
DIA-STRON
DELIVERING MEASUREMENT SOLUTIONS
Skin Testing
Instrumentation

BLS780 Ballistometer

Overview

The BLS780 is based upon the traditional ballistometric principle of impacting an object at a constant force. This measures its firmness by indentation and dynamic resilience by the degree of rebound. The innovation in the Ballistometer arises from the inclusion of a torsional wire mechanism, which makes the instrument non-gravity dependant. The unique design of the Ballistometer allows the user to define the amount of energy put into the skin so that different layers may be studied.

Principle benefits:

- Works at any angle, non-gravity dependant
- Measures small, inaccessible test sites
- Tests for different materials
- Consistency with parallel support arm
- Bespoke software with automated analysis
- Lightweight and easy to transport

Applications and claims:

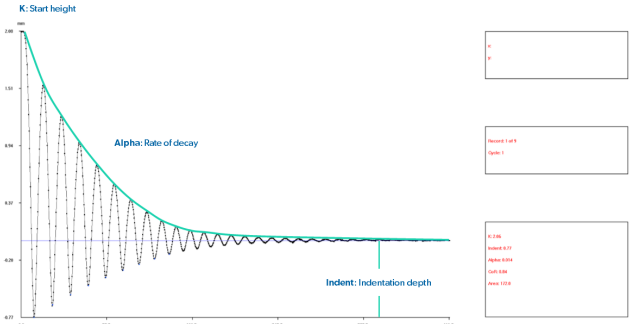
- Elasticity, firmness, hydration
- Anti-ageing product claims
- Cellulite related claims
- Evaluation of medical conditions; schleroderma and oedema
- Quality of wound formation; burn and scar healing

Metrology principle —

The Ballistometer consists of a slim line probe only 25cm long and a small control unit connected to a PC USB port. The probe contains a rigid low mass arm suspended at its balance point on a torsion wire. A ruby tipped stylus is fixed to one end. The arm is activated by a solenoid that elevates the probe tip from the test surface. On release, the arm oscillates around its balance position and the stylus bounces repeatedly on the test site before coming to rest. The position of the arm is monitored by an optical sensor and the positional data transmitted to the PC via the control unit.

The two main factors that influence the data are the impact force and the dynamic properties of the test site. The user can control the impact force of the stylus using a mechanical switch that is recessed into the Ballistometer probe. At any one setting the elevation and release of the arm generates a constant amount of kinetic energy so that the data is influenced only by the nature of the test site.

The Torsional Ballistometer has been used in applications to measure skin firmness, elasticity, hydration, anti-aging products, cellulite, in the evaluation of medical conditions such as scleroderma and oedema, and the quality of wound formation.



Control and analysis software —

The Ballistometer is supplied with Windows MApp software to control the instrument, to display the acquired data and to run the data analysis. The following relevant parameters are calculated.

- Indentation: the peak penetration depth of the probe tip beneath the skin level (skin datum)
- K: the start height of the probe tip above the skin surface. This is related to the energy stored in the torsion wire
- Alpha: the rate of energy damping. Large values indicate energy absorbing (in-elastic) samples
- Coefficient of Restitution—CoR: a high value indicates a highly elastic sample
- Area: the area between the bounce profile and the skin zero datum

The user can view the graphical display and the numerical parameters are calculated automatically and displayed on the screen. The analysed parameters and raw data can be exported into tab delimited text files.

References —

Publications:

- Langton, A.K., Graham, H.K., Griffiths, C.E.M., Watson, R.E.B. (2019), "Ageing significantly impacts the biomechanical function and structural composition of skin", Exp. Dermatol., 28:8, 981-984.
- Jongmi Lim, M.S., et al. (2019) "Antiaging and antioxidant effects of topical autophagy activator: A randomized, placebo-controlled, double-blinded study", Journal of Cosmetic Dermatology, 18:1, 197 -203
- Woo, M.S., Moon, K.J., Jung, H.Y., Park, S.R., Moon, T.K., Kim, N.S., Lee, B.C., (2014) "Comparison of skin elasticity test results from the Ballistometer ® and Cutometer ®", Skin Research and Technology, 20:4, 422-428
- Willard, J. (2012) "Mechano-modulation of Burn Wound Repair", Thesis, The Ohio State University

Examples of use in patent claims:

- WO2019245229A1 Cosmetic composition comprising nanoemulsion in which 7-dehydrocholesterol, cholesterol, and stearic acid encapsulated in internal phase of hyaluronic acid-ceramide np complex, Dec 2019 (Gowoon Sesang Cosmetic Co.)
- WO2017077497 Synergistic extract of Palmaria Palmata and Jasmine, compositions comprising same and uses thereof, May 2017 (Ashland)
- US20120115956 Use of isoleucine n-hexadecanoyl as a "volumizing" and/or "plumping" agent for human skin, May 2012 (Seppic)
- US7737179 Methods for treatment of dermatological conditions, June 2010 (Johnson and Johnson)

TLS850
Translucency Meter

Overview

Novel method for investigating translucent materials using a hand-held probe. Suitable for use with liquids, emulsions or solids such as skin.

