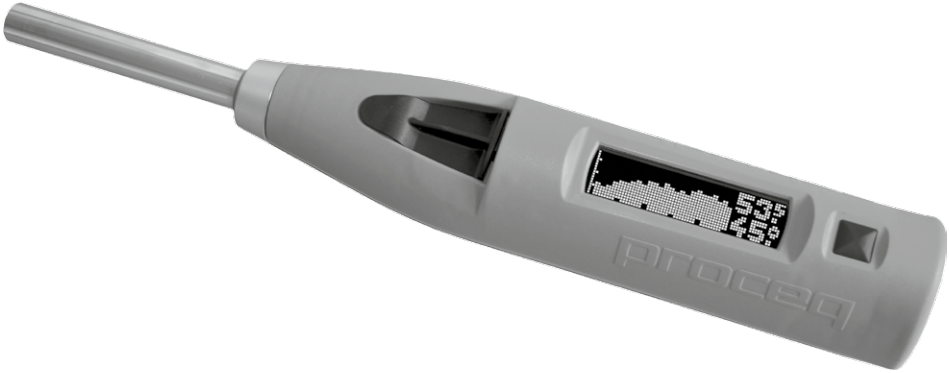
paperschmidt

# Operating Instructions

## Paper Roll Hardness Tester

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# Operating Instructions


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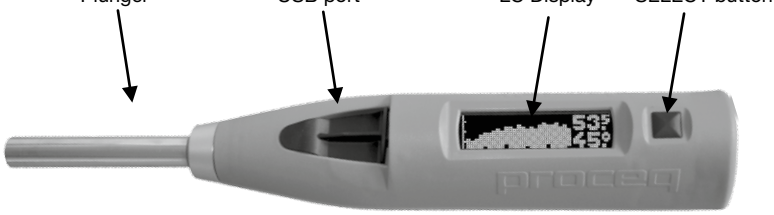
# 1. Getting Started

**Note:** First time user: Complete the tutorial OR see a demo by a qualified Proceq representative. If you only need to do simple measurements, please go to chapter 3.3.

**Charging the PaperSchmidt**
The PaperSchmidt uses a built-in Lithium Polymer accumulator. In case of a low battery alert, you can still record approximately 100 to 200 impacts. When the display indicates a low battery, connect the PaperSchmidt to the charger or to a PC. Approximately 90 minutes of charging will bring your PaperSchmidt to its full capacity. The PaperSchmidt can be recharged at any time.

**Power ON**
Press the SELECT button to power on.




**Check the calibration of the hammer**
Perform a calibration check on your hammer as described in chapter 7.2.
Congratulations! Your new PaperSchmidt is fully operational and you can now continue with your measurements.

**Performing a reset**
In case a reset is required, this can be done by performing an impact with the select button pressed.

**Note:** This will remove any lower and upper limits that may have been set.

**Note:** Should your instrument be fully discharged, start with a reset after recharging.

**Power OFF**
The PaperSchmidt will shut down automatically after 5 minutes of inactivity.

**Standards and Regulations Applied**
The following standard has been applied in the PaperSchmidt.
**TAPPI T 834 om-07** (Determination of containerboard roll hardness)
The following recommendation has been taken into consideration in the PaperSchmidt.
**TAPPI TIP 1004-01** (TAPPI Roll Number for inventory/tracking systems and bar codes)
This standard recommends a 12 digit roll number. The PaperSchmidt is able to accept roll identifier names (Roll IDs) in this format.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# 2. Care and maintenance

## 2.1 Battery care

The PaperSchmidt uses a built-in Lithium Polymer accumulator with a capacity of 150 mAh. When the hammer shuts down, the PCB controller goes into a standby mode. Thus, very low currents of 10 to 15 µA are constantly flowing. If fully charged, the battery can last in standby mode for up to 2 years. However, be aware that deep discharging as well as storage when empty is particularly damaging the Lithium-Polymer batteries and should be avoided to prevent permanent damage to the battery pack.

Avoid this problem, by regularly charging your PaperSchmidt during prolonged periods of inactivity.

