

# RQ8000

# Paper Roll Quality Tester Technical Manual

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Company:	Proceq SA
	Ringstrasse 2
	CH-8603 Schwerzenbach
	Switzerland

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The features described in this instruction manual represent the complete technology of this instrument. These features are either included in the standard delivery or available as options at additional costs.

Illustrations, descriptions as well as the technical specifications conform to the instruction manual at hand at the time of publishing or printing. However, Proceq SA policy is one of continuous product development. All changes resulting from technical progress, modified construction or similar are reserved without obligation for Proceq to update.

Some of the images shown in this instruction manual are of a pre-production model and/or are computer generated; therefore the design/features on the final version of this instrument may differ in various aspects.

The instruction manual has been drafted with the utmost care. Nevertheless, errors cannot be entirely excluded. The manufacturer will not be liable for errors in this instruction manual or for damages resulting from any errors.

The manufacturer will be grateful at any time for suggestions, proposals for improvement and references to errors.



# 1 Introduction

The RQ8000 Roll Quality Tester is designed for fast and accurate measurement of paper roll and machine roll hardness profile.

This hand-held measurement device includes hardness measuring unit and distance encoder. Paper reels with non-uniform hardness profile may cause problems when printed or converted.

RQ8000 is the fastest and the most accurate system to detect reels that need to be excluded in printing or converting processes.

## 1.1 Scope of this document

This document is an instruction manual for the RQ8000 Roll Quality Tester. It describes in technical details, the use of the RQ8000 and the its PC software.



# 2 System Parts

# 2.1 RQ8000 measurement system

Each RS8000 Roll Quality Measurement system comes with a sturdy padded carrying case containing:





The following parts are included in the delivery:

#### Content

- 1 RQ8000 Wireless measurement device
- Rechargeable AA batteries (preferably removed from the RQP before 4+4 packing)
- Battery charger + power cord 1
- 1 Car power adapter
- 1 SD Card
- USB cable type A-B 1
- 1 USB memory stick with RQ8000 software and drivers
- 1 Plastic strip
- 2 Allen key and spare screws
- RQ8000 Quick Start Guide in Printed version 1





















# 3 Measurement Head usage

## 3.1 Measurement head layout

#### 3.1.1 Switches and connectors

A	Barcode reader direction indicator	
0	Power button	
	Barcode reader button/add new roll tag	
	SD card slot	
USB	USB connector	

## 3.1.2 Indicator LEDs

じ	Power status
5	SD card operation
	Barcode reader status
*	Bluetooth link
CERTIFICO USB	USB connection

# 3.2 Batteries and Recharging

#### 3.2.1 Inserting Batteries

RQ8000 unit is powered by four rechargeable type "AA" batteries. Only use rechargeable AA batteries due to the unit's built-in recharging function.

Reliable measurement requires that the NiMH batteries are in good condition and that the capacity of the batteries should preferably be 2000mAh or more. Alkaline or other disposable non-rechargeable batteries are not to be used with RQ8000 measurement system.

The battery cover has a rotating lock system and plugs in and out to reveal the batteries. The metal part in the middle of the cover is the locking system which can be rotated with a coin or a similar tool. The operation should be smooth when the battery cover is pressed against the RQP's metal surface. The springs support the batteries and the locking system ensures a tight fit.





Make sure that the batteries are inserted in the correct direction of polarity, there is a check-up drawing located near the battery lid (below):



Study the overview of the battery compartment with the lid removed. The visible ends of the inserted batteries should correspond to the ones in the drawing next to it (+ being the one with the knob, - being the more flat-ended one.)

When packing up the RQ8000 to its carrying case for transporting the measurement system to another location it is advised that the batteries should be removed from the battery slot and packed separately. This way the measurement device does not switch on by accident resulting in lowered charge or drained batteries and also the rechargeable batteries have a lower risk of self-discharging. This is also the recommended procedure when the measurement device is going be left alone in storage for longer periods of time.

With the batteries removed the real-time clock of the RQ8000 device loses the correct time in 2-4 weeks. If this is the case it is recommended that the RQ8000 is connected to the PC before making a measurement. By doing this the correct time is set and the timestamps of the measured files are correct.

## 3.2.2 Recharging Batteries

There are two methods of keeping RQ8000 batteries loaded and ready for measurement.

Every RQ8000 unit is supplied with an **external battery charger** which allows the user to recharge the batteries outside the RQ8000 unit. When using an external charger to charge your batteries make sure that you charge them to full capacity before inserting them back to the RQ8000.

Another method is the **USB charge**. When the RQ8000 is connected to the computer with a USB cable the unit will recharge the AA batteries inside the unit. This recharge method is usually slower than recharging with a separate, dedicated AA recharger but USB recharge is sufficient for keeping the RQ8000 unit measurement ready for occasional measurements.

The usual measurement-recharge ratio for USB charge is 20% vs 80%, if the unit gets one hour of measurement time it should get four hours of USB recharge to get fully recharged. Please check that your RQ8000 unit supports USB charging before using this option.

