certain circumstances the Goto-Element would crash when the (Data) Autosave function was called. This has been solved.

Version 4.62.0000

(Released 12.04.2016)

Below is a list of things that are new and/or changed in version 4.62.0000 compared with version 4.61.0003 of RheoWin.

Installation

Viscotester iQ Air
- The installation program now allows the installation of RheoWin for the **new** Viscotester iQ Air rheometer.

DeviceManager

Viscotester iQ Air rheometer

- There is a *new* driver VTiQAir.dll for the *new* Viscotester iQ Air. For the optional TM-xx-x temperature control modules the VTiQ Air uses the same driver as the 'normal' VTiQ, i.e. the VTiQT.dll driver.

MARS I, III, 40 and 60
- The inertia determination routine now uses CD Oscillation mode at two different (large) amplitudes to measure the moment of inertia.
- The available options in the Options box on the Options page of the Properties of 'MARS xx' editor are now sorted/ordered differently.
- There are two *new* options for the Oscillation mode in the Options box on the Options page of the Properties of 'MARS xx' editor:
  Active compliance correction CD-OSC
  Active inertia correction CS-OSC
These new options are activated by default.

> **Note** When these corrections are activated the measurement results may (slightly) differ from those previously measured without these corrections. For situations where that is not desired these corrections can be deactivated.

> **Note** When the new firmware is not installed or the options are deactivated, the firmware will use the passive compliance correction and passive inertia correction which were standard until now.

> **Note** New MARS firmware versions are needed for these options to work.
> The µP1 microcontroller firmware version must be 50.19.001 or higher.
> The µP2 DSP firmware version must be 50.17.165 or higher.
> (check the www.rheowin.com/firmware.htm web-page for the availability of such firmware versions).

Measuring Geometries
- The handling of the Solid clamp geometry was not correct for both the version with the classical conical coupling and the new Connect Assist version. This has been solved.

Viscotester D and E drivers
- The Temperature offset tables were not used correctly. This has been solved.

JobManager

JobEditor
- The software handling of Connect Assist geometries (MARS 40, MARS 60 and VTiQ) has been modified. Instead of displaying one or more message windows a green or red status light is now displayed between the geometry name and the Connect Assist button in the JobEditor dialog.
- The Connect Assist functionality (MARS 40, MARS 60 and VTiQ) can now be completely disabled by selecting the option Use geometry defined in Job (disable Connect Assist) in the Connect Assist settings dialog.

> **Note** The Connect Assist settings dialog is accessed by *right clicking* on the Measuring geometry drop-down list or on the Connect Assist button.

Rotation Ramp elements
- Under certain circumstances the Take from previous options for the shear rate or shear stress set value did not work properly. This has been solved.

Version 4.62.0003

(Released 10.05.2016)

Below is a list of things that are new and/or changed in version 4.62.0003 compared with version 4.62.0000 of RheoWin.

DeviceManager

Viscotester iQ (Air) rheometer
- The diagnosis window for these instruments has been modified.
- The automatic integration time (ROT Elements) functionality has been improved.

> **Note** For this to work with the VTiQ, firmware version V1 must 1.10.000 or higher.
> For the VTiQ this is implemented from the start.

UTC drivers
- Since the UTC control box only works with a baudrate of 4800, the baudrates 9600 and 19200 have been removed from the baudrate selection box.

JobManager

Device Toolbar
- The device toolbar is now automatically disabled when the automatic temperature calibration tool is running.

JobEditor
- The software handling of Connect Assist geometries (MARS 40, MARS 60 and VTiQ) has been further improved.
- Under certain circumstances an error message Hades Error 36 would popup at the start of a Job. This has been solved.

Axial Time element
- The axial strain value was not calculated correctly. This has been solved.
- The gap change values Δh and Δ%h are now measured and stored, just as in the Axial Ramp element.

Version 4.63.0000

(Released 20.07.2016)

Below is a list of things that are new and/or changed in version 4.63.0000 compared with version 4.62.0003 of RheoWin.

DeviceManager

MARS 40 and 60 drivers
- The actual lift speed did not correspond to the lift speed values selected in the Lift Element.
- This has been solved, the actual lift speed now corresponds to the selected value.
- Because the existing selectable lift speed values were relatively low, four new lift speed values (5, 10, 20 and 50 mm/s) have been added.

> **Note** New MARS firmware versions are needed for these options to work.
> The µP1 microcontroller firmware version must be 50.21.000 or higher.
> The µP2 DSP firmware version must be 50.19.000 or higher.
> The µP3 firmware version must be 61.02.000 or higher.
> (check the www.rheowin.com/firmware.htm web-page for the availability of such firmware versions) JobManager

Lift Element
- The lift speed control has been modified. The operator can now define a gap value above which the lift will move at it's maximum speed (this is a device dependent value) and below which the lift will either move with the selected speed value (Use Speed option) or the lift will apply a set normal force (Use Autotension option) to the sample.
- The gap at which the lift speed is changed is defined by the new When gap <= xxx.x mm value in the Lift Element editor.

> **Note** The above is valid for *all* Rheometer models.

Rot Temperature Ramp Element
- Data measured by a Job running internally in a VTiQ (Air) was not displayed correctly. This has been solved.

Rot Ramp Element
- Under (rare) circumstances the Rot Ramp element would hang or crash at the beginning or the end of the ramp. This has been solved.

Axial Time Element
- Under very special circumstances the element editor would crash because of a division by zero. This has been solved.

Yield-Stress Evaluation Element
- Under (very rare) circumstances the Yield-Stress value calculated during a Job run could be different (i.e. not correct) from the value calculated in DataManager. This has been solved.

Temperature Calibration Tool
- The (optional) temperature calibration tool program has been updated. Some smaller bugs have been fixed.

Version 4.63.0001

(Released 22.07.2016)

Below is a list of things that are new and/or changed in version 4.63.0001 compared with version 4.63.0000 of RheoWin.

JobManager

Curve discussion element
- The QC-result was not displayed correctly for the Mean value calculation. This has been solved.

Version 4.63.0002

(Released 18.08.2016)

Below is a list of things that are new and/or changed in version 4.63.0002 compared with version 4.63.0001 of RheoWin.

DeviceManager

Imaging DLL for Camera/RheoScope
- In version 4.63.000x the camera did not work because the Imaging.dll that was automatically installed does not work with (the older) FGControl version 2.3.3.1 which was used until know.
- Starting from this version RheoWin (i.e. the Imaging.dll) works with FGControl version 2.6.0.2 by default. This new FGControl version is available on the RheoWin CD and can also be downloaded from www.rheowin.com/rheowin46.htm. See the HAAKE RheoWin User Guide Camera installation version 2.3 on how to install the FGControl software.
- Users who do not want to use the new FGControl version 2.6.0.2, can manually install a version of the Imaging.dll which is compatible with FGControl 2.3.3.1. This imaging.dll (see the Imaging.dll for FGControl 2.3.3.1 directory in the zip file) is part of the rhw4630000_complete.zip file which can be downloaded from the RheoWin web-site. This file is also available on the RheoWin CD in RheoWin\Imaging.dll for FGControl 2.3.3.1 directory.

Version 4.63.0003

(Released 09.11.2016)

Below is a list of things that are new and/or changed in version 4.63.0003 compared with version 4.63.0002 of RheoWin.

DeviceManager

MARS I and MARS III drivers
- The actual lift speed did not correspond to the lift speed values selected in the Lift Element. This has been solved, the actual lift speed now corresponds to the selected value. Because the existing selectable lift speed values were relatively low, four new lift speed values (5, 10, 20 and 50 mm/s) have been added.

> **Note** New MARS I / MARS III firmware versions are needed for this to work.
> The μP1 Box microcontroller firmware version must be 50.23.000 or higher.
> The μP2 Box DSP firmware version must be 50.18.000 or higher.
> The μP3 Stand firmware version must be 50.25.000 or higher.
> (check the www.rheowin.com/firmware.htm web-page for the availability of such firmware versions).

JobManager

Axial Ramp Element (MARS I, III, 40, 60)

- The communication between the Axial-Ramp Element in RheoWin and the Axial-Ramp control in the firmware has been modified in order to optimize the Axial Ramp performance.

> **Note** New MARS I / MARS III firmware versions are needed for this to work.
> The µP1 Box microcontroller firmware version must be 50.23.000 or higher.
> The µP2 Box DSP firmware version must be 50.18.000 or higher.
> The µP3 Stand firmware version must be 50.25.000 or higher.
> (Check the www.rheowin.com/firmware.htm web-page for the availability of such firmware versions.)

> **Note** New MARS 40 / MARS 60 firmware versions are needed for this to work.
> The µP1 Box microcontroller firmware version must be 50.23.000 or higher.
> The µP2 Box DSP firmware version must be 50.19.000 or higher.
> The µP3 Stand firmware version must be 61.03.000 or higher.
> (Check the www.rheowin.com/firmware.htm web-page for the availability of such firmware versions.)

Version 4.63.0004

(Released 24.01.2017)

Below is a list of things that are new and/or changed in version 4.63.0004 compared with version 4.63.0003 of RheoWin.

DeviceManager

Imaging DLL (RheoScope Module)

- The scale gauge that is displayed on top of an image acquired with the RheoScope module was slightly wrong. This has been corrected.

> **Note** This correction only applies to images acquired with RheoWin 4.63.0004 or newer, that is NOT to images acquired as part of measurements made with earlier RheoWin versions.

> **Note** Due to the limited screen resolution of computer monitors the accuracy of the scale gauge is limited to values in the range of 1 µm.

Version 4.7x.00xx

Version 4.70.0000

(Released 11.05.2017)

Below is a list of things that are new and/or changed in version 4.70.0000 compared with version 4.63.0004 of RheoWin.

Installation

Font installation

- The Gebr. HAAKE GmbH (Font filename: ThermoRheo.ttf) is not installed anymore. RheoWin now uses the default Windows system font. In Windows 7 and for most Western European languages, this is the Segoe UI font. In other Windows versions and/or for other languages the Windows system font may be different. As a consequence the greek symbols used for physical quantities look slightly different now compared with all previous RheoWin versions.

ConnectAssist geometries for MARS 40 and MARS 60

- Starting from this version all standard ConnectAssist geometries that are availalbe for the MARS 40 and MARS 60 are installed and available in the list of geometries when installing RheoWin with a MARS 40, MARS 60 or general key. (In previous versions only the standard ConnectAssist geometries that are available for the VTiQ were installed and available.)

Supported rheometers, temperature control devices and circulators

- Drivers for the RS150, RS80, RS75, RheoScope 1 and RT20 rheometers are *not* part of the installation anymore. For these instruments RheoWin 4.63.0004 or earlier should be used.
- Drivers for the VT6L, VT6R, VT7L, VT7R as well as the VT7L-plus and VT7-R-plus viscometers are *not* part of the installation anymore.
- For these instruments RheoWin 4.63.0004 or earlier should be used.
- Drivers for the TC80, TC81, TC500 and TC501 temperature controllers are *not* part of the installation anymore. For these instruments RheoWin 4.63.0004 or earlier should be used.
- Drivers for the F3C, F6/N6/F8/N8, DC30, DC50 and Phoenix circulator models are *not* part of the installation anymore. For these instruments RheoWin 4.63.0004 or earlier should be used.

General

Compatibility with previous RheoWin versions

- RheoWin 4.69.00xx can read all *.rwj, *.rwd, *.rwp etc. files created with any previous RheoWin version, but (as with all previous versions) files saved with this version can *not* be read with any previous version.

Languages

- The following languages have been updated and completed: Traditional Chinese, Simplified Chinese, Japanese, Polish, French and German.

New Unicode

- RheoWin is now a 100% Unicode program.
- All text in RheoWin is now in Unicode format, this means that text in any language can be mixed with text in any other language. A practical example is the use of greek characters for physicals quantities in combination with non-western-european languages (for example Chinese, Japanese, Korean, Polish, Russian, etc.)
- The text in the language.xls file is now in Unicode format.

Program "Splash screen" and Help > Info about screen

- The RheoWin start-up "Splash-screen" and the Help > Info about screen are completely new designed according to the latest Thermo Fisher Scientific brand guidelines.

Quantities / Units

- In previous RheoWin versions the quantities N_1 and ψ_1 were named normal force difference and normal force coefficient respectively. That was not correct. These quantities are now correctly named normal stress difference and normal stress coefficient respectively.

Restart message

- The message "Program not terminated correctly. It is recommended to restart your computer" is not displayed anymore at the next start after an unexpected closing of either JobManager or DataManager.

Values of A- and M-factor
- The values of the A- and M-Factor are now displayed in the same format throughout the software.

Rheometer and auxillary drivers

Spectrometer (OMNIC)
- Under certain circumstances OMNIC would produce an error message stating that a spectrum file could not be saved. This would halt a RheoWin job (until the message box was closed). This has been solved.

> **Note** For this to work a modified version of the OMNIC_CI.dll is needed. This dll file must copied into the c:\Program files(x86)\omnic folder. In the file omnicsettings.ini in the c:\My Documents\omnic folder the following line must be added to the [Files] section: DisableSaveErrorMessage=1.

> **Note** The modified version of the OMNIC_CI.dll can be downloaded using the following link: www.rheowin.com/files/Omnic_CI_DLL_patch.zip. This file is for Omnic 9.7.xxx only.

> **Note** There is no patch available for older Omnic versions.

DeviceManager

Inertia determination
- Under certain circumstances (for example for all vane geometries) the inertia value was not determined correctly. This has been solved.

JobManager

Element/Job/Template explorer
- The display of the Measurement elements in the Job Elements list was slightly "scrambled" when RheoWin was installed using a VTiQ installation key. This has been solved.