If the battery is damaged, it will not be possible to turn the hammer on and it will have to be returned to a Proceq Service Centre for replacement.

## 2.2 Plunger care and lubrication

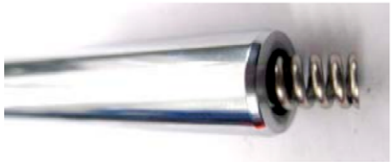
Correct operation of the hammer can be affected by a sticking plunger. Possible indications are:

- Low reading on the anvil.
- Intermittent failure to register an impact.
- Plunger does not fully return to starting position before the next impact.

This problem can be solved by applying one or two drops, (no more), of light oil (e.g. sewing machine oil) on the lateral surface of the plunger.
If the plunger is dirty, wipe it with a soft cloth before applying the oil. After applying the oil, turn the plunger a few times and depress it a few times to spread the oil evenly. Wipe off any excess oil before use.

**When removing the plunger to clean it, be careful not to lose the plunger spring that is located within the barrel of the plunger!!**

**1 Removing plunger**



Attention:
- Be careful that the plunger spring does not get lost.

Procedure:
- Pull off the plunger from hammer guide bar.
- Remove plunger spring from plunger.

If the plunger spring is lost, the hammer will not register any impacts. If lost, contact a Proceq Service Centre to order a replacement plunger spring (part number 341 10 312).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# 3. Safety and Liability

## 3.1 General Information

This manual contains important information on the safety, use and maintenance of the PaperSchmidt. Read through the manual carefully before the first use of the instrument. Keep the manual in a safe place for future reference.

## 3.2 Liability

Our “General Terms and Conditions of Sales and Delivery” apply in all cases. Warranty and liability claims arising from personal injury and damage to property cannot be upheld if they are due to one or more of the following causes:

- Failure to use the instrument in accordance with its designated use as described in this manual.
- Incorrect performance check for operation and maintenance of the instrument and its components.
- Failure to adhere to the sections of the manual dealing with the performance check, operation and maintenance of the instrument and its components.
- Unauthorised modifications to the instrument and its components.
- Serious damage resulting from the effects of foreign bodies, accidents, vandalism and force majeure.

All information contained in this documentation is presented in good faith and believed to be correct. Proceq SA makes no warranties and excludes all liability as to the completeness and/or accuracy of the information.

## 3.3 Safety Instructions

The equipment is not allowed to be operated by children or anyone under the influence of alcohol, drugs or pharmaceutical preparations. Anyone who is not familiar with this manual must be supervised when using the equipment.

- Carry out the stipulated maintenance properly and at the correct time.
- Following completion of the maintenance tasks, perform a functional check.

## 3.4 Correct Usage

- The instrument is only to be used to determine the roll hardness profile of paper and film rolls.
- Replace faulty components only with original replacement parts from Proceq.
- Accessories should only be installed or connected to the instrument if they are expressly authorized by Proceq. If other accessories are installed or connected to the instrument then Proceq will accept no liability and the product guarantee is forfeit.