Many common materials transmit and scatter light but are neither transparent (transmit a clear image), or opaque (transmit no light at all). Such materials are described as translucent and the degree of translucency depends on the absorption and scattering coefficients of the material.

Translucency is an important phenomenon in that it contributes to measurement errors using standard colorimeters or spectrophotometers and changes the 'appearance' of materials to the eye.

Applications and claims:

- Personal and beauty products: skin translucency, radiance
- Foods and beverages
- Plastics, diffusers
- Paints, inks and paper

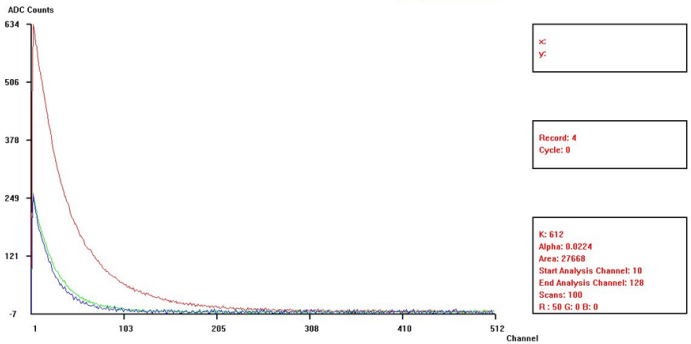
Metrology principle —

The TLS850 uses a novel method developed by Dia-Stron. A narrow light beam from an RGB LED source illuminates the test sample. Translucent materials scatter the light within the material, and a proportion of this scattered light is returned to the probe. Using a fibre optic faceplate (FOP), the object can be mapped, and the back-scattered light collected by the probe. The collected light can then be displayed on a computer as light level as a function of distance from the point of sample illumination.

The key feature is that only internally scattered light is collected—not light reflected from the surface as with conventional instruments. Translucency is quantified by the rate of lateral scatter of light and the total amount of back-scattered light. The measurements can be carried out using single colour mode of red, green or blue from the LED.

The hand-held probe consists of an RGB LED light source and a fibre optic faceplate to transmit back-scattered light to a NMOS photodiode array. The captured signal is digitised by a microprocessor and the data corrected for background lighting conditions. The results are transferred by a USB link to the MApp software for data collection, display and analysis.

A parallel support arm option can be used with both the BLS780 and TLS850. It is intended to lower the probe vertically on to the test site with a controlled downward force. A foot pedal is also available to trigger the data acquisition.



References —

Publications:

- Im Jang, S., Lee, M., Han, J. et al. (2020), "A study of skin characteristics with long-term sleep restriction in Korean women in their 40s", Skin Res. Technol., 26:2, 193-199
- Kim, M.A., Kim, E.J., Kang, B.Y. and Lee, H.K. (2017), "The effects of sleep deprivation on the bio-physical properties of facial skin", Journal of Cosmetics, Dermatological Sciences and Applications, 7:1, 34-47
- Hae-In Pyeon , Jia Bak, Jin-I Seok, Soojeong So, Hwa-Jin Suh, Mikyung Oh, Segi Kim, Chung-Eun Yang, Il Kyung Chung 5, Yun-Sik Choi (2017), "Effects of nano-sized bee pollen as a new cosmetic ingredient", Korea Institute of Dermatological Sciences, Asian J. Beauty Cosmetol., 15:1, 1-9.

Examples of use in patent claims:

- WO2019149450A1 Use of cyclic peptides in cosmetic, August 2019 (Sederma)
- WO2017103052A1 Cosmetic composition based on white pigments and spherical titanium dioxide aggregates, June 2017 (L'Oreal)

Technical Specifications

BLS780

Control Unit	
Net weight	2kg
Total weight with packaging	3kg
Control unit width	230mm
Control unit height	100mm
Control unit depth	120mm
Measurement Probe	
Probe length	250mm
Probe height	40mm
Probe width	50mm
Stylus energy adjustment	Manual
General Specifications	
Power	10W
Voltage Universal Input	90-260V 47-63Hz
Socket(s)	1
Computer connection	USB

Content

BLS780 Probe
BLS780 Control Unit
USB Interface Cable
Power Supply
MApp Software (Windows compatible)

