SQC in laboratory

the more data the higher precision

Only series of measurements analysis can provide information on the measurement result accuracy. Automaton of this process by means of Auto–SQC, like in Radwag balances, guarantees quick reaction. It is especially crucial for these laboratories that work in feedback kind of cooperation with production departments.

Analysis of plethora of information is not a problematic issue whenever ergonomic solutions offered by Radwag are in use.

Being aware of the multiple possibilities of usage, Radwag applications consist of two modules of Statistics. These modules are different in terms of functional capabilities. The first one enables statistical operation performance on freely selected data. Statistical operation provides the user with information on sum, mean value, Min and Max value, range, standard deviation and variance. This module is characteristic for offering the possibility of adding new measurements to an already performed series of measurements (OPEN formula).

XA 220.4Y

AS 220.3Y

The second module, called SQC, i.e. Statistical Quality Control, is intended for mass control of a sample, wherein the weighment tolerance has been specified. The particular process may be defined clearly by a batch number and by a quantity of measurements performed per series. The module's characteristic feature is the lack of possibility to add new measurements to an already performed series (CLOSE formula)

Considerable advantage of this module is presentation of sample weight by means of graph (SQC–GRAPH). The visual presentation is an invaluable asset for the process of sampling.

Statistics

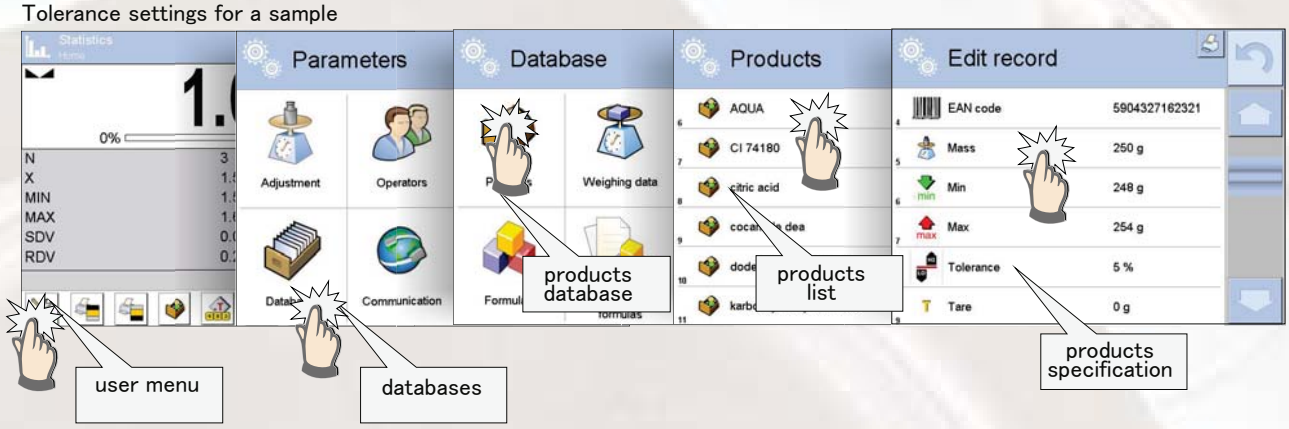
Statistics module offers possibility of quick analysis of data regardless of rigors driven by tolerance. Net weight measurement may be performed with different tare settings (single, sum of all, autotare etc.)

Chart of Probability Distribution for a series of measurements

initial filtration of measuring data

Initial filtration is possible, when for a product selected from a database which is to be analyzed, the percent tolerance has been specified in relation to reference mass. In addition to that, the result control function has to be activated. Through such operation only those measurements which are within the weighment tolerance will be selected for analysis. Initial filtration procedure allows to eliminate not only those measurement which are not within the weighment tolerance but also random ones.