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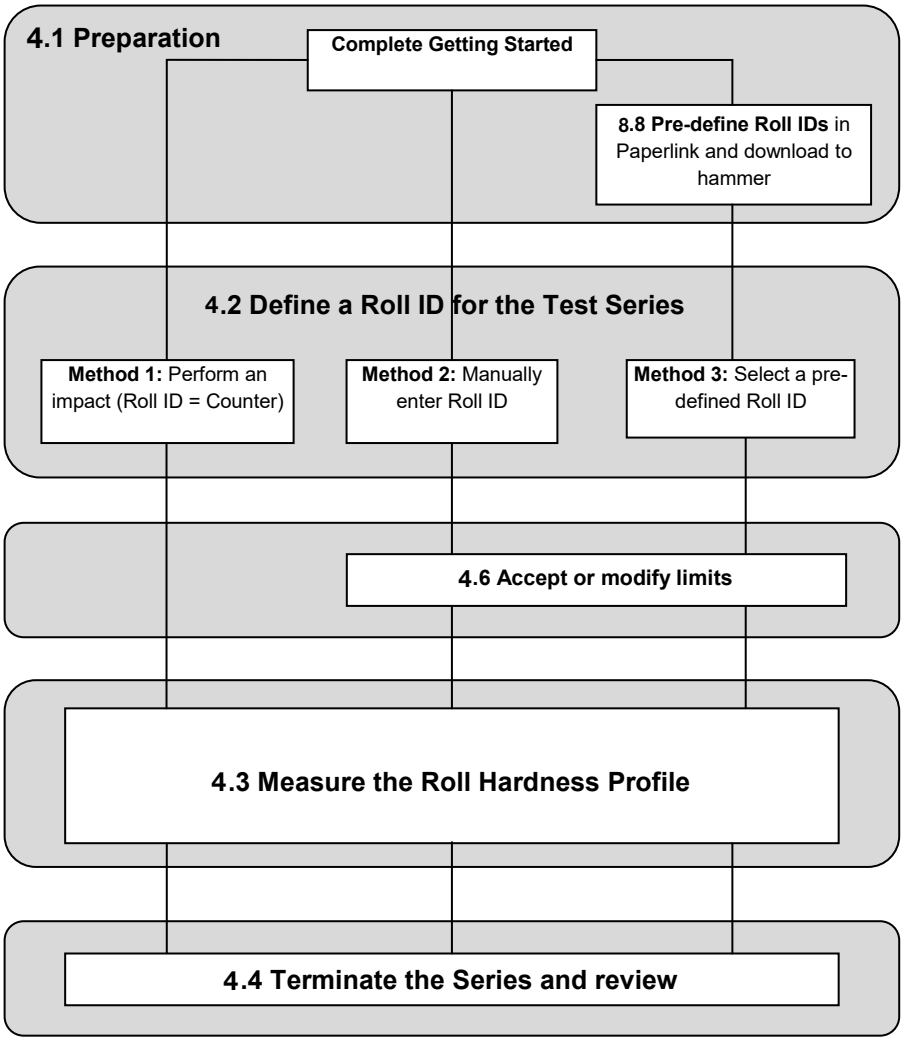
# 4. Real Tests





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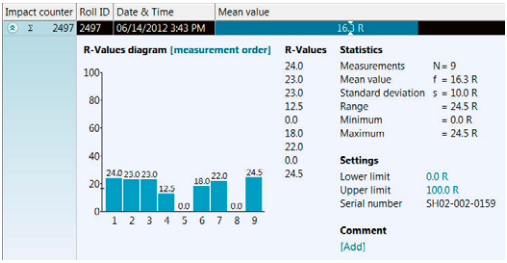
## 4.1 Preparation

If desired, define Roll IDs for the paper rolls under test using Paperlink and download these onto the PaperSchmidt (See 8.8)

By default PaperSchmidt will ignore invalid impacts, (i.e. impacts that are too low to register a correct reading). It may be that on rolls with very soft spots, the user may wish to store such readings also. This is done in PaperLink “Device – Options – Store invalid readings as zero”.




## 4.2 Define a Roll ID for the Test Series

The data list is the starting point for a new test series. Navigate within the data list by rolling the PaperSchmidt either away from you or towards you.

The upper section contains empty series with pre-defined Roll IDs.

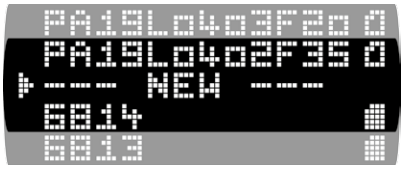
The lower section contains completed series which can be reviewed.

There are 3 methods to define a Roll ID for a new test series.

**Method 1 – Perform an impact**
It is not necessary to define a specific Roll ID. Simply begin a measurement series by performing an impact directly from the data list. Whatever upper/lower limits were previously set will be adopted automatically for this series. In this case the actual 4-digit value of the internal impact counter is used as a Roll ID and will appear in the review list once the series has been terminated.

