AlphaTack Plus

Precision Tack Measuring Instrument

Owners Manual

Operation Manual

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1. AlphaTack Plus Highlights

The AlphaTack Plus instrument allows quick tack determination of printing inks with a high degree of accuracy and reproducibility. Due to its closely controlled test conditions the AlphaTack Plus methodology offers significant advantages over the usual tack testing methods. The AlphaTack Plus provides a problem-solving approach to measuring pure tack (QC), ink length, tack stability vs. time, vs. temperature, vs. line force and offers a practical and consistent solution to commonly encountered problems of splitting ink films.

The AlphaTack Plus is a new, innovative tack measurement instrument. It features a fully automated system, providing accurate results under controlled conditions.

Features:

- operator independent, fully automated measuring system
- stable measurements over the lifetime of the instrument
- accurate, reliable and easy to operate
- cost savings through minimal labour time and accurate measurements
- automated, embedded ink film dispensing unit
- internal, liquid free temperature control for high reliability and energy saving
- temperature controlled rollers (metal and elastomer)
- provides compatible tack numbers with previous tack measuring instruments
- automatic tack and temperature calibration
- no balance or manual dispensing tools required
- cleans in just a few seconds
- space saving, compact design
- easily transported by one person
- ideal for use outside of the laboratory

2. Importance of tack measurement in the printing ink industry

2.1. What is tack?

Tack is a measure of the forces required to split a single film into two. In case of ink, such film splitting is influenced by rheological and adhesive ink properties and the internal cohesion of the ink.

Tack depends heavily on the ink formulation. Inks must be formulated to optimize the quality of printing and minimize undesired effects in the printing process, such as substrate rupture or coating pick-up, web contamination, dot gain, poor setting, loss of gloss, loss of color density etc. that can be caused by too high or too low tack.

When tack is too high it is hard to separate the paper from the printing blanket or when it is too low the ink does not transfer properly down the inking roller chain. A major influence on ink tack has the vehicle system used for the formulation, so that good tack properties of vehicles are crucial for good performance of litho inks on the press.

Tack is a critical issue in the lithographic process and tack is relevant to all stages of distribution or transfer in the printing process. Therefore, accurate tack measurements are essential for a good performance of ink on the press.

2.2. How to measure ink tack?

Conventional instruments being developed to measure tack all rely on the same principle of measuring the force exerted on a measuring roller that is positioned on the ink film of a driven roller. This method suffers various disadvantages due to the fact that the result of both compression and splitting forces are measured.

In addition to this, different manufacturers of tackmeters have established their own arbitrary scales, so that it is difficult to compare the results of tack measurements of an instrument from "manufacturer A" with the ones from a "manufacturer B". Even comparability of measurement results of instruments from a single manufacturer is difficult, mainly due to the fact that different viscoelastic properties of the measuring elastomer roller and the wear of bearings causing differences in tack reading. The AlphaTack Plus test method is a breakthrough in tack measuring technology by elimination of errors caused by these effects.

2.3. Principle of AlphaTack measurement

Tack measurements usually provide a tack value which includes the film splitting force combined with contributions from the elastomer roller elasticity, ball bearing friction and forces for ink film formation.

Owing to its innovative technical design the AlphaTack Plus overcomes all the principle-based difficulties of the usual tack measuring method. A solid state force sensor is embedded seamlessly into the surface of driving metal roller. This sensor measures the complete pressure profile in the roller nip and transfers this data to the PC after each nip passage.

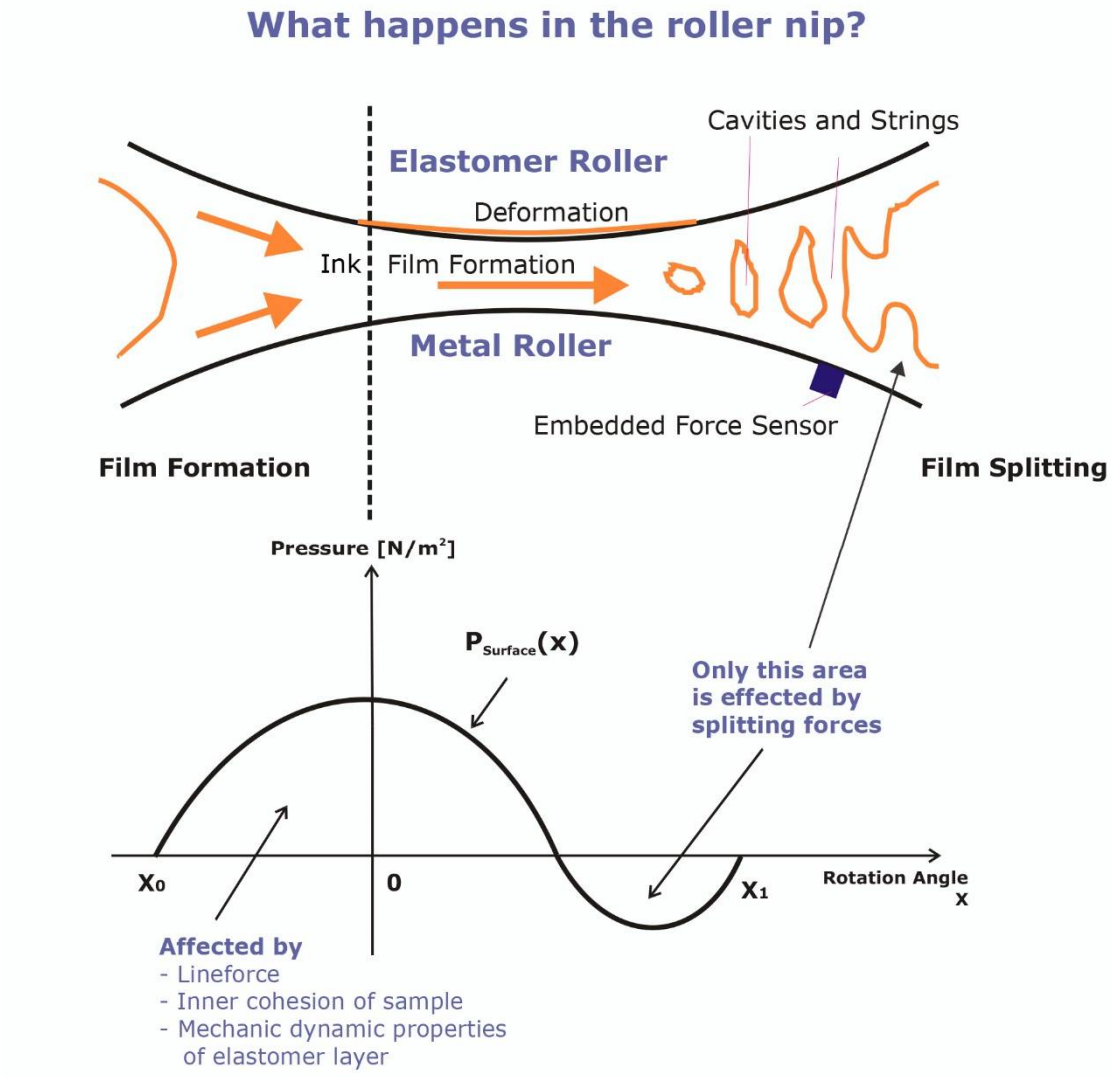

What happens in the roller nip?
Cavities and Strings
Elastomer Roller
Deformation
Ink
Film Formation
Metal Roller
Embedded Force Sensor
Film Formation
Film Splitting
Pressure [N/m²]
P Surface (x)
Only this area
is effected by
splitting forces
X0
0
X1
Rotation Angle
x
Affected by
- Lineforce
- Inner cohesion of sample
- Mechanic dynamic properties
of elastomer layer

Figure 1

The measuring software considers only the negative parts of the pressure profile, which represent the pure splitting force in the vertical direction. The summarized parameter is called LineTack [N/m] and expresses the pure force for film splitting based on SI units. Consequently factors like variations of elastomer roller elasticity or ball bearing friction are eliminated and do not influence the test results anymore. That's why the AlphaTack Plus provides uniquely accurate and reproducible measurements over the lifetime of the instrument.