Tolerance settings for a sample

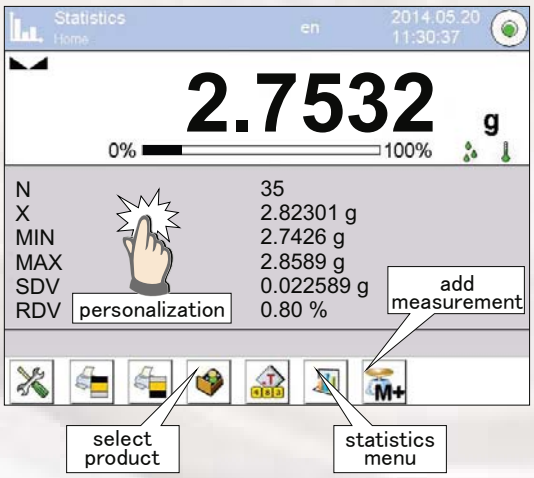


measurement series

Statistical data are displayed in an Info workspace, all the information is updated on–line after each performed measurement.

The user can:

- Adjust the content of Info workspace (personalization);
- View complete information on measurement data at any time;
- Save information, print reports.



report example

-------- Statistics ----------

N	35
SUM	98.8054 g
X	2.82301 g
MIN	2.7426 g
MAX	2.8589 g
D	0.1163 g
SDV	0.022589 g
RDV	0.80 %

Data archiving is possible either by print or by means of USB data storage device.

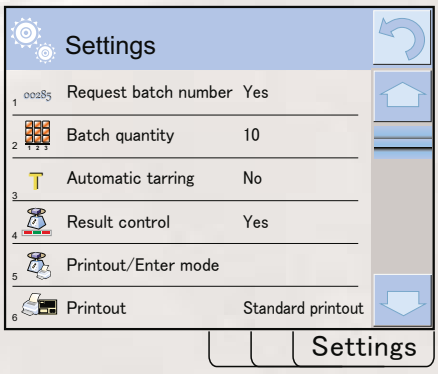
SQC Statistical Quality Control

Statistics module SQC is an ingenious device for control of various samples' weight. The tests may be performed either within production (critical limits and warning limits) or in-course of other monitoring processes.

All data is permanently saved to balance memory thus allowing for its potential verification (compliance with legal acts, branch regulations, etc.)

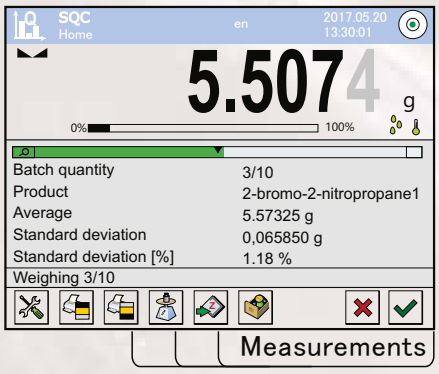
Ergonomics, personalization

The user has three touch panels at his disposal allowing him to freely configure measuring procedures, e.g. number of measurements, names, printouts etc.



Panel allowing specification of test parameters such as batch quantity, control performed accordingly to a given tolerance. Possibility of adjusting a given procedure printout to the users needs is offered.

The user can specify the record mode of measurements (manual, automatic, for stable measurements, with the use of low or high threshold value).



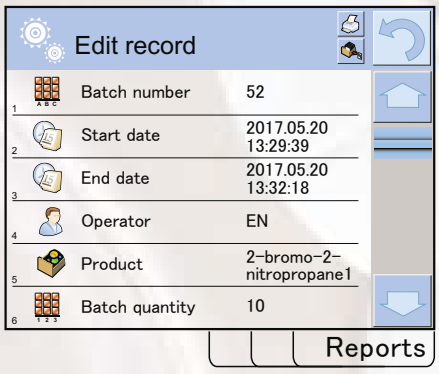
Precise weighing module serves for performing measurements with user-specified parameters for stability and filtering of the measuring signal. It guarantees measurement accuracy regardless of any influence factors.