Roll ID = Counter

**Method 2 – Manual entry of the Roll ID**




Scroll to “NEW” and press the SELECT button.

Enter the Roll ID on the PaperSchmidt (see 4.5)

Accept or modify the upper/lower limits (see 4.6) and begin measuring the roll hardness profile.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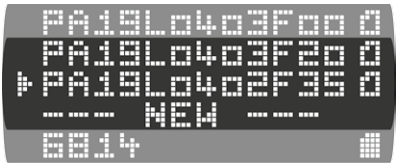
**Method 3 – Select a pre-defined Roll ID**



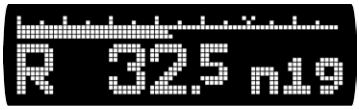

Scroll to the desired pre-defined Roll ID in the upper section of the data list and press the SELECT button.

Accept or modify the upper/lower limits (see 4.6) and begin measuring the roll hardness profile.

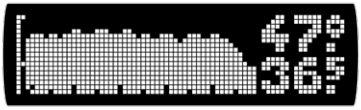
**Note:** A single pre-defined name can be used for a whole batch of rolls. In this case, each time you move on to the next roll, select the same name again from the review list and the device will increase an index which is used to identify that particular roll in the list.

## 4.3 Measure the Roll Hardness Profile

Each factory has its own recommendations for measuring the roll hardness. However, the method is very similar in all cases and some general principles can be applied. Begin at one end of the roll, not too close to the edge. To carry out an impact, place the hammer perpendicular to the paper roll. Push the hammer against the surface of the roll at a moderate speed until the impact is triggered. (For best results, impact at the same angle and apply the same pressure for each reading.) Repeat this procedure at a regular spacing to obtain a profile across the entire roll.




The rebound value is displayed on the screen after each impact along with the number of impacts in the current series. (A series may contain up to 99 impacts.)




“TIP” the plunger to display the running profile. The minimum and maximum measured values are displayed on the right. (TIP = Slightly depress the plunger, but not far enough to impact.)

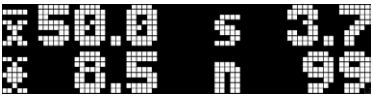
Pressing the SELECT button gives you the option of terminating a series (SUM icon) or deleting the last impact if it was an obvious outlier (Dustbin icon). Scroll to the desired icon and press the SELECT button again.

A confirmation screen prevents terminating a series prematurely. Use cancel (X-symbol) or confirm (tick-symbol). If an outlier is deleted, the display returns to the previous value and the series counter is reduced by one.

## 4.4 Terminate the Series and review

At the end of the roll, terminate the series by pressing the SELECT button. Then press on the “Sum” icon as shown above and confirm the action. This will take you to the statistics screen where you can review all of the significant data for the test series.

Mean R value Standard deviation




Range (Max-Min) No. of impacts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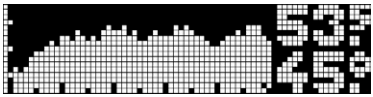
Tilt the PaperSchmidt to show the roll hardness profile. The screen can show a roll hardness profile of up to 50 impacts. However, a single series may contain up to 99 impacts for very large rolls. To see beyond the 50 impacts simply TILT the PaperSchmidt to show the impacts to the right. A marker on the scale at the bottom of the profile shows the “50th” impact position on both screens.



50th impact

50th impact

Exit the summary display mode by pressing the SELECT button if you want to enter or select a new roll ID. Simply proceed to a next measurement series if you don’t use specific roll IDs.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## 4.5 Entering a Roll ID manually

Having selected “NEW” from the data list, the user may define a Roll ID for the test series manually. The Roll ID can be up to 12 characters long. The screen begins with the last Roll ID that was entered, or with the impact counter value following a reset.

The cursor position is shown inverted.
The screen can show up to 10 characters.
Arrows at the bottom indicate if there is more to the left or right.

- TILT to scroll to the character you wish to change and press the SELECT button to access the character select screen.

The character select screen is arranged in 3 rows to allow the user to locate the desired characters quickly.