Job Controller
- When a Job is cancelled before any data is measured the Save data dialog is not displayed anymore and no *.rwd file is saved.
- In a Job in which a *.rwd file is loaded and in which no new data is measured, the data of the loaded *.rwd file is now displayed on the first (default) page of the table.

Job Editor
- When the option No data file is selected in the Filename > Save data file dialog, a *.rwdfile that is loaded in a Evaluation-only-Job (a Job in which no measurement is made) will not be saved at the end of the job anymore, even if changes were made in the *.rwd file.
- The properties of a Connect Assist adapter can now be modified (without removing the adapter entry from the list of geometries in the DeviceManager first) by right clicking on the Measuring geometry selection field in the Devices area of the JobEditor and then selecting Edit Connect Assist adapter properties from the popup menu.
- In the Connect Assist adapter properties dialog the operator can now select a geometry from a list of predefined geometries which matches the adapter type.

Message Element
- The message element can now display the result(s) of any evaluation element in combination with any other (user defined text) during a Job run.

- The result(s) can be displayed in two different ways:
  a) The complete result text of an evaluation element, as shown in the information window, can be displayed.
  b) Any individual result value and/or the QC result, calculated by the evaluation element can be displayed separately.
- In order to display the complete result text of any evalution element in the message window during a Job run, the string R_ID**x**_TXT, where **x** stands for the ID number of the evaluation element in the Job, can be placed anywhere in the Message edit field in the Element editor.
- In order to display the QC result of any evalution element in the message window during a Job run, the string R_ID**x**_QC, where **x** stands for the ID number of the evaluation element in the Job, can be placed anywhere in the Message edit field in the Element editor.
- In order to display any individual result value of any evalution element in the message window during a Job run, the string R_ID**x**_P**y**, or R_ID**x**_P**y**_**z** where **x** stands for the ID number of the evaluation element in the Job and **y** or **y** and **z** indicate the individual result value (depending on the element), can be placed anywhere in the Message edit field in the Element editor.
- Note that if **y** < 9 it MUST be written as 01, 02, etc. that is with a leading zero.
- Example Jobs explaining this in detail (for each evaluation element) are part of the RheoWin installation.

> **Note** In the SHRP element only the R_ID**x**_TXT result text is available.

Lift Element
- Ejecting the rotor as part of a Job did not work reliably. This has been solved.

> **Note** There were also some issues regarding this in the firmware. These are solved starting from firmware version V3: 61.04.0006 for the MARS 60 and MARS 40.

All Measurement Elements
- During a Job run any measurement element could (very rarely) display a Hades Error and inadvertently halt the Job at the same time. This has been solved.
- The element ID and the element repetition number (when using the Goto Element) are now saved for every data point as part of a *.rwd file and can be displayed in a table.

Axial Ramp Element
- The idle time between two axial ramp elements has been reduced from approximately 1.5 s to approximately 0.6 s.

ROT Ramp Element and ROT Ramp Temperature Element
- In contrast to all other measurement elements the data acquisition in these elements was such that the segment time value for the first data point was always (very close to) 0.0. This has been modified. The first data point is now acquired at a segment time value which corresponds to the time difference between the subsequent data points of the element.

OSC Frequency Sweep Element, OSC Amplitude Sweep and OSC Temperature Step Element
- These elements can now communicate with the FTIR software in order to simultaneously measure rheological data and FTIR spectra.

All Evaluation Elements
- The manual selection of a curve is now in the format [x-quantity ▼] = f ([y-quantity ▼]), where [x-quantity ▼] and [y-quantity ▼] stand for quantity selection drop down boxes.

New Linear Viscoelastic Range Evaluation Element
- With the completely _new_ Linear Viscoelastic Range (LVR) evaluation element the end of the linear viscoelastic range can be automatically calculated from the G', G", |?*|, ? or tan(?) of an oscillation stress or strain sweep measurement with a user-defined tolerance value.

- Optionally the criticial stress and/or strain as well as the G', G" crossover point can be calculated. The format of the graphical and numerical result can be configured on the Layout page of the element editor.

New Advanced Curve Discussion Evaluation Element

- With the completely *new* Advanced Curve Discussion evaluation element the following points in any y=f(x) data set (curve) can be automatically calculated:
  1) The point on a curve where the slope has a certain (user defined) value.
  2) The point on a curve where the relative slope has a certain (user defined) value.
  3) The point on a curve where the y-value reaches a certain (user defined) percentage of a reference value. The reference value can be the first or the last point in the curve, or the minimum or maximum y-value on the curve.
  4) The intercept point of two tangent lines drawn through two user defined x-ranges along the curve.
- The format of the graphical and numerical result can be configured on the Layout page of the element editor.

Curve Fit Evaluation Element

- There are three new curve fit models available

Sisko	$\tau = \eta_\infty \dot{\gamma} + K \dot{\gamma}^n$
Sisko (Visc)	$\eta = \eta_\infty + K \dot{\gamma}^{n-1}$
Slope y=f(log(x))	$y = a + b \log(x)$

> **Note** In contrast to the Sisko (Visc) model, which works very good on almost any matching data, the Sisko model does not always work very well. This is *not* caused by a bug in RheoWin but by the data itself.

Crossover Evaluation Element

- On special request the Crossover element now also optionally calculates a "degree of crosslinking" (Vernetzungsgrad) value using the equation V = a+b*G'(at f=0,5 Hz).
- This *new* option can be activated in the Specials area on the Layout page of the element editor.

DataManager

All analysis routines

- The dialog of an analysis routine is now automatically put in front of the graph after executing the analysis routine. This was not always the case in the past.

Data selection dialog

- The manual selection of a curve is now in the format [x-quantity ▼] = f ([y-quantity ▼]), where [x-quantity ▼] and [y-quantity ▼] stand for quantity selection drop down boxes.

New analysis routines

- The *new* Linear Viscoelastic Range (LVR) and *new* Advanced Curve Discussion analysis routines (see above) are available in DataManager as well.

Analysis routine toolbar

- In all previous RheoWin version not all analysis routine icons were displayed when the vertical height of the computer screen was below a certain value. This has been fixed, the toolbar will now display the icons in two columns when needed.

Camera image display

- Saving images as a video file (in *.avi and *.wmv format) did not work correctly. This has been solved.
- The scale bar in the upper right corner of the image can now be enabled/disabled by using the new option Show scale bar from the image context menu.
- The scale bar now contains intermediate scale tic marks.

- In previous RheoWin versions the length of an object or region, etc. in an image could be measured by drawing a line (using the mouse) on the image. The numerical value of the length of the line (in μm) was displayed. As soon as the mouse button was released the line and numerical value would disappear. This functionality has been modfied/extended.
- After activating the new option Length measurement > Save measurements from the image context menu, the operator can now draw upto 10 length measurement lines in each image.
- These length measurement lines are stored in the *.rwd data file (when the file is saved).
- When this new option is not activated the functionality is as in previous RheoWin versions.
- By selecting the command Length measurement > Delete measurements in current image all lines in the current image are deleted.
- By selecting the command Length measurement > Delete measurements in all images all lines in all images (of the *.rwd data file) are deleted.
- This new functionality can also be controlled by the four new buttons below the image.

> **Note** Once drawn the lines can not be modified anymore, nor deleted individually.

> **Note** The length measurement lines are not part of the images themselves, in order to export the image including one or more lines a screenshot tool must be used.

Graph / Table display

Saving a graph
- A graph can now be saved as a *.png, *.jpg or *.tiff file also.
- A graph can *not* be saved as a *.dib file anymore.
- On (very) slow computers, when saving a graph as an image, the item text of the context menu that was selected was part of the image. This has been solved.

Saving data as text
- The data as displayed in a table can now be saved in either ASCII text format or in Unicode text format by selecting the corresponding Encoding option at the bottom of the Save as dialog.

Element ID in a table
- The element ID and the element repetition number of a data point can be displayed in a table by selecting the quantities Elm-ID and/or Elm-Rep. for display in a table column.

Range calculator

Reference point
- By entering a value for the shear rate or the shear stress or the angular velocity or the torque the other the values for the other three quantities can now be calculated based on the viscosity reference value.
- All four values are displayed numerically and the corresponding reference point is displayed in the viscosity = f (shear rate) graph.
- A value is displayed in red color when it is outside the instrument range.
- This new functionality can be switched off/on in the Settings dialog.

Unit selection
- The units for torque and angular velocity can now be modified by clicking on the unit text behind the respective value edit field.

Version 4.70.0002

(Released 07.06.2017)

Below is a list of things that are new and/or changed in version 4.70.0002 compared with version 4.70.0000 of RheoWin.

Installation

Installation under Windows XP
- An attempt to install RheoWin 4.70.000x under Windows XP is now actively blocked and will leave the system unmodified.

Installation of new LVR Element
- The new LVR evaluation element was not installed correctly, as a consequence it was not visible in the list of elements in the JobManager. This has been solved.

Art service software
- The ART service software has been updated.

Rheometer and auxillary drivers

MARS I, II, III, 40 and 60
- There was a problem in combination with the ART service software. This has been solved.

RV1 and RS1
- During the lift zero point determination RheoWin could not be controlled. This has been solved.

JobManager

Temperature Set Element
- Under very rare circumstances the temperature set element would cause a Job to freeze. This has been solved.

Set Element
- Some texts in the element editor have been corrected.

Linear Viscoelastic Range Evaluation Element
- Some improvements in the calculation method have been implemented.

Version 4.70.0003

(Released 09.06.2017)

Below is a list of things that are new and/or changed in version 4.70.0003 compared with version 4.70.0002 of RheoWin.

Rheometer and auxillary drivers

RV1, RS1
- The serial number was not displayed correctly in the info/protocol window. This has been solved.

All devices with serial communication (RS232)
- The selected COM-Port was not stored. This has been solved.

JobManager

Message Element
- The new functionality for displaying evaluation results did not work correctly. This has been solved.

Version 4.70.0005

(Released 12.06.2017)

Below is a list of things that are new and/or changed in version 4.70.0005 compared with version 4.70.0003 of RheoWin.

Installation

VTiQ with pressure cell stand
- For the VTiQ with pressure cell stand the driver for the UTMC can now be selected during the installation.

General

Languages
- The following languages have been updated and completed: English, German and French.

Rheometer and other drivers

Foculus camera driver
- In certain situation (for example in the Manual Control window) there were problems with the communication between the Foculus camera driver and RheoWin. This has been solved.

JobManager

Report Element
- The Title for report text and the Graph title text which can be entered in the element editor were not used in the report printout/preview/export. This has been solved.

Version 4.70.0006

(Released 25.07.2017)

Below is a list of things that are new and/or changed in version 4.70.0006 compared with version 4.70.0005 of RheoWin.

Rheometer drivers

RV1, RS1, RS300, RS600, RS3000, RS6000
- Under certain circumstances internal Jobs were not correctly transfered to the instrument. This has been solved.

DataManager

Camera image display
- The scaling factor for (RheoScope) camera images can now be manually edited for each camera lens separately in the *new* Edit scaling factor dialog.
- The Edit scaling factor dialog can be accessed via the Length measurement > Edit scaling factor item in the image context popup menu.
- The scaling factor is calculated by entering the Target value and the Actual value and then clicking the Calculate button.
- By clicking the Apply button the new value is set for use in future measurements.
- By clicking the Reset button the default value can be retrieved.

Version 4.75.0000

(Released for testing 26.09.2017)

Below is a list of things that are new and/or changed in version 4.75.0000 compared with version 4.70.0006 of RheoWin.

Installation

Supported circulators

- Since RheoWin version 4.70.0000 drivers for legacy (older) circulators like the F3C, F6/N6/F8/N8, DC5, DC30, DC50 and Phoenix circulator models are *not* part of the installation anymore. After the launch of version 4.70.0000 we had requests for some of these drivers. As an intermediate solution we have decided to supply these drivers on special request. Please note that currently only some of these drivers are available immediately, others must be created and tested first.

General

Performance

- The internal structure and internal "communication" of the JobController and the Graph/Table/Info module have been redesigned for a better overall performance of the RheoWin software.

Compatibility with HAAKE PolySoft software

- The data files from the PolySoft software can now be loaded in RheoWin.

Device Manager

Geometries

- The A- and M-factors of recognized Connect Assist rotors were displayed with too many significant numbers. This has been solved.
- The A- and M-factors of all measuring geometries are now displayed with four significant digits throughout RheoWin.

Rheometer drivers

RV1, RS1, RS300, RS600, RS3000, RS6000

- Under certain circumstances internal Jobs were not correctly transfered from the instrument. This has been solved.

JobManager

JobEditor

- The list of predefined geometries for use with a Connect Assist adapter was displayed correctly. This has been solved.

JobController

- The Stop Job - Last set temperature dialog will now displayed on the center of the screen.

Crossover-Element

- The QC-criteria calculation did not work correctly when two or more crossover points were found in one dataset. This has been solved.

Datamanager

Layout from file

- The setting of the Layout from file option was ignored. This has been solved.

Camera image display

- The camera images can now be saved as part of an image file and copied to the windows clipboard including the length measurement lines and the scale bar when the option Length measurement > Show measurements from the image context menu is activated.
- The image is always saved and copied in the same size as it displayed in RheoWin.
- The lines are not saved as part of the image file when the *.lwf image format is choosen.

- The lines are not saved as part of the image file when the commands Save all images or Save as Video are used.
- The lines are not printed when the Print command is used.

RWR Viewer

Rheological data graph
- In some cases this graph did not show the desired data. This has been solved. (Please note: this bug fix can not and does not solve problems with existing *.rwr files.)

Version 4.75.0001

(Released for testing 16.10.2017)

Below is a list of things that are new and/or changed in version 4.75.0001 compared with version 4.75.0000 of RheoWin.