SQC-Graph

The user has at his disposal function of automatic adjustment of weighment tolerance (bargraph) thus being able to perform sampling as safely and quickly as needed.

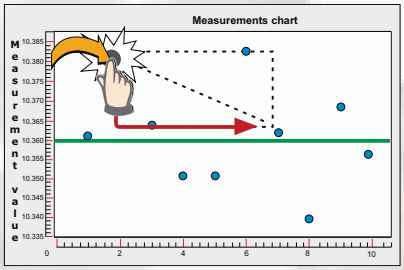
Viewer-Graph

The graph can be freely and easily adjusted. All the user has to do is to touch the panel and move finger to a demanded position in order to enforce automatic adjustment of the graph. When willing to return to the initial settings the user has to press the zoom icon.



SQC Reports is a brand new device intended for storing and processing great deal of information. It records various information on performed test to a database, ie. test number, name, statistical data, information data.

SQC Reports contain Viewer-Graph module which enables dynamic adjustment of the graphs.



SQC Statistical Quality Control

Statistics module SQC is an ingenious device for control of various samples' weight. The tests may be performed either within production (critical limits and warning limits) or in–course of other monitoring processes.

record

Information on the monitoring process allows to verify data at any moment. This guarantees compliance with quality systems such as ISO, GLP, GMP, HACCP, etc.

AS 220.3Y
Databases / SQC Reports

batch number
start date
end date
operator
product
batch quantity
average
standard deviation
Min
Max
T2 (–) errors quantity
T1 (–) errors quantity
T1 (+) errors quantity
T2 (+) errors quantity
measurements chart
measurements chart with tolerance thresholds

report example

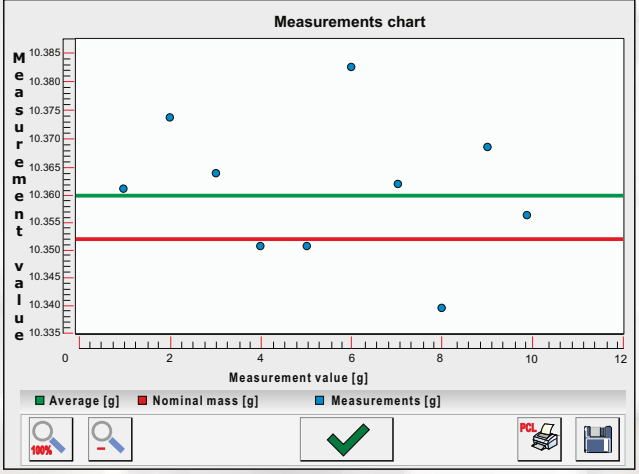
SQC

Operator		en
Product		probe 1
Start date		2017.05.19 13:18:28
End date		2017.05.19 13:21:54
Batch number		43786
Batch quantity		10
Nominal mass		10.3 g
T2– threshold	1.03 g	10 %
T1– threshold	0.515 g	5 %
T1+ threshold	0.515 g	5 %
T2+ threshold	1.03 g	10 %

Measurement 1	
Net	10.361[0] g
Measurement 2	
Net	10.373[1] g
Measurement 3	
Net	10.364[2] g
Measurement 4	
Net	10.349[6] g
Measurement 5	
Net	10.349[6] g
Measurement 6	
Net	10.381[4] g
Measurement 7	
Net	10.362[0] g
Measurement 8	
Net	10.338[7] g
Measurement 9	
Net	10.368[0] g
Measurement 10	
Net	10.354[6] g

T2– errors quantity	0	0 %
T1– errors quantity	0	0 %
T1+ errors quantity	0	0 %
T2+ errors quantity	0	0 %
Average	10.36022 g	
Standard deviation	0.011895 g	

Signature



Measurements chart in relation to average value.