- ROLL and TILT to the desired character and press the SELECT button to set it.
- Repeat this procedure to enter the complete Roll ID.
- Scroll to the “ENTER” symbol at the far right of the Roll ID and press the SELECT button.

**Deleting a character**

- TILT to scroll to the character you wish to delete and press the SELECT button to access the character select screen.
- TILT to the delete symbol and press the SELECT button. (See below)
- The character is deleted. Any characters to the right of the character deleted will shift left.

The character select screen has a special symbol (highlighted), that allows the user to delete the selected character from the Roll ID

## 4.6 Accept or modify limits

This function is a rapid way to check if the roll hardness profile is within a pre-defined tolerance. After selecting a pre-defined Roll ID or after entering a Roll ID manually, the actual upper and lower limit values are displayed, e.g. 28R is the lower limit, 56R is the upper limit.

TILT to adjust the value and press SELECT.

(It may also be blank if you were previously working with no limits. To work without limits, adjust them to 0R resp. 100R.) To accept the limits displayed press the SELECT button. To modify the limit values, scroll the cursor to the limit you wish to change and press SELECT.

> **Note:** If the lower limit is higher than the upper limit, they will be reversed automatically


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**Display warnings**

When carrying out a measurement (See 4.3) the display will give a warning if any of the limits are exceeded. In this example, the limit sign next to the R indicates that the lower limit has been exceeded. If the upper limit has been exceeded, the arrow points upwards.

In the roll profile view (after TIP function and in the summary view), impacts which exceed the limits will blink.

## 4.7 Review list

A previous series can be reviewed directly from the data list. The lower portion of the data list shows the last 20 completed measurement series identified by name.

This symbol identifies a file which contains data.

Scroll to the series you wish to review and press the select button. You are given the option to look at the summary data or to delete the series. If you choose to delete the series, the confirmation window will be displayed.

If you wish to look at the summary data, you will be taken directly to the statistics screen. (See 4.4)

**Note:** Only the last 20 completed measurement series can be reviewed in the data list. The PaperSchmidt stores many more. The remaining series can only be seen once the data has been put into Paperlink.


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# 5. Technical Specifications

| | |
|---|---|
| **Mechanical Data** | |
| Impact energy | 0.735 Nm |
| Hammer mass | 115 g |
| Spring constant | 0.262 N/mm |
| Spring extension | 75 mm |
| Dimensions of housing | 55 x 55 x 250 mm (340 mm to tip of plunger) |
| Dimensions (plunger visible part) | 105 x ø15 mm (radius of spherical tip 25mm) |
| Weight | 570 g |
| **Memory Data** | |
| No. of impacts in a series | Maximum 99 |
| No. of series names | 50 series names. Each name can be up to 12 characters long. |
| Memory capacity | Dependent on length of test series, Example 1: 401 series with 10 values per series, Example 2: 246 series with 20 values per series |
| **Electrical Data** | |
| Display | 17 x 71 pixel, graphic |
| Power consumption | ~13 mA measuring, ~4 mA set-up and review, ~0.02 mA idle |
| Accumulator duty | > 5000 impacts between charges |
| Charger connection | USB type B (5V, 100 mA) |
| Accumulator capacity | ~150 mAh |
| **Environmental conditions** | |
| Operating temperature | 0 to 50°C |
| Storage temperature | -10 to 70°C |
| IP Classification | IP54 |


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# 6 Part Numbers and Accessories

## 6.1 Units

| Part No. | Description |
|---|---|
| 342 10 000 | PaperSchmidt consisting of battery charger with USB-cable, CD with Paperlink software, carrying strap, documentation, carrying bag |

## 6.2 Parts and Accessories

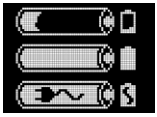
| | |
|---|---|
| 341 10 113 | Cover for USB port |
| 342 10 310 | Plunger complete with plunger spring |
| 342 10 400 | Testing Anvil PaperSchmidt |
| 341 80 105 | Carrying bag |
| 351 90 018 | USB cable 1.8m |
| 341 80 112 | USB charger, global |
| 341 80 203 | Carrying strap (loop) |

Please contact your Proceq business unit or authorized service centre for pricing and availability.