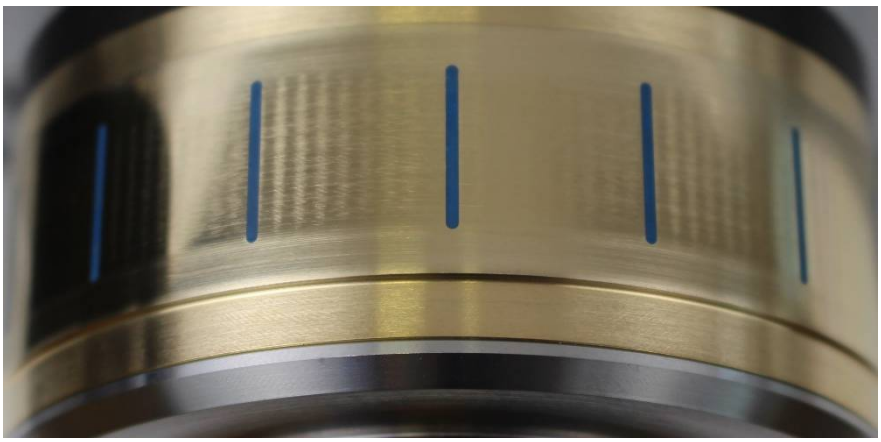


Figure 2, the blue stripes sense the surface pressure profil in real time

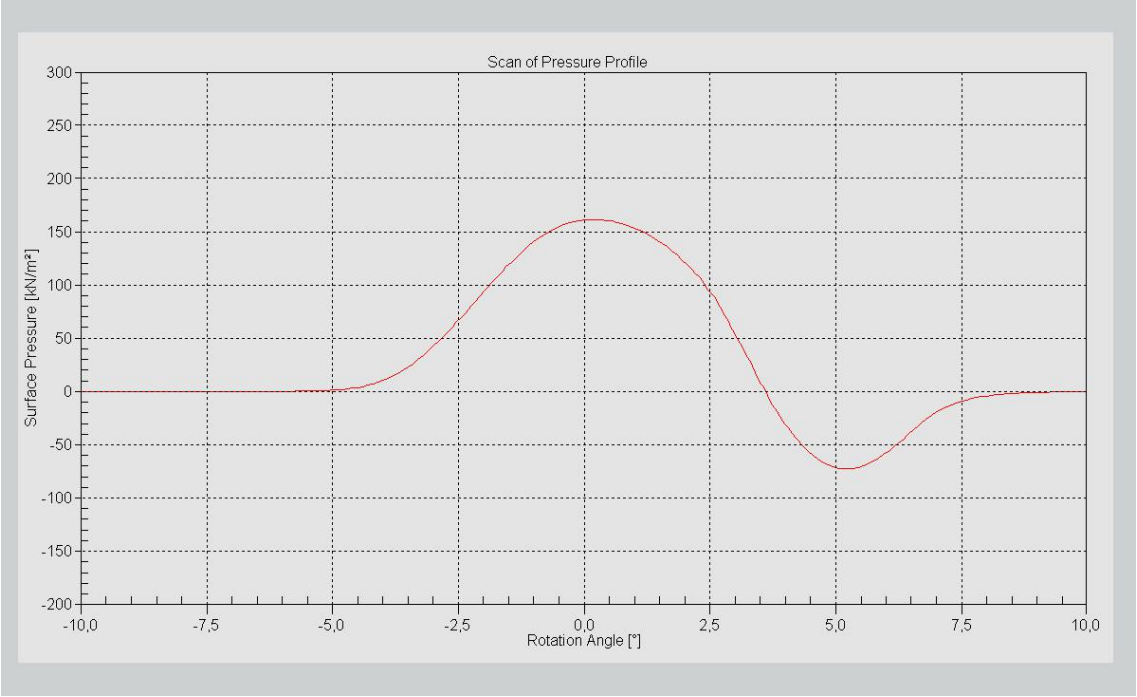


Figure 3, surface pressure profile scanned every roller turn

2.4. Principle of temperature control

The correct and stable temperature setting is one of the key factors for reproducible and accurate measuring results. A deviation of one degree in temperature may lead to a deviation in tack to five percent or more.

The AlphaTack Plus controls metal and elastomer roller temperature independently of each other but at same set temperature. Platinum temperature probes are placed inside the rollers close to their surface. So the nip temperature is stabilized with accuracy better than 0.1 °C. The AlphaTack Plus active heating and cooling systems are encapsulated in the rollers and operate without liquids for high reliability. Compared to water bath only a fracture of electrical energy is consumed, essentially lowering operational costs during the instruments lifetime.

Why does the AlphaTack Plus stabilize the elastomer roller temperature?

Controlling only the metal roller may lead to deviations of nip temperature. Measurements have shown that the yielding nip temperature is determined approximately 70 % by metal surface and 30 % by elastomer surface. So the temperature of elastomer roller affects essentially the accuracy of tack measurement.

Consequently the AlphaTack Plus has no specific warming up period. For example, after switching on the roller temperatures are stabilized exactly at 30.0 °C in less than 3 minutes.

Because of these short response times the AlphaTack Plus can vary the nip temperature during a measurement in defined manner too. So also specific measurements like tack stability vs. temperature can be performed easily.

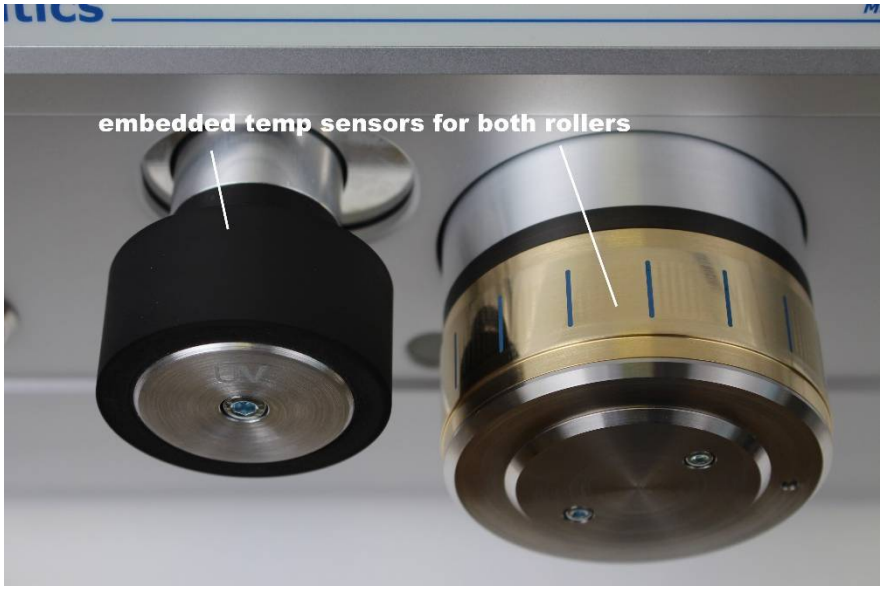


Figure 4, both rollers are temperature controlled separately

External water baths or closed cycle cooler are thermally inert and demand extra space and energy. The AlphaTack Plus controls their temperatures by modern Peltier devices usable for heating and cooling. The AlphaTack Plus needs no water bath and operates without any cooling fluids.

3. Getting Started

3.1. Safety Precautions

Read this note before the instrument will be taken into operation!

- Before connecting the AlphaTack Plus instrument the power supply:
- Ensure that the MAINS switch at the rear panel is in off position.
- Ensure that the power voltage of your mains socket corresponds with the power voltage of the instrument.
- Ensure that the power cable plug is connected only to a power socket that has a protective earth contact. This applies equally, if an extension cable is used: the cable must contain an earth conductor!
- To effect grounding of the instrument case, the power plug must be inserted before connections are made to a computer and balance. The power plug must remain connected until all other units have been connected or disconnected.
- Any interruption of the ground connection (inside or outside the instrument) is prohibited.
- The instrument must be disconnected from all voltage sources before it is opened for any adjustment, replacement or repair. The manufacturer does not take any responsibility for any adjustments, maintenance by the user. Consult NOVOMATICS, if repairs are necessary.

Whenever it is likely that the safety of the instrument has been impaired, it should be made inoperative and secured against any unintended operation. Safety could be impaired if:

- Any case or cable shows visible damage.
- The instrument fails to perform the intended operation.
- It has been subjected to prolong under unfavorable storage conditions.
- It has been subjected to severe transport stress.
- When the instrument will be taken into operation or during operation:
- Don't touch the rollers; touching the rollers may lead to injuries of skin or hair.
- Protect your hairs by a hairnet or something similar, if your head may be located near to the rotating rollers. Unprotected hairs or hairs may lead to injuries of the head if the instrument is not switched off immediately.

- Use glasses to protect your eyes when the sample under test will be observed, as ink particles may lead to injuries of the eyes.

3.2. Advanced safety function for AlphaTack HS (High Speed)

The AlphaTack HS supports roller speeds up to 450 m/min. For protecting the operators coming in any touch with these fast turning rollers the AlphaTack HS is equipped with ultrasonic proximity switch for instant roller stop.

A periodic peep sounds as soon as there any object closer than 40 cm in front of the rollers. In case the distance is shorten down to 30 cm the rollers and so also the test stops within one second.

Washing is possible without any limitation since elastomer roller is separated from metal roller.

Figure 5 shows proximity switch on front side

4. Installation

4.1. Software installations

There are two packages needed for instrument operation. Before starting make sure that the instrument is off and the instrument cable is not connected to the computer.

4.1.1. Installation of WinAlphaTACK software from flash drive

1. Insert the flash drive
2. Start the program {flash drive}:\winalphatacksetup.exe manually
3. Follow the default adjustments by pressing Next
4. Note, the USB driver installation is part of installation process

4.1.2. Installation of WinAlphaTACK software from Internet

1. Visit: http://www.novomatics.de/downloads/
2. Login in with username and password
3. New users please fill out the registration request to receive login details
4. Download winalphatacksetup.exe

   After downloading from Novomatics server start the program winalphatacksetup.exe manually

   Follow the default adjustments by pressing Next

   Note, the USB driver installation is part of installation process

You may see a message from ‘User Access Control’ asking ‘Do you want to allow this app to make changes to your PC? If so, click yes to continue.

Press the Extract button. Follow all installation including license terms agreement acceptance shown and the driver will be automatically installed. From a legal point of view, the user must accept the license terms of the driver. Successful installation is shown in Figure 7 wizard.

Figure 6 Driver Installation Completion

4.2. Setting up the AlphaTack Plus

Place the instrument on a heavy and stable table that is usable for weights of more than 50 kg. Additionally the table should not be sensitive for resonance that can be affected by vibrations of the instrument.

For reproducible tack results it is essential that the AlphaTack Plus has to be surrounded completely with air of same temperature. Don't exposure the unit the direct influence of air conditions and/or heating.

Don't place any electronic devices on top of the instrument. Because the top is warmed up by inner electrical devices the self-cooling of a device placed on top is not granted, so that malfunctions of this device are possible.