**NOTE**: Because of the USB charging function it is extremely important that the batteries are always correctly aligned and **only rechargeable AA batteries are used with RQ8000 unit**. If the batteries are not intended for recharging they may overheat or even explode and inflict serious damage to the RQ8000 unit and its surroundings.



# 4 Measurement and Calibration

## 4.1 Performing a measurement

## 4.1.1 Turning the power on and off

Start up the RQ8000 with a short press of the power button marked with

All LEDs are lit for a short period and the device should be ready for measurement with the power LED turned green.

You may choose to read a barcode from a roll (as instructed in section 3.2), create a new roll tag from scratch with barcode/new roll button (3.3) or proceed to the actual measurement (section 3.4.)

#### 4.1.2 Using the barcode reader to read a new roll tag



The barcode button activates the camera which is used to acquire barcode information from a roll label. The barcode distance should optimally be some 10-20 centimeters away from the front end of the RQ8000and the green line projected to the surface should be visible and uniform. The barcode does not need to be in line with the guided line nor does the RQP need to be turned to a similar angle, the camera is able to read barcodes from any direction. To ensure fast recognition of the barcode the RQP device should be directed towards the barcode while starting the reading.

The Barcode LED **should** flash a green light when a barcode is successfully recognized. If the LED blinks red the device was not able to recognize the barcode before timeout.

You may retry by pushing the same button



## 4.1.3 Using the barcode button to create a new roll tag from scratch

If the measured rolls do not have barcode IDs but you wish to create a marker to separate your measurements from each other (for different rolls for example) you can press the barcode reader button **will** to mark them. This will create a separate directory for a measurement or a group of measurements each time the button is pressed.

#### 4.1.4 Measurement

Place the RQ8000on the surface or roll you wish to measure and move the measurement head forward with firmly holding it against the surface. The hammer will hit rapidly while the distance wheel is turning and the required force against the wheel is detected.

Keep the movement steady and make sure that you have a firm grab of the measurement head when moving it over the edge of a roll.

If the measured surface or the length of the measurement is extremely short then the preferred method of ending a measurement of a profile is to stop moving the head forward and to lift the measurement head away from the surface.

The measured profile is now saved to the SD disk.

## 4.2 Measurement Speed

RQ8000 measurements are considerably faster than other methods of roll profile measurement. For optimal results the measurement has to be steady and controlled and if the analysis requires more data this can easily be achieved by slowing down the measurement speed. For normal measurements the speed may be something from 5cm per second and for very precise measurements the speed can be as low as 1cm per second. This will result to more measurement points and larger data to be analysed.



# 4.3 RQ8000 Calibration Sample (optional)

With the RQ8000 Calibration Sample the operator can easily check that the RQ8000 unit has retained its measurement level.

The calibration sample is a standard surface with a good glide attached inside a sturdy metal enclosure. When performing a calibration sample measurement the movement speed should be closer to 1cm per second. For optimal results the calibration sample is measured twice without lifting the unit from the surface, please review the picture below.

		$\sim$
<		

This will allow the measurement to have more data for accurate border recognition. The displayed calibration profile will be from the first sweep.

If you would like to purchase a calibration sample for your RQ8000 unit please contact Proceq for further details.



# 5 Software Overview and Usage

The following will describe how to manage and analyze the measured data. More detailed information about measurement and data analysis can be found on a separate document provided on the USB stick that comes with the RQ8000 unit.

## 5.1 File Management

The RQ8000 installation program registers the roll file types so that they can be manipulated directly from the Windows Explorer.

Name A Raw Data 20091109133520\_1234567890.roll 20091109133609\_1234567890.roll 20091109133702\_1234567890.roll build.rolls Deceleration.png Penetration.png Velocity Ratio.png

When the RQ8000 software is running double-clicking on a measurement file will analyse the file with the software.

You can recognize the roll files from their type (file extension) or by their icons (below):



Data of multiple rolls, multiple profiles in view



Data of a single roll, a single profile



# 5.2 Analysis Software

The main components of the RQ8000 are the file Builder, Device Control, Main Control, Recent Builds and the View Component window(s).

RQP V2 Builder. Version 2.0	RQP V2 Device Control. Versi	TAPIO V2 Main Control. Version 1.2	
% C:\Users\TAPIO User\Documents\Tapio Technologies\       BUILD       EXPLORE       RECENT BUILDS	SCAN DEVICE DOWNLOAD SD CARD	TAPIO V2 Main Control. Version 1.2	•
ROP V2 Deceleration View (BC). Version 2.1		Starting up	
Proceq Deceleration		Deceleration View (BC): Updating.	
80.0 -		4	
70.0 -		SETTINGS	
G G		SHUTDOWN	
ion (E		Recent Builds	
- 0.09 - 20 20		- PERMANENT - - HISTORY -	•
50.0 -			
44.0 -			4
0.000 0.200 0.400 0.600 0.800 1.0	00 1.200 1.4001.503		

## 5.2.1 Builder



Builder has an user interface including:

#### Build path control

- Any changes on path will start build action of the directory
- Build path may be selected using standard windows file selector
- Double click the .roll file to change the build path and start build action



#### Explore button

• Will open windows explorer window for the current build path

#### Recent Builds

 shows a history and user defined permanent build paths enabling quick browsing of latest measurements.



