



## Corporate overview

Sure Torque began the development of the first electronic torque tester in 1985 in response to the needs of manufacturing and quality control engineering departments for precision torque testing instrumentation, capable of accurate, NIST certifiable torque measurement. Our equipment line offers rigorous testing of closure integrity, and is a necessary requirement to meet today's stringent specifications for quality control and data collection.

Our torque testers are currently an invaluable part of the production and quality control departments for major corporations such as Abbott, Eli Lilly, Schering, Upjohn, Procter & Gamble, Coca Cola, S.C. Johnson, Gerber, Seagram, Hershey, Warner Lambert, and Kraft General Foods, to name a few.

Container cap torque is important, not only for package appearance and product integrity, but mainly for customer satisfaction and consumer safety. We fully support a total commitment to quality control at STI; after all, we developed this advanced technology in response to the needs of our customers. STI continues to respond to our customers' needs by developing and manufacturing the most sophisticated, up to date electronic torque testers available in the world today.

We know today's consumers judge product quality based on many criteria, which include packaging, appearance and overall effectiveness of the product. Cap torque not only impacts the package's appearance, but more importantly, the customer's perception of the manufacturers' level of quality and concern.

In today's competitive market, the consumer avoids buying products if there is detectable evidence of product leakage, product tampering or something as simple as a difficult to remove closure.

Quality control of the filling operation is concerned with possible product loss due to loose caps on liquid products and the stability of both liquid and dry products. Stability is of particular concern with moisture sensitive products, which require that the integrity of the container cap and the internal seal be maintained. Stability considerations are critical since product loss due to evaporation or moisture absorption can cause significant changes in potency and thereby the efficacy of the product.

Container closure application can significantly affect the success of a product and closure application defects are detectable with the correct torque testing protocols in place, thus assuring closures meet certain specifications, thereby assuring product integrity.

To achieve the desired level of product quality, manufacturers set certain specifications for acceptable torque values, based upon container closure testing conducted on each container type.

At Sure Torque, our line of torque testing equipment is designed to not only conduct precise closure torque testing, but to also provide data necessary for evaluation of a closure system's compatibility to a container, efficiency of tamper evident bands and closure or liner durability. This data will help determine a closure's conformance to performance specifications, and evaluate a capper's capability.

Thank you for your interest in Sure Torque.  
We look forward to supporting your closure testing requirements.



SURE TORQUE SB-TF  
SMART BOTTLE TORQUE-FORCE  
WIRELESS TORQUE/FORCE TESTER

TECHNICAL DATA'S AND OPERATION MANUAL (v1.1)



Smart Bottle is a Bluetooth wireless torque-force tester. SB-TF measures the dynamic chuck application torque and the top load on the capper machine even at normal production speed, during the production. Highest measuring speed is 200 Hz on each channel (torque, force).

Smart Bottle can be placed in any (bigger) sized dummy bottle to accommodate it to the size of the container the capper is set for.

This document is downloadable from:

[http://www.suretorque.eu/media/wysiwyg/download/manual\\_SB-TF\\_v1.1.pdf](http://www.suretorque.eu/media/wysiwyg/download/manual_SB-TF_v1.1.pdf)

DETAILS

Technical details:

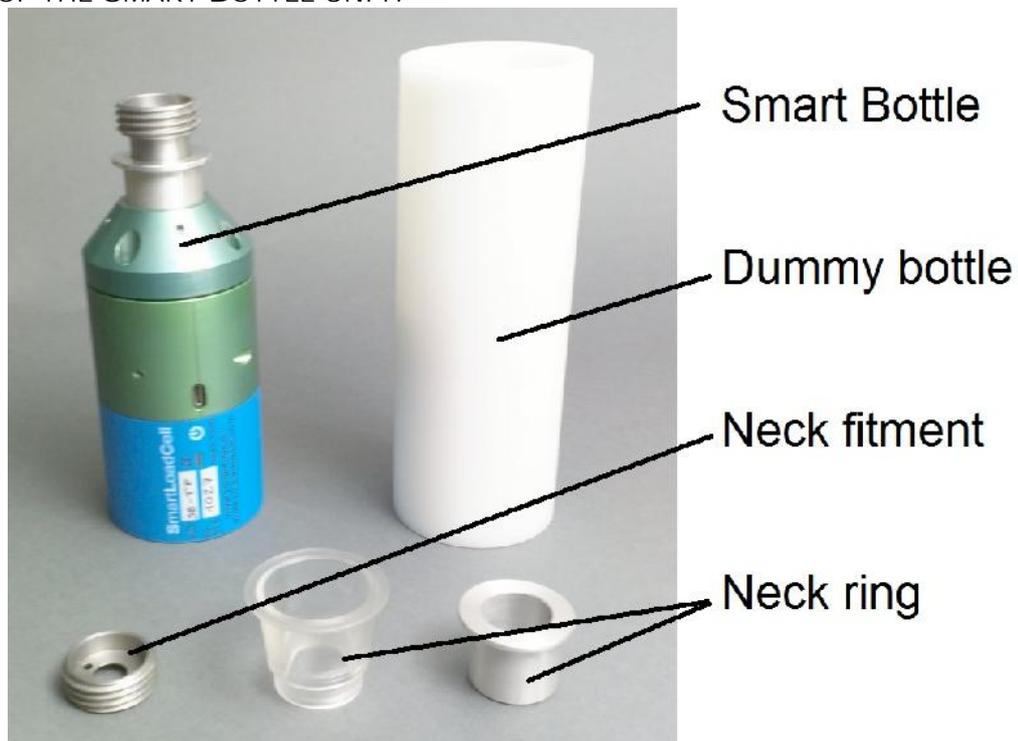
Smartphone requirement	1 GB RAM, 1 GHz Processor, 4 GB ROM
Android version	Android 4.4 or higher
Measuring range:	-10Nm - +10 Nm (cca +/- 88.5 lbfIn) / 30 kg
Torque units:	LbfIn, LbfFt, Nm, dNm, Ncm, kgfcm
Force units:	kg, N, Lb

manual\_SB-TF\_v1.1



Displayed values:	Actual, Max1, (Max2), torque-time diagram
Accuracy	+/- 0,5% F.S.
Maximum measuring frequency:	200 Hz (SPS) = 5 ms
Range analysis	Yes – In range / under range / over range
Capable closure types:	any kind of serrated twist cap
Maximum sample size:	Any
Calibration kit:	available
Battery life:	6 hours
DC supply:	Micro USB
Included software:	Android application Data manager for PC
Memory:	Thousands of results (phone memory)
Stored data's:	measurement nr, peak results, date, time, diagram, instrument name, serial number, comment, calibration date
Resistance grade:	IP 54
Language:	English
Dimensions: Footprint / Height	D59 x 150 mm
Net weight:	0,9 kg
Shipping weight:	1 kg
Shipping dimensions:	
Shipping packaging:	Heavy duty waterproof case
Warranty:	3 years

**PARTS OF THE SMART BOTTLE UNIT:**





GETTING STARTED

Application download: [www.suretorque.eu](http://www.suretorque.eu) / Useful information / Support / SLC-apk  
System requirements: Android 4.4 or higher, 1 GB RAM, 1 GHz Processor, 4 GB ROM  
Application can be used both with 1 and 2 channel SmartLoadCell systems. By 2 channel systems both channels must be configured and a primary channel must be selected.

1. Install the SmartLoadCell Android application on your device!
2. Pair your SmartLoadCell with your device and connect. When pairing, all the important SmartLoadCell parameters will be uploaded to the phone from the SmartLoadCell's memory (calibration data, load cell type, measuring range, etc.)
3. Personalize your settings (use point as decimal):
  - a. Choose measuring mode – Recommended test mode for the Smart Bottles: Continuous mode



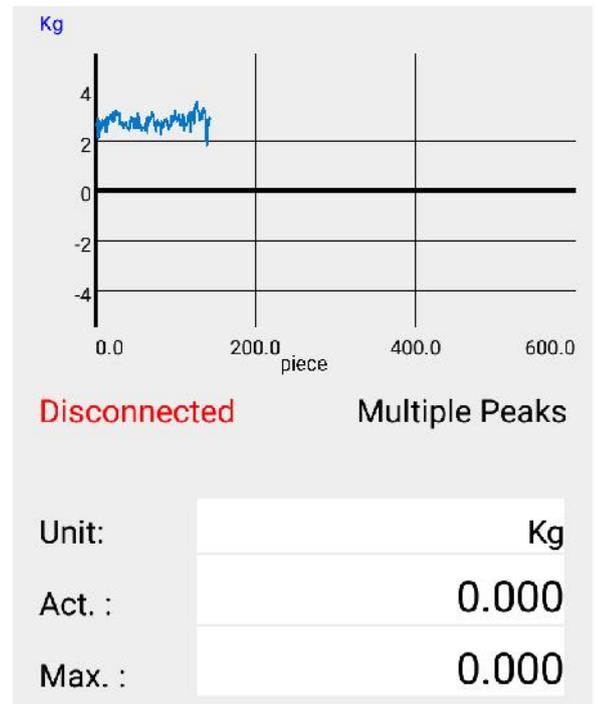
Continuous – records all measuring points from start to stop  
Result: maximum value.  
This mode is ideal for monitoring longer procedures with several peaks



