

Mecmesin

Digital Torque Testers



Torque Measurement

Manufacturers of products supplied in containers, which use screw closures, are acutely aware of the need to check that the correct torque has been applied to ensure that they deliver a quality product.

With the amazing diversity of caps and closures available, there is an ever-increasing demand to prove that they fulfil the essential requirements of:-

- Minimal leakage or evaporation
- Product integrity during storage, distribution and display on the shelf
- Being tight enough to create an effective seal whilst still being easy-to-open and reseal by the consumer

Closure torque meters need to be able to hold the peak values of application and removal torque. This can be done mechanically with old-style 'spring-type' closure meters, or by constantly updating the memory register of electronic instruments. With mechanical testers, factors such as friction and inertia can lead to peak readings which vary enormously depending on how quickly the individual operator applies torque to the closure. Even in the case of electronic instruments, the peak reading can be 'missed' if the memory register is not updated fast enough... all Mecmesin closure torque testers operate at a sampling rate of 1000 times per second.

Technical Standards

There are several ASTM Standards which specify equipment and test procedures for evaluating closure torques :

- D2063-91, D3198-97, D3474-90 (all updated in 2002)
- D3469-97, D3472-97, D3474-90, D3810-97, D3968-97

For more details visit www.astm.org

For more information on testing procedures visit www.mecmesin.com/literature.html

Closure Torque Testers

Full technical details of the Mecmesin range of electronic torque meters are contained within this brochure, but models can be briefly summarised:-

- Tornado** - ideal for capturing peak values of application and release torque with pass/fail signals for the operator + on-board memory (page 2)
- Orbis** - ideal for capturing peak values of application and release torque (page 3)
- Orbis TE** - ideal for both capturing the 'slip torque' and 'bridge torque' of tamper-evident closures (page 5)
- CRC Tester** - ideal for capturing force and torque characteristics of CRC type 'push and twist' closures (page 6)



Tornado



The Tornado is a bench-top digital alternative to traditional mechanical testers, available in capacities of 1.5N.m, 6N.m and 10N.m. Its wipe-clean enclosure and stainless steel / anodised aluminium top-plate allow any spillage to be cleaned easily.

Containers of cylindrical or irregular shapes with diameter of 8 – 55mm or 20 - 195mm can be quickly and securely held between the easily adjustable clamp posts... there is no need for time-consuming tooling changes between different bottles and caps.

The high sampling rate employed by the electronics minimises variability in peak readings arising from operators applying torque at different speeds, which is a common problem with mechanical 'spring-type' testers.

Peak values for application and release torque are held on the digital display for easy viewing in all common units of measurement. To assist the operator a target torque limit can be set, which when reached will trigger audible and visual (LED) alarms.










After the test is completed, data can either be stored internally within the memory of the Tornado for subsequent download, or automatically transferred to a PC, printer or datalogger via the RS232 output socket. This allows full reporting of results for statistical analysis.


The Tornado measures from zero to full-scale with an accuracy of $\pm 0.5\%$ of full-scale at a resolution of 1:5000 and is delivered at no extra charge with a calibration certificate traceable to UK national standards.

Key Features

- Pass/fail alarms
- High accuracy
- Data output for archiving results
- Splash-proof
- On-board memory
- 3 different capacities (1.5, 6, & 10N.m)
- Easy-to-read display of application and release torque
- Mains and/or battery-powered

Tornado Technical Specification

	Tornado 1.5	Tornado 6	Tornado 10
Measurement range	0 - 1.5N.m  0 - 15kgf.cm  0 - 13lbf.in 	0 - 6N.m  0 - 60kgf.cm  0 - 50lbf.in 	0 - 10N.m  0 - 100kgf.cm  0 - 90lbf.in 
Display resolution	0.0003N.m 0.003kgf.cm 0.003lbf.in	0.001N.m 0.01kgf.cm 0.01lbf.in	0.002N.m 0.02kgf.cm 0.02lbf.in
Container diameter	8 - 55mm	20 - 195mm	20 - 195mm
Units of measurement	N.m, mN.m, N.cm, kgf.cm, gf.cm, lbf.ft, lbf.in, ozf.in		
Sampling rate	1200Hz		
Accuracy	$\pm 0.5\%$ full scale deflection		
Overload	120% of full scale		
Weight	4.6kg		
Dimensions (mm)	350(w) x 250(d) x 85(h)		
Part No.	876-003	876-002	876-001

 Clockwise and anticlockwise



Lug-style vacuum closure



Miniature pharmaceutical



Non-cylindrical

Orbis



The Orbis provides a low-cost digital alternative to traditional mechanical testers. It has been designed for ease-of-use and portability thanks to its moulded carry-handle and compact lightweight housing, making it ideally suited for use in production and quality control areas.

Containers of round or irregular shapes with diameter of 10 – 160mm can be quickly and securely held between the easily adjustable clamp posts... there is no need for time-consuming tooling changes between different bottles and caps. The stainless steel / anodised aluminium top-plate is sculpted to incorporate a drip tray and can be wiped clean after any spillage with minimal risk of liquid ingress.