4.2.1. Instrument cables and connections

The AlphaTack Plus measuring system needs only a main cable and a USB cable. If any damage is detected exchange the hose/cable before the instrument is taken in further operation. In case of doubt contact your supplier or Novomatics (please refer to 54).

4.2.1.1. Mains cable

Please only use cable from the manufacturer. These are tested and delivered in mechanical stable version. Your socket must have a secure, electrical ground connection.

4.2.1.2. USB cable

Please only use cable from the manufacturer. These are tested and delivered in mechanical stable version.

4.2.1.3. Switching on the AlphaTack Plus, Start of WinAlphaTack

The AlphaTack Plus can be switched on, if all connections to the instrument are made. In the instrument display serial number, software version and operation time are shown.

Start WinAlphaTack now. The connection to the AlphaTack Plus is made automatically. You indicate a fine connection when several instrument instructions are output within the communication window on lower frame edge.

After installation and before a first test is started several adjustments must be proven because they can be changed during transport.

5. Start of a first tack measurement

The WinAlphaTack computer software supports the operator in data evaluation, curve overlays, automatic creation of measurement reports, data transfer to other programs etc.

Open the dialog Measurement/AlphaTack Plus Sample Preparation... Enter sample names and correct sample weight. Eventually you add a comment, which is saved for later evaluation within the result file.

5.1. Sample settings

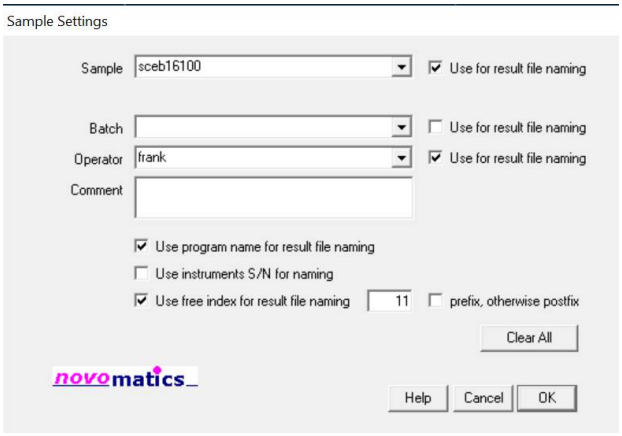


Figure 7

Please select program standard within the upper toolbar.

5.2. Program settings

Open the dialog measurement\programs … for checking the program settings. The WinAlphaTack software provides a maximum of flexibility for creating own measuring programs.

5.2.1. General settings

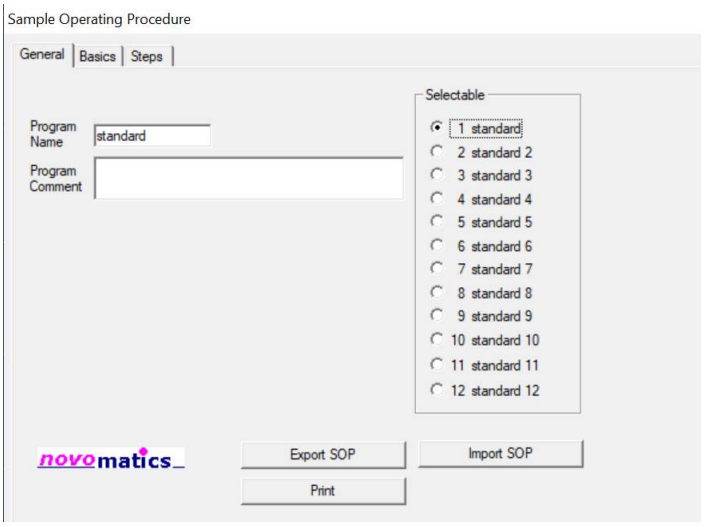


Figure 8

5.2.2. Basic settings

For advanced testing conditions please press Basic tab in this dialog. Define sample volume, manner of ink film creation, temperature stabilization conditions within this dialog.

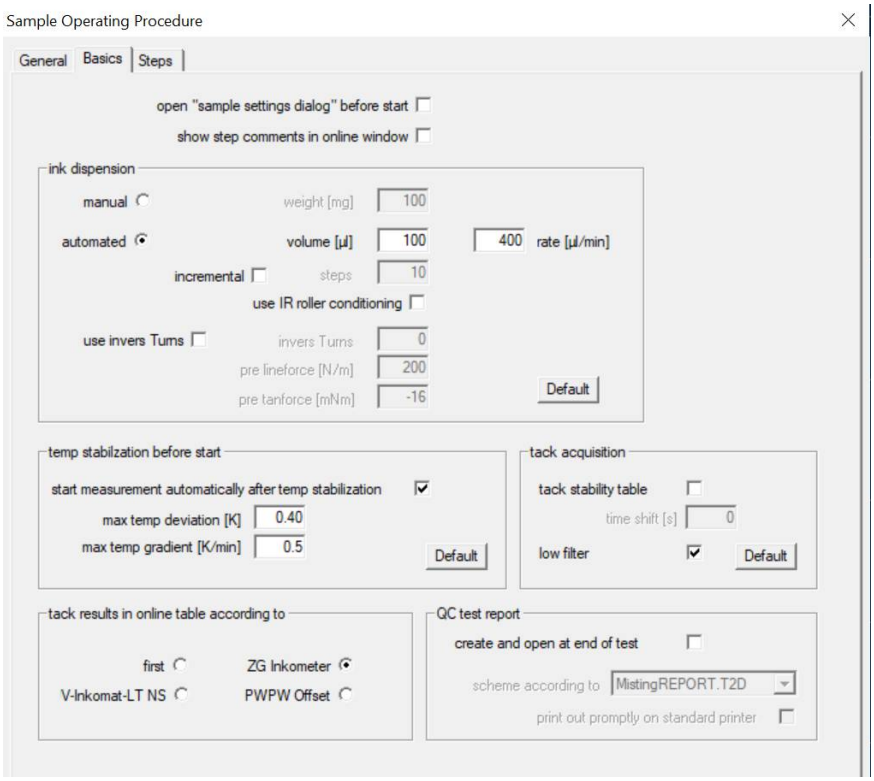


Figure 9

5.2.3. Program steps

The program run can be checked and modified at Measurement/Programs/Steps.

The program is organized in steps. For every step the parameter can be set separately. Usually the temperature should not be changed within a measuring program, so please set all temperature set point to the equal value.

For adding new steps at list end use the add button. For inserting steps after list selection use the insert button. For deleting steps use the remove button. Press change for taking over changed values into step press change button.

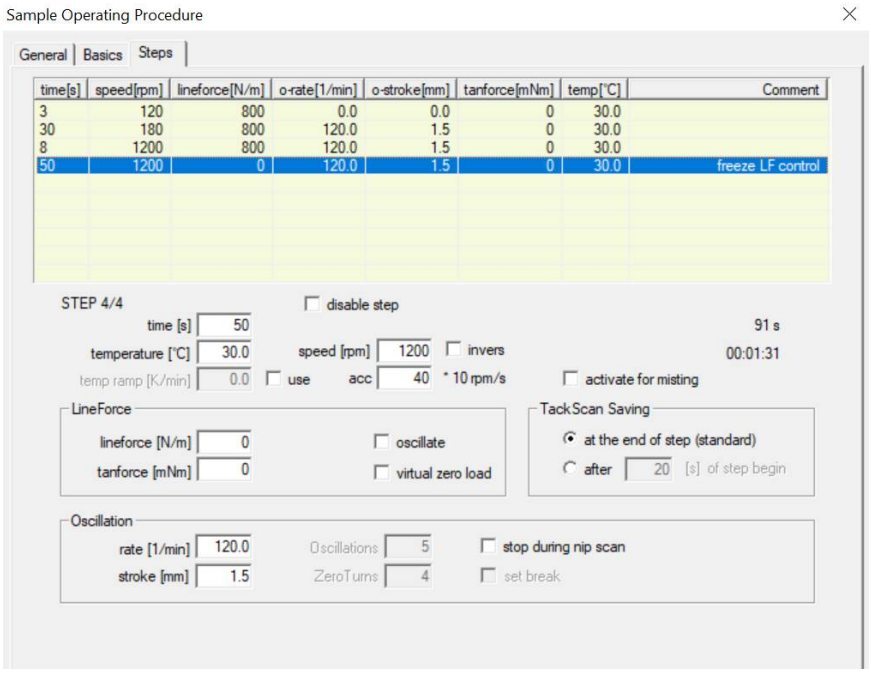


Figure 10

5.3. Automatic ink dispenser

Manual ink dispensing units for tack tests based on piston-tube design are known from lab practice. The AlphaTack Plus has been equipped with a similar but embedded, automated ink dispensing unit.

The setting volume can be defined within the basic program settings. The standard volume is 100 µl resulting a film thickness of approx. 10 µm.

Manual ink dispensing units for tack tests based on piston-tube design are known from lab practice. The AlphaTack Plus has been equipped with a similar but embedded, automated ink dispensing unit. Its dispensing volume is defined indirectly via the film thickness parameter of the selected measuring program.

Before the measurement is started the operator fills up the ink with a small smooth spatula to its upper edge.

During the first seconds of test the ink is continuously dispensed and in cooperation with the oscillating elastomer roller a reproducible ink film is created.

The ink dispensing unit does not require attention for cleaning. It is cleaned during the roller cleaning process.

When filled remove surplus ink by a small piece of sharp-edged cardboard
Move in direction like shown

The ink-filled dispenser should be on same surface level like surrounding metal.

There should be no hill or valley.

Remove remaining ink by a dry cleaning cloth.

6. Cleaning

6.1. Rapid cleaning

The small ink contaminated surface requires only a minimum of cleaning time. After test the instrument is in stand-by for starting the wash.