General

Languages
- The following languages have been updated and completed: Korean.

Datamanager

Add file to page
- Under certain circumstances RheoWin would crash when adding a *.rwd data file to a page. This has been solved.

Load page
- After loading a *.rwp page file, evaluation results were not always correctly shown. This has been solved.

Graph / Table display

Significant digits in a table
- Under certain circumstances the displayed number of significant digits was not correct. This has been solved.

Version 4.75.0002

(Released 25.10.2017)

Below is a list of things that are new and/or changed in version 4.75.0002 compared with version 4.75.0001 of RheoWin.

General

Language file
- The language file is now an Access database file (*.accdb) and not an Excel file (*.xls) file any more.

> **Note** The reason for this change is that RheoWin will show a database related error message on start-up when Windows update KB4041676 (Windows 10) or Windows update KB4041686 (Windows 7) has been installed. These Windows updates contain an error regarding the handling of *.xls files.

Device Manager

Diagnosis window of thermocontroller devices
- The version of several thermocontroller (UTMC, UTC, DC30, Phoenix) was not displayed correctly. This has been solved.

Version 4.75.0003

(Released 10.11.2017)

Below is a list of things that are new and/or changed in version 4.75.0003 compared with version 4.75.0002 of RheoWin.

General

Splashscreen
- On launching JobManager and DataManager the Splashscreen is now opened and closed before the main program window is opened.

JobManager

Example Jobs
- The graph axis settings in some of the example Jobs have been corrected.

Automatic file names
- In Jobs which were created with RheoWin 4.63.xxxx or older the settings for the automatic file name were not correctly loaded. This has been solved.

DataManager

OSC Multiwave Element
- OSC Multiwave data generated with RheoWin 4.63.xxxx or older was not loaded correctly. This has been solved.

Curve Fit Element
- Data files generated with RheoWin 4.30.0030 containing a curve fit were not loaded correctly. This has been solved.

Version 4.75.0005

(Released 01.12.2017)

Below is a list of things that are new and/or changed in version 4.75.0005 compared with version 4.75.0003 of RheoWin.

Installation

Windows 10 version 1709 user privileges
- When Windows 10 is updated to version 1709 (2017 Falls Creator's Update) the Windows installation routine deletes/modifies certain existing registry user privileges that are needed by RheoWin. As a result RheoWin could not be started correctly anymore. This problem does not occur when RheoWin is installed after Windows 10 is updated. Starting from this version of RheoWin this problem is solved by modifications in the RheoWin installation program.

AuditTrail viewer
- The audit trail database entries were not always correctly ordered by time/date. This has been fixed.

JobManager

Loading last Job on start up

- When the option Open last job in the Configuration > Preferences > General dialog is selected, the job that was closed last will be automatically loaded on start up.

JobEditor dialog size

- When saving a Job the current JobEditor dialog size is now saved and restored when the Job is loaded again.

LVR Element

- The Calculate LVR based on option is no longer locked when the Use DIN 51810-2 recommended settings option is selected.

JobManager & DataManager

- On start up a message is displayed when the necessary Windows users privileges for RheoWin are not sufficient.

Version 4.8x.00xx

Version 4.80.0000

(Released 09.03.2018)

Below is a list of things that are new and/or changed in version 4.80.0000 compared with version 4.75.0005 of RheoWin.

Installation

Supported circulators

- Drivers for the (older) circulator models F6/N6/F8/N8, DC5, DC30, DC50 and Phoenix circulator models are now part of the installation again.

Languages

- The english, german, french, polish, spanish, chinese, japanese and korean language tranlsations have been updated and completed.

DeviceManager

Measuring geometries

- The FL10, FL100 and FL1000 vane geometries + Adapter Ux are now installed for the VTiQ and MARS 40/60.
- The pressure cell geometries PZ32, PZ33 and PZ34 are now part of the installation.
- Some properties of the CC22 25-HS/SS, CC22 100-HS/SS and CC22 400-HS/SS were not correct. This has been solved.

JobManager

JobEditor

- The symbols for the physical quantities γ, $\dot{\gamma}$, τ , Fn, h are now displayed in front of the set values in the (6th row of the) element list.
- For oscillation elements the symbols γ_0 and τ_0 are used, see below.
- The mode abbreviations CF and CG (see below) are displayed in the the (5th row of the) element list.

RheoWizard
- Under certain circumstances the RheoWizard did not work correctly. This has been fixed.

Export element
- Under certain circumstances the column delimiter symbol for a data table, which can be selected in the Configuration > Preferences > General dialog was not correct. This has been solved.

FTIR-Spectrum element
- The Omnic Experiment files that can be selected in this element were incorrectly called Configuration files. This has been corrected.

File Load element
- When the *new* Select first, auto load next option is selected and the element is used together with the Goto element in a loop, the element will load all *.rwd data files which it finds in one (user defined) directory one after the other. The directory is selected by selecting one *.rwd file in the desired directory using the file Open dialog that will appear when running the job.
- An example Job (Read rwd data and export to ASCII.rwj) demonstrating the use of this functionality is available in the Job Explorer in the Jobs/# Examples/10. Evaluation directory.

All measurement element editors
- The individual editor pages are now all on one level: The Rot/Osc-parameter pages, the Acquisition pages and the Break criteria pages have been moved from the second level to the first level.
- The default order of the pages is basically the same as in the previous two level design with the exception that the Break criteria page (if existent) is always the last page.
- Alternative page order configurations can be selected from the Element editor pages menu in the JobEditor context menu (Popup menu).
- The Options, Extern and Break criteria pages can be hidden by setting the corresponding option on the Element editor pages menu in the JobEditor context menu (Popup menu).
- The editors have been "cleaned-up" regarding their appearence: "Controls" have been repositioned and resized to fit text in all languages, the positioning of "controls" has been standardized in all editors, all group boxes now have a title, the Take from previous checkbox is now always positioned above the edit field that it applies to, etc.
- Missing translations for a few text items have been added.

All OSC measurement element editors
- The Waiting time edit field is now placed above the # Repetitions edit field in order to reflect the actual sequence in which they are used in a measurement.
- The stress/strain edit fields are now labeled with γ_0 and τ_0 instead of just γ and τ to indicate that these values are sinewave amplitude values.
- By right clicking on the γ_0 and τ_0 label in front of the stress or strain edit field in the OSC Time Element (only in this element!) the old situation can be restored. This setting is valid for all OSC elements and the JobEditor element list, see below.

ROT Time element
- The minimum number of data points that can be acquired is now 1 (instead of 2).

ROT Ramp element
- Under certain circumstances this element caused a job to stop prematurely. This has been solved.

OSC Temperature Ramp element
- When Take from previous is selected for the start temperature either the Duration or the heating/cooling rate $\Delta T/t$ can be selected as the fixed parameter.

Axial Elements
- The mode text controlled force mode is now abbreviated as CF.
- The mode text controlled gap mode is now abbreviated as CG.

JobManager and DataManager

CurveFit element/evaluation

- In the Parameter list there is now a fifth column, Show, with a check box for each model parameter. When the check box for a certain parameter is unchecked the parameter value will not be displayed in the result text.

LVR element/evaluation

- The calculation of the critical stress and strain, as well as other internal functionality has been optimized.

SHRP element/evaluation

- Under certain circumstances the SHRP evaluation would crash. This has been solved.

Interpolation/x-th data point element/evaluation

- Under certain circumstances a x-th data point was not correctly determined. This has been solved. Please note that when using this element for determining a x-th data point, the (x-axis) range must be set to total range.

Report templates

Templates for Excel export

- The templates ExcelExport.lst, ExcelExport_TableOnly.lst and ExcelExport_GraphAndTable.lst for export to an Excel-file export have updated.

Template for LVR element

- There is a new template GraphAndLVR.lst for use with the LVR (Linear Viscoelastic Range) evaluation element.

Graph / Table display

General perfomance

- The general performance of the graph and table functionality has been improved.

Version 4.80.0001

(Released 14.03.2018)

Below is a list of things that are new and/or changed in version 4.80.0001 compared with version 4.80.0000 of RheoWin.

JobManager

OSC Temperature Ramp element

- Due to a bug, Jobs (created with a previous RheoWin version) containing this element could not be loaded in RheoWin 4.80.0000. This has been solved.

Version 4.81.0000

(Released 16.05.2018)

Below is a list of things that are new and/or changed in version 4.81.0000 compared with version 4.80.0001 of RheoWin.

Installation

Visual C Redistributable

- Under certain circumstances the Microsoft Visual C Redistributable package (VCRedist 2015) was not installed correctly. This has been solved.

JobManager

JobEditor
- For the Lift and the Message element the display of a (text) message and/or an image and/or a video during Job run time is now indicated by means of the text [*Message*], [*Image*], [*Video*] in the element list.

Manual Control (Monitor) window
- The Normal force Start button was not always working correctly. This has been solved.

Temperature Setting element editor
- The editor pages have been adapted to the new layout of the measurement elements.

Identification element editor
- The maximum number of saved Substance > Name entries is now 500.
- All saved Substance > Name entries can now be deleted by right clicking on the Substance > Name edit field and selecting Delete all items command.
- Any individual selected Substance > Name entry can now be deleted by right clicking on the Substance > Name edit field and selecting Delete this item command.

ROT Time element
- The option Take from previous for the Temperature value was not correctly displayed in the Job Info/Protocol window.

All evaluation elements
- There was a problem with very long path names for data files. This has been solved.

JobManager and DataManager

CurveFit element/evaluation
- The resulting fit parameters for the Casson (lin) model were not correctly displayed in the Job Info/Protocol window. This has been solved.

Area element/evaluation
- The calculated area values were not correct when the temperature was plotted on one of the axis.
- On the Layout page in the Numerical area of the element editor, the operator can now select to display the Area and/or the Sum area and/or the Diff. area in the Job Info/Protocoll window.
- The Diff. area value is always displayed in the Result list in the element editor.
- The Sum area value is the sum of all Area values of the selected data segments.
- The Diff. area value is the difference of the Area values of two subsequent selected data segments.

DataManager

File menu
- With the new File > Save > Save OSC (Multiwave) Segments as OSC Time Curve Segments command, data from OSC and OSC MultiWave segments are splitted up into separate *.rwd files each containing an OSC Time Curve segment with the data for one frequency from the original file.
  The new files are automatically saved in the same directory as the original data *.rwd or page *.rwp file. The names of the new *.rwd files consist of the original file name plus the appended text _f=x.x, were x.x stands for the actual frequency. The complete contents of the info/protocol window, including the element definition of the original(!) file, is stored in each new file.
- There are now so called hints for the Graph, Table, Protocol and Video buttons in the toolbar.

Version 4.82.0000

(Released 27.07.2018)

Below is a list of things that are new and/or changed in version 4.82.0000 compared with version 4.81.0000 of RheoWin.

Installation

Languages
- A first version of the Hebrew language translation is now included.
- The Chinese, Japanese, Korean, Portugese, French, Spanish, and Polish languages have been updated.

Quantities/Units

Friction normal force
- There is a new sub-quantity Fnf, that is the friction normal force, for the Ball on three plates measuring geometry.

Special quantities for bitumen measurements
- There are two *new* quantities |G*| x sin(δ) and |G*| / sin(δ) available.
- These quantities are sub-quantities of the quantity G.

> **Note** These quantities are disabled by default and must be enabled before they can be used.

DeviceManager

Driver for MARS II
- Under rare circumstances the Rot Ramp element would hang or crash at the beginning or the end of the ramp. Modifications have been made to prevent this.

Plate/Plate geometry
- The effective M-factor for a plate/plate geometry depends on the actual gap between the two plates. The M-factor for any plate/plate geometry as displayed and stored in the DeviceManager is always the M-factor for a gap of 1.0 mm.
  Until now this was not reflected in the geometry editor in the DeviceManager.
  Starting from this version the M-Factor of a a plate/plate geometry is correctly displayed as M.h with the unit ((1/s)/(rad/s)).mm.

> **Note** In the Info/Protocol text of measured data the effective M-factor is displayed.

- With the *new* Single-point correction (ROT: γ, γ̇, τ, N1) option the operator can now activate the calculation of representative values of the strain, shear-rate, shear-stress and first normal stress difference values according to Macosko (the representive value are the rim values multiplied by 0.755). For this the A- and M-Factors are automatically modified.
  When this option is not active the values at the rim of the plates are calculated (as was the case in the past) using the normal A- and M-factors.
  The single-point correction is used for ROT measurements only. For OSC measurements the normal A- and M-factors are used automatically even when ROT and OSC measurement elements are used in one Job.
  When this option is active a corresponding text it is displayed in the Info/Protocol text.
  When this option is active both the normal A- and M-factors and the corrected A- and M- factors are displayed in the Info/Protocol text.

Tribology geometry
- A new geometry with the name TR13 45° of the type Tribology - Ball on three plates is now part of the installation.

Camera settings (MARS I/II/III, MARS40/60, RheoScope 1, Simulator)
- When a specific video format is not available (anymore) the first format in the list is automatically selected. This in order to prevent error message to appear.

JobManager

Data export element
- In the Export ASCII area on the ASCII / Report page of the element editor there is a *new* option Encoding which allows the operator to select either the ANSI (=plain ASCII) or the Unicode format for the exported *.txt file.
- The results of the LVR and Advanced curve discussion element can now be selected for export also.

All measurement elements/Job controller
- Under rare circumstances certain elements would halt a Job. Modifications have been made to prevent this.
- The relative (procentual) option of the freely definable break criteria did not work correctly. This has been solved.
- When the fourth option of the freely definable break criteria is set to "%" instead of the default "---", the value measured at the time set in the fifth option is used as the reference value for the relative break criterium.