Single peak – Measurement stops automatic after the 1<sup>st</sup> peak.  
Result: maximum value

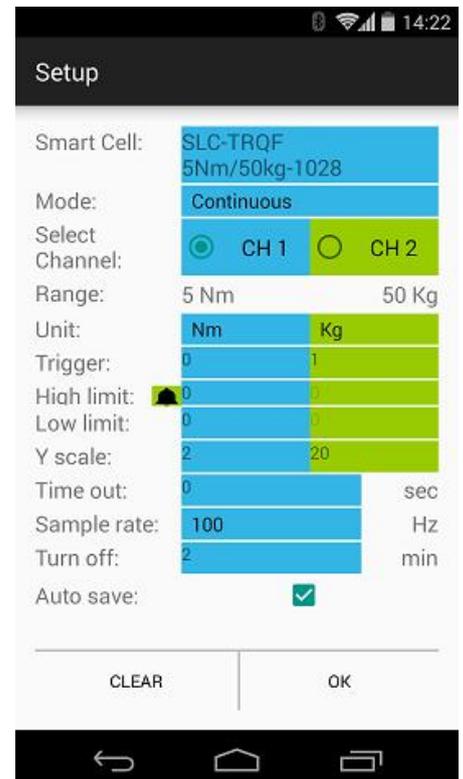


Double peaks – Measurement stops automatic after the 2<sup>nd</sup> peak.  
 Results: Max1, Max2



Multiple peaks – Records only the maximum values of the test cycles – 1 test cycle is represented by 1 point on the diagram. This test is generally used for testing hundreds of cycles  
 Result: maximum of the peaks

- b. Select measuring unit
- c. Set trigger level – Trigger level is a load level that starts and stops the measurement recording - "start-stop signal" of the measurement. As long as the measured value is under the trigger, recording will not be started. Measurement will be stopped (or paused), if the measured value drops under the trigger level. Recommended level is between 2-15% of the expected maximum value.
- d. If you need range checking, set high and low limits. Values will be displayed with different colors:
  - blue – under range
  - green – in range
  - red – over range
 (by 2-channel unit select the "primary" channel too)





It is possible to switch on a sound signal for the exceeding of the high limit with the ring button.

- e. Set time out (relevant only in double peaks mode) – This time defines how long the instrument waits for the start of the second peak's measurement. If time out elapses without value over the trigger, MAX2 will be 0.
- f. Set Y scale for the diagram's scaling (default setting is the maximum of the cell, recommended value is a little above your expected maximum)
- g. Select sample rate (6,25 – 400 Hz, recommended: 50-200 Hz)
- h. Set turn off time (for automatic shut down after disconnecting)
- i. Check Auto save box if you want to save all results automatic

#### MEASURING WITH THE SMART BOTTLE

1. Turn on the unit (if necessary first change the neck ring / neck fitment and apply the SB unit in the dummy bottle)
2. Connect to the Smartphone and make sure all settings are correct (measuring mode, trigger level, sampling rate)
3. Make sure the unloaded value is 0. If not, hit TARE button
4. Tap the diagram area to start recording
5. Perform your test  
Continuous and multiple tests can be stopped by tapping the diagram area again.  
Single and Double peak tests will be stopped automatically.
6. After the test you may add a comment to the test. You can also add the same comment to more test with checking "Remember"
7. You may save the result with the save button (unless you have set auto save)

#### FURTHER FEATURES

CLEAR button on the main screen will clear the screen

CLEAR button on the SETUP screen will clear all the setup parameters including the SmartLoadCell pairing.

Menu/History – All saved results can be reviewed. Results can be deleted one by one (or in bulk with hitting the trash button longer). Diagrams can be scrolled and zoomed.

Menu/Export to XML will create an export\_11111\_22222.xml file in the Download folder of your android device. Download file can be forwarded to PC via Bluetooth, email, internet or USB cable.