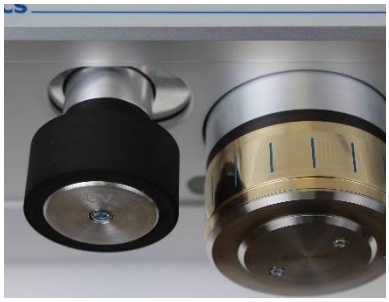
Start the wash just by turning the elastomer slightly. At best with cleaning cloth wetted already with cleaning agent.

Because small amount of required solvent and short cleaning time the operators are only in minimal contact with solvent.

Start wash by turning the rubber slightly with cleaning cloth

Proceed with metal or rubber roller

Wash the other roller



Finished

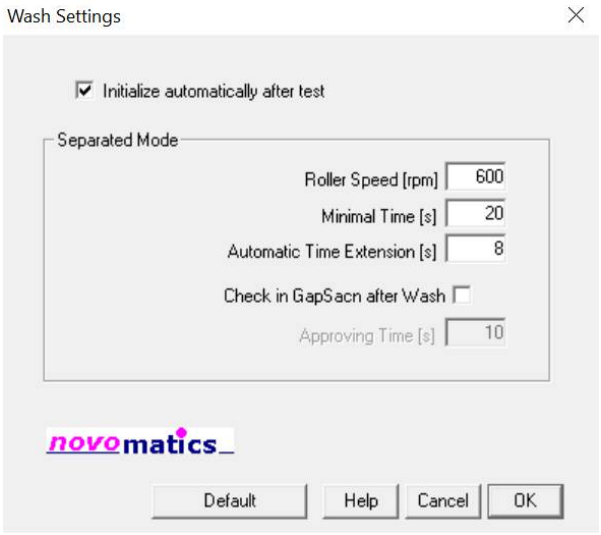


Figure 11

Refer to Instruments\Wash Settings … for modification of **Wash Settings**.

6.2. AlphaTack Plus instrument case

The instrument is made of stainless steel or anodized aluminum parts only that are usually compatible with standard cleaning solvents like acetone or IPA. Take care not to clean the elastomer roller with it. The force sensor within the metal roller is made of ceramics and is compatible to standard cleaning solvents, too.

6.3. Cleaning agents

For best tack reproducibility the cleaning agents are not allowed to have non-evaporating ingredients like surfactants or salts.

For conventional roller cleaning it is highly recommended to use simply petroleum benzine.

For UV Inks a mixture of ethanol and ethyl acetate has been proved to be successful, like:

Wash Up W907, Art.-No.: W907-K042, 25 kgs can

Supplier:
Zeller+Gmelin GmbH & Co. KG, Schlossstraße 20,73054 Eislingen, Germany
Phone: ++49 7161 802 0, www.zeller-gmelin.de

WIPEX Special cleaning rag, white
Viscose-Fleece-Rag, approx. 75g/mý, 29 x 38 cms
Solvent-consistent, 400 rags
Product-No.: 1504305

Supplier:
FINCKE-Hygiene Fachgroßhandel OHG,In der Florinskaul 8, 56218 Mülheim-Kärlich, Germany
Phone: ++49 261-2 40 41, www.fincke-hygiene.de

7. Data evaluation

7.1. Principles of data saving

WinAlphaTack saves all measured data within a measuring files with the extension *.res. During a test all relevant data are saved within the file {install path}\last.res. After the test you are requested entering a name for data saving within a separate file. The file name is suggested by the sample name you entered before.

Independent on this the measured data can be saved manually by pressing File/Save Online As… and entering you new file name. This has to be done before a next test is initialized; otherwise the measured data are lost.

7.2. Loading result into results diagraphs

Open a new result window by pressing Window\New Result\Process. Press the right mouse button over it and press Content… Select one more measuring files which have to be inserted into this diagraph. Please note that the complete diagraph (axes, colors, content) can be saved by pressing File\Save and reloaded by pressing File\Open Diagram… or File\Recent Diagrams.

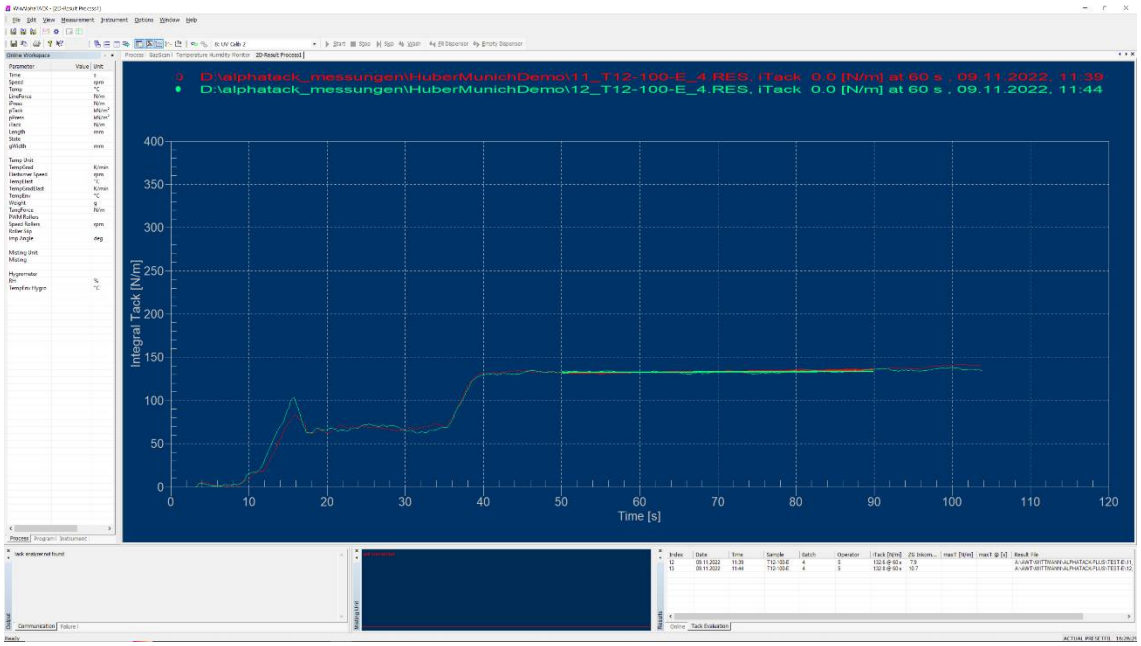


Figure 12

7.3. Measuring reports

WinAlphaTack contains a reporting interface to MS Word. A mask file (standard: {install path}\repmaskalpha1.dot) is filled automatically with measuring relevant data and saved using the name of the measuring file but with the extension *.doc.

Usually MS Word should be started before creating a report. Than there are three ways creating a report file. Firstly the operator is requested doing it at the end of test. Secondly it is possible within the Content dialog of a result window (see picture above). Thirdly press File\Create Reports… for the selection of one or more result files for report creation. Please note that older reports of same file will be overwritten.

Select tackreport.t2d and the result file to be reported.

Press right mouse button and than Content … for modifications.

Press right mouse button too for printing copying etc.

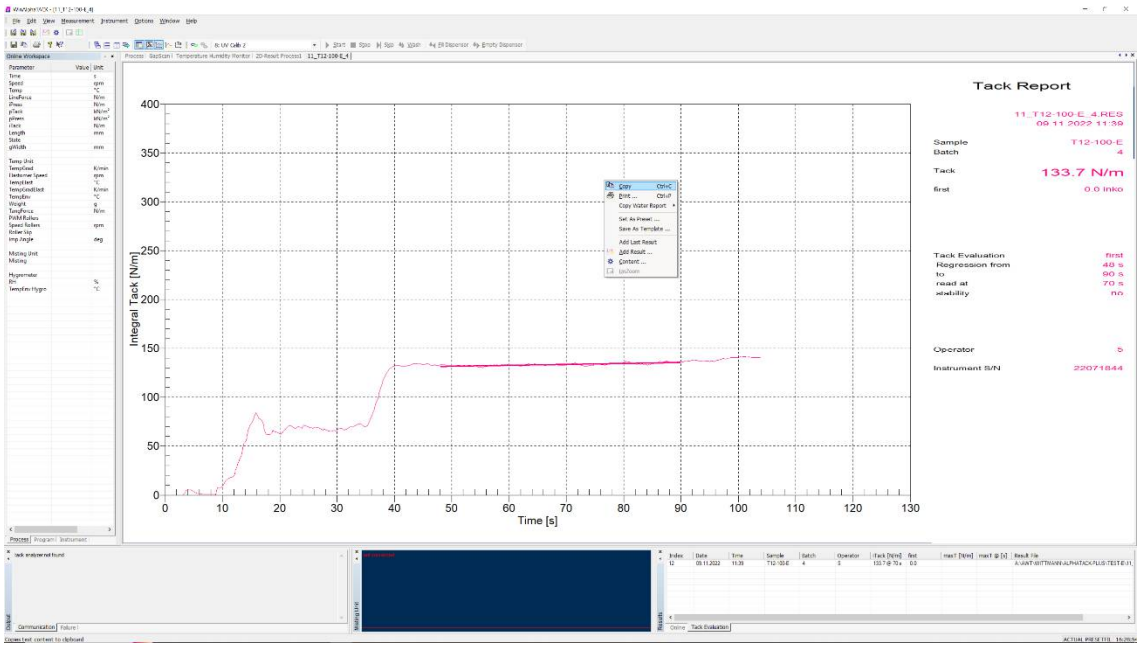


Figure 13

7.4. Tack Evaluation

WinAlphaTack supports up to four tack evaluation sets. A tack evaluation set defines how to read the tack value on a tack measuring curve and – when requested – how to translate this read value to a value of a former instrument.