All ROT elements and Axial Time element
- These elements now calculate the friction force (Ff), the friction normal force (Fnf) the friction coefficient and the circumfential velocity vR for the Ball on three plates Tribology measuring geometry.

ROT Time curve, ROT Ramp and ROT Step element
- When a Tribology type geometry is selected, the editors of these element are now automatically switched into "tribology mode". In "Tribology mode" the set values are vR (in CR-mode) and Ff (in CS-mode) instead of $\dot{\gamma}$ (in CR-Mode) and τ (in CS-Mode).

All OSC elements
- The *new* quantities $|G^*| \times \sin(\delta)$ and $|G^*| / \sin(\delta)$ are now calculated and saved during every measurement and can also be used as Break criteria in the elements.

JobController
- The display of the job control buttons in the upper left corner of the JobController have been slightly cleaned up.

DataManager

File menu
- The items in the File menu have been reordered in a more logical way.
- All items that relate to a *.rwd file now have the word data in their name.
- There is a *new* item Save data which saves a *.rwd directly (without asking for a new file name).
- The Page submenu has been removed, the five Page menu items are now placed in the file menu itself. The New item has been renamed to New page and is part of the five Page items.

Toolbar
- The buttons in the toolbar have been reordered in a more logical way, in accordance with the file menu.
- There is a new button Save data which saves a *.rwd directly (without asking for a new file name). The toolbar now also contains buttons for all Page related items from the file menu (apart from the Close page item).

Page title
- The title text (caption text) of a page now always starts with the text Page:.

- When a *.rwp page file is loaded the page file name is now displayed with the extension (in previous version the extension was not shown).
- When one or more *.rwd data file(s) are loaded in a new page the name of the first *.rwd file is displayed in the page title which then starts with the text Page (not saved):.

Graph and Table display

Print graph

- When printing a graph from the graph context menu using the Print command the text printed below the graph was not printed correctly. This has been solved.

Save graph

- Saving a graph as a file from the graph context menu did not work when the graph was displayed on the 2nd monitor of a PC with two monitors. This has been solved.

Version 4.82.0001

(Released 01.08.2018)

Below is a list of things that are new and/or changed in version 4.82.0001 compared with version 4.82.0000 of RheoWin.

Installation

Languages

- The translations of some items in the DataManager File menu were missing in certain languages. Those translations have been completed.

Quantities/Units

Special quantities for bitumen measurements

- The two new quantities $|G^*| \times \sin(\delta)$ and $|G^*| / \sin(\delta)$ were not correctly installed. This has been solved.

Version 4.82.0002

(Released 31.08.2018)

Below is a list of things that are new and/or changed in version 4.82.0002 compared with version 4.82.0001 of RheoWin.

DeviceManager

SolidClamp tool

- In version 4.82.0001 both the A- and M-factor for the solid clamp tool were not calculated correctly. This has been solved.

JobManager and DataManager

Structure Recovery Element (Evaluation)

- This element can now also be applied to the data measured using three subsequent OSC Time Curve elements.

Version 4.83.0004

(Released 07.02.2019)

Below is a list of things that are new and/or changed in version 4.83.0004 compared with version 4.82.0002 of RheoWin.

Installation

Languages
- A first version of the russian language translation is now included.

AuditTrail

Data files with a long file name
- Data file names with more than 29 characters caused problems in the AuditTrail. This has been solved.

JobRun program

Command-line parameters
- The command-line parameter option for the Jobrun.exe program (which is used for starting pre-defined Jobs directly, i.e. instead of using JobManager), was not working anymore in the last RheoWin versions. This has been solved.
- The following command-line parameters are available:
  With the command-line parameter /SUBSTANCENAME:**text** the sample name, is set to **text**, just as if it were entered in the Identification dialogue.
  With the command-line parameter /SUBSTANCENUMBER:**text** the sample number, is set to **text**, just as if it were entered in the Identification dialogue.
  With the command-line parameter /COMMENT:**text** the comment, is set to **text**, just as if it were entered in the Identification dialogue.
  With the command-line parameter /DESCRIPTION:**text** the sample descriptionis set to **text**, just as if it were entered in the Identification dialogue.
  The following is a example of how to use this:
  > jobrun.exe "**jobname.rwj**" "/SUBSTANCENAME:**sample name**"
  > "/SUBSTANCENUMBER:**sample number**" "/DESCRIPTION:**description**"

  Please note the use of " " around each command-line parameter to allow for a file-name or a text that contains spaces.
- This feature can be used to start RheoWin Job's directly from within a LIMS or ERP system.

JobManager and DataManager

Job, Data, Pages, Templates explorer
- In the Open dialog which is used for selecting the explorer-tree start directory unreadable characters were displayed under certain circumstances. This has been solved.

Lift Element
- The short texts displayed in the JobControl status field, which inform the operator about the lift status, are now slightly more detailed.

Curve Fit Element
- The calculation of the initial values for the Windhab model has been improved in order to give a better curve fit result.
- The parameter list in the element dialog can now display up to 5 parameters at the same time.

LVR Element
- The underlaying algorithm of the LVR calculation has been improved.
- On the Data/Method/Result page of the element editor there is a *new* edit field Data tolerance. All data point that are outside of the tolerance band defined by this value are ignored during the calculation.

Advanced Curve Discussion Element

- This element can now also calculate the Inflection point of a curve.
- The element dialog has been slightly modified, the five possible calculation methods are now selected from a drop-down list (instead of radio buttons).

DataManager

All evaluation element dialogs

- The commands Recalculate, Calc as new, Delete and Data select are now also available (for each result) in a popup context menu in the result tree on the right hand side of the dialog.
- The selection of multiple results (for deleting only) in the result tree is now possible.
- Deleting a result from the result tree can now also be done using the Delete key on the keyboard.
- The tool-tips in the result tree are now multi-lined (if needed) and therefore now always directly display the complete result of an evaluation.

Graph and Table display

Graph layout dialog and table layout dialog

- These dialogs are now opened notably quicker.
- Clicking the Update button will now redraw/update the active graph or table with any modified setting, without closing the dialog first.

Graph context menu

- In the graph (right mouse key) popup context menu there is a *new* command Show/hide files with a submenu in which all files in the active graph are listed. With this command all curves belonging to a certain file can be removed/added from/to the graph in a more convenient and quicker way then via the Graph layout > Data > Curves > Hide file command.

Version 4.84.0003

(Released 08.05.2019)

Below is a list of things that are new and/or changed in version 4.84.0003 compared with version 4.83.0004 of RheoWin.

JobManager

Manual Control

- The normal force control is now stopped when the lift stop button is clicked.
- Upon closing the manual control window the normal force control is not stopped when it was still active.

Message Element

- The size of the Message element run-time dialog has been increased.
- The Ok button has been replaced with a much larger Continue button.

Export Element

- Data can now be saved in the IUPAC XML format using the Export element also.

LVR Element

- The default value for the tolerance value for the calculation of the plateau value has been changed to 5%.
- Some dialog texts have been modified.

Curve-Fit Element

- Under certain circumstances the element crashed when performing multiple curve-fits on one data curve. This has been solved.

DataManager

Saving a file or page
- When saving a file or page in DataManager in previous versions of RheoWin, a message confirming the correct saving was displayed. This behaviour has been modified, such messages are no longer displayed.

Select file dialog
- The select file dialog which is displayed when using the File > Edit data identification command must now be closed using the Cancel button and will stay open after clicking the Ok button and editing the identification of a file.

Saving in IUPAC XML format
- Under certain circumstances saving in IUPAC XML format did not work correctly. This has been solved.

Graph and Table display

Graph display
- The automatic scaling for logarithmic axes has been improved.

Report

Wrong gap value in report header
- In the header part of a report an incorrect value for the geometry gap was reported. This has been solved. (A patch for version 4.83.0004 for this is available.)

Version 4.85.0000

(Released 03.06.2019)

Below is a list of things that are new and/or changed in version 4.85.0000 compared with version 4.84.0003 of RheoWin.

Installation

MARS iQ and MARS iQ Air rheometers
- The installation program now allows the installation of RheoWin for the *new* MARS iQ and the *new* MARS iQ Air rheometers.
- The "look" of the installation dialog windows has been slightly modernized.

General

Software certificate
- RheoWin now comes with a GlobalSign code signing certificate to prove that:
  1) the HAAKE RheoWin software is legitimate,
  2) the HAAKE RheoWin software comes from a known software vendor
  3) the code has not been tampered with since being published.
- The digital signature is applied to the RheoWin setup.exe file and all RheoWin executable files.
- The digital signature is issued for "Thermo Electron (Karlsruhe) GmbH" as the publisher.

DeviceManager

MARS iQ and MARS iQ Air rheometers
- There are two *new* drivers for the *new* MARS iQ and MARS iQ Air rheometers.
- There are two *new* drivers for the integrated temperature controllers of the *new* MARS iQ and MARS iQ Air rheometers.

All MARS rheometers
- The single-point correction for γ, γ̇, τ and N1 was, incorrectly, applied to CD-OSC data when this option was active. This has been solved.

JobManager

Manual Control
- When the manual control window is closed, the rheometer drive motor was not always stopped correctly. This has been solved.
- The set value for the shear-rate is now recalculated when the gap value is changed.

Lift Element
- The Best angular position option could cause the rotor to rotate when moving to the (gap) trim-position. This has been solved.

CS/CR Rotation Step element
- Under certain circumstances the Break criteria did not work correctly. This has been solved.

Crossover Evaluation element
- The crossover calculation did not work correctly when the select data contained data segments with just one data point. This has been solved.

Curve-fit Evaluation element
- A *new* curve-fit model Casson (Visc)(lin) has been implemented. This two parameter Casson model performs a curve fit on linearized viscosity=f(shear-rate) data.

Graph and Table display

Activating/De-activating data-segments during Job run
- Activating and de-activating a data-segment during a Job run did not work anymore. This has been solved.

Axis title
- When two quantities were selected for the X-axis, the axis title was not displayed correctly. This has been solved.

Version 4.85.0001

(Released 05.07.2019)

Below is a list of things that are new and/or changed in version 4.85.0001 compared with version 4.85.0000 of RheoWin.

Installation

Permissions for certain directories
- The installation program now automatically set the correct permissions for the following directories which are used by RheoWin:

  C:\Users\Public\Documents\Thermo\RheoWin

  and

  C:\ProgramData\Thermo\RheoWin

> **Note** This can and will only work when the Windows user (for example a Windows Administrator) who installs RheoWin has the priviliges to modify these permissions.

JobManager & DataManager

LVR Evaluation element
- Under certain circumstances the calculation of the plateau values did not work correctly. This has been solved.

Version 4.85.0002

(Released 08.07.2019)

Below is a list of things that are new and/or changed in version 4.85.0002 compared with version 4.85.0001 of RheoWin.

JobManager

Temperature calibration module
- The user interface language setting of the JobManager was not transferred to this module, as a consequence this module always used the english language. This has been solved.

Version 4.86.0000

(Released 01.08.2019)

Below is a list of things that are new and/or changed in version 4.86.0000 compared with version 4.85.0002 of RheoWin.

JobManager

Lift element
- When the rheometer drive motor was set to rotate during the lift movement, the rotation was not stopped when finishing the lift movement (MARS iQ only). This has been solved.

Report element
- This element can now also be controlled from the MARS iQ touchscreen panel (Continue button).

Goto element
- The Goto element can now be used to change the value of the set parameter γ or $\dot{\gamma}$ or τ (in CR-Mode) and set parameters f and γ or τ (in OSC-Mode) of the target element by defining an end value for the set parameter (for the Goto loop), by defining how (linear or logarithmic) the set value should be changed and by defining how often the Goto element should be executed. The start value of the set parameter is the value defined in the target element itself.
- Goto-loops can now also be nested (one loop inside another loop).
- The element icon in the list of element in the Job-Editor now shows whether the target element of the Goto element is before (above) or after (below) the Goto element itself.

Show data element
- In the element editor of the Show data (or Pause) element now contains a new option Show all current R_IDxx_Pxx result parameters.
- When this option is activated a list with all current result parameters and their result values will be displayed by this element during Job run.
- For this to work the Show data element should be placed in the Job at a position after all Evaluation elements.
- The list with the current result parameters is meant as a help function, that is for a better understanding of the naming convention of the R_IDx_Py_z result parameter names and for use during the "design/test" phase of a job.
- When the Job is working properly this option should be deactivated.

- An example Job with the name Evaluation-only (12, Math element).rwj containing this feature, is available in the default RheoWin Jobs \\# Examples\10. Evaluation directory.

Math element
- With the *new* Math element calculations can be made with numerical result values of any evaluation element.
- On the Calculation page of the element editor the operator can select and define an equation.
- On the Layout page of the element editor the operator can select how the equation is displayed in the Protocoll/Info window during Job run and in DataManager.
- Currently the Math element contains the following two user definable equations:

  result1 = operand1 operator operand2

  result2 = (operand1 operator1 operand2) operator3 (operand3 operator2 operand4)

  For any operand a numeric value or a result parameter name (R_IDx_Py_z) can be entered. The operator can be selected from a drop-down list. The following (basic) operators are available +, -, x, / and ^.

  This enables the RheoWin operator to use equations like:

  result1 = A + B, result1 = A - B, result1 = A / B, result1 = A x B, result1 = A ^ B

  and

  result2= (A + B) / (C - D), result2 = (A - B) / C, etc.

  with for example A = R_ID8_P02_1 (a result parameter name) or A = 10,5 (a numeric value) etc.
- A practical example for the use of the new Math element is to calculate the quotient of two viscosity values where the two viscosity values are mean values, calculated with the CurveDiscussion element.
- An example Job with the name Evaluation-only (12, Math element).rwj containing this feature, is available in the default RheoWin Jobs \\# Examples\10. Evaluation directory.