Status LED – Status LED has 3 states:

- Green flashing – unit is ready to use, but unconnected
- Blue flashing – unit connected
- Red - charging



Shutting down the SmartLoadCell – To turn off select the turn off button on the main screen or keep the power button pushed for 10 seconds on the SmartLoadCell unit.

Charging – SmartLoadCells can be charged with any micro USB charger. While charging the status led on the unit will be red. Battery state can be monitored by hitting the battery icon on the main screen. Battery is enough for about 10 hours of operation. Please note that when battery is almost discharged, it is possible that you experience some spikes in the measurement. It is recommended not to discharge batteries under 10%.

On the PC - the included data manager program can:

- Convert results to csv-file (excel compatible)
- Display the results with diagrams
- Make statistical analysis of the results
- Create report from the individual results or from the statistical analyses

#### DATA MANAGER PROGRAM

Data manager program for pc can be downloaded in zip form from:

[www.suretorque.eu](http://www.suretorque.eu) / Useful information / Support / SLC\_DAQ\_1.1

link: [http://www.suretorque.eu/media/wysiwyg/download/SLC\\_DAQ\\_1\\_1\\_0.ZIP](http://www.suretorque.eu/media/wysiwyg/download/SLC_DAQ_1_1_0.ZIP)

When opening an export.xml file, a csv file will be created from the results.

With the program you may view all the measurement results saved in the xml. Individual results can be printed in report form.

The screenshot displays the 'Smart Load Cell Data Manager' software interface. At the top, there are input fields for SLC Type (s cel-100 kg), S/N, ID (10), Test Type (Continuous), Comment (s cela), and Date (2017.01.27. 12:03:13). Below these is a 'Diagram' section with a graph showing force in Kg over time in seconds. The graph shows a fluctuating signal around a mean value. Below the graph are fields for MAX1 (-5.900 Kg), MAX2 (0.00000), and a 'Data Files' table. The table has columns for Unit S/N, ID, Comment, Date/Time, Smart Load Cell Type, Unit, MAX1, MAX2, and File Name. The right side of the window features a 'STATISTICS' panel with dropdown menus for SLC Type and Test Type, input fields for From Row Number and To Number, and LSL Range Minimum and Maximum. It includes a 'CALCULATE' button and a section for 'PARAMETERS' and 'STATISTICS' with various numerical values. A 'PRINT REPORT' button is at the bottom right.

Unit S/N	ID	Comment	Date/Time	Smart Load Cell Type	Unit	MAX1	MAX2	File Name
5	1111	5	2017.01.26. 17:06	s cel-100kg	Kg	-4.078		imp00005.slc
6	1111	6	2017.01.26. 17:11	s cel-100kg	Kg	-4.458		imp00006.slc
7	1111	7 s cela	2017.01.26. 17:11	s cel-100kg	Kg	-2.583		imp00007.slc
8	1111	8 s cela	2017.01.26. 17:11	s cel-100kg	Kg	-3.275		imp00008.slc
9	1111	9 s cela	2017.01.27. 12:07	s cel-100kg	Kg	4.220		imp00009.slc
10	1111	10 s cela	2017.01.27. 12:00	s cel-100kg	Kg	-5.900		imp00010.slc
11	1111	11 s cela	2017.01.27. 12:08	s cel-100kg	Kg	-6.613		imp00011.slc
12	1111	12 s cela	2017.01.27. 12:08	s cel-100kg	Kg	-7.807		imp00012.slc
13	1111	13 s cela	2017.01.27. 12:08	s cel-100kg	Kg	-8.210		imp00013.slc
14	1111	14 s cela	2017.01.27. 12:08	s cel-100kg	Kg	7.073		imp00014.slc
15	1111	15 s cela	2017.01.27. 12:00	s cel-100kg	Kg	-5.107		imp00015.slc
16	1111	16 s cela	2017.01.27. 12:09	s cel-100kg	Kg	-4.965	-7.764	imp00016.slc

On the right side of the window you can select and filter the results and make statistics on the filter. Statistics can be printed in report form as well.

CALIBRATION

1. Assemble the calibration stand.
2. Fix the unit on the measuring stand by the 2 M6 screws
3. Remove the neck thread change part of the IMB



4. Fix the calibration disk.



5. When the disk is unloaded, TARE the displayed values

6. To check the **CLOCKWISE** calibration, hang both weights on the disk so, that both weights are hanging on the **GREEN side** wheels. As the disk radius is 4 In, and both weights are 2 Lbf/in, the measured actual torque should be 16 Lbf/in, and actual force should be 0 Lb.