# 7. Maintenance and Support

## 7.1 Self test function

The PaperSchmidt performs a number of self checks and gives an alert when there is a problem.



These three alerts show the battery status:
Low battery, Battery full, Battery charging

Low impact energy: The impact spring is out of tolerance and should be replaced. It is recommended to return the PaperSchmidt to an authorized service centre.

## 7.2 Checking the calibration on the anvil

The PaperSchmidt checks for correct impact energy with each and every impact. Nevertheless, it is recommended to check the calibration on a regular basis.

- Perform a series of 10 impacts on the anvil (Proceq Part Nr. 342 10 400)
- Check that the average R-value lies within the tolerance shown on the label.
- If it is out of tolerance, it should be returned to an authorized service centre for recalibration.

The EURO anvil p/n 310 09 040 can also be used.

**Note:** There is a small spring located inside the plunger. Take care not to lose this when removing the plunger for cleaning. Therefore hold the Paper Schmidt with the plunger downward. Pull out the plunger and remove the spring.

## 7.3 Support Concept

Proceq is committed to providing a complete support service for this instrument by means of our global service and support facilities. It is recommended that the user register the product on www.proceq.com to obtain the latest on available updates and other valuable information.

## 7.4 Standard Warranty and Extended Warranty

The standard warranty covers the electronic portion of the instrument for 24 months and the mechanical portion of the instrument for 6 months. An extended warranty for one, two or three years for the electronic portion of the instrument may be purchased up to 90 days of date of purchase.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# 8 Paperlink Software

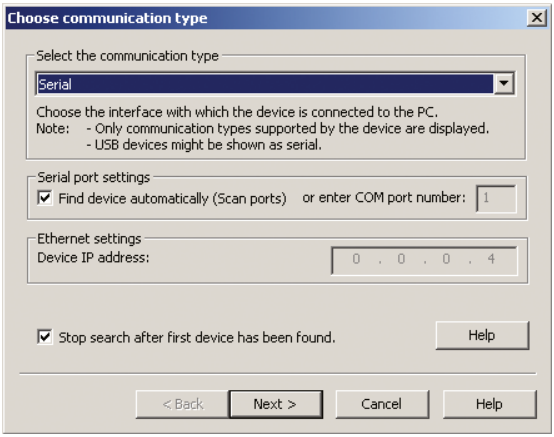
## 8.1 Starting Paperlink

Locate the file “Paperlink_Setup” on your computer or on the CD and click on it. Follow the instructions you see on the screen.

**Application settings**
The menu item “File – Application settings” allows the user to select the language and the date and time format to be used.

**Connecting to the PaperSchmidt**

Connect the PaperSchmidt to a USB port, then click on the icon to bring up below window:




Leave the settings as default or if you know the COM port you can enter it manually.

Click on “Next >”

The USB driver installs a virtual COM port which is used to communicate with the PaperSchmidt. When a PaperSchmidt has been found, you will see another window. Click on the “Finish” button to establish the connection.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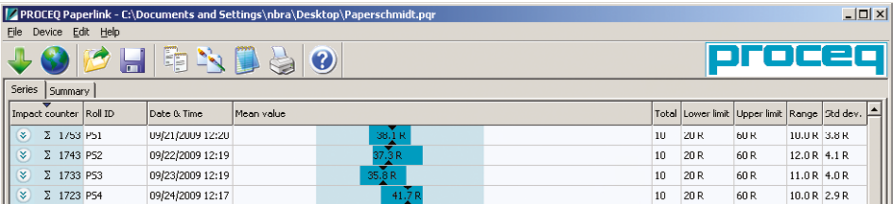
## 8.2 Viewing the data