> **Note** The Math element is not available in the RheoWin DataManager. The result of the Math element however is stored in the *.rwd data file and displayed in the DataManager Protocol/Info window, but the result is not updated when the evaluation result(s) it is based on are modified/recalculated in DataManager.

All Evaluation elements
- The user defineable text for a QC criterium was not displayed correctly when it contained "special" characters like ü, ö, ä, etc.

Version 4.86.0001

(Released 12.09.2019)

Below is a list of things that are new and/or changed in version 4.86.0001 compared with version 4.86.0000 of RheoWin.

Installation

Default Rheometer and Temperature Controller
- The settings for the default rheometer and temperature controller are now saved/restored when modifying an existing installation.

General

Internet Links in Help Menu
- The internet links in the Help menu have been updated.

JobManager

Save element
- When trying to overwrite a signed file a clear warning message is now displayed.

MultiStep-Element
- The ROT MultiStep-element is now also available for the MARS iQ (Air).

> **Note** The MARS iQ (Air) must be equipped with firmware version V1:01.01.003 or newer.

Version 4.86.0002

(Released 23.10.2019)

Below is a list of things that are new and/or changed in version 4.86.0002 compared with version 4.86.0001 of RheoWin.

Installation

Access database engine installation
- The Microsoft Access database engine installation that part of previous RheoWin versions was corrupted by the installation of Microsoft Office 365. In order to overcome this issue RheoWin now installs and uses the Microsoft Access 2010 database engine.

JobManager and DataManager

Interpolation element and Curve discussion element
- The number format for result values was not correct in some result displays. This has been solved.

Version 4.87.0001

(Released 28.09.2020)

Below is a list of things that are new and/or changed in version 4.87.0001 compared with version 4.86.0002 of RheoWin.

Installation

Languages
- A first version of the Thai language translation is now included.
- A first version of the Italian language translation is now included.

SHRP element and Asphalt/Bitumen software module
- The SHRP evaluation element is now part of the new Asphalt/Bitumen software module and *not* part of the standard installation anymore.
  Customers with a valid RheoWin installation key (issued before 01.01.2021) can request a special installation key (order no. 098-5567) for the SHRP evaluation element at no cost.
- The *new* Asphalt/Bitumen software module consists of the *new* MSCR, the *new* BYET and the *new* LAS evaluation elements as well as the existing SHRP evaluation element.
  A special installation key (order no. 098-5566) is needed to install the Asphalt/Bitumen software module.

General

Loading older electronically signed data files
- Electronically signed RheoWin *.rwd data files from older RheoWin versions could not be opened. This has been solved.

Readme and new file

- The readme.doc and new.doc files have been replaced by the RheoWin_Readme.pdf and RheoWin_New.pdf files in Adobe PDF file format.
- The corresponding items in the Help menu have been slightly changed.

Rheometer drivers

MARS iQ (Air)

- On the Additional data page of the Properties of 'MARS iQ (Air)' dialog a camera can be selected for acquiring images as part of a measurement (just as with any other MARS).

> **Note** The RheoScope module is *not* yet available for the MARS iQ (Air).

- Modifying the IP-adress of a MARS iQ (Air), using the Set IPADDR command on the General page of the Properties of 'MARS iQ (Air)' dialog did not work and resulted in an error message. This has been solved.

MARS I / II / III / 40 / 60

- The drivers of these rheometers are now equipped with two tables, each containing a set of frequency dependent waiting times and numbers of repetitions for oscillation elements. One table is optimized getting high-quality data, the other table is optimized for getting data more quickly. These tables can be selected on the Data acquisition page of all oscillation element editors. These tables are identical for the MARS I, II, III, 40 and 60

MARS iQ (Air)

- The drivers of these rheometers are now equipped with six tables, each containing a set of frequency dependent waiting times and numbers of repetitions for oscillation elements. Three tables, one for each measurement mode, are optimized for getting high-quality data, the other set of three tables is optimized for getting data more quickly. These tables can be selected on the Data acquisition page of all oscillation element editors.
These tables are *not* identical for the MARS iQ and the MARS iQ Air.

Temperature control drivers

MTMC for MARS iQ (Air), MARS 40 / 60

- The temperature offset table can now contain up to 20 offset values.
- Temperature offset tables can now also be defined for all TM-xx-x that are based on liquid temperature control using a circulator. This applies to the TM-LI-P, TM-LI-C (old model), TM-LI-C32 and TM-LI-C48 modules.

> **Note** MARS 40/60 Firmware μP1 50.25.003, μP2 50.23.000 and μP3 65.00.012 or newer is needed for the above two points to work.

> **Note** MARS iQ(Air) Firmware μP1 01.06.003, μP2 01.06.002 and μP3 65.00.012 or newer is needed for he above two points to work.

- The values entered in the table are now checked more stringently. Temperatures values must be in the range of -100 °C to 400 °C, offset values must be in the range of -15 °C to 15 °C.

JobManager

Message element

- Sending an e-mail from the Message element did not work in certain previous RheoWin versions. This has been solved.

> **Note** Currently the Message element can *not* send e-mails via a SMTP server that insists on using SSL authentication. Company network setting may prohibit RheoWin to send e-mails.

Save element

- A Job specific default data directory can now be specified for the Ask for file name option by clicking the corresponding Settings button and selecting the file name in the Ask for file name dialog.
- Several *new* options are now available in the Automatic file name dialog for the Additional part of the automatic file name:
  - A new combined DateTime entry with format YYYYMMDDHHMM.
  - Two additional Free text entries which can be placed anywhere in the file name.
  - The Separator between the entries can now be selected from a list or manually entered.
  - A new option Ask for confirmation before saving allows the operator to decide whether the measured data should be saved or not (using the automatically created file name) at job run time.

Export element

- On the ASCII / Report page of the element editor the Extension of the exported ASCII file can now be defined. Possible extensions are .txt, .csv, .asc and .sqm. The defined extension is used for any ASCII file created by the export element.
- On the *new* ASCII for LIMS page of the element editor the content of the exported ASCII file can now be freely composed by entering any Unicode text and/or inserting certain parameter names and text names.
  - All allowed parameter names and text names are displayed in two popup menus which are accessed from the two buttons below the edit field.
  - The parameter names are also available from the right mouse key context popup menu.
  - The parameter names and text names can be selected from the popup menu and inserted in the edit field at the text cursor position.
  - The parameter names are replaced by the corresponding parameter value when the ASCII file is exported.
  - The text names are replaced by the corresponding text in the currently used language when the ASCII file is exported.
  - Result parameters names R_IDxx_Pyy_z are replaced by the corresponding evaluation element result value, with or without it's unit (when available), when the ASCII file is exported.
  - Tabs can be entered by using the keyboard tab key (the tabs are not visible).
  - To export the contents of the edit field the option Export the following text above the edit field must be activated.
  - To export result values with their unit (when available) the option Show results with unit must be activated.
  - The content of the edit field is exported in addition to what is selected for export on the ASCII / Report page of the element editor.

Rotation time element

- Under certain rare circumstances one data point too few (at the end of the element) was acquired. This has been solved.

All oscillation elements except the frequency sweep element

- On the Data acquisition page in the Single data point settings area of the element editor there are now three options for the Waiting time, # Repetitons.
  These options are:
  Auto: High quality acq. (f-dependent)
  Auto: Fast acq. (f-dependent)
  Manual (same for all f)
  The Manual option corresponds with the previous RheoWin versions. The two *new* Auto options use the tables defined in the rheometer driver.

> **Note** For the Viscotester iQ (Air) only the two Auto options are available.

Oscillation time element

- For the MARS iQ (Air) instruments a limiting maximum torque value for the CD mode can now be defined (just like in the case of all other MARS instruments).

Oscillation frequency sweep element

- On the Data acquisition page in the Single data point settings area of the element editor there are now four options for the Waiting time, # Repetitons.
  These options are:
  Auto: High quality acq. (f-dependent)
  Auto: Fast acq. (f-dependent)
  Auto: User defined (f-dependent)
  Manual (same for all f)
  The Manual option corresponds with the previous RheoWin versions. The first two *new* Auto options use the tables defined in the rheometer driver. The third *new* Auto option uses an user-defined table which is accessed by clicking the Edit button behind the option selection box. This user defined table is saved as part of the RheoWin Job.
- By right clicking (almost) anywhere on the Data acquisition page and then selecting the Repetitions table command from the context menu, a table displaying every frequency with its waiting time and number of repetitions as well as the expected duration of the frequency sweep can be displayed. For the MARS I/II/III/40/60, depending on the mode (CS/CD/CD-AS) and the frequency range, the actual duration may differ from the calculated (expected) duration.

> **Note** For the Viscotester iQ (Air) only the two Auto options are available.

- On the Oscillation page in the Mode area of the element editor there is a *new* option CR. When CR-mode is selected the shear rate amplitude $\dot{\gamma}_0$ is the set parameter. CR-mode in oscillation is basically CD-mode with a non-constant frequency dependent strain amplitude γ_0 according to the equation $\gamma_0 = \dot{\gamma}_0/\omega$.

> **Note** This option is available for the MARS I/III/40/60 instruments only.

- On the page in the Mode area of the element editor there is a *new* option Non const. ampl. when CS or CD is set for the mode.
  When this option is selected both a start and an end value for the stress or strain amplitude can be defined in the stress/strain area of the editor.

> **Note** This option is available for the MARS I/III/40/60 and MARS iQ (Air) instruments only.

- For the MARS iQ (Air) instruments the frequency values can now be defined in the form of a Table of values (just like in the case of all other MARS instruments).

> **Note** Firmware V1: 01.04.000 or newer is needed for this work.

- The maximum number of frequency values in a table has been increased to 310.

Oscillation amplitude sweep element

- For the MARS iQ (Air) instruments the amplitude values can now be defined in the form of a Table of values (just like in the case of all other MARS instruments).

> **Note** Firmware V1 01.04.000 or newer is needed for this work.

- The maximum number of amplitude values in a table has been increased to 310.

Oscillation temperature ramp element

- On the *new* Options page of the element editor there is an *new* option Use ΔT instead of end T. When this option is selected the operator can edit ΔT (ΔT = End T - Start T) instead of End T on the Temperature page of the element editor. This useful when this element is used in a Goto element loop.
- The radio buttons behind Duration and ΔT/t are now always available so that either value can be kept constant when editing a temperature value.
- The value of temperature gradient ΔT/t is now always displayed as ΔT per minute, independent of the unit (ms, s, min, h) selected for the time.
- For the MARS iQ (Air) instruments a limiting maximum torque value for the CD mode can now be defined (just like in the case of all other MARS instruments).

Oscillation temperature steps element

- For the MARS iQ (Air) instruments a limiting maximum torque value for the CD mode can now be defined (just like in the case of all other MARS instruments).
- This element is now also compatible with the MARS iQ (Air) instruments.

> **Note** Firmware V1: 01.04.000 or newer is needed for this work.

Asphalt measurement element

- A *new* measurement element for performing measurements according to
  - ASTM D7405-15, AASHTO T350-19, DIN EN 16659 or FGSV AL DLSR-Prüfung (MSCRT),
  - AASHTO TP 123-16 Method A and B,
  - AASHTO TP 101-12 and AASHTO TP 101-14.
- A special installation key is needed to be able to install this element.

JobManager and DataManager

MSCR evaluation element for asphalt testing

- A *new* evaluation element for evaluating MSCR measurement data according to ASTM D7405-15, AASHTO T350-19, DIN EN 16659 or FGSV AL DLSR-Prüfung (MSCRT).
- A special installation key is needed to be able to install this element.

BYET evaluation element for asphalt testing

- A *new* evaluation element for evaluating measurement data according AASHTO TP 123-16 Method A and B.
- A special installation key is needed to be able to install this element.

LAS evaluation element for asphalt testing
- A *new* evaluation element for evaluating LAS measurement data according to AASHTO TP 101-12 and AASHTO TP 101-14.
- A special installation key is needed to be able to install this element.

Curvefit element
- The calculation of the start parameter values for the Casson curve fit model has been improved.

Area evaluation element
- The editor of this element did not work properly anymore in the last RheoWin versions. This has been solved.

Graph/Table display

Axis scaling
- For values larger than 10^{20} the axis scaling did not work properly. This has been solved.

Range calculator

Parallel plate geometries
- The gap value was always displayed as being 0.0 on the Numerical page. This has been corrected, the correct value is now displayed.
- The sample volume was not correctly displayed on the Numerical page when the gap value differed from the default gap value of 1.0 mm.
- The angular velocity values were not correctly exported to a *.rwd file when the gap value differed from the default gap value of 1.0 mm.

Version 4.87.0002

(Released 22.10.2020)

Below is a list of things that are new and/or changed in version 4.87.0002 compared with version 4.87.0001 of RheoWin.

JobManager and DataManager

MSCR, BYET and LAS evaluation elements for asphalt testing
- Certain internal data plausibility tests were found to be too stringent and have been modified.

Version 4.87.0005

(Released 17.12.2020)

Below is a list of things that are new and/or changed in version 4.87.0005 compared with version 4.87.0002 of RheoWin.

Installation

SHRP element and Asphalt/Bitumen software module
- The SHRP evaluation element is now part of the new Asphalt/Bitumen software module and *not* part of the standard installation anymore.
  Customers with a valid RheoWin installation key (issued before 01.01.2021) can request a special installation key (order no. 098-5567) for the SHRP evaluation element at no cost.

- The *new* Asphalt/Bitumen software module consists of the *new* MSCR, the *new* BYET and the *new* LAS evaluation elements as well as the existing SHRP evaluation element.
  A special installation key (order no. 098-5566) is needed to install the Asphalt/Bitumen software module.

