



DTM310 Dermal Torque Meter



General Information

Principal benefits

- Proven method for evaluating stratum corneum elasticity, hydration and friction
- Easily adjustable for study of different skin layers
- PC controlled for simple operation
- Support both constant and ramped torque protocols
- Advanced Windows application software featuring automated data analysis
- Lightweight design for hand held or bench mounted operation

Overview

The Dermal Torque Meter (DTM) has demonstrated the importance of mechanical properties as indicators of skin hydration and the integrity of the stratum corneum.

The DTM is one of the most sensitive and reliable instrument for evaluating the stratum corneum. The DTM is the instrument of choice for scientists studying this vital layer of the skin and assessing the impact of topical products, such as moisturisers on its mechanical properties. Other applications include assessment of frictional properties of products applied to the skin and ageing studies involving the analysis of mechanical properties of full skin thickness.

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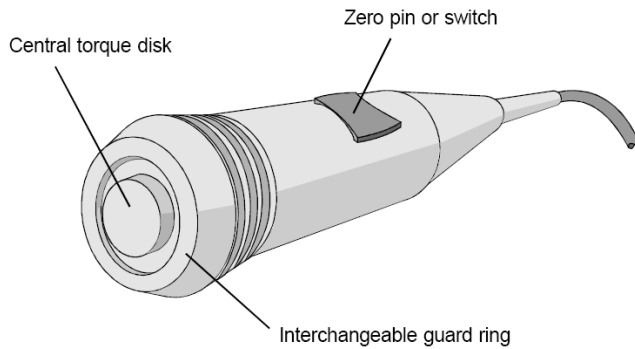
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Measurement Principle

In the mid 1980's research scientists at L'Oreal made a major breakthrough in the field of skin biomechanics. They developed a torsional method for measuring the visco-elastic properties of skin that could detect changes in mechanical properties induced by the hydrating effect of water and assess the moisturising properties of different cosmetic skin preparations.

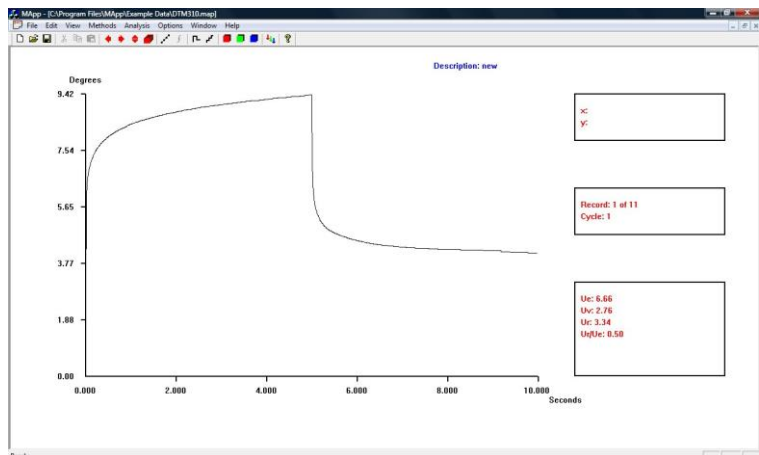


In the torsional method, a central disk is attached to the skin with adhesive tape and rotated under a predetermined torque. The amount of skin under examination is limited by a stationary guard ring that is attached by adhesive tape. The gap between the central disk and the concentric guard ring is of critical importance. When measuring the upper layer of skin, maximum sensitivity is achieved by restricting the gap to 1mm. For studies of full skin thickness, the gap is

increased to 5mm allowing the torsional forces to be applied to the deeper layers.

Much of the published work involves the use of protocols that apply a constant torque for a predetermined length of time (torque on) followed by a torque off period in which the force is rapidly released and the skin attempts to restore the distortion created by the torsional forces. The angular rotation of the torque disk is measured throughout this process.

When torque is applied to the skin, there is an initial rapid rotation followed by a slower exponential phase as the skin progressively resists the torsional forces. The initial rapid phase, which is referred to as U_e , is a measure of the extensibility of the skin and has been demonstrated to be useful as a measure of stratum corneum hydration (De Rigal & Leveque (1985), Bioeng. Skin 1, p13-23 and Challoner N.I. (1997), Cos & Tol, 112, 12, p51). Sophisticated



analysis algorithms have been applied to the curve data with a reported increase in the sensitivity of the method (Salter et al (1993), Int. Journ. of Cosmetic Science, 15 p200-218).

A further application of the DTM is in the measurement of skin friction (Gassenmeier et al (1998), Cos & Tol.113).



Specifications

| Programmable Features | |
|----------------------------|-----------|
| Torque Range | 1-30 mNm |
| Protocol | Cont/Ramp |
| Ramp Resolution | 0.1 mNm |
| Protocol duration: | |
| Torque on | Up to 30s |
| Torque off | Up tp 30s |
| Cycle repeats | 1 to 20 |
| Measurement Specifications | |
| Torque Resolution | 0.1 mNm |
| Angular Sensor | 0-20 deg. |
| Linearity | 0.5% |
| Angular Resolution | 0.02 deg. |
| Central Disk | 20mm |
| Ring Gaps | 1,3,5 mm |
| Data Acquisition | 300Hz |
| Physical Specifications | |
| Net Weight | 2.5kg |
| Total packed weight | 5kg |
| Control unit: | |
| Width | 300mm |
| Height | 90m |
| Depth | 260mm |
| General Specifications | |
| Power | 30W |
| Voltage | 90-260V |
| Universal input | 47-63Hz |
| Socket(s) | 1 |
| PC connection | USB |

The Dermal Torque Meter DTM310 consists of a mechanical probe, a control unit that connects to a PC via USB and a Windows application software called MApp.

The probe mass has been minimised for easy use in hand held operation and a parallel arm is available as an accessory for bench mounted use.

The instrument is operated by the MApp PC application software, compatible with other Dia-Stron skin instruments. The user can specify torque protocols using either constant or ramped torque methods. Each protocol may be repeated, without removing the probe from the test site, for up to 20 cycles. The software records data to hard disk, where analysis can be fully automated.

Option: Parallel Support Arm

The parallel support arm can be used with the DTM, Ballistometer or Translucency probes. It is intended to lower the probe vertically on to the test site with a controlled downward force.

The parallel action arm consists of a rigid parallelogram with a single counterbalance arm projecting to one side. Downward pressure is controlled by sliding the counter-balance weight along the counter-balance arm.

The support arm accessory has the following parts:

1. Parallel action probe support arm with bench super-clamp
2. Counter-balance weight
3. Probe adaptor

Content

DTM310 Probe
DMT Control Unit
USB Interface Cable
Power Supply
MApp Software CD