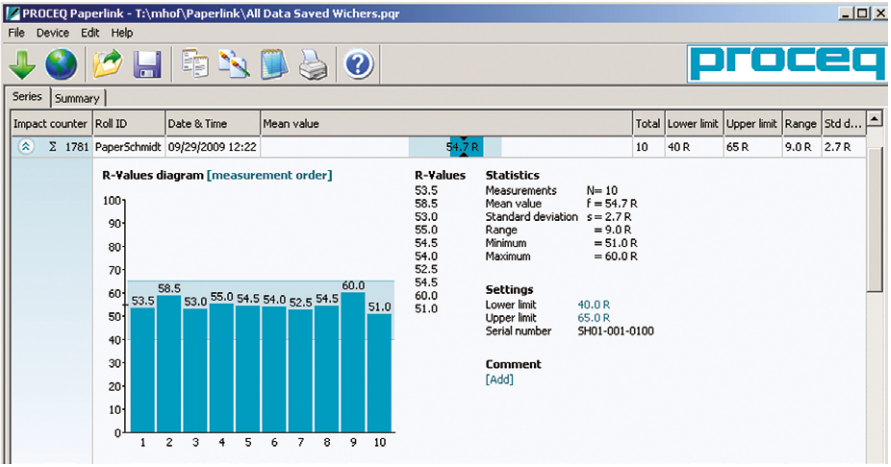
The data stored on your PaperSchmidt will be displayed on the screen:




The test series is identified by the “Impact counter” value and by a “Roll ID” if assigned.

- The user may alter the Roll ID directly in the “Roll ID” column.
- The “Date & Time” when the measurement series was made.
- The “Mean value”.
- The “Total” number of impacts in this series.
- The “Lower limit” and “Upper limit” set for that series.
- The “Range” of the values in this series.
- The “Std dev.” Standard deviation of the measurement series.

Click on the double arrow icon in the impact counter column to see the profile.




If limits have been set, they are displayed as above with a blue band. It is also possible to adjust the limits directly in this window by clicking on the blue limit values.

> **Note:** The user may also add a comment to the measurement series. To do so, click on “Add”.

> **Note:** The user may alter the order in which the measurements are shown. Click on “measurement order” to switch to “ordered by value”.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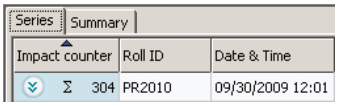
**Summary window**
In addition to the above “Series” view, Paperlink also offers a “Summary” window. This is useful when comparing a batch of rolls of the same type. Click on the respective tab to switch between views.

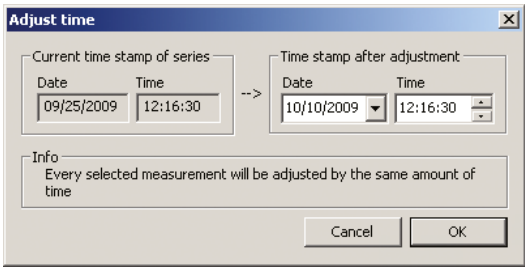



**Note:** To include or exclude a series from the summary, click on the summary symbol in the impact counter column. This symbol is either “black” or “greyed out”, which shows whether or not the particular series is included in the summary. The summary view can be adjusted in a similar way to the detailed view of a series.”.

## 8.3 Adjusting the max/min settings

Maximum and Minimum settings that were used in the PaperSchmidt at the time of the measurement series can be adjusted subsequently in Paperlink. This can be done either by right clicking directly on the item in the appropriate column, or by clicking on the blue setting item in the detailed view of a measurement series. In each case a selection box will appear with the choice of setting.

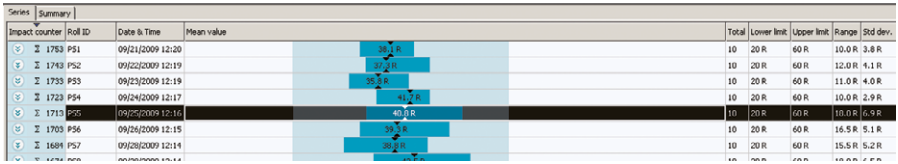
## 8.4 Adjusting the date and time




Right click in the date and time column.
The time will be adjusted for the selected series only.