LAS evaluation element

- The LAS element is currently not installed. It will be available again in a future RheoWin version.

Example and template files

- There are 21 new Job example job files in subdirectories of the `\# Examples\06. Measurements according to standards` directory. This includes Job for various ASTM, AASHTO, DIN and FGSV bitumen (asphalt) standards as well Jobs for the DIN 54458 and DIN 17408 standards.

Rheometer drivers

MARS iQ (Air)

- The rotation settings (torque or angular velocity) in the element following a rotation ramp element did not work correctly. This has been solved.

JobManager

Axial Ramp element

- When the Data acquisition > Distribtuion was set to Log there was an 1 s delay for the first datapoint. This has been solved.

JobManager and DataManager

MSCR evaluation element

- In the Numerical group box on the *new* Layout page of the element editor the user can now select which numerical values will be included in the result information text.
- In the Numerical group box on the *new* Layout page of the element editor the user can now select whether the Parameter symbol and/or the Parameter name (as used in the corresponding standard) is included in the result information text.
- The intermediate result values of the MSCR calculation can now be optionally saved in a *.csv file. To activate this option the following line(s) of text must added to the element.ini file:
  `[MSCR]`
  `ExportIntermediateResults=On`

BYET evaluation element

- In the Numerical group box on the *new* Layout page of the element editor the user can now select which numerical values will be included in the result information text.
- The quantity selection on the QC page of the element editor was not correct. This has been solved.

Report templates

Excel export

- In the `ExcelExport_TableOnly.LST` template the table header was missing. This has been solved.
- There is a new template `ExcelExport_Table+FileName.LST` which exports the currently defined table including the table header plus the name of the *.rwd file.
- All `ExcelExport*.LST` templates files now produce an Excel file in which the table values are formatted as (custom) numbers and not as text anymore.

MSCR, BYET and LAS evaluation elements for asphalt testing

- There are new variables available for use in report templates for the three new elements.

Version 4.87.0006

(Released 18.01.2021)

Below is a list of things that are new and/or changed in version 4.87.0006 compared with version 4.87.0005 of RheoWin.

Installation

Asphalt/Bitumen software module

- The Asphalt/Bitumen module is now automatically installed when using the 098-5019 general installation key.

Rheometer drivers

All VTiQ and MARS rheometers

- Under certain circumstances oscillation measurements did not work correctly with version 4.87.0005 This has been solved.

JobManager

All OSC elements

- Under certain circumstances oscillation measurements did not work correctly with version 4.87.0005 This has been solved.

Version 4.87.0009

(Released 29.03.2021)

Below is a list of things that are new and/or changed in version 4.87.0009 compared with version 4.87.0006 of RheoWin.

Installation

Language file

- Text entries for the new Bitumen evaluation elements were missing. This has been solved.

Example Jobs and templates

- The following new examples Jobs and template files are now part of the installation:
  - 76 new Jobs according to several ASTM, AASHTO, DIN and FGSV standards.
  - 13 new report templates files used by the above mentioned Jobs.
  - 24 new graph and report template files used by the above mentioned Jobs.
  - Several new "Media" files (images and videos) used by the above mentioned Jobs.

  The Job files are stored in the RheoWin `Jobs > # Examples > 06. Measurements according to standards > Asphalt Binder and Bitumen Tests` directory which is directly accessible from the RheoWin **Element/Job/Template explorer** in RheoWin JobManager.

General

Audit Trail

- When the HAAKE RheoWin software can not access the HAAKE RheoWin Audit Trail database file, for whatever reason, any information that is to be stored in the audit trail database file is stored in a temporary text file instead and a warning message `Error write AuditTrail! Please call you administrator` is displayed. At this point the operator should close RheoWin and restore the connection between HAAKE RheoWin and the HAAKE RheoWin Audit Trail data base file before using HAAKE RheoWin again.
  When the connection is restored and HAAKE RheoWin is started again, RheoWin will automatically transfer all audit trail entries that were stored in the temporary file to the audit trail database file and delete the temporary file.
  During this transfer process certain audit trail entries were not transferred correctly, resulting in erroneous (incomprehensible) entries in the audit trail database. This has been solved.

Rheometer drivers

MARS iQ (Air)

- When two (or more) rheometers were connected to and controlled by one instance of RheoWin at the same time, starting a RheoWin Job from the touchscreen of one rheometer would instantaneously stop any already running RheoWin Job controlling any other rheometer. This has been solved.
- When the JobList Editor was opened when a Job was running (on any rheometer connected to RheoWin) the Job was stopped instantaneously. This has been solved.
- The text displayed in several menus, on the MARS iQ (Air) touchscreen, when a RheoWin Job is running, has been improved and is now more informative.
- By tapping the Continue button on the MARS iQ (Air) touschscreen it was possible to bypass entering sample information in a mandatory field of the identification dialog. This has been solved.

JobManager

JobEditor

- When two (or more) rheometers were connected to and controlled by one instance of RheoWin at the same time, the Job Controller windows (in which the graph and table are displayed) of all Jobs were automatically placed at exactly the same position on the screen, and thus exactly on top of each other, making all windows but the last opened window invisible. In order to prevent this, the position of the Job Controller window can now be selected from the *new* Windows position list on the General page of the Display dialog. The Display dialog is opened by clicking on the Display button in the JobEditor.
- When two (or more) rheometers were connected to and controlled by one instance of RheoWin at the same time, all message and dialog windows of all Jobs, opened while the Job is running, were displayed with exactly the same window title bar text, making it impossible to know which window belongs to which Job (or rheometer). By activating the *new* Show rheometer in title option on the General page of the Display dialog, the rheometer name will be displayed in the title bar of all windows, thus making the windows distinguishable.

> **Note** These message and dialog windows are still automatically placed on top of each other, making some of the windows invisible at first.

ROT Multi-Step element

- The Multi-Step element now calculates and stores the quantity J(t), that is the compliance, as part of the measurement data.

OSC Temperature Step element

- Under certain circumstances the data acquisition started before a stationary temperature value was reached. This has been solved.

JobManager and DataManager

Thixotropy evaluation element

- Under certain circumstances the Thixotropy element would crash. This has been solved.

SHRP evaluation element

- In the element editor the texts that are displayed as part of the elements evaluation results can now be edited.
- In the SHRP evaluation results the characters "-m" behind sin(δ) are not displayed anymore.

Report templates

New variables

- There are four new variables which can be used in any report template:
  The variable `SensorDiameter` which is replaced in the report by the language dependent word "Diameter".
  The variable `VariableSensorDiameter` which is replaced in the report by the numeric value of the diameter of the measuring geometry. The diameter value is always displayed in mm.
  The variable `SetTemp` which is replaced in the report by the language dependent words "Set temperature".
  The variable `SetTemp_Id`x which is replaced in the report by the numeric value of the set temperature in the measuring element with ID x. The element ID number x can have a value between 2 and 50. The temperature value is displayed using the currently selected physical unit (that is °C or °f or K).

Version 4.87.0015

(Released 20.09.2021)

Below is a list of things that are new and/or changed in version 4.87.0015 compared with version 4.87.0010 of RheoWin.

Rheometer drivers

MARS iQ (Air)

- The handling of torque overload and angular velocity overload messages from the instrument has been modified.

JobManager

Save Element

- Under certain circumstances "strange" characters were displayed in the edit field of the (Windows) File save dialog. This has been solved.

Message element - MARS iQ (Air) only
- Under certain circumstances the command triggered by tapping the Continue button on the MARS iQ (Air) touchscreen was not properly handled by the Message element. This has been solved.

OSC Frequency Sweep element
- When a torque overload message is received from the instrument, the job will now stop the element and continue with the next element in the Job.
- Under certain circumstances two data points at 0.1 Hz were measured and saved, instead of one. This has been solved.

OSC Amplitude Sweep element
- When a torque overload message is received from the instrument, the job will now stop the element and continue with the next element in the Job.

OSC Temperature Step element - MARS iQ (Air) only
- The data acquisition (number of waiting periods and number repetitions for each data point) was not correctly executed for every data point. This has been solved.

OSC Temperature Ramp element
- The set value for the ramp end temperature was not saved when switching between the various pages in the element editor. This has been solved.

JobManager and DataManager

Creep analysis element
- The result of the calculation of the slope $d(\log(\gamma))/d(\log(t))$ was incorrectly reported as $d(\log(\dot{\gamma}))/d(\log(t))$. This has been solved.

Version 4.87.0018

(Released 18.10.2021)

Below is a list of things that are new and/or changed in version 4.87.0018 compared with version 4.87.0015 of RheoWin.

Installation

Example Jobs and templates
- Certain Asphalt Binder and Bitumen Tests example Jobs have been updated.

Disposable plate geometries
- The D P15/Al + Adapter Px disposable plate geometry has been added to the list of geometries.
- The inertia values of all D Pxx/Al geometries has been slightly adjusted.

JobManager

JobList for the MARS iQ (Air)
- By activating the **JobList for all users** option in the JobList editor dialog, all RheoWin users can use the same JobList on the MARS iQ (Air) touchscreen.

Snapshot
- Under certain circumstances the Report output of the Snapshot test did not work correctly or crashed. This has been solved.

Temperature Calibration tool
- The Temperature Calibration (software) tool has been updated, it is now possible to control the rheometer lift from within the tool.

Version 4.88.0000

(Released 18.01.2022)

Below is a list of things that are new and/or changed in version 4.88.0000 compared with version 4.87.0018 of RheoWin.

Installation

Example Jobs and templates
- Certain examples job and data files were not compatible with RheoWin versions 4.87.00xx and 4.88.00xx and have been removed.

Rheometer drivers

MARS iQ Air
- In order to improve the data quality, the number of waiting periods and repetitions for frequencies in the range of 0.07 Hz < f < 5 Hz has been changed (increased). In order for this to work firmware V1 version 0.1.10.000 or higher is needed.

MARS iQ (Air)
- After switching the instrument off and on again, without restarting RheoWin, starting a Job from the MARS iQ (Air) touchscreen did not work. This has been solved.

Device Manager

Handling of Connect Assist Adapter
- When an Adapter, with a certain serial number which is already present in the list of geometries but with a different name, is detected, the previous instance of that adapter (with another name) in the list is replaced by the new one.

JobManager

MultiWave Element
- Under certain circumstances the MultiWave element did not work properly. This has been solved.

Reference element
- The Reference element has been completely rewritten. The element editor now has the same layout as all other evaluation elements including a QC page.
- The Reference element can placed in a job before and/or after measurement elements. When it is placed before the measurement elements, the element can only display the tolerance band. When it is placed after a measurement element it can also determine how many data points are within the tolerance band.
- The (upper and lower) tolerance band curves and the reference file curve can be selected to be displayed separately.
- The (upper and lower) tolerance band curves can now also be defined by loading two reference files, one for the upper band and one for the lower band.
- By activating the Check if data within band option the element will determine how many of the measured data points are (not) within the tolerance band (and the defined x-range).
- The numbers resulting from the Check if data within band option can be used as a QC criteria.
- The two *new* example job files
  ```
  Evaluation-only (13, Reference, 1 ref.file+ref.band).rwj
  ```
  and
  ```
  Evaluation-only (14, Reference, 2 ref.files).rwj
  ```
  illustrate the new functionality.

DataManager

Reference evaluation
- The Reference element is now also available as an analysis function in DataManager.

Temperature offset calibration tool

Exported temperature offset table
- A temperature offset table (that is a .tot file) exported by the Temperature offset calibration tool could not be imported by the DeviceManager. This has been solved.

Version 4.88.0001

(Released 16.02.2022)

Below is a list of things that are new and/or changed in version 4.88.0001 compared with version 4.88.0000 of RheoWin.

Installation

Template update process
- The template/example update process at the end of the installation has been modified. As a result a Windows system message window is now displayed.
  When being asked, select to copy/overwrite all existing example files.

Measuring geometries
- The C25 1°/Ti cone/plate geometry has been added to the list of geometries.

JobManager

Monitor/Manual control
- The privilege setting for the Monitor/Manual control window (in the UserManagementSystem) was ignored. This has been solved.

Oscillation Elements
- Under certain (very rare) circumstances all oscillation elements produced a `Domain error` message. This has been solved.
- Under certain circumstances activating/deactivating the **Take from previous** options did not work correctly. This has been solved.

Version 4.88.0002

(Released 19.07.2022)

Below is a list of things that are new and/or changed in version 4.88.0002 compared with version 4.88.0001 of RheoWin.

DeviceManager / Device Drivers

VT iQ (Air) Temperature controller
- The values entered in the temperature offset table are now checked more stringently. Temperatures values must be in the range of -100 °C to 400 °C, offset values must be in the range of -15 °C to 15 °C.

Measuring geometries
- The BC68 5°/Ti BiCone rotor with ConnectAssist coupling for interfacial rheology was not correctly handled by RheoWin. That has been solved.

JobManager

Set Element

- Under certain circumstances using the Nano offset determination option for the MARS 1, MARS 3, MARS 40 and MARS 60 resulted in wrong data in subsequent measurement elements. This has been solved.

Version 4.9x.00xx

> **Note** Version 4.91.0000 is the first officially released 4.9x.00xx version.

Version 4.91.0000

(Released 25.01.2023)

Below is a list of things that are new and/or changed in version 4.91.0000 compared with version 4.88.0002 of RheoWin.

Installation

Language file

- For the English language the texts "Substance" and "Substance name" or "Name" (for the sample identification) have been replaced by "Sample" and "Sample name" respectively. This is visible in the Identification / Notes dialog, the Identification / Notes element editor, the Automatic filename dialog, the Preferences dialog, etc. This change has no impact on a generated automatic file name.