7.4.1. How to read tack on measuring curves

Goto Measurement\Tack Evaluation …

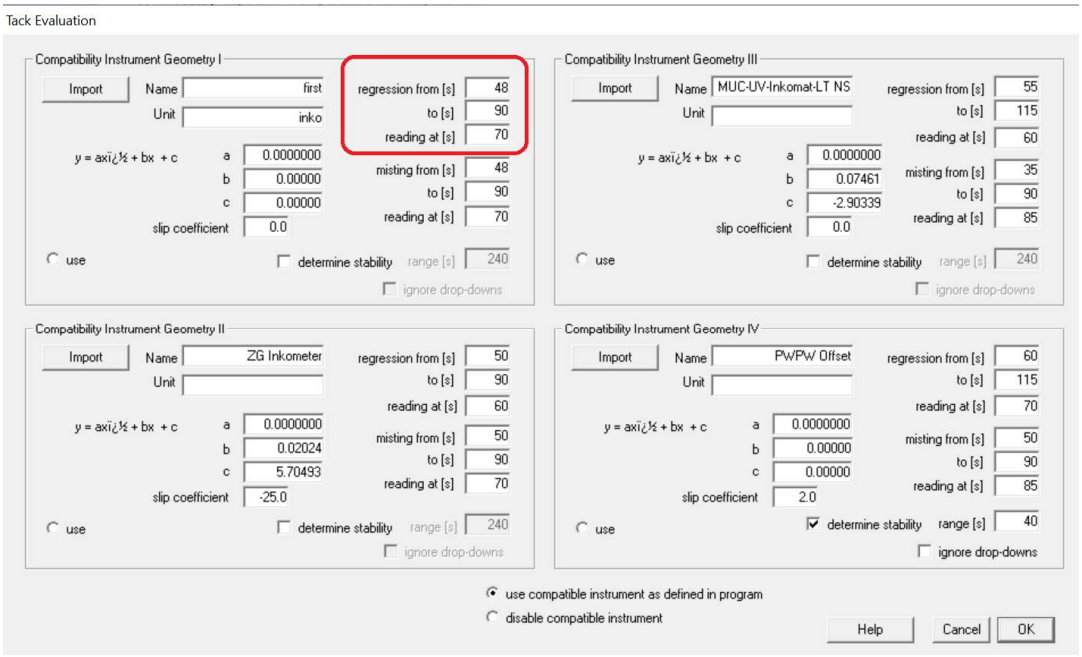


Figure 14

Tack read the measuring curves are done by interpolated regression lines. Use the parameter regression from [s], to [s] and reading at [s] for reading definitions.

Go back to measuring diagram. Press right mouse button and Content … for the selection of one of the four tack evaluation sets.

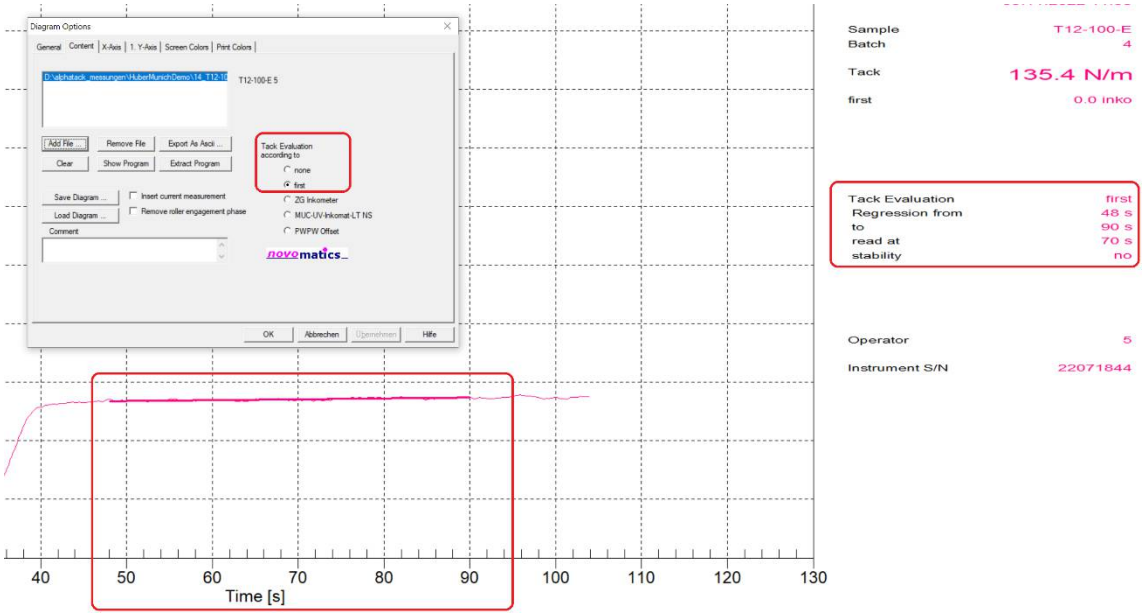


Figure 15

7.4.2. How to create backward compatibility to former instruments

Unlike classic instruments - which interpret a kind of outer tangential force as a value for tack - the AlphaTack Plus measures all forces in the roller nip. The AlphaTack Plus determines forces in horizontal and vertical direction as function of the roller contact angle. Only the vertical forces on nip outlet are used for tack value calculation. But for backward compatibility the AlphaTack Plus has to considers further forces due to calculate the tangential force exposed to virtual upper measuring roller as known from classic instruments.

Previous instruments like Tack-O-Scope or Inkometer are not equal to each other. That's why a backward compatibility can be created for a specific instrument only.

7.4.2.1 Measure a series of offset inks

Firstly measure a serie of offset inks on AlphaTack Plus and the classic instrument. Five till ten inks are fine. Their tack values have to cover the usual tack measuring range. So measure some low tack, middle and higher tack inks. Make sure that the testing conditions like temperature, speed and thickness are similar. Since some offset ink may change their rheological properties time-dependently perform these measurements at best at same time.

7.4.2.2 Create the compatibility set

When done go to Measurement\Tool\Compatibility to previous instruments …

Press clear to empty the table. Press Add and insert all AlphaTack Plus results of interest. Enter the reading conditions within left marked red rectangle figure 16. Assign all corresponding tack values CompTack of the previous instrument by using the Apply button.

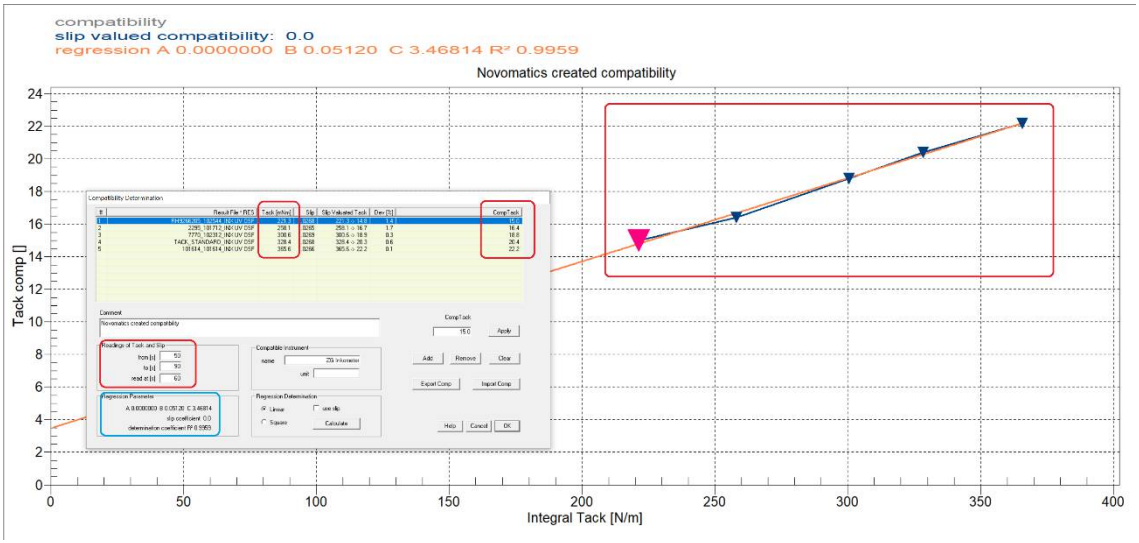


Figure 16

Press the Calculate button. The interpolation is done instantly and should lead to the orange interpolation line/curve which is closest to all measuring points. Usually the linear interpolation without slip consideration is fine.

Note the determination coefficient within blue rectangle. As closer to 1 as better. Here the value of 0.9959 is excellent.

You can vary the from to and read at [s] parameter to optimize the quality of interpolation. After entering the new from to and read at [s] parameter press the Calculate button again and follow up the determination coefficient.

When finished describe the compatibility set, here as ZG Inkometer. Press Export Comp the save the set into a separate file.