## 8.5 Exporting data

Paperlink allows you to export selected series or the entire project for use in third party programs.
To export selected series, click in the table of the measurement series you wish to export. It will be highlighted as shown.





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Click on the “Copy as text” icon. The data for this measurement series is copied to the clipboard and can be pasted into another program such as Excel. If you wish to export the individual impact values of the series, you have to display them by clicking on the double arrow icon as described above before you “Copy as text”.

Click on the “Copy as picture” icon – For exporting the selected items only into another document or report. This performs the same action as above, but the data is exported in the form of a picture and not as text data.

“Export as text” icon – Allows you to export the entire project data as a text file that can then be imported into another program such as Excel. Click on the “Export as text” icon. This will open the “Save As” window where you can define the location in which you wish to store the *.txt file.

**Note:** Paperlink has two “tabs” with two display formats. “Series” and “Summary”. When performing this operation, the project data will be exported in the format defined by the active “Tab”, i.e. either in “series” or “summary” format.

To open the file in Excel, locate the file and right click on it and “Open with” – “Microsoft Excel”. The data will be opened in an Excel document for further processing. Or drag and drop the file into an open Excel window.

**Note:** Measurement series may be copied between Paperlink project files by selecting with CTRL-C and pasting using CTRL-V.

## 8.6 Deleting and restoring data

The menu item “Edit – Delete” allows you to delete one or more selected series from the downloaded data.

**Note:** This does not delete data from the PaperSchmidt, only data in the current project.

The menu item “Edit – Select all”, allows the user to select all series in the project for exporting etc.

**Restoring original downloaded data**
Select the menu item: “File – Restore all original data” to restore the data to the original format as it was downloaded. This is a useful feature if you have been manipulating the data, but wish to go back to the raw data once again. A warning will be given to say that the original data is about to be restored. Confirm to restore.

**Note:** Any names or comments that have been added to series will be lost.

**Deleting data stored on the PaperSchmidt**
Select the menu item “Device – Delete all Data on Device” to delete all data stored on the PaperSchmidt. A warning will be given to say that the data is about to be deleted on the device. Confirm to delete.

**Note:** Please note, this will delete every measurement series and cannot be undone. It is not possible to delete individual series.


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## 8.7 Further Functions

The following menu items are available via the icons at the top of the screen:

“Upgrade” icon - Allows you to upgrade your firmware via the Internet or from local files.

“Open project” icon – Allows you to open a previously saved project. It is also possible to drop a *.pqr file onto Paperlink to open it.

“Save project” icon – Allows you to save the current project. (Note this icon is greyed out if you have opened a previously saved project.

“Print” icon – Allows you to print out the project. You may select in the printer dialog, if you want to print out all of the data or selected readings only.


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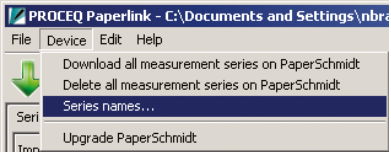
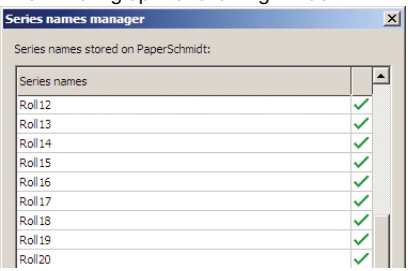
## 8.8 Pre-define Roll IDs

Select the menu item “Device - Series names…” to create pre-defined roll names which can be downloaded onto the PaperSchmidt before testing a batch of rolls.




This will bring up the following window.




Simply type in the names for the series and they are transferred automatically onto the PaperSchmidt. Up to 50 series names can be defined in this way. Each name can be up to 12 characters long.

**Note:** Please note, that also “copy and paste” works with data from Excel.

## 8.9 Technical Information Paperlink software

**System requirements:** Windows XP, Windows Vista, Windows 7, Windows 8, USB-Connector. An Internet connection is necessary for automatic updates, if available. An Internet connection is necessary for firmware updates (using PqUpgrade), if available. PDF Reader is required to show the “Help Manual”.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