SQC Statistical Quality Control

Statistics module SQC is an ingenious device for control of various samples' weight. The tests may be performed either within production (critical limits and warning limits) or in–course of other monitoring processes.

archiving

Export of information guarantees data safety and possibility to analyze the data by means of other computer systems. Regular printout means quick assessment of a particular series in terms of tolerance and specified thresholds (T1/T2).

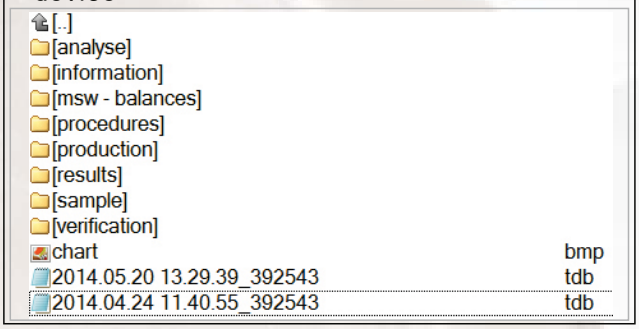
report

The analysis results may be sent to a chosen peripheral device (printer/computer).

```
------------------ SQC -----------------
Operator                          en
Product                       probe 1
Start date      2014.05.19 13:18:28
End date        2014.05.19 13:21:54
Batch number                   43786
Batch quantity                    10
Nominal mass                  10.3 g
T2– threshold     1.03 g        10 %
T1– threshold    0.515 g         5 %
T1+ threshold    0.515 g         5 %
T2+ threshold     1.03 g        10 %

------------ Measurement 1 -------------
Net                    10.361[0] g
------------ Measurement 2 -------------
Net                    10.373[1] g
. . . . . .
```

export

One of the possible ways of archiving SQC procedure report is its export to USB data storage device



Printout

Export – record form

2014.05.20	13.29.39	392543
(date)	(time)	(serial no.)

SQC automatic cycle measurement

Automatic cycle measurement requires cooperation of at least two devices. The first one is PA-04 /H automatic feeder which forms an ordered set out of a particular number of randomly arranged elements. Thus prepared sample's elements are separately transferred one by one by means of a chute to a weighing pan. The second device is balance which measures the elements and records their mass. These two devices work in feedback kind of cooperation for which the vibration level may be adjusted.

detector of elements

all the tested elements are recorded

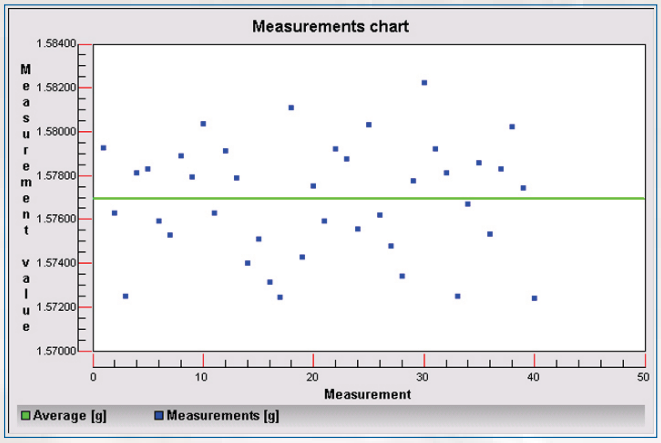
special solutions

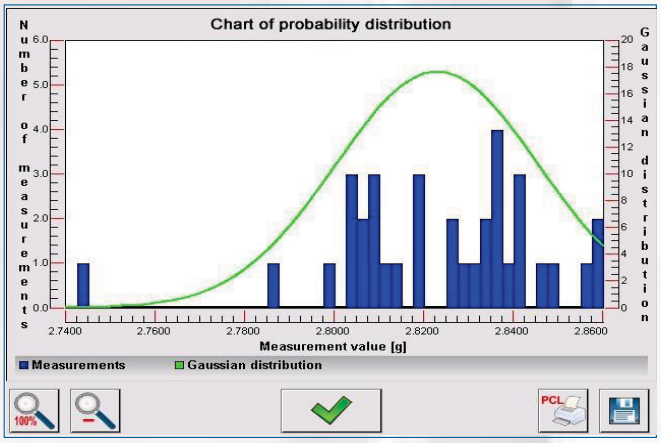
resistance to infuence factors

AS 220.3Y balance

PA-04 /H automatic feeder

SQC MODULE of .3Y series balances presents statistical analysis in a form of chart directly on a balance display. The charts may be printed on a freely chosen printer (PLC) or exported to .bmp file (transfer to USB port).