7.4.2.3 Apply the compatibility set to measurements and results

Goto **Measurement\Tack Evaluation …**

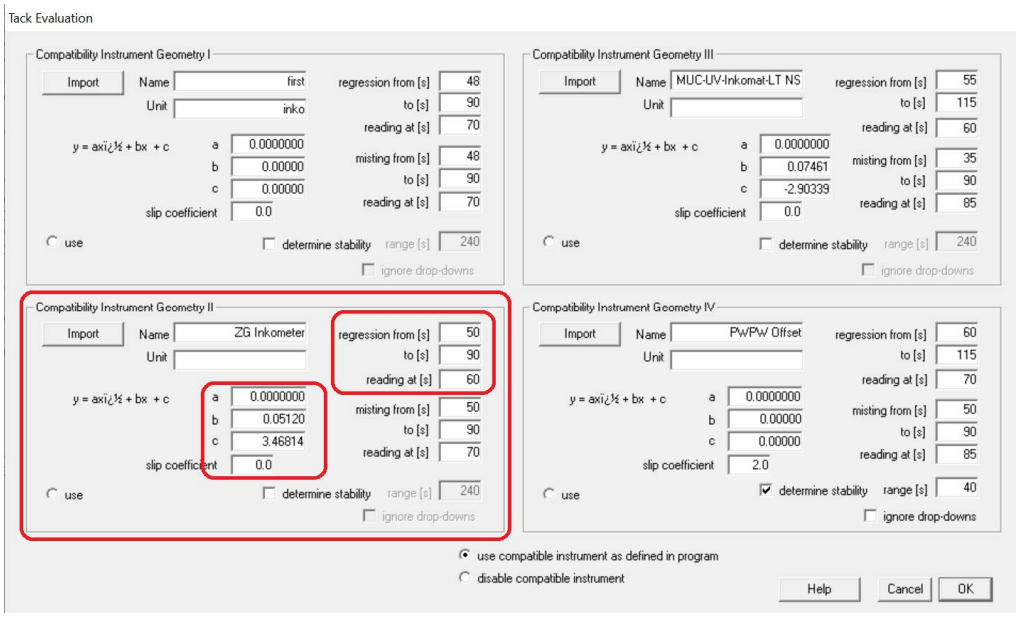


Figure 17

Press one of the four the Import buttons to assign the compatibility set created as described in chapter before. All essential parameter will be taken over. Release with OK.

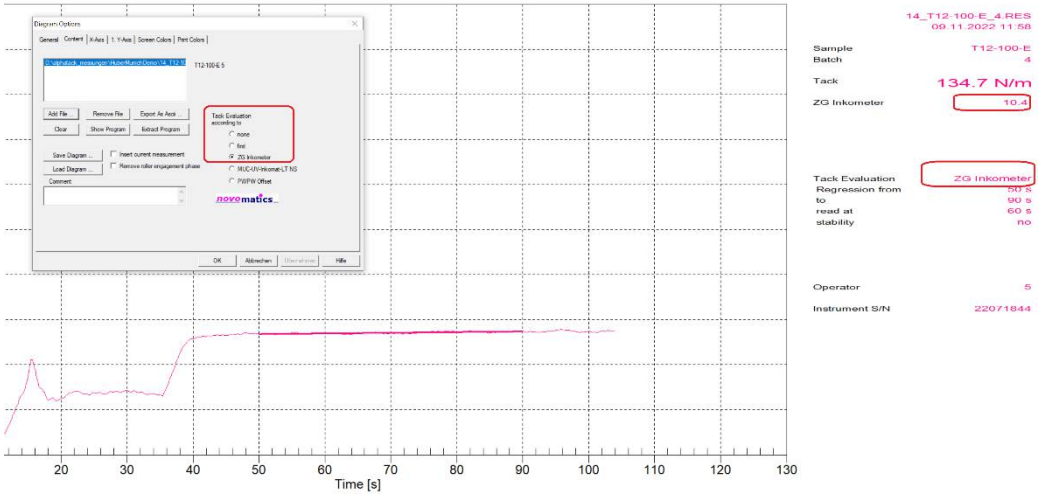


Figure 18

Open the diagram or template of your choice and press right mouse button. Apply one of the four compatibility sets as shown in figure 18. Release with OK. Now the compatible tack value is displayed within upper right rectangle.

8. Definition of variables

8.1. Pressure distribution function

The pressure distribution function reflects the real pressure vs. rotation angle at a certain point on surface. It is measured for every roller turn. In first part their course depends on applied conditions like line force, elasticity of elastomer roller but also on friction of applied ink. The splitting behavior is described by the second part of the line course.

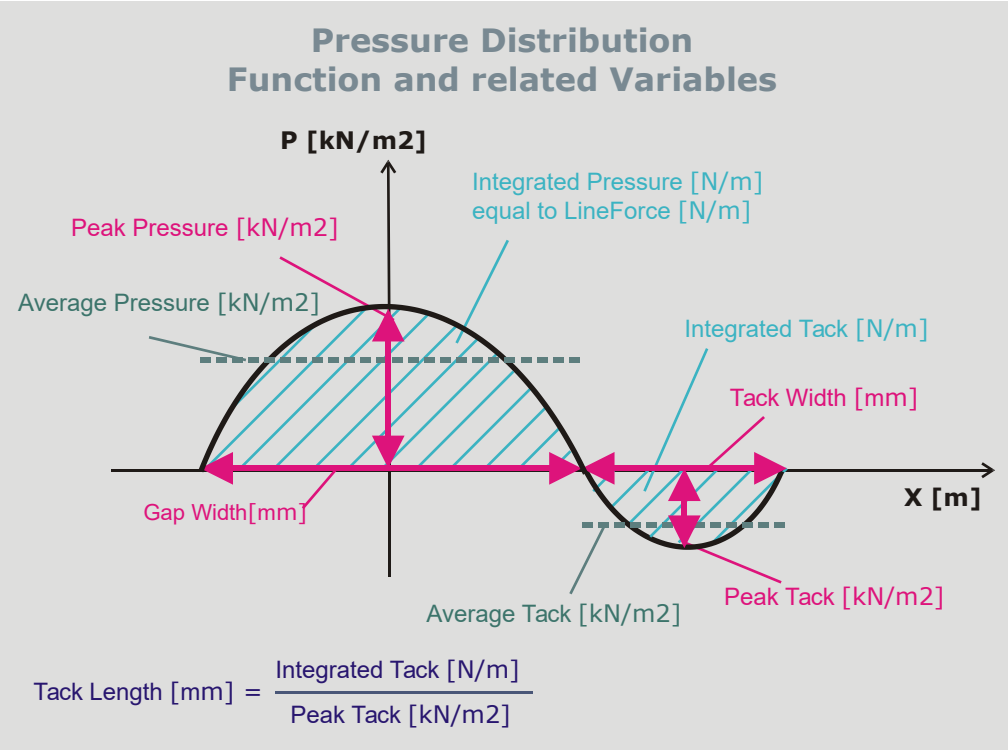


Figure 19

8.2. Definition of variables

The AlphaTack Plus measurement system operates with a set of independent and dependent variable. Independent variable can be defined in a measurement program and will apply to the sample during the measurement. The dependent variables will be quantified during measurement and depend on sample itself and applied independent variables. For example: The measured peak tack is up from the ink itself on one hand but also from the applied roller speed on the other.

WinAlphaTack distinguishes also between process and tackscan variables. Process variables characterize the current state of sample and measurement independent of a certain position on roller surface.

In opposite to this tackscan variables describe the current of sample in dependence on a certain roller position and under the applied process conditions.

A fourth variable characterization is process value and set point for independent variables. A set point is the physical value that has to be achieved (for example. set point temperature has been set to 30.0 °C). The process value is the real value measured by the instrument (for example, measured temperature on roller surface 29.9 °C).

8.2.1. Independent variables

Time [s, min]

Indicates the time since start of measurement.

Temperature [°C, °F, K]

Indicates the temperature of measurement roller surface. The measurement roller contains a PT 1000 temperature probe that is placed very close to roller surface. This arrangement grants a smallest temperature difference between surface and probe. For details please refer to temperature control system.

The postfix SP defines the set point of temperature (the value that has to be achieved). The postfix PV defines the process value of temperature (the real temperature value).

Roller Speed [rpm, m/min, m/s, km/h]

The gearless electronic driving system allows the step less adjustment of speeds. It is defined in rotations per minute. The equivalent surface speed is calculated by the roller diameter.

The postfix SP defines the set point of roller speed (the value that has to be achieved). The postfix PV defines the process value of roller speed (the real speed value).

Line Force , Integral Pressure[N/m]

The line force variable indicates the applied force between upper elastomer roller and measurement roller. It is expressed relatively to the roller length. This makes this variable independent of real roller length and simplifies the comparability to the situation on press.

The postfix SP defines the set point of line force (the value that has to be applied). The postfix PV defines the process value of line force (the real line force value).

8.2.2. Dependent variables

Pressure related variables

These variables correspond to the first part of the measured pressure distribution function. They are essentially up from applied line force, inner friction of ink and dynamic mechanic properties of elastomer roller.

Integral Pressure [N/m]

The integral force indicates the complete vertical force that is applied to the ink during its way through the roller nip. It is the integral of the pressure distribution function over roller nip. It corresponds exactly to applied line force.

The integral force is expressed in relation to roller length.

Tack related variables

These variables correspond to the second part of the measured pressure distribution function. They are up only from the splitting dynamic of the ink under applied test conditions.

Peak Tack [kN/m^2]

The peak tack Pressure denotes the minimum of the pressure distribution function. It indicates the maximal vertical tack force that is effective to the ink during the film splitting process.

Integral Tack [N/m]

The integral tack denotes the complete vertical force that is needed to split the ink film after leaving the nip. It is the integral of the pressure distribution function over the film splitting process.

The integral force is expressed in relation to roller length. It is the force moving apart inks covered measurement and elastomer under the applied conditions.

Tack Width [mm]

The tack width describes the distance between start and end position of film splitting process.

Length [mm]

The variable length is the quotient of Integral Tack and Peak Tack. It describes the inks tendency to create longer filaments during film splitting process.