7. To check FORCE calibration place the big, 10 Lbf weight on the middle of the disk. You should read 16 Lbf/in actual torque and 10 Lbf actual force.
8. Remove the weights
9. To check the **COUNTER CLOCKWISE** calibration, hang both weights on the disk so, that both weights are hanging on the **RED side** wheels. Actual torque should be -16 Lbf/in, and actual force should be 0 Lbf/in.



10. To check FORCE calibration place the big, 10 Lbf weight on the middle of the disk. You should read 10 Lbf actual force. You may add the 2 2Lb weights too, so you should read 14 Lb – **IMPORTANT: always put symmetric load on the Smart Bottle! Never use the 10 Lb weight for torque calibration!**



11. Remove the weight! Actual torque should be 0 Lbf and actual force should be 0 Lb



- 12. You may try the calibration with the torque and load at the same time too (2 Lb weights hanging on either the CW /green/ or the CCW /red/ side and the 10 Lb weight on the top of the disk.
- 13. If the instrument is well calibrated, torque and force results should be within +/-1% tolerance range at high loads, and within +/- 0.5 LbfIn / +/- 0,5 Lbf by 0 loads.
- 14. Repeat torque calibration for at least 3 times! If the measured values are out of the tolerance, the instrument needs to be recalibrated!

RECALIBRATION – **ATTENTION! ONLY IF NECESSARY!**

- 1. Enter the CALIBRATION menu by typing the password: 10562348
- 2. Follow the calibration steps of the calibration:
- 3. Select the channel to be calibrated (channel 1 – torque / channel 2 – force)
  - a. Torque calibration
    - i. Check the calibration unit and the calibration value (16 LbIn)
    - ii. Hang both weights on the CW side of the calibration disk (green side) and hit OK for +Max load calibration
    - iii. Remove weights and hit OK for +0 calibration
    - iv. Hang both weights on the CCW side of the calibration disk (red side) and hit OK for –Max load calibration
  - b. Force calibration
    - i. Check the calibration unit and the calibration value
    - ii. Apply maximum load and hit OK for +Max load calibration
    - iii. Remove weight and hit OK for 0 calibration
- 4. Check calibration as described above in Calibration

UNITS AND CONVERSATION

TORQUE

inlb: inch-pound

ftlb: foot-pound

Nm: Newton-meter

dNm: deci newton-meter - 0,1 Nm

Ncm: Newton-cm, - 0,01 Nm

Lbfl n	LbfFt	Nm	dNm	Ncm	Kgfc m
1	0.083	0.113	1.13	11.3	1.1521
12	1	1.356	13.56	135.6	13.8255
8.851	0.738	1	10	100	10.1972
0.885	0.074	0.1	1	10	1.0197
0.089	0.007	0.01	0.1	1	0.1020
0.8679	0.072	0.0980	0.9806	9.8066	1
6		7	6	1	1



FORCE

N: Newton  
Lb: Pounds force  
Kg: Kilograms force  
T: Ton

N	Kg	Lbf	Ton
1	0.102	0.225	0.0001
9.807	1	2.205	0.001
4.448	0.454	1	0.0004 5
9806.8 1	1000	2204. 6	1

TROUBLESHOOTING

SmartLoadCell unit connected, but it seems not measuring:  
It may happen that the pairing is not successful at the first time. In this case disconnect and connect again.  
If it won't help: enter MENU/SETTINGS and CLEAR the settings, then select Smart Cell again and wait until the cell data's are uploaded (Range value will be filled and status led turns from green to blue)

Application was developed with English language settings. If you experience malfunction with different language setting, close the application, change language to English and run the application again.

SmartLoadCell application freezes – Enter settings/apps in on your Android device and force stop the application. If this doesn't help it is recommended to uninstall the application and then reinstall it again.

MAINTENANCE

SmartLoadCells are precision measuring devices, handle them with care! In normal case SmartLoadCells will not require any preventive or systematic maintenance.  
Battery is to be changed if it wears out. Battery type: Nokia BL-5C, 1000 mAh.  
Battery is located under the cover of the SmartLoadCell unit. If cover is sealed, pay attention on sealing it with clear silicone when reclosing the cover!

ENJOY THE FREEDOM OF TELEMETRY!



***The Cap Test Specialist***

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Notes