PA-04/H TECHNICAL DATA	PA-04/H
Fed object diameter	ϕ 3 ÷ 10 mm
Feeder diameter	ϕ 180 mm
Height of feeder's vibrating element	70 mm
Feeder speed	1 ÷ 15 pcs / min

SQC automatic cycle measurement

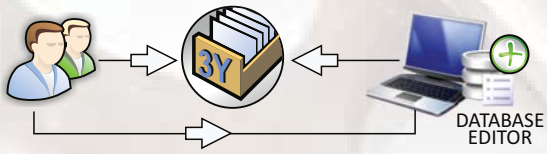
All statistical operations related to a tested sample are performed by SQC MODULE. This makes the statistical control workstation a mobile one and therefore it can be located in various production or control areas. EXPORT option of .3Y series balances allows sending demanded data concerning tested sample to a superior computer system.

report example

```
---------- Mass control ----------
Report number          04/10/06/15/08
Operator                     Admin
Product                   tab 100
Start date        2017.03.12 15:08:56
End date          2017.03.12 15:09:56
Batch number                   10
Reference quantity             10
Nominal mass              1.065 g
T2- threshold   0.0426 g    4 %
T1- threshold   0.0213 g    2 %
T1+ threshold   0.0213 g    2 %
T2+ threshold   0.0426 g    4 %

---------- Measurement 1 ----------
Net                       1.095 g
---------- Measurement 2 ----------
Net                       1.049 g
---------- Measurement 3 ----------
Net                       1.033 g
---------- Measurement 4 ----------
Net                       1.097 g
---------- Measurement 5 ----------
Net                       1.038 g
---------- Measurement 6 ----------
Net                       1.057 g
---------- Measurement 7 ----------
Net                       1.091 g
---------- Measurement 8 ----------
Net                       1.090 g
---------- Measurement 9 ----------
Net                       1.037 g
---------- Measurement 10 ----------
Net                       1.209 g


T2- errors quantity          0   0 %
T1- errors quantity          3  30 %
T1+ errors quantity          5  50 %
T2+ errors quantity          1  10 %
Average                 1.0796 g
Standard deviation  0.052373021045 g

---------------------------------------
Signature
```

MAIN INFORMATION

The tested sample may be defined in a balance DATABASE. Its reference value must be specified in terms of mass and quantity. The tolerance thresholds must be given. Information may be updated by means of DATABASE EDITOR computer software.



MEASUREMENTS

The measurement accuracy depends on applied balance type. Generally while selecting balance one should remember that the smaller sample weight is (this condition refers to a single element weight) the smaller scales interval should be chosen.

REPEATABILITY is the most important balance parameter that needs to be considered while selecting an appropriate balance type for cooperation with an automatic feeder.

RESULTS

Sample analysis results are recorded into database and into ALIBI MEMORY. Both, text and graphic form of the measurements can be analyzed.

Transfer of data to other applications is possible due to EXPORT option.

Statistics

The R2 series balance is a reliable device which meets requirements of any laboratory. It features an LCD display with a new text information line, 14–button keypad and automatic adjustment system.

Statistics function is one of many applications to which the user gets access via the user menu. The function is supported with information contained within databases such as Users Database, Products Database, Packagings Database (tares).