The high sampling rate employed by the electronics minimises variability in peak readings caused by operators applying torque at different speeds, which is a common problem with mechanical 'spring-type' testers.

Peak values for application and release torque are held on the digital display for easy viewing in all common units of measurement. After the test is completed, data can be automatically transferred to a PC, printer or datalogger via the RS232 output socket to allow full reporting of results and statistical analysis.

The Orbis measures between 0 – 6N.m (0 – 50lbf.in) with an accuracy of $\pm 0.5\%$ of full-scale at a typical resolution of 1:5000 and is delivered at no extra charge with a calibration certificate traceable to UK national standards.

Key Features

- Low cost
- High accuracy
- 6N.m (50lbf.in) range
- Easy-to-read display of application and release torque
- Data output for recording results
- Splash-proof
- Compact and portable
- Mains and/or battery-powered



Features of the Orbis



Food and Drink



Cosmetics



Household chemicals

Orbis Technical Specification

Measurement range	0 - 6N.m ΔG 0 - 60kgf.cm ΔG 0 - 50lbf.in ΔG
Display resolution	0.002N.m 0.02kgf.cm 0.01lbf.in
Container diameter	10 - 160mm
Units of measurement	N.m, mN.m, N.cm, kgf.cm, gf.cm, lbf.ft, lbf.in, ozf.in
Sampling rate	1000Hz
Accuracy	$\pm 0.5\%$ full scale deflection
Overload	typically 150% of full scale
Weight	2.5kg
Dimensions (mm)	250(w) x 200(d) x 55(h)
Part No.	876-007

Orbis TE

Tamper-Evident Torque Tester

The Orbis TE provides all the features and benefits of the basic Orbis for measuring the application and release torque of standard screw closures together with a unique facility for measuring tamper-evident seals.

The torque required to initiate movement of the cap is known as the 'slip torque' (see explanatory graph).

The subsequent torque required to break the bridges between the closure and the pilfer band is known as the 'bridge torque' (see explanatory graph).

When using standard torque meters, it is only possible to see a single peak reading, whereas the Orbis TE, as illustrated, clearly presents the values for both 'slip torque' and 'bridge torque' on the same display. A single key press will automatically transfer either or both values to a PC, printer or datalogger for recording and statistical analysis.

'Spinners' and damaged tamper-evident closures can be identified by their abnormal torque values as measured on the Orbis TE. The term 'spinners' refers to (a) closures which do not break the bridge when twisted anti-clockwise and (b) closures that have been 'over-torqued' by turning the wrong way (i.e. clockwise), causing the thread to strip but not to break the bridges on opening.

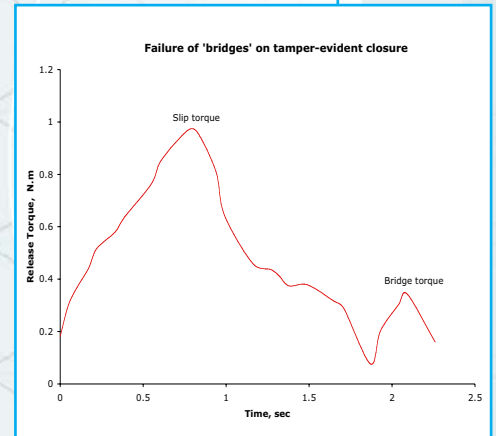
Effective tamper-evidence by induction sealing

Induction sealing is a non-contact heating process, which accomplishes the hermetic sealing of a container with a foil lid. The seal cannot be removed without leaving evidence on the lip of the container.

To ensure effective induction sealing it is essential that the closure is applied with the correct torque. Insufficient torque will cause poor sealing as excessive distance between closure and container will increase heat loss. Regular monitoring and adjusting of capping torque can save valuable time and reduce subsequent rejects later in the production process.

For comprehensive information on induction sealers visit www.enerconind.com

The Orbis TE measures between 0 – 6N.m (0 – 50lbf.in) with an accuracy of $\pm 0.5\%$ of full-scale at a typical resolution of 1:5000 and is delivered as standard with a calibration certificate traceable to UK national standards.



Orbis TE display



Tamper-evident seals

Key Features

- Easy-to-read display of 'slip torque' and 'bridge torque' for tamper-evident closures
- Low cost
- High accuracy
- 6N.m (50lbf.in) range
- Data output for recording results
- Splash-proof
- Compact and portable
- Mains and/or battery-powered

Orbis TE Technical Specification

Measurement range	0 - 6N.m \mathcal{D} 0 - 60kgf.cm \mathcal{D} 0 - 50lbf.in \mathcal{D}
Display resolution	0.002N.m 0.02kgf.cm 0.01lbf.in
Container diameter	10 - 160mm
Units of measurement	N.m, mN.m, N.cm, kgf.cm, gf.cm, lbf.ft, lbf.in, ozf.in
Sampling rate	1000Hz
Accuracy	$\pm 0.5\%$ full scale
Overload	150% of full scale
Weight	2.5kg
Dimensions (mm)	250(w) x 200(d) x 55(h)
Part No.	876-008

CRC Tester

Child-Resistant Closure Tester

The Mecmesin child-resistant closure tester is capable of accepting the simultaneous application of vertical downward force and torque, and presenting both of these values on dedicated displays.