Generally the length of ink indicates the ink’s tendency to form long filaments when stretched or pulled. "Longer" inks flow better but incline earlier to mist or fly. The shape of the splitting process indicates the length of ink under the applied conditions. A longer splitting process combined with lower peak tack shows a stronger tendency to build longer filaments than opposite.

9. Data objects and files

WinAlphaTack is using four several file formats for save and restore all the information needed for instrument operation and data evaluation.

9.1. Preset files (*.set)

A preset files is a binary file and contains all the information of

All dialog adjustments

All diagram adjustments

Eight pre-selectable sample operation procedures (SOP's)

During release of WinAlphaTack all these information are saved in last.set. At next session this file is loaded automatically and used for re-initialization. You can explicitly load and save preset files by File/Load (Save) Preset... For using other preset file than last.set at the starting up refer to the preferences/generals dialog.

It may be useful to use different preset files for different operators, different program types for measurement and data evaluation, etc. In case you want to set WinAlphaTack to reasonable basic adjustments load factory. set explicitly.

9.2. Measurement files (*.res)

A measurement file is a binary file and contains all the information of

All determined process variables vs. time

All saved TackScans of this measurement

All parameter of the used measurement programs

Information of the used AlphaTack Plus instrument

During test the running measurement can be saved explicitly by clicking File/Save Online As... After a test a File Saving Box is opened automatically for saving the online data in a measurement file. Names may be designated and/or suggested using the Options/Preferences/Auto Designation Dialog automatically.

The current measurement is saved into last.res automatically after every saved TackScan. Result Diagrams are using last.res for loading in automatically the current measurement. In this way online data comparison with other result files will be possible during current measurement. At next measurement last.res will be overwritten than.

Use measurement files for saving and restoring measurement results, curve overlays, transfer measurement data to other computers, which are using WinAlphaTack too, etc.

Selectable information of the binary measurement file can be transferred to a text file using the Export as ASCII function.

9.3. Diagram files (*.w2d)

A diagram file is a binary file and contains all the information of

Axes adjustments

Colors

Content of the diagram

WinAlphaTack distinguishes between process-2D, tackscan-2D, and process-3D and tackscan-3D diagrams. Diagrams maybe saved and restored using the File/Open Diagram... and File/Save Diagram... functions.

Use diagram files for saving and restoring the complete appearance of a diagram. Use this file also for diagram transfer to other users in an organization.

9.4. Sample operation procedure files (*.sop)

A program file is a binary file and contains all the information of the used sample operation procedure (SOP). WinAlphaTack supports up to eight pre-selectable programs for direct access. Using the combo box within the measurement control bar placed on top of WinAlphaTack mainframe for program selection.

Use SOP-files if more than eight programs must be saved and/or programs must be transferred to other users.

For loading and restoring open the measurement/programs... dialog. Programs can be set to and saved from of any the eight pre-selectable programs.

10. Principle of line force and tack calibrations

The new calibration mode V2 includes the fundamental forces – applied line force and determined tack force.

The line force variable indicates the applied force between elastomer roller and

metal measuring roller. It is expressed relatively to the roller length, its unit is unit N/m. The tack force or more exactly – line tack - denotes the complete vertical force that is needed to split the ink film after leaving the nip. It is an independent parameter and up only from sample under test. It is expressed also relatively to the roller length; the unit is N/m as well.

That's why the AlphaTack was equipped with two independent force measuring systems: Primary a force sensor, which determines the force between elastomer and metal roller and – secondary - a series of 15 embedded solid state surface sensors, which determine the force profile for pressure and tension within the roller nip.

The calibration of these 15 sensors is performed by applying an exact line force between the rollers.

The accuracy of that line force has to be approved by gravity before.

For that full calibration the operator needs:

1. WinAlphaTACK software V 4.10 or later
2. AlphaTack Plus firmware version V41 or later
3. A 1 kg reference weight with applied hook, can be ordered from Novomatics on request
4. A M5 metric screw approx. 20 mm in length, can be ordered from Novomatics on request
5. A soft underlay for line force calibration
6. A slim calibration roller, Novomatics ordering no. 990008
7. Demineralized water and a pipette

Figure 20

10.1. Calibration of line force

1. Open the dialog Instrument/Calibrations V2/Line Force …
2. Turn the instrument on its left case side, put the soft underlay below the instrument
3. Remove elastomer roller and mount M5 screw like shown below

Figure 21

4. Press the start button and follow up the automated procedure

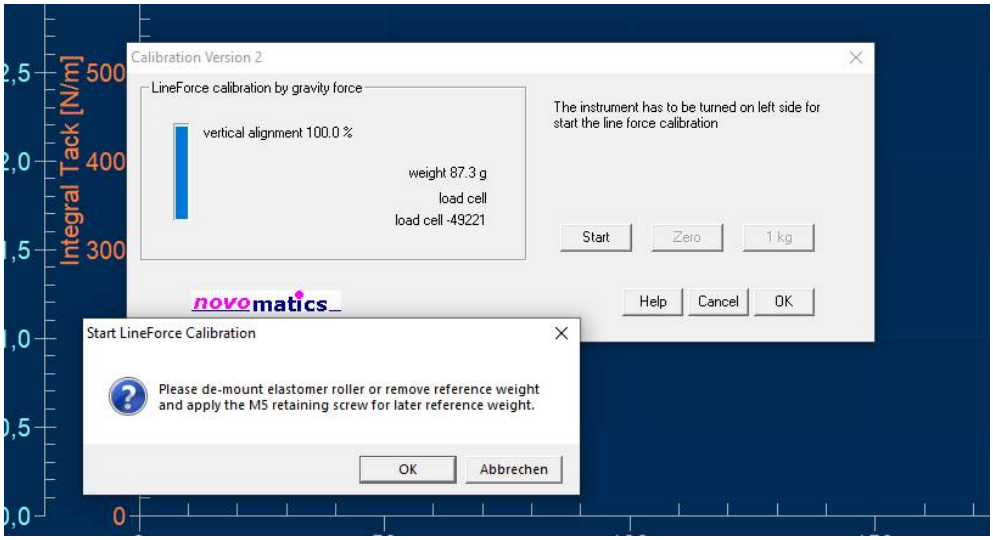


Figure 22

5. You will be requested to apply the 1 kg reference weight

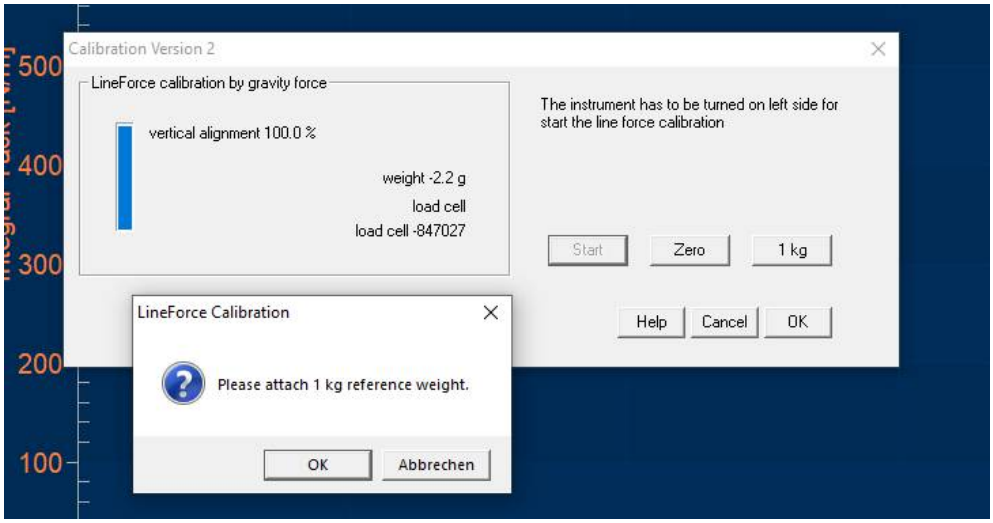


Figure 23

Figure 24

6. When successfully finished, remove weight, screw and turn back the instrument on its bottom side

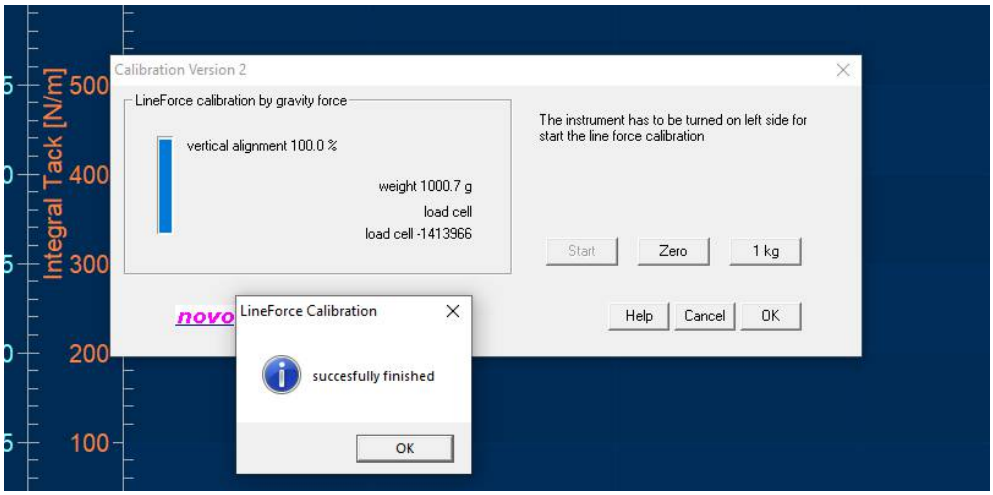


Figure 25

7. Release the dialog with OK and enter the valid supervisor password

Lineforce calibration is recommended approx. every 3 month within a QC environment.