Options

Foot pedal to initiate the acquisition
Parallel Support Arm

TLS850

Programmable Features	
Number of scans	1-10,000
Illumination	% R, G & B
Measurement protocol	RGB scan, R-G-B scans
Measurement Specifications	
LED	R, G & B
Diode array channels	512
FOB size	20mm
Physical Specifications	
Net weight	800g
Total packed weight	2kg
Probe unit (W x H x D)	80 x 35 x 200mm
General Specifications	
Power	10W
Voltage Universal Input	85-265V 47-63Hz
Socket(s)	1
Computer connection	USB

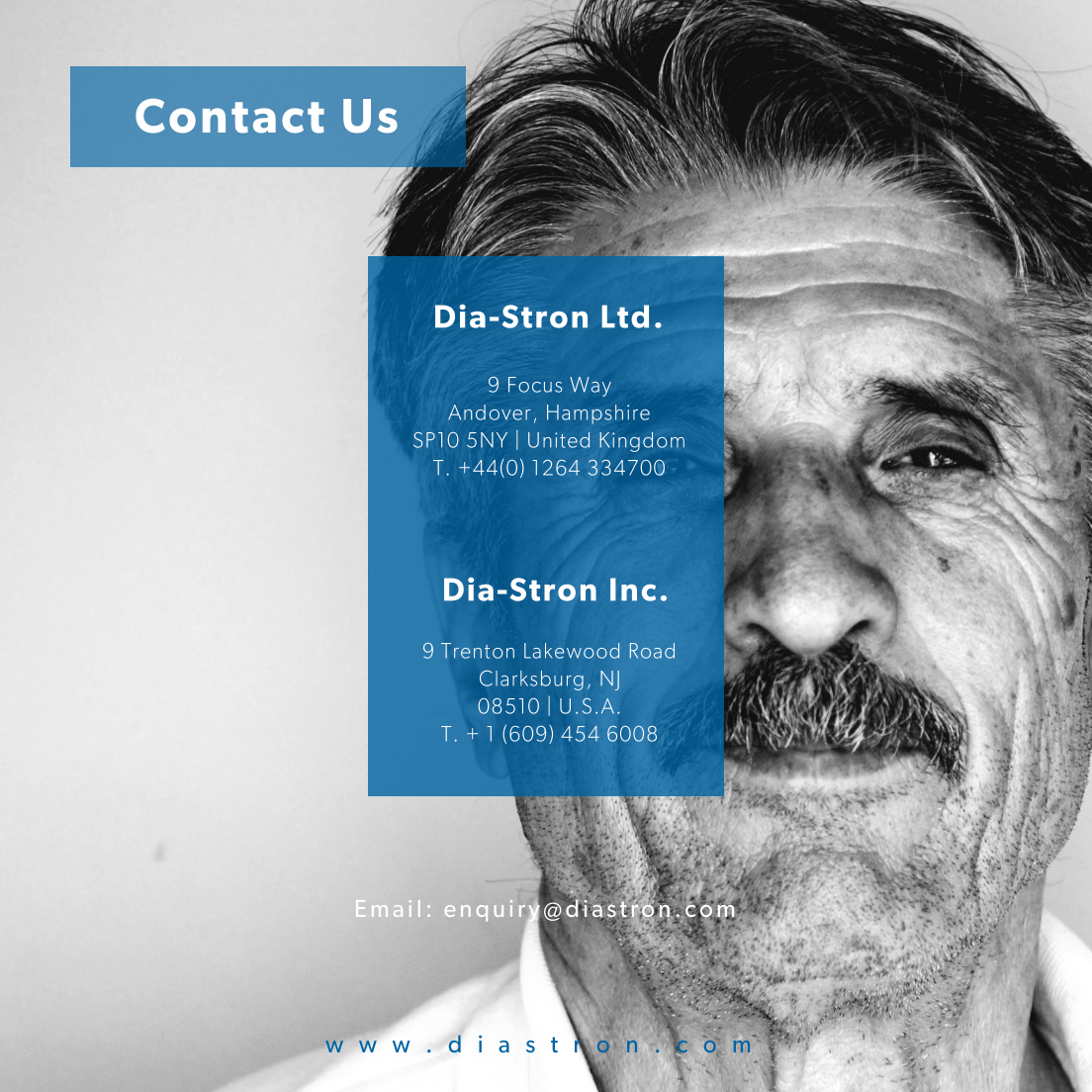
Content

TLS850 Probe
USB Interface Cable
Power Supply and Mains Cord
MApp Software (Windows compatible)

Options

Foot pedal to initiate the acquisition
Parallel Support Arm

Contact Us



Dia-Stron Ltd.

9 Focus Way
Andover, Hampshire
SP10 5NY | United Kingdom
T. +44(0) 1264 334700

Dia-Stron Inc.

9 Trenton Lakewood Road
Clarksburg, NJ
08510 | U.S.A.
T. + 1 (609) 454 6008

Email: enquiry@diastron.com

www.diastron.com