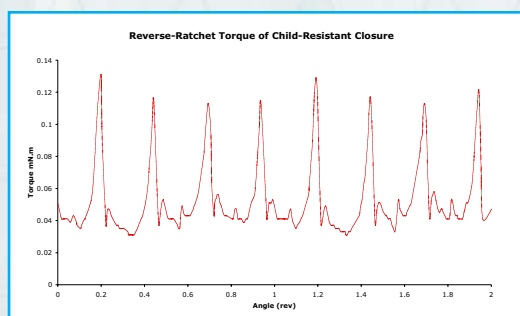
This feature is particularly suitable for the pharmaceutical industry when testing those child-resistant closures (CRC's) which require a push and twist action... see ASTM's D3472-97, D3475-97, D3810-97, D3968-97 and ISO 8317. It can help determine which closures can be opened by the older generation whilst still retaining security for young children.

The operator may apply any downward force to the closure between 0 – 500N (110lbf) whilst applying torque of up to 10N.m (90lbf.in) . Peak values of force and torque can be transmitted via RS232 output to printers, PC's or dataloggers. Alternatively Mecmesin DataPlot software can collect and plot force or torque data in graphical format, which is particularly useful in determining the reverse-ratchet torque of type IA child-resistant closures... see ASTM D3472-97



CRC Tester Technical Specification

	Force	Torque
Measurement range	500N 50kgf 110lbf	0 – 10N.m $\mathcal{D}\mathcal{G}$ 0 – 100kgf.cm $\mathcal{D}\mathcal{G}$ 0 – 90lbf.in $\mathcal{D}\mathcal{G}$
Display resolution	0.1N 0.01kgf 0.02lbf	0.002N.m 0.02kgf.cm 0.02lbf.in
Units of measurement	N, kgf, gf, ozf, lbf	N.m, N.cm, mN.m, kgf.cm, ozf.in, lbf.in, lbf.ft
Container diameters	20 – 195mm	
Sampling rate	1200Hz	
System accuracy	±1% Full scale	
Overload	120% of full scale	
Weight	5kg	
Dimensions (mm)	580(w) x 210(d) x 180(h)	



Accessories

Check calibration kit

To verify periodically the calibration of your torque tester at your factory, Mecmesin offers a bench-top calibration rig specifically designed to hold the Orbis and Tornado. Using dead-weight masses, you will be able to assess the calibration of your equipment and decide immediately whether adjustment or repair is required.



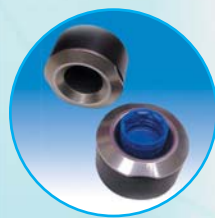
Extra Splash-proof Protection

For the Orbis and Orbis TE, a custom water-resistant jacket is offered which secures beneath the unit and completely covers and protects against ingress of water. When fitted it allows the Orbis models to achieve an IP53 rating.



Closure holders

Plastic closures with flexible walls can often be distorted by operators gripping them under differing pressure, which may cause variability in torque readings. To counteract this effect, Mecmesin offer dedicated closure holders which are specifically moulded to your closure design.



Statistical Mini-Printer

A particularly cost-effective way to record peak torque readings is to use a statistical mini-printer, which can be located next to the torque meter. When an operator completes a batch of tests, a statistical summary can be printed showing the maximum, minimum, range and standard deviation. The summary can then be attached to a test report ensuring full traceability.



Market Sectors

Mecmesin

Force and Torque Test Solutions

Mecmesin Limited
Newton House
Spring Copse Business Park
Slinfold
West Sussex RH13 0SZ
England

Tel +44 (0) 1403 799979
Fax +44 (0) 1403 799975
e-mail info@mecmesin.com

www.mecmesin.com

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Food and Drink

- Mineral water
- Carbonated soft drinks
- Still drinks, sports drinks and juices
- Sauces, baby food, pastes and preserves
- Wines, beers and spirits
- Edible oils

Pharmaceutical/Medical

- Medicines
- Cough syrups
- Insulin dispensers
- Inhalers



Cosmetics

- Lipsticks
- Nail varnishes
- Deodorants and toiletries
- Creams (tubes and jars)

Household Chemicals

- Adhesives and glues
- Soaps and detergents
- Cleaning fluids - polishes, bleaches and disinfectants



Automotive/DIY/Gardening

- Motor oils
- Hydraulic fluids
- Solvents and thinners
- Timber preservatives
- Weedkillers, fungicides, insecticides and fertilizers