10.2. Calibration of tack sensors

8. Open the dialog Instrument/Calibrations V2/Tack Sensors …
9. Mount the slim calibration roller on the AlphaTack and press Start

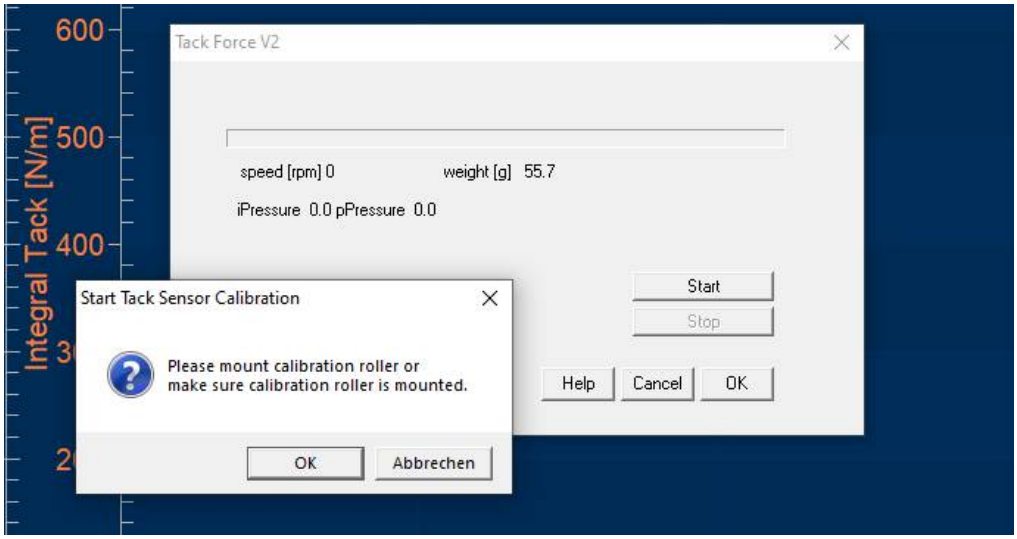


Figure 26

10. Acknowledge by pressing OK, so the calibration procedure starts
11. When the both rollers became in contact it's important to keep their surfaces wet
12. For that purpose it is sufficient to dispense a droplet of demineralized water every three seconds directly into the nip. This guarantees defined surface conditions during the calibration procedure.

Figure 27

13. The instrument determines a series of parameters automatically now, the calibration takes approx. 2 minutes

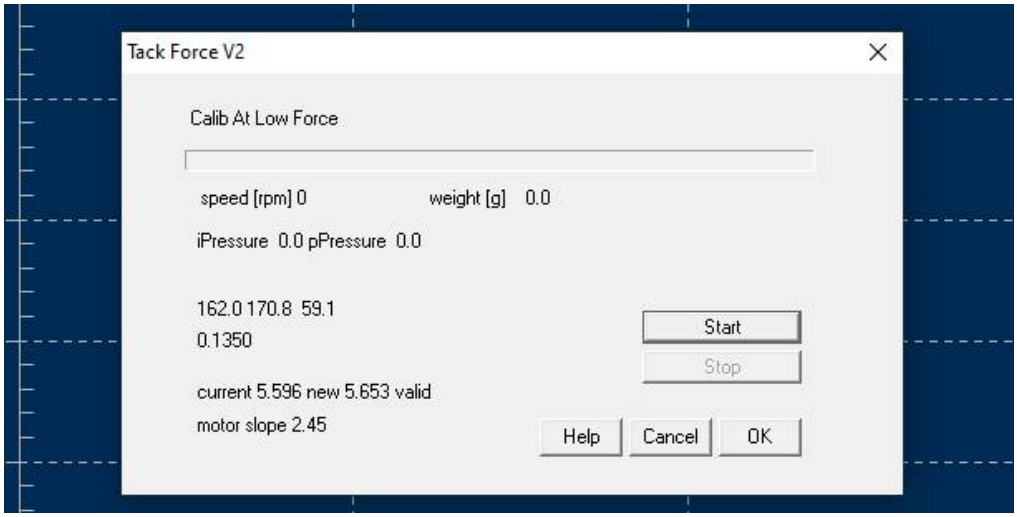


Figure 28

14. When successfully finished release the dialog with OK and enter the valid supervisor password

Now the AlphaTack prepared to use this new calibration.

Tack Force calibration is recommended once a week within a QC environment.

11. Maintenance

The AlphaTack Plus instrument was designed for easy maintenance by the operators themselves. Instrument parts, which are exposed to a stronger wearing, can be exchanged or replaced within a few minutes. Only in exceptional case a service technician must inspect the instrument.

11.1. Exchange of Teflon piston of dispenser

The embedded ink dispenser consists of minimum of moveable parts only. The only part that requires attention is the teflon piston. Usually it is usable over several thousand of dispension but can be replaced by operators themselves.

Switch of the instrument for assure that the metal can not rotate

Loose the two hexagonal screws that hold the metal cover on front of metal roller and remove the cover

Loose and remove the internal screw with a fitting cross screw driver.

Remove the aluminum fixture.

Lift and remove the old teflon piston with piston lifter which is part of accessory kit

Take out the piston

Clean the slot with flattened q-tip and usual cleaning solvent

Insert new or cleaned Teflon piston from top side, press down it to bottom

Mount aluminum fixture

Close cover with two hexagonal screws

There are minor mechanical tolerances from piston to piston. These tolerances can cause that the new piston is either too high or to low at top position. That's why the top position has to be re-tuned.

Feel with you finger tip whether the piston is too high, too low or in exact position.

Use the dialog Instrument\Ink Dispenser settings… for returning the top position

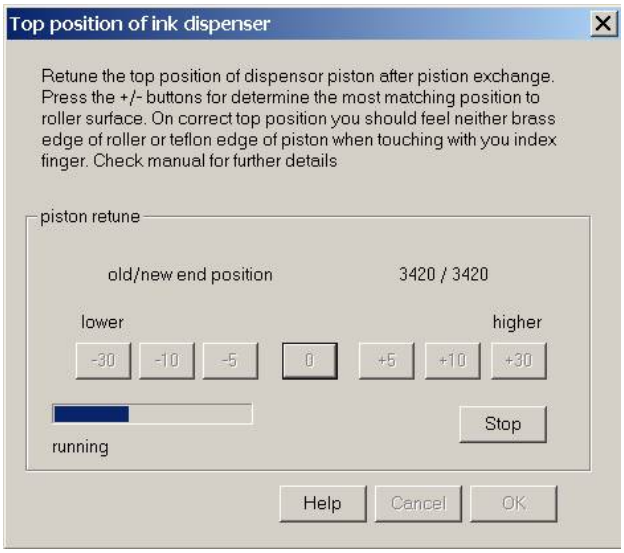


Figure 29

Release the dialog with ok, when you feel a smallest or no edge. Human finger tips are quite sensitive, usually you can feel edges down to 10 microns.

11.2. Exchange of elastomer roller

The living time situation of the elastomer rollers is different compared with classic tack measuring instruments. As the elastomer layer properties cannot affect the measurement results anymore the rollers may be used for much longer time. Only in case of massive surface wearing the roller has to be exchanged.

The second need of roller substitution is the change of ink type. Novomatics offers suitable elastomer materials for conventional and UV inks.

Loose the hexagonal center screw for exchange.

Before the new roller is mounted make sure that there is no pollution or particle on cones of roller shaft and on cones side of new roller. Fix the screw with a middle force only.

Finished

12. Technical specification

Conception

Two slim - roller measurement system. Robust metal case consisting of anodized aluminum and stainless steel components. Sensitive measurement devices are completely encapsulated. User friendly measurement control by WinAlphaTack PC-software via USB interface.

tack force measurement

Sensing Principle	inertial free solid-state force sensor, seamlessly integrated in the metal roller
Pressure measurement range	-500 to 500 kN/m2
LineTack measurement range	0 to 500 N/m
Sampling rate	up to 120.000 s^{-1}
Relative accuracy	< 1 %

Info: Low tack newspaper inks may have a linetack down to 20 N/m, heatset inks may have a linetack of 120 N/m, high tack varnishes may have a linetack of up to 300 N/m

Roller system

two roller slim system, consisting driven metal roller and engaged, oscillating elastomer roller

metal driving and measuring roller	120 – 1800 rpm (30 – 450 m/min), higher speeds on request, embedded tack measuring and temperature measuring device, self calibrating over instrument life time
elastomer impression and distribution roller	embedded temperature measuring device, self calibrating over instrument life time hybrid elastomer material usable for conventional and UV curing samples, pure UV materials on request, easy roller exchange
elastomer oscillation rate	0.5 – 3 s-1
elastomer oscillation amplitude	0.5 – 3 mm

lineforce setting

Range	300 – 1000 N/m, standard 500 N/m

Temperature control

independent control of metal and elastomer roller, fast response, no liquids, precision platinum probes are placed in metal and elastomer rollers close to surface, self-calibrating by internal references

setting range	20 to 40 °C
accuracy	±0.05 °C
setting time to 0.1 °C accuracy	< 3 min
water bath	obsolete

Power supply

Operation voltage	100 - 250 V, 50 – 60 Hz
Power consumption	< 200 VA

Dimensions, weight

L x W x H	36 x 28 x 27 ccm
Weight	20 kgs

Computer

Interface to AlphaTack Plus	USB 2.0
Operating system	Windows 10/11
Software	WinAlphaTACK provided with the measuring system

13. Contacting Novomatics

Please don't hesitate to contact your local distributor or Novomatics for any further information.

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