#### 5.2.2 View Component



- Graph grids and colors can be defined for all visible axes
- Graph limits may be absolute or relative. Upper and lower limits may be different.
- Profiles are resampled to specified distance step before showing and saving to the build file
- Secondary x axis may be defined using offset and multiplier (inches or actuator scale are possible)
- Mean value may be removed from the profile and the data may be converted to [mean %]

# 5.2.3 Main Control and Settings

Clicking on the Main Control window Settings button opens up the Settings dialog

RQ8000 - Settings	
Builder - Decimal point conversion: None - Crop from the end of the profile: 0.000 [m] - Executable file: C:\Program Files\Tapio Technologies\TAPIO V2\Version 1.2\Builder\Execu - Filter corner period: 0.0100 [m] - Profile filtering: None - Language: English - Run executable after build: No - Run executable minimized: No - Crop from the beginning of the profile: 0.000 [m] - Show user interface: Yes - Wait executable completion: No	
Configuration - RQP V2 Builder: Include - TAPIO V2 Configuration: Vital - RQP V2 Deceleration View (AC): Exclude - RQP V2 Deceleration View (BC): Include - RQP V2 Deceleration View (ZC): Exclude - RQP V2 Device Control: Include - TAPIO V2 Main Control: Vital - RQP V2 Penetration View: Exclude - RQP V2 Prepare SD Card: Exclude - TAPIO V2 Settings: Vital - RQP V2 Velocity Ratio View: Exclude - Language: English	
۰ ۲	
CANCEL	
APPLY	
ОК	



Double-click on the desired setting change or right-click to select if the setting is to be changed on all instances

RQ8000 - Settings	
Builder - Decimal point conversion: None - Crop from the end of the profile: 0.000 [m] - Executable file: C:\Program Files\Tapio Technologies\TAPIO V2\Version 1. - Filter corner period: 0.0100 [m] - Profile filtering: None - Language: English - Run executable after build: No	2\Builder\Execu ≣
<ul> <li>Run executable minimized: No</li> <li>Crop from the beginning of the profile: 0.000 [m]</li> <li>Show user interface: Yes</li> <li>Wait executable completion: No</li> </ul>	
Configuration - RQP V2 Builder: Include - TAPIO V2 Configuration: Vital - RQP V2 Deceleration View (AC): Exclude - RQP V2 Deceleration View (BC): Inc - RQP V2 Deceleration View (BC): Exc - RQP V2 Deceleration View (ZC): Exc - RQP V2 Device Control: Include - TAPIO V2 Main Control: Vital - RQP V2 Prepare SD Card: Exclude - TAPIO V2 Settings: Vital - RQP V2 Velocity Ratio View: Exclude	
- Language: English	
CANCEL	
APPLY	
ОК	

Click on the setting and select the value from drop down menu or type in the numeric value

Configuration	83
Include	
✓ Exclude	
ОК	CANCEL

Verify the value and click OK or CANCEL

Configuration	8
RQP V2 Deceleration View (AC)	
Include	
ОК	CANCEL



The changed value is marked with an asterisk (\*) and also the heading has one if any of the settings is changed from the last applied one. Apply the setting with APPLY or OK. If you would like to cancel the setting change(s) at this stage you may click CANCEL

RQ8000 - Settings		
Builder - Decimal point conversion: None - Crop from the end of the profile: 0.000 [m] - Executable file: C:\Program Files\Tapio Technologies\TAPIO V2\Version 1. - Filter corner period: 0.0100 [m] - Profile filtering: None - Language: English - Run executable after build: No - Run executable after build: No - Run executable minimized: No - Crop from the beginning of the profile: 0.000 [m] - Show user interface: Yes - Wait executable completion: No	2\Builder\Execu ≣	
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<	4	
CANCEL		
APPLY		
OK		



# 6 Specifications

## Main features

Measurement frequency:	30Hz, 30 hits/s
Measurement range:	adjustable
Connectivity	
Removable Media:	Secure Digital (SD) card up to 2GB
Wireless:	Bluetooth v2.0, range up to 30m
Wired connection type:	USB
Barcode Reader:	Built-in camera with illumination, various formats supported including linear, stacked linear and matrix bar (QR codes), range 1-30cm
Battery	
Туре:	4 x AA flight-safe batteries, rechargeable. Capacity 2500mAh
	(2000mAh for low self-discharge) or better per battery
Measurement time:	2 hours (continuous)
Standby time:	5 hours (up to)
Charger:	external, any standard AA charger can be used internal, with USB connection
Physical Dimensions	
Size:	190x75x105mm (H x W x D)
Weight:	1.25kg (incl. batteries)