Statistics report consists of 3 defined areas, header, footer and measurements area where statistical results are printed.

report example

```
Operation mode                Statistics
Date                          22.05.2017
Time                          15:06:13
Operator                          Jack

      7.202[8] g
      7.114[5] g
      7.174[3] g
      7.168[3] g
      7.216[7] g
      7.180[1] g
      7.171[2] g
      7.210[7] g
      7.204[0] g
      7.176[2] g
----------Statistics----------
N                              10
Sum                       71.8188 g
Avg                      7.18188 g
Min                       7.1145 g
Max                       7.2167 g
Dif                       0.1022 g
Sdv                    0.028109 g
Rdv                         0.39 %
--------------------------------
Signature
.....
```

The R2 series comprises various balance types with weighing accuracy ranging from 0.01 mg to 0,1 g. Capabilities of all the series types in terms of statistical analysis are identical.

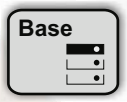
AS 220.R2
Max 220 g, d = 0,1 mg

Functions

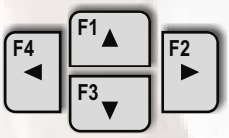
- Weighing
- Parts Counting
- Checkweighing
- Dosing
- Percent Setup
- Solids Density
- Liquids Density
- Animal Weighing
- Statistics
- Totalizing
- Peak Hold

quick access to information

The balance comprises 2 buttons enabling easy access to DataBase and Functions. Additionally it is equipped with 4 programmable function keys F1–F4. The function keys can perform different operations for each mode:



- header printout
- tare editing,
- footer printout,
- product selection



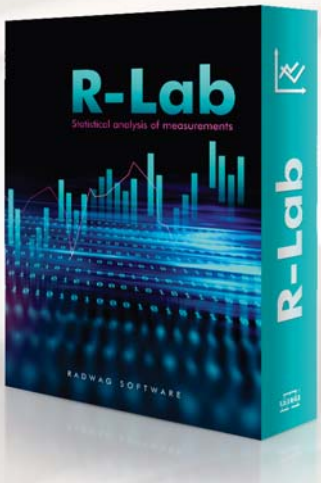
ergonomics and area of use

PS 6000.R2
Max 6 kg, d = 10 mg

Statistics

analysis with the use of computer software

PC software is a useful tool allowing transfer any data from a freely chosen weighing device. Connection between the balance and the software is either wireless (Wi-Fi) or established via communication interface (usually RS 232) or Ethernet.



R-Lab
flexibility and reliability

R-Lab is an up-to-date program that stores, presents and subjects to statistical analysis all the measurements carried out using RADWAG-manufactured balances and scales. The software offers advanced functions of generating and customizing graphs and reports for 20 weighing instruments.

- Measurement Record:
  - manual: the measurement record is carried out upon pressing print/enter key.
  - automatic: performance of series of measurements of specified quantity and time interval.
- Weighing data readout and export to file of the following formats: PDF, MHT (Web), RTF, XLS and XLSX (Excel), CSV, text or graphic.

- Data visualization (weighings presented in a form of graph):
  - measurements graph with statistics data,
  - Gaussian distribution graph and a histogram,
  - stability graph showing difference between successive measurements,
  - all in one graph.

- Statistics – statistical processing of weighing data.
- Generating reports for a selected series of measurements, and possibility of reports filtering.
- Transfer of data from the weighing device to a computer:
  - data transfer using key located on the operation panel
  - data transfer using computer keyboard
  - entering balance-displayed data in keyboard cursor position.

RadKey,
unsophisticated program, endless possibilities

By means of this simple application you can capture the weighing result and transfer it to any text editor or spreadsheet.

- Reading weighing data and transfer to any freely selected program (TXT, XLS, DOC, RTF).
- Record of data to file.
- Programmable Hot-key for weighing result tarring and readout.
- Conversion of text characters to numeric ones (spreadsheets acceptable).
- Storing data in rows or columns (control characters).
- Language versions: Polish, Czech, English, German, French.

We do not sell packaging version of the software. The above presented packagings serve virtual purposes exclusively.