Example Job files

- There are now six directories with pre-defined (measurement) Jobs for each of the current rheometer models (MARS 40, MARS 60, MARS iQ, MARS iQ Air, VT iQ, VT iQ Air). Each directory contains multiple sub-directories with Jobs which are optimized for a specific rheometer model and are ready to be used.
- The example data evaluation Jobs are now found in the sub-directory `08. Data evaluation`.
- There is *new* sub-group (sub-directory) `09. Data export` with six new example Jobs which show how the ASCII for LIMS export functionality in the Export element can be used.

Quantities and Units

- The following new (sub)quanties have been added: log(aT) for WLF TTS curve-fitting, $\dot{\gamma}$-eff and τ-eff (for DIN 51810 Part 4), $\dot{\gamma}$-CM and τ-CM and η-CM for the Cox-Merz transformation, σ-n for tack measurements.
- A new quantity group TTS shift has been added.
- The units gf, kgf, dyne and kN have been added to the Force quantity.

Drivers

All MARS and Viscostester iQ

- The IP address scanning function has been improved. The scanning function now displays intermediate status messages and the response time of the scanning function is shorter.

MARS iQ and Viscostester iQ

- The firmware updater functionality has been improved and was adapted to the larger firmware file sizes.

Temperature Control simulator

- A *new* driver Simulator T (the driver filename is MeasSimT.dll) is now part of every RheoWin installation. This driver simulates a temperature control device. Basically the only thing it does is returning the set temperature value as the measured temperature. The noise level of the "measured" temperature signal can be modified using an entry in the `drivers.ini` file.

UserManager

Multiple logons

- Starting and logging-on into JobManager or DataManager using the Logon dialog while JobManager and/or DataManager was already running could cause problems with the Audit-Trail regarding the recording of the logged in user. This has been solved.

JobManager

Identification / Notes dialog

- In the Identification / Notes dialog (in the JobEditor) the operator now has the option to define the Sample name and Sample no edit fields as Select from list only fields. When this option is activated the operator can *not* enter a new text in the edit field, but only select an existing text from the list.
- The following dialog texts can now be edited by the operator; Sample, Sample name, Sample no, Description, Company, Operator and Comment. These texts can be modified in the User defined language text dialog which is accessed by clicking on the dialog text itself.

> **Note** Modifying a certain text in a certain dialog will also change that text in any other dialog that uses exactly the same text.

> **Note** The (language dependent) modified texts are stored in the file `User.lng` in the directory `C:\ProgramData\Thermo\RheoWin\Language`.
> The contents of the file `LanguageKey.ini`, in the `C:\Program Files (x86)\Thermo\RheoWin` directory, defines which RheoWin dialog texts can be modified.

Identification element

- The options in the element editor are now displayed in the same order as the pages in the Identification/ Notes dialog.

Lift element

- A waiting time can now be defined for the Trim position.
- In the Zero point area of the element editor there is a new option Reset normal force which can be used to reset the normal force signal to 0.0 N. This option can be activated when either the Move lift apart or the Go to standby position at option is activated.

Set element

- The different pages of the element editor have been cleaned-up.
- The CR/CD-Mode page of the element editor has been split-up into two pages, the CR mode page and CD mode page, with separate control loop settings for each mode. The settings on the two pages can not be activated at the same time, this because only one parameter-set can be sent to and used by the rheometer control loop at the same time.

> **IMPORTANT** The CR mode settings should not be used before any oscillation element and the CD mode settings should not be used before any rotation element in the job sequence.

Export element

- A separate path (directory) can now be selected for the exported file.

- For export to Excel the Excel format can now be selected by selecting the corresponding file extension (.xls or .xlsx). The extension .xls corresponds with the format of Excel 2003 and older. The extension .xlsx corresponds with the format of Excel 2007 and newer.
- For any export to ASCII, the file extension .xml can now be selected, this is mainly for use with the ASCII for LIMS export functionality.

> **IMPORTANT** This selection does *not* change the file format in any way, it only changes the file extension.

- The file extensions .csv, .asc, .sqm and .xml are now also available in the file select dialogs on the File name page of the element editor.
- In the ASCII for LIMS edit field any line starting with C_FTO will only be exported (written) when the export file is written for the fist time.
  The example Job files in the sub-group (sub- directory) 09. Data export show how this feature can be used.
- The *new* example Job files Export results (1, ..).rwj, Export results (2, ..).rwj and Export results (3, ..).rwj demonstrate how to export an Excel compatible .csv file, which can be opened with Excel directly.
  This format can be used for exporting the results of multiple Job runs (of the same Job) into one result file.
- The *new* example Job file Export results (4, Excel XML file with Append).rwj demonstrates how to export an Excel compatible .xml file, which can be opened with Excel directly.
  This format offers more editing possibilities as a simple .csv file. Note that the contents of the file must *strictly* follow the Excel XML format.
  See here https://en.wikipedia.org/wiki/Microsoft_Office_XML_formats for more information.
  This format can also be used for exporting the results of multiple Job runs (of the same Job) into one result file. RheoWin will automatically maintain the correct Excel XML file format when appending Excel XML text.
- There are no empty lines at the end of the export file anymore.
- The Rheometer serial number is now available as a parameter name in the ASCII for LIMS edit field.
- The definition of the Job elements as displayed in the Job-Editor is now available as a parameter name in two different versions in the ASCII for LIMS edit field. There is a parameter for the definition of all elements in the Job and a parameter for the definition of the measurement elements only.

Message Element
- On the Screen message page of the element editor there is a *new* option Insert message text in report text. When this option is activated the message text is copied into the selected MessageLine**x** (with $1 \leq$ **x** ≤ 5) report template variable. The MessageLine**x** variables can be used in any report template.
  This new option enables the operator to individually compose the result text of any evaluation element in a report by using R_IDx_Pyy_z result parameters in the message text.

Export Element and Message Element
- In the text exported/displayed by these two elements the parameter name CU_Qxxx is replaced by the current unit of the selected quantity.
- In the text exported/displayed by these two elements the parameter name QN_Qxxx_y is replaced by the name of the selected (sub)quantity.
- In the text exported/displayed by these two elements the parameter name QS_Qxxx_y is replaced by the symbol of the selected (sub)quantity.

- In the above mentioned parameter names CU_Qxxx_y, QN_Qxxx_y and QS_Qxxx_y, CU stands for Current Unit, QN for quantity name, QS for quantity symbol, Q für Quantity, xxx is the RheoWin internal number of a quantity, and y the RheoWin internal number of the sub-quantity.

> **IMPORTANT** The quantity number *must* be written using three digits, that means that the quantity number 1 must be written as 001, the quantity number 17 must be written as 017, etc.. The subquantity numbers must *not* be written using leading 0's.

The RheoWin internal quantity and sub-quantity numbers can be found in the **Configuration > Quantities/Units > Edit > General > Quantity #** edit field for any quantity and the **Configuration > Quantities/Units > Edit > Subquantity > Edit > Subquantity #** edit field for any sub-quantity (of a quantity).

OSC Frequency Sweep element
- In the Shear stress/Strain/Shear rate area on the Oscillation page of the element editor a R_IDx_Pyy_z result parameter name can now be entered in the edit fields for the Shear stress/Strain/Shear rate amplitude value.
- On the Temperature page of the element editor a R_IDx_Pyy_z result parameter name can now be entered in the edit field for the temperature value.

> **Note** When during Job runtime the R_IDx_Pyy_z result parameter contains a value that is not within the allowed range for the corresponding set value, the Job is stopped.

All OSC elements
- All OSC elements now calculate two new quantities $\dot{\gamma}$-eff and τ-eff for each data point.
  $\dot{\gamma}$-eff = 0.71 $\dot{\gamma}$ and τ-eff = 0.71 τ are the effective (or root mean square) values of the amplitudes of $\dot{\gamma}$ and τ as defined in DIN 51810 Part4.
  In DIN 51810 Part 4 these values are used to evaluate the results of an OSC amplitude sweep measurement.
- In all OSC elements the shear-rate amplitude, defined as $\dot{\gamma} = \gamma \omega$, is now calculated for each data point.

All Evaluation Elements with QC functionality
- Under certain circumstances evaluation elements could crash when not using the default English user interface language. This has been solved.

Curve Discussion, Interpolation and SHRP evaluation elements
- In the Segment area on the Select data page of the element editors there is a new option Last segment only. When this option is activated, only the data measured by the last measurement element (that is the last data segment) is used for the evaluation routine.

> **Note** The Last segment only option is meant for use in a Goto loop only.

Math element
- There are now 4 instead of 2 equations in the Math element, that is two equations with two operands and two equations with four operands.
- A unary operator can now be applied to each of the operands. The following unary operators can be selected from drop-down lists: (none,) sqr, cube, sqrt, invers, 10^, e^, log, ln, abs, sin, cos, tan, arcsin, arccos, arctan, ↓decade, ↑decade, round.
  (The two decade functions respectively return the lower and upper full decade relative to the operand value. Two examples: ↓decade(83) = 10, ↑decade(26) = 100.)
- For any binary operator the user can now select no operator. By selecting no operator for a binary operator, parts of the equation can be "disabled" and will then be hidden (not visible).

- The result of one of the first three equations can now be used in one of the following equations by entering R1, R2 or R3 for an operand.

> **Note** The four equations are always calculated in the same top-down order. That means that the result R1 of the first equation can be used in equation 2, 3 and 4, etc., but that, for example the result R3 of equation 3 can not be used in equation 2 and that the result of equation 4 can not be used in any other equation..

JobManager and DataManager

Preferences Dialog

- The Preferences dialog has been cleaned-up. On the General page the position of some items has been modified.

Units Dialog

- The Select unit context popup menu of the main Units dialog has been slightly modified.
- The edit dialog for a quantity and the edit dialog for a sub-quantity have been slightly modified and now both use the same nomenclature.

Curve-Fit element

- A curve-fit can now also be performed using an y-axis range (instead of a x-axis range).
- There is a now *new* curve fit model WLF TTS (lin) for fitting the WLF equation
  $\log(aT) = -c_1(T-T_0)/(c_2-T-T_0)$ to $\log(aT) = f$ (T-shift) data.
  The curve fit is performed on linearized data. The parameter T_0 is not a real fit parameter and can not be influenced by the operator, like the parameters c_1 and c_2.

Advanced Curve Discussion element

- The tangent method now offers the option to calculate the tangent of a curve at a certain x-axis value. Previously the tangent could only be calculated over a certain x-axis range consisting of two x-axis values.
  The x-axis value can be entered as a numeric value or as a R_IDx_Pyy_z result parameter name. The two *new* example Job files
  `Evaluation-only (15, AdvancedCurveDiscussion with R_IDx_Py).rwj`
  and
  `Evaluation-only (16, AdvancedCurveDiscussion with R_IDx_Py).rwj`
  illustrate this new functionality.
- The Percentage of reference value method now offers the following four *new* sub-methods for defining the reference value:
  y Value at x= , the y-axis value at a certain x-axis value,
  y Value, a certain y-axis value,
  y Mean value for x < , the mean value of all y-axis values for x < a certain x-axis value,
  y Mean value for x > , the mean value of all y-axis values for x > a certain x-axis value.
  The x and y values can be entered as a numeric value or as a R_IDx_Pyy_z result parameter name.

LVR element

- In the editor of the LVR element the user can now select to Calculate LVR based on the quantity |G*|.
- On the *new* QC page in the element editor, the user can now define quality control (good/bad) criteria for the calculated values.

Area element

- In the editor of the Area element the user can now select whether the Area above the X-axis, the Area below the X-axis or the complete Area is to be calculated.

Reference element

- The reference element can now display a reference curve and a tolerance band based on a constant (y-axis) value. In this case the reference curve is a straight line parallel to the x-axis.

DataManager

Main program

- Under certain circumstances DataManager would repsonse very slowly or even crash when they are many data files in the default data directories. This has been solved.

Modify/Transform/Add data

- There is *new* item Modify/Transform/Add data in the File menu, with a sub-menu with four new commands. Using these commands data can be modified, transformed or added to the (selected) data file in a a page. A note about the modification is saved in the Notes text of the data file.
- The four *new* commands are:
  - Add to OSC data: $\dot{\gamma}$, $\dot{\gamma}$-eff, τ-eff (DIN 51810-4)
    Using this command the shear rate amplitude ($\dot{\gamma} = \gamma\,\omega$) and two effective values ($\dot{\gamma}$-eff = 0.71 $\dot{\gamma}$ and τ-eff = 0.71 τ) according to DIN 51810 Part 4 are calculated and added to any OSC data segment. The new data is automatically saved in the selected file.
  - Add to OSC data: $\dot{\gamma}$-CM, τ-CM, η-CM (Cox-Merz)
    Using this command a shear rate ($\dot{\gamma}$-CM = ω), viscosity (η-CM = $|\eta^*|$) and shear stress (τ-CM == η-CM $\dot{\gamma}$-CM) value according to the Cox-Merz rule are calculated and saved for any OSC frequency sweep data segment. The new data is automatically saved in the selected file.
  - Add to data: σ-n
    Using this command a normal stress value σ-n = Fn/A (Fn is normal force, A is the horizontal Area of the upper part of the measuring geometry) is calculated and added to any data segment which included normal force data. The new data is automatically saved in the selected file.
  - Apply/remove parallel plate Single-point correction to ROT data: γ, $\dot{\gamma}$, τ, N_1
    Using this command the Single-point correction (according to Macosko) for ROT data measured with a parallel plate geometry can be applied to or removed from any ROT data segment. The recalculated data is automatically saved in a new file with _mod added to the original file name (and in the same directory). The new file is automatically loaded and added to the active page.

TTS evaluation

- The TTS function now automatically calculates and saves the value log(aT) in the result file.

Merge & Mean evaluation

- A completely *new* Merge & Mean evaluation routine is now available in DataManager.
  This evaluation routine offers two (related) functions:
  1) Multiple RheoWin data files can be merged into one new data file.
  2) The mean of multiple RheoWin data file can be calculated and stored in one new data file
- Both the merging and the mean value calculation are applied to all available data, that is not just to the displayed curve(s), using the quantity displayed on the x-axis as the reference.
- During merging all data points are copied from the selected files into the result file individually. Note that for data points that have exactly (!) the same x-axis value only one mean value is added to the result file.
- For calculating the mean value of several files the data points in those files do *not* need to have the same x-axis value. For data points within a certain x-axis value demarcation one mean data point is calculated, for such a resulting data point both the x-axis and the y-axis is a mean value.
  For linear equidistant data points it is recommended to use an Absolute x-value demarcation, for logarithmic equidistant data point it is recommended to use a Relative x-value demarcation.
  The Absolute / Relative option is set automatically depending on the lin/log scaling of the x-axis.

- On the Layout/Options page the operator can select whether the resulting data file is displayed automatically in the current page, a new page or not displayed.

Reports templates

New variables
- There are five new variables MessageLine**x** (with $1 \leq$ **x** ≤ 5) which can be used in any report template.
The contents of these variables are (optionally) created and saved by the Message element.

Graph / Table display

Graph symbols
- The **Data > Layout > Symbol > Style** property (filled, emtpy, empty+dot) was not always saved and restored properly. This has been solved.

Version 4.91.0011

(Released 20.04.2023)

Below is a list of things that are new and/or changed in version 4.91.0011 compared with version 4.91.0000 of RheoWin.

Installation

Example Job files
- The example job and data files have been updated and extended.

Quantities and Units
- The following new sub-quantities have been added: f-rel-3+5 and M-rel-3+5.
- The following new quantity has been added: ∑nonlin.

Drivers

Viscotester iQ (Air), MARS iQ (Air)
- The values of two *new* operation-hour counters are now displayed in the Diagnosis window. One counter counts the hours the instrument was powered-on, the other counts the hours during which the instrument was running a Job (measurement).
The current operation-hour values are stored in every RheoWin *.rwd data file.

> **Note** For the Viscotester iQ (Air) firmware V1 01.07.000 or higher, and for the MARS iQ (Air) firmware V1 01.16.000 or higher, is needed for the counters to be available.

MARS iQ (Air)
- The smallest accepted angle value (for CD-OSC measurements) is now 1 μrad.

JobRun

Job launch
- Under certain circumstances launching a Job, using a link to a Job file or by double clicking a Job file, did not work correctly. The Jobrun.exe program would crash. This has been solved.

JobManager

Snapshot
- The Snapshot function could not be used for the MARS iQ (Air). This has been solved.

Device Toolbar
- The set temperature value on the device toolbar is now updated (within a certain time interval) during a Job run.

Job/Template explorer
- The privileges (as defined in the User Management System) for deleting, renaming, moving, etc. Job and Template files were not respected. This has been corrected.

Geometry recognition
- The geometry recognition logic for not correctly recognized geometries has been improved.

JobController and Monitor Window
- The handling of device initialisation errors has been improved.

ROT Steps element (Stationary flow curve)
- Under certain circumstances the display of the temperature and segment time in the JobController windows was not correct. This has been solved.

ROT Ramp element
- The maximum shear rate (angular velocity) value was rounded in an unpractical way. This has been improved.

ROT Ramp element and Creep element
- In the Shear stress/Shear rate area on the Rotation page of the element editor a R_IDx_Pyy_z result parameter name can now be entered in the edit fields for the Shear stress/Shear rate values.
- On the Temperature page of the element editor a R_IDx_Pyy_z result parameter name can now be entered in the edit field for the temperature value.

> **Note** When during Job runtime the R_IDx_Pyy_z result parameter contains a value that is not within the allowed range for the corresponding set value, the Job is stopped.

OSC Frequency Sweep element
- The option Non-const. ampl. is now disabled when the Table option is activated for the Frequency values.
- The Table option for the Frequency values did not work for the MARS iQ (Air). This has been solved.

All OSC elements
- All OSC elements now calculate and save the (sub)quantities φ-rel-3+5, M-rel-3+5 and ∑nonlin which are defined as follows:
  φ-rel-3+5 = φ-rel-3 + φ-rel-5 ,
  M-rel-3+5 = M-rel-3 + M-rel-5 ,
  ∑nonlin = φ-rel-3+5 + M-rel-3+5 ,
  These values quantify the non-linearity of the OSC angle and torque sine-wave signals and can be used as a break-criteria during a measurement.

> **Note** These quantities are only available for the MARS 40 and MARS 60 and only after RheoWin has communicated at least once with the rheometer.

SER Time Test element
- The Density value that can be entered on the Temperature page of the element editor was not handled and saved correctly. This has been solved.

Multiwave element
- Under certain circumstances the Multiwave element used the wrong set value for the stress amplitude. This has been solved.

Curve Discussion element

- Instead of (useless) numerical values in the Result table on the Data/Method/Result page of the element editor, the R_IDx_Pyy_z result parameter names for each of the defined results are now displayed.

Advanced Curve Discussion and LVR evaluation elements

- While hovering the mouse pointer over the check-box items in the Numerical/Text area of the Layout page, a tool tip will now display the R_IDx_Pyy_z result parameter name for the result value.

Math element

- Under certain circumstances the handling of the input and output result values was not correct. The values were not read/saved using the correct unit. This has been solved.

JobManager and DataManager

Protocol/Info

- The values of the two *new* operation-hour counters are displayed in the Job information area (at right hand side of the graph/table).

Curve Fit element

- In the Graphical area on the Layout page of the element editor there is a new option Show in legend. When this option is deactivated the curve fit line and model name will not be displayed in the graph legend.
- Under certain circumstances the Range min and max values were rounded in an unpractical way. This has been improved.

Curve Discussion element

- When a Method is selected/deselected (in the Method list), the method is now automatically displayed in, respectively removed, from the Result list.

Creep analysis element

- The element editor would crash when changing a Symbol size on the Layout Page. This has been solved.

Advanced Curve Discussion element

- The Tangent intercept method now offers the option to calculate the y- or x-value of a point on the tangent line for any x-axis resp. y-axis value.
  The x-axis and y-axis values can be entered as a numeric value or as a R_IDx_Pyy_z result parameter name in the Numerical area on the Layout page of the element editor.

Reference element

- The reference element can now optionally calculate the X- and/or Y-values of the first and the last data point which is within the tolerance band. These options can be activated in the Numerical/Text area on the Layout page of the element editor.
- Under certain circumstances the display and handling of result values was not correct. The values were not displayed using the correct unit. This has been solved.
- Under certain circumstances the Reference curve was not displayed correctly in the graph. This has been solved.

SHRP, BYET, MSCR and LAS elements

- These elements could be used even when they were not installed. This has been changed.

DataManager

Structure Recovery element

- Selecting data for this element was not possible. This has been solved.

Merge & Mean evaluation
- Applying other data analysis routines to the data file saved by the Merge & Mean analysis routine was not possible. This has been solved.

Range calculator

Numerical range page
- The length value of the rotor of a concentric cylinder geometry was not displayed correctly. This has been solved.

Temperature Calibration program

New functionality
- A fixed duration for the temperature steps can now be defined. The time measurement for this duration is started when the measured TM-xx-x temperature is within an user definable range around the set temperature value.
- The measured data can now be saved in a RheoWin.rwd data file for further analysis.
- At the end of the calibration the graph will now display the data measured for all temperatures.

Version 4.91.0021

(Released 17.08.2023)

Below is a list of things that are new and/or changed in version 4.91.0021 compared with version 4.91.0011 of RheoWin.

Installation

New option Tribology
- In order to be able to use the new measuring geometries for Tribology and the corresponding RheoWin features the *new* Tribology option (order no. 098-5082) must be installed.
- This option is automatically installed when using the installation key 098-5019 for all instruments (this key is for Thermo internal use only).

Example Job files
- The example job and data files have been updated and extended.

Quantities and Units
- The following new sub-quantities have been added: The sliding distance S_d, a quantity used in Tribology.
- The following new quantity has been added: The Hershey number H_e, a dimensionless quantity used in Tribology.

DeviceManager / Device drivers

VT iQ and VT iQ Air (redesigned versions)
- Reading temperature Offset tables from the instrument did not work correctly, this has been solved.

Measuring Geometries
- RheoWin is now compatible with the 5 new Tribology geometry types:
  - TR 13 B3P, ball on 3 plates,
  - TR 13 B3D, ball on 3 discs,
  - TR 13 B3B, ball on 3 balls,
  - TR 12 3BP, 3 balls on plate,
  - TR xx RP, ring on plate, xx stands for various different ring diameter.

- RheoWin ist now compatible with the new Solid Clamps Cylindrical SCU1-7 C-O/SS geometry type.

JobManager

Monitor/Manual control window
- Under certain rare circumstances the Monitor/Manual control window would freeze. This has been solved.

JobEditor
- The 5 new Tribology rotor types are based on the new Tribology Connect Assist adapter. This adapter and thus the Tribology rotors are handled in the JobEditor like all other ConnectAssist adapters.
- When a Tribology rotor is detected the operator can enter a viscosity value which is needed for the calculation of the Hershey number.
- When the Solid Clamps Cylindrical rotor SCU1-7 C-O/SS is detected the operator can enter the diameter value of the sample.

Tribology in measurement elements
- The calculation of tribological relevant measurement data is currently implemented in the following ROT measurement elements:
  - Rotation Time curve
  - Rotation Ramp
  - Rotation Stepped-Ramp
  - Rotation Temperature Ramp
  - Rotation Temperature Stepped-Ramp
- When a Tribology type geometry is selected, the editors of these element automatically switch into "tribology mode". In "Tribology mode" the set values are the circumfential velocity vR (in CR-mode) and the friction force Ff (in CS-mode) instead of $\dot{\gamma}$ (in CR-Mode) and τ (in CS-Mode).

Set element
- For the MARS 40 and MARS 60 the CR mode control settings and the CD mode control settings are now send to the instrument separately as two sets of parameters and can thus both be used in one Job.

> **Note** Firmware version μP2 (Box DSP) 50.24.000 or higher, is needed for this to work.

ROT Time, OSC Time, OSC Temperature Ramp, OSC Temperature Steps elements
- In the editors of these elements the Extern page containing the Trigger functionality is now also available for the MARS iQ and MARS iQ Air.

OSC Frequency Sweep element
- In the VT iQ (Air) the OSC Frequency sweep with a linear frequency distribution did not work. This has been solved.

OSC elements
- For the MARS iQ and MARS iQ Air the start of the OSC elements was optimized.

MultiWave element
- Under certain circumstances the Multiwave element did not work correctly, this has been solved.

Curve fit element
- The min and max values for the x range, in the Range area of the Select data page, can now be entered as R_IDx_Pyy_z result parameter names.
- While hovering the mouse pointer over the Name and Value list items in the Parameter area of the Layout page, a tool tip will now display the R_IDx_Pyy_z result parameter name for the result value.

- The the X at Y=0 value and the three Y at X= values are now also available as R_IDx_Pyy_z result parameter.
- While hovering the mouse pointer over the X at Y=0 and the three Y at X= items in the Numerical area of the Layout page, a tool tip will now display the R_IDx_Pyy_z result parameter name for those result values.

Interpolation element

- The min and max values for the x range, in the Range area of the Select data page of the element editor, can now be entered as R_IDx_Pyy_z result parameter names.
- The values in the first column of the Quantities + Result table on the Data/Method/Result page can now be entered as R_IDx_Pyy_z result parameter names.
- Instead of (useless) numerical values in the Quantities + Result table on the Data/Method/Result page of the element editor, the R_IDx_Pyy_z result parameter names for each of the defined results are now displayed.

Curve Discussion element

- The R_IDx_Py_z parameter names for the Mean value calculation were not correct and have been modified. Under circumstances it may be necessary to adapt existing Jobs accordingly.

Advanced Curve Discussion element

- For the Tangent intercept method the Range min and max values for the two Tangents can now be entered as a numeric value or as a R_IDx_Pyy_z result parameter name.

Crossover element

- While hovering the mouse pointer over the check-box items in the Numerical area and the Specials area of the Layout page, a tool tip will now display the R_IDx_Pyy_z result parameter name for the result value.

Math element

- While hovering the mouse pointer over the Result name edit fields on the Calculation page of the element editor, a tool tip will now display the R_IDx_Pyy_z result parameter name for the result value.
- The R_IDx_Py result parameter names of the Math element itself can now also be used in the Operand edit fields (as far as the internal element logic allows).

DataManager

Modify/Transform/Add data

- There is new function Add to ROTdata: Hershey number (Triboloy)
  Using this command the Hershey number He can be calculated for existing Tribology measurement data. The operator is asked for the viscosity value which is needed for the calculation. The new data is automatically saved in the selected file.

Mean&Merge evaluation

- The button for loading a graph template on the Layout/Options page was not functional. This has been solved.

Spectra calculation

- The settings used for the Spectra calculation are now displayed in the Protocoll/Info window.

MWD calculation

- The displayed result values of Me and Mc were wrong by a factor of 1000. This has been corrected.

Reports templates

MessageLine variables

- The MessageLine**x** (with 1 ≤ **x** ≤ 5) variables for report templates did not work in an evaluation-only Job where data is loaded into the Job by the File load element.
  This has been solved.

Temperature Calibration program

New version

- Some bugs were fix in the new version 2.1.0.22 which is part of this RheoWin version.